IBM Power 760 model RMD delivers unprecedented performance, scalability, reliability, and manageability for demanding commercial workloads

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At a glance

The Power® 760 server is a powerful 1- to 4-socket server that supports up to 48 cores with the Capacity Upgrade on Demand (CUoD) configuration flexibility to meet today's growth and tomorrow's processing needs. The server features:

- Powerful POWER7+™ processors that offer 0/12-, 0/24-, 0/36-, and 0/48-core 3.1 GHz or 3.4 GHz configurations
- Up to 2048 GB of memory with four CUoD processor dual chip modules (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 Mulifunction Card with four Ethernet ports, two USB ports, 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)

Overview

The IBM® Power 760 server (9109-RMD) supports up to four POWER7+ processor DCMs. Each of the four processor DCMs is a 0/12-core CUoD DCM packaged with 2 x 6-core chips. All 0/12-core CUoD processor DCMs are either 3.1 GHz or 3.4 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, 0/12-core CUoD 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 fully populated Power 760 server with four DCMs has a minimum of eight cores activated and up to a maximum of 48 cores with a CUoD granularity of one core.

The Power 760 model RMD server supports a maximum of 64 DDR3 DIMM slots, 16 per 0/12-core processor DCM. Memory features (two memory DIMMs per feature) supported are 8, 16, 32, and 64 GB and run at speeds of 1066 MHz. A system with four DCMs installed has a maximum memory of 2048 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 processor cycles can enable memory expansion up to 125% for AIX® partitions. A server with a maximum of 2048 GB can effectively be expanded to greater than 4 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 760 server offers 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 deliver 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 760 server 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 or SSD 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 feature #ESRA/ESRB/ESRC/ESRD can provide up to 90,000 IOPS. A 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, slim-line, SATA media bay per enclosure (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 port on each system unit (maximum three usable USB ports per system)
- Service Processor
- EnergyScale technology

- Two hardware management console (HMC) ports and two SPCN ports
- 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

Key prerequisites

One of the following operating systems:

- IBM AIX
- IBM i
- Linux™
- VIOS

For more information, refer to the Hardware requirements and Software requirements sections.

Planned availability date

March 15, 2013

Description

Summary of features

The following features are available on the Power 760:

- One to four 0/12-core CUoD processor DCMs
  - 0/12-core (2 x 6-core) 3.1 GHz processor DCM (#EPT5)
  - 0/12-core (2 x 6-core) 3.4 GHz processor DCM (#EPT6)
- One processor core activation for #EPT5 (#EPTA)
- One processor core activation for #EPT6 (#EPTB)
- POWER7+ DDR3 Memory DIMMs (two per feature)
  - 8 GB (2 x 4 GB), 1066 MHz (#EM08)
  - 16 GB (2 x 8 GB), 1066 MHz (#EM4B)
  - 32 GB (2 x 16 GB), 1066 MHz (#EM4C)
  - 64 GB (2 x 32 GB), 1066 MHz (#EM4D)
- 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 system unit (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)
- Two USB ports on the Integrated Multifunction Card plus another USB port provided by the operator panel (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 system unit (maximum four per system)
- Eight I/O expansion slots per system: six Gen2 PCIe 8x slots plus two GX++ slots per system unit
- 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 760:
  - 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
  - Up to two EXP30 Ultra SSD I/O drawers with integrated, high-performance, SAS controllers (#EDR1)
- IBM Systems Director Active Energy Manager™
- 5U (EIA units), 19-inch rack-mount drawer configuration

Processors

Each system must have a minimum of eight active processors.

- Each system must have a minimum of one processor DCM (eight cores active)
- There is a maximum of four processor DCMs (48 cores)
- If more than one processor DCM in one server, then all processor DCM features must be identical; all 3.1 GHz processor DCMs (#EPT5) or all 3.4 GHz processor DCMs (#EPT6)
- All processor DCMs are placed on a mandatory Processor and Memory Backplane (#EPT1)

Memory

Summary configuration considerations:

- Power 760 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)
  - 64 GB (2 x 32 GB DIMMs) (#EM4D)
- 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: 2048 GB, 64 DIMMs x 32 GB/DIMM (32 x #EM4D)

- Three processor DCMs: 1536 GB (24 x #EM4D)
- Two processor DCMs: 1024 GB (16 x #EM4D)
- One processor DCM: 512 GB (8 x #EM4D)

Additional memory configuration details

- The minimum system memory for each number of DCMs is the following:
  - One processor DCM: 32 GB (2 x #EM4B, 4 DIMMs or 4 x #EM08, 8 DIMMs)
  - Two processor DCMs: 32 GB (4 x #EM08, 8 DIMMs)
  - Three processor DCMs: 48 GB (6 x #EM08, 12 DIMMs)
  - Four processor DCMs: 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 plus quantity one of any other memory feature
  - Six DIMMs total: quantity of one memory feature plus quantity two of any other memory feature
  - Eight DIMMs total: quantity of two of one memory feature 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 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, 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 are as follows:
  - 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
EPT5	0/12-core 3.1 GHz POWER7+ Processor
EPT1	Processor and Memory Backplane
EPTR	Service Processor
8 x EPTA	8 Processor Activations

```
2 x EM4B         32 GB  Memory
2 x EM01         Memory Riser Card
EPTS             Storage Backplane
1768             Integrated Multifunction Card
                 (VIOS support only)
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
```

Notes:

- 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.
- One HMC is required for every 9109-RMD; however, a communal HMC is acceptable.

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

```
Feature number   Description

EPT5             0/12-core 3.1 GHz POWER7+ Processor
EPT1             Processor and Memory Backplane
EPTR             Service Processor
8 x EPMA         8 Processor Activations
2 x EM4B         32 GB  Memory
2 x EM01         Memory Riser Card
EPTS             Storage Backplane
2 x 1888         139.5 GB 15k SFF DASD
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 #5899 4-port Ethernet adapter 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 760 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 RMD, with the correct interface to use for each of the drawers and the maximum number of attached I/O drawers:

```
          Order                                              Maximum
Feature   description                  Status     Interface  number

5802      PCIe 12X I/O W/Disks Drawer  Available     12X        4
          (disk bays)
5877      PCIe 12X I/O No Disk Drawer  Available     12X        4
```

```
          (no disk bays)
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.

The following feature-numbered I/O drawers are available for order on the Power 760 server:

- The PCIe 12X I/O Drawer (#5802 and #5877) is a 19-inch I/O and storage drawer. Feature 5802 gives you 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 drawer 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 a SAS controller that can be a SAS PCI-X or 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 I/O drawers (#5802/#5877) are connected to GX++ adapters in the CEC drawer 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 providing 30 hot-swap SSD bays and a pair of integrated large write cache, high-performance SAS controllers. Ultrahigh levels of performance are accomplished without using any PCIe slots on the POWER7 server in an ultradense packaging design. The two

high-performance, integrated SAS controllers each physically enable 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 provide 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/#ES04 are used. A minimum of six SSD 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 (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 760, delivering 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 9109-RMD and its I/O drawers are designed to mount in the 7014-T00, 7014-T42, feature 0551, and feature 0553 racks. These are built to the 19-inch EIA standard. When ordering a new 9109 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 9109-RMD 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 9109-RMD has the following rack requirements:

- The Power 760 can be ordered without a rack.
- The Power 760 consists of one CEC enclosure that requires 5U of vertical rack space.
- The 7014-S25 and feature 0555 rack can support only one Power 760 CEC drawer.
- 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 760 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) or 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 the new 7014-T00 (feature 0551) or 7014-T42 (feature 0553) racks or for the 7014-T00 (feature 0551) or 7014-T42 (feature 0553) racks that you already own.
- A Power 760 door (#ERG7) is available on the 7014-T42 rack. The door is steel with a perforated flat front surface. The perforation pattern extends from the bottom to the top of the door to enhance ventilation and provide some visibility into the rack.

Integrated I/O

- The Power 760 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 760 CEC drawer has six full-length, 8X PCIe Gen2 slots and two GX++ slots and a multifunction card slot. Note that 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 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 drawer; the second power supply provides redundant power for enhanced system availability. A CEC system unit is designed to continue 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.
- Hot-plug procedures are contained in the Customer Information Center on

  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 LPAR allows 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

The 760 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 included 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 provides 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 drawer 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 should one have problems. Also, if configured as a pair, both can be active at the same time (active/active), assuming there are two or more arrays configured to give you 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 an 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 a 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 system unit. 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, the DVD can 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 unit 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. For IBM i, its network install capability can be used to avoid having multiple DVDs on a server.
- The Power 760 server 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 system unit, located in an I/O drawer, such as a #5887 EXP24S, a #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/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/SDD is not required. Attachment of the SAN using a Fibre Channel over Ethernet connection is also supported.
- The Power 760 model RMD supports both 3.5-inch and 2.5-inch SAS DASD hard disk drives (HDD). The 2.5-inch SFF HDD can be mounted either 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 HDDs can be attached to the model RMD but must be located in a feature 5886 EXP12S I/O drawer.
- When ordering feature 1819, you must also order feature 5662. This applies to MES orders of feature 1819 unless feature 5662 is already present in the system. Feature 1815 and feature 5662 cannot be installed in the same drawer. Feature 1819 must not be installed in a drawer unless feature 5662 is also installed.

Capacity Upgrade on Demand

With Capacity Upgrade on Demand (CUoD) you can purchase additional permanent processor capacity in support of a changing work load environment. Processor core activations are purchased either with the initial server or with an MES order at a later time. You can have, for example, a server with 48 physical cores installed, but have activated only part of them. The pricing of the processor cores is based on paying part of the price with the physical core when you physically have it on the server and part of the price only when the core is activated.

CUoD provides three primary benefits. The first is reliability. For example, in the unlikely event of many processor DCM failures, the system is designed in many situations to be able to transparently switch over workload off the failed to other cores which in this context are "standing by". Thus, potentially there can be no impact to your production operations until a service call to replace the failed DCMs is scheduled. A second benefit is less scheduled downtime for processor core "upgrades". The Power 760 must be powered down to add processor DCMs. If you have already physically installed processor cores, they can be quickly activated once IBM ships the activation key. A third benefit is the ability to defer the cost of the activation until it is needed.

Note that processor Elastic (On/Off) or Utility or Trial Capacity on Demand is not provided. Note also that memory CUoD and memory CoD is not available.

Capacity Backup offering (applies to IBM i only)

The Power 760 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 9109-RMD. 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 760 server can be:

- 9119-FHA
- 9119-FHB
- 9117-MMA
- 9406-MMA
- 9117-MMB

- 9117-MMC
- 9117-MMD
- 9179-MHB
- 9179-MHC
- 9179-MHD

These systems have IBM i software licenses with an IBM i P30 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. An activated processor must be available on the CBU server to use the transferred entitlement. You can 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 can 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 760 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

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. The POWER7+ hardware accelerator for Active Memory Expansion delivers 25% higher levels of memory expansion than available with POWER7 processor chips. POWER7+ chips contain a hardware accelerator which handles much of the compression/decompression of memory content can allow 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 is available for partitions running AIX 6.1 with Technology Level 4 and Service Pack 2, or later.

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 depending 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 monitoring capabilities are turned on, the are available in standard AIX performance tools such as lparstat, vmstat, topas, and svmon.

A planning tool is included with AIX , allowing 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 4792, 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

For clients loading the IBM i operating system, the four-digit numeric QPRCFEAT value used on the 9109-RMD 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 EPT5, the QPRCFEAT value for the system would be EPT5. The QPRCFEAT value in a Power 760 server does not change with the addition of more processor DCMs.

Reliability, availability, and serviceability (RAS)

The reliability of the IBM Power 760 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 high product quality levels.

The processor and memory subsystem contain a number of features designed to avoid or correct environmentally induced, single-bit, intermittent failures as well as handle solid faults in components, including selective redundancy to tolerate certain faults without requiring an outage or parts replacement.

The AIX operating system supports disk mirroring (RAID 1) and disk controller duplexing. The Linux operating system supports disk drive mirroring (RAID 1). The adapter offers RAID 0, RAID 5, RAID 6, and RAID 10 for AIX and Linux . Under IBM i OS, mirroring and data spreading is supplied by the operating system and RAID 5 and RAID 6 are supplied by the adapter.

Memory error-correction extensions

POWER7+ memory has error detection and correction code circuitry designed to detect and correct faults that extend across multiple memory modules (DRAMs). This includes tolerating a complete DRAM chip failure (Chipkill recovery). POWER7+

memory used in the Power 760 system also contains a spare memory (DRAM) per rank of memory, which can be substituted for a failed DRAM module (DRAM sparing). The spares can be used when a DRAM fault is detected and offers additional protection beyond that provided by the error detection and correction circuitry. In addition, the POWER7+ memory subsystem scrubs memory to detect and correct intermittent errors.

The bus transferring data between the processor and the memory uses CRC error detection with a failed operation retry mechanism and the ability to dynamically retune bus parameters when a fault occurs. In addition, if a data bit goes bad, the memory bus has the spare capacity to substitute a new data bit-line.

Fault monitoring functions

On POWER7+ processor-based servers, hardware failures and software-detected hardware failures are recorded in the system log. An error log analysis (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 check stop conditions and forwards them to the SFP application and notifies the system administrator.

After the information is logged, if the system is properly configured, a call home service request is initiated, and the pertinent failure data with service parts information and part locations is sent to an IBM Service organization. Client contact information and specific system-related data, such as the machine type, model, and serial number along with engineering data related to the failure, are sent to IBM Service. The call home feature enables IBM service representatives to preemptively bring the most likely replacement parts when a service call is placed, reducing repair time.

Disk drive fault tracking can alert the system administrator of an impending disk failure before it affects customer operation.

Mutual surveillance

The service processor monitors the operation of firmware during the boot process and also monitors the hypervisor for termination. The hypervisor monitors the service processor and performs 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 notifies the operating system, and the operating system can take appropriate action, including calling for service or initiating a failover operation to the alternate service processor if present.

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 temperature remains above the warning level for too long, the system shuts 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.

POWER7+ processor availability enhancements

As in POWER6® , the POWER7+ processor can 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. With this function, 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. In a number of cases, systems with POWER7+ processors can 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 check stopping

As in POWER6 , POWER7+ includes single processor check stopping for certain faults that cannot be handled by the availability enhancements described in the preceding section. This significantly reduces the probability of any one processor affecting total system availability.

Dynamic Fabric Bus Repair

For fabric buses connecting CEC drawers, this feature enables a faulty line on the fabric bus to be replaced by a spare dynamically, without the need to take down the 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 the ability to delete a cache line. 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.

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 examines the affected bus, enables the device driver to reset it, and continues 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 restart automatically following an unrecoverable software error, hardware failure, or environmentally induced (ac power) failure.

Serviceability

The IBM Power 760 is designed with both IBM and customer serviceability in mind. Advancements such as Guiding Light LED architecture are used to control a system of integrated LEDs that lead the individual servicing the machine to the correct part as quickly as possible. With the Power 760, you can replace service parts (customer replaceable unit). To do this, the Power 760 uses Guiding Light LEDs to indicate the parts that need to be replaced.

An HMC attached to the Power 760 enables support personnel (with your authorization) to remotely log in to review error logs and perform remote maintenance if required.

The I/O device and adapter diagnostics consist of stand-alone diagnostics, that are loaded from the DVD-RAM drive, and online diagnostics. Online diagnostics, when installed, are resident with the AIX operating system on the disk or system. They can be booted in single-user mode (service mode), run in maintenance mode, or run concurrently (concurrent mode) with other applications. They have access to the AIX error log and the AIX configuration data.

- Service mode enables checking of system devices and features.
- Concurrent mode enables the normal system functions to continue while selected resources are being checked.
- Maintenance mode enables checking of devices and adapters.

Note: Because the 9109-RMD system has an optional DVD-RAM (#5762), alternative methods for maintaining and servicing the system need to be available if the DVD-RAM is not ordered; an external Internet connection must be available to maintain or update system microcode to the latest required level.

Concurrent maintenance guided service procedures will continue to be supported by the Repair and Verify (R&V) component of the Service Focal Point application running on the HMC. Repair procedures that are not covered by the guided R&V component are documented and available for display on any web browser-enabled system as well as on the HMC. These procedures are available through the InfoCenter application.

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

Service Interface

Using the Service Interface, support personnel can 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
- Service Processor menu
- Operating system service menu
- Service Focal Point on the HMC

In the Guiding Light LED implementation, when a fault condition is detected on the POWER7+ system, an amber system fault LED is illuminated on the operator panel. The Guiding Light system pinpoints the exact part by blinking the amber field-replaceable unit (FRU) identify LED associated with the part to be replaced when selected by the servicer as part of the repair procedure. This action will roll up to the system unit locate and blue system locate LED on the operator panel to provide a path from the system level to the system unit and down to the individual component to be serviced.

The system unit and system identify LEDs will turn on solid and can be used to follow the path from the system to the system unit and down to the specific FRU.

First-failure data capture and error data analysis

First-failure data capture (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 extended 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.

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 is stored in system NVRAM. When the system can be successfully restarted either manually or automatically, the error is 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 can 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 also turns 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 system unit 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 is initiated and the pertinent failure data with service parts information and part locations is sent to an IBM service organization. Client 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 can 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 processor menus (ASMI) can be accessed concurrently with system operation, enabling nondisruptive abilities to change system default parameters.

Accessibility by people with disabilities

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

Statement of general direction

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 and 7R2

IBM 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 preinstall 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

The following are newly announced features on the specific models of the IBM Power Systems 9109 machine type:

Description	MT	Model	Feature
IBM Power 760	9109	RMD	
Solution Delivery Integration (SDI) Indicator	9109	RMD	0002
OEM Light Manufacturing Order Indicator - EMPTY	9109	RMD	0006
Solution Delivery Integration (SDI) Order Indicator - DO NOT BUILD	9109	RMD	0009
One CSC Billing Unit	9109	RMD	0010
Ten CSC Billing Units	9109	RMD	0011
Mirrored System Disk Level, Specify Code	9109	RMD	0040
Device Parity Protection-All, Specify Code	9109	RMD	0041
Mirrored System Bus Level, Specify Code	9109	RMD	0043
Device Parity RAID-6 All, Specify Code	9109	RMD	0047

RISC-to-RISC Data Migration	9109	RMD	0205
AIX Partition Specify	9109	RMD	0265
Linux Partition Specify	9109	RMD	0266
IBM i Operating System Partition Specify	9109	RMD	0267
Specify Custom Data Protection	9109	RMD	0296
Mirrored Level System Specify Code	9109	RMD	0308
RAID Hot Spare Specify	9109	RMD	0347
V.24/EIA232 6.1m (20-Ft) PCI Cable	9109	RMD	0348
V.24/EIA232 15.2m (50-Ft) PCI Cable	9109	RMD	0349
V.35 6.1m (20-Ft) PCI Cable	9109	RMD	0353
V.35 15.2m (50-Ft) PCI Cable	9109	RMD	0354
V.36 6.1m (20-Ft) PCI Cable	9109	RMD	0356
X.21 6.1m (20-Ft) PCI Cable	9109	RMD	0359
X.21 15.2m (50-Ft) PCI Cable	9109	RMD	0360
V.24/EIA232 (80-Ft) PCI Cable	9109	RMD	0365
UPS Factory Integration Specify	9109	RMD	0373
HMC Factory Integration Specify	9109	RMD	0374
Display Factory Integration Specify	9109	RMD	0375
Reserve Rack Space for UPS	9109	RMD	0376
Reserve Rack Space for HMC	9109	RMD	0377
Reserve Rack Space for Display	9109	RMD	0378
CBU Specify	9109	RMD	0444
Customer Specified Placement	9109	RMD	0456
SSD Placement Indicator - CEC	9109	RMD	0462
SSD Placement Indicator (5802/5803)	9109	RMD	0463
SSD Placement Indicator - 5886	9109	RMD	0464
SSD Placement Indicator - 5887	9109	RMD	0465
19 inch, 1.8 meter high rack	9109	RMD	0551
19 inch, 2.0 meter high rack	9109	RMD	0553
IBM i 6.1 with 6.1.1 Machine Code Specify Code	9109	RMD	0566
IBM i 7.1 Specify Code	9109	RMD	0567
Rack Filler Panel Kit	9109	RMD	0599
Load Source Not in CEC	9109	RMD	0719
#1787 Load Source Specify	9109	RMD	0722
#1996 Load Source Specify	9109	RMD	0724
Specify Load Source in #5802/#5803/#5877	9109	RMD	0726
Specify #5886 Load Source placement	9109	RMD	0727
Specify #5887 Load Source placement	9109	RMD	0728
Specify EXP30 Load Source placement	9109	RMD	0729
SAN Load Source Specify	9109	RMD	0837
#3676 Load Source Specify	9109	RMD	0838
#3677 Load Source Specify	9109	RMD	0839
#3678 Load Source Specify	9109	RMD	0840
#3658 Load Source Specify	9109	RMD	0844
#1884 Load Source Specify	9109	RMD	0851
#1888 Load Source Specify	9109	RMD	0853
#1911 Load Source Specify	9109	RMD	0856
#1916 Load Source Specify	9109	RMD	0857
#1879 Load Source Specify	9109	RMD	0870
#1947 Load Source Specify	9109	RMD	0871
#1948 Load Source Specify	9109	RMD	0872
#1956 Load Source Specify	9109	RMD	0874
#1962 Load Source Specify	9109	RMD	0875
#1794 Load Source Specify	9109	RMD	0876
#1737 Load Source Specify (856GB SFF-1 disk)	9109	RMD	0879
#1738 Load Source Specify (856GB SFF-2 disk)	9109	RMD	0880
#ES04 Load Source Specify	9109	RMD	0882
#ES0B Load Source Specify	9109	RMD	0893
#ES0D Load Source Specify	9109	RMD	0894
Modem Cable - US/Canada and General Use	9109	RMD	1025
USB External Docking Station for Removable Disk Drive	9109	RMD	1104
USB 160 GB Removable Disk Drive	9109	RMD	1106
USB 500 GB Removable Disk Drive	9109	RMD	1107
3m, Blue Cat5e Cable	9109	RMD	1111
10m, Blue Cat5e Cable	9109	RMD	1112
25m, Blue Cat5e Cable	9109	RMD	1113
Decline Electronic Service Agent™ Install			

Indicator	9109	RMD	1120
Custom Service Specify, Rochester Minn, USA	9109	RMD	1140
200V 16A 4.3m (14-Ft) TL Line Cord	9109	RMD	1406
125V 4.3m (14-Ft) Line Cord	9109	RMD	1413
200V 1.8m (6-Ft) Locking Line Cord	9109	RMD	1414
4.3m 200V/16A Power Cord EU/Asia	9109	RMD	1420
4.3m 200V/16A Power Cord CH/DK	9109	RMD	1421
200V 4.3m (14-Ft) Locking Line Cord	9109	RMD	1426
200V 4.3m (14-Ft) Watertight Line Cord	9109	RMD	1427
4.3m 200V/10A Power Cord EU/Asia	9109	RMD	1439
4.3m 200V/10A Power Cord Denmark	9109	RMD	1440
4.3m 200V/10A Power Cord S. Africa	9109	RMD	1441
4.3m 200V/10A Power Cord Swiss	9109	RMD	1442
4.3m 200V/10A Power Cord UK	9109	RMD	1443
4.3m 200V/10A Power Cord Israel	9109	RMD	1445
4.3m 200V/32A Power Cord EU 1-PH	9109	RMD	1449
4.3m 200V/16A Power Cord EU 2-PH	9109	RMD	1450
Power Cord (4.3 M), To Wall (250V/15A)	9109	RMD	1452
200V 12A (14-Ft) 4.3m TL Line Cord	9109	RMD	1454
200V (14-Ft) 4.3m Watertight Line Cord	9109	RMD	1456
30m SPCN Cable	9109	RMD	1466
4.3m 200V/12A Pwr Cd UK	9109	RMD	1476
4.3m 200V/16A Pwr Cd	9109	RMD	1477
856GB 10k RPM SAS SFF Disk Drive (IBM i)	9109	RMD	1737
856GB 10k RPM SAS SFF-2 Disk Drive (IBM i)	9109	RMD	1738
900GB 10K RPM SAS SFF Disk Drive (AIX/Linux)	9109	RMD	1751
900GB 10k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9109	RMD	1752
Integrated Multifunction card with Copper SFP+	9109	RMD	1768
Integrated Multifunction card with SR Optical	9109	RMD	1769
177GB SFF-1 SSD w/ eMLC (AIX/Linux)	9109	RMD	1775
177GB SFF-1 SSD w/ eMLC (IBM i)	9109	RMD	1787
600GB 10K RPM SAS SFF Disk Drive (AIX/Linux)	9109	RMD	1790
177GB SFF-2 SSD w/ eMLC (AIX/Linux)	9109	RMD	1793
177GB SFF-2 SSD w/ eMLC (IBM i)	9109	RMD	1794
GX++ 12X DDR Adapter, Dual-port	9109	RMD	1808
SAS Cable for triple split DASD backplane	9109	RMD	1815
Quantity 150 of #1962	9109	RMD	1817
Quantity 150 of #1964	9109	RMD	1818
SAS Cable Assembly for SAS Port	9109	RMD	1819
System port/UPS Conversion Cable	9109	RMD	1827
1.5 Meter 12X to 4X Channel Conversion Cable	9109	RMD	1828
3 Meter 12X to 4X Channel Conversion Cable	9109	RMD	1841
10 Meter 12X to 4X Channel Conversion Cable	9109	RMD	1842
Quantity 150 of #1956	9109	RMD	1844
10 Meter 12X to 4X Enhanced Channel Conversion Cable	9109	RMD	1854
0.6 Meter 12X DDR Cable	9109	RMD	1861
1.5 Meter 12X DDR Cable	9109	RMD	1862
8.0 Meter 12X DDR Cable	9109	RMD	1864
3.0 Meter 12X DDR Cable	9109	RMD	1865

Quantity 150 of #1917	9109	RMD	1866
Quantity 150 of #1947	9109	RMD	1868
Quantity 150 of #1925	9109	RMD	1869
283GB 15K RPM SAS SFF Disk Drive (IBM i)	9109	RMD	1879
300GB 15K RPM SAS SFF Disk Drive (AIX/Linux)	9109	RMD	1880
146.8GB 10K RPM SAS SFF Disk Drive	9109	RMD	1882
73.4 GB 15K RPM SAS SFF Disk Drive	9109	RMD	1883
69.7 GB 15K RPM SAS SFF Disk Drive	9109	RMD	1884
300GB 10K RPM SFF SAS Disk Drive	9109	RMD	1885
146GB 15K RPM SFF SAS Disk Drive (AIX/Linux)	9109	RMD	1886
Quantity 150 of #1793	9109	RMD	1887
139GB 15K RPM SFF SAS Disk Drive (IBM i)	9109	RMD	1888
Quantity 150 of #1883	9109	RMD	1891
Quantity 150 of #1882	9109	RMD	1899
283GB 10K RPM SFF SAS Disk Drive (IBM i)	9109	RMD	1911
GX++ 2-port PCIe2 x8 Adapter	9109	RMD	1914
571GB 10k RPM SAS SFF Disk Drive (IBM i)	9109	RMD	1916
146GB 15k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9109	RMD	1917
300GB 10k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9109	RMD	1925
Quantity 150 of #1879	9109	RMD	1926
Quantity 150 of #1948	9109	RMD	1927
Quantity 150 of #1880	9109	RMD	1928
Quantity 150 of #1953	9109	RMD	1929
139GB 15k RPM SAS SFF-2 Disk Drive (IBM i)	9109	RMD	1947
283GB 15k RPM SAS SFF-2 Disk Drive (IBM i)	9109	RMD	1948
300GB 15k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9109	RMD	1953
283GB 10k RPM SAS SFF-2 Disk Drive (IBM i)	9109	RMD	1956
Quantity 150 of #1794	9109	RMD	1958
571GB 10k RPM SAS SFF-2 Disk Drive (IBM i)	9109	RMD	1962
600GB 10k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9109	RMD	1964
177GB SSD Module with eMLC (AIX/Linux)	9109	RMD	1995
177GB SSD Module with eMLC (IBM i)	9109	RMD	1996
PCIe RAID & SSD SAS Adapter 3Gb w/ Blind Swap Cassette	9109	RMD	2055
Primary OS - IBM i	9109	RMD	2145
Primary OS - AIX	9109	RMD	2146
Primary OS - Linux	9109	RMD	2147
2M LC-SC 50 Micron Fiber Converter Cable	9109	RMD	2456
2M LC-SC 62.5 Micron Fiber Converter Cable	9109	RMD	2459
4 port USB PCIe Adapter	9109	RMD	2728
PCIe 2-Line WAN w/Modem	9109	RMD	2893
3M Asynchronous Terminal/Printer Cable EIA-232	9109	RMD	2934
Asynchronous Cable EIA-232/V.24 3M	9109	RMD	2936
Serial-to-Serial Port Cable for Drawer/Drawer-3.7M	9109	RMD	3124
Serial-to-Serial Port Cable for Rack/Rack- 8M	9109	RMD	3125
1m, (3.3-ft) IB 40G Copper Cable QSFP/QSFP	9109	RMD	3287
3m, (9.8-ft.) IB 40G Copper Cable QSFP/QSFP	9109	RMD	3288
5m QDR IB/E'Net Copper Cable QSFP/QSFP	9109	RMD	3289
10 meter Quad Data Rate InfiniBand Optical Cable, QSFP/QSFP	9109	RMD	3290
30 meter Quad Data Rate InfiniBand Optical Cable, QSFP/QSFP	9109	RMD	3293
SAS YO Cable 1.5m - HD 6Gb Adapter to Enclosure	9109	RMD	3450
SAS YO Cable 3m - HD 6Gb Adapter to Enclosure	9109	RMD	3451
SAS YO Cable 6m - HD 6Gb Adapter to Enclosure	9109	RMD	3452
SAS YO Cable 10m - HD 6Gb Adapter to Enclosure	9109	RMD	3453
SAS X Cable 3m - HD 6Gb 2-Adapter to Enclosure	9109	RMD	3454
SAS X Cable 6m - HD 6Gb 2-Adapter to Enclosure	9109	RMD	3455
SAS X Cable 10m - HD 6Gb 2-Adapter to Enclosure	9109	RMD	3456
SAS YO Cable 15m - HD 3Gb Adapter to Enclosure	9109	RMD	3457
SAS X Cable 15m - HD 3Gb 2-Adapter to Enclosure	9109	RMD	3458
69GB 3.5" SAS Solid State Drive	9109	RMD	3586
69GB 3.5" SAS Solid State Drive	9109	RMD	3587
Widescreen LCD Monitor	9109	RMD	3632
IBM T541H /L150p 15" TFT Color Monitor	9109	RMD	3637
IBM ThinkVision L170p Flat Panel Monitor	9109	RMD	3639
ThinkVision L171p Flat Panel Monitor	9109	RMD	3640
IBM T115 Flat Panel Monitor	9109	RMD	3641
ThinkVision L191p Flat Panel Monitor	9109	RMD	3642
IBM T120 Flat Panel Monitor	9109	RMD	3643
IBM T119 Flat Panel Monitor	9109	RMD	3644
IBM T117 Flat Panel Monitor	9109	RMD	3645

73GB 15K RPM SAS Disk Drive	9109	RMD	3646
146GB 15K RPM SAS Disk Drive (AIX/Linux)	9109	RMD	3647
300GB 15K RPM SAS Disk Drive (AIX/Linux)	9109	RMD	3648
450GB 15K RPM SAS Disk Drive (AIX/Linux)	9109	RMD	3649
SAS Cable (EE) Drawer to Drawer 1M	9109	RMD	3652
SAS Cable (EE) Drawer to Drawer 3M	9109	RMD	3653
SAS Cable (EE) Drawer to Drawer 6M	9109	RMD	3654
428GB 15K RPM SAS Disk Drive (IBM i)	9109	RMD	3658
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 3M:	9109	RMD	3661
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 6M:	9109	RMD	3662
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 15M:	9109	RMD	3663
SAS EX Cable 3m - Drawer to Drawer	9109	RMD	3675
69.7GB 15k rpm SAS Disk Drive	9109	RMD	3676
139.5GB 15k rpm SAS Disk Drive (IBM i)	9109	RMD	3677
283.7GB 15k rpm SAS Disk Drive (IBM i)	9109	RMD	3678
SAS Cable (AI)- Adapter to Internal drive 1M	9109	RMD	3679
SAS EX Cable 6m - Drawer to Drawer	9109	RMD	3680
3M SAS CABLE, ADPTR TO ADPTR (AA)	9109	RMD	3681
SAS Cable (AE) Adapter to Enclosure, single controller/single path 3M	9109	RMD	3684
SAS Cable (AE) Adapter to Enclosure, single controller/single path 6M	9109	RMD	3685
SAS Cable (YI) System to SAS Enclosure, Single Controller/Dual Path 3M	9109	RMD	3687
SAS Cable (AT) 0.6 Meter	9109	RMD	3688
SAS AT Cable 0.6m - HD 6Gb Adapter to 12X Enclosure (AT)	9109	RMD	3689
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 1.5 M	9109	RMD	3691
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 3 M	9109	RMD	3692
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 6 M	9109	RMD	3693
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 15 M	9109	RMD	3694
0.3M Serial Port Converter Cable, 9-Pin to 25-Pin	9109	RMD	3925
Serial Port Null Modem Cable, 9-pin to 9-pin, 3.7M	9109	RMD	3927
Serial Port Null Modem Cable, 9-pin to 9-pin, 10M	9109	RMD	3928
System Serial Port Converter Cable	9109	RMD	3930
1.8 M (6-ft) Extender Cable for Displays (15-pin D-shell to 15-pin D-shell)	9109	RMD	4242
Extender Cable - USB Keyboards, 1.8M	9109	RMD	4256
VGA to DVI Connection Converter	9109	RMD	4276
Package 5X #2055 & 20X #1995 (AIX/Linux)	9109	RMD	4367
Package 5X #2055 & 20X #1996 (IBM i)	9109	RMD	4377
Rack Indicator- Not Factory Integrated	9109	RMD	4650
Rack Indicator, Rack #1	9109	RMD	4651
Rack Indicator, Rack #2	9109	RMD	4652
Rack Indicator, Rack #3	9109	RMD	4653
Rack Indicator, Rack #4	9109	RMD	4654
Rack Indicator, Rack #5	9109	RMD	4655
Rack Indicator, Rack #6	9109	RMD	4656
Rack Indicator, Rack #7	9109	RMD	4657
Rack Indicator, Rack #8	9109	RMD	4658
Rack Indicator, Rack #9	9109	RMD	4659
Rack Indicator, Rack #10	9109	RMD	4660
Rack Indicator, Rack #11	9109	RMD	4661
Rack Indicator, Rack #12	9109	RMD	4662
Rack Indicator, Rack #13	9109	RMD	4663
Rack Indicator, Rack #14	9109	RMD	4664
Rack Indicator, Rack #15	9109	RMD	4665
Rack Indicator, Rack #16	9109	RMD	4666
Active Memory Expansion Enablement	9109	RMD	4792
PCIe Crypto Coprocessor Gen3 BSC 4765-001	9109	RMD	4808
PCIe Crypto Coprocessor Gen4 BSC 4765-001	9109	RMD	4809
One Processor of 5250 Enterprise Enablement	9109	RMD	4988
Full 5250 Enterprise Enablement	9109	RMD	4989
Software Preload Required	9109	RMD	5000
Power Dist Unit 1 Phase NEMA	9109	RMD	5160
Power Dist Unit 1 Phase IEC	9109	RMD	5161

Power Dist Unit 2 of 3 Phase	9109	RMD	5162
Power Dist Unit - 3 Phase	9109	RMD	5163
PCIe2 2-Port 4X IB QDR Adapter 40Gb	9109	RMD	5285
PCIe2 2-port 10GbE SR Adapter	9109	RMD	5287
PCIe2 2-Port 10GbE SFP+Copper Adapter	9109	RMD	5288
2 Port Async EIA-232 PCIe Adapter	9109	RMD	5289
System AC Power Supply, 1925 W	9109	RMD	5532
Sys Console On HMC	9109	RMD	5550
Sys Console-Ethernet No IOP	9109	RMD	5553
Blind Swap Type III Cassette- PCIe, Short Slot	9109	RMD	5646
Blind Swap Type III Cassette- PCI-X or PCIe, Standard Slot	9109	RMD	5647
175MB Cache RAID - Dual IOA Enablement Card	9109	RMD	5662
10Gb FCoE PCIe Dual Port Adapter	9109	RMD	5708
4-Port 10/100/1000 Base-TX PCI Express Adapter	9109	RMD	5717
PCIe2 8Gb 4-port Fibre Channel Adapter	9109	RMD	5729
10 Gigabit Ethernet-CX4 PCI Express Adapter	9109	RMD	5732
8 Gigabit PCI Express Dual Port Fibre Channel Adapter	9109	RMD	5735
PCIe2 4-Port 10GbE&1GbE SR&RJ45 Adapter	9109	RMD	5744
PCIe2 4-Port 10GbE&1GbE SFP+Copper&RJ45 Adapter	9109	RMD	5745
POWER GXT145 PCI Express Graphics Accelerator	9109	RMD	5748
SATA Slimline DVD-RAM Drive	9109	RMD	5762
2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter	9109	RMD	5767
2-Port Gigabit Ethernet-SX PCI Express Adapter	9109	RMD	5768
10 Gigabit Ethernet-SR PCI Express Adapter	9109	RMD	5769
SATA Slimline DVD-RAM Drive	9109	RMD	5771
10 Gigabit Ethernet-LR PCI Express Adapter	9109	RMD	5772
4 Gigabit PCI Express Single Port Fibre Channel Adapter	9109	RMD	5773
4 Gigabit PCI Express Dual Port Fibre Channel Adapter	9109	RMD	5774
4 Port Async EIA-232 PCIe Adapter	9109	RMD	5785
12X I/O Drawer PCIe, SFF disk	9109	RMD	5802
PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	9109	RMD	5805
12X I/O Drawer PCIe, No Disk	9109	RMD	5877
EXP 12S Expansion Drawer	9109	RMD	5886
EXP24S SFF Gen2-bay Drawer	9109	RMD	5887
PCIe2 4-port 1GbE Adapter	9109	RMD	5899
PCIe Dual-x4 SAS Adapter	9109	RMD	5901
PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	9109	RMD	5903
PCIe2 1.8GB Cache RAID SAS Adapter Tri-port 6Gb	9109	RMD	5913
SAS AA Cable 3m - HD 6Gb Adapter to Adapter	9109	RMD	5915
SAS AA Cable 6m - HD 6Gb Adapter to Adapter	9109	RMD	5916
SAS AA Cable 1.5m - HD 6Gb Adapter to Adapter	9109	RMD	5917
SAS AA Cable 0.6m - HD 6Gb Adapter to Adapter	9109	RMD	5918
Non-paired PCIe SAS RAID Indicator	9109	RMD	5923
Non-paired Indicator 5913 PCIe SAS RAID Adapter	9109	RMD	5924
Shared EXP30 Indicator	9109	RMD	5925
SAS EX Cable 1.5m - Drawer to Drawer	9109	RMD	5926
Remote EXP30 Indicator	9109	RMD	5927
Full Width Keyboard -- USB, US English, #103P	9109	RMD	5951
Full Width Keyboard -- USB, French, #189	9109	RMD	5952
Full Width Keyboard -- USB, Italian, #142	9109	RMD	5953
Full Width Keyboard -- USB, German/Austrian, #129	9109	RMD	5954
Full Width Keyboard -- USB, UK English, #166P	9109	RMD	5955
Full Width Keyboard -- USB, Spanish, #172	9109	RMD	5956
Full Width Keyboard -- USB, Japanese, #194	9109	RMD	5957
Full Width Keyboard -- USB, Brazilian Portuguese, #275	9109	RMD	5958
Full Width Keyboard -- USB, Hungarian, #208	9109	RMD	5959
Full Width Keyboard -- USB, Korean, #413	9109	RMD	5960
Full Width Keyboard -- USB, Chinese, #467	9109	RMD	5961
Full Width Keyboard -- USB, French Canadian, #445	9109	RMD	5962
Full Width Keyboard -- USB, Belgian/UK, #120	9109	RMD	5964
Full Width Keyboard -- USB, Swedish/Finnish, #153	9109	RMD	5965
Full Width Keyboard -- USB, Danish, #159	9109	RMD	5966
Full Width Keyboard -- USB, Bulgarian, #442	9109	RMD	5967
Full Width Keyboard -- USB, Swiss/French/German, #150	9109	RMD	5968
Full Width Keyboard -- USB, Norwegian,#155	9109	RMD	5969
Full Width Keyboard -- USB, Dutch, #143	9109	RMD	5970
Full Width Keyboard -- USB, Portuguese, #163	9109	RMD	5971

Full Width Keyboard -- USB, Greek, #319	9109	RMD	5972
Full Width Keyboard -- USB, Hebrew, #212	9109	RMD	5973
Full Width Keyboard -- USB, Polish, #214	9109	RMD	5974
Full Width Keyboard -- USB, Slovakian, #245	9109	RMD	5975
Full Width Keyboard -- USB, Czech, #243	9109	RMD	5976
Full Width Keyboard -- USB, Turkish, #179	9109	RMD	5977
Full Width Keyboard -- USB, LA Spanish, #171	9109	RMD	5978
Full Width Keyboard -- USB, Arabic, #253	9109	RMD	5979
Full Width Keyboard -- USB, Thai, #191	9109	RMD	5980
Full Width Keyboard -- USB, Russian, #443	9109	RMD	5981
Full Width Keyboard -- USB, Slovenian, #234	9109	RMD	5982
Full Width Keyboard -- USB, US English Euro, #103P	9109	RMD	5983
Power Control Cable (SPCN) - 2 meter	9109	RMD	6001
Power Control Cable (SPCN) - 3 meter	9109	RMD	6006
Power Control Cable (SPCN) - 15 meter	9109	RMD	6007
Power Control Cable (SPCN) - 6 meter	9109	RMD	6008
Power Control Cable (SPCN) - 30 meter	9109	RMD	6029
Opt Front Door for 1.8m Rack	9109	RMD	6068
Opt Front Door for 2.0m Rack	9109	RMD	6069
1.8m Rack Trim Kit	9109	RMD	6246
2.0m Rack Trim Kit	9109	RMD	6247
1.8m Rack Acoustic Doors	9109	RMD	6248
2.0m Rack Acoustic Doors	9109	RMD	6249
1.8m Rack Trim Kit	9109	RMD	6263
2.0m Rack Trim Kit	9109	RMD	6272
Power Cord 4.3m (14-ft), Drawer to Wall/IBM PDU (250V/10A)	9109	RMD	6458
Power Cord 4.3m (14-ft), Drawer To OEM PDU (125V, 15A)	9109	RMD	6460
Power Cord 4.3m (14-ft), Drawer to Wall/OEM PDU (250V/15A) U. S.	9109	RMD	6469
Power Cord 1.8m (6-ft), Drawer to Wall (125V/15A)	9109	RMD	6470
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (125V/15A)	9109	RMD	6471
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/16A)	9109	RMD	6472
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/10A)	9109	RMD	6473
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/13A)	9109	RMD	6474
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/16A)	9109	RMD	6475
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)	9109	RMD	6476
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/16A)	9109	RMD	6477
Power Cord 2.7 M(9-foot), To Wall/OEM PDU, (250V, 16A)	9109	RMD	6478
Power Cord (9-foot) , To Wall/OEM PDU, (250V, 10A)	9109	RMD	6479
Power Cord 1.8M (6-foot),To Wall, (250V, 15A), United States	9109	RMD	6487
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (125V/15A or 250V/10A)	9109	RMD	6488
4.3m (14-Ft) 3PH/24A 380-415V Power Cord	9109	RMD	6489
4.3m (14-Ft) 1PH/48A 200-240V Power Cord	9109	RMD	6491
4.3m (14-Ft) 1PH/48-60A 200-240V Power Cord	9109	RMD	6492
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)	9109	RMD	6493
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)	9109	RMD	6494
Power Cord (9-foot), To Wall/OEM PDU, (250V, 10A)	9109	RMD	6495
Power Cord 2.7M (9-foot), To Wall/OEM PDU, (250V, 10A)	9109	RMD	6496
Power Cord (6-foot), To Wall/OEM PDU, (250V, 10A)	9109	RMD	6497
Power Cord (6-foot), To Wall/OEM PDU, (250V, 15A)	9109	RMD	6498
Power Cable - Drawer to IBM PDU, 200-240V/10A	9109	RMD	6577
Optional Rack Security Kit	9109	RMD	6580
Modem Tray for 19-Inch Rack	9109	RMD	6586
Power Cord 2.7M (9-foot), To Wall/OEM PDU, (125V, 15A)	9109	RMD	6651
4.3m (14-Ft) 1PH/24-30A Pwr Cord	9109	RMD	6654

4.3m (14-Ft) 1PH/24-30A WR Pwr Cord	9109	RMD	6655
4.3m (14-Ft)1PH/24A Power Cord	9109	RMD	6656
Power Cord 2.7M (9-foot), To Wall/OEM PDU, (250V, 15A)	9109	RMD	6659
Power Cord 4.3m (14-ft), Drawer to Wall/OEM PDU (125V/15A)	9109	RMD	6660
Power Cord 2.8m (9.2-ft), Drawer to Wall/IBM			
Power Cord 2.8m (9.2-ft), Drawer to Wall/IBM PDU, (250V/10A)	9109	RMD	6665
Power Cord 4.3M (14-foot), Drawer to OEM PDU, (250V, 15A)	9109	RMD	6669
Power Cord (6-foot), To Wall (125V, 15A), PT #59	9109	RMD	6670
Power Cord 2.7M (9-foot), Drawer to IBM PDU, 250V/10A	9109	RMD	6671
Power Cord 1.5M (5-foot), Drawer to IBM PDU, 250V/10A	9109	RMD	6672
Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)	9109	RMD	6680
Power Cord (6-foot), To Wall, (250V, 15A)	9109	RMD	6687
Intelligent PDU+, 1 EIA Unit, Universal UTG0247 Connector	9109	RMD	7109
Environmental Monitoring Probe	9109	RMD	7118
Power Distribution Unit	9109	RMD	7188
Quantity 150 of #3676	9109	RMD	7517
Quantity 150 of #3677	9109	RMD	7518
Quantity 150 of #3678	9109	RMD	7519
Quantity 150 of #3586	9109	RMD	7535
Quantity 150 of #3587	9109	RMD	7536
Quantity 150 of #3658	9109	RMD	7538
Quantity 150 of #1884	9109	RMD	7543
Quantity 150 of #1888	9109	RMD	7544
Quantity 150 of #1885	9109	RMD	7547
Quantity 150 of #1886	9109	RMD	7548
Quantity 150 of #3647	9109	RMD	7549
Quantity 150 of #1790	9109	RMD	7550
Quantity 150 of #1911	9109	RMD	7557
Quantity 150 of #3648	9109	RMD	7564
Quantity 150 of #3649	9109	RMD	7565
Quantity 150 of #1916	9109	RMD	7566
QTY 150, 177GB SFF-1 SSD w/ eMLC (AIX/Linux)	9109	RMD	7578
QTY 150, 177GB SFF-1 SSD w/ eMLC (IBM i)	9109	RMD	7582
OEM (Generic) Indicator	9109	RMD	7770
OEM (GROUPE BULL) Indicator	9109	RMD	7773
OEM (Hitachi) Indicator	9109	RMD	7775
OEM Publications for IBM Logo Product	9109	RMD	7779
2.0m Rack Side Attach Kit	9109	RMD	7780
PowerVM Express	9109	RMD	7793
PowerVM Standard	9109	RMD	7794
PowerVM Enterprise	9109	RMD	7795
Ethernet Cable, 6M, Hardware Management Console to System Unit	9109	RMD	7801
Ethernet Cable, 15m, Hardware Management Console to System Unit	9109	RMD	7802
Side-by-Side for 1.8m Racks	9109	RMD	7840
Ruggedize Rack Kit	9109	RMD	7841
PCI Blind Swap Cassette Kit, Single Wide Adapters, Type II	9109	RMD	7862
PCI Blind Swap Cassette Kit, Double Wide Adapters, Type III	9109	RMD	7863
Linux Software Preinstall	9109	RMD	8143
Linux Software Preinstall (Business Partners)	9109	RMD	8144
Mouse - USB, with Keyboard Attachment Cable	9109	RMD	8841
USB Mouse	9109	RMD	8845
Order Routing Indicator- System Plant	9109	RMD	9169
Language Group Specify - US English	9109	RMD	9300
specify mode-1 & (1)5901/5278 for EXP24S #5887	9109	RMD	9359
Specify mode-1 & (2)5901/5278 for EXP24S #5887	9109	RMD	9360

Specify mode-2 & (2)5901/5278 for EXP24S #5887	9109	RMD	9361
Specify mode-4 & (4)5901/5278 for EXP24S #5887	9109	RMD	9365
Specify mode-2 & (4)5901/5278 for EXP24S #5887	9109	RMD	9366
Specify mode-1 & (2)5903/5805 for EXP24S #5887	9109	RMD	9367
Specify mode-2 & (4)5903/5805 for EXP24S #5887	9109	RMD	9368
Specify mode-1 & CEC SAS port for EXP24 #5887	9109	RMD	9384
Specify mode-1 & (2) 5913 for EXP24S #5887	9109	RMD	9385
Specify mode-2 & (4) 5913 for EXP24S #5887	9109	RMD	9386
Specify Mode-1 & EXP30 for 1 EXP24S #5887	9109	RMD	9388
New AIX License Core Counter	9109	RMD	9440
New IBM i License Core Counter	9109	RMD	9441
New Red Hat License Core Counter	9109	RMD	9442
New SUSE License Core Counter	9109	RMD	9443
Other AIX License Core Counter	9109	RMD	9444
Other Linux License Core Counter	9109	RMD	9445
3rd Party Linux License Core Counter	9109	RMD	9446
VIOS Core Counter	9109	RMD	9447
Other IBM i License Core Counter	9109	RMD	9448
Month Indicator	9109	RMD	9461
Day Indicator	9109	RMD	9462
Hour Indicator	9109	RMD	9463
Minute Indicator	9109	RMD	9464
Qty Indicator	9109	RMD	9465
Countable Member Indicator	9109	RMD	9466
Language Group Specify - Dutch	9109	RMD	9700
Language Group Specify - French	9109	RMD	9703
Language Group Specify - German	9109	RMD	9704
Language Group Specify - Polish	9109	RMD	9705
Language Group Specify - Norwegian	9109	RMD	9706
Language Group Specify - Portuguese	9109	RMD	9707
Language Group Specify - Spanish	9109	RMD	9708
Language Group Specify - Italian	9109	RMD	9711
Language Group Specify - Canadian French	9109	RMD	9712
Language Group Specify - Japanese	9109	RMD	9714
Language Group Specify - Traditional Chinese (Taiwan)	9109	RMD	9715
Language Group Specify - Korean	9109	RMD	9716
Language Group Specify - Turkish	9109	RMD	9718
Language Group Specify - Hungarian	9109	RMD	9719
Language Group Specify - Slovakian	9109	RMD	9720
Language Group Specify - Russian	9109	RMD	9721
Language Group Specify - Simplified Chinese (PRC)	9109	RMD	9722
Language Group Specify - Czech	9109	RMD	9724
Language Group Specify -- Romanian	9109	RMD	9725
Language Group Specify - Croatian	9109	RMD	9726
Language Group Specify -- Slovenian	9109	RMD	9727
Language Group Specify - Brazilian Portuguese	9109	RMD	9728
Language Group Specify - Thai	9109	RMD	9729
Customer Install MES	9109	RMD	9742
Notify CSO After Install	9109	RMD	9743
Product Renovated by IBM Indicator	9109	RMD	9993
PCIe2 2-Port 10GbE RoCE SFP+ Adapter	9109	RMD	EC28
PCIe2 2-Port 10GbE RoCE SR Adapter	9109	RMD	EC30
0.6m (2.0-ft), Blue CAT5 Ethernet Cable	9109	RMD	ECB0
1.5m (4.9-ft), Blue CAT5 Ethernet Cable	9109	RMD	ECB2
Custom Service Specify, Shenzhen, China	9109	RMD	ECSC
EXP30 Ultra SSD I/O Drawer	9109	RMD	EDR1
Specify Mode-1 & (1)ESA1/ESA2 for EXP24S #5887	9109	RMD	EJP1
Specify Mode-1 & (2)ESA1/ESA2 for EXP24S #5887	9109	RMD	EJP2
Specify Mode-2 & (2)ESA1/ESA2 for EXP24S #5887	9109	RMD	EJP3
Specify Mode-2 & (4)ESA1/ESA2 for EXP24S #5887	9109	RMD	EJP4
Specify Mode-4 & (4)ESA1/ESA2 for EXP24S #5887	9109	RMD	EJP5
Specify Mode-2 & (1)ESA1/ESA2 for EXP24S #5887	9109	RMD	EJP6
Specify Mode-2 (2)ESA1/ESA2 for EXP24 #5887	9109	RMD	EJP7
Specify mode-2 (1) ESA1/ESA2 for EXP24 #5887	9109	RMD	EJPA
Specify mode-2 (2)ESA1/ESA2 for EXP24#5887	9109	RMD	EJPB
Specify mode-4 (1)ESA1/ESA2 for EXP24 #5887	9109	RMD	EJPC
Specify mode-4 (2)ESA1/ESA2 for EXP24 #5887	9109	RMD	EJPD
Specify mode-4 (3)ESA1/ESA2 for EXP24 #5887	9109	RMD	EJPE
Specify mode-2 (1)5901/5278 for EXP24 #5887	9109	RMD	EJPJ
Specify mode-2 (2)5901/5278 for EXP24 #5887	9109	RMD	EJPK
Specify mode-4 (1)5901/5278 for EXP24 #5887	9109	RMD	EJPL
Specify mode-4 (2)5901/5278 for EXP24 #5887	9109	RMD	EJPM

Specify mode-4 (3)5901/5278 for EXP24 #5887	9109	RMD	EJPN
Specify mode-2 (2)5903/5805 for EXP24 #5887	9109	RMD	EJPR
Specify mode-2 (2)5913 for EXP24 #5887	9109	RMD	EJPT
Specify Left Half 12X I/O Drawer to ESA1/ESA2	9109	RMD	EJPY
Specify Right Half 12X I/O Drawer to ESA1/ESA2	9109	RMD	EJPZ
Full Width Keyboard -- USB, US English, #103P	9109	RMD	EK51
Full Width Keyboard -- USB, French, #189	9109	RMD	EK52
Full Width Keyboard -- USB, Italian, #142	9109	RMD	EK53
Full Width Keyboard -- USB, German/Austrian, #129	9109	RMD	EK54
Full Width Keyboard -- USB, UK English, #166P	9109	RMD	EK55
Full Width Keyboard -- USB, Spanish, #172	9109	RMD	EK56
Full Width Keyboard -- USB, Japanese, #194	9109	RMD	EK57
Full Width Keyboard -- USB, Brazilian Portuguese, #275	9109	RMD	EK58
Full Width Keyboard -- USB, Hungarian, #208	9109	RMD	EK59
Full Width Keyboard -- USB, Korean, #413	9109	RMD	EK60
Full Width Keyboard -- USB, Chinese, #467	9109	RMD	EK61
Full Width Keyboard -- USB, French Canadian, #445	9109	RMD	EK62
Full Width Keyboard -- USB, Belgian/UK, #120	9109	RMD	EK64
Full Width Keyboard -- USB, Swedish/Finnish, #153	9109	RMD	EK65
Full Width Keyboard -- USB, Danish, #159	9109	RMD	EK66
Full Width Keyboard -- USB, Bulgarian, #442	9109	RMD	EK67
Full Width Keyboard -- USB, Swiss/French/German, #150	9109	RMD	EK68
Full Width Keyboard -- USB, Norwegian,#155	9109	RMD	EK69
Full Width Keyboard -- USB, Dutch, #143	9109	RMD	EK70
Full Width Keyboard -- USB, Portuguese, #163	9109	RMD	EK71
Full Width Keyboard -- USB, Greek, #319	9109	RMD	EK72
Full Width Keyboard -- USB, Hebrew, #212	9109	RMD	EK73
Full Width Keyboard -- USB, Polish, #214	9109	RMD	EK74
Full Width Keyboard -- USB, Slovakian, #245	9109	RMD	EK75
Full Width Keyboard -- USB, Czech, #243	9109	RMD	EK76
Full Width Keyboard -- USB, Turkish, #179	9109	RMD	EK77
Full Width Keyboard -- USB, LA Spanish, #171	9109	RMD	EK78
Full Width Keyboard -- USB, Arabic, #253	9109	RMD	EK79
Full Width Keyboard -- USB, Thai, #191	9109	RMD	EK80
Full Width Keyboard -- USB, Russian, #443	9109	RMD	EK81
Full Width Keyboard -- USB, Slovenian, #234	9109	RMD	EK82
Full Width Keyboard -- USB, US English Euro, #103P	9109	RMD	EK83
Trial PowerVM Live Partition Mobility	9109	RMD	ELPM
Memory Riser Card	9109	RMD	EM01
8GB (2x4GB) Memory DIMMs, 1066 MHz, 2Gb DDR3 DRAM	9109	RMD	EM08
16GB (2x8GB) Memory DIMMs, 1066 MHz, 4Gb DDR3 DRAM	9109	RMD	EM4B
32GB (2x16GB) Memory DIMMs, 1066 MHz, 4Gb DDR3 DRAM	9109	RMD	EM4C
64GB (2x32GB) Memory DIMMs, 1066 MHz, 4Gb DDR3 DRAM	9109	RMD	EM4D
1m (3.3-ft), 10GbE'Net Cable SFP+ Act Twinax Copper	9109	RMD	EN01
3m (9.8-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper	9109	RMD	EN02
5m (16.4-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper	9109	RMD	EN03
PCIe x8 Cable 1.5m	9109	RMD	EN05
PCIe x8 Cable 3m	9109	RMD	EN07
PCIe x8 Cable 8m	9109	RMD	EN08
PCIe2 16Gb 2-port Fibre Channel Adapter	9109	RMD	EN0A
PCIe2 4-port (10Gb FCoE & 1GbE) SR&RJ45	9109	RMD	EN0H
Integrated Mutifunction Card w/ 10GbE RJ45 & Copper Twinax	9109	RMD	EN10
Integrated Multifunction Card w/ 10GbE RJ45 & SR Optical	9109	RMD	EN11
Processor & Memory Backplane	9109	RMD	EPT1
3.1 GHz , Proc DCM, 0/12-core POWER7+ (2x6-core), 16 DDR3 Memory Slots	9109	RMD	EPT5
3.4 GHz , Proc DCM, 0/12-core POWER7+ (2x6-core), 16 DDR3 Memory Slots	9109	RMD	EPT6
1-core activation of #EPT5	9109	RMD	EPTA
1-core activation of #EPT6	9109	RMD	EPTB
Service Processor	9109	RMD	EPTR
Storage Backplane	9109	RMD	EPTS
Quantity 150 of #3452 SAS YO Cable 6m - HD 6Gb			

Adapter to Enclosure	9109	RMD	EQ02
Quantity 150 of #3453 SAS YO Cable 10m - HD 6Gb Adapter to Enclosure	9109	RMD	EQ03
Quantity 150 of #ES0A	9109	RMD	EQ0A
Quantity of 150 #ES0B	9109	RMD	EQ0B
Quantity of 150 #ES0C	9109	RMD	EQ0C
Quantity of 150 #ES0D	9109	RMD	EQ0D
Quantity 150 of #1737 (856GB SFF-1 disk)	9109	RMD	EQ37
Quantity 150 of #1738 (856GB SFF-2 disk)	9109	RMD	EQ38
Quantity 150 of #1751 (900GB SFF-1 disk)	9109	RMD	EQ51
Quantity 150 of #1752 (900GB SFF-2 disk)	9109	RMD	EQ52
Power Cable - Drawer to IBM PDU, 200-240V/10A	9109	RMD	EQ77
RFID Tags for Servers, Compute Nodes, Chassis, Racks, and HMCs	9109	RMD	ERF1
Optional Front Door for Power 770 & 780 2.0m Rack	9109	RMD	ERG7
387GB 1.8" SAS SSD for AIX/Linux with eMLC	9109	RMD	ES02
387GB 1.8" SAS SSD for IBM i with eMLC	9109	RMD	ES04
387GB SFF-1 SSD for AIX/Linux with eMLC	9109	RMD	ES0A
387GB SFF-1 SSD for IBM i with eMLC	9109	RMD	ES0B
387GB SFF-2 SSD for AIX/Linux with eMLC	9109	RMD	ES0C
387GB SFF-2 SSD for IBM i with eMLC	9109	RMD	ES0D
PCIe2 RAID SAS Adapter Dual-port 6Gb	9109	RMD	ESA1
S&H - No Charge	9109	RMD	ESC0
S&H	9109	RMD	ESC7
Six ES02 387GB 1.8" SAS SSD for AIX/Linux with eMLC	9109	RMD	ESR2
Six ES04 387GB 1.8" SAS SSD for IBM i with eMLC	9109	RMD	ESR4
Four ES0A 387GB SFF-1 SSD for AIX/Linux with eMLC	9109	RMD	ESRA
Four ES0B 387GB SFF-1 SSD for IBM i with eMLC	9109	RMD	ESRB
Four ES0C 387GB SFF-2 SSD for AIX/Linux with eMLC	9109	RMD	ESRC
Four ES0D 387GB SFF-2 SSD for IBM i with eMLC	9109	RMD	ESRD
1TB Removable Disk Drive Cartridge	9109	RMD	EU01
RDX USB External Docking Station for Removable Disk Cartridge	9109	RMD	EU04
RDX 320 GB Removable Disk Drive	9109	RMD	EU08
1.5TB Removable Disk Drive Cartridge	9109	RMD	EU15
10G Base T Wrap	9109	RMD	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

New feature

Description	MT	Model	Feature
Rack Content Specify: 9109-RMD	7014	B42	ER0D
	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 9109-RMD 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

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 760, or you can access the product documentation at

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

Services

Global Technology Services

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

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

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

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

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

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

For details on education offerings related to specific products, visit

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

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

Technical information

Specified operating environment

Physical specifications

IBM Power 760 (9109-RMD)

- 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 (48 cores active)
- System power calculator is available at
  http://www-912.ibm.com/see/EnergyEstimator
- Power source loading: 2.45 kVA maximum (48 cores active)
- Thermal output: 8,189 Btu/hr maximum (48 cores active)
- Maximum altitude: 3,048 m (10,000 ft)
- Noise level (weighted sound power) LWAd(B):
  - One drawer with 48 active cores:
    -- 7.1 bels (operating/idle)
    -- 6.5 bels (operating/idle) with acoustic rack doors (#6248 or #6249)
- EnergyScale, 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)
- EnergyScale, 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 760 minimum system configuration

Each Power 760 order must include a minimum of the following items when AIX or Linux is the primary operating system:

Feature number	Description
EPT5	0/12-core 3.1 GHz POWER7+ Processor, or
EPT6	0/12-core 3.4 GHz POWER7+ Processor
EPT1	Processor and Memory Backplane
EPTR	Service Processor
8 x EPTA	8 Processor Activations for EPT5, or
8 x EPTB	8 Processor Activations for EPT6
2 x EM4B	32 GB Memory
2 x EM01	Memory Riser Card
EPTS	Storage Backplane
1768	Integrated Multifunction Card
EN10	Integrated Mutifunction Card w/10 GbE RJ45 and Copper Twinax
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 or Fibre Channel over Ethernet adapter must be ordered if feature 0837 is selected.

Note: One HMC is required for every 9109-RMD; however, a communal HMC is acceptable.

Each Power 760 order must include a minimum of the following items when IBM i is the primary operating system:

Feature number	Description
EPT5	0/12-core 3.1 GHz POWER7+ Processor, or
EPT6	0/12-core 3.4 GHz POWER7+ Processor
EPT1	Processor & Memory Backplane
EPTR	Service Processor
8 x EPTA	8 Processor Activations for EPT5, or
8 x EPTB	8 Processor Activations for EPT6
2 x EM4B	32 GB Memory
2 x EM01	Memory Riser Card
EPTS	Storage Backplane
1768	Integrated Multifunction Card, or (VIOS support only)
EN10	Integrated Mutifunction Card w/10 GbE RJ45 and Copper Twinax
2 x 1888	139.5 GB 15k SFF DASD
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)
5553	System Console - Internal LAN
2 x 6xxx	Two Power Cords

Notes :

- 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.
- 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.

- 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)
- DASD/Media backplane with external SAS port, 6 x 2.5-inch DASD/SSD (#EPTS)

  The minimum system configuration requires at least one SAS disk drive 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), a disk drive is not required. Attachment of the SAN using a Fibre Channel over Ethernet connection is also supported.

  Notes :

  - When feature 2145, IBM i operating system, is selected, a minimum of two DASD is required.
  - No internal DASD is required if feature 0837 (Boot from SAN) is selected. In this case, a Fibre Channel or Fibre Channel over Ethernet adapter must also be ordered.
- 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)
- Choose 32 GB minimum system memory from the following memory features where each feature contains two identical memory DIMMs:
  - 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, 4 Gb (EM4B, Qty=2)
  - 32 GB (2 x 16 GB Memory DIMMs), 1066 MHz, 4 Gb (EM4C, Qty=1)
  - 64 GB (2 x 32 GB Memory DIMMs), 1066 MHz, 4 Gb (EM4D, Qty=1)

RAID

There are multiple protection options for disk/SSD drives in the SAS SFF bays in Power 760 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 may 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/Linux software or by the disk/SSD hardware controllers. Mirroring of drives is provided by AIX/IBM i/Linux software. In addition, AIX/Linux supports controllers providing RAID 0, 5, 6, or 10. IBM i integrated storage management already provides striping so IBM i also supports controllers providing 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 provided in the Power 760 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/Linux and supports RAID 0 or 10 protection for AIX/Linux. Other disk/SSD controllers are provided as PCI adapters. PCI-X SCSI, PCI-X SAS, and PCIe SAS adapters are supported. PCI Controllers with and without write cache are supported. RAID 5 and RAID 6 on controllers with write cache are supported.

AIX/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) provides 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.
  - Can not be ordered as the primary OS with feature numbers 2145 and 0566.
- SAN Load Source Specify
  - Boot from SAN (#0837) or
  - Optional Load Source Specify
- System Console - Internal LAN (#5553)

If installing the Linux operating system, use SUSE Linux Enterprise Server 11 Service Pack 2, or later, with current maintenance updates available from SUSE to enable all planned functionality.

Users interested in Red Hat Enterprise Linux should consult the Statement of general direction .

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, or later.

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 port can be used, but not both. The integrated system port is supported for modem and asynch terminal connections by AIX or Linux . Any other application using serial ports requires a serial port adapter to be installed in a PCIe slot. The integrated system port does 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.
- 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 S/S) 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 0/12-core CUoD processor DCMs
  - 0/12-core (2x6-core) 3.1 GHz processor DCM (#EPT5)
  - 0/12-core (2x6-core) 3.4 GHz processor DCM (#EPT6)
- Two Memory Riser Cards per DCM (2 x #EM01); 8 DIMM slots per riser card
- POWER7+ DDR3 Memory DIMMs (16 DIMMs per DCM))
  - 8 GB (2 x 4 GB), 1066 MHz (Two DIMMs, #EM08)
  - 16 GB (2 x 18 GB), 1066 MHz (Two DIMMS, #EM4B)
  - 32 GB (2 x 16 GB), 1066 MHz (Two DIMMs, #EM4C)
  - 64 GB (2 x 32 GB), 1066 MHz (Two DIMMs, #EM4D)

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 760 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 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: 2048 GB, 64 DIMMs x 32 GB/DIMM (32 x #EM4D)
  - Three processor DCMs: 1536 GB (24 x #EM4D)
  - Two processor DCMs: 1024 GB (16 x #EM4D)
  - One processor DCM: 512 GB (8 x #EM4D)

Additional memory configuration details

- The minimum system memory for each number of DCMs is the following:
  - One processor DCM: 32 GB (2 x #EM4B, 4 DIMMS or 4 x #EM08, 8 DIMMS)
  - Two processor DCMs: 32 GB (4 x #EM08, 8 DIMMs)
  - Three processor DCMs: 48 GB (6 x #EM08, 12 DIMMs)
  - Four processor DCMs: 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.

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
64 GB 1066 MHz (2 x 32 GB RDIMMs)	EM4D	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 760.
  - 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 two.

The following list shows I/O drawers that are supported or available on the 9109 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 760 (48-core)		
O/S	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 date 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 760 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 Ultra SSD I/O drawer (#EDR1)
  - Minimum of two DCMs are required before using GX++ adapters
- 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)

Planning information

Cable orders

No additional cables are required.

Security, auditability, and control

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.

IBM Electronic Services

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.

Now integrated into the base operating system of AIX 5.3, AIX 6.1, and AIX 7.1, 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

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

Terms and conditions

Volume orders: Contact your IBM representative.

IBM Global Financing

Yes

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ICA Lease or Financing Offering:                    Yes
  Eligible for Maintenance:                         Yes
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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
- Mouse
- Display
- Mounting hardware
- Fans
- Line power cord
- Operator panel
- 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
- Processor & Memory Backplane
- Memory Riser Card
- 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
- Operator panel
- 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

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. Calls must be received by 5:00 pm local time in order to qualify for 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.

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.

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 9109 machine type:

Description	Model Number	Feature Numbers	Initial/ MES/ Both/ Support	CSU	RP MES
IBM Power 760					
	RMD		No		
One CSC Billing Unit					
	RMD	0010	Both	Yes	No
Ten CSC Billing Units					
	RMD	0011	Both	Yes	No
Mirrored System Disk Level, Sp					
	RMD	0040	Both	Yes	No
Device Parity Protection All					
	RMD	0041	Both	Yes	No
Mirrored System Bus Level					
	RMD	0043	Both	Yes	No
Device Parity RAID 6 All					
	RMD	0047	Both	Yes	No
RISC to RISC Data Migration					
	RMD	0205	Initial	Yes	No
AIX Partition Specify					
	RMD	0265	Both	Yes	No
Linux Partition Specify					
	RMD	0266	Both	Yes	No
IBM i Partition Specify					
	RMD	0267	Both	Yes	No
Specify Custom Data Protection					
	RMD	0296	Both	Yes	No
Mirrored Level System Specify					
	RMD	0308	Both	Yes	No
RAID Hot Spare Specify					
	RMD	0347	Both	Yes	No
V.24/EIA232 6.1m (20 Ft) PCI C					
	RMD	0348	Both	Yes	No
V.24/EIA232 15.2m (50 Ft) PCI					
	RMD	0349	Support	Yes	No

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V.35 6.1m (20 Ft) PCI Cable
                        RMD     0353 Both     Yes No
V.35 15.2m (50 Ft) PCI Cable
                        RMD     0354 Support  Yes No
V.36 6.1m (20 Ft) PCI Cable
                        RMD     0356 Support  Yes No
X.21 6.1m (20 Ft) PCI Cable
                        RMD     0359 Both     Yes No
X.21 15.2m (50 Ft) PCI Cable
                        RMD     0360 Support  Yes No
V.24/EIA232 (80 Ft) PCI Cable
                        RMD     0365 Support  Yes No
UPS Factory Integration Spcfy
                        RMD     0373 MES      Yes No
HMC Factory Integration Spcfy
                        RMD     0374 MES      Yes No
Display Factory Int. Specify
                        RMD     0375 MES      Yes No
Rack Space for UPS
                        RMD     0376 MES      Yes No
Reserve Rack for HMC
                        RMD     0377 MES      Yes No
Reserve Rack Space for Display
                        RMD     0378 MES      Yes No
CBU Specify
                        RMD     0444 Initial  Yes No
Customer Specified Placement
                        RMD     0456 Initial  Yes No
SSD Placement Indicator CEC
                        RMD     0462 Both     Yes No
SSD Placement Indicator 5802/3
                        RMD     0463 Initial  N/A No
SSD Placement Indicator 5886
                        RMD     0464 Initial  N/A No
SSD Placement Indicator 5887
                        RMD     0465 Initial  N/A No
19 inch, 1.8 meter high rack
                        RMD     0551 MES      Yes No
19 inch, 2.0 meter high rack
                        RMD     0553 MES      Yes No
IBM i 6.1 w/6.1.1 Machine Code
                        RMD     0566 Both     Yes No
IBM i 7.1 Specify Code
                        RMD     0567 Both     Yes No
Rack Filler Panel Kit
                        RMD     0599 Both     Yes No
Load Source Not in CEC
                        RMD     0719 Both     Yes No
#1787 Load Source Specify
                        RMD     0722 Both     Yes No
#1996 Load Source Specify
                        RMD     0724 Initial  N/A No
Specify Load Source 5802/3/77
                        RMD     0726 Both     Yes No
Specify 5886 Load Source plac
                        RMD     0727 Both     Yes No
#5887 Load Source Specify
                        RMD     0728 Both     Yes No
EXP30 Load Source Specify
                        RMD     0729 Both     Yes No
SAN Load Source Specify
                        RMD     0837 Both     Yes No
3676 Load Source Specify
                        RMD     0838 Support  Yes No
3677 Load Source Specify
                        RMD     0839 Support  Yes No
3678 Load Source Specify
                        RMD     0840 Support  Yes No
3658 Load Source Specify
                        RMD     0844 Support  Yes No
1884 Load Source Specify
                        RMD     0851 Support  Yes No
1888 Load Source Specify
                        RMD     0853 Both     Yes No
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1911 Load Source Specify
                        RMD     0856 Both     Yes No
#1916 Load Source Specify
                        RMD     0857 Both     Yes No
#1879 Load Source Specify
                        RMD     0870 Both     Yes No
#1947 Load Source Specify
                        RMD     0871 Both     Yes No
#1948 Load Source Specify
                        RMD     0872 Both     Yes No
#1956 Load Source Specify
                        RMD     0874 Both     Yes No
#1962 Load Source Specify
                        RMD     0875 Both     Yes No
#1794 Load Source Specify
                        RMD     0876 Both     Yes No
#1737 Load Source Specify(856G
                        RMD     0879 Both     Yes No
#1738 Load Source Specify SFF2
                        RMD     0880 Both     Yes No
#ES04 Load Source Specify
                        RMD     0882 Initial  Yes No
#ES0B Load Source Specify
                        RMD     0893 Both     Yes No
#ES0D Load Source Specify
                        RMD     0894 Both     Yes No

Modem Cable US/Canada and GU
                        RMD     1025 Both     Yes No
USB External Docking Station R
                        RMD     1104 Support  Yes No
USB 160 GB Removable Disk Dr
                        RMD     1106 Support  Yes No
USB 500 GB Removable Disk Dr
                        RMD     1107 Both     Yes No
3m, Blue Cat5e Cable
                        RMD     1111 Both     Yes No
10m, Blue Cat5e Cable
                        RMD     1112 Both     Yes No
25m, Blue Cat5e Cable
                        RMD     1113 Both     Yes No
Decline ESA Indicator
                        RMD     1120 NC Initial N/A No

Custom Serv. Specify, Roch
                        RMD     1140 Both     Yes No

200V 16A 4.3m (14 Ft) TL Line
                        RMD     1406 Support  Yes No

125V 4.3m (14 Ft) Line Cord
                        RMD     1413 Support  Yes No
200V 1.8m (6 Ft) Locking Line
                        RMD     1414 Support  Yes No




4.3m 200V/16A Power Cord EU/As
                        RMD     1420 Support  Yes No
4.3m 200V/16A Power Cord CH/DK
                        RMD     1421 Support  Yes No

200V 4.3m (14 Ft) Locking Line
                        RMD     1426 Support  Yes No

200V 4.3m (14 Ft) Watertight L
                        RMD     1427 Support  Yes No
4.3m 200V/10A Power Cord EU/As
                        RMD     1439 Support  Yes No
4.3m 200V/10A Power Cord Denma
                        RMD     1440 Support  Yes No
4.3m 200V/10A Power Cord S. Af
                        RMD     1441 Support  Yes No
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4.3m 200V/10A Power Cord Swiss
RMD 1442 Support Yes No
4.3m 200V/10A Power Cord UK
RMD 1443 Support Yes No
4.3m 200V/10A Power Cord Israe
RMD 1445 Support Yes No
4.3m 200V/32A Power Cord EU 1
RMD 1449 Support Yes No
4.3m 200V/16A Power Cord EU 2
RMD 1450 Support Yes No

200V (14 Ft) 4.3m Line Cord
RMD 1452 Support Yes No

200V 12A (14 Ft) 4.3m TL Line
RMD 1454 Support Yes No

200V (14 Ft) 4.3m Watertight L
RMD 1456 Support Yes No

SPCN Cable
RMD 1466 Support Yes No

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

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0.6 Meter 12X DDR Cable
                        RMD     1861 Both     Yes No
1.5 Meter 12X DDR Cable
                        RMD     1862 Both     Yes No
8 Meter 12X DDR Cable
                        RMD     1864 Both     Yes No
3.0 Meter 12X DDR Cable
                        RMD     1865 Both     Yes No
Quantity 150 of #1917
                        RMD     1866 Both     Yes No
Quantity 150 of #1947
                        RMD     1868 Both     Yes No
Quantity 150 of #1925
                        RMD     1869 Both     Yes No
283GB 15K RPM SAS Disk
                        RMD     1879 Both     Yes No
300GB 15K RPM SAS Disk
                        RMD     1880 Both     Yes No
146.8GB 10K RPM SAS SFF Disk D
                        RMD     1882 Support  Yes No
73.4 GB 15K RPM SAS SFF Disk D
                        RMD     1883 Support  Yes No
69.7 GB 15K RPM SAS SFF Disk D
                        RMD     1884 Support  Yes No
300GB 10K RPM SFF SAS Disk D
                        RMD     1885 Both     Yes No
146GB 15K RPM SFF SAS Disk D
                        RMD     1886 Both     Yes No
Quantity 150 of #1793
                        RMD     1887 Both     Yes No
139GB 15K RPM SFF SAS Disk D
                        RMD     1888 Both     Yes No
QUANTITY 150 OF 1883
                        RMD     1891 Support  Yes No
QUANTITY 150 OF 1882
                        RMD     1899 Support  Yes No
283GB 10K RPM SFF SAS Disk Dri
                        RMD     1911 Both     Yes No
GX++ 2-port PCIe2 x8 Adapter
                        RMD     1914 Both     Yes No
571GB 10k RPM SAS SFF Disk
                        RMD     1916 Both     Yes No
146GB 15k RPM SAS SFF-2 Disk
                        RMD     1917 Both     Yes No
300GB 10k RPM SAS SFF-2 Disk
                        RMD     1925 Both     Yes No
Quantity 150 of #1879
                        RMD     1926 Both     Yes No
Quantity 150 of #1948
                        RMD     1927 Both     Yes No
Quantity 150 of #1880
                        RMD     1928 Both     Yes No
Quantity 150 of #1953
                        RMD     1929 Both     Yes No
139GB 15k RPM SAS SFF-2 Disk
                        RMD     1947 Both     Yes No
283GB 15k RPM SAS SFF-2 Disk
                        RMD     1948 Both     Yes No
300GB 15k RPM SAS SFF-2 Disk
                        RMD     1953 Both     Yes No
283GB 10k RPM SAS SFF-2 Disk
                        RMD     1956 Both     Yes No
Quantity 150 of #1794
                        RMD     1958 Both     Yes No
571GB 10k RPM SAS SFF-2 Disk
                        RMD     1962 Both     Yes No
600GB 10k RPM SAS SFF-2 Disk
                        RMD     1964 Both     Yes No
177GB SSD Module with eMLC (AI
                        RMD     1995 Both     No  No
1 Gigabit iSCSI TOE PCI X on C
                        RMD     1996 Both     No  No
PCIe RAID SSD SAS Adapter 3Gb
                        RMD     2055 Both     Yes No
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Primary OS - IBM i
                        RMD     2145 Both     Yes No
Primary OS AIX
                        RMD     2146 Both     Yes No
Primary OS Linux
                        RMD     2147 Both     Yes No
LC-SC 50 Micron Fiber Conv Cab
                        RMD     2456 Both     Yes No
LC-SC 62.5 Mic.Fib.Conv.Cable
                        RMD     2459 Both     Yes No
4 port USB PCIe Adapter
                        RMD     2728 Both     Yes No
PCIe 2 Line WAN w/Modem
                        RMD     2893 Initial  Yes No
Asynch.Termin/Print.Cbl EIA232
                        RMD     2934 Both     Yes No
Asynchronous Cable EIA 232/V
                        RMD     2936 Both     Yes No
Ser to Ser Port Cab Draw/Draw
                        RMD     3124 Both     Yes No
Serial to Se.Port Cbl Rack 8M
                        RMD     3125 Both     Yes No
1m, QDR IB Copper Cable
                        RMD     3287 Both     Yes No
3m, QDR IB Copper Cable
                        RMD     3288 Both     Yes No
5m QDR IB/E'Net Copper Cable
                        RMD     3289 Both     Yes
10m QDR IB Optic Cable
                        RMD     3290 Both     Yes No
30m QDR IB Optic Cable
                        RMD     3293 Both     Yes No
SAS YO Cable 1.5m - HD 6Gb Ada
                        RMD     3450 Both     Yes No
SAS YO Cable 3m - HD 6Gb Adapt
                        RMD     3451 Both     Yes No
SAS YO Cable 6m - HD 6Gb Adapt
                        RMD     3452 Both     Yes No
SAS YO Cable 10m - HD 6Gb Adap
                        RMD     3453 Both     Yes No
SAS X Cable 3m - HD 6Gb 2-Adap
                        RMD     3454 Both     Yes No
SAS X Cable 6m - HD 6Gb 2-Adap
                        RMD     3455 Both     Yes No
SAS X Cable 10m - HD 6Gb 2-Ada
                        RMD     3456 Both     Yes No
SAS YO Cable 15m - HD 3Gb Adap
                        RMD     3457 Both     Yes No
SAS X Cable 15m - HD 3Gb 2-Ada
                        RMD     3458 Both     Yes No
69GB 3.5 SAS Solid State Driv
                        RMD     3586 Support  Yes No
69GB 3.5 SAS Solid State Driv
                        RMD     3587 Support  Yes No



Widescreen LCD Monitor
                        RMD     3632 Both     Yes No
T541H/L150p 15inchTFT Col.M
                        RMD     3637 Support  Yes No
ThinkVision L170p Flat Pan.M
                        RMD     3639 Support  Yes No
ThinkVision L171p Flat Panel M
                        RMD     3640 Support  Yes No
IBM T115 Flat Panel Monitor
                        RMD     3641 Support  Yes No
ThinkVision L191p Flat Panel M
                        RMD     3642 Support  Yes No
IBM T120 Flat Panel Monitor
                        RMD     3643 Support  Yes No
19in. Flat Panel Monitor
                        RMD     3644 Support  Yes No
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17in. Flat Panel Monitor
RMD 3645 Support Yes No
73GB 15K RPM SAS Disk Drive
RMD 3646 Support Yes No
146GB 15K RPM SAS Disk Drive
RMD 3647 Support Yes No
300GB 15K RPM SAS Disk Drive
RMD 3648 Support Yes No
450GB 15K RPM SAS Disk Drive
RMD 3649 Support Yes No
SAS Cable (EE) Drawer to Dr 1M
RMD 3652 Both Yes No
SAS Cable (EE) Drawer to Dr 3M
RMD 3653 Both Yes No
SAS Cable (EE) Drawer to Dr 6M
RMD 3654 Both Yes No
428GB 15K RPM SAS Disk Drive
RMD 3658 Support Yes No
SAS Cable (X) Adapter to SAS E
RMD 3661 Both Yes No
SAS Cbl X Adp SAS Enclosure 6M
RMD 3662 Both Yes No
SAS Cbl X Adp SAS Encl 15M
RMD 3663 Both Yes No
SAS EX cable 3M - Drw to Drw
RMD 3675 Both Yes No
69.7GB 15k rpm SAS Disk Drv
RMD 3676 Support Yes No
139.5GB 15k rpm SAS Disk Drive
RMD 3677 Support Yes No
283.7GB 15k rpm SAS Disk Drive
RMD 3678 Support Yes No
SAS Cab (AI) Adapter to Int 1M
RMD 3679 Both Yes No
SAS EX Cable 6m - Drw to Drw
RMD 3680 Both Yes No
3M SAS CABLE, ADPTR TO ADPTR (
RMD 3681 Both Yes No
SAS Cab (AE) Adapter to En 3M
RMD 3684 Both Yes No
SAS Cable(AE) Adapter to En 6M
RMD 3685 Both Yes No
SAS Ca(YI) System to SAS 3M
RMD 3687 Both Yes No
SAS Cable (AT) 0.6 Meter
RMD 3688 Both Yes No
SAS AT Cable 0.6m - HD 6Gb Ada
RMD 3689 Both Yes No
SAS Cab(YO) Adapter to SAS1.5M
RMD 3691 Both Yes No
SAS Cab(YO) Adapter to SAS 3M
RMD 3692 Both Yes No
SAS Cab(YO) Adapter to SAS 6M
RMD 3693 Both Yes No
SAS Cab(YO) Adapter to SAS 15M
RMD 3694 Both Yes No
0.3M Serial Prt Converter Cbl
RMD 3925 Both Yes No
Serial Port Null Mod Cab 3.7M
RMD 3927 Both Yes No
Ser.Port Null Modem Cable,10M
RMD 3928 Both Yes No
System Serial Port Converter C
RMD 3930 Both Yes No
6Foot Extend.Cbl for Displays
RMD 4242 Both Yes No
Extender Cable USB Keybo 1.8M
RMD 4256 Both Yes No
VGA to DVI Connection Converte
RMD 4276 Both Yes No
Package 5X 2055 20X 1995
RMD 4367 Both Yes No
Package 5X 2055 20X 1995
RMD 4377 Both Yes No

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One and only one rack indicator feature is required on
all orders (#4650 to #4666).
No Factory Integration Ind.
                        RMD     4650 Initial  N/A No
Rack Indicator, Rack 1
                        RMD     4651 Initial  N/A No
Rack Indicator, Rack 2
                        RMD     4652 Initial  N/A No
Rack Indicator, Rack 3
                        RMD     4653 Initial  N/A No
Rack Indicator, Rack 4
                        RMD     4654 Initial  N/A No
Rack Indicator, Rack 5
                        RMD     4655 Initial  N/A No
Rack Indicator, Rack 6
                        RMD     4656 Initial  N/A No
Rack Indicator, Rack 7
                        RMD     4657 Initial  N/A No
Rack Indicator, Rack 8
                        RMD     4658 Initial  N/A No
Rack Indicator, Rack 9
                        RMD     4659 Initial  N/A No
Rack Indicator, Rack 10
                        RMD     4660 Initial  N/A No
Rack Indicator, Rack 11
                        RMD     4661 Initial  N/A No
Rack Indicator, Rack 12
                        RMD     4662 Initial  N/A No
Rack Indicator, Rack 13
                        RMD     4663 Initial  N/A No
Rack Indicator, Rack 14
                        RMD     4664 Initial  N/A No
Rack Indicator, Rack 15
                        RMD     4665 Initial  N/A No
Rack Indicator, Rack 16
                        RMD     4666 Initial  N/A No
Active Memory Expansion Enable
                        RMD     4792 Both     Yes No
PCIe Crypto Coprocessor Gen3
                        RMD     4808 Both     Yes No
PCIe Crypto Coprocessor Gen4
                        RMD     4809 Both     Yes No
One Processor of 5250 Enterpri
                        RMD     4988 Both     Yes No
Full 5250 Enterprise Enablemen
                        RMD     4989 Both     Yes No
Software Preload Required
                        RMD     5000 Initial  N/A No
Power Dist Unit 1 Phase NEMA
                        RMD     5160 Support  Yes No
Power Dist Unit 1 Phase IEC
                        RMD     5161 Support  Yes No
Power Dist Unit 2 of 3 Phase
                        RMD     5162 Support  Yes No
Power Dist Unit - 3 Phase
                        RMD     5163 Support  Yes No
PCIe 2-Port 4X IB QDR Adapt
                        RMD     5285 Both     Yes No
PCIe2 2-port 10GbE SR Adapter
                        RMD     5287 Both     Yes No
PCIe2 2-port 10GbE SFP+ Adaptr
                        RMD     5288 Both     Yes No
2 Port Async EIA 232 PCIe Adap
                        RMD     5289 Both     Yes No
System Pwr Sup -1925W
                        RMD     5532 Initial  Yes No
Sys Console On HMC
                        RMD     5550 Both     Yes No
Sys Console Ethernet No IOP
                        RMD     5553 Both     Yes No
Blind Swap Type III Cas PCIe
                        RMD     5646 MES      Yes No
Blind Swap Type III Cas PCI X
                        RMD     5647 MES      Yes No
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175MB Cache RAID Dual IOA
RMD 5662 Both Yes No
10Gb FCoE PCIe Dual Port Adapt
RMD 5708 Both Yes No
4 Port 10/100/1000 Base TX PCI
RMD 5717 Both Yes No
PCIe2 8Gb 4-port Fibre Channel
RMD 5729 Both Yes No
10 Gigabit Ethernet CX4 PCI Ex
RMD 5732 Both Yes No
8 Gigabit PCI Express Dual Por
RMD 5735 Both Yes No
PCIe2 4-Port 10GbE&1GbE SR&RJ4
RMD 5744 Both Yes No
PCIe2 4-Port 10GbE&GbE SFP+Cop
RMD 5745 Both Yes No
POWER GXT145 PCI Express Graph
RMD 5748 Both Yes No
SATA Slimline DVD RAM Drive
RMD 5762 Support Yes No
2 Port 10/100/1000 Base TX Eth
RMD 5767 Both Yes No
2 Port Gigabit Ethernet SX PCI
RMD 5768 Both Yes No
10 Gb Eth SR PCI Express Adp
RMD 5769 Both Yes No
SATA Slimline DVD-RAM Drive
RMD 5771 Both Yes No
10 Gigabit Ethernet LR PCI
RMD 5772 Both Yes No
4GigabitPCI-E Single Port Fibr
RMD 5773 Support Yes No
4 Gigabit PCI Express Dual Por
RMD 5774 Both Yes No
4 Port Async EIA 232 PCIe Adap
RMD 5785 Both Yes No
12X I/O Drawer PCIe, SFF disk
RMD 5802 Both Yes No
PCIe 380MB Cache Dual x4 3Gb S
RMD 5805 Both Yes No
12X I/O Drawer PCIe, No Disk
RMD 5877 Both Yes No
EXP 12S Expansion Drawer
RMD 5886 Support Yes No
EXP24S SFF Gen2-bay Drawer
RMD 5887 Both Yes No
PCIe2 4-port 1GbE Adapter
RMD 5899 Both Yes No
PCIe Dual x4 SAS Adapter
RMD 5901 Both Yes No
PCIe 380MB Cache Dual x4 3Gb
RMD 5903 Support Yes No
PCIe2 1.8GB Cache RAID SAS Ada
RMD 5913 Both Yes No
SAS AA Cable 3m - HD 6Gb Adapt
RMD 5915 Both Yes No
SAS AA Cable 6m - HD 6Gb Adapt
RMD 5916 Both Yes No
SAS AA Cable 1.5m - HD 6Gb Ada
RMD 5917 Both Yes No
SAS AA Cbl 0.6m - HD 6Gb Adapt
RMD 5918 Both Yes No
Non paired PCIe SAS RAID Ind
RMD 5923 Both Yes No
Non-paired Indicator 5913 PCIe
RMD 5924 Both Yes No
Shared EXP30 Indicator
RMD 5925 Both Yes No
SAS EX Cable 1.5m - Drw to Drw
RMD 5926 Both Yes No
Remote EXP30 Indicator
RMD 5927 Both Yes No
Full Width Key USB, US English
RMD 5951 Support Yes No

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Full Width Key USB, French
                        RMD     5952 Support  Yes No
Full Width Key USB, Italian
                        RMD     5953 Support  Yes No
Full Width Key USB, German/Aus
                        RMD     5954 Support  Yes No
Full Width Key USB, UK English
                        RMD     5955 Support  Yes No
Full Width Key USB, Spanish
                        RMD     5956 Support  Yes No
Full Width Key USB, Japanese
                        RMD     5957 Support  Yes No
Full Width Key USB, BrazilianP
                        RMD     5958 Support  Yes No
Full Width Key USB, Hungarian
                        RMD     5959 Support  Yes No
Full Width Key USB, Korean
                        RMD     5960 Support  Yes No
Full Width Key USB, Chinese
                        RMD     5961 Support  Yes No
Full Width Key USB, French Can
                        RMD     5962 Support  Yes No
Full Width Key USB, Belgian/UK
                        RMD     5964 Support  Yes No
Full Width Key USB, Swedish/Fi
                        RMD     5965 Support  Yes No
Full Width Key USB, Danish
                        RMD     5966 Support  Yes No
Full Width Key USB, Bulgarian
                        RMD     5967 Support  Yes No
Full Width Key USB, Swiss/Fr/G
                        RMD     5968 Support  Yes No
Full Width Key USB, Norwegian
                        RMD     5969 Support  Yes No
Full Width Key USB, Dutch
                        RMD     5970 Support  Yes No
Full Width Key USB, Portuguese
                        RMD     5971 Support  Yes No
Full Width Key USB, Greek
                        RMD     5972 Support  Yes No
Full Width Key USB, Hebrew
                        RMD     5973 Support  Yes No
Full Width Key USB, Polish
                        RMD     5974 Support  Yes No
Full Width Key USB, Slovakian
                        RMD     5975 Support  Yes No
Full Width Key USB, Czech
                        RMD     5976 Support  Yes No
Full Width Key USB, Turkish
                        RMD     5977 Support  Yes No
Full Width Key USB, LA Spanish
                        RMD     5978 Support  Yes No
Full Width Key USB, Arabic
                        RMD     5979 Support  Yes No
Full Width Key USB, Thai
                        RMD     5980 Support  Yes No
Full Width Key USB, Russian
                        RMD     5981 Support  Yes No
Full Width Key USB, Slovenian
                        RMD     5982 Support  Yes No
Full Width Key USB, US English
                        RMD     5983 Support  Yes No
Power Control Cable(SPCN)-2m
                        RMD     6001 Support  Yes No
Power Control Cbl (SPCN) 3 m
                        RMD     6006 Both     Yes No
Power Control Cbl (SPCN) 15 m
                        RMD     6007 Both     Yes No
Power Control Cable(SPCN)-6m
                        RMD     6008 Support  Yes No
Power Control Cable(SPCN)-30m
                        RMD     6029 Support  Yes No
Opt Front Door for 1.8m Rack
                        RMD     6068 MES      Yes No
```

```
Opt Front Door for 2.0m Rack
                        RMD     6069 MES      Yes No
1.8m Rack Trim Kit
                        RMD     6246 Support  Yes No
2.0m Rack Trim Kit
                        RMD     6247 Support  Yes No
1.8m Rack Acoustic Doors
                        RMD     6248 MES      Yes No
2.0m Rack Acoustic Doors
                        RMD     6249 MES      Yes No
1.8m Rack Trim Kit
                        RMD     6263 MES      Yes No
2.0m Rack Trim Kit
                        RMD     6272 MES      Yes No
Pwr Crd 4.3m 14ft Wall IBM PDU
                        RMD     6458 Both     Yes No
Pwr Crd (14FT), Drwr - OEM PDU
                        RMD     6460 Both     Yes No
Pwr Crd 4.3m 14ft Wall OEM PDU
                        RMD     6469 Both     Yes No
Pwr Crd 1.8m 6ft Wall 125V/15A
                        RMD     6470 Support  Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU
                        RMD     6471 Both     Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU
                        RMD     6472 Both     Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU
                        RMD     6473 Both     Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU
                        RMD     6474 Both     Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU
                        RMD     6475 Both     Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU
                        RMD     6476 Both     Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU
                        RMD     6477 Both     Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU
                        RMD     6478 Both     Yes No
PWR Cord(9foot),(250V,10A)
                        RMD     6479 Support  Yes No
Pwr Crd 1.8m 6ft Wall 250V,15A
                        RMD     6487 Support  Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU
                        RMD     6488 Both     Yes No
4.3m (14 Ft) 3PH/24A Power Cor
                        RMD     6489 MES      Yes No
4.3m (14 Ft) 1PH/48A Pwr Cord
                        RMD     6491 MES      Yes No
4.3m (14 Ft) 1PH/48 60A Pwr Co
                        RMD     6492 MES      Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU
                        RMD     6493 Both     Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU
                        RMD     6494 Both     Yes No
To Wall/OEM PDU, (250V, 10A)
                        RMD     6495 Support  Yes No
Pwr Crd 2.7m 9ft Wall 250V,10A
                        RMD     6496 Both     Yes No
PWR Cord(6ft),To Wall/OEM PDU
                        RMD     6497 Both     Yes No
Power Cord 6ftTo Wall OEM PDU
                        RMD     6498 Support  Yes No
Power Cable Drawer to IBM PD
                        RMD     6577 Both     Yes No
Optional Rack Security Kit
                        RMD     6580 MES      Yes No
Modem Tray for 19-Inch Rack
                        RMD     6586 MES      Yes No
Pwr Crd 2.7m 9ft Wall 125V,15A
                        RMD     6651 Both     Yes No
4.3m 1PH/24-30A Pwr Cord
                        RMD     6654 MES      Yes No
4.3m 14Ft 1PH/24 30A WR Pwr
                        RMD     6655 MES      Yes No
```

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4.3m 14Ft 1PH/24A Power Cord
                        RMD     6656 MES      Yes No

Pwr.Cord(9ft),To Wall/OEM PDU
                        RMD     6659 Both     Yes No
Pwr Crd 14ft 4.3m WallOEM PDU
                        RMD     6660 MES      Yes No
Pwr Crd 2.8m 9.2ft Wall PDU
                        RMD     6665 Both     Yes No
Pwr Crd 4.3M, Drwr - OEM PDU
                        RMD     6669 Both     Yes No
Pwr Crd 6-FT, (125V,15A)PT#59
                        RMD     6670 Support  Yes No
Pwr Crd 2.7M, Drwr - IBM PDU
                        RMD     6671 Both     Yes No
Pwr Crd 1.5M, Drwr - IBM PDU
                        RMD     6672 Both     Yes No
Pwr Crd 2.7m 9ft Wall OEM PDU
                        RMD     6680 Both     Yes No
Power Cord (6ft),To Wall
                        RMD     6687 Support  Yes No
IIntelligent PDU+ 1 EIA Unit
                        RMD     7109 MES      Yes No
Environmental Monitoring Probe
                        RMD     7118 Both     Yes No
Power Distribution Unit
                        RMD     7188 MES      Yes No


Quantity 150 of #3676
                        RMD     7517 Support  Yes No
Quantity 150 of #3677
                        RMD     7518 Support  Yes No
Quantity 150 of #3678
                        RMD     7519 Support  Yes No
Quantity 150 of 3586
                        RMD     7535 Support  Yes No
Quantity 150 of 3587
                        RMD     7536 Support  Yes No
Quantity 150 of 3658
                        RMD     7538 Support  Yes No
Quantity 150 of #1884
                        RMD     7543 Support  Yes No
Quantity 150 of #1888
                        RMD     7544 Both     Yes No
Quantity 150 of #1885
                        RMD     7547 Both     Yes No
Quantity 150 of #1886
                        RMD     7548 Both     Yes No
Quantity 150 of 3647
                        RMD     7549 Support  Yes No
Quantity 150 of #1790
                        RMD     7550 Both     Yes No
PCIe RAID SSD SAS Adapter 3Gb
                        RMD     7557 Both     Yes No
Quantity 150 of 3648
                        RMD     7564 Support  Yes No
Quantity 150 of 3649
                        RMD     7565 Support  Yes No
Quantity 150 of #1916
                        RMD     7566 Both     Yes No
QTY 150 177GB SFF-1 SSD 1775
                        RMD     7578 Both     Yes No
QTY 150 177GB SFF-1 SSD IBM i
                        RMD     7582 Both     Yes No
2.0m Rack Side Attach Kit
                        RMD     7780 Support  Yes No
PowerVM Express
                        RMD     7793 Both     Yes No
PowerVM Standard
                        RMD     7794 Both     Yes No
PowerVM Enterprise
                        RMD     7795 Both     Yes No
Eth Cbl 6M HW Management
```

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                        RMD     7801 Support  Yes No
Eth Cbl 15M HW Management
                        RMD     7802 Both     Yes No
Side-by-Side for 1.8m Racks
                        RMD     7840 Support  Yes No
Ruggedize Rack Kit
                        RMD     7841 Support  Yes No
PCI Blind Swap Cassette Kit
                        RMD     7862 Support  Yes No
PCI Blind Swap Cassette Kit
                        RMD     7863 MES      Yes No
Linux Software Preinstall
                        RMD     8143 Initial  N/A No
Linux Software Preinstall BP
                        RMD     8144 Initial  N/A No
Mouse-USB,Black KBD Att C
                        RMD     8841 Support  Yes No
USB Mouse
                        RMD     8845 Both     Yes No
Order Routing Indicator Syste
                        RMD     9169 Initial  N/A No
Language Group Spcf-US Eng
                        RMD     9300 NC Initial N/A No
specify mode-1 & (1)5901/5278
                        RMD     9359 Initial  N/A No
Specify mode-1 & (2)5901/5278
                        RMD     9360 Both     Yes No
Specify mode-2 & (2)5901/5278
                        RMD     9361 Both     Yes No
Specify mode-4 & (4)5901/5278
                        RMD     9365 Both     Yes No
Specify mode-2 & (4)5901/5278
                        RMD     9366 Both     Yes No
Specify mode-1 & (2)5903/5805
                        RMD     9367 Both     Yes No
Specify mode-2 & (4)5903/5805
                        RMD     9368 Both     Yes No
Specify mode-1 & CEC SAS port
                        RMD     9384 Both     Yes No
Specify mode-1 & (2) 5913 EXP
                        RMD     9385 Both     Yes No
Specify mode-2 & (4) 5913 EXP
                        RMD     9386 Both     Yes No
Mode-1 & EXP30 for 1 EXP24S #5
                        RMD     9388 Both     Yes No
New AIX License Core Counter
                        RMD     9440 NC Initial N/A No
New IBM i Lic Core Counter
                        RMD     9441 NC Initial N/A No
New Red Hat Lic Core Counter
                        RMD     9442 NC Initial N/A No
New SUSE Lic Core Counter
                        RMD     9443 NC Initial N/A No
Other AIX Lic Core Counter
                        RMD     9444 NC Initial N/A No
Other Linux Lic Core Counter
                        RMD     9445 NC Initial N/A No
3rd Party Linux Lic Core Cnt
                        RMD     9446 NC Initial N/A No
VIOS Core Counter
                        RMD     9447 NC Initial N/A No
Month Indicator
                        RMD     9461 Initial  N/A No
Day Indicator
                        RMD     9462 Initial  N/A No
Hour Indicator
                        RMD     9463 Initial  N/A No
Minute Indicator
                        RMD     9464 Initial  N/A No
Qty Indicator
                        RMD     9465 Initial  N/A No
Countable Member Indicator
                        RMD     9466 Initial  N/A No
Language Group Spcf-Dutch
```

```
                        RMD     9700 NC Initial N/A No
Language Group Spcf-French
                        RMD     9703 NC Initial N/A No
Language Group Spcf-German
                        RMD     9704 NC Initial N/A No
Language Group Spcf-Polish
                        RMD     9705 NC Initial N/A No
Lang Group Specify - Norwegian
                        RMD     9706 NC Initial N/A No
Lang.Group Spcf-Portuguese
                        RMD     9707 NC Initial N/A No
Language Group Spcf-Spanish
                        RMD     9708 NC Initial N/A No
Language Group Spcf-Italian
                        RMD     9711 NC Initial N/A No
Langua Gr Speci Canadian Frenc
                        RMD     9712 NC Initial N/A No
Language Group Spcf-Japanese
                        RMD     9714 NC Initial N/A No
Language Group Specify Tr Chin
                        RMD     9715 NC Initial N/A No
Language Group Spcf-Korean
                        RMD     9716 NC Initial N/A No
Language Group Spcf-Turkish
                        RMD     9718 NC Initial N/A No
Language Group Spcf-Hungarian
                        RMD     9719 NC Initial N/A No
Language Group Spcf-Slovakian
                        RMD     9720 NC Initial N/A No
Language Group Spcf-Russian
                        RMD     9721 NC Initial N/A No
Lang Group Spcf Simpl Chinese
                        RMD     9722 NC Initial N/A No
Language Group Spcf-Czech
                        RMD     9724 NC Initial N/A No
Language Group Spcf-Romanian
                        RMD     9725 NC Initial N/A No
Lang Group Specify - Croatian
                        RMD     9726 NC Initial N/A No
Language Group Spcf-Slovenian
                        RMD     9727 NC Initial N/A No
Lang Group Specify - Braz Port
                        RMD     9728 NC Initial N/A No
Lang Group Specify - Thai
                        RMD     9729 NC Initial N/A No
PCIe2 2-Port 10GbE RoCE SFP+ A
                        RMD     EC28 Both     Yes No
PCIe2 2-Port 10GbE RoCE SR Ada
                        RMD     EC30 Both     Yes No
0.6m Blue CAT5 Ethernet Cable
                        RMD     ECB0 Both     Yes No
1.5m Blue CAT5 Ethernet Cable
                        RMD     ECB2 Both     Yes No

Custom Serv. Specify, Shen
                        RMD     ECSC Both     N/A No
EXP30 Ultra SSD I/O Drawer
                        RMD     EDR1 Both     Yes No
Mode-1 & (1)ESA1/ESA2 for 5887
                        RMD     EJP1 Both     Yes No
Mode-1 & (2)ESA1/ESA2 for 5887
                        RMD     EJP2 Both     Yes No
Mode-2 & (2)ESA1/ESA2 for 5887
                        RMD     EJP3 Both     Yes No
Mode-2 & (4)ESA1/ESA2 for 5887
                        RMD     EJP4 Both     Yes No
Mode-4 & (4)ESA1/ESA2 for 5887
                        RMD     EJP5 Both     Yes No
Mode-2 & (1)ESA1/ESA2 for 5887
                        RMD     EJP6 Both     Yes No
Specify Mode-2(2)ESA1/ESA2
                        RMD     EJP7 Both     Yes No
Specify mode-2(1) ESA1/ESA2
                        RMD     EJPA Both     Yes No
```

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Specify mode-2 (2) ESA1/ESA2
                        RMD     EJPB Both     Yes No
Specify mode-4 (1)ESA1/ESA2
                        RMD     EJPC Both     Yes No
Specify mode-4(2)ESA1/ESA2
                        RMD     EJPD Both     Yes No
Specify mode-4 (3)ESA1/ESA2
                        RMD     EJPE Both     Yes No
Specify mode-2 (1)5901/5278
                        RMD     EJPJ Both     Yes No
Specify mode-2(2)5901/5278
                        RMD     EJPK Both     Yes No
Specify mode-4 (1)5901/5278
                        RMD     EJPL Both     Yes No
Specify mode-4 (2) 5901/5278
                        RMD     EJPM Both     Yes No
Specify mode-4 (3) 5901/5278
                        RMD     EJPN Both     Yes No
Specify mode-2 (2)5903/5805
                        RMD     EJPR Both     Yes No
Specify mode-2 (2) 5913
                        RMD     EJPT Both     Yes No
Specify Left Half 12X I/O Draw
                        RMD     EJPY Both     Yes No
Specify Right Half 12X I/O Dra
                        RMD     EJPZ Both     Yes No
Full Width Key USB, US English
                        RMD     EK51 Both     Yes No
Full Width Key USB, French
                        RMD     EK52 Both     Yes No
Full WidthKey USB,Italian
                        RMD     EK53 Both     Yes No
Full Width Key USB, German/Aus
                        RMD     EK54 Both     Yes No
Full Width Key USB, UK English
                        RMD     EK55 Both     Yes No
Full Width Key USB, Spanish
                        RMD     EK56 Both     Yes No
Full Width Key USB, Japanese
                        RMD     EK57 Both     Yes No
Full Width Key USB, BrazilianP
                        RMD     EK58 Both     Yes No
Full Width Key USB, Hungarian
                        RMD     EK59 Both     Yes No
Full Width Key USB, Korean
                        RMD     EK60 Both     Yes No
Full Width Key USB, Chinese
                        RMD     EK61 Both     Yes No
Full Width Key USB, French Can
                        RMD     EK62 Both     Yes No
Full Width Key USB, Belgian/UK
                        RMD     EK64 Both     Yes No
Full Width Key USB, Swedish/Fi
                        RMD     EK65 Both     Yes No
Full Width Key USB, Danish
                        RMD     EK66 Both     Yes No
Full Width Key USB, Bulgarian
                        RMD     EK67 Both     Yes No
Full Width Key USB, Swiss/Fr/G
                        RMD     EK68 Both     Yes No
Full Width Key USB, Norwegian
                        RMD     EK69 Both     Yes No
Full Width Key USB, Dutch
                        RMD     EK70 Both     Yes No
Full Width Key USB, Portuguese
                        RMD     EK71 Both     Yes No
Full Width Key USB, Greek
                        RMD     EK72 Both     Yes No
Full Width Key USB, Hebrew
                        RMD     EK73 Both     Yes No
Full Width Key USB, Polish
                        RMD     EK74 Both     Yes No
Full Width Key USB, Slovakian
                        RMD     EK75 Both     Yes No
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Full Width Key USB, Czech
                        RMD     EK76 Both     Yes No
Full Width Key USB, Turkish
                        RMD     EK77 Both     Yes No
Full Width Key USB, LA Spanish
                        RMD     EK78 Both     Yes No
Full Width Key USB, Arabic
                        RMD     EK79 Both     Yes No
Full Width Key USB, Thai
                        RMD     EK80 Both     Yes No
Full Width Key USB, Russian
                        RMD     EK81 Both     Yes No
Full Width Key USB, Slovenian
                        RMD     EK82 Both     Yes No
Full Width Key USB, US English
                        RMD     EK83 Both     Yes No
Trial Live Partition Mobility
                        RMD     ELPM Both     Yes No
Memory Riser Card
                        RMD     EM01 Both     Yes No
8GB (2x4GB) Memory DIMMs 1066
                        RMD     EM08 Both     Yes No
16GB (2x8GB) Memory DIMMs 1066
                        RMD     EM4B Both     Yes No
32GB (2x16GB) Mem DIMMs 1066
                        RMD     EM4C Both     Yes No
64GB (2x32GB) Mem DIMMs 1066
                        RMD     EM4D Both     Yes No
1m 10GbE Cable SFP+ Act Twinax
                        RMD     EN01 Both     Yes No
3m 10GbE Cable SFP+ Act Twinax
                        RMD     EN02 Both     Yes No
5m 10GbE Cable SFP+ Act Twinax
                        RMD     EN03 Both     Yes No
PCIe x8 Cable 1.5m
                        RMD     EN05 Both     Yes No
PCIe x8 Cable 3m
                        RMD     EN07 Both     Yes No
PCIe x8 Cable 8m
                        RMD     EN08 Both     Yes No
PCIe2 16Gb 2-port Fibre Channe
                        RMD     EN0A Both     Yes No
PCIe2 4-port 10Gb FCoE & 1GbE
                        RMD     EN0H Both     Yes No
Integ Multifunc Card w/ 10GbE
                        RMD     EN10 Both     Yes No
Integ Multifunc Card w/10GbEo
                        RMD     EN11 Both     Yes No
Processor & Memory Backplane
                        RMD     EPT1 Initial  No  No
3.1 GHz Proc, 0/12-core P7+
                        RMD     EPT5 Both     No  No
3.4 GHz Proc,0/12-core P7+
                        RMD     EPT6 Both     No  No
1-core activation of #EPT5
                        RMD     EPTA Both     Yes No
1-core activation of #EPT6
                        RMD     EPTB Both     Yes No
Service Processor
                        RMD     EPTR Initial  No  No
Storage Backplane
                        RMD     EPTS Initial  No  No
Quantity 150 of #3452 SAS Cabl
                        RMD     EQ02 Both     Yes No
Quantity 150 of #3453 SAS YO
                        RMD     EQ03 Both     Yes No
Quantity 150 of #ES0A
                        RMD     EQ0A Both     Yes No
Quantity of 150 #ES0B
                        RMD     EQ0B Both     Yes No
Quantity of 150 #ES0C
                        RMD     EQ0C Both     Yes No
Quantity of 150 #ES0D
                        RMD     EQ0D Both     Yes No
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Quantity 150 of #1737
                        RMD     EQ37 Both     Yes No
Quantity 150 of #1738
                        RMD     EQ38 Both     Yes No
Quantity 150 of #1751
                        RMD     EQ51 Both     Yes No
Quantity 150 of #1752
                        RMD     EQ52 Both     Yes No
Power Cable Drawer to IBM PD
                        RMD     EQ77 Both     Yes No
RFID Tags for Compute Nodes
                        RMD     ERF1 Initial  N/A No
Front Door for P770/780 2MRack
                        RMD     ERG7 MES      Yes No
387GB 1.8" SAS SSD (AIX/Linux)
                        RMD     ES02 Both     Yes No
387 GB 1.8 SSD for IBMi w/eMLC
                        RMD     ES04 Both     Yes No
387GB SFF-1 SSD for AIX/Linux
                        RMD     ES0A Both     Yes No
387GB SFF-1 SSD for IBMi
                        RMD     ES0B Both     Yes No
387GB SFF-2 SSD for AIX/Linux
                        RMD     ES0C Both     Yes No
387GB SFF-2 SSD for IBM i
                        RMD     ES0D Both     Yes No
PCIe2 RAID SAS Adapter 6Gb
                        RMD     ESA1 Both     Yes No
S&H - No Charge
                        RMD     ESC0 Initial  N/A No
S&H
                        RMD     ESC7 Initial  N/A No
Six ES02 387GB 1.8" SAS AIX/Li
                        RMD     ESR2 Initial  Yes No
Six ES04 387 GB 1.8 SSD IBMi
                        RMD     ESR4 Initial  Yes No
Four ES0A 387GB SFF-1 SSD AIX
                        RMD     ESRA Initial  Yes No
Four ES0B 387GB SFF-1 SSD IBMi
                        RMD     ESRB Initial  Yes No
Four ES0C387GB SFF-2 SSD AIX
                        RMD     ESRC Initial  Yes No
Four ES0D 387GB SFF-2 SSD IBMi
                        RMD     ESRD Initial  Yes No
1TB Removable Disk Cartridge
                        RMD     EU01 Both     Yes No
RDX USB External Docking
                        RMD     EU04 Both     Yes No
RDX 320 GB Removable Disk Driv
                        RMD     EU08 Both     Yes No
1.5TB Removable Disk Cartridge
                        RMD     EU15 Both     Yes No
10G Base T Wrap
                        RMD     EU20 Both     Yes No
```

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

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


Rack Content Specify: 9109-RMD
                        B42     ER0D Initial  N/A No
                        T00          Initial  Yes
                        T42          Initial  Yes
```

Feature conversions

Feature conversions for 9109-RMD 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

For additional information on maintenance and pricing, contact your IBM representative or your IBM Business Partner, or call 800-IBM-CALL (800-426-2255).

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Corrections

(Corrected on May 13, 2013)

In the Terms and conditions section corrected information on warranty service upgrades.

(Corrected on April 19, 2013)

Moved the 24x7 coverage text from the CRU and On-site service section to the Warranty period section. Deleted replacement parts that were added in error.