IBM Power 710 and 730 Express servers offer IBM POWER7 technology in 2U rack-mount configuration

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At a glance

The Power® 710 and 730 Express® servers are fueled by the outstanding performance and energy efficiency of the POWER7™ processor with a choice of AIX®, IBM® i, or Linux® operating systems and solutions from thousands of ISVs that can set your business apart from the competition -- all in a 2U rack-mount package.

- Powerful 64-bit 4-core, 6-core, and 8-core POWER7 processor modules
  - 4-core, 6-core, and 8-core configurations on the Power 710
  - 8-core, 12-core, and 16-core configurations on the Power 730
- Up to 64 GB of memory on the Power 710 and 128 GB of memory on the Power 730 with optional memory riser cards, optionally augmented with Active Memory™ Expansion
- Rich I/O options in the system unit:
  - Four PCIe Low Profile slots
  - Six disk/solid-state drives (SSD) SAS SFF (small form-factor) bays -- up to 1.8 TB
  - Slimline DVD-RAM
  - Bay for tape or removable drive (with #5263)
  - Integrated SAS/SATA controller for disk/SSD/DVD
  - Host Ethernet Adapters (four 1 Gb or two 10 Gb)
- EnergyScale™ technology

Overview

The Power 710 Express server is a high-performance, energy-efficient, reliable, and secure infrastructure and application server in a dense form factor. As a high-performance infrastructure or application server, the Power 710 Express contains

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innovative workload-optimizing technologies that maximize performance based on client computing needs and Intelligent Energy features that help maximize performance and optimize energy efficiency, resulting in one of the most cost-efficient solutions for UNIX®, IBM i, and Linux deployments.

The IBM Power 710 Express server is a 2U rack-mount server with one processor socket offering 4-core 3.0 GHz, 6-core 3.7 GHz, and 8-core 3.55 GHz configurations.

The IBM Power 730 Express server delivers the outstanding performance of the POWER7 processor in a dense, rack-optimized form factor and is ideal for running multiple application and infrastructure workloads in a virtualized environment. Take advantage of the Power 730 Express servers' scalability and capacity by leveraging our industrial-strength PowerVM™ technology to fully utilize the server's capability.

The IBM Power 730 Express server is a 2U rack-mount server with two processor sockets offering 8-core 3.0 and 3.7 GHz, 12-core 3.7 GHz, and 16-core 3.55 GHz configurations.

The Power 710 Express server supports a maximum of eight DDR3 DIMM slots, with four DIMM slots included in the base configuration and four DIMM slots available with an optional memory riser card, allowing for a maximum system memory of 64 GB. The Power 730 Express server supports a maximum of 16 DDR3 DIMM slots, with four DIMM slots included in the base configuration and 12 DIMM slots available with a maximum of three optional memory riser cards, allowing for a maximum system memory of 128 GB.

Memory features (two memory DIMMs per feature) supported are 8 GB and 16 GB and run at speeds of 1066 MHz. Also, the optional Active Memory Expansion can allow the effective maximum memory capacity to be much larger than the true physical memory. Innovative compression/decompression of memory content using processor cycles can allow memory expansion up to 100%. A server with a maximum of 128 GB can effectively be expanded up to 256 GB. This can enhance virtualization and server consolidation by allowing a partition to do significantly more work with the same physical amount of memory or a server to run more partitions and do more work with the same physical amount of memory.

The Power 710 and 730 Express servers offer three storage backplane options. The first supports three SFF SAS hard disk drives (HDDs) or solid-state drives (SSDs), an SATA DVD, and a half-high tape drive. The second supports six SFF SAS HDDs/SSDs and an SATA DVD. The third supports six SFF SAS HDDs/SSDs, an SATA DVD, Dual Write Cache RAID, and an external SAS port. HDDs/SSDs are hot-swap and front accessible.

Also available in the Power 710 and Power 730 system units is a choice of quad gigabit or dual 10 Gb integrated host Ethernet adapters. These native ports can be selected at the time of initial order. Virtualization of these integrated Ethernet adapters is supported.

Other integrated features include:

- Four PCIe x8 Low Profile expansion slots
- One GX++ slot on the Power 710 and two GX++ slots on the Power 730 for 4X connections
- Service Processor
- Integrated SAS/SATA controller for disk/SSD/DVD in system unit
- EnergyScale technology
- Two system ports, three USB ports, and two HMC ports
- Redundant and hot-swap power
- Redundant and hot-swap cooling

Key prerequisites

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

- AIX Version 7.1, or later
- AIX Version 6.1 with the 6100-06 Technology Level, or later
- AIX Version 5.3 with the 5300-12 Technology Level and Service Pack 1, or later
- AIX Version 5.3 with the 5300-11 Technology Level and Service Pack 5, or later (planned availability: September 30, 2010)
- AIX Version 5.3 with the 5300-10 Technology Level and Service Pack 5, or later (planned availability: September 30, 2010)

Note: VIOS support requires VIOS 2.2, or later.

If installing the IBM i operating system:

- IBM i 6.1 with i 6.1.1 machine code, or later
- IBM i 7.1, or later

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

- SUSE Linux Enterprise Server 11 Service Pack 1 for the Power 710 and Power 730 Express Servers™, or later, with current maintenance updates available from Novell to enable all planned functionality.
- SUSE Linux Enterprise Server 10 Service Pack 3 for the Power 710 and Power 730 Express Servers, or later, with current maintenance updates available from Novell to enable all planned functionality.
- Red Hat Enterprise Linux Version 5.5 for POWER, or later.

  Users should also update their systems with the latest Linux for Power service and productivity tools available at

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

If installing VIOS:

- VIOS 2.2, or later

If installing IBM Systems Director:

- IBM Systems Director Editions for Power Servers 6.2.0.1, or later.

Java 1.4.2 on POWER7

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 6 or Java 5 whenever possible.

For more information, visit

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

Refer to the IBM Prerequisite Web site for software requirements for each feature number:

    https://www-912.ibm.com/e_dir/eServerPrereq.nsf

Planned availability date

September 17, 2010, except for feature 2319, which is planned to be available on December 10, 2010

Description

Power 710 and Power 730

Summary of standard features:

- Rack-mount (2U) configuration
- 4-, 6-, and 8-core processor modules
  - 4-core, 6-core, and 8-core configurations on the Power 710
  - 8-core, 12-core, and 16-core configurations on the Power 730
- 8 GB or 16 of 1066 MHz DDR3 ECC memory (error checking and correcting) memory, expandable to 64 GB on the Power 710 and 128 GB on the Power 730
- Three storage backplane options:
  - Three SFF SAS HDDs/SSDs, SATA DVD bay, tape drive bay
  - Six SFF SAS HDDs/SSDs, SATA DVD bay
  - Six SFF SAS HDDs/SSDs, SATA DVD bay, Dual Write Cache SAS RAID, external SAS port
- Choice of three HEA daughter cards:
  - Quad-port RJ45 1 Gb HEA (Copper)
  - Dual-port SFP+ 10 Gb HEA (Fiber SR)
  - Dual-port SFP+ 10 Gb HEA (Copper TwinAx)
- Four PCIe x8 Low Profile slots
- One GX++ slot on the Power 710; two GX++ slots on the Power 730
- Integrated:
  - Service Processor
  - EnergyScale technology
  - Hot-swap and redundant cooling
  - Three USB ports, two system ports, two HMC ports
- One Power supply on the Power 710, two power supplies on the Power 730
  - 1725 Watt AC, Hot-swap
  - Additional power supply available for redundant power on the Power 710

The minimum Power 710 initial order must include a processor module, processor activations, memory, one HDD/SSD, a storage backplane, a power supply and power cord, an operating system indicator, a chassis indicator, and a Language Group Specify.

If IBM i is the Primary Operating System (#2145), the initial order must also include one additional HDD/SSD, Mirrored System Disk Level Specify Code, and a System Console Indicator. A DVD is defaulted on every order but may be de-selected.

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

```
    Feature number   Description

    8350             0/4 core 3.0 GHz POWER7 Processor Module
    4 x 8360         4 Processor Activations
    4526             8 GB (2 x 4096 MB) Memory
```

```
1883                73.4 GB 15k SFF HDD
5263                Storage Backplane for 2.5-inch Drives
                    /SATA DVD/Tape
1832                Quad-port RJ45 1 Gb HEA

5603                Power Supply, 1725 Watt AC
7317                Single Processor Chassis
9300/97xx)          Language Group Specify
2146 or 2147        Primary Operating System Indicator - IBM AIX (2146)
                    or Linux (2147)
6xxx                One Power Cord
```

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.

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

```
Feature number     Description

8350                0/4 core 3.0 GHz POWER7 Processor Module
4 x 8360            4 Processor Activations
4526                8 GB (2 x 4096 MB) Memory

2 x 1884            69.7 GB 15K RPM SAS SFF HDD
5268                Storage Backplane for six SFF Drives/SATA

                    DVD bay/Dual Write Cache SAS RAID, external SAS
                    port

1832                Quad-port RJ45 1 Gb HEA

5603                Power Supply, 1725 Watt AC
7317                Single Processor Chassis
9300/97xx)          Language Group Specify
2145                Primary Operating System Indicator - IBM i
0040                Mirrored System Disk Level Specify Code
0566 or 0567        IBM i 6.1.1 or IBM i 7.1 indicator
5550                System Console on HMC Indicator
6xxx                One Power Cord
```

Notes:

- When IBM i is the primary operating system (#2145), a DVD-ROM or DVD-RAM
  must be accessible by the Power 710. A DVD will be defaulted on every order but
  may be de-selected.
- 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.

The minimum Power 730 initial order must include two processor modules,
processor activations, memory, one HDD/SSD, a storage backplane, two power
supplies and two power cords, an operating system indicator, a chassis indicator, and
a Language Group Specify.

If IBM i is the Primary Operating System (#2145), the initial order must also include
one additional HDD/SSD, Mirrored System Disk Level Specify Code, and a System
Console Indicator. A DVD is defaulted on every order but may be de-selected.

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

```
Feature number     Description

2 x 8350            0/4 core 3.0 GHz POWER7 Processor Module
8 x 8360            8 Processor Activations
```

```
4526                8 GB (2 x 4096 MB) Memory

1883                73.4 GB 15k SFF HDD
5263                Storage Backplane for 2.5-inch Drives
                    /SATA DVD/Tape
1832                Quad-port RJ45 1 Gb HEA

2 x 5603            Power Supply, 1725 Watt AC
7318                Two Processor Chassis
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.

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

```
Feature number     Description

2 x 8350           0/4 core 3.0 GHz POWER7 Processor Module
8 x 8360           8 Processor Activations
4526               8 GB (2 x 4096 MB) Memory

2 x 1884           69.7 GB 15K RPM SAS SFF HDD
5268               Storage Backplane for six SFF Drives/SATA

                   DVD bay/Dual Write Cache SAS RAID, external SAS
                   port

1832               Quad-port RJ45 1 Gb HEA

2 x 5603           Power Supply, 1725 Watt AC
7318               Two Processor Chassis
9300/97xx)         Language Group Specify
2145               Primary Operating System Indicator - IBM i
0040               Mirrored System Disk Level Specify Code
0566 or 0567       IBM i 6.1.1 or IBM i 7.1 indicator
5550               System Console on HMC Indicator
2 x 6xxx           Two Power Cords
```

Notes:

- When IBM i is the primary operating system (#2145), a DVD-ROM or DVD-RAM
  must be accessible by the Power 730.
- 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.

IBM Editions

IBM Editions are available only as initial order.

If you order a Power 710 or Power 730 Express server IBM Edition as defined below,
you can qualify for half the initial configuration's processor core activations at no
additional charge.

The total memory (based on the number of cores) and the quantity/size of disk,
SSD, Fibre Channel adapters, or Fibre Channel over Ethernet (FCoE) adapters
shipped with the server are the only features that determine if a customer is entitled
to a processor activation at no additional charge.

Specifically, with an IBM Edition, processor activations for the processor module
options are:

Power 710

- 3.0 GHz 4-core processor module (#8350)
  - 2 x #8360 (chargeable) and 2 x #8363 (no-charge) with 4-core (1 x #8350) configuration
- 3.7 GHz 6-core processor module (#8349)
  - 3 x #8382 (chargeable) and 3 x #8384 (no-charge) with 6-core (1 x #8349) configuration
- 3.55 GHz 8-core processor module (#8359)
  - 4 x #8372 (chargeable) and 4 x #8375 (no-charge) with 8-core (1 x #8359) configuration

Power 730

- 3.0 GHz 4-core processor module (#8350)
  - 4 x #8360 (chargeable) and 4 x #8363 (no-charge) with 8-core (2 x #8350) configuration
- 3.7 GHz 4-core processor module (#8348)
  - 4 x #8381 (chargeable) and 4 x #8383 (no-charge) with 8-core (2 x #8348) configuration
- 3.7 GHz 6-core processor module (#8349)
  - 6 x #8382 (chargeable) and 6 x #8384 (no-charge) with 12-core (2 x #8349) configuration
- 3.55 GHz 8-core processor module (#8359)
  - 8 x #8372 (chargeable) and 8 x #8375 (no-charge) with 16-core (2 x #8359) configuration

When you purchase an IBM Edition, you can purchase an AIX, IBM i, or Linux operating system license, or you may choose to purchase the system with no operating system. The AIX, IBM i, or Linux operating system is processed via a feature number on AIX 5.3, 6.1, or 7.1; IBM i 6.1.1 or IBM i 7.1; and SUSE Linux Enterprise Server or Red Hat Enterprise Linux. If you choose AIX 5.3, 6.1, or 7.1 for your primary operating system, you can also order IBM i 6.1.1 or IBM i 7.1 and SUSE Linux Enterprise Server or Red Hat Enterprise Linux. The converse is true if you choose an IBM i or Linux subscription as your primary operating system.

Processor modules and processor activations are only available to Solution Delivery Integration (SDIs) as MES orders.

IBM Edition minimum memory definition details:

A minimum of 2 GB memory per core on the Power 710 and 4 GB memory per core on the Power 730 is needed to qualify for the IBM Edition, except on the 6-core IBM Edition where there is a 16 GB minimum memory requirement for the Power 710. There can be different valid memory configurations that meet the minimum requirement.

For example:

Power 710

- 4-core (8 GB minimum) -- 1 x 8 GB (2 x 4 GB DIMMs) Memory (#4526); Also, 1 x 16 GB (2 x 8 GB DIMMs) Memory (#4527)
- 6-core (16 GB minimum) -- 2 x 8 GB (2 x 4 GB DIMMs) Memory (#4526); Also, 1 x 16 GB (2 x 8 GB DIMMs) Memory (#4527)
- 8-core (16 GB minimum)-- 2 x 8 GB (2 x 4 GB DIMMs) Memory (#4526); Also, 1 x 16 GB (2 x 8 GB DIMMs) Memory (#4527)

Power 730

- 8-core (32 GB minimum) -- 4 x 8 GB (2 x 4 GB DIMMs) Memory (#4526); Also, 2 x 16 GB (2 x 8 GB DIMMs) Memory (#4527)
- 12-core (48 GB minimum) -- 6 x 8 GB (2 x 4 GB DIMMs) Memory (#4526); Also, 3 x 16 GB (3 x 8 GB DIMMs) Memory (#4527)
- 16-core (64 GB minimum)-- 8 x 8 GB (2 x 4 GB DIMMs) Memory (#4526); Also, 4 x 16 GB (4 x 8 GB DIMMs) Memory (#4527)

Edition minimum Disk/SSD/Fibre Channel/FCoE definition details:

- Minimum of: Two HDD, or two SSD, or two Fibre Channel adapters, or two FCoE adapters. You only need to meet one of these disk/SSD/FC/FCoE criteria. Partial criteria cannot be combined.
  - Two SAS HDDs -- any capacity drives located in the system unit or feature 5886 disk drawer qualify.
  - Two SAS SSDs -- any capacity drives located in the system unit or feature 5886 disk drawer qualify.
  - Two SSD Modules with eMLC (#1995/#1996)-- modules located in the system unit with feature 2053 qualify.
  - Two Fibre Channel PCI-e adapters located in the system unit.
  - Two Fibre Channel over Ethernet PCI-e adapters located in the system unit.

These sample configurations can be changed as needed and still qualify for processor entitlements at no additional charge. However, selection of total memory or HDD/SSD/Fibre Channel/FCoE adapter quantities smaller than the totals defined as the minimums disqualifies the order as an IBM Edition and the no-charge processor activations are then removed.

Multiple sample POWER7 IBM Edition configurations are provided in the IBM internal configurator tool, including:

- 3.0 GHz 4-core processor module
- 3.7 GHz 4-core processor module
- 3.7 GHz 6-core processor module
- 3.55 GHz 8-core processor module

Dynamic logical partitioning

The dynamic logical partitioning (LPAR) function provides enhanced resource management for the Power 710 and Power 730 Express servers. Dynamic LPAR allows available system resources to be quickly and easily configured across multiple logical partitions to meet the rapidly changing needs of your business.

Dynamic LPAR also allows you to add new system resources such as new HDDs or SSDs into your system's configuration without requiring a reboot. Without the optional PowerVM Standard Edition (#5227) or PowerVM Enterprise Edition (#5228) feature, as many as eight LPARs are supported in an 8-core Power 710 and 16 LPARs are supported in an 16-core Power 730. If the PowerVM Standard or Enterprise Edition feature is installed in the system, a maximum of 10 dynamic LPARs for each physical processor can be defined, with a Power 710 system maximum of 80 dynamic LPARs and a Power 730 system maximum of 160 dynamic LPARs.

An HMC or IVM is required to manage POWER7 processor-based servers implementing partitioning. Multiple POWER7 processor-based servers can be supported by a single HMC.

If an HMC is used to manage any POWER7 processor-based server, the HMC must be a CR3, or later, model rack-mount HMC or C05, or later, deskside HMC.

When IBM Systems Director is used to manage an HMC or if the HMC manages more than 254 partitions, the HMC should have 3 GB of RAM minimum and be CR3 model, or later, rack-mount or C06, or later, deskside.

PowerVM Editions (optional)

Three optional PowerVM Edition features are now available on the Power 710 and Power 730: PowerVM Express Edition, PowerVM Standard Edition, and PowerVM Enterprise Edition. These are managed using built-in Integrated Virtualization Manager (IVM) software or optionally through use of an HMC.

PowerVM Standard Edition (#5227) and PowerVM Enterprise Edition (#5228) allow customers to create partitions in units of less than 1 CPU (sub-CPU LPARs) and allow the same system I/O to be virtually added to these partitions. The optional features, available for a fee, also include a software component that provides cross-partition workload management.

PowerVM Standard and Enterprise Editions offer:

- Micro-Partitioning™ (up to 10 partitions per processor core, 80 per Power 710 system and 160 per Power 730 system)
- Virtualized disk and optical devices (VIOS)
- Automated CPU reconfiguration
- Real-time partition configuration and load statistics
- Support for dedicated and shared processor LPAR groups
- Support for manual provisioning of resources

At initial order entry, selecting feature number 5227 or 5228 will result in Micro-Partitioning to be enabled during manufacture and the enabling software media and publications to be shipped to the customer. When ordering feature number 5227 or 5228 as an MES, an activation key will be posted on an IBM Web site, and the customer must retrieve it and install it on the system.

The IBM Web site is

   http://www-912.ibm.com/pod/pod

Other features of PowerVM Editions:

- If any processors in a system have the Virtualization feature, all active processors must have it.
- Once the Virtualization feature is installed in a system, it cannot be removed.
- Virtual Ethernet and Virtual Storage are part of PowerVM Editions.

PowerVM Enterprise Edition also includes Live Partition Mobility, which allows for the movement of a logical partition from one POWER6™ or POWER7 server to another with no application downtime, and Active Memory Sharing, which dynamically reallocates memory between running logical partitions on a server. Also available is PowerVM Express (#5225), designed for users looking for an introduction to more advanced virtualization features at a highly affordable price. With PowerVM Express and IVM, users can create up to three partitions on the server, leverage VIOS, utilize Shared Dedicated Capacity to help optimize use of processor cycles, and even try out the Shared Processor Pool. With its intuitive browser-based interface, IVM is easy to use and helps reduce the time and effort required to manage virtual devices, processors, and partitions. An HMC is not required.

Notes:

- PowerVM 2.1.2.11 with Fix Pack 22.1 and Service Pack 1, or later, and a supported AIX or Linux operating system level are minimum requirements for performing Live Partition Mobility functions on POWER7. Refer to the Software requirements section for more information on minimum AIX and Linux operating system levels.

- Active Memory Sharing is planned to be supported with the availability of SLES 11 SP1.

Customers can upgrade from PowerVM Express to either PowerVM Standard or PowerVM Enterprise, or they can upgrade from PowerVM Standard to PowerVM Enterprise.

By upgrading to PowerVM Standard or PowerVM Enterprise, users gain the ability to create up to 80 logical partitions on the Power 710 or up to 160 logical partitions on the Power 730. Users also gain the ability to manage their PowerVM enabled machine with either an HMC or the Integrated Virtualization Manager.

By upgrading to PowerVM Enterprise, users can leverage Live Partition Mobility and Active Memory Sharing.

I/O drawer availability

One disk-only I/O drawer is supported, providing large storage capacity and multiple partition support:

- Feature 5886 EXP12S holds 3.5-inch SAS disk or SSD.

EXP 12S SAS Drawer (#5886)

The EXP 12S SAS Drawer (#5886) is a 2 EIA drawer and mounts in a 19-inch rack. The drawer can hold either SAS HDDs or SSD. The EXP 12S SAS drawer has twelve 3.5-inch SAS disk 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 HDDs or SSD contained in the EXP12S are controlled by one or two PCIe or PCI-X SAS adapters connected to the EXP12S via SAS cables. The SAS cable will vary, depending upon the adapter being used, the operating system being used, and the protection desired.

- The large cache PCI-X feature 5904/5908 uses a SAS Y cable when a single port is running the EXP12S. A SAS X cable is used when a pair of adapters are used for controller redundancy.
- The medium cache PCI-X feature 5902 and PCIe feature 5903 adapters are always paired and use a SAS X cable to attach the feature 5886 I/O drawer.
- The zero cache PCI-X feature 5912 and PCIe feature 5901 use a SAS Y cable when a single port is running the EXP12S. A SAS X cable is used for AIX/Linux environments when a pair of adapters is used for controller redundancy.

In all of the above configurations, all 12 SAS bays are controlled by a single controller or a single pair of controllers.

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 710 or Power 730, providing a very low-cost disk storage solution. When used this way, the imbedded SAS controllers in the system unit drive the HDDs in EXP12S. A second unit cannot be cascaded to a feature 5886 attached in this way.

19-inch racks

The Model 8231-E2B and its I/O drawers are designed to mount in the 25U 7014-S25 (#0555), 36U 7014-T00 (#0551), or the 42U 7014-T42 (#0553) rack. These racks are built to the 19-inch EIA standard. When you order a new 8231 system, you can also order the appropriate 7014 rack model with the system hardware on

the same initial order. IBM is making the racks available as features of the 8232-E2B when you order additional I/O drawer hardware for an existing system (MES order). The rack feature number 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.

1.3-meter rack (#0555 - supported only)

The 1.3-meter rack (#0555) is a 25 EIA unit rack. The rack is the same rack delivered when you order the 7014-S25 rack.

1.8-meter rack (#0551)

The 1.8-meter rack (#0551) is a 36 EIA unit rack. The rack that is delivered as feature 0551 is the same rack delivered when you order the 7014-T00 rack; the included features may be different. Some features that are delivered as part of the 7014-T00 must be ordered separately with the feature 0551. Order the feature 0551 only when required to support rack integration of MES orders prior to shipment from IBM.

2.0-meter rack (#0553)

The 2.0-meter rack (#0553) is a 42 EIA unit tall rack. The rack that is delivered as feature 0553 is the same rack delivered when you order the 7014-T42 rack; the included features may be different. Some features that are delivered as part of the 7014-T42 must be ordered separately with the feature 0553. Order the feature 0553 only when required to support rack integration of MES orders prior to shipment from IBM.

IBM Power Systems Deployment-ready Services

IBM offers a portfolio of integration, configuration, and customization services for IBM Power Systems™. These Deployment-ready Services are designed to accelerate customer solution deployment and reduce related resources and cost. Offerings include:

- Integration
  - Component integration
  - Rack integration
  - Operating system preinstallation
  - Unit personalization
  - Third-party hardware/software installation
  - Customer-specified placement
- Asset tagging: Standard tagging Radio Frequency Item Device (RFID)
- Special packaging: Box consolidation
- System customization: Remote access partitioning customized operating system/firmware

For more information on Deployment-ready Services, refer to

http://www.ibm.com/power/deploymentreadyservices/

Reliability, availability, and serviceability (RAS) features

Reliability, fault tolerance, and data correction

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

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

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

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

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

Memory error correction extensions

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

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

Fault monitoring functions

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

Mutual surveillance

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

Environmental monitoring functions

POWER7 based servers include a range of environmental monitoring functions:

- Temperature monitoring warns the system administrator of potential environmental-related problems by monitoring the air inlet temperature. When the inlet temperature rises above a warning threshold, the system initiates an orderly shutdown. When the temperature exceeds the critical level or if the temperature remains above the warning level for too long, the system will shut down immediately.

- Fan speed is controlled by monitoring actual temperatures on critical components and adjusting accordingly. If internal component temperatures reach critical levels, the system will shut down immediately, regardless of fan speed. When a redundant fan fails, the system calls out the failing fan and continues running. When a nonredundant fan fails, the system shuts down immediately.

Availability enhancement functions

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

POWER7 processor functions

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

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

POWER7 single processor checkstopping

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

Partition availability priority

Also available is the ability to assign availability priorities to partitions. If an alternate processor recovery event requires spare processor resources in order to protect a workload, when no other means of obtaining the spare resources is available, the system will determine which partition has the lowest priority and attempt to claim the needed resource. On a properly configured POWER7 processor-based server, this allows that capacity to be first obtained from, for example, a test partition instead of a financial accounting system.

POWER7 cache availability

The POWER processor-based line of servers continues to be at the fore-front of cache availability enhancements. The L3 cache is now integrated on the POWER7 processor. The POWER7 processor provides both L2 and L3 cache line delete functions.

Special uncorrectable error handling

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

PCI extended error handling

PCI extended error handling (EEH)-enabled adapters respond to a special data packet generated from the affected PCI slot hardware by calling system firmware, which will examine the affected bus, allow the device driver to reset it, and continue without a system reboot. For Linux, EEH support extends to the majority of

frequently used devices, although some third-party PCI devices may not provide native EEH support.

Predictive failure and dynamic component deallocation

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

Uncorrectable error recovery

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

Serviceability

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

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

- Design for Customer Set Up (CSU), Customer Installed Features (CIF), and Customer Replaceable Units (CRU)
- Error detection and Fault Isolation (ED/FI)
- First Failure Data Capture (FFDC)
- Converged service approach across multiple IBM server platforms

Service environments

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

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

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

Service Interface

The Service Interface allows support personnel to communicate with the service support applications in a server using a console, interface, or terminal. Delivering

a clear, concise view of available service applications, the Service Interface allows the support team to manage system resources and service information in an efficient and effective way. Applications available via the Service Interface are carefully configured and placed to give service providers access to important service functions.

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

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

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

First Failure Data Capture 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 extending tracing or diagnostics program. For the vast majority of faults, a good FFDC design means that the root cause can also be detected automatically without servicer intervention.

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

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

Diagnostics

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

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

Automatic diagnostics

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

Stand-alone diagnostics

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

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

Concurrent maintenance

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

Service labels

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

- Location diagrams: Location diagrams are strategically located on the system hardware, relating information regarding the placement of hardware components. Location diagrams may include location codes, drawings of physical locations, concurrent maintenance status, or other data pertinent to a repair. Location diagrams are especially useful when multiple components are installed such as DIMMs, CPUs, processor books, fans, adapter cards, LEDs, and power supplies.
- Remove/replace procedures: Service labels that contain remove/replace procedures are often found on a cover of the system or in other spots accessible to the servicer. These labels provide systematic procedures, including diagrams, detailing how to remove/replace certain serviceable hardware components.
- Arrows: Numbered arrows are used to indicate the order of operation and serviceability direction of components. Some serviceable parts such as latches, levers, and touch points need to be pulled or pushed in a certain direction and certain order for the mechanical mechanisms to engage or disengage. Arrows generally improve the ease of serviceability.

Packaging for service

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

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

Error handling and reporting

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

(ELA) can be used to display the failure cause and the physical location of the failing hardware.

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

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

Service Processor

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

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

Call Home

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

IBM Electronics Services

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

Integrated in the operating system in addition to the HMC, Electronic Service Agent is designed to automatically and electronically report system failures and customer-perceived issues to IBM, which can result in faster problem resolution and increased

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

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

Select your country.

Click on "IBM Electronic Service Agent Connectivity Guide."

Benefits

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

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

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

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

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

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

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

Accessibility by people with disabilities

A U.S. 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

IBM is pursuing Energy Star computer server qualification for certain configurations of the Power 730 Express Server.

On Power 710 and Power 730 servers, IBM plans to support the following AIX technology levels:

- AIX V6.1 with the 6100-05 Technology Level and Service Pack 3, or later
- AIX V6.1 with the 6100-04 Technology Level and Service Pack 7, or later
- AIX V6.1 with the 6100-03 Technology Level and Service Pack 7, or later

Red Hat intends for the upcoming release of Red Hat Enterprise Linux 6 to support the latest POWER7 models: Power 710, 720, 730, 740, and 795.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represents goals and objectives only. Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchase decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

Product number

The following are newly announced features on the specific models of the IBM Power Systems 8231 machine type:

Description	Machine type	Model	Feature number
IBM Power 710/Power 730	8231	E2B	
EMEA Bulk MES Indicator	8231	E2B	0004
Specify Code for External High Speed Modem	8231	E2B	0032
Specify Code for Alternate External High Speed Modem	8231	E2B	0034
Mirrored System Disk Level, Specify Code	8231	E2B	0040
Device Parity Protection-All, Specify Code	8231	E2B	0041
Device Parity RAID-6 All, Specify Code	8231	E2B	0047
Special Manufacturing Operations Indicator	8231	E2B	0098
RISC-to-RISC Data Migration	8231	E2B	0205
AIX Partition Specify	8231	E2B	0265
Linux Partition Specify	8231	E2B	0266
IBM i Operating System Partition Specify	8231	E2B	0267
CSC Specify	8231	E2B	0275
Specify Custom Data Protection	8231	E2B	0296
Mirrored Level System Specify Code	8231	E2B	0308
RAID Hot Spare Specify	8231	E2B	0347
V.24/EIA232 6.1m (20-Ft) PCI Cable	8231	E2B	0348
V.24/EIA232 15.2m (50-Ft) PCI Cable	8231	E2B	0349
V.35 6.1m (20-Ft) PCI Cable	8231	E2B	0353
V.35 15.2m (50-Ft) PCI Cable	8231	E2B	0354
V.36 6.1m (20-Ft) PCI Cable	8231	E2B	0356

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X.21 6.1m (20-Ft) PCI Cable                       8231  E2B    0359
X.21 15.2m (50-Ft) PCI Cable                      8231  E2B    0360
V.24/EIA232 (80-Ft) PCI Cable                     8231  E2B    0365
V.24/EIA232 20-Ft. PCI Cable with M3              8231  E2B    0368
Customer Specified Placement                      8231  E2B    0456
SSD Placement Indicator - CEC                     8231  E2B    0462
19 inch, 1.8 meter high rack                      8231  E2B    0551
19 inch, 2.0 meter high rack                      8231  E2B    0553
19 inch, 1.3 meter high rack                      8231  E2B    0555
IBM i 6.1 with 6.1.1 Machine Code Specify Code    8231  E2B    0566
IBM i 7.1 Specify Code                            8231  E2B    0567
Rack Filler Panel Kit                             8231  E2B    0599
Load Source Not in CEC                            8231  E2B    0719
#1996 Load Source Specify                         8231  E2B    0724
Specify #5886 Load Source placement               8231  E2B    0727
SAN Load Source Specify                           8231  E2B    0837
#3677 Load Source Specify                         8231  E2B    0839
#3678 Load Source Specify                         8231  E2B    0840
#3658 Load Source Specify                         8231  E2B    0844
#1884 Load Source Specify                         8231  E2B    0851
#1888 Load Source Specify                         8231  E2B    0853
#1909 Load Source Specify                         8231  E2B    0854
#1911 Load Source Specify                         8231  E2B    0856
US TAA Compliance Indicator                       8231  E2B    0983
Modem Cable - Austria                             8231  E2B    1010
Modem Cable - Belgium                             8231  E2B    1011
Modem Cable - Africa                              8231  E2B    1012
Modem Cable - Israel                              8231  E2B    1013
Modem Cable - Italy                               8231  E2B    1014
Modem Cable - France                              8231  E2B    1015
Modem Cable - Germany                             8231  E2B    1016
Modem Cable - UK                                  8231  E2B    1017
Modem Cable - Iceland/Sweden                      8231  E2B    1018

Modem Cable - Fin/Nor                             8231  E2B    1021
Modem Cable - Netherlands                         8231  E2B    1022
Modem Cable - Swiss                               8231  E2B    1023
Modem Cable - Denmark                             8231  E2B    1024
Modem Cable - US/Canada and General Use           8231  E2B    1025
USB 160 GB Removable Disk Drive                   8231  E2B    1106
USB 500 GB Removable Disk Drive                   8231  E2B    1107
USB Internal Docking Station for Removable RDX
Disk Drive                                        8231  E2B    1123
80/160GB DAT160 SAS Tape Drive (3.5")             8231  E2B    1124


200V 16A 4.3m (14-Ft) TL Line Cord                8231  E2B    1406
4.3m 200V/16A Pwr Cd Italy                        8231  E2B    1408




4.3m 200V/16A Power Cord S. Africa                8231  E2B    1418
4.3m 200V/16A Power Cord Israel                   8231  E2B    1419
4.3m 200V/16A Power Cord EU/Asia                  8231  E2B    1420
4.3m 200V/16A Power Cord CH/DK                    8231  E2B    1421

200V 4.3m (14-Ft) Locking Line Cord               8231  E2B    1426


4.3m 200V/10A Power Cord EU/Asia                  8231  E2B    1439
4.3m 200V/10A Power Cord Denmark                  8231  E2B    1440
4.3m 200V/10A Power Cord S. Africa                8231  E2B    1441
4.3m 200V/10A Power Cord Swiss                    8231  E2B    1442
4.3m 200V/10A Power Cord UK                       8231  E2B    1443
4.3m 200V/10A Power Cord Israel                   8231  E2B    1445

4.3m 200V/32A Power Cord EU 1-PH                  8231  E2B    1449
4.3m 200V/16A Power Cord EU 2-PH                  8231  E2B    1450
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4.3m 200V/12A Pwr Cd UK	8231	E2B	1476
4.3m 200V/16A Pwr Cd	8231	E2B	1477
System port/UPS Conversion Cable	8231	E2B	1827
Quad-port 1 Gb HEA Daughter Card	8231	E2B	1832
Dual-port 10Gb HEA Daughter Card (Fiber)	8231	E2B	1833
Dual-port 10 Gb HEA Daughter Card (Copper)	8231	E2B	1837
73.4 GB 15K RPM SAS SFF Disk Drive	8231	E2B	1883
69.7 GB 15K RPM SAS SFF Disk Drive	8231	E2B	1884
300GB 10K RPM SFF SAS Disk Drive	8231	E2B	1885
146GB 15K RPM SFF SAS Disk Drive	8231	E2B	1886
139GB 15K RPM SFF SAS Disk Drive	8231	E2B	1888
69GB SFF SAS Solid State Drive	8231	E2B	1890
69GB SFF SAS Solid State Drive	8231	E2B	1909
283GB 10K RPM SFF SAS Disk Drive (IBM i)	8231	E2B	1911
177GB SSD Module with eMLC (AIX/Linux)	8231	E2B	1995
177GB SSD Module with eMLC (IBM i)	8231	E2B	1996
PCIe LP RAID & SSD SAS Adapter 3Gb	8231	E2B	2053
Primary OS - IBM i	8231	E2B	2145
Primary OS - AIX	8231	E2B	2146
Primary OS - Linux	8231	E2B	2147
Factory Deconfiguration of 1-core	8231	E2B	2319
2M LC-SC 50 Micron Fiber Converter Cable	8231	E2B	2456
2M LC-SC 62.5 Micron Fiber Converter Cable	8231	E2B	2459
3M Asynchronous Terminal/Printer Cable EIA-232	8231	E2B	2934
Asynchronous Cable EIA-232/V.24 3M	8231	E2B	2936
Serial-to-Serial Port Cable for Drawer/Drawer-3.7M	8231	E2B	3124
Serial-to-Serial Port Cable for Rack/Rack- 8M	8231	E2B	3125
3-meter DDR 4X Copper Cable	8231	E2B	3246
Widescreen LCD Monitor	8231	E2B	3632
IBM T541H /L150p 15" TFT Color Monitor	8231	E2B	3637
IBM ThinkVision® L170p Flat Panel Monitor	8231	E2B	3639
ThinkVision L171p Flat Panel Monitor	8231	E2B	3640
IBM T115 Flat Panel Monitor	8231	E2B	3641
ThinkVision L191p Flat Panel Monitor	8231	E2B	3642
IBM T120 Flat Panel Monitor	8231	E2B	3643
IBM T119 Flat Panel Monitor	8231	E2B	3644
IBM T117 Flat Panel Monitor	8231	E2B	3645
146GB 15K RPM SAS Disk Drive	8231	E2B	3647
300GB 15K RPM SAS Disk Drive	8231	E2B	3648
450GB 15K RPM SAS Disk Drive	8231	E2B	3649
SAS Cable (EE) Drawer to Drawer 1M	8231	E2B	3652
SAS Cable (EE) Drawer to Drawer 3M	8231	E2B	3653
SAS Cable (EE) Drawer to Drawer 6M	8231	E2B	3654
428GB 15K RPM SAS Disk Drive	8231	E2B	3658
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 3M:	8231	E2B	3661
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 6M:	8231	E2B	3662
SAS Cable (X) Adapter to SAS Enclosure, Dual Controller/Dual Path 15M:	8231	E2B	3663
139.5GB 15k rpm SAS Disk Drive	8231	E2B	3677
283.7GB 15k rpm SAS Disk Drive	8231	E2B	3678
SAS Cable (AE) Adapter to Enclosure, single controller/single path 3M	8231	E2B	3684
SAS Cable (AE) Adapter to Enclosure, single controller/single path 6M	8231	E2B	3685
SAS Cable (YI) System to SAS Enclosure, Single Controller/Dual Path 1.5M	8231	E2B	3686
SAS Cable (YI) System to SAS Enclosure, Single Controller/Dual Path 3M	8231	E2B	3687
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 1.5 M	8231	E2B	3691
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 3 M	8231	E2B	3692
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 6 M	8231	E2B	3693
SAS Cable (YO) Adapter to SAS Enclosure, Single Controller/Dual Path 15 M	8231	E2B	3694
0.3M Serial Port Converter Cable, 9-Pin to 25-Pin	8231	E2B	3925
Asynch Printer/Terminal Cable, 9-pin to 25-pin, 4M	8231	E2B	3926
Serial Port Null Modem Cable, 9-pin to 9-pin, 3.7M	8231	E2B	3927

Serial Port Null Modem Cable, 9-pin to 9-pin, 10M	8231	E2B	3928
System Serial Port Converter Cable	8231	E2B	3930
1.8 M (6-ft) Extender Cable for Displays (15-pin D-shell to 15-pin D-shell)	8231	E2B	4242
Extender Cable - USB Keyboards, 1.8M	8231	E2B	4256
VGA to DVI Connection Converter	8231	E2B	4276
8GB (2x4GB) Memory DIMMs, 1066 MHz, 2Gb DDR3 DRAM	8231	E2B	4526
16GB (2x8GB) Memory DIMMs, 1066 MHz, 2Gb DDR3 DRAM	8231	E2B	4527
Rack Indicator- Not Factory Integrated	8231	E2B	4650
Rack Indicator, Rack #1	8231	E2B	4651
Rack Indicator, Rack #2	8231	E2B	4652
Rack Indicator, Rack #3	8231	E2B	4653
Rack Indicator, Rack #4	8231	E2B	4654
Rack Indicator, Rack #5	8231	E2B	4655
Rack Indicator, Rack #6	8231	E2B	4656
Rack Indicator, Rack #7	8231	E2B	4657
Rack Indicator, Rack #8	8231	E2B	4658
Rack Indicator, Rack #9	8231	E2B	4659
Rack Indicator, Rack #10	8231	E2B	4660
Rack Indicator, Rack #11	8231	E2B	4661
Rack Indicator, Rack #12	8231	E2B	4662
Rack Indicator, Rack #13	8231	E2B	4663
Rack Indicator, Rack #14	8231	E2B	4664
Rack Indicator, Rack #15	8231	E2B	4665
Rack Indicator, Rack #16	8231	E2B	4666
Active Memory Expansion Enablement	8231	E2B	4795
One Processor of 5250 Enterprise Enablement	8231	E2B	4970
Full 5250 Enterprise Enablement	8231	E2B	4974
Software Preload Required	8231	E2B	5000
Power Dist Unit 1 Phase NEMA	8231	E2B	5160
Power Dist Unit 1 Phase IEC	8231	E2B	5161
Power Dist Unit 2 of 3 Phase	8231	E2B	5162
Power Dist Unit - 3 Phase	8231	E2B	5163
PowerVM Express Edition	8231	E2B	5225
PowerVM Standard Edition	8231	E2B	5227
PowerVM Enterprise Edition	8231	E2B	5228
Storage Backplane -- 3 SFF Drives/SATA DVD/HH Tape	8231	E2B	5263
Memory Riser Card	8231	E2B	5265
GX++ Dual-port 4x Channel Attach	8231	E2B	5266
Storage Backplane -- 6 SFF Drives/SATA DVD	8231	E2B	5267
Storage Backplane -- 6 SFF Drives/SATA DVD/RAID/ External SAS Port	8231	E2B	5268
PCIe LP POWER GXT145 Graphics Accelerator	8231	E2B	5269
PCIe LP 10Gb FCoE 2-port Adapter	8231	E2B	5270
PCIe LP 4-Port 10/100/1000 Base-TX Ethernet Adapter	8231	E2B	5271
PCIe LP 10GbE CX4 1-port Adapter	8231	E2B	5272
PCIe LP 8Gb 2-Port Fibre Channel Adapter	8231	E2B	5273
PCIe LP 2-Port 1GbE SX Adapter	8231	E2B	5274
PCIe LP 10GbE SR 1-port Adapter	8231	E2B	5275
PCIe LP 4Gb 2-Port Fibre Channel Adapter	8231	E2B	5276
PCIe LP 4-Port Async EIA-232 Adapter	8231	E2B	5277
PCIe LP 2-x4-port SAS Adapter 3Gb	8231	E2B	5278
RFID TAGS FOR SERVERS, BLADES, BLADECENTERS, RACKS, AND HMCS	8231	E2B	5524
Sys Console On HMC	8231	E2B	5550
Sys Console-Ethernet No IOP	8231	E2B	5553
System AC Power Supply, 1725 W	8231	E2B	5603
SATA Slimline DVD-RAM Drive	8231	E2B	5762
EXP 12S Expansion Drawer	8231	E2B	5886
Full Width Keyboard -- USB, US English, #103P	8231	E2B	5951
Full Width Keyboard -- USB, French, #189	8231	E2B	5952
Full Width Keyboard -- USB, Italian, #142	8231	E2B	5953
Full Width Keyboard -- USB, German/Austrian, #129	8231	E2B	5954
Full Width Keyboard -- USB, UK English, #166P	8231	E2B	5955
Full Width Keyboard -- USB, Spanish, #172	8231	E2B	5956
Full Width Keyboard -- USB, Japanese, #194	8231	E2B	5957
Full Width Keyboard -- USB, Brazilian Portuguese, #275	8231	E2B	5958
Full Width Keyboard -- USB, Hungarian, #208	8231	E2B	5959
Full Width Keyboard -- USB, Korean, #413	8231	E2B	5960

```
Full Width Keyboard -- USB, Chinese, #467          8231  E2B   5961
Full Width Keyboard -- USB, French Canadian, #445  8231  E2B   5962
Full Width Keyboard -- USB, Belgian/UK, #120       8231  E2B   5964
Full Width Keyboard -- USB, Swedish/Finnish, #153  8231  E2B   5965
Full Width Keyboard -- USB, Danish, #159           8231  E2B   5966
Full Width Keyboard -- USB, Bulgarian, #442        8231  E2B   5967
Full Width Keyboard -- USB, Swiss/French/German,
#150                                               8231  E2B   5968
Full Width Keyboard -- USB, Norwegian,#155         8231  E2B   5969
Full Width Keyboard -- USB, Dutch, #143            8231  E2B   5970
Full Width Keyboard -- USB, Portuguese, #163       8231  E2B   5971
Full Width Keyboard -- USB, Greek, #319            8231  E2B   5972
Full Width Keyboard -- USB, Hebrew, #212           8231  E2B   5973
Full Width Keyboard -- USB, Polish, #214           8231  E2B   5974
Full Width Keyboard -- USB, Slovakian, #245        8231  E2B   5975
Full Width Keyboard -- USB, Czech, #243            8231  E2B   5976
Full Width Keyboard -- USB, Turkish, #179          8231  E2B   5977
Full Width Keyboard -- USB, LA Spanish, #171       8231  E2B   5978
Full Width Keyboard -- USB, Arabic, #253           8231  E2B   5979
Full Width Keyboard -- USB, Thai, #191             8231  E2B   5980
Full Width Keyboard -- USB, Russian, #443          8231  E2B   5981
Full Width Keyboard -- USB, Slovenian, #234        8231  E2B   5982
Full Width Keyboard -- USB, US English Euro,
#103P                                              8231  E2B   5983
Opt Front Door for 1.8m Rack                       8231  E2B   6068
Opt Front Door for 2.0m Rack                       8231  E2B   6069
1.8m Rack Acoustic Doors                           8231  E2B   6248
2.0m Rack Acoustic Doors                           8231  E2B   6249
1.8m Rack Trim Kit                                 8231  E2B   6263
2.0m Rack Trim Kit                                 8231  E2B   6272
Power Cable -- Drawer to IBM PDU, 14-foot, 250V/
10A                                                8231  E2B   6458
Power Cord 4.3m (14-ft), Drawer To OEM PDU
(125V, 15A)                                        8231  E2B   6460
Power Cord 4.3m (14-foot), Drawer to OEM PDU,
(250V, 15A), U. S.                                 8231  E2B   6469
Power Cord 1.8m(6-foot), To Wall (125V, 15A)       8231  E2B   6470
Power Cord 2.7m (9-foot), To Wall/OEM PDU,
(125V, 15A)                                        8231  E2B   6471
Power Cord 2.7m (9-foot), To Wall/OEM PDU,
(250V, 16A)                                        8231  E2B   6472
Power Cord 2.7m (9-foot), To Wall/OEM PDU,
(250V, 10A)                                        8231  E2B   6473
Power Cord 2.7M (9-foot), To Wall/OEM PDU,
(250V, 13A)                                        8231  E2B   6474
Power Cord 2.7M (9-foot), To Wall/OEM PDU,
(250V, 16A)                                        8231  E2B   6475
Power Cord 2.7M (9-foot), To Wall/OEM PDU,
(250V, 10A)                                        8231  E2B   6476
Power Cord 2.7M (9-foot), To Wall/OEM PDU,
(250V, 16A)                                        8231  E2B   6477
Power Cord 2.7 M(9-foot), To Wall/OEM PDU,
(250V, 16A)                                        8231  E2B   6478
Power Cord (9-foot) , To Wall/OEM PDU, (250V,
10A)                                               8231  E2B   6479
Power Cord 1.8M (6-foot),To Wall, (250V, 15A),
United States                                      8231  E2B   6487
Power Cord 2.7M (9-foot), To Wall/OEM PDU,
(125V, 15A or 250V, 10A )                          8231  E2B   6488
4.3m (14-Ft) 3PH/24A Power Cord                    8231  E2B   6489
4.3m (14-Ft) 1PH/48A Pwr Cord                      8231  E2B   6491

Power Cord 2.7M (9-foot), To Wall/OEM PDU,
(250V, 10A)                                        8231  E2B   6493
Power Cord 2.7M (9-foot), To Wall/OEM PDU,
(250V, 10A)                                        8231  E2B   6494
Power Cord (9-foot), To Wall/OEM PDU, (250V, 10A)  8231  E2B   6495
Power Cord 2.7M (9-foot), To Wall/OEM PDU,
(250V, 10A)                                        8231  E2B   6496
Power Cord (6-foot), To Wall/OEM PDU, (250V, 10A)  8231  E2B   6497
Power Cord (6-foot), To Wall/OEM PDU, (250V, 15A)  8231  E2B   6498
Power Cable - Drawer to IBM PDU, 200-240V/10A      8231  E2B   6577
Optional Rack Security Kit                         8231  E2B   6580
Modem Tray for 19-Inch Rack                        8231  E2B   6586
```

Power Cord 2.7M (9-foot), To Wall/OEM PDU, (125V, 15A)	8231	E2B	6651
4.3m (14-Ft) 3PH/16A Power Cord	8231	E2B	6653
4.3m (14-Ft) 1PH/24-30A Pwr Cord	8231	E2B	6654
4.3m (14-Ft) 1PH/24-30A WR Pwr Cord	8231	E2B	6655
4.3m (14-Ft)1PH/24A Power Cord	8231	E2B	6656
Power Cord 2.7M (9-foot), To Wall/OEM PDU, (250V, 15A)	8231	E2B	6659
Power Cord (14-foot), Drawer To OEM PDU (125V, 15A)	8231	E2B	6660
Power Cord 3 M (10 ft), Drawer to IBM PDU, 250V/10A	8231	E2B	6665
Power Cord 4.3M (14-foot), Drawer to OEM PDU, (250V, 15A)	8231	E2B	6669
Power Cord (6-foot), To Wall (125V, 15A),	8231	E2B	6670
Power Cord 2.7M (9-foot), Drawer to IBM PDU, 250V/10A	8231	E2B	6671
Power Cord 1.5M (5-foot), Drawer to IBM PDU, 250V/10A	8231	E2B	6672
Power Cord 2.7M (9-foot), To Wall/OEM PDU, (250V, 10A)	8231	E2B	6680
Power Cord (6-foot), To Wall, (250V, 15A)	8231	E2B	6687
Intelligent PDU+, 1 EIA Unit, Universal UTG0247 Connector	8231	E2B	7109
Environmental Monitoring Probe	8231	E2B	7118
Power Distribution Unit	8231	E2B	7188
Chassis with One Processor Planar	8231	E2B	7317
Chassis with Two Processor Planar	8231	E2B	7318
2.0m Rack Side Attach Kit	8231	E2B	7780
Ethernet Cable, 6M, Hardware Management Console to System Unit	8231	E2B	7801
Ethernet Cable, 15m, Hardware Management Console to System Unit	8231	E2B	7802
Side-by-Side for 1.8m Racks	8231	E2B	7840
Ruggedize Rack Kit	8231	E2B	7841
Linux Software Preinstall	8231	E2B	8143
Linux Software Preinstall (Business Partners)	8231	E2B	8144
4-core 3.7 GHz POWER7 Processor Module	8231	E2B	8348
6-core 3.7 GHz POWER7 Processor Module	8231	E2B	8349
4-core 3.0 GHz POWER7 Processor Module	8231	E2B	8350
8-core 3.55 GHz POWER7 Processor Module	8231	E2B	8359
One Processor Activation for Processor Feature #8350	8231	E2B	8360
Zero-priced Processor Activation for #8350	8231	E2B	8363
One Processor Activation for Processor Feature #8359	8231	E2B	8372
Zero-priced Processor Activation for #8359	8231	E2B	8375
One Processor Activation for Processor Feature #8348	8231	E2B	8381
One Processor Activation for Processor Feature #8349	8231	E2B	8382
Zero-priced Processor Activation for #8348	8231	E2B	8383
Zero-priced Processor Activation for #8349	8231	E2B	8384
Mouse - USB, with Keyboard Attachment Cable	8231	E2B	8841
USB Mouse	8231	E2B	8845
Order Routing Indicator- System Plant	8231	E2B	9169
Language Group Specify - US English	8231	E2B	9300
New AIX License Core Counter	8231	E2B	9440
New IBM i License Core Counter	8231	E2B	9441
New Red Hat License Core Counter	8231	E2B	9442
New SUSE License Core Counter	8231	E2B	9443
Other AIX License Core Counter	8231	E2B	9444
Other Linux License Core Counter	8231	E2B	9445
3rd Party Linux License Core Counter	8231	E2B	9446
VIOS Core Counter	8231	E2B	9447
Month Indicator	8231	E2B	9461
Day Indicator	8231	E2B	9462
Hour Indicator	8231	E2B	9463

```
Minute Indicator                                    8231  E2B  9464
Qty Indicator                                       8231  E2B  9465
Countable Member Indicator                          8231  E2B  9466
Language Group Specify - Dutch                      8231  E2B  9700
Language Group Specify - French                     8231  E2B  9703
Language Group Specify - German                     8231  E2B  9704
Language Group Specify - Polish                     8231  E2B  9705
Language Group Specify - Norwegian                  8231  E2B  9706
Language Group Specify - Portuguese                 8231  E2B  9707
Language Group Specify - Spanish                    8231  E2B  9708
Language Group Specify - Italian                    8231  E2B  9711
Language Group Specify - Canadian French            8231  E2B  9712
Language Group Specify - Japanese                   8231  E2B  9714
Language Group Specify - Traditional Chinese
(Taiwan)                                            8231  E2B  9715
Language Group Specify - Korean                     8231  E2B  9716
Language Group Specify - Turkish                    8231  E2B  9718
Language Group Specify - Hungarian                  8231  E2B  9719
Language Group Specify - Slovakian                  8231  E2B  9720
Language Group Specify - Russian                    8231  E2B  9721
Language Group Specify - Simplified Chinese (PRC)   8231  E2B  9722
Language Group Specify - Czech                      8231  E2B  9724
Language Group Specify -- Romanian                  8231  E2B  9725
Language Group Specify - Croatian                   8231  E2B  9726
Language Group Specify -- Slovenian                 8231  E2B  9727
Language Group Specify - Brazilian Portuguese       8231  E2B  9728
Language Group Specify - Thai                       8231  E2B  9729
```

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

```
                                          Machine       Feature
Description                               type  Model   number

Rack Content Specify: 8231-E2B -- 2U      7014  B42     0370
                                                S25
                                                T00
                                                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 8231-E2B virtualization engine features:

```
                                                    Return
From FC:                  To FC:                    parts

5225 - PowerVM Express    5227 - PowerVM Standard    No
Edition                   Edition
5225 - PowerVM Express    5228 - PowerVM Enterprise  No
Edition                   Edition
5227 - PowerVM Standard   5228 - PowerVM Enterprise  No
Edition                   Edition
```

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

You can access the product documentation at

http://publib.boulder.ibm.com/infocenter/systems/scope/hw/index.jsp

Product documentation is also available on DVD (SK5T-7087).

The following information is shipped with the 8231-E2B:

```
8231-E2B Service DVD        SK5T-7087-04
Installation Road Map
Safety Information
Statement of Warranty
```

Hardware documentation such as installation instructions, user's information, and service information is available to download or view at

http://www.ibm.com/systems/support

AIX documentation can be found at the IBM AIX Information Center

http://publib.boulder.ibm.com/infocenter/pseries/index.jsp

Visit the IBM System Support Site, which contains the documentation for the hardware

http://www.ibm.com/systems/support

The IBM Systems Information Center provides you with a single information center where you can access product documentation for IBM systems hardware, operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access. The IBM Systems Information Center

http://publib14.boulder.ibm.com/infocenter/systems

IBM Publications Center Portal

http://www.ibm.com/shop/publications/order

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided, as well as payment options via credit card. A large number of publications are available online in various file formats, which can currently be downloaded free of charge.

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

```
Rack-Mount:

  Width: 440 mm  (19.0 in)
  Depth: 706 mm  (27.8 in)
  Height: 89 mm  (3.5 in)
  Weight (Maximum configuration): Power 710 -- 28.2 kg (62 lbs)
                                  Power 730 -- 29.5 kg (65 lbs)
```

Operating environment

- Temperature: (nonoperating) 5° to 45°C (41° to 113°F); recommended
  temperature (operating) 18° to 27°C (64° to 80°F); allowable operating
  temperature 5° to 35°C (41° to 95°F)
- Relative humidity: Nonoperating 8% to 80%; recommended 5.5°C (42°F) dew
  point to 60% RH and 15°C (59°F) dew point
- Maximum dew point: 28°C (84°F)(operating)
- Operating voltage: 100 to 127 or 200 to 240 V ac (Power 710); 200 to 240 V ac
  (Power 730);
- Operating frequency: 47/63 Hz
- Maximum measured power consumption:

  – Power 710 -- 650 watts (maximum)

  – Power 730 -- 1100 watts (maximum)

- Power factor: 0.98
- Thermal output:

  – Power 710 -- 2,218 Btu/hour (maximum)

  – Power 730 -- 3,754 Btu/hour (maximum)

- Power-source loading

  – Power 710 -- 0.663 kVa (maximum configuration)

  – Power 730 -- 1.122 kVa (maximum configuration)

  – Maximum altitude: 3,050 m (10,000 ft)

Note: The maximum measured value is the worst case power consumption
expected from a fully populated server under an intensive workload. The maximum
measured value also accounts for component tolerance and non-ideal operating
conditions. Power consumption and heat load vary greatly by server configuration
and utilization. The IBM Systems Energy Estimator should be used to obtain a heat
output estimate based on a specific configuration

   http://www-912.ibm.com/see/EnergyEstimator

Noise level and sound power (Preliminary data)

```
Power 710:  6.6 bels (Operating and idling)
Power 730:  6.6 bels (Operating and idling)
```

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 Class A

- Europe: CISPR 22 Class A

- Japan: VCCI-A

- Korea: Korean Requirement Class A

- China: People's Republic of China commodity inspection law Class A

Homologation -- Telecom environmental testing (Safety and EMC): Homologation approval for specific countries has been initiated with the IBM Homologation and Type Approval (HT&A) organization in LaGaude, France. This Power Systems model and applicable features meet the environmental testing requirements of the country telecom and have been designed and tested in compliance with the Full Quality Assurance Approval (FQAA) process as delivered by the British Approval Board for Telecom (BABT), the U.K. Telecom regulatory authority.

Product safety/Country testing/Certification

- UL 60950 Underwriters Laboratory, Safety Information

- CSA C22.2 No. 60950-00, Canadian Standards Association

- EN60950 European Norm

- IEC 60950, Edition 1, 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).

Hardware requirements

Power 710/730 minimum system configuration

The Power 710 offers 4-, 6-, and 8-core configurations with one processor module. The Power 710 can contain up to 64 GB of system memory (32 GB maximum per memory riser card).

The Power 730 offers 8-, 12-, and 16-core configurations with two processor modules. The Power 730 can contain up to 128 GB of system memory (32 GB maximum per memory riser card).

Both the Power 710 and Power 730 offer four PCIe Low Profile adapters, and three or six SFF HDDs/SDDS and one or two media devices, depending on the storage backplane selected.

Each Power 710/730 initial order must include a minimum of the following items:

- One system central electronics complex (CEC) enclosure with the following items:
  - One power cord (#6458, #6460, #6469-#6478, #6487-#6494, #6496, #6577, #6580, #6651, #6653-#6660, #6665, #6669, #6671, #6672, #6680)
  - One Language Group, Specify (#9300 or #97xx)
- For the Power 710, choose one processor module from:

- 4-core 3.0 GHz POWER7 processor module (#8350)
- 6-core 3.7 GHz POWER7 processor module (#8349)
- 8-core 3.55 GHz POWER7 processor module (#8359)
- For the Power 730, choose two processor modules from:
  - 4-core 3.0 GHz POWER7 processor module (#8350)
  - 4-core 3.7 GHz POWER7 processor module (#8348)
  - 6-core 3.7 GHz POWER7 processor module (#8349)
  - 8-core 3.55 GHz POWER7 processor module (#8359)

  Note: Both processor modules must be the same feature number.

- For the Power 710, choose processor activations from:
  - 4 x #8360, or 2 x #8360 and 2 x #8363 with processor card #8350
  - 6 x #8382, or 3 x #8382 and 3 x #8384 with processor card #8349
  - 8 x #8372, or 4 x #8372 and 4 x #8375 with processor card #8359
- For the Power 730, choose processor activations from:
  - 8 x #8360, or 4 x #8360 and 4 x #8363 with processor card #8350
  - 8 x #8381, or 4 x #8381 and 4 x #8383 with processor card #8348
  - 12 x #8382, or 6 x #8382 and 6 x #8384 with processor card #8349
  - 16 x #8372, or 8 x #8372 and 8 x #8375 with processor card #8359

  Notes:

  - Features 8363, 8375, 8383, and 8384 are part of IBM Editions.
  - Processor activations are only available to SDIs as MES orders.
- Choose 8 GB minimum memory from:
  - 8 GB (2 x 4 GB) Memory DIMMs, 1066 MHz, DDR3 (#4526)
  - 16 GB (2 x 8 GB) Memory DIMMs, 1066 MHz, DDR3 (#4527)
- Choose Storage Backplane from:
  - 3 x SFF/SATA DVD bay/Tape bay (#5263)
  - 6 x SFF/SATA DVD bay (#5267)
  - 6 x SFF/SATA DVD bay with Dual Write Cache RAID, and an external SAS port (#5268)

  Note: IBM i (#2145) requires feature 5268.
- Choose Ethernet daughter card from:
  - Quad-port RJ45 1 Gb Host Ethernet Adapter (#1832) (Copper)
  - Dual-port FSP+ 10 Gb Host Ethernet Adapter (Fiber SR) (#1833)
  - Dual-port FSP+ 10 Gb Host Ethernet Adapter (Copper TwinAx) (#1837)
- Choose HDD/SSD from:
  - 73.4 GB SAS SFF HDD 15,000 RPM (#1883) (AIX/Linux/VIOS)
  - 146.8 GB SAS SFF HDD 15,000 RPM (#1886) (AIX/Linux/VIOS)
  - 300 GB SAS SFF HDD 15,000 RPM (#1885) (AIX/Linux/VIOS)
  - 69.7 GB SAS SFF HDD 15,000 RPM (#1884) (IBM i)
  - 139.5 GB SAS SFF HDD 15,000 RPM (#1888) (IBM i)
  - 283 GB SAS SFF HDD 10,000 RPM (#1911) (IBM i)
  - 69 GB SAS SFF Solid State Drive (#1890) (AIX/Linux/VIOS)
  - 69 GB SAS SFF Solid State Drive (#1909) (IBM i)
  - 177 GB SAS 1.8" Solid State Drive (#1995) (AIX/Linux/VIOS)
  - 177 GB SAS 1.8" Solid State Drive (#1996) (IBM i)

Notes:

- – Features 1995 and 1996 require feature 2053.
- – When feature 2145, IBM i operating system, is selected, a minimum of two HDD/SSD is required.
- – No internal HDD/SSD 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.
- Power 710 requires one 1725 watt AC Power Supply (1 x #5603) and one power cord (1 x #6xxx); Power 730 requires two 1725 watt AC Power Supplies (2 x #5603) and two power cords (2 x #6xxx).
- Choose chassis type from:

  - – Power 710 requires one processor chassis (#7317).
  - – Power 730 requires two processor chassis (#7318).

- Choose Primary Operating System Indicator from:

  - – IBM i (#2145 -- requires #0566 or #0567, #5550 or #5553, #5762, and #0040)
  - – AIX (#2146)
  - – Linux (#2147)

Note: One nonfeaturized memory riser card is included in the base system. One additional memory riser card feature (#5265) can be ordered on the Power 710. Three additional memory riser card features (#5265) can be ordered on the Power 730.

RAID

There are multiple protection options for HDD/SSD drives in the SAS SFF bays in Power 710 and Power 730 system units 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 HDD/SSD drives are protected.

This HDD/SSD drive protection can be provided by AIX/IBM i/Linux software or by the HDD/SSD hardware controllers. Mirroring of drives is provided by AIX/IBM i/Linux software. In addition, AIX/Linux supports controllers providing RAID 0, 1, 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 HDD/SSD protection, hot spare capability can be used for protected drives. Specific hot spare prerequisites apply.

An integrated SAS HDD/SSD controller is provided in the Power 710 and Power 730 system units and provides support for JBOD and RAID 0 for AIX or Linux. It is optionally augmented by RAID 5, RAID 6, and RAID 10 capability when feature 5268 is added to the configuration. In addition to these protection options, mirroring of drives by the operating system is supported. AIX or Linux supports all of these options. IBM i does not use JBOD and uses imbedded functions instead of RAID 10, but does leverage the RAID 5 or 6 function of the integrated controllers. Other disk/SSD controllers are provided as 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.

Software requirements

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

- AIX Version 7.1, or later
- AIX Version 6.1 with the 6100-06 Technology Level, or later
- AIX Version 5.3 with the 5300-12 Technology Level and Service Pack 1, or later
- AIX Version 5.3 with the 5300-11 Technology Level and Service Pack 5, or later (planned availability: September 30, 2010)
- AIX Version 5.3 with the 5300-10 Technology Level and Service Pack 5, or later (planned availability: September 30, 2010)

Note: VIOS support requires VIOS 2.2, or later.

If installing the IBM i operating system:

- IBM i 6.1 with i 6.1.1 machine code, or later
- IBM i 7.1, or later

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

- SUSE Linux Enterprise Server 11 Service Pack 1 for the Power 710 and Power 730 Express Servers, or later, with current maintenance updates available from Novell to enable all planned functionality.
- SUSE Linux Enterprise Server 10 Service Pack 3 for the Power 710 and Power 730 Express Servers, or later, with current maintenance updates available from Novell to enable all planned functionality.
- Red Hat Enterprise Linux Version 5.5 for POWER, or later.

  Users should also update their systems with the latest Linux for Power service and productivity tools available at

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

If installing VIOS:

- VIOS 2.2. or later

If installing IBM Systems Director:

- IBM Systems Director Editions for Power Servers 6.2.0.1, or later.

Java 1.4.2 on POWER7

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, IBM recommends upgrading Java-based applications to Java 6 or Java 5 whenever possible.

For more information, visit

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

Refer to the IBM Prerequisite Web site for software requirements for each feature number

  https://www-912.ibm.com/e_dir/eServerPrereq.nsf

Limitations

System

- Integrated system ports are not supported under AIX or Linux when the HMC ports are connected to an HMC. Either the HMC ports or the integrated system

---

ports can be used, but not both. IBM i can continue to use a system port for communication to a UPS even with an HMC attached.

- The integrated system ports are 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 PCI slot. The integrated system ports do not support HACMP™ configurations. IBM i only supports the use of the system ports for attachment to a UPS.

Hardware management console (HMC) machine code

An HMC or IVM is required to manage POWER7 processor-based servers implementing partitioning. Multiple POWER7 processor-based servers can be supported by a single HMC.

If an HMC is used to manage any POWER7 processor-based server, the HMC must be a CR3, or later, model rack-mount HMC or C05, or later, deskside HMC.

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.

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

   https://www14.software.ibm.com/webapp/set2/sas/f/hmc/home.html

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.

When IBM Systems Director is used to manage an HMC or if the HMC manages more than 254 partitions, the HMC should have 3 GB of RAM minimum and be CR3 model, or later, rack-mount or C06, or later, deskside.

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:
  - #0724 -- #1996 (177 GB 1.8" SSD) Load Source Specify
  - #0727 -- Remote Load Source Specify in #5886
  - #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
  - #0854 -- #1909 (69 GB SFF SSD) Load Source Specify
  - #0856 -- #1911 (283 GB 10K RPM SFF HDD) Load Source Specify
- 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 modules

- One or two processor modules are required on an order with four, six, or eight processor cores on the processor module. A minimum/maximum of one processor module is required on a Power 710 order and a minimum/maximum of two processor modules is required on a Power 730 order.
- All processors must be activated.

- The 4-core 3.0 GHz processor module (#8350) requires that four processor activation codes be ordered. A maximum of four processor activation code features (4 x #8360, or 2 x #8360 and 2 x #8363) are allowed per processor module.
- The 4-core 3.7 GHz processor module (#8349) requires that four processor activation codes be ordered. A maximum of four processor activation code features (4 x #8381, or 2 x #8381 and 2 x #8383) are allowed per processor module.
- The 6-core 3.7 GHz processor module (#8349) requires that six processor activation codes be ordered. A maximum of six processor activation code features (6 x #8382, or 3 x #8382 and 3 x #8384) are allowed per processor module.
- The 8-core 3.55 GHz processor module (#8359) requires that eight processor activation codes be ordered. A maximum of eight processor activation code features (8 x #8372, or 4 x #8372 and 4 x #8375) are allowed per processor module.

Power supply

- The Power 710 contains one 1725 watt AC power supply (1 x #5603). The Power 730 contains two 1725 watt AC power supplies (2 x #5603).
- A second 1725 watt AC power supply (#5603) is available for redundant power on the Power 710.

Redundant fans

- Redundant fans standard

Power cords

One power cord is required for each power supply on the order. The Power 710 supports 110-127 V ac and 200-240 V ac power cords. The Power 730 supports 200-240 V ac power cords only.

System memory

A minimum 8 GB or two DIMMs of memory is required on the Power 710 and Power 730 systems.

- The base machine contains one nonfeaturized memory riser card with four DIMM sockets. Memory features consume two memory DIMM sockets.
  - The Power 710 offers one optional memory riser card feature (1 x #5265) with an additional four DIMM sockets. Maximum system memory is 32 GB without feature 5265 and 64 GB with one x feature 5265.
  - The Power 730 offers three optional memory riser card features (3 x #5265) with an additional four DIMM sockets per feature. Maximum system memory is 32 GB without feature 5265 and 128 GB with three x feature 5265.
- A system can be ordered with a single memory feature 4526 or 4527. When adding additional memory to a system with one x feature 4526, a second one x feature 4526 must be ordered, and then all memory must be ordered in increments of two x feature 4526. When adding additional memory to a system with one x feature 4527, a second one x feature 4527 must be ordered, and then all memory must be ordered in increments of two x feature 4527.
- Feature 4526 and feature 4527 are not allowed on the same memory riser card. However, memory features can be different from one memory riser card to another.
- It is generally recommended that memory be installed evenly across all memory riser cards in the system. Balancing memory across the installed memory riser cards allows memory access in a consistent manner and typically results in the best possible performance for your configuration. However, balancing memory fairly evenly across multiple memory riser cards, compared to balancing memory exactly evenly typically has a very small performance difference.

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

```
Figure 1.  Memory features

                        Feature    Minimum   Maximum
        Feature         number     quantity  quantity

        8 GB 1066 MHz   4526          0       4 (Power 710)
          (2 x 4 GB RDIMMs)                   8 (Power 730)

        16 GB 1066 MHz  4527          0       4 (Power 710)
          (2 x 8 GB RDIMMs)                   8 (Power 730)
```

Drawer/Tower attachment:

- Feature number 5886 EXP12S SAS DASD Expansion Drawer
  - Feature number 5268 supports one feature number 5886 drawer directly off the system unit's SAS port.
  - EXP12S drawers are attached to a PCI-X or PCIe SAS adapter via SAS cables.
  - Not orderable on a 4-core Power 710 system (#8350).
  - The system maximum is eight.

The following list shows I/O drawers that are supported or available on the 8231 machine type and the correct interface to use for each of the drawers.

```
Feature                                 Order
number    Description                   status    Interface

5886      Exp 12S SAS Disk Drawer       Available  SAS
```

PCI card slots

The Power 710 and Power 730 contain four 8x, PCIe Low Profile slots.

- One GX++ slot is available on the Power 710. Two GX++ slots are available on the Power 730. Feature 5266 can be installed in either GX++ slot.

Note: Optional GX++ Dual-port Attach adapter (#5266) is used in server clustering configurations.

Graphics adapters

- A graphics adapter, keyboard, and mouse are not required in the minimum configuration.
- The maximum number of graphics adapters supported in the Power 710 and Power 730 CEC is four. Not supported under IBM i.

I/O adapters

- Host Ethernet Adapter features (#1832, #1833, and #1837) are not plugged into a slot.
- Refer to Figure 2 for additional I/O adapter information.

```
Figure 2.  I/O adapter features

                                Orderable  Supported CEC Sys
                                feature    feature   Max Max
        I/O adapter             number     number    qty qty  Size

        PCIe LP RAID & SSD SAS A     2053              2   2   LP
        PCIe LP POWER GXT145 Graphics Acc 5269         4   4   LP
        PCIe LP 10Gb FCoE 2-port Adapter  5270         4   4   LP
        PCIe LP 4-Port 10/100/1000 Base-T 5271         4   4   LP
```

```
PCIe LP 10GbE CX4 1-port Adapter   5272                4   4   LP
PCIe LP 8Gb 2-Port Fibre Channel   5273                4   4   LP
PCIe LP 2-Port 1GbE SX Adapter     5274                4   4   LP
PCIe LP 10GbE SR 1-port Adapter    5275                4   4   LP
PCIe LP 4Gb 2-Port Fibre Channel   5276                4   4   LP
PCIe LP 4-Port Async EIA-232 Adap  5277                4   4   LP
PCIe LP 2-x4-port SAS Adapter 3Gb  5278                4   4   LP


    Note:  1 x #5266 allowed in the Power 710. 2 x #5266 allowed in the
           Power 730.
```

Storage devices/Bays

- The Power 710 and Power 730 have a slim media bay that can contain an optional DVD-RAM (#5762 or follow-on) and a tape bay (only available with #5263) that can contain a tape drive or removable disk drive.
- Either feature number 5263, 5267, or 5268 must be selected.
  - Feature number 5263 supports three small form-factor (SFF) disk units, either HDD or SSD, an SATA DVD, and a tape. No split backplane supported. No RAID 5/6 support.
  - Feature number 5267 supports six SFF disk units, either HDD or SSD, and an SATA DVD. No split backplane supported. No RAID 5/6 support.
  - Feature number 5268 supports six SFF disk units, either HDD or SSD, and an SATA DVD. No split backplane supported. RAID 5/6 supported.
  - One of feature numbers 1883, 1884, 1885, 1886, 1888, 1890, 1909, or 1911 must be selected (no HDDs/SSDs are required in the CEC if feature number 0837 is selected).
  - Disk units can be placed in any slot at any time with or without a split backplane.
  - A feature 1124 DAT160 80/160 GB tape feature and a feature 1123 USB Internal Docking Station for Removable RDX Disk Drive are mutually exclusive. One or the other can be on the system but not both. A minimum of 1 x feature 1106 or feature 1107 must be ordered with each feature 1124 ordered.
- SAS-bay-based Solid State Drive (SSDs)(#1890 and #1909) support restrictions:
  - SFF features 1890 and 1909 are supported in the Power 710 and Power 730 CEC.
  - SSDs and disk drives (HDDs) are not allowed to mirror each other.
  - SSDs are not supported by feature 5278.
  - A feature 5886 containing SSD drives cannot be attached to the CEC external SAS port on the Power 710 or Power 730.
  - In a Power 710 or Power 730, SSDs and HDDs may not be mixed with feature number 5263. SSDs and HDDs may be mixed with feature number 5267 or 5268. However, they cannot be in the same RAID array with feature number 5268.
- HDD/SSD Data Protection -- if IBM i (#2145) is selected, one of the following is required:
  - Disk mirroring (default) -- requires feature 0040 or 0308
  - SAN boot (#0837)
  - RAID -- requires feature 5268
  - Mixed Data Protection (#0296)

```
  Figure 3. Storage device features


                                          Orderable
                            Maximum       feature
    Device                  quantity  Bay number

    DVD-RAM (SATA)               1     Slim  5762


    DAT160 80/160 GB Tape        1     Tape  1124
    USB Internal Docking Station
```

```
        for Removable RDX Disk
        Drive                        1      Tape        1123
```

```
                                                   Orderable
                          Maximum                  feature
         Device          quantity         Bay      number

                      AIX IBM i Linux

         73.4 GB 15K,        6     0    6  SFF 1-6    1883
           SAS, SFF
         69.7 GB 15K,        0     6    0  SFF 1-6    1884
           SAS, SFF
         300 GB 10K,         6     0    6  SFF 1-6    1885
           SAS, SFF
         146.8 GB 15K,       6     0    6  SFF 1-6    1886
           SAS, SFF
         139.5 GB 15K,       0     6    0  SFF 1-6    1888
           SAS, SFF
         69 GB SAS, SFF,     6     0    6  SFF 1-6    1890
           Solid-state
         69 GB SAS, SFF,     0     6    0  SFF 1-6    1909
           Solid-state
         283 GB 10K,         0     6    0  SFF 1-6    1911
              SAS, SFF
         177 GB SAS, 1.8",   8     0    8              1995
           Solid-state                 8 in 2 x #2053
         177 GB SAS, 1.8",   0     8    0              1996
           Solid-state                 8 in 2 x #2053

         Note:  Six disks or solid-state drives maximum can be
                installed internally.
```

```
                                                   Orderable
                          Maximum                  feature
         Device          quantity         Bay      number

                      AIX IBM i Linux
         146.8 GB 15K RPM,  96    0       96  8 x #5886   3647
           SAS
         300 GB 15K RPM,    96    0       96  8 x #5886   3648
           SAS
         450 GB 15K RPM,    96    0       96  8 x #5886   3649
           SAS
         139.6 GB 15K RPM,   0   96        0  8 x #5886   3677
           SAS
         283.8 GB 15K RPM,   0   96        0  8 x #5886   3678
           SAS
         428.4 GB 15K RPM,   0   96        0  8 x #5886   3658
           SAS
```

Notes:

- 3.5-inch DASD is not supported in the 8231-E2B CEC.
- SCSI disks are not supported on the 8231-E2B.

Planning information

Cable orders

No cables 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.

Global Technology Services

Contact your IBM representative for the list of selected services available in your country, either as standard or customized offerings, for the efficient installation, implementation, or integration of this product.

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.

Warranty period

Three years.

Alternative warranty options are available on a special bid basis from your IBM representative or Business Partner.

Warranty service

If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. An IBM technician will attempt to resolve your problem over the telephone, or electronically via an IBM Web site. 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. 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 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- and location-specific information. This product is covered by the following types of service.

Customer Replaceable Unit Service and On-site for other selected parts.

Customer Replaceable Unit Service: IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request. CRUs are designated as being either a Tier 1 or a Tier 2 CRU.

Tier 1 CRU: Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation. For machines with on-

site same-day response service, IBM will replace a Tier 1 CRU at your request, at no additional charge.

Tier 2 CRU: You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

Based upon availability, CRUs will be shipped for next-business-day delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, 1) return instructions and a container are shipped with the replacement CRU, and 2) you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRU parts:

- DASD Drive
- DVD Drive
- Dedicated Ethernet
- Fan Air Baffle
- Fan
- All PCI Adapters
- Power Supply
- Adapter - GX ++
- Line/power cord
- Keyboard
- Mouse
- External cables
- Display
- Operator Panel
- TOD Battery
- Memory DIMMs
- Processor VRM
- SAS Conduit Cable
- USB Tape Drive/Cable
- USB Tape Drive
- Interlock Switch
- RAID Aux. Cache Battery Card
- RAID AUX Cache Card

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.

- IBM onsite Repair Limited, 9 hours per day, Monday through Friday, excluding public or national holidays, next-business-day response, Latest Call Registration 15:00.

Non-IBM parts support

Warranty 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

During the warranty period, warranty service upgrades provide an enhanced level of On-site Service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of On-site Service acquired by the customer. Service levels are response time objectives and are not guaranteed.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. 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.

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.

- IBM On-site Repair, Same Business Day Onsite Response Time, Latest Call Registration 12:00, 9 hours per day, Monday through Friday, excluding public or national holidays
- IBM On-site Repair, Same Business Day 6 hours average Onsite Response Time, 24 hours per day, Monday through Sunday, 365 days a year

Customer Replaceable Units (CRUs) may be provided as part of the machine's standard warranty CRU Service except that you may install a CRU yourself or request IBM installation, at no additional charge, under one of the On-site Service levels specified above. For additional information on the CRU Service, see warranty information.

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 Web site. 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- 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.

- IBM On-site Repair Limited, Next Business Day Onsite Response Time, Latest Call Registration 15:00, 9 hours per day, Monday through Friday, excluding public or national holidays
- IBM On-site Repair, Next Business Day Onsite Response Time, 9 hours per day, Latest Call Registration 15:00, Monday through Friday, excluding public or national holidays
- IBM On-site Repair, Same Business Day Onsite Response Time, Latest Call Registration 12:00, 9 hours per day, Monday through Friday, excluding public or national holidays
- IBM On-site Repair, Same Business Day 6 hours average Onsite Response Time, 24 hours per day, Monday through Sunday, 365 days a year

Customer Replaceable Unit Service:

If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive), and depending upon the maintenance service offerings in your geography, IBM will ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request.

Based upon availability, CRUs will be shipped for next-business-day delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, 1) return instructions and a container are shipped with the replacement CRU, and 2) you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

Customer Replaceable Unit Service and On-site Service for other selected parts:

On-site and Customer Replaceable Unit Service is available in your geography. Refer to the information above for On-site Service. Below, you will find additional information pertaining to CRU Service available for your product.

CRUs are designated as being either a Tier 1 or a Tier 2 CRU.

Tier 1 CRUs: Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

For machines with On-site Same-day Response Service, IBM will replace a Tier 1 CRU part at your request, at no additional charge.

Tier 2 CRUs: You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

The following parts have been designated as Tier 1 CRU parts:

- DASD Drive
- DVD Drive
- Dedicated Ethernet
- Fan Air Baffle
- Fan
- All PCI Adapters
- Power Supply
- Adapter - GX ++
- Line/power cord
- Keyboard
- Mouse
- External cables
- Display
- Processor VRM
- SAS Conduit Cable
- USB Tape Drive/Cable

Feature numbers or models for which there is a maintenance charge:

```
8231-E2B Type/Model

8231-E2B Feature number 0551
8231-E2B Feature number 0553
8231-E2B Feature number 0555
8231-E2B Feature number 1124
8231-E2B Feature number 1890
8231-E2B Feature number 1909
8231-E2B Feature number 1995
8231-E2B Feature number 1996
```

```
8231-E2B Feature number 5886
8231-E2B Feature number 8348
8231-E2B Feature number 8349
8231-E2B Feature number 8350
8231-E2B Feature number 8359
```

Machine Exchange Service: IBM will initiate shipment of a replacement machine to your location. You are responsible for its installation and verification of operation. You must pack the failed machine into the shipping container that contained the replacement machine and return the failed machine to IBM. Transportation charges, both ways, are paid by IBM. You may be charged for the replacement machine if IBM does not receive the failed machine within 15 days of your receipt of the replacement.

Non-IBM part support

Under certain conditions, IBM repairs selected non-IBM parts at no additional charge for machines that are covered under warranty service upgrades or maintenance services.

IBM Service provides hardware problem determination on non-IBM parts (for example, adapter cards, PCMCIA cards, disk drives, and memory) installed within IBM machines covered under warranty service upgrades or maintenance services and provides the labor to replace the failing parts at no additional charge.

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

Warranty service upgrades

Usage plan machine

No

IBM hourly service rate classification

Three

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

Maintenance service offerings

This machine is eligible under terms and conditions of the IBM ServiceSuite™, the IBM Enterprise Service Agreement (ESA), or under the IBM Maintenance Agreement. Consult your IBM representative for details.

Field-installable features

Yes

Model conversions

No

Machine installation

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

Graduated program license charges apply

Yes.

The applicable processor tier is: Small

Licensed machine code

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

http://www-1.ibm.com/servers/support/machine_warranties/machine_code.html

Machine using LMC Type Model

IBM may release changes to the machine code. IBM plans to make the machine code changes available for download from the IBM pSeries® technical support Web site

http://www-933.ibm.com/support/fixcentral/

If the machine does not function as warranted and your problem can be resolved through your application of downloadable machine code, you are responsible for downloading and installing these designated machine code changes as IBM specifies. If you would prefer, you may request IBM to install downloadable machine code changes; however, you may be charged for that service.

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For more information, Business Partners should refer to the relevant product exhibits on

https://www.ibm.com/partnerworld/mem/bpal/emea/exhibit/index.jsp

Prices

For all local charges, contact your IBM representative.

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