

# IBM Power 750 Express model E8D delivers unprecedented performance, scalability, reliability, and manageability for demanding commercial workloads

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## At a glance



The Power® 750 Express® server is a powerful 1- to 4-socket server that supports up to 32 cores with the configuration flexibility to meet today's growth and tomorrow's processing needs. The server features:

- Powerful POWER7+™ processors that offer 8- to 32-core configuration options: 8-, 16-, 24-, and 32-core 3.5 or 4.0 GHz configurations
- Up to 1024 GB of memory with four processor DCMs installed, optionally augmented with Active Memory™ Expansion
- Rich I/O options in the system unit:
  - Six PCIe 8X Gen2 slots in the system unit
  - Two GX++ slots for attaching up to four 12X PCIe I/O drawers or up to two EXP30 Ultra SSD I/O drawers
  - Six HDD/SSD SAS small form factor (SFF) bays and integrated SAS I/O controllers
  - Integrated Multifunction Card with four Ethernet, two USB, and one serial port
  - One hot-plug, slim-line, SATA media bay per system unit (optional)
- Service Processor
- Redundant hot-swap ac power supplies
- 19-inch rack-mount 5U configuration
- EnergyScale™ technology
- PowerVM® ( Express , Standard, or Enterprise)

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## Overview

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The Power 750 Express server (8408-E8D) supports up to four POWER7+ processor dual chip modules (DCMs). Each of the four processor DCMs is an 8-core DCM packaged with 2 x 4-core chips. All 8-core processor DCMs are either 3.5 or 4.0 GHz mounted on a dedicated card with a granularity of one DCM in a 19-inch rack-mount, 5U (EIA units) drawer configuration. Each POWER7+ processor DCM is a 64-bit, 8-core processor packaged on a dedicated card with a maximum of 64 DDR3 DIMMs, 10 MB of L3 cache per core, and 256 KB of L2 cache per core. A Power 750 Express server can be populated with one, two, three, or four DCMs providing 8, 16, 24, or 32 cores. All the cores are active.

The Power 750 Express server supports a maximum of 64 DDR3 DIMM slots, 16 per 8-core processor DCM. Memory features (two DIMMs per memory feature) supported are 8, 16, and 32 GB and run at speeds of 1066 MHz. A system with four DCMs installed has a maximum memory of 1024 GB. Also, the optional Active Memory Expansion can enable the effective maximum memory capacity to be much larger than the true physical memory. Innovative compression/decompression of memory content using a new hardware accelerator can allow memory expansion up to 125% for AIX® partitions. A server with a maximum of 1024 GB can effectively be expanded in excess of 2 TB. This can enhance virtualization and server consolidation by allowing more partitions or running more work with the same physical amount of memory.

The Power 750 Express server delivers great I/O expandability. In addition to the six PCIe Gen2 slots in the system unit, up to four 12X-attached I/O drawers (#5802 or #5877), add up to 40 PCIe Gen1 slots. This set of PCI slots can provide extensive connectivity to LANs, switches, SANs, asynchronous devices, SAS storage, tape storage, and more. For example, more than 64 TB of SAS disk storage is supported.

The Power 750 Express system unit includes six SFF SAS bays. This offers up to 5.4 TB HDD capacity or up to 3.6 TB SSD capacity. All SAS disks and SSDs are 2.5-inch SFF and hot swappable. The six SAS SFF bays can be split into two sets of three bays for additional configuration flexibility using just the integrated SAS adapters.

Two new SSD packages offer ordering convenience and price savings for a new server order. Each 6-pack SSD feature #ESR2/#ESR4 for the EXP30 Ultra SSD I/O Drawer can provide up to 140,000 I/O operations per second (IOPS) in just 1/5th of a 1U drawer. The 4-pack SSD features #ESRA/ESRB/ESRC/ESRD can provide up to 90,000 IOPS. 6-pack or 4-pack SSD must be ordered with the server, not as a later MES order.

Other integrated features include:

- Enhanced I/O bandwidth with PCIe Gen2 slots compared to the PCIe Gen1 and PCI-X slots of the POWER7® 750
- Enhanced I/O redundancy and flexibility with two new, integrated POWER7 + I/O controllers compared to the POWER7 750
- One hot-plug, One hot-plug, slim-line SATA media bay per system unit (optional)
- Redundant hot-swap ac power supplies
- Choice of Integrated Multifunction Card options (maximum one per system):
  - Dual 10 Gb Optical + Dual 1 Gb Ethernet (#1769)
  - Dual 10 Gb Copper + Dual 1 Gb Ethernet (#1768)
  - Dual 10 Gb Optical + Dual 1/10 Gb Ethernet (#EN11)
  - Dual 10 Gb Copper + Dual 1/10 Gb Ethernet (#EN10)
- One serial port per each Integrated Multifunction Card: two USB ports per each Integrated Multifunction Card plus another USB port on each system unit (maximum three usable USB ports per system)
- Service Processor
- EnergyScale technology

- Two SPCN ports and two hardware management console (HMC) ports (HMC is optional)
- Redundant and hot-swap power
- Redundant and hot-swap cooling
- 4-pack and 6-pack SSD features that can be ordered with a new server

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## Key prerequisites

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One of the following operating systems:

- IBM® AIX
- IBM i
- Linux™
- VIOS

For more information refer to the [Hardware requirements](#) and [Software requirements](#) sections.

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## Planned availability date

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- March 15, 2013, for model 8408-E8D

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## Description

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### Summary of features

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The following features are available on the Power 750 Express :

- One to four 8-core DCMs:
  - 8-core (2 x 4-core) 3.5 GHz processor DCM (#EPT8)
  - 8-core (2 x 4-core) 4.0 GHz processor DCM (#EPT7)
- POWER7+ DDR3 Memory DIMMs (two per feature):
  - 8 GB (2 x 4 GB), 1066 MHz (#EM08)
  - 16 GB (2 x 16 GB), 1066 MHz (#EM4B)
  - 32 GB (4 x 8 GB), 1066 MHz (#EM4C)
- Active Memory Expansion with POWER7+ hardware accelerator (#4792)
- Six hot-swappable, 2.5-inch, small form factor, SAS disks or SSD bays per system
- One hot-plug, slim-line, SATA media bay per enclosure (optional #EPTS)
- Redundant hot-swap 1,925 watts ac power supplies
- Choice of Integrated Multifunction Card options (maximum one per system):
  - Dual 10 Gb Optical + Dual 1 Gb Ethernet (#1769)
  - Dual 10 Gb Copper + Dual 1 Gb Ethernet (#1768)
  - Dual 10 Gb Optical + Dual 1/10 Gb Ethernet (#EN11)
  - Dual 10 Gb Copper + Dual 1/10 Gb Ethernet (#EN10)
- One serial port per each Integrated Multifunction Card: two USB ports per each Integrated Multifunction Card plus another USB port on each enclosure (maximum three usable USB ports per system)
- DASD/Media backplane with external SAS port, 6 x 2.5-inch DASD/SSD (#EPTS)
  - One to six SFF SAS DASD or SSDs (mixing allowed)
  - Two integrated SAS controllers to run SAS bays
  - One slim bay for a DVD-RAM (required)

- One integrated SATA controller to run the DVD-RAM
- Two HMC ports per enclosure (maximum four per system)
- Eight I/O expansion slots per system
  - Six Gen2 PCIe 8x slots plus two GX++ slots per enclosure
- Dynamic LPAR support, processor, and memory
- PowerVM (optional):
  - Micro-Partitioning®
  - Virtual I/O Server (VIOS)
  - Support for dedicated and shared processor logical partition (LPAR) groups
  - Support for manual provisioning of resources partition migration ( PowerVM - Enterprise Edition)
- Optional PowerHA® for AIX , IBM i, and Linux
- 12X I/O drawer with PCIe slots for 16-core or larger Power 750:
  - Up to four PCIe I/O drawers (#5802 or #5877)
- Disk/SSD-only I/O drawers:
  - Up to 32 EXP24S SFF SAS I/O drawers (#5887) on SAS PCIe controller (optionally one of the 32 drawers can be attached to the external SAS port of the system unit)
  - Up to 27 EXP12S 3.5-inch SAS I/O drawers (#5886) on SAS PCIe controllers (supported but not orderable)
  - Up to two EXP30 Ultra SSD I/O drawers (#EDR1) with integrated, high-performance SAS controllers
- 5U (EIA units) 19-inch, rack-mount drawer configuration
- IBM Systems Director Active Energy Manager™

## Processors

- Each system must have a minimum of one processor DCM (eight cores).
- There is a maximum of four processor DCMs (32 cores).
- If you have more than one processor DCM in one server, then all processor DCM features must be identical: all 3.5 GHz processor DCM (#EPT8) or all 4.0 GHz processor DCM (#EPT7).
- All the cores must be activated using #EPTE or #EPTF.
- All processor DCMs are placed on a mandatory Processor and Memory Backplane (#EPT1).
- A minimum of 8 GB per core is required to use #EPTE or #EPTF 0\$ 1-core activation features.

## Memory

Summary configuration considerations:

- Power 750 memory is ordered using memory features that ship two DDR3 1066 MHz DIMMs per feature.
  - 8 GB (2 x 4 GB DIMMs)(#EM08)
  - 16 GB (2 x 8 GB DIMMs)(#EM4B)
  - 32 GB (2 x 16 GB DIMMs)(#EM4C)
- The DIMMs are plugged into memory riser cards (#EM01) located on the Processor and Memory Backplane (#EPT1). Each riser card has eight DIMM slots.
- Two memory riser cards (16 DIMM slots) must be installed per each installed DCM. Thus, there are two, four, six, or eight riser cards depending on if there are one, two, three, or four processor DCMs.
- The maximum system memory for each number of DCMs is the following:
  - Four processor DCMs: 1024 GB, 64 DIMMs x 16 GB/DIMM (32 x #EM4C)
  - Three processor DCMs: 768 GB (24 x #EM4C)

- Two processor DCMs: 512 GB (16 x #EM4C)
- One processor DCM: 256 GB (8 x #EM4C)
- Additional memory configuration details:
  - Each installed DCM is serviced exclusively by each of its two associated memory riser cards.
  - The minimum system memory with one processor DCM is 32 GB (2 x #EM4B, 4 DIMMs or 4 x #EM08, 8 DIMMs).
  - The minimum system memory with two processor DCMs is 32 GB (4 x #EM08, 8 DIMMs).
  - The minimum system memory with three processor DCMs is 48 GB (6 x #EM08, 12 DIMMs).
  - The minimum system memory with four processor DCMs is 64 GB (8 x #EM08, 16 DIMMs).
- Each riser card must have at least one memory feature code (two identical DIMMs)
- A memory riser card can have two, four, six, or eight DIMMs ordered by one, two, three, or four memory features. All the memory features can be the same in the riser card or up to two different size memory features can be used in the same riser card. If using two different size memory features, valid examples per riser card are:
  - Four DIMMs total: quantity of one memory feature code plus quantity one of any other memory feature
  - Six DIMMs total: quantity of one memory feature code plus quantity two of any other memory feature
  - Eight DIMMs total: quantity of two of one memory feature code plus quantity of two of any other memory feature

Invalid examples using more than one memory size feature are:

  - More than two sizes of memory features (example: 8 GB plus 16 GB plus 32 GB in one riser)
  - Quantity three of one memory feature plus quantity one of another memory feature; use two sets of two features instead of this mixture for 8 DIMMs
- Different system memory feature numbers can be mixed on each of the two memory riser cards associated with each DCM. Likewise, riser cards on multiple processor DCMs can have the same or different memory features.
- IBM recommends for better performance that the quantity of DIMMs should be evenly distributed across each of the riser cards. Also, IBM recommends the total quantity of GB on each riser card should be balanced as much as possible. Where possible, avoid having one riser card with more than twice the GB of another riser card on the server. These are general performance recommendations, not mandatory configuration rules, and the first recommendation is typically more significant than the second recommendation.
- The eight DIMM slots in a riser card are labeled C1, C2, C3, C4, C5, C6, C7, and C8. DIMM placement rules:
  - The DIMMs in C1 and C3 must be identical. Similarly, the DIMMs in C2 and C4 must be identical and C5 and C7 must be identical and C6 and C8 must be identical.
  - The four DIMMs if present in C1/C2/C3/C4 must be identical in a riser card. The four DIMMs if present in C5/C6/C7/C8 must be identical in a riser card.

The minimum defined configuration in eConfig, if no choice is made, when AIX or Linux is the primary operating system is:

Feature number	Description
EPT8	8-core 3.5 GHZ POWER7+ Processor
EPT1	Processor & Memory Backplane
EPTR	Service Processor
8 x EPTF	8 Processor Activations
2 x EM4B	32 GB Memory
2 x EM01	Memory Riser Card

EPTS	Storage Backplane
1768	Integrated Multifunction Card
1886	146.8 GB 15k SFF DASD
2 x 5532	Two 1,925 watt ac power supplies, base
5771	SATA DVD-RAM
9300/97xx)	Language Group Specify
2146 or 2147	Primary Operating System Indicator - IBM AIX (#2146) or Linux (#2147)
2 x 6xxx	Two Power Cords

**Note:** No internal DASD is required if feature 0837 (Boot from SAN) is selected. A Fibre Channel adapter or Fibre Channel over Ethernet must be ordered if feature 0837 is selected.

The minimum defined configuration in eConfig, if no choice is made, when IBM i is the primary operating system is:

Feature number	Description
EPT8	8-core 3.5 GHZ POWER7+ Processor
EPT1	Processor & Memory Backplane
EPTR	Service Processor
8 x EPTF	8 Processor Activations
2 x EM4B	32 GB Memory
2 x EM01	Memory Riser Card
EPTS	Storage Backplane
1768	Integrated Multifunction Card is optional (VIOS support only)
2 x 1888	139.5 GB 15k SFF DASD (Not required if SAN is chosen)
2 x 5532	Two 1,925 watt ac power supplies, base
5771	SATA DVD-RAM
9300/97xx)	Language Group Specify
2145	Primary Operating System Indicator - IBM i
0040	Mirrored System Disk Level Specify Code
0567	IBM i 7.1, or later
0837	SAN Load Source Specify (Boot from SAN) (If SAN is chosen, does not require two disk drives)
5553	System Console - Internal LAN
2 x 6xxx	Two Power Cords

**Note:** The Ethernet ports and serial port of the Integrated Multifunction Card is not natively supported by IBM i and thus cannot be used for IBM i LAN console support. The 4-port Ethernet adapter (#5899) is usually used with this function or an optional HMC can be used for IBM i console functions.

**Note:** No internal DASD is required if feature 0837 (Boot from SAN) is selected. A Fibre Channel or Fibre Channel over Ethernet adapter must be ordered if feature 0837 is selected.

### I/O drawer availability

- It is recommended that any attached I/O drawers be located in the same rack as the Power 750 Express server for ease of service, but they can be installed in separate racks if the application or other rack content requires it.
- The following list shows the I/O drawers that are supported or available on the model E8D, with the correct interface to use for each of the drawers and the maximum number of attached I/O drawers:

Feature	Order description	Status	Interface	Maximum number
5802	PCIe 12X I/O w/Disks Drawer (disk bays)	Available	12X	4
5877	PCIe 12X I/O No Disk Drawer (no disk bays)	Available	12X	4
5887	EXP24S SFF Gen2-bay Drawer	Available	SAS	51
EDR1	EXP30 ultra SSD I/O Drawer	Available	PCIe	2
5886	EXP12S SAS Disk Drawer	Supported	SAS	27

**Note:** Two or more processor DCMs are required in order to attach a #5802, #5877, or #EDR1.

## Additional I/O drawer information

- The PCIe 12X I/O Drawer (#5802 and #5877) is a 19-inch I/O and storage drawer. Feature 5802 provides a 4 EIA unit tall drawer containing 10 PCI-E-based I/O adapter slots and 18 SAS hot-swap small form-factor disk bays, which can be used for either disk drives or SSD, organized into two groups of nine. Each group of disk slots is controlled by one or two PCIe SAS storage adapters located in a PCIe slot in the same feature 5802 as the SAS drives. A maximum of two feature 5802 drawers can be placed on the same 12X loop. Feature 5877 is the same as feature 5802, except it does not contain any SAS bays. Feature 5877 can be on the same loop as feature 5802. Feature 5877 cannot be upgraded to feature 5802.

The physical dimensions of the drawer measure 444.5 mm (17.5 in) wide by 177.8 mm (7.0 in) high by 711.2 mm (28.0 in) deep for use in a 19-inch rack. The adapter slots use blind swap cassettes and support hot plugging of adapter cards. A minimum configuration of two 12X DDR cables, two ac power cables, and two SPCN cables is required to ensure proper redundancy. The drawer attaches to the host CEC system unit with a 12X adapter in a GX slot via 12X DDR cables available in different cable lengths: 0.6 (#1861), 1.5 (#1862), 3.0 (#1865), or 8 meters (#1864). The 12X SDR cables are not supported.

- The EXP24S SFF Gen2-bay Drawer (#5887) is an expansion drawer with twenty-four 2.5-inch form factor SAS bays. Slot filler panels are included for empty bays when initially shipped. A feature 5887 supports up to 24 hot-swap SFF SAS hard disk drives (HDD) or solid state drives (SSD). It uses only 2 EIA of space in a 19-inch rack. The EXP24S includes redundant ac power supplies and two power cords. The EXP24S SFF bays use Gen2 or SFF-2 SAS bays that are not compatible with CEC SFF Gen1 SAS bays or with feature 5802 or 5803 SFF SAS bays.

With AIX , Linux , and VIOS, the EXP24S can be ordered with four sets of six bays, two sets of 12 bays, or one set of 24 bays (mode 4, 2, or 1). With IBM i, the EXP24S can be ordered as one set of 24 bays (mode 1).

The EXP24S SAS ports are attached to an SAS controller that can be an SAS PCIe adapter or pair of adapters. The EXP24S can also be attached to an imbedded SAS controller in a server with an imbedded SAS port or to the integrated SAS controllers in the EXP30 Ultra SSD I/O Drawer. Attachment between the SAS controller and the EXP24S SAS ports is via the appropriate SAS Y or X or EX cables.

## 12X I/O drawer cables

- The #5802/#5877 I/O drawers are connected to the GX++ adapters in the CEC system unit with 12X DDR cables. 12X DDR cables available in different cable lengths: 1.5 (#1862), 3.0 (#1865), or 8 meters (#1864).
- The first 12X I/O drawer attached in any I/O drawer loop requires two 12X DDR cables. If a second 12X drawer is used on the I/O loop, one additional 12X DDR cable is required.
- The first 12X I/O drawer attached to a system unit requires two power control cables. Each additional 12X I/O drawer added to a system requires one additional power control cable. Each system has one power control loop. All I/O drawers attached to a system are included in the same power control loop. Power control cable loops are different in this regard from 12X DDR cable loops.

EXP30 Ultra SSD I/O Drawer (#EDR1) is a 1U high I/O drawer that provides 30 hot-swap SSD bays and a pair of integrated large write cache, high-performance SAS controllers. Ultrahigh levels of performance are offered without using any PCIe slots on the POWER7 server in an ultradense packaging design. The two high-performance, integrated SAS controllers each physically provide 3.1 GB write cache. Working as a pair, they offer mirrored write cache data and controller redundancy. The cache contents are designed to be protected by built-in flash memory in case of power failure. If the pairing is broken, write cache is not used after existing cache

content is written out to the drive and performance will probably be slowed until the controller pairing is reestablished.

Each controller is connected to a GX++ PCIe adapter in a server (for example, #1914) over a PCIe x8 cable such as #EN05, #EN07, or #EN08. Usually both controllers are attached to one server, but each controller can be assigned to a different server or partition or VIOS. Active/Active capability is supported assuming at least two RAID arrays. The controllers deliver RAID 0, RAID 5, RAID 6, and RAID 10 for AIX, Linux, and VIOS. The controllers provide RAID 5 and RAID 6 for IBM i. AIX, IBM i, Linux, and VIOS also offer OS mirroring (LVM).

The SAS controllers' CCIN is 57C3. eMLC SSDs designed to fit in the Ultra drawer bays, such as the 387 GB SSD (#ES02 or #ES04), are used. A minimum of six SSDs are required in each Ultra drawer. Each controller can access all 30 SSD bays.

The EXP12S SAS Drawer (#5886) is a 2 EIA tall drawer and mounts in a 19-inch rack. The drawer can hold either SAS disk drives or SSDs. The drawer is 511.05 mm (20.12 in) long and can weigh up to 18.14 kg (40 lb) without SAS drives. The EXP12S SAS drawer has twelve 3.5-inch SAS bays with redundant data paths to each bay. The drawer supports redundant hot-plug power and cooling and redundant hot-swap SAS expanders (Enclosure Services Manager, or ESM). Each ESM has an independent SCSI Enclosure Services (SES) diagnostic processor.

The SAS disk drives or SSDs contained in the EXP12S are controlled by one or two PCIe SAS adapters connected to the EXP12S via SAS cables. The SAS cable will vary depending on the adapter being used, the operating system being used, and the protection that you need.

A second EXP12S drawer can be attached to another drawer using two SAS EE cables, providing 24 SAS bays instead of 12 bays for the same SAS controller port. This is called *cascading*. In this configuration, all 24 SAS bays are controlled by a single controller or a single pair of controllers.

The feature 5886 can also be directly attached to the SAS port on the rear of the Power 750 Express, giving you a very low-cost disk storage solution. When used this way, the embedded SAS RAID controllers augmented by the 175 MB Cache RAID - Dual IOA Enablement Card (#5662) in the system unit control the disk drives in EXP12S. A second unit cannot be cascaded to a feature 5886 attached in this way.

## 19-inch racks

The 8408-E8D and its I/O drawers are designed to mount in the 7014-T00, 7014-T42, 7014-B42, feature 0551, and feature 0553 racks. These are built to the 19-inch EIA standard. When ordering a new 8408 system, you can order the appropriate 7014 rack model with the system hardware on the same initial order. IBM also makes the racks available as features of the 8408-E8D when you order additional I/O drawer hardware for an existing system (MES order). The rack features 0551 and 0553 should be used if you want IBM to integrate the newly ordered I/O drawer in a 19-inch rack before shipping the MES order.

The 8408-E8D has the following rack requirements:

- The Power 750 Express can be ordered without a rack.
- The Power 750 Express consists of one CEC system unit that requires 5U of vertical rack space.
- The 36 EIA unit (1.8 meter) rack (#0551) and the 42 EIA unit (2.0 meter) rack (#0553) are available for order on MES upgrade orders only. For initial system orders, the racks should be ordered as machine type 7014-T00 or T42.
- When a Power 750 Express server is installed in a 7014-T00 or 7014-T42 rack that has no front door, you must order a Thin Profile Front Trim Kit for the rack. The required trim kit for the 7014-T00 rack is feature number 6263. The required trim kit for the 7014-T42 rack is feature number 6272.
- Acoustic door features are available with the 7014-T00 (feature 0551) and 7014-T42 (feature 0553) racks to meet the lower acoustic levels identified in the physical specifications section. You can order the acoustic door feature on new



7014-T00 (feature 0551), 7014-T42 (feature 0553) racks, or for the 7014-T00 (feature 0551) or 7014-T42 (feature 0553) racks that you already own.

- A Power 750 Express door (#ERG7) is available on the 7014-T42 rack.

## Integrated I/O

- The Power 750 Express CEC drawer ( AIX or Linux ) must contain one Integrated Multifunction Card (#1768, #1769, #EN10, or #EN11).
- The card's Ethernet ports cannot be used for an IBM i console. Separate Ethernet adapters such as #5899 that can be directly controlled by IBM i without VIOS should be used for IBM i LAN consoles, if needed. Alternatively, an HMC can also be used for an i console.
- Each card has four Ethernet ports, two USB ports, and one serial port. Usage of the serial port by AIX or Linux is supported for modem call home, TTY console, and snooping even if an HMC or SDMC is attached to the server, unlike the earlier Power 750 Express server (8233-E8B). Using the serial port to communicate with a UPS is not supported. If IBM i needs to communicate through a serial connection to a UPS, a #5802 or #5877 I/O drawer's serial port is required.

## I/O slots and adapters

- Each Power 750 Express CEC system unit has six full-length, 8X PCIe Gen2 slots, two GX++ slots, and a multifunction card slot. The GX++ slots are enabled if two or more processor DCMs are installed.
- Extensive configuration rules and checking procedures are incorporated into the marketing configurator eConfig to help ensure a valid system configuration.
- The maximum feature limits in the feature descriptions of this document for adapters and devices may not provide optimal system performance. These limits are given to assist with connectivity and functional assurance. The maximum values shown here apply to the features installed in the system unit. Adding remote I/O drawers will increase these limits. Adding 12X-attached I/O drawers or an Ultra SSD I/O drawer will increase these limits for servers that have two or more processor DCMs.

## Power

Two ac power supplies are required for each CEC system unit; the second power supply provides redundant power for enhanced system availability. A CEC system unit is designed to function with one working power supply. A failed power supply can be hot swapped but must remain in the system until the replacement power supply is available for exchange.

## Power distribution units

For systems installed in IBM 7014 or feature 055x racks, the following power distribution unit (PDU) rules apply (not all PDUs are available in all models of the 7014 or #055x):

- For PDU feature numbers 7188 and 7109 when using power cord feature numbers 6654, 6655, 6656, 6657, or 6658
- For PDU feature numbers 7188 and 7109 when using power cord feature numbers 6489, 6491, 6492, or 6653

To better enable electrical redundancy, each server drawer has two power supplies that must be connected to separate PDUs.

## Hot-plug options

- The following options are hot-plug capable:
  - System ac power supplies: one functional power supply must remain installed at all times while the system is operating.
  - Disk drives and SSD in SAS bays.
  - Most PCIe adapters.

- Media devices.
- For information on hot-plug procedures, visit Customer Information Center at <http://pic.dhe.ibm.com/infocenter/powersys/v3r1m5/topic/p7hbm/p7hbm.pdf>
- If the system boot device or system console is attached using an I/O adapter feature, that adapter may not be hot-plugged.

### Logical partitioning

- Without PowerVM , dynamic logical partitioning (LPAR) enables one partition per processor core.
- With PowerVM , up to 20 partitions are allowed per processor core. Logical partitioning is supported when PowerVM (#7942 or #7995) is ordered.

### Available backplane configurations

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The 750 CEC drawer has an extremely flexible and powerful backplane for supporting disk or SSDs. The six SFF bays can be configured in three different ways to match your business needs. Two built-in SAS controllers can be optionally augmented with a 175 MB Cache RAID Battery Card. Two embedded SAS disk/SSD controllers are provided for redundancy or for additional flexibility. The optional 175 MB Cache RAID - Dual IOA Enablement Card feature (#5662) enables dual 175 MB write cache and includes dual batteries for protection of that write cache.

The backplane can be configured as one set of six bays, two sets of three bays (3/3), or three sets of two bays (2/2/2). Configuration options will vary depending upon the controller options and the operating system selected. The controllers for the six-bay or 3/3 configurations are always the two pairs of embedded controllers. If the 2/2/2 configuration is used, the two embedded controllers run the first two sets of bays (2/2) and a feature 5901 PCIe SAS adapter located in a PCIe slot in a CEC system unit controls the third set (2). By having three controllers, you can have three boot drives supporting three partitions.

The following SSD/HDD configuration rules apply:

- You can mix SSD and HDD drives when configured as one set of six bays.
- To have both SSDs and HDDs within a 3/3 split configuration, you must use the same type of drive within each set of three. You cannot mix SSDs and HDDs within a subset of three bays.
- To have both SSDs and HDDs within a 2/2/2 split configuration, you must use the same type of drive within each set of two. You cannot mix SSDs and HDDs within a subset of two bays. The feature 5901 PCIe SAS adapter that controls the remaining two bays in a 2/2/2 configuration does not support SSDs.

You can configure the two embedded controllers together as a pair for higher redundancy or you can configure them separately. If you configure them separately, they can be owned by different partitions or they could be treated independently within the same partition. If configured as a pair, they provide controller redundancy and can automatically switch over to the other controller if there are problems with one of the controllers. Also, if configured as a pair, both can be active at the same time (active/active) assuming there are two or more arrays configured, providing additional performance capability as well as redundancy. If configured as a pair, the pair controls all six SFF bays and all six drives. The 3/3 or 2/2/2 configurations are not used with the paired controllers. RAID 0 and RAID 10 are supported, and you can also mirror two sets of controller/drives using the operating system.

Adding the optional 175 MB Cache RAID - Dual IOA Enablement Card (#5662) causes the pair of embedded controllers in that processor system unit to be configured as dual controllers accessing all six SAS bays. Without the feature 5662, each of the two controllers can access only two or three SAS bays. With the 175 MB Cache RAID - Dual IOA Enablement Card, you can get controller redundancy, additional RAID protection options, and additional I/O performance. RAID 5 (a minimum of three drives required) and RAID 6 (a minimum of four drives required) are available when configured as dual controllers with one set of six bays.

Another expansion option available using the paired embedded controller configuration with the 175 MB Cache RAID - Dual IOA Enablement Card feature is an SAS expansion port. The SAS expansion port can add more SAS bays to the six bays in the system unit. A feature 5887 SAS disk drawer in mode 1 can be attached using a SAS port on the rear of the processor drawer, and its 24 SAS bays are run by the pair of embedded controllers. The pair of embedded controllers are now running 30 SAS bays (six SFF bays in the system unit and 24 SFF bays in the drawer). The disk drawer is attached to the SAS port with an SAS YI cable and the embedded controllers connected to the port using a feature 1819 cable assembly. In this 30-bay configuration, all drives must be HDDs. A feature 5886 SAS disk drawer can similarly be configured in place of the #5887 drawer.

IBM i supports configurations using one set of six bays but does not support logically splitting the backplane into 3/3 or 2/2/2. Thus, the 175 MB Cache RAID - Dual IOA Enablement Card (#5662) is required if IBM i is to access any of the SAS bays in that processor enclosure. AIX, Linux, and VIOS support configurations using two sets of three bays (3/3) or three sets of two bays (2/2/2) without feature 5662 and supports dual controllers running one set of six bays with feature 5662.

The system backplane also includes a third embedded controller for running the DVD-RAM drive in the CEC drawer. Because the controller is independent from the two SAS disk/SSD controllers, it allows the DVD to be switched between multiple partitions without affecting the assignment of disks or SSDs in the CEC drawer.

### **Disks, media, and boot devices/Load source devices**

- A device capable of reading a DVD must be in the system or attached to the system. It must be available to perform operating system installation, maintenance, problem determination, and service actions such as maintaining system firmware and I/O microcode at their latest levels. Alternatively for AIX or VIOS, a network with an AIX or VIOS NIM server configured to perform these functions can be used. Alternatively for IBM i, its network install capability can be used to avoid multiple DVDs on a server.
- The Power 750 Express can support one DVD drive in the system unit. Other DVD drives can be attached externally to the system unit.
- System boot/load source is supported via DASD or SSD located in the CEC enclosure, located in an I/O drawer such as a #5887 EXP24S, an #5802 12X I/O drawer, an EXP30 Ultra SSD I/O Drawer, or PCIe RAID and SSD SAS Adapter. For AIX/VIOS boot drives, a network attached via LAN adapters can also be used. System boot/load source can also be done from a SAN.
- The minimum system configuration requires at least one SAS HDD or SSD in the system for AIX, Linux, or VIOS and two for IBM i. Or if using a Fibre Channel attached SAN indicated by feature number 0837, an HDD/SSD is not required. Attachment of the SAN using a Fibre Channel over Ethernet connection is also supported.
- The model E8D supports both 3.5-inch and 2.5-inch SAS DASD hard disk drives (HDD). The 2.5-inch (SFF) HDD can either be mounted in the system unit or in the EXP24S SFF Gen2-bay Drawer (#5887) or in an #5802 12X I/O Drawer. The 3.5-inch DASD hard disks can be attached to the model E8D but must be located in a EXP12S I/O drawer (#5886).

### **Capacity Backup offering (applies to IBM i only)**

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The Power 750 Express systems Capacity Backup (CBU) designation can help meet your requirements for a second system to use for backup, high availability, and disaster recovery. It enables you to temporarily transfer IBM i processor license entitlements and 5250 Enterprise Enablement entitlements purchased for a primary machine to a secondary CBU-designated system. Temporarily transferring these resources instead of purchasing them for your secondary system may result in significant savings. Processor activations cannot be transferred.

The CBU specify feature number 0444 is available only as part of a new server purchase of a 8408-E8D. Certain system prerequisites must be met, and system

registration and approval are required before the CBU specify feature can be applied on a new server.

Standard IBM i terms and conditions do not allow either IBM i processor license entitlements or 5250 OLTP (Enterprise Enablement) entitlements to be transferred permanently or temporarily. These entitlements remain with the machine they were ordered for. When you register the association between your primary and on-order CBU system, you must agree to certain terms and conditions regarding the temporary transfer.

After a CBU system designation is approved and the system is installed, you can temporarily move your optional IBM i processor license entitlement and 5250 Enterprise Enablement entitlements from the primary system to the CBU system when the primary system is down or while the primary system processors are inactive. The CBU system can then better support fail-over and role swapping for a full range of test, disaster recovery, and high availability scenarios. Temporary entitlement transfer means that the entitlement is a property transferred from the primary system to the CBU system and may remain in use on the CBU system as long as the registered primary and CBU system are in deployment for the high availability or disaster recovery operation.

The primary system for a Power 750 Express server can be:

- 9117-MMA
- 9406-MMA
- 9117-MMB
- 9117-MMC
- 9117-MMD
- 9179-MHB
- 9179-MHC
- 9179-MHD
- 8233-E8B
- 8408-E8D
- 9109-RMD
- 9409-M50
- 8204-E8A
- 8234-EMA
- 8205-E6B
- 8205-E6C
- 8205-E6D

These systems have IBM i software licenses with an IBM i P20 software tier, or higher. The primary machine must be in the same enterprise as the CBU system.

Before you can temporarily transfer IBM i processor license entitlements from the registered primary system, you must have more than one IBM i processor license on the primary machine and at least one IBM i processor license on the CBU server. You may then transfer any IBM i processor entitlements above the minimum one, assuming the total IBM i workload on the primary system does not require the IBM i entitlement you would like to transfer during the time of the transfer. During this temporary transfer, the CBU system's internal records of its total number of IBM i processor license entitlements are not updated, and you may see IBM i license noncompliance warning messages from the CBU system. Such messages that arise in this situation do not mean you are not in compliance.

Before you can temporarily transfer 5250 entitlements, you must have more than one 5250 Enterprise Enablement entitlement on the primary server and at least one 5250 Enterprise Enablement entitlement on the CBU system. You may then transfer

the entitlements that are not required on the primary server during the time of transfer and that are above the minimum of one entitlement.

For example, if you have an 8-core Power 750 Express as your primary system with four IBM i processor license entitlements (three above the minimum) and two 5250 Enterprise Enablement entitlements (one above the minimum), you can temporarily transfer up to three IBM i entitlements and one 5250 Enterprise Enablement entitlement. During the temporary transfer, the CBU system's internal records of its total number of IBM i processor entitlements is not updated, and you may see IBM i license noncompliance warning messages from the CBU system.

If your primary or CBU machine is sold or discontinued from use, any temporary entitlement transfers must be returned to the machine on which they were originally acquired.

For CBU registration and further information, visit

<http://www.ibm.com/systems/power/hardware/cbu>

## **Active Memory Expansion**

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Active Memory Expansion is an innovative POWER7+ and POWER7 technology that allows the effective maximum memory capacity to be much larger than the true physical memory maximum. POWER7+ chips contain a hardware accelerator, which handles much of the compression/decompression of memory content, can enable memory expansion up to 125%, about 25% more than POWER7 chips. This can enable an AIX partition to do significantly more work or support more users with the same physical amount of memory. Similarly, it can enable a server to run more partitions and do more work for the same physical amount of memory.

Active Memory Expansion uses CPU resource to expand memory capacity. The trade-off of memory capacity for processor cycles can be an excellent choice, but the degree of expansion varies on how compressible the memory content is. It also depends on having adequate spare CPU capacity available for this expansion overhead. Tests in IBM laboratories using sample workloads showed excellent results for many workloads in terms of memory expansion per additional CPU utilized. Other test workloads had more modest results.

You have a great deal of control over Active Memory Expansion usage. Each individual AIX partition can turn Active Memory Expansion on or off. Control parameters set the amount of expansion you need in each partition to help control the amount of CPU used by the Active Memory Expansion function. An IPL is required for the specific partition that is turning on memory expansion. After it is turned on, monitoring capabilities are available in standard AIX performance tools such as `lparstat`, `vmstat`, `topas`, and `svmon`.

A planning tool is included with AIX, enabling you to sample actual workloads and estimate both how expandable the partition's memory is and how much CPU resource is needed. Any Power Systems™ model can run the planning tool. In addition, a one-time, 60-day trial of Active Memory Expansion is available to enable more exact memory expansion and CPU measurements. You can request the trial using the Capacity on Demand web page

<http://www.ibm.com/systems/power/hardware/cod/>

Active Memory Expansion is enabled by chargeable hardware feature 4791, which can be ordered with the initial order of the server or as an MES order. A software key is provided when the enablement feature is ordered, which is applied to the server. An IPL is not required to enable the server. The key is specific to an individual server and is permanent. It cannot be moved to a different server.

The additional CPU resource used to expand memory is part of the CPU resource assigned to the AIX partition running Active Memory Expansion. Normal licensing requirements apply.

## **IBM i operating system**

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For clients loading the IBM i operating system, the four-digit numeric QPRCFEAT value used on the 8408-E8D is the same as the four-digit numeric feature number for the processors used in the system. For example, if the processor feature number in a system is EPT8, the QPRCFEAT value for the system would be EPT8. The QPRCFEAT value in a Power 750 Express server does not change with the addition of more processors DCMs.

## **Reliability, fault tolerance, and data correction**

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The reliability of systems starts with components, devices, and subsystems that are designed to be fault-tolerant. POWER7+ uses lower voltage technology, improving reliability with stacked latches to reduce soft error (SER) susceptibility. During the design and development process, subsystems go through rigorous verification and integration testing processes. During system manufacturing, systems go through a thorough testing process to help ensure the highest level of product quality.

The system cache and memory offer ECC (error checking and correcting) fault-tolerant features. ECC is designed to correct environmentally induced, single-bit, intermittent memory failures and single-bit hard failures. With ECC, the likelihood of memory failures will be substantially reduced. ECC also provides double-bit memory error detection that helps protect data in the event of a double-bit memory failure.

The AIX and IBM i operating systems provide disk drive mirroring and disk drive controller duplexing. The Linux operating system supports disk drive mirroring (RAID 1) through software, while other RAID protection schemes are provided via hardware RAID adapters.

The Journaled File System, also known as JFS or JFS2, helps maintain file system consistency and reduces the likelihood of data loss when the system is abnormally halted due to a power failure. JFS, the recommended file system for 32-bit kernels, now supports extents on the Linux operating system. This feature is designed to substantially reduce or eliminate fragmentation. Its successor, JFS2, is the recommended file system for 64-bit kernels.

With 64-bit addressing, a maximum file system size of 32 TB and maximum file size of 16 TB, JFS2 is highly recommended for systems running the AIX operating system.

### **Memory error correction extensions**

The memory has single-bit-error correction and double-bit-error detection ECC circuitry. The ECC code is also designed such that the failure of any one specific memory module within an ECC word by itself can be corrected absent any other fault.

Memory protection features include scrubbing to detect errors, a means to call for the deallocation of memory pages for a pattern of correctable errors detected, and signaling deallocation of a logical memory block when an error occurs that cannot be corrected by the ECC code.

### **Fault monitoring functions**

- When a POWER7+ processor-based system is powered on, built-in self-test (BIST) and power-on self-test (POST) check processor, cache, memory, and associated hardware required for proper booting of the operating system. If a noncritical error is detected or if the errors occur in resources that can be removed from the system configuration, the restarting process is designed to proceed to completion. The errors are logged in the system nonvolatile RAM (NVRAM).
- Disk drive fault tracking is designed to alert the system administrator of an impending disk drive failure before it impacts customer operation.

## **Mutual surveillance**

The Service Processor monitors the operation of the firmware during the boot process, and also monitors the Hypervisor for termination. The Hypervisor monitors the Service Processor and will perform a reset/reload if it detects the loss of the Service Processor. If the reset/reload does not correct the problem with the Service Processor, the Hypervisor will notify the operating system and the operating system can take appropriate action, including calling for service.

## **Environmental monitoring functions**

POWER7+ processor-based servers include a range of environmental monitoring functions:

- Temperature monitoring warns the system administrator of potential environmental-related problems by monitoring the air inlet temperature. When the inlet temperature rises above a warning threshold, the system initiates an orderly shutdown. When the temperature exceeds the critical level or if the temperature remains above the warning level for too long, the system will shut down immediately.
- Fan speed is controlled by monitoring actual temperatures on critical components and adjusting accordingly. If internal component temperatures reach critical levels, the system will shut down immediately, regardless of fan speed. When a redundant fan fails, the system calls out the failing fan and continues running. When a nonredundant fan fails, the system shuts down immediately.

## **Availability enhancement functions**

The POWER7+ family of systems continues to offer and introduce significant enhancements designed to increase system availability.

### **POWER6® processor functions**

As in POWER6, the POWER7+ processor has the ability to do processor instruction retry and alternate processor recovery for a number of core-related faults. This significantly reduces exposure to both hard (logic) and soft (transient) errors in the processor core. Soft failures in the processor core are transient (intermittent) errors, often due to cosmic rays or other sources of radiation, and generally are not repeatable. When an error is encountered in the core, the POWER7+ processor will first automatically retry the instruction. If the source of the error was truly transient, the instruction will succeed and the system will continue as before. On IBM systems prior to POWER6, this error would have caused a checkstop.

Hard failures are more difficult, being true logical errors that will be replicated each time the instruction is repeated. Retrying the instruction will not help in this situation because the instruction will continue to fail. As in POWER6, POWER7+ processors have the ability to extract the failing instruction from the faulty core and retry it elsewhere in the system for a number of faults, after which the failing core is dynamically deconfigured and called out for replacement. The entire process is transparent to the partition owning the failing instruction. These systems are designed to avoid a full system outage.

### **POWER7+ single processor checkstopping**

As in POWER6, POWER7+ provides single processor checkstopping. This significantly reduces the probability of any one processor affecting total system availability.

### **Partition availability priority**

Also available is the ability to assign availability priorities to partitions. If an alternate processor recovery event requires spare processor resources in order to protect a workload, when no other means of obtaining the spare resources is available, the system will determine which partition has the lowest priority and attempt to claim the needed resource. On a properly configured POWER7+

processor-based server, this allows that capacity to be first obtained from, for example, a test partition instead of a financial accounting system.

### **POWER7+ cache availability**

The L2 and L3 caches in the POWER7+ processor are protected with double-bit detect, single-bit correct error detection code (ECC). In addition, the caches maintain a cache line delete capability. A threshold of correctable errors detected on a cache line can result in the data in the cache line being purged and the cache line removed from further operation without requiring a reboot. An ECC uncorrectable error detected in the cache can also trigger a purge and delete of the cache line. This results in no loss of operation if the cache line contained data unmodified from what was stored in system memory. Modified data would be handled through special uncorrectable error handling. L1 data and instruction caches also have a retry capability for intermittent error and a cache set delete mechanism for handling solid failures. In addition, the POWER7+ processors also have the ability to dynamically substitute a faulty bit-line in an L3 cache dedicated to a processor with a spare bit-line.

### **Special uncorrectable error (SUE) handling**

Uncorrectable errors are difficult for any system to tolerate, although there are some situations where they can be shown to be irrelevant. For example, if an uncorrectable error occurs in cached data that will never again be read or where a fresh write of the data is imminent, it would be unwise to "protect" the user by forcing an immediate reboot.

SUE handling was an IBM innovation introduced for POWER5 processors, where an uncorrectable error in memory or cache does not immediately cause the system to terminate. Rather, the system tags the data and determines whether it will ever be used again. If the error is irrelevant, it will not force a checkstop.

### **PCI extended error handling**

PCI extended error handling (EEH)-enabled adapters respond to a special data packet generated from the affected PCI slot hardware by calling system firmware, which will examine the affected bus, allow the device driver to reset it, and continue without a system reboot. For Linux, EEH support extends to the majority of frequently used devices, although some third-party PCI devices may not provide native EEH support.

### **Predictive failure and dynamic component deallocation**

Servers with POWER® processors have long had the capability to perform predictive failure analysis on certain critical components such as processors and memory. When these components exhibit symptoms that would indicate a failure is imminent, the system can dynamically deallocate and call home about the failing part before the error is propagated system-wide. In many cases, the system will first attempt to reallocate resources in such a way that will avoid unplanned outages. In the event that insufficient resources exist to maintain full system availability, these servers will attempt to maintain partition availability by user-defined priority.

### **Uncorrectable error recovery**

When the auto-restart option is enabled, the system can automatically restart following an unrecoverable software error, hardware failure, or environmentally induced (ac power) failure.

### **Serviceability**

The purpose of serviceability is to repair the system while attempting to minimize or eliminate service cost (within budget objectives), while maintaining high customer satisfaction. Serviceability includes system installation, MES (system upgrades/downgrades), and system maintenance/repair. Depending upon the system and warranty contract, service may be performed by the customer, an IBM representative, or an authorized warranty service provider.



The serviceability features delivered in this system provide a highly efficient service environment by incorporating the following attributes

- Design for customer setup (CSU), customer installed features (CIF), and customer replaceable units (CRU)
- Error detection and fault isolation (ED/FI)
- First-failure data capture (FFDC)
- Converged service approach across multiple IBM server platforms

### **Service environments**

The HMC is a dedicated server that provides functions for configuring and managing servers for either partitioned or full-system partition using a GUI or command-line interface (CLI). An HMC attached to the system allows support personnel (with client authorization) to remotely log in to review error logs and perform remote maintenance if required. The HMC V7.7.0 (SP1) contains the following:

- Support for managing IBM Power 750 and 760
- Support for PowerVM functions such as new HMC GUI interface for VIOS install
- Improved transition from IVM to HMC management
- Ability to update the user's password in Kerberos from the HMC for clients utilizing remote HMC

The POWER7+ processor-based platforms support two main service environments:

- Attachment to one or more HMCs is a supported option by the system. This is the default configuration for servers supporting logical partitions with dedicated or virtual I/O. In this case, all servers have at least one logical partition.
- No HMC. There are two service strategies for non-HMC systems
  - Full system partition: A single partition owns all the server resources and only one operating system may be installed.
  - Partitioned system: In this configuration, the system can have more than one partition and can be running more than one operating system. In this environment, partitions are managed by the Integrated Virtualization Manager (IVM), which includes some of the functions offered by the HMC.

### **Service Interface**

The Service Interface enables support personnel to communicate with the service support applications in a server using a console, interface, or terminal. Delivering a clear, concise view of available service applications, the Service Interface enables the support team to manage system resources and service information in an efficient and effective way. Applications available via the Service Interface are carefully configured and placed to give service providers access to important service functions.

Different service interfaces are used, depending on the state of the system and its operating environment. The primary service interfaces are:

- LEDs
- Operator Panel
- Service Processor menu
- Operating system service menu
- Service Focal Point™ on the HMC
- Service Focal Point Lite on IVM

In the light path LED implementation, when a fault condition is detected on the POWER7+ system, an amber FRU fault LED will be illuminated, which will be rolled up to the system fault LED. The light path system pinpoints the exact part by turning on the amber FRU fault LED associated with the part to be replaced.

The system can clearly identify components for replacement by using specific component-level LEDs, and can also guide the servicer directly to the component by signaling (turning on solid) the system fault LED, enclosure fault LED, and the component FRU fault LED. The servicer can also use the identify function to blink the FRU-level LED. When this function is activated, a roll-up to the blue enclosure locate and system locate LEDs will occur. These LEDs will turn on solid and can be used to follow the light path from the system to the enclosure and down to the specific FRU.

### **First-failure data capture (FFDC) and error data analysis**

FFDC is a technique that helps ensure that when a fault is detected in a system, the root cause of the fault will be captured without the need to re-create the problem or run any sort of extending tracing or diagnostics program. For the vast majority of faults, a good FFDC design means that the root cause can also be detected automatically without servicer intervention.

FFDC information, error data analysis, and fault isolation are necessary to implement the advanced serviceability techniques that enable efficient service of the systems and to help determine the failing items.

In the rare absence of FFDC and Error Data Analysis, diagnostics are required to re-create the failure and determine the failing items.

### **Diagnostics**

General diagnostic objectives are to detect and identify problems such that they can be resolved quickly. Elements of IBM's diagnostics strategy include the following:

- Common error code format equivalent to a system reference code, system reference number, checkpoint, or firmware error code.
- Fault detection and problem isolation procedures. Support remote connection ability to be used by the IBM Remote Support Center or IBM Designated Service.
- Interactive intelligence within the diagnostics with detailed online failure information while connected to IBM's back-end system.

### **Automatic diagnostics**

Because of the FFDC technology designed into IBM Servers, it is not necessary to re-create diagnostics for failures or require user intervention. Solid and intermittent errors are designed to be correctly detected and isolated at the time the failure occurs. Runtime and boottime diagnostics fall into this category.

### **Stand-alone diagnostics**

As the name implies, stand-alone or user-initiated diagnostics require user intervention. The user must perform manual steps, including:

- Compact disk-based diagnostics
- Keying in commands
- Interactively selecting steps from a list of choices

### **Concurrent maintenance**

The system will continue to support concurrent maintenance of power, cooling, PCI adapters, DASD, DVD, and firmware updates (when possible). The determination of whether a firmware release can be updated concurrently is identified in the readme information file released with the firmware.

### **Service labels**

Service providers use these labels to assist them in performing maintenance actions. Service labels are found in various formats and positions, and are intended to transmit readily available information to the servicer during the repair process. Following are some of these service labels and their purpose:

## Location diagrams

Location diagrams are strategically located on the system hardware, relating information regarding the placement of hardware components. Location diagrams may include location codes, drawings of physical locations, concurrent maintenance status, or other data pertinent to a repair. Location diagrams are especially useful when multiple components are installed such as DIMMs, CPUs, processor books, fans, adapter cards, LEDs, and power supplies.

## Remove/replace procedures

Service labels that contain remove/replace procedures are often found on a cover of the system or in other spots accessible to the servicer. These labels provide systematic procedures, including diagrams, detailing how to remove/replace certain serviceable hardware components.

## Arrows

Numbered arrows are used to indicate the order of operation and serviceability direction of components. Some serviceable parts such as latches, levers, and touch points need to be pulled or pushed in a certain direction and certain order for the mechanical mechanisms to engage or disengage. Arrows generally improve the ease of serviceability.

## Packaging for service

The following service enhancements are included in the physical packaging of the systems to facilitate service:

- **Color coding (touch points):** Terracotta-colored touch points indicate that a component (FRU/CRU) can be concurrently maintained. Blue-colored touch points delineate components that are not concurrently maintained -- those that require the system to be turned off for removal or repair.
- **Tool-less design:** Selected IBM systems support tool-less or simple tool designs. These designs require no tools or simple tools such as flathead screw drivers to service the hardware components.
- **Positive retention:** Positive retention mechanisms help to ensure proper connections between hardware components such as cables to connectors, and between two cards that attach to each other. Without positive retention, hardware components run the risk of becoming loose during shipping or installation, preventing a good electrical connection. Positive retention mechanisms like latches, levers, thumb-screws, pop Nylatches (U-clips), and cables are included to help prevent loose connections and aid in installing (seating) parts correctly. These positive retention items do not require tools.

## Error handling and reporting

In the unlikely event of system hardware or environmentally induced failure, the system runtime error capture capability systematically analyzes the hardware error signature to determine the cause of failure. The analysis result will be stored in system NVRAM. When the system can be successfully restarted either manually or automatically, the error will be reported to the operating system. Error Log Analysis (ELA) can be used to display the failure cause and the physical location of the failing hardware.

With the integrated Service Processor, the system has the ability to automatically send out an alert via phone line to a pager or call for service in the event of a critical system failure. A hardware fault will also turn on the amber system fault LED located on the system unit to alert the user of an internal hardware problem. The indicator may also be set to blink by the operator as a tool to allow system identification. For identification, the blue locate LED on the enclosure and at the system level will turn on solid. The amber system fault LED will be on solid when an error condition occurs.

On POWER7+ processor-based servers, hardware and software failures are recorded in the system log. When an HMC is attached, an ELA routine analyzes the error, forwards the event to the Service Focal Point (SFP) application running on the HMC, and notifies the system administrator that it has isolated a likely cause of the system problem. The Service Processor event log also records unrecoverable checkstop conditions, forwards them to the SFP application, and notifies the system administrator. Once the information is logged in the SFP application, if the system is properly configured, a call home service request will be initiated and the pertinent failure data with service parts information and part locations will be sent to an IBM Service organization. Customer contact information and specific system-related data such as the machine type, model, and serial number, along with error log data related to the failure are sent to IBM Service.

### **Service Processor**

The Service Processor enables you to diagnose, check the status of, and sense the operational conditions of a system. It runs on its own power boundary and does not require resources from a system processor to be operational to perform its tasks.

The Service Processor supports surveillance of the connection to the HMC and to the system firmware (Hypervisor). It also provides several remote power control options, environmental monitoring, reset, restart, remote maintenance, and diagnostic functions, including console mirroring. The Service Processors menus (ASMI) can be accessed concurrently with system operation allowing nondisruptive abilities to change system default parameters.

### **Call Home**

Call Home refers to an automatic or manual call from a customer location to IBM support structure with error log data, server status, or other service-related information. Call Home invokes the service organization in order for the appropriate service action to begin. Call Home can be done through HMC or non-HMC managed systems. While configuring Call Home is optional, clients are encouraged to implement this feature in order to obtain service enhancements such as reduced problem determination and faster and potentially more accurate transmittal of error information. In general, using the Call Home feature can result in increased system availability. The Electronic Service Agent™ application can be configured for automated call home. Refer to the next section for specific details on this application.

### **IBM Electronics Services**

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Electronic Service Agent and the IBM Electronic Services Web portal comprise the IBM Electronic Services solution--dedicated to providing fast, exceptional support to IBM customers. IBM Electronic Service Agent is a no-charge tool that proactively monitors and reports hardware events such as system errors, performance issues, and inventory. Electronic Service Agent can help focus on the customer's company strategic business initiatives, save time, and spend less effort managing day-to-day IT maintenance issues.

Integrated in the operating system in addition to the HMC, Electronic Service Agent is designed to automatically and electronically report system failures and customer-perceived issues to IBM, which can result in faster problem resolution and increased availability. System configuration and inventory information collected by Electronic Service Agent also can be viewed on the secure Electronic Services Web portal and used to improve problem determination and resolution between the customer and the IBM support team. As part of an increased focus to provide even better service to IBM customers, Electronic Service Agent tool configuration and activation comes standard with the system. In support of this effort, a new HMC External Connectivity security white paper has been published, which describes data exchanges between the HMC and the IBM Service Delivery Center (SDC) and the methods and protocols for this exchange. To read the white paper and prepare for Electronic Service Agent installation, go to the "Reference Guide" section at:

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

Select your country.

Click on " IBM Electronic Service Agent Connectivity Guide."

### **Benefits**

**Increased uptime:** Electronic Service Agent is designed to enhance the warranty and maintenance service by providing faster hardware error reporting and uploading system information to IBM Support. This can optimize the time monitoring the symptoms, diagnosing the error, and manually calling IBM Support to open a problem record. And 24 x 7 monitoring and reporting means no more dependency on human intervention or off-hours customer personnel when errors are encountered in the middle of the night.

**Security:** Electronic Service Agent is secure in monitoring, reporting, and storing the data at IBM . Electronic Service Agent securely transmits via the Internet (HTTPS or VPN) and can be configured to communicate securely through gateways to provide customers a single point of exit from their site. Communication between the customer and IBM only flows one way; activating Service Agent does not enable IBM to call into a customer's system. System inventory information is stored in a secure database, which is protected behind IBM firewalls. The customer's business applications or business data is never transmitted to IBM .

**More accurate reporting:** Because system information and error logs are automatically uploaded to the IBM Support Center in conjunction with the service request, customers are not required to find and send system information, decreasing the risk of misreported or misdiagnosed errors. Once inside IBM , problem error data is run through a data knowledge management system and knowledge articles are appended to the problem record.

**Customized support:** Using the IBM ID entered during activation, customers can view system and support information in the "My Systems" and "Premium Search" sections of the Electronic Services Web site.

The Electronic Services web portal is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. This web portal enables you to gain easier access to IBM resources for assistance in resolving technical problems. The newly improved My Systems and Premium Search functions make it even easier for Electronic Service Agent-enabled customers to track system inventory and find pertinent fixes.

My Systems provides valuable reports of installed hardware and software using information collected from the systems by IBM Electronic Service Agent . Reports are available for any system associated with the customer's IBM ID. Premium Search combines the function of search and the value of Electronic Service Agent information, providing advanced search of the technical support knowledgebase. Using Premium Search and the Service Agent information that has been collected from the system, customers are able to see search results that apply specifically to their systems.

For more information on how to utilize the power of IBM Electronic Services, visit the following website or contact an IBM Systems Services Representative

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

### **Accessibility by people with disabilities**

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

[http://www.ibm.com/able/product\\_accessibility/index.html](http://www.ibm.com/able/product_accessibility/index.html)

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## Statement of general direction

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### **AIX 5.3 and 7.1 support for Power 710, 720, 730, 740, 750, and 760**

IBM intends to provide to those clients with AIX 7.1 Technology Level 0 and/or Technology Level 1 and AIX 5.3 Technology Level 12 (and the associated service extension offering) the ability to run that environment on the new Power 710 (8231-E1D), Power 720 (8202-E4D), Power 730 (8231-E2D), Power 740 (8205-E6D), Power 750 (8408-E8D), and Power 760 (9109-RMD).

### **VIOS 2.2.1 support for Power 710, 720, 730, 740, 750, and 760**

IBM intends to provide to those clients with VIOS 2.2.1 the ability to run that environment on the new Power 710 (8231-E1D), PowerLinux™ 7R1 (8246-L1D, 8246-L1T), Power 720 (8202-E4D), Power 730 (8231-E2D), PowerLinux 7R2 (8246-L2D, 8246-L2T), Power 740 (8205-E6D), Power 750 (8408-E8D) and Power 760 (9109-RMD).

### **Standard Disclaimer**

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### **RHEL 6.4 support for Power 710, 7R1, 720, 730, 7R2, 740, 750, 760, and PowerLinux 7R1, 7R2**

Red Hat intends to continue to work with Red Hat to provide support for the new Power 710 (8231-E1D), PowerLinux 7R1 (8246-L1D, 8246-L1T), Power 720 (8202-E4D), Power 730 (8231-E2D), PowerLinux 7R2 (8246-L2D, 8246-L2T), Power 740 (8205-E6D), Power 750 (8408-E8D), and Power 760 (9109-RMD) with an upcoming Red Hat Enterprise Linux 6 release. For additional questions about the availability of this release and supported hardware servers, consult the Red Hat Hardware Catalog at

<https://hardware.redhat.com>

### **RHEL 6 Preinstall feature for Power 710, 720, 730, 740, 750, 760, and PowerLinux 7R1, 7R2**

IBM intends to provide support for pre-install of an upcoming Red Hat Enterprise Linux 6 release on the new Power 710 (8231-E1D), PowerLinux 7R1 (8246-L1D, 8246-L1T), Power 720 (8202-E4D), Power 730 (8231-E2D), PowerLinux 7R2 (8246-L2D, 8246-L2T), Power 740 (8205-E6D), Power 750 (8408-E8D) and Power 760 (9109-RMD) systems.

### **Standard Red Hat Disclaimer**

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## Product number

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The following are newly announced features on the specific models of the IBM Power Systems 8408 machine type:

Description	MT	Model	Feature
IBM Power 750	8408	E8D	
Solution Delivery Integration (SDI) Indicator	8408	E8D	0002
OEM Light Manufacturing Order Indicator - EMPTY	8408	E8D	0006
Solution Delivery Integration (SDI) Order Indicator - DO NOT BUILD	8408	E8D	0009
One CSC Billing Unit	8408	E8D	0010
Ten CSC Billing Units	8408	E8D	0011
Mirrored System Disk Level, Specify Code	8408	E8D	0040
Device Parity Protection-All, Specify Code	8408	E8D	0041
Mirrored System Bus Level, Specify Code	8408	E8D	0043
Device Parity RAID-6 All, Specify Code	8408	E8D	0047
RISC-to-RISC Data Migration	8408	E8D	0205
AIX Partition Specify	8408	E8D	0265
Linux Partition Specify	8408	E8D	0266
IBM i Operating System Partition Specify	8408	E8D	0267
Specify Custom Data Protection	8408	E8D	0296
Mirrored Level System Specify Code	8408	E8D	0308
RAID Hot Spare Specify	8408	E8D	0347
V.24/EIA232 6.1m (20-Ft) PCI Cable	8408	E8D	0348
V.24/EIA232 15.2m (50-Ft) PCI Cable	8408	E8D	0349
V.35 6.1m (20-Ft) PCI Cable	8408	E8D	0353
V.35 15.2m (50-Ft) PCI Cable	8408	E8D	0354
V.36 6.1m (20-Ft) PCI Cable	8408	E8D	0356
X.21 6.1m (20-Ft) PCI Cable	8408	E8D	0359
X.21 15.2m (50-Ft) PCI Cable	8408	E8D	0360
V.24/EIA232 (80-Ft) PCI Cable	8408	E8D	0365
UPS Factory Integration Specify	8408	E8D	0373
HMC Factory Integration Specify	8408	E8D	0374
Display Factory Integration Specify	8408	E8D	0375
Reserve Rack Space for UPS	8408	E8D	0376
Reserve Rack Space for HMC	8408	E8D	0377
Reserve Rack Space for Display	8408	E8D	0378
CBU Specify	8408	E8D	0444
Customer Specified Placement	8408	E8D	0456
SSD Placement Indicator - CEC	8408	E8D	0462
SSD Placement Indicator (5802/5803)	8408	E8D	0463

SSD Placement Indicator - 5886	8408	E8D	0464
SSD Placement Indicator - 5887	8408	E8D	0465
19 inch, 1.8 meter high rack	8408	E8D	0551
19 inch, 2.0 meter high rack	8408	E8D	0553
IBM i 6.1 with 6.1.1 Machine Code Specify Code	8408	E8D	0566
IBM i 7.1 Specify Code	8408	E8D	0567
Rack Filler Panel Kit	8408	E8D	0599
Load Source Not in CEC	8408	E8D	0719
#1787 Load Source Specify	8408	E8D	0722
#1996 Load Source Specify	8408	E8D	0724
Specify Load Source in #5802/#5803/#5877	8408	E8D	0726
Specify #5886 Load Source placement	8408	E8D	0727
Specify #5887 Load Source placement	8408	E8D	0728
Specify EXP30 Load Source placement	8408	E8D	0729
SAN Load Source Specify	8408	E8D	0837
#3676 Load Source Specify	8408	E8D	0838
#3677 Load Source Specify	8408	E8D	0839
#3678 Load Source Specify	8408	E8D	0840
#3658 Load Source Specify	8408	E8D	0844
#1884 Load Source Specify	8408	E8D	0851
#1888 Load Source Specify	8408	E8D	0853
#1911 Load Source Specify	8408	E8D	0856
#1916 Load Source Specify	8408	E8D	0857
#1879 Load Source Specify	8408	E8D	0870
#1947 Load Source Specify	8408	E8D	0871
#1948 Load Source Specify	8408	E8D	0872
#1956 Load Source Specify	8408	E8D	0874
#1962 Load Source Specify	8408	E8D	0875
#1794 Load Source Specify	8408	E8D	0876
#1737 Load Source Specify (856GB SFF-1 disk)	8408	E8D	0879
#1738 Load Source Specify (856GB SFF-2 disk)	8408	E8D	0880
#ES04 Load Source Specify	8408	E8D	0882
#ES0B Load Source Specify	8408	E8D	0893
#ES0D Load Source Specify	8408	E8D	0894

Modem Cable - US/Canada and General Use	8408	E8D	1025
USB External Docking Station for Removable Disk Drive	8408	E8D	1104
USB 160 GB Removable Disk Drive	8408	E8D	1106
USB 500 GB Removable Disk Drive	8408	E8D	1107
3m, Blue Cat5e Cable	8408	E8D	1111
10m, Blue Cat5e Cable	8408	E8D	1112
25m, Blue Cat5e Cable	8408	E8D	1113
Decline Electronic Service Agent Install Indicator	8408	E8D	1120

Custom Service Specify, Rochester Minn, USA	8408	E8D	1140
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200V 16A 4.3m (14-Ft) TL Line Cord	8408	E8D	1406
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125V 4.3m (14-Ft) Line Cord	8408	E8D	1413
200V 1.8m (6-Ft) Locking Line Cord	8408	E8D	1414

4.3m 200V/16A Power Cord EU/Asia	8408	E8D	1420
4.3m 200V/16A Power Cord CH/DK	8408	E8D	1421

200V 4.3m (14-Ft) Locking Line Cord	8408	E8D	1426
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200V 4.3m (14-Ft) Watertight Line Cord	8408	E8D	1427
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4.3m 200V/10A Power Cord EU/Asia	8408	E8D	1439
4.3m 200V/10A Power Cord Denmark	8408	E8D	1440
4.3m 200V/10A Power Cord S. Africa	8408	E8D	1441
4.3m 200V/10A Power Cord Swiss	8408	E8D	1442



4.3m 200V/10A Power Cord UK	8408	E8D	1443
4.3m 200V/10A Power Cord Israel	8408	E8D	1445
4.3m 200V/32A Power Cord EU 1-PH	8408	E8D	1449
4.3m 200V/16A Power Cord EU 2-PH	8408	E8D	1450
Power Cord (4.3 M), To wall (250V/15A)	8408	E8D	1452
200V 12A (14-Ft) 4.3m TL Line Cord	8408	E8D	1454
200V (14-Ft) 4.3m Watertight Line Cord	8408	E8D	1456
30m SPCN Cable	8408	E8D	1466
4.3m 200V/12A Pwr Cd UK	8408	E8D	1476
4.3m 200V/16A Pwr Cd	8408	E8D	1477
856GB 10k RPM SAS SFF Disk Drive (IBM i)	8408	E8D	1737
856GB 10k RPM SAS SFF-2 Disk Drive (IBM i)	8408	E8D	1738
900GB 10K RPM SAS SFF Disk Drive (AIX/Linux)	8408	E8D	1751
900GB 10K RPM SAS SFF-2 Disk Drive (AIX/Linux)	8408	E8D	1752
Integrated Multifunction card with Copper SFP+	8408	E8D	1768
Integrated Multifunction card with SR Optical	8408	E8D	1769
177GB SFF-1 SSD w/ eMLC (AIX/Linux)	8408	E8D	1775
177GB SFF-1 SSD w/ eMLC (IBM i)	8408	E8D	1787
600GB 10K RPM SAS SFF Disk Drive (AIX/Linux)	8408	E8D	1790
177GB SFF-2 SSD w/ eMLC (AIX/Linux)	8408	E8D	1793
177GB SFF-2 SSD w/ eMLC (IBM i)	8408	E8D	1794
GX++ 12X DDR Adapter, Dual-port	8408	E8D	1808
SAS Cable for triple split DASD backplane	8408	E8D	1815
Quantity 150 of #1962	8408	E8D	1817
Quantity 150 of #1964	8408	E8D	1818
SAS Cable Assembly for SAS Port	8408	E8D	1819
System port/UPS Conversion Cable	8408	E8D	1827
1.5 Meter 12X to 4X Channel Conversion Cable	8408	E8D	1828
3 Meter 12X to 4X Channel Conversion Cable	8408	E8D	1841
10 Meter 12X to 4X Channel Conversion Cable	8408	E8D	1842
Quantity 150 of #1956	8408	E8D	1844
10 Meter 12X to 4X Enhanced Channel Conversion Cable	8408	E8D	1854
0.6 Meter 12X DDR Cable	8408	E8D	1861
1.5 Meter 12X DDR Cable	8408	E8D	1862
8.0 Meter 12X DDR Cable	8408	E8D	1864
3.0 Meter 12X DDR Cable	8408	E8D	1865
Quantity 150 of #1917	8408	E8D	1866
Quantity 150 of #1947	8408	E8D	1868
Quantity 150 of #1925	8408	E8D	1869
283GB 15K RPM SAS SFF Disk Drive (IBM i)	8408	E8D	1879
300GB 15K RPM SAS SFF Disk Drive (AIX/Linux)	8408	E8D	1880
146.8GB 10K RPM SAS SFF Disk Drive	8408	E8D	1882
73.4 GB 15K RPM SAS SFF Disk Drive	8408	E8D	1883
69.7 GB 15K RPM SAS SFF Disk Drive	8408	E8D	1884
300GB 10K RPM SFF SAS Disk Drive	8408	E8D	1885
146GB 15K RPM SFF SAS Disk Drive (AIX/Linux)	8408	E8D	1886
Quantity 150 of #1793	8408	E8D	1887
139GB 15K RPM SFF SAS Disk Drive (IBM i)	8408	E8D	1888
Quantity 150 of #1883	8408	E8D	1891
Quantity 150 of #1882	8408	E8D	1899
283GB 10K RPM SFF SAS Disk Drive (IBM i)	8408	E8D	1911
GX++ 2-port PCIe2 x8 Adapter	8408	E8D	1914
571GB 10k RPM SAS SFF Disk Drive (IBM i)	8408	E8D	1916
146GB 15k RPM SAS SFF-2 Disk Drive (AIX/Linux)	8408	E8D	1917
300GB 10k RPM SAS SFF-2 Disk Drive (AIX/Linux)	8408	E8D	1925
Quantity 150 of #1879	8408	E8D	1926
Quantity 150 of #1948	8408	E8D	1927
Quantity 150 of #1880	8408	E8D	1928
Quantity 150 of #1953	8408	E8D	1929
139GB 15k RPM SAS SFF-2 Disk Drive (IBM i)	8408	E8D	1947
283GB 15k RPM SAS SFF-2 Disk Drive (IBM i)	8408	E8D	1948
300GB 15k RPM SAS SFF-2 Disk Drive (AIX/Linux)	8408	E8D	1953

283GB 10k RPM SAS SFF-2 Disk Drive (IBM i)	8408	E8D	1956
Quantity 150 of #1794	8408	E8D	1958
571GB 10k RPM SAS SFF-2 Disk Drive (IBM i)	8408	E8D	1962
600GB 10k RPM SAS SFF-2 Disk Drive (AIX/Linux)	8408	E8D	1964
177GB SSD Module with eMLC (AIX/Linux)	8408	E8D	1995
177GB SSD Module with eMLC (IBM i)	8408	E8D	1996
PCIe RAID & SSD SAS Adapter 3Gb w/ Blind Swap Cassette	8408	E8D	2055
Primary OS - IBM i	8408	E8D	2145
Primary OS - AIX	8408	E8D	2146
Primary OS - Linux	8408	E8D	2147
Factory Deconfiguration of 1-core	8408	E8D	2319
2M LC-SC 50 Micron Fiber Converter Cable	8408	E8D	2456
2M LC-SC 62.5 Micron Fiber Converter Cable	8408	E8D	2459
4 port USB PCIe Adapter	8408	E8D	2728
PCIe 2-Line WAN w/Modem	8408	E8D	2893
3M Asynchronous Terminal/Printer Cable EIA-232	8408	E8D	2934
Asynchronous Cable EIA-232/V.24 3M	8408	E8D	2936
Serial-to-Serial Port Cable for Drawer/Drawer-3.7M	8408	E8D	3124
Serial-to-Serial Port Cable for Rack/Rack- 8M	8408	E8D	3125
1m, (3.3-ft) IB 40G Copper Cable QSFP/QSFP	8408	E8D	3287
3m, (9.8-ft.) IB 40G Copper Cable QSFP/QSFP	8408	E8D	3288
5m QDR IB/E'Net Copper Cable QSFP/QSFP	8408	E8D	3289
10 meter Quad Data Rate InfiniBand Optical Cable, QSFP/QSFP	8408	E8D	3290
30 meter Quad Data Rate InfiniBand Optical Cable, QSFP/QSFP	8408	E8D	3293
SAS YO Cable 1.5m - HD 6Gb Adapter to Enclosure	8408	E8D	3450
SAS YO Cable 3m - HD 6Gb Adapter to Enclosure	8408	E8D	3451
SAS YO Cable 6m - HD 6Gb Adapter to Enclosure	8408	E8D	3452
SAS YO Cable 10m - HD 6Gb Adapter to Enclosure	8408	E8D	3453
SAS X Cable 3m - HD 6Gb 2-Adapter to Enclosure	8408	E8D	3454
SAS X Cable 6m - HD 6Gb 2-Adapter to Enclosure	8408	E8D	3455
SAS X Cable 10m - HD 6Gb 2-Adapter to Enclosure	8408	E8D	3456
SAS YO Cable 15m - HD 3Gb Adapter to Enclosure	8408	E8D	3457
SAS X Cable 15m - HD 3Gb 2-Adapter to Enclosure	8408	E8D	3458
69GB 3.5" SAS Solid State Drive	8408	E8D	3586
69GB 3.5" SAS Solid State Drive	8408	E8D	3587
Widescreen LCD Monitor	8408	E8D	3632
IBM T541H /L150p 15" TFT Color Monitor	8408	E8D	3637
IBM Thinkvision L170p Flat Panel Monitor	8408	E8D	3639
ThinkVision L171p Flat Panel Monitor	8408	E8D	3640
IBM T115 Flat Panel Monitor	8408	E8D	3641
ThinkVision L191p Flat Panel Monitor	8408	E8D	3642
IBM T120 Flat Panel Monitor	8408	E8D	3643
IBM T119 Flat Panel Monitor	8408	E8D	3644
IBM T117 Flat Panel Monitor	8408	E8D	3645
73GB 15K RPM SAS Disk Drive	8408	E8D	3646
146GB 15K RPM SAS Disk Drive (AIX/Linux)	8408	E8D	3647
300GB 15K RPM SAS Disk Drive (AIX/Linux)	8408	E8D	3648
450GB 15K RPM SAS Disk Drive (AIX/Linux)	8408	E8D	3649
SAS Cable (EE) Drawer to Drawer 1M	8408	E8D	3652
SAS Cable (EE) Drawer to Drawer 3M	8408	E8D	3653
SAS Cable (EE) Drawer to Drawer 6M	8408	E8D	3654
428GB 15K RPM SAS Disk Drive (IBM i)	8408	E8D	3658
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 3M:	8408	E8D	3661
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 6M:	8408	E8D	3662
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 15M:	8408	E8D	3663
SAS EX Cable 3m - Drawer to Drawer	8408	E8D	3675
69.7GB 15k rpm SAS Disk Drive	8408	E8D	3676
139.5GB 15k rpm SAS Disk Drive (IBM i)	8408	E8D	3677
283.7GB 15k rpm SAS Disk Drive (IBM i)	8408	E8D	3678
SAS Cable (AI)- Adapter to Internal drive 1M	8408	E8D	3679
SAS EX Cable 6m - Drawer to Drawer	8408	E8D	3680
3M SAS CABLE, ADPTR TO ADPTR (AA)	8408	E8D	3681
SAS Cable (AE) Adapter to Enclosure, single controller/single path 3M	8408	E8D	3684
SAS Cable (AE) Adapter to Enclosure, single controller/single path 6M	8408	E8D	3685

SAS Cable (YI) System to SAS Enclosure, Single Controller/Dual Path 3M	8408	E8D	3687
SAS Cable (AT) 0.6 Meter	8408	E8D	3688
SAS AT Cable 0.6m - HD 6Gb Adapter to 12X Enclosure (AT)	8408	E8D	3689
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 1.5 M	8408	E8D	3691
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 3 M	8408	E8D	3692
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 6 M	8408	E8D	3693
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 15 M	8408	E8D	3694
0.3M Serial Port Converter Cable, 9-Pin to 25-Pin	8408	E8D	3925
Serial Port Null Modem Cable, 9-pin to 9-pin, 3.7M	8408	E8D	3927
Serial Port Null Modem Cable, 9-pin to 9-pin, 10M	8408	E8D	3928
System Serial Port Converter Cable	8408	E8D	3930
1.8 M (6-ft) Extender Cable for Displays (15-pin D-shell to 15-pin D-shell)	8408	E8D	4242
Extender Cable - USB Keyboards, 1.8M	8408	E8D	4256
VGA to DVI Connection Converter	8408	E8D	4276
Package 5X #2055 & 20X #1995 (AIX/Linux)	8408	E8D	4367
Package 5X #2055 & 20X #1996 (IBM i)	8408	E8D	4377
Rack Indicator- Not Factory Integrated	8408	E8D	4650
Rack Indicator, Rack #1	8408	E8D	4651
Rack Indicator, Rack #2	8408	E8D	4652
Rack Indicator, Rack #3	8408	E8D	4653
Rack Indicator, Rack #4	8408	E8D	4654
Rack Indicator, Rack #5	8408	E8D	4655
Rack Indicator, Rack #6	8408	E8D	4656
Rack Indicator, Rack #7	8408	E8D	4657
Rack Indicator, Rack #8	8408	E8D	4658
Rack Indicator, Rack #9	8408	E8D	4659
Rack Indicator, Rack #10	8408	E8D	4660
Rack Indicator, Rack #11	8408	E8D	4661
Rack Indicator, Rack #12	8408	E8D	4662
Rack Indicator, Rack #13	8408	E8D	4663
Rack Indicator, Rack #14	8408	E8D	4664
Rack Indicator, Rack #15	8408	E8D	4665
Rack Indicator, Rack #16	8408	E8D	4666
Active Memory Expansion Enablement	8408	E8D	4792
PCIe Crypto Coprocessor Gen3 BSC 4765-001	8408	E8D	4808
PCIe Crypto Coprocessor Gen4 BSC 4765-001	8408	E8D	4809
One Processor of 5250 Enterprise Enablement	8408	E8D	4988
Full 5250 Enterprise Enablement	8408	E8D	4989
Software Preload Required	8408	E8D	5000
Power Dist Unit 1 Phase NEMA	8408	E8D	5160
Power Dist Unit 1 Phase IEC	8408	E8D	5161
Power Dist Unit 2 of 3 Phase	8408	E8D	5162
Power Dist Unit - 3 Phase	8408	E8D	5163
PCIe2 2-Port 4X IB QDR Adapter 40Gb	8408	E8D	5285
PCIe2 2-port 10GbE SR Adapter	8408	E8D	5287
PCIe2 2-Port 10GbE SFP+Copper Adapter	8408	E8D	5288
2 Port Async EIA-232 PCIe Adapter	8408	E8D	5289
System AC Power Supply, 1925 W	8408	E8D	5532
Sys Console On HMC	8408	E8D	5550
Sys Console-Ethernet No IOP	8408	E8D	5553
Blind Swap Type III Cassette- PCIe, Short Slot	8408	E8D	5646
Blind Swap Type III Cassette- PCI-X or PCIe, Standard Slot	8408	E8D	5647
175MB Cache RAID - Dual IOA Enablement Card	8408	E8D	5662
10Gb FCoE PCIe Dual Port Adapter	8408	E8D	5708
4-Port 10/100/1000 Base-TX PCI Express Adapter	8408	E8D	5717
PCIe2 8Gb 4-port Fibre Channel Adapter	8408	E8D	5729
10 Gigabit Ethernet-CX4 PCI Express Adapter	8408	E8D	5732
8 Gigabit PCI Express Dual Port Fibre Channel Adapter	8408	E8D	5735
PCIe2 4-Port 10GbE&1GbE SR&RJ45 Adapter	8408	E8D	5744
PCIe2 4-Port 10GbE&1GbE SFP+Copper&RJ45 Adapter	8408	E8D	5745
POWER GXT145 PCI Express Graphics Accelerator	8408	E8D	5748
SATA Slimline DVD-RAM Drive	8408	E8D	5762
2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter	8408	E8D	5767

2-Port Gigabit Ethernet-SX PCI Express Adapter	8408	E8D	5768
10 Gigabit Ethernet-SR PCI Express Adapter	8408	E8D	5769
SATA Slimline DVD-RAM Drive	8408	E8D	5771
10 Gigabit Ethernet-LR PCI Express Adapter	8408	E8D	5772
4 Gigabit PCI Express Single Port Fibre Channel Adapter	8408	E8D	5773
4 Gigabit PCI Express Dual Port Fibre Channel Adapter	8408	E8D	5774
4 Port Async EIA-232 PCIe Adapter	8408	E8D	5785
12X I/O Drawer PCIe, SFF disk	8408	E8D	5802
PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	8408	E8D	5805
12X I/O Drawer PCIe, No Disk	8408	E8D	5877
EXP 12S Expansion Drawer	8408	E8D	5886
EXP24S SFF Gen2-bay Drawer	8408	E8D	5887
PCIe2 4-port 1GbE Adapter	8408	E8D	5899
PCIe Dual-x4 SAS Adapter	8408	E8D	5901
PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	8408	E8D	5903
PCIe2 1.8GB Cache RAID SAS Adapter Tri-port 6Gb	8408	E8D	5913
SAS AA Cable 3m - HD 6Gb Adapter to Adapter	8408	E8D	5915
SAS AA Cable 6m - HD 6Gb Adapter to Adapter	8408	E8D	5916
SAS AA Cable 1.5m - HD 6Gb Adapter to Adapter	8408	E8D	5917
SAS AA Cable 0.6m - HD 6Gb Adapter to Adapter	8408	E8D	5918
Non-paired PCIe SAS RAID Indicator	8408	E8D	5923
Non-paired Indicator 5913 PCIe SAS RAID Adapter	8408	E8D	5924
Shared EXP30 Indicator	8408	E8D	5925
SAS EX Cable 1.5m - Drawer to Drawer	8408	E8D	5926
Remote EXP30 Indicator	8408	E8D	5927
Full width Keyboard -- USB, US English, #103P	8408	E8D	5951
Full width Keyboard -- USB, French, #189	8408	E8D	5952
Full width Keyboard -- USB, Italian, #142	8408	E8D	5953
Full width Keyboard -- USB, German/Austrian, #129	8408	E8D	5954
Full width Keyboard -- USB, UK English, #166P	8408	E8D	5955
Full width Keyboard -- USB, Spanish, #172	8408	E8D	5956
Full width Keyboard -- USB, Japanese, #194	8408	E8D	5957
Full width Keyboard -- USB, Brazilian Portuguese, #275	8408	E8D	5958
Full width Keyboard -- USB, Hungarian, #208	8408	E8D	5959
Full width Keyboard -- USB, Korean, #413	8408	E8D	5960
Full width Keyboard -- USB, Chinese, #467	8408	E8D	5961
Full width Keyboard -- USB, French Canadian, #445	8408	E8D	5962
Full width Keyboard -- USB, Belgian/UK, #120	8408	E8D	5964
Full width Keyboard -- USB, Swedish/Finnish, #153	8408	E8D	5965
Full width Keyboard -- USB, Danish, #159	8408	E8D	5966
Full width Keyboard -- USB, Bulgarian, #442	8408	E8D	5967
Full width Keyboard -- USB, Swiss/French/German, #150	8408	E8D	5968
Full width Keyboard -- USB, Norwegian, #155	8408	E8D	5969
Full width Keyboard -- USB, Dutch, #143	8408	E8D	5970
Full width Keyboard -- USB, Portuguese, #163	8408	E8D	5971
Full width Keyboard -- USB, Greek, #319	8408	E8D	5972
Full width Keyboard -- USB, Hebrew, #212	8408	E8D	5973
Full width Keyboard -- USB, Polish, #214	8408	E8D	5974
Full width Keyboard -- USB, Slovakian, #245	8408	E8D	5975
Full width Keyboard -- USB, Czech, #243	8408	E8D	5976
Full width Keyboard -- USB, Turkish, #179	8408	E8D	5977
Full width Keyboard -- USB, LA Spanish, #171	8408	E8D	5978
Full width Keyboard -- USB, Arabic, #253	8408	E8D	5979
Full width Keyboard -- USB, Thai, #191	8408	E8D	5980
Full width Keyboard -- USB, Russian, #443	8408	E8D	5981
Full width Keyboard -- USB, Slovenian, #234	8408	E8D	5982
Full width Keyboard -- USB, US English Euro, #103P	8408	E8D	5983
Power Control Cable (SPCN) - 2 meter	8408	E8D	6001
Power Control Cable (SPCN) - 3 meter	8408	E8D	6006
Power Control Cable (SPCN) - 15 meter	8408	E8D	6007
Power Control Cable (SPCN) - 6 meter	8408	E8D	6008
Power Control Cable (SPCN) - 30 meter	8408	E8D	6029
Opt Front Door for 1.8m Rack	8408	E8D	6068
Opt Front Door for 2.0m Rack	8408	E8D	6069
1.8m Rack Trim Kit	8408	E8D	6246
2.0m Rack Trim Kit	8408	E8D	6247
1.8m Rack Acoustic Doors	8408	E8D	6248
2.0m Rack Acoustic Doors	8408	E8D	6249
1.8m Rack Trim Kit	8408	E8D	6263

2.0m Rack Trim Kit	8408	E8D	6272
Power Cord 4.3m (14-ft), Drawer to wall/IBM PDU (250V/10A)	8408	E8D	6458
Power Cord 4.3m (14-ft), Drawer To OEM PDU (125V, 15A)	8408	E8D	6460
Power Cord 4.3m (14-ft), Drawer to wall/OEM PDU (250V/15A) U. S.	8408	E8D	6469
Power Cord 1.8m (6-ft), Drawer to wall (125V/15A)	8408	E8D	6470
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU (125V/15A)	8408	E8D	6471
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU (250V/16A)	8408	E8D	6472
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU (250V/10A)	8408	E8D	6473
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/13A)	8408	E8D	6474
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/16A)	8408	E8D	6475
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/10A)	8408	E8D	6476
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/16A)	8408	E8D	6477
Power Cord 2.7 M(9-foot), To wall/OEM PDU, (250V, 16A)	8408	E8D	6478
Power Cord (9-foot) , To wall/OEM PDU, (250V, 10A)	8408	E8D	6479
Power Cord 1.8M (6-foot),To wall, (250V, 15A), United States	8408	E8D	6487
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (125V/15A or 250V/10A )	8408	E8D	6488
4.3m (14-Ft) 3PH/24A 380-415V Power Cord	8408	E8D	6489
4.3m (14-Ft) 1PH/48A 200-240V Power Cord	8408	E8D	6491
4.3m (14-Ft) 1PH/48-60A 200-240V Power Cord	8408	E8D	6492
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/10A)	8408	E8D	6493
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/10A)	8408	E8D	6494
Power Cord (9-foot), To wall/OEM PDU, (250V, 10A)	8408	E8D	6495
Power Cord 2.7M (9-foot), To wall/OEM PDU, (250V, 10A)	8408	E8D	6496
Power Cord (6-foot), To wall/OEM PDU, (250V, 10A)	8408	E8D	6497
Power Cord (6-foot), To wall/OEM PDU, (250V, 15A)	8408	E8D	6498
Power Cable - Drawer to IBM PDU, 200-240V/10A	8408	E8D	6577
Optional Rack Security Kit	8408	E8D	6580
Modem Tray for 19-Inch Rack	8408	E8D	6586
Power Cord 2.7M (9-foot), To wall/OEM PDU, (125V, 15A)	8408	E8D	6651
4.3m (14-Ft) 1PH/24-30A Pwr Cord	8408	E8D	6654
4.3m (14-Ft) 1PH/24-30A WR Pwr Cord	8408	E8D	6655
4.3m (14-Ft)1PH/24A Power Cord	8408	E8D	6656
Power Cord 2.7M (9-foot), To wall/OEM PDU, (250V, 15A)	8408	E8D	6659
Power Cord 4.3m (14-ft), Drawer to wall/OEM PDU (125V/15A)	8408	E8D	6660
Power Cord 2.8m (9.2-ft), Drawer to wall/IBM PDU, (250V/10A)	8408	E8D	6665
Power Cord 4.3M (14-foot), Drawer to OEM PDU, (250V, 15A)	8408	E8D	6669
Power Cord (6-foot), To wall (125V, 15A), PT #59	8408	E8D	6670
Power Cord 2.7M (9-foot), Drawer to IBM PDU, 250V/10A	8408	E8D	6671
Power Cord 1.5M (5-foot), Drawer to IBM PDU, 250V/10A	8408	E8D	6672
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/10A)	8408	E8D	6680
Power Cord (6-foot), To wall, (250V, 15A)	8408	E8D	6687

Intelligent PDU+, 1 EIA Unit, Universal UTG0247

Connector	8408	E8D	7109
Environmental Monitoring Probe	8408	E8D	7118
Power Distribution Unit	8408	E8D	7188
Quantity 150 of #3676	8408	E8D	7517
Quantity 150 of #3677	8408	E8D	7518
Quantity 150 of #3678	8408	E8D	7519
Quantity 150 of #3586	8408	E8D	7535
Quantity 150 of #3587	8408	E8D	7536
Quantity 150 of #3658	8408	E8D	7538
Quantity 150 of #1884	8408	E8D	7543
Quantity 150 of #1888	8408	E8D	7544
Quantity 150 of #1885	8408	E8D	7547
Quantity 150 of #1886	8408	E8D	7548
Quantity 150 of #3647	8408	E8D	7549
Quantity 150 of #1790	8408	E8D	7550
Quantity 150 of #1911	8408	E8D	7557
Quantity 150 of #3648	8408	E8D	7564
Quantity 150 of #3649	8408	E8D	7565
Quantity 150 of #1916	8408	E8D	7566
QTY 150, 177GB SFF-1 SSD w/ eMLC (AIX/Linux)	8408	E8D	7578
QTY 150, 177GB SFF-1 SSD w/ eMLC (IBM i)	8408	E8D	7582
OEM (Generic) Indicator	8408	E8D	7770
OEM (GROUPE BULL) Indicator	8408	E8D	7773
OEM (Hitachi) Indicator	8408	E8D	7775
OEM Publications for IBM Logo Product	8408	E8D	7779
2.0m Rack Side Attach Kit	8408	E8D	7780
PowerVM Express	8408	E8D	7793
PowerVM Standard	8408	E8D	7794
PowerVM Enterprise	8408	E8D	7795
Ethernet Cable, 6M, Hardware Management Console to System Unit	8408	E8D	7801
Ethernet Cable, 15m, Hardware Management Console to System Unit	8408	E8D	7802
Side-by-Side for 1.8m Racks	8408	E8D	7840
Ruggedize Rack Kit	8408	E8D	7841
PCI Blind Swap Cassette Kit, Single Wide Adapters, Type II	8408	E8D	7862
PCI Blind Swap Cassette Kit, Double Wide Adapters, Type III	8408	E8D	7863
Linux Software Preinstall	8408	E8D	8143
Linux Software Preinstall (Business Partners)	8408	E8D	8144
Mouse - USB, with Keyboard Attachment Cable	8408	E8D	8841
USB Mouse	8408	E8D	8845
Order Routing Indicator- System Plant	8408	E8D	9169
Language Group Specify - US English	8408	E8D	9300
specify mode-1 & (1)5901/5278 for EXP24S #5887	8408	E8D	9359
Specify mode-1 & (2)5901/5278 for EXP24S #5887	8408	E8D	9360
Specify mode-2 & (2)5901/5278 for EXP24S #5887	8408	E8D	9361
Specify mode-4 & (4)5901/5278 for EXP24S #5887	8408	E8D	9365
Specify mode-2 & (4)5901/5278 for EXP24S #5887	8408	E8D	9366
Specify mode-1 & (2)5903/5805 for EXP24S #5887	8408	E8D	9367
Specify mode-2 & (4)5903/5805 for EXP24S #5887	8408	E8D	9368
Specify mode-1 & CEC SAS port for EXP24 #5887	8408	E8D	9384
Specify mode-1 & (2) 5913 for EXP24S #5887	8408	E8D	9385
Specify mode-2 & (4) 5913 for EXP24S #5887	8408	E8D	9386
Specify Mode-1 & EXP30 for 1 EXP24S #5887	8408	E8D	9388
New AIX License Core Counter	8408	E8D	9440
New IBM i License Core Counter	8408	E8D	9441
New Red Hat License Core Counter	8408	E8D	9442
New SUSE License Core Counter	8408	E8D	9443
Other AIX License Core Counter	8408	E8D	9444
Other Linux License Core Counter	8408	E8D	9445
3rd Party Linux License Core Counter	8408	E8D	9446
VIOS Core Counter	8408	E8D	9447
Other IBM i License Core Counter	8408	E8D	9448
Month Indicator	8408	E8D	9461
Day Indicator	8408	E8D	9462
Hour Indicator	8408	E8D	9463
Minute Indicator	8408	E8D	9464
Qty Indicator	8408	E8D	9465
Countable Member Indicator	8408	E8D	9466
Language Group Specify - Dutch	8408	E8D	9700
Language Group Specify - French	8408	E8D	9703

Language Group Specify - German	8408	E8D	9704
Language Group Specify - Polish	8408	E8D	9705
Language Group Specify - Norwegian	8408	E8D	9706
Language Group Specify - Portuguese	8408	E8D	9707
Language Group Specify - Spanish	8408	E8D	9708
Language Group Specify - Italian	8408	E8D	9711
Language Group Specify - Canadian French	8408	E8D	9712
Language Group Specify - Japanese	8408	E8D	9714
Language Group Specify - Traditional Chinese (Taiwan)	8408	E8D	9715
Language Group Specify - Korean	8408	E8D	9716
Language Group Specify - Turkish	8408	E8D	9718
Language Group Specify - Hungarian	8408	E8D	9719
Language Group Specify - Slovakian	8408	E8D	9720
Language Group Specify - Russian	8408	E8D	9721
Language Group Specify - Simplified Chinese (PRC)	8408	E8D	9722
Language Group Specify - Czech	8408	E8D	9724
Language Group Specify -- Romanian	8408	E8D	9725
Language Group Specify - Croatian	8408	E8D	9726
Language Group Specify -- Slovenian	8408	E8D	9727
Language Group Specify - Brazilian Portuguese	8408	E8D	9728
Language Group Specify - Thai	8408	E8D	9729
Customer Install MES	8408	E8D	9742
Notify CSO After Install	8408	E8D	9743
Product Renovated by IBM Indicator	8408	E8D	9993
PCIe2 2-Port 10GbE RoCE SFP+ Adapter	8408	E8D	EC28
PCIe2 2-Port 10GbE RoCE SR Adapter	8408	E8D	EC30
0.6m (2.0-ft), Blue CAT5 Ethernet Cable	8408	E8D	ECB0
1.5m (4.9-ft), Blue CAT5 Ethernet Cable	8408	E8D	ECB2
Custom Service Specify, Shenzhen, China	8408	E8D	ECSC
EXP30 Ultra SSD I/O Drawer	8408	E8D	EDR1
SPSS on Power Solution Indicator	8408	E8D	EHSS
Specify Mode-1 & (1)ESA1/ESA2 for EXP24S #5887	8408	E8D	EJP1
Specify Mode-1 & (2)ESA1/ESA2 for EXP24S #5887	8408	E8D	EJP2
Specify Mode-2 & (2)ESA1/ESA2 for EXP24S #5887	8408	E8D	EJP3
Specify Mode-2 & (4)ESA1/ESA2 for EXP24S #5887	8408	E8D	EJP4
Specify Mode-4 & (4)ESA1/ESA2 for EXP24S #5887	8408	E8D	EJP5
Specify Mode-2 & (1)ESA1/ESA2 for EXP24S #5887	8408	E8D	EJP6
Specify Mode-2 (2)ESA1/ESA2 for EXP24 #5887	8408	E8D	EJP7
Specify mode-2 (1) ESA1/ESA2 for EXP24 #5887	8408	E8D	EJPA
Specify mode-2 (2)ESA1/ESA2 for EXP24#5887	8408	E8D	EJPB
Specify mode-4 (1)ESA1/ESA2 for EXP24 #5887	8408	E8D	EJPC
Specify mode-4 (2)ESA1/ESA2 for EXP24 #5887	8408	E8D	EJPD
Specify mode-4 (3)ESA1/ESA2 for EXP24 #5887	8408	E8D	EJPE
Specify mode-2 (1)5901/5278 for EXP24 #5887	8408	E8D	EJPJ
Specify mode-2 (2)5901/5278 for EXP24 #5887	8408	E8D	EJPK
Specify mode-4 (1)5901/5278 for EXP24 #5887	8408	E8D	EJPL
Specify mode-4 (2)5901/5278 for EXP24 #5887	8408	E8D	EJPM
Specify mode-4 (3)5901/5278 for EXP24 #5887	8408	E8D	EJPN
Specify mode-2 (2)5903/5805 for EXP24 #5887	8408	E8D	EJPR
Specify mode-2 (2)5913 for EXP24 #5887	8408	E8D	EJPT
Specify Left Half 12X I/O Drawer to ESA1/ESA2	8408	E8D	EJPY
Specify Right Half 12X I/O Drawer to ESA1/ESA2	8408	E8D	EJPZ
Full width Keyboard -- USB, US English, #103P	8408	E8D	EK51
Full width Keyboard -- USB, French, #189	8408	E8D	EK52
Full width Keyboard -- USB, Italian, #142	8408	E8D	EK53
Full width Keyboard -- USB, German/Austrian, #129	8408	E8D	EK54
Full width Keyboard -- USB, UK English, #166P	8408	E8D	EK55
Full width Keyboard -- USB, Spanish, #172	8408	E8D	EK56
Full width Keyboard -- USB, Japanese, #194	8408	E8D	EK57
Full width Keyboard -- USB, Brazilian Portuguese, #275	8408	E8D	EK58
Full width Keyboard -- USB, Hungarian, #208	8408	E8D	EK59
Full width Keyboard -- USB, Korean, #413	8408	E8D	EK60
Full width Keyboard -- USB, Chinese, #467	8408	E8D	EK61
Full width Keyboard -- USB, French Canadian, #445	8408	E8D	EK62
Full width Keyboard -- USB, Belgian/UK, #120	8408	E8D	EK64
Full width Keyboard -- USB, Swedish/Finnish, #153	8408	E8D	EK65
Full width Keyboard -- USB, Danish, #159	8408	E8D	EK66
Full width Keyboard -- USB, Bulgarian, #442	8408	E8D	EK67
Full width Keyboard -- USB, Swiss/French/German, #150	8408	E8D	EK68
Full width Keyboard -- USB, Norwegian, #155	8408	E8D	EK69

Full width Keyboard -- USB, Dutch, #143	8408	E8D	EK70
Full width Keyboard -- USB, Portuguese, #163	8408	E8D	EK71
Full width Keyboard -- USB, Greek, #319	8408	E8D	EK72
Full width Keyboard -- USB, Hebrew, #212	8408	E8D	EK73
Full width Keyboard -- USB, Polish, #214	8408	E8D	EK74
Full width Keyboard -- USB, Slovakian, #245	8408	E8D	EK75
Full width Keyboard -- USB, Czech, #243	8408	E8D	EK76
Full width Keyboard -- USB, Turkish, #179	8408	E8D	EK77
Full width Keyboard -- USB, LA Spanish, #171	8408	E8D	EK78
Full width Keyboard -- USB, Arabic, #253	8408	E8D	EK79
Full width Keyboard -- USB, Thai, #191	8408	E8D	EK80
Full width Keyboard -- USB, Russian, #443	8408	E8D	EK81
Full width Keyboard -- USB, Slovenian, #234	8408	E8D	EK82
Full width Keyboard -- USB, US English Euro, #103P	8408	E8D	EK83
Trial PowerVM Live Partition Mobility	8408	E8D	ELPM
Memory Riser Card	8408	E8D	EM01
8GB (2x4GB) Memory DIMMs, 1066 MHz, 2Gb DDR3 DRAM	8408	E8D	EM08
16GB (2x8GB) Memory DIMMs, 1066 MHz, 4Gb DDR3 DRAM	8408	E8D	EM4B
32GB (2x16GB) Memory DIMMs, 1066 MHz, 4Gb DDR3 DRAM	8408	E8D	EM4C
1m (3.3-ft), 10GbE Net Cable SFP+ Act Twinax Copper	8408	E8D	EN01
3m (9.8-ft), 10Gb E Net Cable SFP+ Act Twinax Copper	8408	E8D	EN02
5m (16.4-ft), 10Gb E Net Cable SFP+ Act Twinax Copper	8408	E8D	EN03
PCIe x8 Cable 1.5m	8408	E8D	EN05
PCIe x8 Cable 3m	8408	E8D	EN07
PCIe x8 Cable 8m	8408	E8D	EN08
PCIe2 16Gb 2-port Fibre Channel Adapter	8408	E8D	EN0A
PCIe2 4-port (10Gb FCoE & 1GbE) SR&RJ45	8408	E8D	EN0H
Integrated Multifunction Card w/ 10GbE RJ45 & Copper Twinax	8408	E8D	EN10
Integrated Multifunction Card w/ 10GbE RJ45 & SR Optical	8408	E8D	EN11
Processor & Memory Backplane	8408	E8D	EPT1
4.0 GHz , 8-core POWER7+ Processor DCM (2x4-core)	8408	E8D	EPT7
3.5 GHz , 8-core POWER7+ Processor DCM (2x4-core)	8408	E8D	EPT8
1-core activation of #EPT7 (No charge)	8408	E8D	EPTC
1-core activation of #EPT8 (No charge)	8408	E8D	EPTD
1-core activation of #EPT7	8408	E8D	EPTE
1-core activation of #EPT8	8408	E8D	EPTF
Service Processor	8408	E8D	EPTR
Storage Backplane	8408	E8D	EPTS
Quantity 150 of #3452 SAS YO Cable 6m - HD 6Gb Adapter to Enclosure	8408	E8D	EQ02
Quantity 150 of #3453 SAS YO Cable 10m - HD 6Gb Adapter to Enclosure	8408	E8D	EQ03
Quantity 150 of #ES0A	8408	E8D	EQ0A
Quantity of 150 #ES0B	8408	E8D	EQ0B
Quantity of 150 #ES0C	8408	E8D	EQ0C
Quantity of 150 #ES0D	8408	E8D	EQ0D
Quantity 150 of #1737 (856GB SFF-1 disk)	8408	E8D	EQ37
Quantity 150 of #1738 (856GB SFF-2 disk)	8408	E8D	EQ38
Quantity 150 of #1751 (900GB SFF-1 disk)	8408	E8D	EQ51
Quantity 150 of #1752 (900GB SFF-2 disk)	8408	E8D	EQ52
Power Cable - Drawer to IBM PDU, 200-240V/10A	8408	E8D	EQ77
RFID Tags for Servers, Compute Nodes, Chassis, Racks, and HMCs	8408	E8D	ERF1
Optional Front Door for Power 770 & 780 2.0m Rack	8408	E8D	ERG7
387GB 1.8" SAS SSD for AIX/Linux with eMLC	8408	E8D	ES02
387GB 1.8" SAS SSD for IBM i with eMLC	8408	E8D	ES04
387GB SFF-1 SSD for AIX/Linux with eMLC	8408	E8D	ES0A
387GB SFF-1 SSD for IBM i with eMLC	8408	E8D	ES0B
387GB SFF-2 SSD for AIX/Linux with eMLC	8408	E8D	ES0C
387GB SFF-2 SSD for IBM i with eMLC	8408	E8D	ES0D
PCIe2 RAID SAS Adapter Dual-port 6Gb	8408	E8D	ESA1
S&H - No Charge	8408	E8D	ESC0
S&H	8408	E8D	ESC7
Six ES02 387GB 1.8" SAS SSD for AIX/Linux with eMLC	8408	E8D	ESR2
Six ES04 387GB 1.8" SAS SSD for IBM i with eMLC	8408	E8D	ESR4



Four ES0A 387GB SFF-1 SSD for AIX/Linux with eMLC	8408	E8D	ESRA
Four ES0B 387GB SFF-1 SSD for IBM i with eMLC	8408	E8D	ESRB
Four ES0C 387GB SFF-2 SSD for AIX/Linux with eMLC	8408	E8D	ESRC
Four ES0D 387GB SFF-2 SSD for IBM i with eMLC	8408	E8D	ESRD
1TB Removable Disk Drive Cartridge	8408	E8D	EU01
RDX USB External Docking Station for Removable Disk Cartridge	8408	E8D	EU04
RDX 320 GB Removable Disk Drive	8408	E8D	EU08
1.5TB Removable Disk Drive Cartridge	8408	E8D	EU15
10G Base T Wrap	8408	E8D	EU20

The following are newly announced features on the specific models of the IBM Power Systems 7014 machine type:

### **Planned availability date: March 15, 2013**

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#### ***New feature***

Description	MT	Model	Feature
Rack Content Specify: 8408-E8D	7014	B42	ER02
	7014	T00	
	7014	T42	

#### ***Feature conversions***

The existing components being replaced during a model or feature conversion become the property of IBM and must be returned.

Feature conversions are always implemented on a "quantity of one for quantity of one" basis. Multiple existing features may not be converted to a single new feature. Single existing features may not be converted to multiple new features.

The following conversions are available to customers:

#### ***Feature conversions for 8408-E8D virtualization engine features***

From FC:	To FC:	Return parts
7793 - PowerVM Express	7794 - PowerVM Standard	No
7793 - PowerVM Express	7795 - PowerVM Enterprise	No
7794 - PowerVM Standard	7795 - PowerVM Enterprise	No

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## **Publications**

IBM Power Systems hardware documentation provides you with the following topical information:

- System overview
- Planning for the system
- Installing and configuring the system
- Working with consoles, terminals, and interfaces
- Managing system resources
- Working with operating systems and software applications
- Troubleshooting, service, and support

Product documentation is available on a DVD (SK5T-7087), which is shipped with the Power 750, or you can access the product documentation at

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/index.jsp>

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## Services

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### Global Technology Services

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IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure to be an On Demand Business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or visit

<http://www.ibm.com/services/>

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or visit

<http://www.ibm.com/services/continuity>

For details on education offerings related to specific products, visit

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

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

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## Technical information

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### Specified operating environment

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#### *Physical specifications*

IBM Power 750 Express server (8408-E8D)

- Rack-mount:
  - Width: 447 mm (17.6 in)
  - Depth: 858 mm (33.8 in)
  - Height: 217 mm (8.56 in), 5 EIA units
  - Weight: 70.3 kg (155 lb)

To assure installability and serviceability in non-IBM industry-standard racks, review the installation planning information for any product-specific installation requirements.

#### *Operating environment*

- Temperature:
  - 5 to 45 degrees C (41 to 113 F) nonoperating
  - 5 to 35 degrees C (41 to 95 F) operating
- Relative humidity: (noncondensing):
  - 8% to 80% nonoperating
  - 20% to 80% operating
- Maximum dew point:
  - 28 degrees C (82 F) nonoperating
  - 29 degrees C (84 F) operating
- Operating voltage: 200 to 240 V ac

- Operating frequency: 50 to 60 Hz +/- 3 Hz
- Power consumption: 2,400 watts maximum (32 cores active)
- Power source loading: 2.45 kVA maximum (32 cores active)
- System power calculator is available at  
<http://www-912.ibm.com/see/EnergyEstimator>
- Power factor: 0.98
- Thermal output: 8,189 Btu/hr maximum (32 cores active)
- Maximum altitude: 3,048 m (10,000 ft)
- Noise level (weighted sound power) - LWAd(B):
  - 7.1 bels (operating/idle)
  - 6.5 bels (operating/idle) with acoustic rack doors (#6248 or #6249)
- Energy scale, maximum frequency: 8.2 bels (operating/idle)
- With high power PCIe adapters: 7.6 bels (operating/idle)
- Noise level (weighted sound pressure (LpAm(dB)):
  - 55 dB (operating/idle)
  - 49 dB (operating/idle) with acoustic rack doors (#6248 or #6249)
- Energy Scale, maximum frequency: 66 dB (operating/idle)
- With high power PCIe adapters: 60 dB (operating/idle)

**Notes:**

1. Declared level LWAd is the upper-limit weighted average sound power level measured at the 1-meter bystander position.
2. Declared level LpAm is the mean average weighted sound pressure level measured at the 1-meter bystander position.
3. B and dB are abbreviations for bels and decibels respectively where 1 B = 10 dB.
4. All data is for 25 degrees C or below

***EMC conformance classification***

This equipment is subject to FCC rules and shall comply with the appropriate FCC rules before final delivery to the buyer or centers of distribution.

- U.S.: FCC CFR, Title 47, Part 15, EMI Class A
- EEA, Turkey: EU Council Directive 2004/108/EC, EMI Class A
- Japan: VCCI Council, EMI Class A
- Korea: KCC, EMI Class A
- China (PRC): CPCS, EMI Class A
- Taiwan: Taiwan BSMI, EMI Class A
- Australia\New Zealand: ACMA, EMI Class A
- Canada: ICES-003, EMI Class A
- Russia: GOST R, EMI Class A
- Saudi Arabia: MoCI, EMI Class A
- Vietnam: MPT, EMI Class A

***Homologation -- Telecom Type Approval***

Homologation approval for specific countries has been initiated with the IBM Homologation and Type Approval (HT&A) organization in LaGaude, France.

This product is not certified for connection by any means whatsoever to interfaces of public telecommunications networks. Certification may be required by law prior to making any such connection. Contact an IBM representative or reseller for any questions.

### **Product safety/Country testing/Certification**

- UL 60950-1 1st Edition Underwriters Laboratory, Safety Information
- CAN/CSA22.2 No. 60950-1 1st Edition
- EN60950-1:2001 European Norm
- GS Mark (Safety, TUV, EN60950)- Germany, Europe
- IEC 60950-1 1st Edition, International Electrotechnical Commission, Safety Information
- Nordic deviations to IEC 60950-1 1st Edition

### **General requirements**

The product is in compliance with IBM Corporate Bulletin C-B 0-2594-000 Statement of Conformity of IBM Product to External Standard (Suppliers Declaration).

### **Homologation**

This product is not certified for direct connection by any means whatsoever to interfaces of public telecommunications networks. Certification may be required by law prior to making any such connection. Contact an IBM representative or reseller for any questions.

### **Hardware requirements**

#### **Power 750 Express minimum system configuration**

Each Power 750 Express order must include a minimum of the following items:

- One Power 750 Express Central Electronics Complex (CEC) drawer with the following items:
    - One Processor and Memory Backplane (#EPT1)
    - Service Processor (#EPTR)
    - One Storage Backplane (#EPTS)- optional (see below)
    - Two ac power supplies (#5532)
    - Two power cords; one for each power supply (#5532). These are selected by the customer and should be rated at 200-240 V and 10A.
    - One 8-core processor DCM (#EPT7/#EPT8)
    - Eight processor activations (#EPTC/E, #EPTD/F)
    - 32 GB of system memory (4 DIMMS)
    - One Removable Media Device (#5771) :optional, a stand-alone system (not network-attached) would required this feature.
    - One optional Integrated Multifunction Card (one of these):
      - Quad Ethernet 2 X 1 GB and 2 X 10 GB Optical (#1769)
      - Quad Ethernet 2 X 1 GB and 2 X 10 GB Copper (#1768)
      - Dual 10 Gb Copper + Dual 1/10 Gb Ethernet (#EN10)
      - Dual 10 Gb Optical + Dual 1/10 Gb Ethernet (#EN11)
- Note:** The Ethernet ports and serial port of the Integrated Multifunction Card is not natively supported by IBM i and thus can not be used for IBM i LAN console support. The #5899 4-port Ethernet adapter is usually used with this function or an optional HMC can be used for IBM i console functions.
- One Language Group Specify (#9300 or #97xx)
  - One primary operating system (one of these):
    - AIX (#2146)
    - Linux (#2147)
    - IBM i (#2145)
  - DASD/Data Protection: If IBM i (#2145) is selected, one of the following is required:

- Disk mirroring (default): Requires feature 0040, 0043, or 0308.
- SAN boot (#0837).
- RAID: Requires feature 5679 and either feature 0041 or 0047.
- Mixed Data Protection (#0296).
- Choose one processor DCM from:
  - 8-core 3.5 GHz POWER7+ processor DCM (#EPT8)
  - 8-core 4.0 GHz POWER7+ processor DCM (#EPT7)
- Choose eight processor activations from:
  - 8 x #EPTE = 8-core activations of DCM processor #EPT7
  - 4 x #EPTC plus 4 x #EPTE = 8-core activations of DCM processor #EPT7
  - 8 x #EPTF = 8-core activations of DCM processor #EPT8
  - 4 x #EPTD plus 4 x #EPTF = 8-core activations of DCM processor #EPT8

**Note:** The no-charge processor core activations, #EPTC and #EPTD, have a minimum prerequisite of 8 GB active memory per core before they can be ordered. That is, a minimum of 64 GB of active memory per DCM is a prerequisite before ordering the no-charge processor core activations. When either EPTC or EPTD are ordered, 50% of the DCM processor core activations can be no-charge #EPTC/EPTD and at least 50% must be priced #EPTE/EPTF. Processor activations are only available to SDIs as MES orders.
- On a new server order this 8 GB/core minimum applies to the entire server in order for the no-charge #EPTC/D activation features to be ordered. If a MES order, the 8 GB/core rule is also applied to the entire 750 server configuration, not just the new MES order. If the GB/core 750 configuration is lower than 8 GB/core, then the no-charge #EPTC/D activations cannot be ordered and all activations must be the full price #EPTE/F. If the server previously had not qualified for the no-charge #EPTC/D activations and a MES order is placed with enough memory to meet the 8 GB/core minimum on the entire server (original plus MES), then a maximum of 50% of the cores activation features on that MES order can be no-charge #EPTC/D. If the server previously had a great deal of memory and little or no memory was ordered with a new processor DCM MES order, then no-charge #EPTC/D can still be used on 50% of the MES core activations as long as the system 8 GB/core minimum is still satisfied.
 

**Note:** Processor activations are only available to SDIs as MES orders.
- Choose 32 GB minimum system memory with a minimum of two identical memory feature numbers from:
  - 8 GB (2 x 4 GB) Memory DIMMs, 1066 MHz, 2 Gb (EM08, Qty=4)
  - 16 GB (2 x 8 GB) Memory DIMMs, 1066 MHz, 2 Gb (EM4B, Qty=2)
  - 32 GB (2 x 16 GB) Memory DIMMs, 1066 MHz, 2 Gb (EM4C, Qty=2)
- DASD/Media backplane with external SAS port, 6 x 2.5-inch DASD/SSD (#EPTS)
  - The minimum system configuration requires at least one SAS HDD or SSD in the system for AIX or Linux and two for IBM i, or if using a Fibre Channel attached SAN (indicated by feature number 0837), an HDD or SSD is not required. Attachment of the SAN using a Fibre Channel over Ethernet connection is also supported.
- If IBM i native support is required, choose Ethernet card from:
  - 2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter (#5767)
  - 2-Port Gigabit Ethernet-SX PCI Express Adapter (#5768)
  - 10 Gigabit Ethernet-LR PCI Express Adapter (#5772)
  - PCIe2 4-Port 1 GbE Adapter (#5899)
- Choose DASD/SSD from:
  - 856 GB 10K RPM SAS SFF Disk Drive ( IBM i)(#1737)
  - 856 GB 10K RPM SAS SFF-2 Disk Drive ( IBM i)(#1738)
  - 900 GB 10K RPM SAS SFF Disk Drive (AIX/Linux)(#1751)

- 900 GB 10K RPM SAS SFF-2 Disk Drive (AIX/Linux)(#1752)
- 600 GB 10K RPM SAS SFF Disk Drive (AIX/Linux)(#1790)
- 300 GB 10K RPM SFF SAS Disk Drive (#1885)
- 146 GB 15K RPM SFF SAS Disk Drive (AIX/Linux)(#1886)
- 139 GB 15K RPM SFF SAS Disk Drive ( IBM i)(#1888)
- 283 GB 10K RPM SFF SAS Disk Drive ( IBM i)(#1911)
- 571 GB 10K RPM SAS SFF Disk Drive ( IBM i)(#1916)
- 146 GB 15K RPM SAS SFF-2 Disk Drive (AIX/Linux)(#1917)
- 300 GB 10K RPM SAS SFF-2 Disk Drive (AIX/Linux)(#1925)
- 139 GB 15K RPM SAS SFF-2 Disk Drive ( IBM i)(#1947)
- 283 GB 15K RPM SAS SFF-2 Disk Drive ( IBM i)(#1948)
- 300 GB 15K RPM SAS SFF-2 Disk Drive (AIX/Linux)(#1953)
- 283 GB 10K RPM SAS SFF-2 Disk Drive ( IBM i)(#1956)
- 571 GB 10K RPM SAS SFF-2 Disk Drive ( IBM i)(#1962)
- 600 GB 10K RPM SAS SFF-2 Disk Drive (AIX/Linux)(#1964)

## **RAID**

There are multiple protection options for disk/SSD drives in the SAS SFF bays in Power 750 Express system unit or drives in 12X attached I/O drawers or drives in disk-only I/O drawers. Although protecting drives is always recommended, AIX/ Linux users can choose to leave some or all drives unprotected at their own risk and IBM supports these configurations. IBM i configuration rules differ in this regard, and IBM supports IBM i partition configurations only when disk/SSD drives are protected.

This disk/SSD drive protection can be provided by AIX , IBM i, or Linux software or by the disk/SSD hardware controllers. Mirroring of drives is delivered by AIX , IBM i, or Linux software. In addition, AIX and Linux support controllers that include RAID 0, 5, 6, or 10. IBM i integrated storage management already offers striping, so IBM i also supports controllers that include RAID 5 or 6. To further augment disk/SSD protection, hot spare capability can be used for protected drives. Specific hot spare prerequisites apply.

An integrated SAS Disk/SSD controller is included in the Power 750 Express system unit. It is optionally augmented by a 175 MB write cache and RAID 5 and RAID 6 capability when feature 5679 is added to the configuration. Without feature 5679, the integrated controller supports system mirroring protection for AIX , IBM i, and Linux and supports RAID 0 or 10 protection for AIX and Linux . Other disk/SSD controllers are provided as PCIe adapters. PCI controllers with and without write cache are supported.

AIX and Linux can use disk drives formatted with 512 byte blocks when being mirrored by the operating system. These disk drives must be reformatted to 528 byte sectors when used in RAID arrays. Although a small percentage of the drive's capacity is lost, additional data protection such as ECC and bad block detection is gained in this reformatting. For example, a 300 GB disk drive when reformatted provides around 283 GB. IBM i always uses drives formatted to 528 byte. IBM Power SSDs are formatted to 528 byte.

RAID 0 (minimum two drives) offers striping without parity for performance, but does not offer any fault tolerance. In data striping, data is broken down into several smaller, equally sized pieces. Each piece is then written to or read from multiple drives. This process increases I/O bandwidth by simultaneously accessing multiple data paths. Because RAID-0 does not offer any redundancy, a single drive failure can result in the loss of all data in a striped set. This means that all of the data on all the drives could be lost if even a single drive fails.

Note that RAID 0 drives can be mirrored by software to provide protection.

RAID 5 (minimum three drives) uses block-level data striping with distributed parity. RAID 5 stripes both data and parity information across three or more drives. Fault tolerance is maintained by ensuring that the parity information for any given block of data is placed on a drive separate from those used to store the data itself. RAID 5 requires N+1 drives to accommodate this parity data, thus the available storage capacity for each array is reduced by one drive to provide protection.

RAID 6 (minimum four drives) uses block-level data striping with dual distributed parity, the same as RAID 5 except RAID 6 uses a second level of independently calculated and distributed parity information for additional fault tolerance. This extra fault tolerance provides data security in the event two drives fail before a drive can be replaced. RAID 6 requires N+2 drives to accommodate the additional parity data.

RAID 10 is RAID 0 plus redundancy. In this type of implementation, an array with an even number of drives is created with mirrored pairs of drives within the array. A RAID 0 stripe set of data is created across the mirrored pairs for performance and for redundancy.

If a protected drive fails, the failing drive can be removed from its hot-plug bay and the drive replaced while the server and partition continue to run. The contents can then be re-created while the system continues to run. Note that until the drive is both replaced and its contents re-created, the protection provided using just mirroring or RAID 10 is absent for that drive's now unmirrored paired drive. Similarly, the entire RAID 5 array is unprotected until the failed drive is replaced and re-created. RAID 6 and hot spare were designed to provide additional protection.

### **Software requirements**

If installing the AIX operating system (one of these):

- AIX 7.1 with the 7100-02 Technology Level and Service Pack 2, or later
- AIX 6.1 with the 6100-08 Technology Level and Service Pack 2, or later
- AIX 6.1 with the 6100-07 Technology Level and Service pack 7, or later (planned availability March 29, 2013)
- AIX 6.1 with the 6100-06 Technology Level and Service pack 11, or later (planned availability March 29, 2013)

If installing the IBM i operating system (one of these):

- IBM i 7.1, or later
- IBM i 6.1 with machine code 6.1.1, or later
  - Requires all I/O to be virtual.
  - Cannot be ordered as the primary operating system with feature numbers 2145 and 0566.

If installing the Linux operating system, one of these:

- SUSE Linux Enterprise Server 11 Service Pack 2, or later, with current maintenance updates available from SUSE to enable all planned functionality
- Red Hat Enterprise Linux 6.4 for POWER, or later (planned availability February 21, 2013)

Users should also update their systems with the latest Linux for Power service and productivity tools available from IBM's website

<http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html>

If installing VIOS, use VIOS 2.2.2.2.

If installing Java™ 1.4.2 on POWER7+ servers, there are unique considerations when running Java 1.4.2 on POWER7+ . For best exploitation of the outstanding performance capabilities and most recent improvements of POWER7+ technology,

IBM recommends upgrading Java-based applications to Java 7, Java 6, or Java 5 whenever possible. For more information, refer to the following website

<http://www.ibm.com/developerworks/java/jdk/aix/service.html>

## **Limitations**

### **System**

- The integrated system port (the serial port on an Integrated Multifunction Card) is not supported under AIX or Linux when the HMC ports are connected to an HMC. Either the HMC ports or the integrated system ports can be used, but not both.
- The integrated system port is supported for modem and async terminal connections by AIX or Linux . Any other application using serial ports requires a serial port adapter to be installed in a PCI slot. The integrated system ports do not support HACMP™ configurations. IBM i does not support the use of the system port with or without an HMC.

### **Hardware management console (HMC) machine code**

If attaching an HMC to a new server or adding function to an existing server that requires a firmware update, the HMC machine code may need to be updated. Machine code includes firmware and microcode. Access to machine code updates is conditioned on entitlement and license validation in accordance with IBM policy and practice. IBM may verify entitlement through customer number, serial number, electronic restrictions, or any other means or methods employed by IBM in its discretion.

To determine the HMC machine code level required for the firmware level on any server, go to the following web page to access the Fix Level Recommendation Tool (FLRT) on or after the planned availability date for this product. FLRT will identify the correct HMC machine code for the selected system firmware level

<http://www14.software.ibm.com/webapp/set2/flrt/home>

If a single HMC is attached to multiple servers, the HMC machine code level must be updated to the server with the most recent firmware level. All prior levels of server firmware are supported with the latest HMC machine code level. The HMC V7.7.0 (SP1) contains the following:

- Support for managing IBM Power 750 and 760
- Support for PowerVM functions such as new HMC GUI interface for VIOS install
- Improved transition from IVM to HMC management
- Ability to update the user's password in Kerberos from the HMC for clients utilizing remote HMC

### **Boot requirements**

- Selection of feature 0837 will indicate boot from SAN.
- DASD/Data Protection: If IBM i (#2145) is selected, one of the following is required:
  - Disk mirroring (default): Requires feature 0040, 0043, or 0308.
  - SAN boot (#0837).
  - RAID: Requires feature 5679 and either feature 0041 or 0047.
  - Mixed Data Protection (#0296).
- If IBM i (#2145) is selected as the primary operating system and SAN boot is not selected (#0837), one of the following Load/Source specify codes must be specified:
  - #0837 -- SAN Load Source Specify
  - #0838 -- #3676 (69.7 GB 15K RPM HDD) Load Source Specify



- #0839 -- #3677 (139.5 GB 15K RPM HDD) Load Source Specify
- #0840 -- #3678 (283.7 GB 15K RPM HDD) Load Source Specify
- #0844 -- #3658 (428 GB 15K RPM HDD) Load Source Specify
- #0851 -- #1884 (69.7 GB 15K RPM SFF HDD) Load Source Specify
- #0853 -- #1888 (138 GB 15K RPM SFF HDD) Load Source Specify
- #0856 -- #3676 (69.7 GB 15K RPM HDD) Load Source Specify
- #0857 -- #3677 (139.5 GB 15K RPM HDD) Load Source Specify
- #0870 -- #1879 Load Source Specify
- #0871 -- #1947 (139 GB 15K RPM HDD) Load Source Specify
- #0872 -- #1948 (283 GB 15K RPM SFF HDD) Load Source Specify
- #0874 -- #1956 (283 GB 10K RPM SFF HDD) Load Source Specify
- #0875 -- #1962 (571 GB 10K RPM SFF HDD) Load Source Specify
- #0876 -- #1794 (177 GB S/S SFF) Load Source Specify IBM i
- #0879 -- #1737 (856 GB 10K RPM HDD) Load Source Specify IBM i
- #0880 -- #1738 (856 GB 10K RPM SFF HDD) Load Source Specify
- #0882 -- #ES04 (400 GB 1.8-inch SSD) Load Source Specify IBM i
- If IBM i (#2145) is selected and the load source disk unit is not in the CEC (system unit), one of the following specify codes must also be selected:
  - #0726 -- Specify Remote Load Source in #5802 (12X I/O Drawer PCIe with SFF bays) Disk
  - #0727 -- Remote Specify #5886 Load Source Placement (EXP12S I/O Drawer)
  - #0728 -- Specify #5887 Load Source Placement (EXP24S I/O Drawer)
  - #0729 -- Specify EXP30 Load Source Placement (#EDR1 Ultra SSD Drawer)
  - #0837 -- SAN Load Source Specify (Boot from SAN)
- If IBM i (#2145) is selected, one of the following system console specify codes must be selected:
  - #5550 -- System Console on HMC
  - #5553 -- System Console - Internal LAN

### **Processor and Memory Backplane (#EPT1)**

- One to four 8-core DCMs
  - 8-core (2 x 4-core) 3.5 GHz processor DCM (#EPT8)
  - 8-core (2 x 4-core) 4.0 GHz processor DCM (#EPT7)
- POWER7+ DDR3 Memory DIMMs (16 DIMMs per DCM)
  - 8 GB (2 x 4 GB), 1066 MHz (Two DIMMs, #EM08)
  - 16 GB (2 x 16 GB), 1066 MHz (Two DIMMs, #EM4B)
  - 32 GB (4 x 8 GB), 1066 MHz (Two DIMMs, #EM4C)

**Redundant fans:** Standard

**Power supply:** The base machine must contain two ac power supplies (#5532).

### **Power cords**

- Two power cords are required. A power cord must be ordered for each ac power supply (#5532).
- Power 750 Express requires 200-240 V ac for all configurations.

### **System memory**

- The DIMMs are plugged into memory riser cards (#EM01) located on the Processor and Memory Backplane (#EPT1). Each riser card has eight DIMM slots.

- Two memory riser cards (16 DIMM slots) must be installed per each installed DCM. Thus there are two, four, six, or eight riser cards depending on whether there are one, two, three, or four processor DCMs.
- The maximum system memory for each number of DCMs is the following:
  - Four processor DCMs: 1024 GB, 64 DIMMs x 16 GB/DIMM (32 x #EM4C)
  - Three processor DCMs: 768 GB (24 x #EM4C)
  - Two processor DCMs: 512 GB (16 x #EM4C)
  - One processor DCM: 256 GB (8 x #EM4C)
- Additional memory configuration details:
  - The minimum system memory with one processor DCM is 32 GB (2 x #EM4B, 4 DIMMS or 4 x #EM08, 8 DIMMS).
  - The minimum system memory with two processor DCMs is 32 GB (4 x #EM08, 8 DIMMS).
  - The minimum system memory with three processor DCMs is 48 GB (6 x #EM08, 12 DIMMS).
  - The minimum system memory with four processor DCMs is 64 GB (8 x #EM08, 16 DIMMS ).
  - Different system memory feature numbers may be mixed on each of the two memory riser cards servicing each DCM.
- Each riser card must have at least one memory feature code (two identical DIMMs)
- A memory riser card can have two, four, six, or eight DIMMs ordered by one, two, three, or four memory features. All the memory features can be the same in the riser card or up to two different size memory features can be used in the same riser card. If using two different size memory features, valid examples per riser card are:
  - Four DIMMs total: quantity of one memory feature code plus quantity one of any other memory feature
  - Six DIMMs total: quantity of one memory feature code plus quantity two of any other memory feature
  - Eight DIMMs total: quantity of two of one memory feature code plus quantity of two of any other memory feature

Invalid examples using more than one memory size feature are:

- More than two sizes of memory features (example: 8 GB plus 16 GB plus 32 GB in one riser)
- Quantity three of one memory features plus quantity one of another memory feature; use two sets of two features instead of this mixture for eight DIMMs
- Different system memory feature numbers can be mixed on each of the two memory riser cards associated with each DCM. Likewise, riser cards on multiple processor DCMs can have the same or different memory features.
- IBM recommends for better performance that the quantity of DIMMs should be evenly distributed across each of the riser cards. Also, secondarily IBM recommends the total quantity of GB on each riser card should be balanced as much as possible. Where possible, avoid having one riser card with more than twice the GB of another riser card on the server. These are general performance recommendations, not mandatory configuration rules, and the first recommendation is typically more significant than the second recommendation.
- The eight DIMM slots in a riser card are labeled C1, C2, C3, C4, C5, C6, C7 and C8. DIMM placement rules:
  - The DIMMs in C1 and C3 must be identical. Similarly the DIMMs in C2 and C4 must be identical and C5 and C7 must be identical and C6 and C8 must be identical.
  - The four DIMMs, if present in C1/C2/C3/C4, must be identical in a riser card  
The four DIMMs, if present in C5/C6/C7/C8, must be identical in a riser card.

Plans for future memory upgrades should be taken into account when deciding which memory feature size to use at the time of initial system order.

Memory features:

Feature	Feature number	Minimum quantity	Maximum quantity
8 GB 1066 MHz (2 x 4 GB RDIMMs)	EM08	0	32
16 GB 1066 MHz (2 x 8 GB RDIMMs)	EM4B	0	32
32 GB 1066 MHz (2 x 16 GB RDIMMs)	EM4C	0	32

**Drawer/Tower attachment:**

- Features 12X I/O Drawer PCIe SFF Disk (#5802) and 12X I/O Drawer PCIe No Disks (#5877)
  - A maximum of two per 12X loop is allowed.
  - A maximum of four are supported on the Power 750 Express .
  - No mixing of features 5802 and 5877 are allowed with other drawers on the same loop.
  - Features 5802 and 5887 are allowed on the same loop.
- Feature EXP12S SAS DASD Expansion Drawer (#5886)
  - EXP12S drawers are attached to a PCIe SAS adapter via SAS cables.
  - The system maximum is 27.
- Feature EXP30 Ultra SSD Expansion Drawer (#EDR1)
  - EXP30 drawers are attached to a PCIe x8 adapter (GX++) via PCIe x8 cables.
  - The system maximum is 2.

The following list shows I/O drawers that are supported or available on the 8408 machine type and the correct interface to use for each of the drawers.

Feature	Description	Order Status	Interface number	
5802	PCIe 12X I/O Drawer (w/Disk Bays)	Available	12X	4
5877	PCIe 12X I/O Drawer (No Disk Bays)	Available	12X	4
5887	EXP24S SFF Gen2-bay Drawer	Available	SAS	51
EDR1	EXP30 Ultra SSD I/O Drawer	Available	SSD	2
5886	EXP12S SAS Disk Drawer	Supported	SAS	27

**Note:** Two or more processor DCMs are required in order to attach a #5802, #5877, or #EDR1

Maximum number of attached I/O drawers per system:

Feature	Power 750 Express (48-core)		
	AIX	Linux	IBM i
5802	4	4	4
5877	4	4	4
5887	51	51	51
EDR1	2	2	2
5886	27	27	27

I/O drawers are connected to the adapters in the CEC with the following data transfer cables:

- 12X DDR cables for the feature 5802 and 5877 I/O drawers
- 12X SDR or DDR cables for the feature 5796 I/O drawers
- Two PCIe cables such as EN05, EN07, or EN08 connect to the I/O drawer (#EDR1)

## PCIe card slots

The Power 750 Express has a maximum of six PCIe 8x hot-plug slots.

- Optional 12X GX+ and GX++ adapters are used for attaching I/O expansion drawers with PCIe slots and, optionally, disk/SSD
  - (#1808) - GX++ 12X DDR Adapter, Dual-port connects #5802 or #5877 12X PCIe and/or SFF disk I/O drawer
  - (#1914) - GX++ 2-port PCIe2 x8 Adapter connects #EDR1 Ultra SSD I/O drawer

## Planning information

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### **Cable orders**

No additional cables are required.

### **Security, auditability, and control**

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This product uses the security and auditability features of host software and application software.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

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## IBM Electronic Services

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Electronic Service Agent and the IBM Electronic Support web portal are dedicated to providing fast, exceptional support to IBM Systems customers. The IBM Electronic Service Agent tool is a no-additional-charge tool that proactively monitors and reports hardware events, such as system errors, performance issues, and inventory. The Electronic Service Agent tool can help you stay focused on your company's strategic business initiatives, save time, and spend less effort managing day-to-day IT maintenance issues. Servers enabled with this tool can be monitored remotely around the clock by IBM Support all at no additional cost to you.

Electronic Service Agent is designed to automatically and electronically report system failures and utilization issues to IBM, which can result in faster problem resolution and increased availability. System configuration and inventory information collected by the Electronic Service Agent tool also can be viewed on the secure Electronic Support web portal, and used to improve problem determination and resolution by you and the IBM support team. To access the tool main menu, simply type "smitty esa\_main", and select "Configure Electronic Service Agent ." In addition, ESA now includes a powerful Web user interface, giving the administrator easy access to status, tool settings, problem information, and filters. For more information and documentation on how to configure and use Electronic Service Agent, refer to

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

The IBM Electronic Support portal is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. This portal enables you to gain easier access to IBM resources for assistance in resolving technical problems. The My Systems and Premium Search functions make it even easier for Electronic Service Agent tool-enabled customers to track system inventory and find pertinent fixes.

### **Benefits**

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**Increased uptime:** The Electronic Service Agent tool is designed to enhance the Warranty or Maintenance Agreement by providing faster hardware error reporting

and uploading system information to IBM Support. This can translate to less wasted time monitoring the "symptoms," diagnosing the error, and manually calling IBM Support to open a problem record. Its 24 x 7 monitoring and reporting mean no more dependence on human intervention or off-hours customer personnel when errors are encountered in the middle of the night.

**Security:** The Electronic Service Agent tool is designed to be secure in monitoring, reporting, and storing the data at IBM . The Electronic Service Agent tool securely transmits either via the Internet (HTTPS or VPN) or modem, and can be configured to communicate securely through gateways to provide customers a single point of exit from their site. Communication is one way. Activating Electronic Service Agent does not enable IBM to call into a customer's system. System inventory information is stored in a secure database, which is protected behind IBM firewalls. It is viewable only by the customer and IBM . The customer's business applications or business data is never transmitted to IBM .

**More accurate reporting:** Since system information and error logs are automatically uploaded to the IBM Support center in conjunction with the service request, customers are not required to find and send system information, decreasing the risk of misreported or misdiagnosed errors. Once inside IBM , problem error data is run through a data knowledge management system and knowledge articles are appended to the problem record.

**Customized support:** Using the IBM ID entered during activation, customers can view system and support information in the "My Systems" and "Premium Search" sections of the Electronic Support Web site at

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

My Systems provides valuable reports of installed hardware and software using information collected from the systems by Electronic Service Agent . Reports are available for any system associated with the customer's IBM ID. Premium Search combines the function of search and the value of Electronic Service Agent information, providing advanced search of the technical support knowledgebase. Using Premium Search and the Electronic Service Agent information that has been collected from your system, customers are able to see search results that apply specifically to their systems.

For more information on how to utilize the power of IBM Electronic Services, contact your IBM Systems Services Representative, or visit

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

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## Terms and conditions

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**Volume orders:** Contact your IBM representative.

### **IBM Global Financing**

Yes

ICA Lease or Financing Offering:	Yes
Eligible for Maintenance:	Yes

### **Warranty period**

One year

An IBM part or feature installed during the initial installation of an IBM machine is subject to a full warranty effective on the date of installation of the machine. An IBM part or feature that replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty effective on its date of installation. Unless specified

otherwise, the warranty period, type of warranty service, and service level of a part or feature are the same as those for the machine in which it is installed.

This product is provided with a one-year standard warranty. For your convenience, IBM has provided two additional years of extended warranty services plus an upgrade to 24x7 coverage to make this offering. Consult with your advisors about the appropriate financial treatment for this offering. See your sales representative for other available service options.

### **Warranty service**

If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone, or electronically via an IBM website. IBM may request Electronic Service Agent (ESA) activation and you must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend the time of your call and is subject to parts availability. If applicable to your product, parts considered Customer Replaceable Units (CRUs) will be provided as part of the machine's standard warranty service.

Service levels are response-time objectives, may be limited in some areas, and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country-specific and location-specific information.

### **Customer replacement parts**

Tier 1 CRUs are those parts which require minimal effort, skill, or experience in order to service. Tier 1 items are mandatory CRUs when base 9 x 5 next-business-day warranty or maintenance is specified in the terms and conditions contract and is in force. However, if the customer elects not to perform Tier 1 service, an IBM SSR may be contracted at an additional service charge to perform the service. If the customer has 7x24 warranty or maintenance in force, then all parts, Tier 1 and Tier2, may be replaced or serviced by a SSR without an additional charge.

The following parts have been designated as Tier 1 CRUs:

- Keyboard
- Control panel
- Mouse
- Display
- Mounting hardware
- Fans
- Line power cord
- Power supply
- DASD
- Ethernet adapters
- RAID battery card and battery
- Slim line DVD
- FSP Card and cable
- Internal to External SAS Cable
- PCI Adapter and Adapter Cassette
- DVD
- TOD Battery
- Clock Pass-thru card
- DDR3 Memory DIMMs

Tier 2 CRUs require more effort than Tier 1 CRUs and also require a higher level of skill and/or experience when being serviced by the customer. As with Tier 1 parts, if the customer elects not to perform Tier service, an IBM SSR may be contracted at an additional service charge to perform the service. If the customer has 7 x 24 warranty or maintenance in force, then all parts will be replaced or serviced by an SSR without an additional charge.

The following parts have been designated as Tier 2 CRUs:

- FSP Cable
- SAS DASD / Media Backplane
- I/O Planar
- Memory Riser Card/DASD/Media backplane with external SAS port, 8 x 2.5-inch
- Memory Regulator 5 Card

### ***CRU and on-site service***

At IBM's discretion, you will receive specified CRU service, or IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

Service level is:

- 9 hours per day, Monday through Friday, excluding holidays, next-business-day response. Calls must be received by 5:00 pm local time in order to qualify for next-business-day response.

### **Non-IBM parts service**

IBM is now shipping machines with selected non-IBM parts that contain an IBM field replaceable unit (FRU) part number label. These parts are to be serviced during the IBM machine warranty period. IBM is covering the service on these selected non-IBM parts as an accommodation to their customers, and normal warranty service procedures for the IBM machine apply.

### ***Warranty service upgrades***

### **Customer replaceable unit service and on-site service for other selected parts**

#### **Customer replacement parts**

Tier 1 CRUs are those parts which require minimal effort, skill, or experience in order to service. Tier 1 items are mandatory CRUs when base 9 x 5 next-business-day warranty or maintenance is specified in the terms and conditions contract and is in force. However, if the customer elects not to perform Tier 1 service, an IBM SSR may be contracted at an additional service charge to perform the service. If the customer has 7x24 warranty or maintenance in force, then all parts, Tier 1 and Tier2, may be replaced or serviced by a SSR without an additional charge.

The following parts have been designated as Tier 1 CRUs:

- Keyboard
- Mouse
- Display
- Mounting hardware
- Fans
- Line power cord
- Power supply
- DASD

- Ethernet adapters
- RAID battery card and battery
- Slim line DVD
- FSP Card and cable
- Internal to External SAS Cable
- PCI Adapter and Adapter Cassette
- DVD
- TOD Battery
- Clock Pass-thru card
- DDR3 Memory DIMMs

Tier 2 CRUs require more effort than Tier 1 CRUs and also require a higher level of skill and/or experience when being serviced by the customer. As with Tier 1 parts, if the customer elects not to perform Tier service, an IBM SSR may be contracted at an additional service charge to perform the service. If the customer has 7 x 24 warranty or maintenance in force, then all parts will be replaced or serviced by an SSR without an additional charge.

The following parts have been designated as Tier 2 CRUs:

- FSP Cable
- SAS DASD / Media Backplane
- Processor & Memory Backplane

### ***Maintenance services***

If required, IBM provides repair or exchange service depending on the types of maintenance service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically, via an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. IBM may request Electronic Service Agent (ESA) activation and you must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response-time objectives and are not guaranteed. The specified level of maintenance service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country-specific and location-specific information. The following service selections are available as maintenance options for your machine type.

### ***On-site service***

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose. The following service selections are available as warranty upgrades for your machine type.

Service levels are:

- 9 hours per day, Monday through Friday, excluding holidays, next- business-day response
- 9 hours per day, Monday through Friday, excluding holidays, 4-hour average, same-business-day response
- 24 hours per day, 7 days a week, 4-hour average response
- 24 hours per day, 7 days a week, 2-hour average response

**Note:** Canada does not support 2-hour average response.

<http://www-5.ibm.com/services/europe/maintenance/>



## **Non-IBM parts service**

Under certain conditions, IBM provides services for selected non-IBM parts at no additional charge for machines that are covered under maintenance services.

This service includes hardware problem determination (PD) on the non-IBM parts (for example, adapter cards, PCMCIA cards, disk drives, memory) installed within IBM machines and provides the labor to replace the failing parts at no additional charge.

If IBM has a Technical Service Agreement with the manufacturer of the failing part, or if the failing part is an accommodations part (a part with an IBM FRU label), IBM may also source and replace the failing part at no additional charge. For all other non-IBM parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or a maintenance service.

## **Warranty service upgrades**

### **IBM hourly service rate classification**

Two

When a type of service involves the exchange of a machine part, the replacement may not be new, but will be in good working order.

### **Field-installable features**

Yes

### **Model conversions**

No

### **Machine installation**

Customer setup. Customers are responsible for installation according to the instructions IBM provides with the machine.

### **Graduated program license charges apply**

Yes

The applicable processor tier is: Small

### **Licensed machine code**

IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement by contacting your IBM representative or visiting

[http://www.ibm.com/servers/support/machine\\_warranties/machine\\_code.html](http://www.ibm.com/servers/support/machine_warranties/machine_code.html)

Access to Machine Code updates is conditioned on entitlement and license validation in accordance with IBM policy and practice. IBM may verify entitlement through customer number, serial number, electronic restrictions, or any other means or methods employed by IBM in its discretion.

If the machine does not function as warranted and your problem can be resolved through your application of downloadable machine code, you are responsible for downloading and installing these designated Machine Code changes as IBM specifies.

If you would prefer, you may request IBM to install downloadable machine code changes; however, you may be charged for that service.

**Machine Code license acceptance requirement**

Acceptance-By-Use Machine: Yes, acceptance of the Machine Code license terms is conveyed through the user's initial use of the machine.

**Educational allowance**

Educational allowance: A reduced charge is available to qualified education customers. The educational allowance may not be added to any other discount or allowance.

The educational allowance is 5% for the products in this announcement.

**Prices**

Prices are subject to change without notice.

GST, QST, and sales taxes, where applicable, are extra.

For additional information and current prices, contact your local IBM representative.

**Product charges**

The following are newly announced features on the specific models of the IBM Power Systems 8408 machine type:

Description	Model Number	Feature Numbers	Initial/ MES/ Both/ Support	RP	
				CSU	MES
IBM Power 750	E8D			Yes	
One CSC Billing Unit	E8D	0010	Both	Yes	No
Ten CSC Billing Units	E8D	0011	Both	Yes	No
Mirrored System Disk Level, Sp	E8D	0040	Both	Yes	No
Device Parity Protection All	E8D	0041	Both	Yes	No
Mirrored System Bus Level	E8D	0043	Both	Yes	No
Device Parity RAID 6 All	E8D	0047	Both	Yes	No
RISC to RISC Data Migration	E8D	0205	Initial	Yes	No
AIX Partition Specify	E8D	0265	Both	Yes	No
Linux Partition Specify	E8D	0266	Both	Yes	No
IBM i Partition Specify	E8D	0267	Both	Yes	No
Specify Custom Data Protection	E8D	0296	Both	Yes	No
Mirrored Level System Specify	E8D	0308	Both	Yes	No
RAID Hot Spare Specify	E8D	0347	Both	Yes	No
V.24/EIA232 6.1m (20 Ft) PCI C	E8D	0348	Both	Yes	No
V.24/EIA232 15.2m (50 Ft) PCI	E8D	0349	Support	Yes	No
V.35 6.1m (20 Ft) PCI Cable					

V.35 15.2m (50 Ft) PCI Cable	E8D	0353	Both	Yes	No
V.36 6.1m (20 Ft) PCI Cable	E8D	0354	Support	Yes	No
X.21 6.1m (20 Ft) PCI Cable	E8D	0356	Support	Yes	No
X.21 15.2m (50 Ft) PCI Cable	E8D	0359	Both	Yes	No
V.24/EIA232 (80 Ft) PCI Cable	E8D	0360	Support	Yes	No
UPS Factory Integration Spcfy	E8D	0365	Support	Yes	No
HMC Factory Integration Spcfy	E8D	0373	MES	Yes	No
Display Factory Int. Specify	E8D	0374	MES	Yes	No
Rack Space for UPS	E8D	0375	MES	Yes	No
Reserve Rack for HMC	E8D	0376	MES	Yes	No
Reserve Rack Space for Display	E8D	0377	MES	Yes	No
CBU Specify	E8D	0378	MES	Yes	No
Customer Specified Placement	E8D	0444	Initial	Yes	No
SSD Placement Indicator CEC	E8D	0456	Initial	Yes	No
SSD Placement Indicator 5802/3	E8D	0462	Both	Yes	No
SSD Placement Indicator 5886	E8D	0463	Initial	N/A	No
SSD Placement Indicator 5887	E8D	0464	Initial	N/A	No
19 inch, 1.8 meter high rack	E8D	0465	Initial	N/A	No
19 inch, 2.0 meter high rack	E8D	0551	MES	Yes	No
IBM i 6.1 w/6.1.1 Machine Code	E8D	0553	MES	Yes	No
IBM i 7.1 Specify Code	E8D	0566	Both	Yes	No
Rack Filler Panel Kit	E8D	0567	Both	Yes	No
Load Source Not in CEC	E8D	0599	Both	Yes	No
#1787 Load Source Specify	E8D	0719	Both	Yes	No
#1996 Load Source Specify	E8D	0722	Both	Yes	No
Specify Load Source 5802/3/77	E8D	0724	Initial	N/A	No
Specify 5886 Load Source plac	E8D	0726	Both	Yes	No
#5887 Load Source Specify	E8D	0727	Both	Yes	No
EXP30 Load Source Specify	E8D	0728	Both	Yes	No
SAN Load Source Specify	E8D	0729	Both	Yes	No
3676 Load Source Specify	E8D	0837	Both	Yes	No
3677 Load Source Specify	E8D	0838	Support	Yes	No
3678 Load Source Specify	E8D	0839	Support	Yes	No
3658 Load Source Specify	E8D	0840	Support	Yes	No
1884 Load Source Specify	E8D	0844	Support	Yes	No
1888 Load Source Specify	E8D	0851	Support	Yes	No
1911 Load Source Specify	E8D	0853	Both	Yes	No

	E8D	0856 Both	Yes	No
#1916 Load Source Specify	E8D	0857 Both	Yes	No
#1879 Load Source Specify	E8D	0870 Both	Yes	No
#1947 Load Source Specify	E8D	0871 Both	Yes	No
#1948 Load Source Specify	E8D	0872 Both	Yes	No
#1956 Load Source Specify	E8D	0874 Both	Yes	No
#1962 Load Source Specify	E8D	0875 Both	Yes	No
#1794 Load Source Specify	E8D	0876 Both	Yes	No
#1737 Load Source Specify(856G	E8D	0879 Both	Yes	No
#1738 Load Source Specify SFF2	E8D	0880 Both	Yes	No
#ES04 Load Source Specify	E8D	0882 Initial	Yes	No
#ES0B Load Source Specify	E8D	0893 Both	Yes	No
#ES0D Load Source Specify	E8D	0894 Both	Yes	No
Modem Cable US/Canada and GU	E8D	1025 Both	Yes	No
USB External Docking Station R	E8D	1104 Support	Yes	No
USB 160 GB Removable Disk Dr	E8D	1106 Support	Yes	No
USB 500 GB Removable Disk Dr	E8D	1107 Both	Yes	No
3m, Blue Cat5e Cable	E8D	1111 Both	Yes	No
10m, Blue Cat5e Cable	E8D	1112 Both	Yes	No
25m, Blue Cat5e Cable	E8D	1113 Both	Yes	No
Decline ESA Indicator	E8D	1120 NC Initial	N/A	No
Custom Serv. Specify, Roch	E8D	1140 Both	Yes	No
200V 16A 4.3m (14 Ft) TL Line	E8D	1406 Support	Yes	No
	E8D	1414 Support	Yes	No
4.3m 200V/16A Power Cord EU/As	E8D	1420 Support	Yes	No
4.3m 200V/16A Power Cord CH/DK	E8D	1421 Support	Yes	No
200V 4.3m (14 Ft) Locking Line	E8D	1426 Support	Yes	No
200V 4.3m (14 Ft) Watertight L	E8D	1427 Support	Yes	No
4.3m 200V/10A Power Cord EU/As	E8D	1439 Support	Yes	No
4.3m 200V/10A Power Cord Denma	E8D	1440 Support	Yes	No
4.3m 200V/10A Power Cord S. Af	E8D	1441 Support	Yes	No
4.3m 200V/10A Power Cord Swiss	E8D	1442 Support	Yes	No
4.3m 200V/10A Power Cord UK				

	E8D	1443	Support	Yes	No
4.3m 200V/10A Power Cord Israe	E8D	1445	Support	Yes	No
4.3m 200V/32A Power Cord EU 1	E8D	1449	Support	Yes	No
4.3m 200V/16A Power Cord EU 2	E8D	1450	Support	Yes	No
200V (14 Ft) 4.3m Line Cord	E8D	1452	Support	Yes	No
200V (14 Ft) 4.3m Watertight L	E8D	1456	Support	Yes	No
30m SPCN Cable	E8D	1466	Support	Yes	No
4.3m 200V/12A Pwr Cd UK	E8D	1476	Support	Yes	No
4.3m 200V/16A Pwr Cd	E8D	1477	Support	Yes	No
856GB 10k RPM SAS SFF Disk	E8D	1737	Both	Yes	No
856GB 10k RPM SAS SFF-2 Disk	E8D	1738	Both	Yes	No
900GB 10k RPM SAS SFF Disk	E8D	1751	Both	Yes	No
900GB 10k RPM SAS SFF-2 Disk	E8D	1752	Both	Yes	No
Quad ENET Card w Copper SFP+	E8D	1768	Both	Yes	No
Quad ENET Card w SR Optical	E8D	1769	Both	Yes	No
177GB SFF-1 SSD w/ eMLC AIX/Li	E8D	1775	Both	Yes	No
177GB SFF-1 SSD w/ eMLC IBM i	E8D	1787	Both	Yes	No
600GB 10k RPM SAS SFF Disk	E8D	1790	Both	Yes	No
177GB SFF-2 SSD w/ eMLC AIX/Li	E8D	1793	Both	Yes	No
177GB SFF-2 SSD w/ eMLC IBM i	E8D	1794	Both	Yes	No
GX 12X DDR Adapter Dual port	E8D	1808	Both	Yes	No
SAS Cable for triple split DAS	E8D	1815	Both	Yes	No
Quantity 150 of #1962	E8D	1817	Both	Yes	No
Quantity 150 of #1964	E8D	1818	Both	Yes	No
SAS Cbl Assembly for SAS Port	E8D	1819	Both	Yes	No
System port/UPS Conversion Cab	E8D	1827	Both	Yes	No
1.5 Meter 12X to 4X Channel CC	E8D	1828	Both	Yes	No
3 Meter 12X to 4X Channel CC	E8D	1841	Both	Yes	No
12X to 4X Chan conv- 10M	E8D	1842	Support	Yes	No
Quantity 150 of #1956	E8D	1844	Both	Yes	No
10 Meter 12X to 4X Enhance CCC	E8D	1854	Both	Yes	No
0.6 Meter 12X DDR Cable	E8D	1861	Both	Yes	No
1.5 Meter 12X DDR Cable	E8D	1862	Both	Yes	No

8 Meter 12X DDR Cable	E8D	1864	Both	Yes	No
3.0 Meter 12X DDR Cable	E8D	1865	Both	Yes	No
Quantity 150 of #1917	E8D	1866	Both	Yes	No
Quantity 150 of #1947	E8D	1868	Both	Yes	No
Quantity 150 of #1925	E8D	1869	Both	Yes	No
283GB 15K RPM SAS Disk	E8D	1879	Both	Yes	No
300GB 15K RPM SAS Disk	E8D	1880	Both	Yes	No
146.8GB 10K RPM SAS SFF Disk D	E8D	1882	Support	Yes	No
73.4 GB 15K RPM SAS SFF Disk D	E8D	1883	Support	Yes	No
69.7 GB 15K RPM SAS SFF Disk D	E8D	1884	Support	Yes	No
300GB 10K RPM SFF SAS Disk D	E8D	1885	Both	Yes	No
146GB 15K RPM SFF SAS Disk D	E8D	1886	Both	Yes	No
Quantity 150 of #1793	E8D	1887	Both	Yes	No
139GB 15K RPM SFF SAS Disk D	E8D	1888	Both	Yes	No
QUANTITY 150 OF 1883	E8D	1891	Support	Yes	No
QUANTITY 150 OF 1882	E8D	1899	Support	Yes	No
283GB 10K RPM SFF SAS Disk Dri	E8D	1911	Both	Yes	No
GX++ 2-port PCIe2 x8 Adapter	E8D	1914	Both	Yes	No
571GB 10k RPM SAS SFF Disk	E8D	1916	Both	Yes	No
146GB 15k RPM SAS SFF-2 Disk	E8D	1917	Both	Yes	No
300GB 10k RPM SAS SFF-2 Disk	E8D	1925	Both	Yes	No
Quantity 150 of #1879	E8D	1926	Both	Yes	No
Quantity 150 of #1948	E8D	1927	Both	Yes	No
Quantity 150 of #1880	E8D	1928	Both	Yes	No
Quantity 150 of #1953	E8D	1929	Both	Yes	No
139GB 15k RPM SAS SFF-2 Disk	E8D	1947	Both	Yes	No
283GB 15k RPM SAS SFF-2 Disk	E8D	1948	Both	Yes	No
300GB 15k RPM SAS SFF-2 Disk	E8D	1953	Both	Yes	No
283GB 10k RPM SAS SFF-2 Disk	E8D	1956	Both	Yes	No
Quantity 150 of #1794	E8D	1958	Both	Yes	No
571GB 10k RPM SAS SFF-2 Disk	E8D	1962	Both	Yes	No
600GB 10k RPM SAS SFF-2 Disk	E8D	1964	Both	Yes	No
177GB SSD Module with eMLC (AI	E8D	1995	Both	No	No
1 Gigabit iSCSI TOE PCI X on C	E8D	1996	Both	No	No
PCIe RAID SSD SAS Adapter 3Gb	E8D	2055	Both	Yes	No
Primary OS - IBM i	E8D	2145	Both	Yes	No
Primary OS AIX	E8D	2146	Both	Yes	No

Primary OS Linux					
	E8D	2147	Both	Yes	No
Factory Deconfiguration of 1 c	E8D	2319	Initial	Yes	No
LC-SC 50 Micron Fiber Conv Cab	E8D	2456	Both	Yes	No
LC-SC 62.5 Mic.Fib.Conv.Cable	E8D	2459	Both	Yes	No
4 port USB PCIe Adapter	E8D	2728	Both	Yes	No
PCIe 2 Line WAN w/Modem	E8D	2893	Initial	Yes	No
Asynch.Termin/Print.Cbl	EIA232	2934	Both	Yes	No
Asynchronous Cable EIA 232/V	E8D	2936	Both	Yes	No
Ser to Ser Port Cab Draw/Draw	E8D	3124	Both	Yes	No
Serial to Se.Port Cbl Rack 8M	E8D	3125	Both	Yes	No
1m, QDR IB Copper Cable	E8D	3287	Both	Yes	No
3m, QDR IB Copper Cable	E8D	3288	Both	Yes	No
5m QDR IB/E'Net Copper Cable	E8D	3289	Both	Yes	No
10m QDR IB Optic Cable	E8D	3290	Both	Yes	No
30m QDR IB Optic Cable	E8D	3293	Both	Yes	No
SAS YO Cable 1.5m - HD 6Gb Ada	E8D	3450	Both	Yes	No
SAS YO Cable 3m - HD 6Gb Adapt	E8D	3451	Both	Yes	No
SAS YO Cable 6m - HD 6Gb Adapt	E8D	3452	Both	Yes	No
SAS YO Cable 10m - HD 6Gb Adap	E8D	3453	Both	Yes	No
SAS X Cable 3m - HD 6Gb 2-Adap	E8D	3454	Both	Yes	No
SAS X Cable 6m - HD 6Gb 2-Adap	E8D	3455	Both	Yes	No
SAS X Cable 10m - HD 6Gb 2-Ada	E8D	3456	Both	Yes	No
SAS YO Cable 15m - HD 3Gb Adap	E8D	3457	Both	Yes	No
SAS X Cable 15m - HD 3Gb 2-Ada	E8D	3458	Both	Yes	No
69GB 3.5 SAS Solid State Driv	E8D	3586	Support	Yes	No
69GB 3.5 SAS Solid State Driv	E8D	3587	Support	Yes	No
Widescreen LCD Monitor					
	E8D	3632	Both	Yes	No
T541H/L150p 15inchTFT Col.M	E8D	3637	Support	Yes	No
ThinkVision L170p Flat Pan.M	E8D	3639	Support	Yes	No
ThinkVision L171p Flat Panel M	E8D	3640	Support	Yes	No
IBM T115 Flat Panel Monitor	E8D	3641	Support	Yes	No
ThinkVision L191p Flat Panel M	E8D	3642	Support	Yes	No
IBM T120 Flat Panel Monitor	E8D	3643	Support	Yes	No
19in. Flat Panel Monitor	E8D	3644	Support	Yes	No
17in. Flat Panel Monitor	E8D	3645	Support	Yes	No

73GB 15K RPM SAS Disk Drive	E8D	3646	Support	Yes	No
146GB 15K RPM SAS Disk Drive	E8D	3647	Support	Yes	No
300GB 15K RPM SAS Disk Drive	E8D	3648	Support	Yes	No
450GB 15K RPM SAS Disk Drive	E8D	3649	Support	Yes	No
SAS Cable (EE) Drawer to Dr 1M	E8D	3652	Both	Yes	No
SAS Cable (EE) Drawer to Dr 3M	E8D	3653	Both	Yes	No
SAS Cable (EE) Drawer to Dr 6M	E8D	3654	Both	Yes	No
428GB 15K RPM SAS Disk Drive	E8D	3658	Support	Yes	No
SAS Cable (X) Adapter to SAS E	E8D	3661	Both	Yes	No
SAS Cbl X Adp SAS Enclosure 6M	E8D	3662	Both	Yes	No
SAS Cbl X Adp SAS Encl 15M	E8D	3663	Both	Yes	No
SAS EX cable 3M - Drw to Drw	E8D	3675	Both	Yes	No
69.7GB 15k rpm SAS Disk Drv	E8D	3676	Support	Yes	No
139.5GB 15k rpm SAS Disk Drive	E8D	3677	Support	Yes	No
283.7GB 15k rpm SAS Disk Drive	E8D	3678	Support	Yes	No
SAS Cab (AI) Adapter to Int 1M	E8D	3679	Both	Yes	No
SAS EX Cable 6m - Drw to Drw	E8D	3680	Both	Yes	No
3M SAS CABLE, ADPTR TO ADPTR (	E8D	3681	Both	Yes	No
SAS Cab (AE) Adapter to En 3M	E8D	3684	Both	Yes	No
SAS Cable(AE) Adapter to En 6M	E8D	3685	Both	Yes	No
SAS Ca(YI) System to SAS 3M	E8D	3687	Both	Yes	No
SAS Cable (AT) 0.6 Meter	E8D	3688	Both	Yes	No
SAS AT Cable 0.6m - HD 6Gb Ada	E8D	3689	Both	Yes	No
SAS Cab(YO) Adapter to SAS1.5M	E8D	3691	Both	Yes	No
SAS Cab(YO) Adapter to SAS 3M	E8D	3692	Both	Yes	No
SAS Cab(YO) Adapter to SAS 6M	E8D	3693	Both	Yes	No
SAS Cab(YO) Adapter to SAS 15M	E8D	3694	Both	Yes	No
0.3M Serial Prt Converter Cbl	E8D	3925	Both	Yes	No
Serial Port Null Mod Cab 3.7M	E8D	3927	Both	Yes	No
Ser.Port Null Modem Cable,10M	E8D	3928	Both	Yes	No
System Serial Port Converter C	E8D	3930	Both	Yes	No
6Foot Extend.Cbl for Displays	E8D	4242	Both	Yes	No
Extender Cable USB Keybo 1.8M	E8D	4256	Both	Yes	No
VGA to DVI Connection Converte	E8D	4276	Both	Yes	No
Package 5X 2055 20X 1995	E8D	4367	Both	Yes	No
Package 5X 2055 20X 1995	E8D	4377	Both	Yes	No

One and only one rack indicator feature is required on all orders (#4650 to #4666).



No Factory Integration Ind.	E8D	4650	Initial	N/A	No
Rack Indicator, Rack 1	E8D	4651	Initial	N/A	No
Rack Indicator, Rack 2	E8D	4652	Initial	N/A	No
Rack Indicator, Rack 3	E8D	4653	Initial	N/A	No
Rack Indicator, Rack 4	E8D	4654	Initial	N/A	No
Rack Indicator, Rack 5	E8D	4655	Initial	N/A	No
Rack Indicator, Rack 6	E8D	4656	Initial	N/A	No
Rack Indicator, Rack 7	E8D	4657	Initial	N/A	No
Rack Indicator, Rack 8	E8D	4658	Initial	N/A	No
Rack Indicator, Rack 9	E8D	4659	Initial	N/A	No
Rack Indicator, Rack 10	E8D	4660	Initial	N/A	No
Rack Indicator, Rack 11	E8D	4661	Initial	N/A	No
Rack Indicator, Rack 12	E8D	4662	Initial	N/A	No
Rack Indicator, Rack 13	E8D	4663	Initial	N/A	No
Rack Indicator, Rack 14	E8D	4664	Initial	N/A	No
Rack Indicator, Rack 15	E8D	4665	Initial	N/A	No
Rack Indicator, Rack 16	E8D	4666	Initial	N/A	No
Active Memory Expansion Enable	E8D	4792	Both	Yes	No
PCIe Crypto Coprocessor Gen3	E8D	4808	Both	Yes	No
PCIe Crypto Coprocessor Gen4	E8D	4809	Both	Yes	No
One Processor of 5250 Enterpri	E8D	4988	Both	Yes	No
Full 5250 Enterprise Enablemen	E8D	4989	Both	Yes	No
Software Preload Required	E8D	5000	Initial	N/A	No
Power Dist Unit 1 Phase NEMA	E8D	5160	Support	Yes	No
Power Dist Unit 1 Phase IEC	E8D	5161	Support	Yes	No
Power Dist Unit 2 of 3 Phase	E8D	5162	Support	Yes	No
Power Dist Unit - 3 Phase	E8D	5163	Support	Yes	No
PCIe 2-Port 4X IB QDR Adapt	E8D	5285	Both	Yes	No
PCIe2 2-port 10GbE SR Adapter	E8D	5287	Both	Yes	No
PCIe2 2-port 10GbE SFP+ Adaptr	E8D	5288	Both	Yes	No
2 Port Async EIA 232 PCIe Adap	E8D	5289	Both	Yes	No
System Pwr Sup -1925W	E8D	5532	Initial	Yes	No
Sys Console On HMC	E8D	5550	Both	Yes	No
Sys Console Ethernet No IOP	E8D	5553	Both	Yes	No
Blind Swap Type III Cas PCIe	E8D	5646	MES	Yes	No
Blind Swap Type III Cas PCI X	E8D	5647	MES	Yes	No
175MB Cache RAID Dual IOA	E8D	5662	Both	Yes	No

10Gb FCoE PCIe Dual Port Adapt	E8D	5708	Both	Yes	No
4 Port 10/100/1000 Base TX PCI	E8D	5717	Both	Yes	No
PCIe2 8Gb 4-port Fibre Channel	E8D	5729	Both	Yes	No
10 Gigabit Ethernet CX4 PCI Ex	E8D	5732	Both	Yes	No
8 Gigabit PCI Express Dual Por	E8D	5735	Both	Yes	No
PCIe2 4-Port 10GbE&1GbE SR&RJ4	E8D	5744	Both	Yes	No
PCIe2 4-Port 10GbE&GbE SFP+Cop	E8D	5745	Both	Yes	No
POWER GXT145 PCI Express Graph	E8D	5748	Both	Yes	No
SATA Slimline DVD RAM Drive	E8D	5762	Support	Yes	No
2 Port 10/100/1000 Base TX Eth	E8D	5767	Both	Yes	No
2 Port Gigabit Ethernet SX PCI	E8D	5768	Both	Yes	No
10 Gb Eth SR PCI Express Adp	E8D	5769	Both	Yes	No
SATA Slimline DVD-RAM Drive	E8D	5771	Both	Yes	No
10 Gigabit Ethernet LR PCI	E8D	5772	Both	Yes	No
4GigabitPCI-E Single Port Fibr	E8D	5773	Support	Yes	No
4 Gigabit PCI Express Dual Por	E8D	5774	Both	Yes	No
4 Port Async EIA 232 PCIe Adap	E8D	5785	Both	Yes	No
12X I/O Drawer PCIe, SFF disk	E8D	5802	Both	Yes	No
PCIe 380MB Cache Dual x4 3Gb S	E8D	5805	Both	Yes	No
12X I/O Drawer PCIe, No Disk	E8D	5877	Both	Yes	No
EXP 12S Expansion Drawer	E8D	5886	Support	Yes	No
EXP24S SFF Gen2-bay Drawer	E8D	5887	Both	Yes	No
PCIe2 4-port 1GbE Adapter	E8D	5899	Both	Yes	No
PCIe Dual x4 SAS Adapter	E8D	5901	Both	Yes	No
PCIe 380MB Cache Dual x4 3Gb	E8D	5903	Support	Yes	No
PCIe2 1.8GB Cache RAID SAS Ada	E8D	5913	Both	Yes	No
SAS AA Cable 3m - HD 6Gb Adapt	E8D	5915	Both	Yes	No
SAS AA Cable 6m - HD 6Gb Adapt	E8D	5916	Both	Yes	No
SAS AA Cable 1.5m - HD 6Gb Ada	E8D	5917	Both	Yes	No
SAS AA Cbl 0.6m - HD 6Gb Adapt	E8D	5918	Both	Yes	No
Non paired PCIe SAS RAID Ind	E8D	5923	Both	Yes	No
Non-paired Indicator 5913 PCIe	E8D	5924	Both	Yes	No
Shared EXP30 Indicator	E8D	5925	Both	Yes	No
SAS EX Cable 1.5m - Drw to Drw	E8D	5926	Both	Yes	No
Remote EXP30 Indicator	E8D	5927	Both	Yes	No
Full width Key USB, US English	E8D	5951	Support	Yes	No
Full width Key USB, French	E8D	5952	Support	Yes	No

Full width Key USB, Italian	E8D	5953	Support	Yes	No
Full width Key USB, German/Aus	E8D	5954	Support	Yes	No
Full width Key USB, UK English	E8D	5955	Support	Yes	No
Full width Key USB, Spanish	E8D	5956	Support	Yes	No
Full width Key USB, Japanese	E8D	5957	Support	Yes	No
Full width Key USB, BrazilianP	E8D	5958	Support	Yes	No
Full width Key USB, Hungarian	E8D	5959	Support	Yes	No
Full width Key USB, Korean	E8D	5960	Support	Yes	No
Full width Key USB, Chinese	E8D	5961	Support	Yes	No
Full width Key USB, French Can	E8D	5962	Support	Yes	No
Full width Key USB, Belgian/UK	E8D	5964	Support	Yes	No
Full width Key USB, Swedish/Fi	E8D	5965	Support	Yes	No
Full width Key USB, Danish	E8D	5966	Support	Yes	No
Full width Key USB, Bulgarian	E8D	5967	Support	Yes	No
Full width Key USB, Swiss/Fr/G	E8D	5968	Support	Yes	No
Full width Key USB, Norwegian	E8D	5969	Support	Yes	No
Full width Key USB, Dutch	E8D	5970	Support	Yes	No
Full width Key USB, Portuguese	E8D	5971	Support	Yes	No
Full width Key USB, Greek	E8D	5972	Support	Yes	No
Full width Key USB, Hebrew	E8D	5973	Support	Yes	No
Full width Key USB, Polish	E8D	5974	Support	Yes	No
Full width Key USB, Slovakian	E8D	5975	Support	Yes	No
Full width Key USB, Czech	E8D	5976	Support	Yes	No
Full width Key USB, Turkish	E8D	5977	Support	Yes	No
Full width Key USB, LA Spanish	E8D	5978	Support	Yes	No
Full width Key USB, Arabic	E8D	5979	Support	Yes	No
Full width Key USB, Thai	E8D	5980	Support	Yes	No
Full width Key USB, Russian	E8D	5981	Support	Yes	No
Full width Key USB, Slovenian	E8D	5982	Support	Yes	No
Full width Key USB, US English	E8D	5983	Support	Yes	No
Power Control Cable(SPCN)-2m	E8D	6001	Support	Yes	No
Power Control Cbl (SPCN) 3 m	E8D	6006	Both	Yes	No
Power Control Cbl (SPCN) 15 m	E8D	6007	Both	Yes	No
Power Control Cable(SPCN)-6m	E8D	6008	Support	Yes	No
Power Control Cable(SPCN)-30m	E8D	6029	Support	Yes	No
Opt Front Door for 1.8m Rack	E8D	6068	MES	Yes	No
Opt Front Door for 2.0m Rack	E8D	6069	MES	Yes	No

1.8m Rack Trim Kit	E8D	6246	Support	Yes	No	
2.0m Rack Trim Kit	E8D	6247	Support	Yes	No	
1.8m Rack Acoustic Doors	E8D	6248	MES	Yes	No	
2.0m Rack Acoustic Doors	E8D	6249	MES	Yes	No	
1.8m Rack Trim Kit	E8D	6263	MES	Yes	No	
2.0m Rack Trim Kit	E8D	6272	MES	Yes	No	
Pwr Crd 4.3m 14ft wall	IBM PDU	E8D	6458	Both	Yes	No
Pwr Crd (14FT), Drwr -	OEM PDU	E8D	6460	Both	Yes	No
Pwr Crd 4.3m 14ft wall	OEM PDU	E8D	6469	Both	Yes	No
Pwr Crd 1.8m 6ft wall	125V/15A	E8D	6470	Support	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU	E8D	6471	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU	E8D	6472	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU	E8D	6473	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU	E8D	6474	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU	E8D	6475	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU	E8D	6476	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU	E8D	6477	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU	E8D	6478	Both	Yes	No
PWR Cord(9foot), (250V,10A)	E8D	6479	Support	Yes	No	
Pwr Crd 1.8m 6ft wall	250V,15A	E8D	6487	Support	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU	E8D	6488	Both	Yes	No
4.3m (14 Ft) 3PH/24A Power Cor	E8D	6489	MES	Yes	No	
4.3m (14 Ft) 1PH/48A Pwr Cord	E8D	6491	MES	Yes	No	
4.3m (14 Ft) 1PH/48 60A Pwr Co	E8D	6492	MES	Yes	No	
Pwr Crd 2.7m 9ft wall	OEM PDU	E8D	6493	Both	Yes	No
Pwr Crd 2.7m 9ft wall	OEM PDU	E8D	6494	Both	Yes	No
To wall/OEM PDU, (250V, 10A)	E8D	6495	Support	Yes	No	
Pwr Crd 2.7m 9ft wall	250V,10A	E8D	6496	Both	Yes	No
PWR Cord(6ft),To wall/OEM PDU	E8D	6497	Both	Yes	No	
Power Cord 6ftTo wall	OEM PDU	E8D	6498	Support	Yes	No
Power Cable Drawer to	IBM PD	E8D	6577	Both	Yes	No
Optional Rack Security	Kit	E8D	6580	MES	Yes	No
Modem Tray for 19-Inch	Rack	E8D	6586	MES	Yes	No
Pwr Crd 2.7m 9ft wall	125V,15A	E8D	6651	Both	Yes	No
4.3m 1PH/24-30A Pwr Cord	E8D	6654	MES	Yes	No	
4.3m 14Ft 1PH/24 30A WR Pwr	E8D	6655	MES	Yes	No	
4.3m 14Ft 1PH/24A Power Cord	E8D	6656	MES	Yes	No	

Pwr.Cord(9ft),To wall/OEM PDU	E8D	6659	Both	Yes	No
Pwr Crd 14ft 4.3m wall/OEM PDU					
Pwr Crd 2.8m 9.2ft wall PDU	E8D	6665	Both	Yes	No
Pwr Crd 4.3M, Drwr - OEM PDU	E8D	6669	Both	Yes	No
Pwr Crd 6-FT, (125V,15A)PT#59	E8D	6670	Support	Yes	No
Pwr Crd 2.7M, Drwr - IBM PDU	E8D	6671	Both	Yes	No
Pwr Crd 1.5M, Drwr - IBM PDU	E8D	6672	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	E8D	6680	Both	Yes	No
Power Cord (6ft),To wall	E8D	6687	Support	Yes	No
IIntelligent PDU+ 1 EIA Unit	E8D	7109	MES	Yes	No
Environmental Monitoring Probe	E8D	7118	Both	Yes	No
Power Distribution Unit	E8D	7188	MES	Yes	No
Quantity 150 of #3676	E8D	7517	Support	Yes	No
Quantity 150 of #3677	E8D	7518	Support	Yes	No
Quantity 150 of #3678	E8D	7519	Support	Yes	No
Quantity 150 of 3586	E8D	7535	Support	Yes	No
Quantity 150 of 3587	E8D	7536	Support	Yes	No
Quantity 150 of 3658	E8D	7538	Support	Yes	No
Quantity 150 of #1884	E8D	7543	Support	Yes	No
Quantity 150 of #1888	E8D	7544	Both	Yes	No
Quantity 150 of #1885	E8D	7547	Both	Yes	No
Quantity 150 of #1886	E8D	7548	Both	Yes	No
Quantity 150 of 3647	E8D	7549	Support	Yes	No
Quantity 150 of #1790	E8D	7550	Both	Yes	No
PCIe RAID SSD SAS Adapter 3Gb	E8D	7557	Both	Yes	No
Quantity 150 of 3648	E8D	7564	Support	Yes	No
Quantity 150 of 3649	E8D	7565	Support	Yes	No
Quantity 150 of #1916	E8D	7566	Both	Yes	No
QTY 150 177GB SFF-1 SSD 1775	E8D	7578	Both	Yes	No
QTY 150 177GB SFF-1 SSD IBM i	E8D	7582	Both	Yes	No
2.0m Rack Side Attach Kit	E8D	7780	Support	Yes	No
PowerVM Express	E8D	7793	Both	Yes	No
PowerVM Standard	E8D	7794	Both	Yes	No
PowerVM Enterprise	E8D	7795	Both	Yes	No
Eth Cbl 6M HW Management	E8D	7801	Support	Yes	No
Eth Cbl 15M HW Management	E8D	7802	Both	Yes	No
Side-by-Side for 1.8m Racks	E8D	7840	Support	Yes	No

Ruggedize Rack Kit	E8D	7841	Support	Yes	No
PCI Blind Swap Cassette Kit	E8D	7862	Support	Yes	No
PCI Blind Swap Cassette Kit	E8D	7863	MES	Yes	No
Linux Software Preinstall	E8D	8143	Initial	N/A	No
Linux Software Preinstall BP	E8D	8144	Initial	N/A	No
Mouse-USB,Black KBD Att C	E8D	8841	Support	Yes	No
USB Mouse	E8D	8845	Both	Yes	No
Order Routing Indicator Syste	E8D	9169	Initial	N/A	No
Language Group Spcf-US Eng	E8D	9300	NC Initial	N/A	No
specify mode-1 & (1)5901/5278	E8D	9359	Initial	N/A	No
Specify mode-1 & (2)5901/5278	E8D	9360	Both	Yes	No
Specify mode-2 & (2)5901/5278	E8D	9361	Both	Yes	No
Specify mode-4 & (4)5901/5278	E8D	9365	Both	Yes	No
Specify mode-2 & (4)5901/5278	E8D	9366	Both	Yes	No
Specify mode-1 & (2)5903/5805	E8D	9367	Both	Yes	No
Specify mode-2 & (4)5903/5805	E8D	9368	Both	Yes	No
Specify mode-1 & CEC SAS port	E8D	9384	Both	Yes	No
Specify mode-1 & (2) 5913 EXP	E8D	9385	Both	Yes	No
Specify mode-2 & (4) 5913 EXP	E8D	9386	Both	Yes	No
Mode-1 & EXP30 for 1 EXP24S #5	E8D	9388	Both	Yes	No
New AIX License Core Counter	E8D	9440	NC Initial	N/A	No
New IBM i Lic Core Counter	E8D	9441	NC Initial	N/A	No
New Red Hat Lic Core Counter	E8D	9442	NC Initial	N/A	No
New SUSE Lic Core Counter	E8D	9443	NC Initial	N/A	No
Other AIX Lic Core Counter	E8D	9444	NC Initial	N/A	No
Other Linux Lic Core Counter	E8D	9445	NC Initial	N/A	No
3rd Party Linux Lic Core Cnt	E8D	9446	NC Initial	N/A	No
VIOS Core Counter	E8D	9447	NC Initial	N/A	No
Month Indicator	E8D	9461	Initial	N/A	No
Day Indicator	E8D	9462	Initial	N/A	No
Hour Indicator	E8D	9463	Initial	N/A	No
Minute Indicator	E8D	9464	Initial	N/A	No
Qty Indicator	E8D	9465	Initial	N/A	No
Countable Member Indicator	E8D	9466	Initial	N/A	No
Language Group Spcf-Dutch	E8D	9700	NC Initial	N/A	No
Language Group Spcf-French	E8D	9703	NC Initial	N/A	No
Language Group Spcf-German	E8D	9704	NC Initial	N/A	No

Language Group Spcf-Polish	E8D	9705	NC	Initial	N/A	No
Lang Group Specify - Norwegian	E8D	9706	NC	Initial	N/A	No
Lang.Group Spcf-Portuguese	E8D	9707	NC	Initial	N/A	No
Language Group Spcf-Spanish	E8D	9708	NC	Initial	N/A	No
Language Group Spcf-Italian	E8D	9711	NC	Initial	N/A	No
Langua Gr Speci Canadian Frenc	E8D	9712	NC	Initial	N/A	No
Language Group Spcf-Japanese	E8D	9714	NC	Initial	N/A	No
Language Group Specify Tr Chin	E8D	9715	NC	Initial	N/A	No
Language Group Spcf-Korean	E8D	9716	NC	Initial	N/A	No
Language Group Spcf-Turkish	E8D	9718	NC	Initial	N/A	No
Language Group Spcf-Hungarian	E8D	9719	NC	Initial	N/A	No
Language Group Spcf-Slovakian	E8D	9720	NC	Initial	N/A	No
Language Group Spcf-Russian	E8D	9721	NC	Initial	N/A	No
Lang Group Spcf Simpl Chinese	E8D	9722	NC	Initial	N/A	No
Language Group Spcf-Czech	E8D	9724	NC	Initial	N/A	No
Language Group Spcf-Romanian	E8D	9725	NC	Initial	N/A	No
Lang Group Specify - Croatian	E8D	9726	NC	Initial	N/A	No
Language Group Spcf-Slovenian	E8D	9727	NC	Initial	N/A	No
Lang Group Specify - Braz Port	E8D	9728	NC	Initial	N/A	No
Lang Group Specify - Thai	E8D	9729	NC	Initial	N/A	No
PCIe2 2-Port 10GbE RoCE SFP+ A	E8D	EC28	Both		Yes	No
PCIe2 2-Port 10GbE RoCE SR Ada	E8D	EC30	Both		Yes	No
0.6m Blue CAT5 Ethernet Cable	E8D	ECB0	Both		Yes	No
1.5m Blue CAT5 Ethernet Cable	E8D	ECB2	Both		Yes	No
Custom Serv. Specify, Shen	E8D	ECSC	Both		N/A	No
EXP30 Ultra SSD I/O Drawer	E8D	EDR1	Both		Yes	No
SPSS on Pwr Sol Ind	E8D	EHSS	Initial		Yes	No
Mode-1 & (1)ESA1/ESA2 for 5887	E8D	EJP1	Both		Yes	No
Mode-1 & (2)ESA1/ESA2 for 5887	E8D	EJP2	Both		Yes	No
Mode-2 & (2)ESA1/ESA2 for 5887	E8D	EJP3	Both		Yes	No
Mode-2 & (4)ESA1/ESA2 for 5887	E8D	EJP4	Both		Yes	No
Mode-4 & (4)ESA1/ESA2 for 5887	E8D	EJP5	Both		Yes	No
Mode-2 & (1)ESA1/ESA2 for 5887	E8D	EJP6	Both		Yes	No
Specify Mode-2(2)ESA1/ESA2	E8D	EJP7	Both		Yes	No
Specify mode-2(1) ESA1/ESA2	E8D	EJPA	Both		Yes	No
Specify mode-2 (2) ESA1/ESA2	E8D	EJPB	Both		Yes	No
Specify mode-4 (1)ESA1/ESA2						

E8D	EJPC Both	Yes	No
Specify mode-4(2)ESA1/ESA2			
E8D	EJPD Both	Yes	No
Specify mode-4 (3)ESA1/ESA2			
E8D	EJPE Both	Yes	No
Specify mode-2 (1)5901/5278			
E8D	EJPI Both	Yes	No
Specify mode-2(2)5901/5278			
E8D	EJPK Both	Yes	No
Specify mode-4 (1)5901/5278			
E8D	EJPL Both	Yes	No
Specify mode-4 (2) 5901/5278			
E8D	EJPM Both	Yes	No
Specify mode-4 (3) 5901/5278			
E8D	EJPN Both	Yes	No
Specify mode-2 (2)5903/5805			
E8D	EJPR Both	Yes	No
Specify mode-2 (2) 5913			
E8D	EJPT Both	Yes	No
Specify Left Half 12X I/O Draw			
E8D	EJPY Both	Yes	No
Specify Right Half 12X I/O Dra			
E8D	EJPZ Both	Yes	No
Full width Key USB, US English			
E8D	EK51 Both	Yes	No
Full width Key USB, French			
E8D	EK52 Both	Yes	No
Full widthkey USB,Italian			
E8D	EK53 Both	Yes	No
Full width Key USB, German/Aus			
E8D	EK54 Both	Yes	No
Full width Key USB, UK English			
E8D	EK55 Both	Yes	No
Full width Key USB, Spanish			
E8D	EK56 Both	Yes	No
Full width Key USB, Japanese			
E8D	EK57 Both	Yes	No
Full width Key USB, BrazilianP			
E8D	EK58 Both	Yes	No
Full width Key USB, Hungarian			
E8D	EK59 Both	Yes	No
Full width Key USB, Korean			
E8D	EK60 Both	Yes	No
Full width Key USB, Chinese			
E8D	EK61 Both	Yes	No
Full width Key USB, French Can			
E8D	EK62 Both	Yes	No
Full width Key USB, Belgian/UK			
E8D	EK64 Both	Yes	No
Full width Key USB, Swedish/Fi			
E8D	EK65 Both	Yes	No
Full width Key USB, Danish			
E8D	EK66 Both	Yes	No
Full width Key USB, Bulgarian			
E8D	EK67 Both	Yes	No
Full width Key USB, Swiss/Fr/G			
E8D	EK68 Both	Yes	No
Full width Key USB, Norwegian			
E8D	EK69 Both	Yes	No
Full width Key USB, Dutch			
E8D	EK70 Both	Yes	No
Full width Key USB, Portuguese			
E8D	EK71 Both	Yes	No
Full width Key USB, Greek			
E8D	EK72 Both	Yes	No
Full width Key USB, Hebrew			
E8D	EK73 Both	Yes	No
Full width Key USB, Polish			
E8D	EK74 Both	Yes	No
Full width Key USB, Slovakian			
E8D	EK75 Both	Yes	No
Full width Key USB, Czech			
E8D	EK76 Both	Yes	No
Full width Key USB, Turkish			



	E8D	EK77 Both	Yes	No
Full width Key USB, LA Spanish	E8D	EK78 Both	Yes	No
Full width Key USB, Arabic	E8D	EK79 Both	Yes	No
Full width Key USB, Thai	E8D	EK80 Both	Yes	No
Full width Key USB, Russian	E8D	EK81 Both	Yes	No
Full width Key USB, Slovenian	E8D	EK82 Both	Yes	No
Full width Key USB, US English	E8D	EK83 Both	Yes	No
Trial Live Partition Mobility	E8D	ELPM Both	Yes	No
Memory Riser Card	E8D	EM01 Both	Yes	No
8GB (2x4GB) Memory DIMMs 1066	E8D	EM08 Both	Yes	No
16GB (2x8GB) Memory DIMMs 1066	E8D	EM4B Both	Yes	No
32GB (2x16GB) Mem DIMMs 1066	E8D	EM4C Both	Yes	No
1m 10GbE Cable SFP+ Act Twinax	E8D	EN01 Both	Yes	No
3m 10GbE Cable SFP+ Act Twinax	E8D	EN02 Both	Yes	No
5m 10GbE Cable SFP+ Act Twinax	E8D	EN03 Both	Yes	No
PCIe x8 Cable 1.5m	E8D	EN05 Both	Yes	No
PCIe x8 Cable 3m	E8D	EN07 Both	Yes	No
PCIe x8 Cable 8m	E8D	EN08 Both	Yes	No
PCIe2 16Gb 2-port Fibre Channe	E8D	EN0A Both	Yes	No
PCIe2 4-port 10Gb FCoE & 1GbE	E8D	EN0H Both	Yes	No
Integ Multifunc Card w/ 10GbE	E8D	EN10 Both	Yes	No
Integ Multifunc Card w/10GbEo	E8D	EN11 Both	Yes	No
Processor & Memory Backplane				
4.0 GHZ , 8-c P7+ Proc	DCM			
	E8D	EPT1 Initial	No	No
4.0 GHZ , 8-c P7+ Proc	DCM			
	E8D	EPT7 Both	No	No
3.5 GHZ , 8-c P7+ Proc	DCM			
NC 1-core activation of #EPT7	E8D	EPT8 Both	No	No
NC 1-core activation of #EPT7	E8D	EPTC Both	Yes	No
NC 1-core activation of #EPT8	E8D	EPTD Both	Yes	No
1-core activation of #EPT7	E8D	EPTe Both	Yes	No
1-core activation of #EPT8	E8D	EPTF Both	Yes	No
Service Processor				
	E8D	EPTR Initial	No	No
Storage Backplane				
	E8D	EPTS Initial	No	No
Quantity 150 of #3452 SAS Cabl	E8D	EQ02 Both	Yes	No
Quantity 150 of #3453 SAS YO	E8D	EQ03 Both	Yes	No
Quantity 150 of #ES0A	E8D	EQ0A Both	Yes	No
Quantity of 150 #ES0B	E8D	EQ0B Both	Yes	No
Quantity of 150 #ES0C	E8D	EQ0C Both	Yes	No
Quantity of 150 #ES0D	E8D	EQ0C Both	Yes	No

Quantity 150 of #1737	E8D	EQ0D Both	Yes	No
Quantity 150 of #1738	E8D	EQ37 Both	Yes	No
Quantity 150 of #1751	E8D	EQ38 Both	Yes	No
Quantity 150 of #1752	E8D	EQ51 Both	Yes	No
Power Cable Drawer to IBM PD	E8D	EQ52 Both	Yes	No
RFID Tags for Compute Nodes	E8D	EQ77 Both	Yes	No
Front Door for P770/780 2MRack	E8D	ERF1 Initial	N/A	No
387GB 1.8" SAS SSD (AIX/Linux)	E8D	ERG7 MES	Yes	No
387 GB 1.8 SSD for IBMi w/eMLC	E8D	ES02 Both	Yes	No
387GB SFF-1 SSD for AIX/Linux	E8D	ES04 Both	Yes	No
387GB SFF-1 SSD for IBMi	E8D	ES0A Both	Yes	No
387GB SFF-2 SSD for AIX/Linux	E8D	ES0B Both	Yes	No
387GB SFF-2 SSD for IBM i	E8D	ES0C Both	Yes	No
PCIe2 RAID SAS Adapter 6Gb	E8D	ES0D Both	Yes	No
S&H - No Charge	E8D	ESA1 Both	Yes	No
S&H	E8D	ESC0 Initial	N/A	No
Six ES02 387GB 1.8" SAS AIX/Li	E8D	ESC7 Initial	N/A	No
Six ES04 387 GB 1.8 SSD IBMi	E8D	ESR2 Initial	Yes	No
Four ES0A 387GB SFF-1 SSD AIX	E8D	ESR4 Initial	Yes	No
Four ES0B 387GB SFF-1 SSD IBMi	E8D	ESRA Initial	Yes	No
Four ES0C 387GB SFF-2 SSD AIX	E8D	ESRB Initial	Yes	No
Four ES0D 387GB SFF-2 SSD IBMi	E8D	ESRC Initial	Yes	No
1TB Removable Disk Cartridge	E8D	ESRD Initial	Yes	No
RDX USB External Docking	E8D	EU01 Both	Yes	No
RDX 320 GB Removable Disk Driv	E8D	EU04 Both	Yes	No
1.5TB Removable Disk Cartridge	E8D	EU08 Both	Yes	No
10G Base T Wrap	E8D	EU15 Both	Yes	No
	E8D	EU20 Both	Yes	No

The following are newly announced features on the specific models of the IBM Power Systems 7014 machine type:

Description	Model	Feature	Initial/ MES/ Both/ Support	RP CSU MES
Machine Type 7014	Number	Numbers		

Rack Content Specify: 8408-E8D

B42	ER02	Initial	Yes
T00		Initial	Yes
T42		Initial	Yes

## Feature conversions

### Feature conversions for 8408-E8D virtualization engine features

From FC:	To FC:	Parts Returned
7793 - PowerVM Express	7794 - PowerVM Standard	No
7793 - PowerVM Express	7795 - PowerVM Enterprise	No
7794 - PowerVM Standard	7795 - PowerVM Enterprise	No

## Maintenance charges

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## **Corrections**

### **(Corrected on April 18, 2013)**

In the Terms and conditions section moved the 24x7 coverage text from CRU and on-site service to the Warranty period section. Deleted replacement parts that were added in error.

### **(Corrected on May 13, 2013)**

In Terms and conditions section corrected information about warranty service upgrades.