



# IBM Power Systems I/O improves performance, virtualization, and physical footprint efficiency

## Table of contents

<a href="#">1 Overview</a>	<a href="#">14 Product number</a>
<a href="#">2 Key prerequisites</a>	<a href="#">20 Publications</a>
<a href="#">2 Planned availability date</a>	<a href="#">20 Technical information</a>
<a href="#">2 Description</a>	<a href="#">21 Terms and conditions</a>
<a href="#">12 Statement of general direction</a>	<a href="#">21 Pricing</a>
	<a href="#">32 Corrections</a>

## At a glance

Several I/O enhancements to the Power Systems™ product line improve performance, virtualization, price performance, and physical footprint efficiency:

- EXP30 Ultra SSD I/O Drawer (#5888) with 387GB eMLC SSD (#ES02)
- Low profile capable PCIe Gen2 SAS adapter (#ESA1/ESA2)
- 387GB eMLC SSD for SFF SAS bays (#ES0A/ES0B/ES0C/ES0D)
- Lower price 4-port 1Gb Ethernet Adapter (#5260/5899)
- Low profile PCIe Gen2 8Gb 4-port Fibre Channel Adapter (#EN0Y)
- RDX 320GB Removable Disk Drive (#EU08)
- 80/160GB DAT160 USB Tape Drive (#EU16)
- RoCE capable PCIe Gen2 10Gb Ethernet Adapter (#EC27/EC28)
- Additional IBM Manufacturing configuration options for #5887 EXP24S I/O Drawer

## Overview

IBM introduces several I/O enhancements to the Power Systems product line to further improve performance, virtualization, price performance, and physical footprint efficiency.

The EXP30 Ultra SSD I/O Drawer (#5888) provides an ultra-dense and ultra-high-performance option for solid state drives (SSDs). Up to thirty 387 GB Enterprise Multi-Level Cell (eMLC) solid state drives (#ES02) provide up to 11.6 TB of capacity in only 1U of 19-inch rack space. A pair of very powerful integrated SAS controllers run the drawer's SSDs, providing up to 400,000+ IOPS. The Ultra Drawer attaches to GX++ slots in Power® 710, 720, 730, and 740 servers without using any PCIe slots in the system unit.

A new low profile PCIe Gen2 SAS adapter (#ESA2) is small enough to fit in the 2U Power 710/730 or in the 2U PCIe Riser card of the Power 720/740. It supports SSDs providing RAID 0, 5, 6 and 10 capabilities using a single PCIe slot. A full high version (#ESA1) is available for taller Power Systems PCIe Gen2 slots. Though its overall SSD performance capacity is lower than that of the #5913 PCIe2 1.8GB Cache RAID SAS Adapter announced in October 2011, its ability to fit in 2U space, use of only one PCIe slot, and price performance can be advantageous.

SSD capacity and performance are doubled for SFF SAS bays with a 387 GB eMLC solid state drive (#ES0A/ES0B/ES0C/ES0D). These SSDs have twice the capacity

of the existing 177GB SSDs (#1775/1787/1793/1794) and their price per GB is significantly improved.

The PCIe2 4-port 1Gb Ethernet Adapter (#5260/5899) offers four copper/UTP Ethernet ports at a significantly lower price than the existing 4-port UTP adapters (#5271/5717).

The PCIe2 LP 8Gb 4-port Fibre Channel Adapter (#EN0Y) is a low profile adapter for Gen2 slots. It is smaller than but functionally equivalent to the existing full high 4-port 8Gb adapter (#5729) announced in October 2011.

The RDX 320GB Removable Disk Drive (#EU08) provides a cartridge with twice the capacity of the 160GB RDX Disk Drive (#1106) for about the same price. RDX is a great alternative save/restore technology for many AIX/Linux clients who might have selected DAT160 tape drives. It can provide great performance, reliability, and extremely long media life.

The 80/160GB DAT160 USB Tape Drive (#EU16) is enclosed in a Power 720/740/750 system unit and driven through a USB connection. Its drive performance is the same as the existing SAS DAT160 drives (#5619), but it does not use the integrated SAS controller and thus may offer an overall performance advantage to the system.

A new 2-port 10Gb Ethernet adapter (#EC27/EC28) provides RDMA over Converged Ethernet (RoCE) capability for AIX®. This can allow greater throughput, lower latency, and improved processor utilization.

A new, no-charge IBM Manufacturing specify feature code (#EUC5) can improve the initial cabling of 12X-attached #5802/5877 PCIe I/O Drawers available on 9117-MMB, 9117-MMC, 9179-MHB, and 9179-MHC.

Configuration flexibility of the existing #5887 EXP24S I/O Drawer is enhanced with the addition of several no-charge specify codes (EJPA, EJPB, EJPC, EJPD, EJPJ, EJPK, EJPL, EJPM, EJPN, EJPR, EJPT). These codes allow IBM Manufacturing to ship specific drawer/adaptor/cable configurations which are subsets of the originally announced configuration options, lowering the configuration price.

---

## Key prerequisites

---

Refer to the *Sales Manual* for individual feature requirements.

---

## Planned availability date

---

May 25, 2012, except for EJPA, EJPB, EJPC, EJPD, EJPJ, EJPK, EJPL, EJPM, EJPN, EJPR, and EJPT, which have a planned availability date of June 22, 2012.

IBM configurator tools support is planned to start June 12, 2012.

Orders can be taken only with eConfig availability.

---

## Description

---

### **EXP30 Ultra SSD I/O Drawer (#5888)**

Solid state drive (SSD) or flash technology can provide a much larger number of I/O Operations Per Second (IOPS) compared to spinning hard disk drive (HDD) technology, and can therefore slash I/O-bound batch window times, improve interactive or query response time, and even make previously performance-impractical applications work well. Depending on the workload, it can range from 66X to 250X more IOPS with an SSD vs an HDD. (Pre-2012 SSD comparisons ranged from 33X to 125X.) Additionally, a small set of SSDs can offer energy, cooling, and footprint savings by replacing a much larger set of HDDs. By combining

SSDs and HDDs in the same partition or application, you can leverage the performance capability of SSD technology on the hot data or files and leverage the HDD technology's lower cost/GB on the cold data or files. Hot SSD plus cold HDD usage can often provide the best overall system price performance.

The EXP30 Ultra SSD I/O Drawer (#5888) provides ultra-dense packaging and ultra-high performance for up to 30 SSDs without requiring a PCI slot. The EXP30 Ultra SSD I/O Drawer requires only 1U (1 EIA) of standard 19-inch rack space, while providing up to 11.6 TB of capacity using 387GB SSDs. This ultra-dense packaging is more than twice the density of the #5887 EXP24S Drawer which offers 24 drives in 2U of space plus needing space for prerequisite #5887 SAS controllers/adapters.

The EXP30 Ultra SSD I/O Drawer has incredible specifications. It provides up to 400,000 IOPS (read only) or up to 340,000 IOPS (60% read/40% write) or up to 270,000 IOPS (100% write). It provides up to 4.5 GB/s bandwidth from the SSD. And all of this in just 1U of space - ultra performance in an ultra-dense package. Compared to a SFF 15k rpm HDD which will typically provide 200 to maybe 400 IOPS and need space in a 2U form factor, the EXP30 Ultra SSD I/O Drawer is light years ahead.

The EXP30 Ultra SSD I/O Drawer is attached directly to the Power 710 (8231-E1C), 720 (8202-E4C), 730 (8231-E2C), or 740 (8205-E6C) GX++ slot for higher bandwidth.

Integrated into each EXP30 Ultra SSD I/O Drawer are two powerful IBM-designed SAS controllers with very large 3.1 GB write cache. These Ultra controllers work as a pair providing redundancy and protection of the write cache contents. The controllers leverage the latest and most powerful IBM® SAS adapter technology and employ high-performance hardware and firmware technology. Use of IBM's active/active SAS technology allows each controller to be the optimized controller for one or more RAID arrays and provides higher aggregate performance.

The 387GB SSD (#ES02) used in the EXP30 Ultra SSD I/O Drawer has the latest eMLC technology. It provides twice the capacity and performance of the 2011 SSD technology and up to twice the previous SSD performance levels. These SSDs are packaged as 1.8-inch SAS drives which can be added or removed concurrently while the drawer is in use. The drives are formatted to 528 byte sectors which allows SCSI T10 standardized data integrity fields to exist on every block of data. JBOD mode (512 byte sectors) is not supported.

The SSDs can be protected using RAID 0, RAID 5, RAID 6, or RAID 10, by operating system mirroring (LVM). RAID 1 functionally is provided by creating RAID 10 with two drives. Hot spare is also supported with RAID 5 or RAID 6. RAID 5 arrays of up to 30 drives can be configured, but to utilize the higher performance of active/active functionality, an even number of RAID arrays is recommended. JBOD mode for AIX/Linux/VIOS is not supported.

When configuring an EXP30 Ultra SSD I/O Drawer, a minimum of six SSDs is required per drawer. The SSD can be used like any SAS drive, including boot drives.

eMLC technology stands for "Enterprise Multi-Level Cell" flash memory technology. IBM was the first server vendor to provide this SSD technology option which blends enterprise-class performance and reliability characteristics with the more cost-effective characteristics of MLC flash storage. The new #ES02 387GB SSD builds upon this base and, using advances in both the SSD device controller flash memory management plus advances in eMLC technology itself, provides an even better value proposition. Like IBM's earlier eMLC SSD, the drives are designed to provide great sustained performance levels and extended endurance or reliability. For example, the new IBM eMLC SSD modules were designed to provide 24x7x365 usage even running write-intensive levels for at least five years. Typical client usage is expected to be much lower, especially regarding the average percentage of writes, and thus drive lifespan can be much longer.

The EXP30 Ultra SSD I/O Drawer requires the latest firmware level, 7.4.4, planned for May 2012. The following operating systems support the EXP30 Ultra SSD Drawer:

- AIX Version 7.1 with the 7100-01 Technology Level and Service Pack 4 or later
- AIX Version 7.1 with the 7100-00 Technology Level and Service Pack 6 or later (planned availability 6/29/2012)
- AIX Version 6.1 with the 6100-07 Technology Level and Service Pack 4 or later
- AIX Version 6.1 with the 6100-06 Technology Level and Service Pack 8 or later (planned availability 6/29/2012)
- AIX Version 5.3 with the 5300-12 Technology Level and Service Pack 6 or later (planned availability 6/29/2012) with AIX 5.3 service extension only
- Red Hat Enterprise Linux™ 5.8 for POWER®, or later
- Novell SUSE Linux Enterprise 11 Service Pack 2, or later

IBM i support is not offered at this time even through VIOS 2.2.1.4.

You can find the required driver update for Linux at

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

Each of the two integrated SAS controllers in the EXP30 Ultra SSD I/O Drawer requires a connection to a GX++ PCIe2 x8 Adapter located in the Power Server GX++ slot. The 2U Power 710 (8231-E1C) and Power 730 (8231-E2C) use a single-port GX++ PCIe2 Adapter (#EJ0H) and thus two GX++ PCIe2 adapters are needed to support one EXP30 Ultra SSD I/O Drawer. The 4U Power 720 (8202-E4C) and Power 740 (8205-E6C) use a dual-port GX++ PCIe2 Adapter (#EJ03) and thus one GX++ PCIe2 adapter can support one EXP30 Ultra SSD I/O Drawer. If a GX++ PCIe2 adapter is used in the GX++ slot, the GX++ slot can not be used for an I/O loop. Note that a Power 710 has only one GX++ slot so that a single Power 710 can not provide both connections to an Ultra Drawer.

The connection between the GX++ PCIe adapter in the server's GX++ slot and the EXP30 Ultra SSD I/O Drawer's integrated SAS controller is through a PCIe cable, #EN05 (1.5 meter) or #EN07 (3 meter). Two cables are required, one for each integrated SAS controller.

For redundancy one Ultra Drawer can attach to two different Power 720/740#EJ03 per GX++ PCIe adapters, using just one port on each GX++ PCIe adapter. Expanding on this cabling option, two Ultra Drawers can share two #EJ03 GX++ PCI Adapters.

For high-availability configurations, an Ultra Drawer can be attached to two different GX++ PCIe Adapters located on two different servers. For example, one Ultra Drawer can be attached to one port of a #EJ0H GX++ Adapter and to one port of a #EJ03 GX++ Adapter. Typically this would be done under control of AIX PowerHA® software in the same way a SAS adapter pair such as a pair of #5913 or pair of #5805 can be attached. In this scenario if one server fails, the other server can access all the SAS drives controlled by the Ultra Drawer's integrated SAS controllers. To assist IBM configurator tools in recognizing this scenario two specify feature codes are used for each EXP30 Ultra SSD I/O Drawer shared across two servers, #5925 and #5927.

The SAS SSD bays are always physically one set of drives, even though there may be multiple RAID arrays in this one set. With two or more RAID arrays, each RAID array can be optimized to either of the integrated SAS controllers to take advantage of active/active performance improvements via the read/write bandwidth of both adapters.

In all the above scenarios the two integrated Ultra SAS controllers work as a pair to provide protection of the write cache contents. If there is a failure to one of the controllers or a failure to that controller's PCI cable or its GX++ PCIe2 Adapter, the write cache contents are written out to the SAS SSD drives and caching is disabled. The remaining SAS adapter is designed to continue working without using the write cache. This helps ensure that write cache contents do not become a possible single point of failure and data loss. Full access to all the devices and RAID protection is maintained via the remaining integrated Ultra SAS controller. When the pairing is re-

established, write cache usage resumes. Note that SAS controller's performance for many workloads can be noticeably reduced if the write cache is not being used. To help alert the operations staff of the problem, multiple error messages are posted advising of the missing pairing for write cache.

The write cache contents are also protected against power failures. Supercapacitors in the integrated SAS controllers provide power to write out cache content to integrated non-volatile flash memory in the integrated SAS controllers if power is lost. Batteries are not used and thus there is no battery maintenance required.

The Power 710/730 (8231-E2B) or Power 720 (8202-E4B) or Power 740 (8205-E6B), which are also known as "B models," can not attach or support the EXP30 Ultra SSD I/O Drawer. The #5888 is not supported on the 4-core Power 710 or 4-core Power 720.

The PCIe slots in the Power 710/720/730/740 system units are not hot plug capable and if a PCIe2 adapter needs to be added or removed, downtime of the system needs to be scheduled. The same is true for the GX++ PCIe2 Adapter and by extension the integrated redundant SAS controllers and their redundant fans in the Ultra Drawer. The Ultra Drawer's SAS bays and the redundant power supplies are hot plug capable.

When ordered with a new Power 710/720/730/740 or as an MES for an existing Power 710/720/730/740, the #5888 Ultra Drawer and #ES02 SSD features have a 3-year warranty. But if ordered along with a Power 520 to Power 720 upgrade, a 1-year warranty applies.

See also [Statement of general direction](#) for the Ultra Drawer in this announcement letter.

### **PCIe2 RAID SAS Adapter Dual-port 6Gb (#ESA1/ESA2)**

The PCIe2 RAID SAS Adapter is an SSD-only SAS adapter which is based on the same powerful IBM PCIe Gen2 SAS adapter technology first introduced in late 2011 with the #5913 large cache SAS Adapter and also employed in the #5888 Ultra Drawer. Unlike the #5913 or #5888, the #ESA1/ESA2 has zero write cache. Though zero write cache reduces the adapter's potential overall performance compared to the #5913 or #5888, the adapter has plenty of performance. It easily attaches to and effectively supports more busy SSDs than the #5805 380MB cache PCIe Gen1 adapter.

Having zero cache offers three key configuration advantages to the selected Power servers on which it is supported:

1. The adapter can be small enough to be offered as a low profile adapter (#ESA2) and be used in the Power 710/730 (8231-E1C/E2C) or in the Gen2 PCIe riser card (#5685) of the Power 720/740 (8202-E4C/8205-E6C). Prior to the #ESA2, a PCIe SAS adapter capable of supporting SSDs was not available to the Power 710/730 system units.
2. Though using a pair of PCIe2 RAID SAS adapters is recommended for best performance and redundancy, using a pair is optional since there is no write cache to protect. Thus a single adapter using only a single PCIe slot can support SSDs even if using RAID. Using only one slot can be a very cost-effective configuration and also can conserve PCIe slots assuming adapter redundancy is not required.
3. Batteries or flash memory to preserve write cache content in case of power failure is not required. This means no battery maintenance on a RAID controller and allows the adapter to have a more attractive price.

The #ESA1 (full high) adapter and #ESA2 (low profile) adapter are electronically identical and are also physically identical except for their tail stocks.

The #ESA1/ESA2 has dual 6Gbps Mini SAS HD 4x ports. Thus the adapter is capable of attaching 6Gbps devices with sustained bandwidths reaching up to 22 Gbps or 2.2 GBps per adapter, dependent upon the workload, available host bus, and device

capability. A pair of adapters could attain up to 4.4 GBps using an active/active configuration and relatively balanced division of drive arrays.

The adapter provides two Mini-SAS HD (high density) connectors for the attachment of SSDs located in the #5887 EXP24S or #5802/5803 12X PCIe I/O drawers. X, YO, or AT SAS cables with HD connectors are used to attach to these drawers. 177GB or 387GB SSDs are supported. 69GB SSDs are not tested and therefore are not supported. Attaching HDDs (disk drives) has not been tested and is not supported on the #ESA1/ESA2. Attachment to the #5886 EXP12S has not been tested and is not supported. Attachment to SSDs located in the system unit is not available.

One #ESA1/ESA2 or a pair of ESA1/ESA2 (dual adapters) can attach a maximum of one I/O drawer. The maximum number of SSDs that can be controlled per single #ESA1/ESA2 or per pair of #ESA1/ESA2 depends on the I/O drawer being used. If a #5803 I/O drawer is used the maximum is 26. If a #5887 EXP24S I/O drawer is used the maximum is 24.

If controlling SSDs in a #5802/5803 with a single #ESA1/ESA2 the adapter should be located in that #5802/5803. If controlling SSDs in a #5802/5803 with a pair of #ESA1/ESA2 at least one of the adapters must be located in that #5802/5803. Note that IBM configuration tools will assume for simplicity that both adapters of a #ESA1 pair are located in the #5802/5803, but clients have more flexibility and can locate the second adapter in a nearby PCI slot of a different enclosure. Note the AT cable connecting the #ESA1/ESA2 to the SAS bays of the #5802/5803 is only 0.6 meters long.

A single adapter or a pair of adapters provide RAID 0, RAID 5, RAID 6, and RAID 10 for AIX, Linux, and VIOS. A single adapter or a pair of adapters provide RAID 5 and RAID 6 for IBM i. IBM i provides both OS mirroring and data spreading. AIX, Linux, and VIOS provide operating system mirroring (LVM). RAID 5 arrays of 3 to 26 drives are supported. JBOD on a single adapter or a pair of adapters is not supported.

The full high #ESA1 adapter is supported in the:

- Power 770/780 system unit (9117-MMC/9179-MHC) -- a maximum of six #ESA1 per processor enclosure
- #5802/#5877 I/O drawer attached to the Power 720/730/740/770/780 (8202-E4C/8231-E2C/8205-E6C/9117-MMC/9179-MHC) - a maximum of 10 per drawer
- #5803/#5873 I/O drawer attached to the Power 795 (9119-FHB) - a maximum of 20 per drawer

#ESA1 is not supported and must not be used in the Power 720/740 system unit (8202-E4C/8205-E6C). #ESA1 has not been tested and is not supported in the full high slots of Power System models not specifically identified above.

The low profile #ESA2 adapter is supported in the:

- Power 710/730 (8231-E1C/E2C) system units - a maximum of two #ESA2 per system unit
- Power 720/740 (8202-E4C/8205-E6C) PCIe Gen2 riser card (#5685) - a maximum of two #ESA2 per #5685

#ESA2 has not been tested and is not supported in the low profile slots of Power 710/730 (8231-E2B) or PCIe Gen1 Riser Card (#5610).

Note the aggregate bandwidth of the #5802/5877 or #5803/5873 would not be adequate for maximum aggregate #ESA1 performance if the maximum number of adapters is used. This "over configuring," however, may be desirable for configurations with large amounts of redundancy required. For unconstrained #ESA1 performance, probably 4-5 per #5802/5877 or 8-10 per #5803/5873 is a better planning maximum.

If a #ESA2 adapter is placed in the Power 710 or Power 730 system unit, the fan speed needs to be increased somewhat to provide better cooling. This is done by switching the unit from acoustic mode to nonacoustic mode. IBM Manufacturing plans to do this setting if the #ESA2 adapter is ordered along with a Power 710/730,

but if the #ESA2 is added to the server later, the client should remember to change the setting.

Specific SAS cables are required to attach to the #ESA1/ESA2 adapters' Mini-SAS HD connectors. To attach to the SAS drives in a #5802 or #5803 12X PCIe I/O drawer, 0.6 meter HD SAS AT cables are used (#3689). To attach to a #5887 EXP24S I/O Drawer, HD SAS YO or X cables are used. HD SAS YO cables are #3450, #3451, #3452, or #3453 with lengths of 1.5, 3, 6, or 10 meters. HD SAS X cables are #3454, #3455, or #3456 with lengths of 3, 6, or 10 meters.

With the #ESA1/ESA2 adapter, additional no-charge specify codes (#EJP1-EJPE) are available on EXP24S (#5887) to indicate to IBM Manufacturing the mode to which the drawer must be set and the adapter, controller, and cable configuration which will be used. The physical adapters, controllers, and cables should be ordered with their own chargeable feature numbers.

Specify	Mode	Adapter/Controller	Cable to Drw	Environment
#EJP1	Mode 1	One #ESA1/ESA2	1 YO cable	AIX/IBM i/Linux/VIOS
#EJP2	Mode 1	Pair #ESA1/ESA2	2 YO cables	AIX/IBM i/Linux/VIOS
#EJP3	Mode 2	Pair #ESA1/ESA2	2 X cables	AIX/Linux/VIOS
#EJP4	Mode 2	Two pair #ESA1/2	2 X cables	AIX/Linux/VIOS
#EJP5	Mode 4	Four #ESA1/ESA2	2 X cables	AIX/Linux/VIOS
#EJP6	Mode 2	One #ESA1/ESA2	2 YO cables	AIX/Linux/VIOS
#EJP7	Mode 2	Two #ESA1/ESA2	2 YO cables	AIX/Linux/VIOS

The following specify codes communicating a "partial" configuration to IBM Manufacturing are planned to be available in June 2012.

Specify	Mode	Adapter/Controller	Cable to Drw	Environment
#EJPA	Mode 2	One #ESA1/2	1 YO cable	AIX/Linux/VIOS 1/2 #EJP7
#EJPB	Mode 2	Pair #ESA1/2	1 X cable	AIX/Linux/VIOS 1/2 #EJP4
#EJPC	Mode 4	One #ESA1/2	1 X cable	AIX/Linux/VIOS 1/4 #EPJ5
#EJPD	Mode 4	Two #ESA1/2	1 X cable	AIX/Linux/VIOS 1/2 #EPJ5
#EJPE	Mode 4	Three #ESA1/2	2 X cables	AIX/Linux/VIOS 3/4 #EPJ5

To help IBM Manufacturing understand more exactly how to cable the #ESA1/ESA2 adapter, no-charge specify features #EJPY and #EJPZ indicate attachment to the left or right side of a #5802/5803 12X-attached PCIe I/O Drawer with SAS bays.

The #ESA1/ESA2 can support 177GB (#1775/1787/1793/1794) or 387GB (#ES0A/ES0B/ES0C/ES0D) SFF SSDs. More than one capacity SSDs can be on the same #ESA1/ESA2, but must be in separate arrays. HDDs are not supported. 69GB SSDs are not supported. The SSDs can run by a single #ESA1/ESA2 adapter or run by a pair of adapters. 528-byte sectors (RAID) are used and 512-byte sectors (JBOD) are not supported.

Like the #5913 large cache PCIe SAS adapter, additional protection capabilities called T10 Data Integrity Field (DIF) are architected into the #ESA1/ESA2 adapter. As a result, the formatting of SSD arrays on a #ESA1/ESA2 differs slightly compared to how they would be formatted on older SAS adapters such as the 5904/5906/5908 adapter or 5805/5903 adapter or on integrated SAS controllers inside POWER6® or POWER7® servers.

The 528-byte formatted SSDs drives or arrays can usually be easily moved off older adapters to the #ESA1/ESA2 adapter and will automatically be converted by the #ESA1/ESA2. The word "usually" is used because AIX, Linux, and VIOS drives that were placed in an array that did not use the default 256k stripe size or that were individually included into an existing array will require reformatting before being moved to the #ESA1/ESA2 adapter. Also note that moving SSDs off the #ESA1/ESA2 adapter and onto older adapters requires the SSDs to be reformatted, before being placed on the older adapters. During this migration while reformatting RAID protection is not in effect and it is recommended that production data be backed up before taking this step.

The #ESA1/ESA2 requires the 7.4.4 firmware level planned to be available May 2012. The adapter is supported by AIX 5.3 or later, IBM i 6.1 or later, RHEL 5.8

or later, SLES 10 SP4 or SLES 11 SP2 or later, or VIOS 2.2.1.4 or later. IBM i connection through VIOS is not supported.

### **387GB SFF SSD with eMLC (#ES0A/ES0B/ES0C/ES0D)**

The 387GB SFF SSD with eMLC is the second generation of eMLC technology offering significant performance, capacity, and price-performance advantages. Using faster and more powerful technology, it offers approximately twice the drive throughput (IOPS and MBps) of the first-generation eMLC SSD technology. It has twice the capacity of the predecessor 177 GB SFF SSD, potentially reducing the number of SAS controllers and SAS bays for the same GB capacity or the same level IOPS.

eMLC technology stands for "Enterprise Multi-Level Cell" flash memory technology. IBM was the first server vendor to provide this SSD technology option which blends enterprise-class performance and reliability characteristics with the more cost-effective characteristics of MLC flash storage. The new #ES0A/B/C/D 387GB SSDs build upon this base and, using advances in both the SSD device controller flash memory management plus advances in MLC technology itself, provide an even better value proposition. Like IBM's earlier eMLC SSDs, the drives are designed to provide great sustained performance levels and extended endurance and reliability. For example, the new IBM eMLC SSD modules were designed to provide 24x7x365 usage even running write-intensive levels for at least five years. Typical client usage is expected to be much lower, especially regarding the average percentage of writes, and thus drive life span can be much longer.

Four feature codes are used for this drive to identify the type of SFF(2.5-inch) SAS bay and the operating system which will use the drive. If used in a POWER7 system unit or a 12X-attached #5802/5803 I/O drawer, then #ES0A/ES0B features are used and named "SFF-1." If used in a #5887 EXP24S storage drawer, then #ES0C/ES0D are used and named "SFF-2." SFF-1 and SFF-2 drives are not interchangeable as the SAS bays physically differ. #ES0A and #ES0C features are used to order SSDs for AIX, Linux, or VIOS. #ES0B and #ES0D features are used to order SSDs for IBM i. #ES0A and ES0B are identical and physically interchangeable, but two features are used to help IBM configuration tools understand the usage and slightly different configuration rules under the different OS environments. Likewise, #ES0C and #ES0D are identical and physically interchangeable.

The 387GB SFF SSDs are supported on POWER7 servers including the Power 710/730 (8231-E2B/E1C/E2C), Power 720 (8202-E4B/E4C), Power 740 (8205-E6B/E6C), Power 750 (8233-E8B), Power 755 (8236-E8C), Power 770 (9117-MMB/MMC), Power 780 (9179-MHB/MHC), and Power 795 (9119-FHB). Usage in POWER6 servers has not been tested and is not supported.

The 387GB SFF SSDs are supported by the SAS controllers integrated in the system units of the Power 710/720/730/740/750/755/770/780. These SSDs are also supported by the following IBM PCI SAS adapters:

- #5805/5903 PCIe 380MB Cache Dual=x4 3Gb SAS RAID Adapter
- #5913 PCIe2 1.8GB Cache RAID SAS Adapter Tri-port 6Gb
- #ESA1/ESA2 PCIe2 RAID SAS Adapter Dual-port 6Gb
- #5904/5906/5908 PCI-X DDR 1.5GB Cache SAS RAID Adapter

**Note:** The increased performance levels of the 387GB SFF SSDs may have some configuration considerations unless the SSDs are not very busy. This means the SAS controllers or adapters can support fewer busy 387GB SFF SSDs than compared to the maximum quantity of busy 69GB or 177GB SSDs from a full performance perspective. Of course the newer PCIe Gen2 SAS adapters can run a much higher quantity of SSDs than the older PCIe Gen1 or PCI-X adapters.

The 387GB SFF SSDs can be located on the same SAS controller as other capacity SSDs assuming there are available SAS bays. SSDs and HDDs can not be mixed in the same array. Different capacity SSDs can not be mixed in the same array.



The #ES0A/ES0B/ES0C/ES0C is shipped from IBM formatted to 528 byte sectors yielding 387 GB capacity. Reformatting to 512-byte sectors (JBOD) is not supported.

#ES0A/ES0C is supported by:

- AIX Version 7.1 with the 7100-01 Technology Level or later
- AIX Version 7.1 with Service Pack 4 or later
- AIX Version 6.1 with the 6100-07 Technology Level or later
- AIX Version 6.1 with the 6100-06 Technology Level, and Service Pack 6, or later
- AIX Version 6.1 with the 6100-05 Technology Level, and Service Pack 7, or later
- AIX Version 5.3 with the 5300-12 Technology Level and Service Pack 5, or later (note that AIX 5.3 service extension is required)
- Red Hat Enterprise Linux 5.8 for POWER , or later
- Red Hat Enterprise Linux 6.2 for POWER , or later
- Novell SUSE Linux Enterprise 10, Service Pack 4, or later
- Novell SUSE Linux Enterprise 11 Service Pack 2, or later
- VIOS 2.2.1.4 or later

#ES0B/ES0D is supported by:

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

### **Price/Performance 1GB Ethernet Adapter**

The PCIe2 4-port 1Gb Ethernet Adapter (#5260/5899) offers four copper/UTP (unshielded twisted pair) Ethernet ports. #5899 fits in a full high PCIe slot and #5260 fits in a low profile PCIe slot. The adapter provides equivalent function to the existing 4-port UTP adapters (#5271/5717), but at less than half the price. The #5260/5899 adapter provides equivalent function to the existing 2-port UTP adapter (#5767/5281/9055/9056), but with twice the number of ports. #5260/#5899 is a PCIe Gen2 adapter, but can be located in both PCIe Gen1 and PCIe Gen2 slots. The adapters are supported on POWER7 servers, but are not tested and are not supported on POWER6 servers. The adapter can be placed in the Power 710, 720, 730, 740, 750, 755, 770, and 780 system unit and in the #5802 and #5877 I/O drawers. It is supported by AIX , IBM i, Linux , and VIOS. It is not tested and is thus not supported as of May 2012 in the Power 795 #5803/5873.

With the #5260/5899 4-port 1Gb LAN adapter's availability, the "C" model Power 710/720/730/740 will change from using the current #9055/9056 2-port 1GB LAN adapter as part of their base definition. The 8231-E1C and 8231-E2C will use the #5260 instead of the #9055. The 8202-E4C and 8205-E6C will use the #5899 instead of the #9056. This provides twice the number of ports in just one PCIe slot for essentially the same price.

### **Low Profile 4-Port 8Gb HBA**

The PCIe2 LP 8Gb 4-port Fibre Channel Adapter (#EN0Y) is a low profile Gen2 PCIe x8 host bus adapter (HBA). It is functionally equivalent to the full high 4-port 8Gb adapter (#5729) announced in October 2011. #EN0Y can be placed in Gen2 low profile PCIe slots in the Power 710 (8231-E1C) or Power 730 (8231-E2C) or in the Power 720/740 PCIe Gen2 Riser Card (#5685). The adapter has not been tested in and is therefore not supported in Gen1 low profile PCIe slots.

The adapter uses fiber optics with LC type connectors running at 2, 4, or 8Gbps over multimode fiber optic cables. AIX , Linux , and VIOS natively support the adapter, though VIOS is required for NPIV capability. IBM i is supported through VIOS.

## **RDX 320GB Removable Disk Drive**

The RDX 320GB Removable Disk Drive (#EU08) adds a new capacity point to the existing 160GB, 500GB, and 1000GB RDX drives. For about the same price it provides a cartridge with twice the capacity of the 160GB RDX Disk Drive(#1106). RDX cartridges are placed in USB-attached RDX docking stations: #1103/1123 internal or #1104 external. The RDX 320GB cartridge is supported by AIX , Linux , and VIOS on POWER6 and POWER7 servers. As of April 2012, IBM i does not provide USB drivers and does not support RDX media.

The RDX removable drive can be a great alternative entry save/restore technology for many clients compared to technologies such as DAT160, DAT320, QIC, VXA-2, VXA-320, or 8mm tape cartridges. It even compares well against older LTO™ technology. The RDX is basically a disk drive which can provide great performance, reliability, and extremely long media life. Though an individual drive is more costly than an individual tape cartridge, the typical RDX removable cartridge has a much longer life span and doesn't need to be replaced nearly as often. The RDX docking bay into which the RDX removable drive is placed is also much lower cost than the tape drive. Unlike tape drive heads, RDX does not need to be cleaned, avoiding cleaning cartridges, operational costs, and the problems associated with dirty tapes and dirty tape heads. The rugged RDX cartridge is sealed and works well in dirty environments which can cause problems for tape drives or cartridges. Note "dirty" is not just environments like manufacturing, but includes most offices or back rooms which have a lot of dust, dirt, or carpet fibers compared to computer rooms with filtered air. The cooling fans in tape drives can suck in a lot of particles, especially if the unit has been placed near the floor.

When selecting the capacity for a specific environment, note that RDX drives do not provide hardware compression, unlike many tape drives. Compression can be done via software running on the server if required. Also note that like tape cartridges ordered with Power Systems , the RDX cartridge is not covered by the server's warranty or service agreement. Like other media it is warranted for a 3-month period.

## **New USB-attached DAT160 Tape Drive**

The 80/160GB DAT160 USB Tape Drive (#EU16) is an alternative to the existing SAS-attached #5619 DAT160 tape drive. The #EU16 and #5619 drives are located in the Power 720 (8202-E4B/E4C), Power 740 (8205-E4B/E4C), Power 750 (8233-E8B), and Power 755 (8236-E8C) system unit in the half-high media bay. The USB-attached and SAS-attached DAT160 tape drives provide equivalent drive performance and function considering just the tape drive. The difference is in the controller which runs the drive. If there are no other devices attached to the SAS controller, then there is probably no difference. But many clients use internal HDD or SSD attached to the integrated SAS controller. Integrated SAS controller contention can be reduced if the DAT160 tape drive is attached to a USB port in the server and not the integrated SAS controller. With separate integrated controllers, the combined HDD/SSD and tape drive performance may improve. Backups/Saves/Restore may speed up.

Note when the #EU16 tape drive is configured, it uses a USB cable included in the #EU16 feature to connect to a USB port inside the server. The cable is not visible from the outside of the server, but this connection disables the USB port on the operator panel on the front of the server. It does not impact the USB ports on the rear of the server.

The #EU16 USB tape drive is supported by AIX , Linux , and VIOS. As of April 2012, IBM i does not have a USB driver except through VIOS.

## **RoCE-capable Ethernet Adapter (#EC27 / #EC28)**

This PCIe Gen2 adapter supports the IBTA RoCE standard. IBTA is InfiniBandTrade Association. RoCE is Remote Direct Memory Access (RDMA) over Converged Ethernet. This protocol is a more efficient mechanism for transferring data for applications which support its usage. Typical usage might be in clusters of servers.

The adapter can support significantly greater bandwidth with low latency than typical Ethernet protocols. Instead of the typically more expensive InfiniBand switches it can leverage the typically lower-cost Ethernet infrastructure. RoCE can minimize CPU overhead by more efficiently using memory access than many other protocols. This offloads the CPU from I/O networking tasks, potentially improving server performance, scalability, and licensing costs.

The full high #EC28 is supported in PCIe Gen2 slots of the Power 720 (8202-E4C), Power 740 (8205-E6C), Power 770 (9117-MMC), and Power 780 (9179-MHC). The low profile #EC27 is supported in PCIe Gen2 slots of the Power 710 (8231-E1C) and Power 730 (8231-E2C) and in the PCIe Gen2 Riser Card (#5685) of the Power 720/740 (model E4C/E6C).

The RoCE adapter is supported by AIX but note as of May 2012, AIX supports only RoCE and does not support NIC device drivers.

### **12X Cable Performance Specify (#EUC5)**

A new, no-charge IBM Manufacturing specify feature code (#EUC5) can improve the initial cabling of 12X-attached #5802/5877 I/O Drawers to the Power 770(9117-MMB/MMC) and Power 780 (9179-MHB/MHC). Without #EUC5, the IBM eConfig tool and IBM Manufacturing make default assumptions designed to minimize the cost of the configuration. For example in the case of the 12X I/O Drawer, eConfig may not default the extra 12X cables to allow each I/O drawer to be on its own 12X loop. And IBM Manufacturing may configure two drawers per loop and ship 12X cables separately instead of spreading out the drawers onto the maximum number of GX++ adapters available unless Customer Specified Placement had been used. Clients can end up recabling some of the 12X I/O drawers to spread them out over more 12X loops for greater aggregate bandwidth.

The EUC5 feature alerts eConfig to ensure plenty of GX++ adapters and 12Xcables are available for all the 12X I/O drawers to be on their own 12X loop. Only when more 12X I/O drawers have been selected than the maximum installable quantity of GX++ 12X adapters does eConfig start putting two 12X I/O drawers per loop. Note this approach can add additional GX++ adapters and 12X cables to a configuration. IBM Manufacturing recognizes the #EUC5 code and alsospreads the 12X I/O drawers across all available loops.

### **Additional #5887 EXP24S Configuration Flexibility**

Configuration flexibility of the existing #5887 EXP24S I/O Drawer and SAS adapters is enhanced with the addition of several no-charge specify codes. Prior to these additional specify codes, IBM configuring and ordering systems used only specify codes which show EXP24S drawers with a full set of adapters and cables. The new feature codes allow clients to order EXP24S with "partial" configurations, lowering the initial cost of the configuration. For example, ordering half the number of cables and half the SAS adapters is possible if the client wishes to order the remaining adapter and cable at a later time for the initially unusable half of the EXP24S.

Note that when the additional cables or controllers are ordered, the eConfig user should remove the "partial" no-charge specify code and add a "full" no-charge specify code. IBM configuration tools only understand how to relate one specify code with one EXP24S drawer. IBM configuration tools do not know how to combine two or more partial specify codes for one #5887 EXP24S.

The new "partial" codes should be available in June and are:

#EJPJ	Mode 2	One #5901/5278	1 YO cable	AIX/Linux/VIOS	1/2 of #9361
#EJPK	Mode 2	Pair #5901/5278	1 X cable	AIX/Linux/VIOS	1/2 of #9366
#EJPL	Mode 4	One #5901/5278	1 X cable	AIX/Linux/VIOS	1/4 of #9365
#EJPM	Mode 4	Two #5901/5278	1 X cable	AIX/Linux/VIOS	1/2 of #9365
#EJPN	Mode 4	Three #5901/5278	2 X cables	AIX/Linux/VIOS	3/4 of #9365
#EJPR	Mode 2	Pair #5903/5805	1 X cable	AIX/Linux/VIOS	1/2 of #9368
#EJPT	Mode 2	Pair #5913	1 X cable	AIX/Linux/VIOS	1/2 of #9386

Note that #EJPL and #EJPN result in one end of the X cable being unattached to a #5901/5278 SAS adapter. This is done so that if and when another adapter is used

in the future, the cable will be ready to connect. Also note #EJPL and #EJPN have an odd number of adapters.

The above partial specify codes are in addition to the new full and partial specify codes added to communicate how to handle the new #ESA1/ESA2 SASadapter. These specify codes (EJP1, EJP2, EJP3, EJP4, EJP5, EJP6, EJP7, EJPA, EJPB, EJPC, and EJPD) were described earlier in this announcement letter.

### **Expanded #5913 Configuration Option**

The large cache PCIe Gen2 SAS adapter (#5913) offer additional cabling and location flexibility. Now when running SAS drives located in a #5802/580312X-attached I/O drawer only one of the #5913 pair must be placed in the PCIe slots of that same #5802/5803. Previously, configuration rules required both adapters in the #5913 pair to be located in the same #5802/5803 to run SAS drives in that #5802/5803. Thus now one #5913 could be located in one #5802/5803 I/O drawer and the other half of the #5913 pair can be located in a system unit or I/O drawer.

This has two potential benefits. First it allows for potentially greater bandwidth by allowing each half of the #5913 to be attached to different I/O buses. Second, it offers additional redundancy, especially if the #5913 pair is controlling SAS drives outside of the #5802/5803 as well as the SAS drives in the #5802. So if a #5802/5803 failed which had only one of the #5913, the second #5913 is designed to continue working with the SAS drives it could continue accessing. Depending on the #5802/5803 failure, the #5802/5803 SAS drives may or may not be available to the second #5913, but its ability to access the drives in a #5887 EXP24S should still be present. The ability to "split" the #5913 pair is already supported for #5913 pairs not controlling SAS drives in a #5802/5803, so this is extending this existing configuration option.

Note that the AT SAS cable attaching a #5913 to a #5802/5803 is only 0.6 meters long so it is very important to ensure the PCIe slot for the second #5913 is close to the #5802/5803 in which the first #5913 is located. Also note that for simplicity IBM configuration tools such as eConfig and IBM Manufacturing will continue to assume that both #5913 of the #5913 pair are located in the same #5802/5803 as the SAS drives they are controlling. Unless Customer Specified Placement (CSP) is ordered, the client will need to "split apart" the #5913 pair after the system has been shipped.

---

## **Statement of general direction**

---

IBM Power Systems has supported and continues to support PCI-X adapters and PCI-X I/O drawers for many server generations including POWER4, POWER5, POWER6, and POWER7. IBM plans to have POWER7 servers be the last generation of Power servers to support PCI-X adapters and PCI-X I/O drawers. PCIe adapters and I/O drawers already offer higher performance on POWER6 and POWER7 servers and will provide a better foundation for future servers.

Historically as IBM has introduced newer generations of servers, for example POWER5, POWER5+, POWER6, POWER6+™, and POWER7, the newer servers do not support some of the older I/O which doesn't meet the performance or functional requirements of the new server. The following planning information should help clients plan for the Power server which is planned to immediately follow POWER7. IBM plans to support SAS disk drives on these future Power servers and plans to support non-disk SCSI devices such as tape or optical, when PCI-X slots are available, but does not plan to support SCSI disk drives. The #5786 EXP24 SCSI Disk Drawer which provides 3.5-inch SCSI bays and the #5782 PCI-X 1.5GB Cache SCSI Adapter which attaches to the #5786 EXP24 are not planned to be supported after POWER7. The SCSI #5736 PCI-X adapter is planned to be supported when attaching tape or optical drives.

IBM plans that POWER6 servers running the IBM i release following 7.1 will not support the older, slower HSL/RIO-attached I/O drawers. This planning statement does not impact POWER7 clients or IBM i 7.1 clients. POWER7 servers do not

support HSL/RIO I/O drawers and there is no change to IBM i 7.1 HSL/RIO support. IBM i clients who have an HSL/RIO-attached I/O drawer or tower such as the #5094/5294, #0595/5095, #0588/5088, #5790, or #5791/5794 should plan on moving to newer 12X-attached I/O drawers on their POWER6 server before moving to the release following IBM i 7.1. Note that HSL/RIO I/O drawers or towers are the only enclosure which supports IOP adapters on a POWER6 server. Attachment to some older devices is only provided through an IOP-based adapter. For example, IOP-based communication adapters are required for SDLC/SNA/X.25 device attachment. Likewise an IOP is required for twinax device attachment without a protocol converter. For additional detail visit

<http://www.ibm.com/systems/support/i/planning/upgrade>

IBM plans to expand the capabilities of the #5888 EXP30 Ultra SSD I/O Drawer in several areas. First, the number of servers which support attachment is planned to be expanded to include the Power 770/780 (9117-MMC/9179-MHC) and other future servers.

Second, the attachment of up to two #5887 EXP24S Disk Drawers downstream of the #5888 is planned. The Ultra Drawer's integrated SAS controllers would then run these EXP24S drawers (up to 48 disk drives) in addition to the 30 SSD in the Ultra Drawer. Assuming 600GB drives are used in the EXP24S, this would provide a total of up to 40 TB storage capacity in only 5U of space while using zero PCIe slots.

Third, IBM also plans to provide Easy Tier™ functionality for this EXP30 Ultra Drawer and downstream EXP24S Disk Drawer combination for AIX and AIX/VIOS. The Ultra drawer's integrated SAS controllers would automatically monitor and manage the contents of the SSD and HDD and place "hot" (frequently accessed) content on the SSD and "cold" (less frequently accessed) content on the HDD.

Fourth, IBM plans to expand the integration of IBM Power Systems with the #5888 EXP30 Ultra SSD I/O Drawer and with selected IBM storage solutions such as the IBM Storage System DS8000®. With this planned advanced integration configuration, the Ultra Drawer would provide an extremely low latency cache for the IBM SAN, improving overall I/O performance while maintaining the SAN's advanced capabilities such as FlashCopy® and Metro/Global Mirroring and supporting Power Systems Live Partition Mobility capability.

Red Hat intends to support the IBM EXP30 Ultra SSD I/O Drawer (#5888) with an upcoming Red Hat Enterprise Linux 6 minor release. Red Hat plans availability for such update for the second quarter of 2012. For additional questions about the availability of this release, contact Red Hat.

Red Hat intends to support the PCIe Gen2 2-Port 10Gb Ethernet RoCE SFP+ Adapter (#EC27, #EC28) with an upcoming Red Hat Enterprise Linux 6 minor release. Red Hat plans availability for such update for the second quarter of 2012. For additional questions about the availability of this release, contact Red Hat.

Information concerning Red Hat Enterprise Linux was obtained from Red Hat. Questions concerning Red Hat Enterprise Linux should be directed to Red Hat, as Red Hat Enterprise Linux is not an IBM product. Red Hat Enterprise Linux is sold or licensed, as the case may be, to users under Red Hat's terms and conditions. Availability and support are the responsibility of Red Hat. IBM IS NOT LIABLE AND MAKES NO WARRANTIES, EXPRESS OR IMPLIED, REGARDING RED HAT ENTERPRISE LINUX, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OR CONDITION OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Moreover, all statements regarding IBM's or Red Hat's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only. Information regarding potential future third-party products that may work with an IBM product should not be relied on in making a purchase decision. The information mentioned regarding potential future third-party products is not a commitment, promise, or legal obligation to deliver any material, code, or functionality. Information about potential future third-party products may not be incorporated into any contract. The development, release, and timing of any future

features or functionality described for IBM or Red Hat products remain at IBM's or Red Hat's sole discretion, as applicable.

IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice at IBM's sole discretion. Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing 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 1164, 7014, 7042, 7316, 7778, 7779, 7809, 7863, 7891, 7893, 7895, 7953, 7955, 7989, 7998, 8202, 8203, 8204, 8205, 8231, 8233, 8234, 8236, 8261, 8406, 9117, 9119, and 9179 machine types:

(8261-E4S feature EU08 is only available in EMEA.)

### Planned availability date May 25, 2012

---

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

Description	MT	Model	Feature
Rack Content Specify: 5888-1U	7014	B42	0458
	7014	S25	
	7014	T00	
	7014	T42	
Manufacturing Routing Code for CSC	7989	BCH	0712
	8205	E6B	
	8205	E6C	
Specify #5888 Load Source placement	8202	E4C	0729
	8205	E6C	
	8231	E1C	
	8231	E2C	
#ES0B Load Source Specify	8202	E4B	0893
	8202	E4C	
	8205	E6B	
	8205	E6C	
	8231	E1C	
	8231	E2B	
	8231	E2C	
	8233	E8B	
	9117	MMB	
	9117	MMC	
	9119	FHB	
	9179	MHB	
	9179	MHC	
#ES0D Load Source Specify	8202	E4B	0894
	8202	E4C	
	8205	E6B	
	8205	E6C	
	8231	E1C	
	8231	E2B	
	8231	E2C	
	8233	E8B	
	9117	MMB	
	9117	MMC	
	9119	FHB	
	9179	MHB	
	9179	MHC	
USB External Docking Station for Removable Disk Drive	8231	E1C	1104
	8231	E2C	

CAT5E Ethernet Cable, 3M BLUE	7989	BCH	1111
CAT5E Ethernet Cable, 10M BLUE	7989	BCH	1112
CAT5E Ethernet Cable, 3M GREEN	7989	BCH	1115
CAT5E Ethernet Cable, 10M GREEN	7989	BCH	1116
CAT5E Ethernet Cable, 25M YELLOW	7989	BCH	1121
	8205	E6B	
	8205	E6C	
1m (3.3-ft) IB/E'Net 40G Copper Cable QSFP/QSFP	8231	E1C	3287
	8231	E2C	
3m (9.8-ft.) IB/E'Net 40G Copper Cable QSFP/QSFP	8231	E1C	3288
	8231	E2C	
5m QDR IB/E'Net Copper Cable QSFP/QSFP	8231	E1C	3289
	8231	E2C	
10 meter Quad Data Rate InfiniBand Optical Cable, QSFP/QSFP	8231	E1C	3290
	8231	E2C	
30 meter Quad Data Rate InfiniBand Optical Cable, QSFP/QSFP	8231	E1C	3293
	8231	E2C	
SAS YO Cable 1.5m - HD 6Gb Adapter to Enclosure	8231	E1C	3450
SAS YO Cable 3m - HD 6Gb Adapter to Enclosure	8231	E1C	3451
SAS YO Cable 6m - HD 6Gb Adapter to Enclosure	8231	E1C	3452
SAS YO Cable 10m - HD 6Gb Adapter to Enclosure	8231	E1C	3453
SAS X Cable 3m - HD 6Gb 2-Adapter to Enclosure	8231	E1C	3454
SAS X Cable 6m - HD 6Gb 2-Adapter to Enclosure	8231	E1C	3455
SAS X Cable 10m - HD 6Gb 2-Adapter to Enclosure	8231	E1C	3456
PCIe2 LP 4-port 1GbE Adapter	8202	E4B	5260
	8202	E4C	
	8205	E6B	
	8205	E6C	
	8231	E1C	
	8231	E2B	
	8231	E2C	
EXP30 Ultra SSD I/O Drawer	8202	E4C	5888
	8205	E6C	
	8231	E1C	
	8231	E2C	
PCIe2 4-port 1GbE Adapter	8202	E4B	5899
	8202	E4C	
	8205	E6B	
	8205	E6C	
	8231	E2C	
	8233	E8B	
	8236	E8C	
	9117	MMB	
	9117	MMC	
	9179	MHB	
	9179	MHC	
Shared #5888 EXP30 Indicator	8202	E4C	5925
	8205	E6C	
	8231	E1C	
	8231	E2C	
Remote #5888 EXP30 Indicator	8202	E4C	5927
	8205	E6C	
	8231	E1C	
	8231	E2C	
PCIe2 LP 2-Port 10GbE RoCE SFP+ Adapter	8202	E4C	EC27
	8205	E6C	
	8231	E1C	
	8231	E2C	
PCIe2 2-Port 10GbE RoCE SFP+ Adapter	8202	E4C	EC28
	8205	E6C	
	9117	MMC	
	9179	MHC	
GX++ 2-port PCIe2 x8 Adapter	8202	E4C	EJ03
	8205	E6C	
GX++ LP 1-port PCIe2 x8 Adapter	8231	E1C	EJ0H
	8231	E2C	
Specify Mode-1 & (1)ESA1/ESA2 for EXP24S #5887	8202	E4C	EJP1
	8205	E6C	

	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify Mode-1 & (2)ESA1/ESA2 for EXP24S #5887	8202	E4C	EJP2
	8205	E6C	
	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify Mode-2 & (2)ESA1/ESA2 for EXP24S #5887	8202	E4C	EJP3
	8205	E6C	
	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify Mode-2 & (4)ESA1/ESA2 for EXP24S #5887	8202	E4C	EJP4
	8205	E6C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify Mode-4 & (4)ESA1/ESA2 for EXP24S #5887	8202	E4C	EJP5
	8205	E6C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify Mode-2 & (1)ESA1/ESA2 for EXP24S #5887	8202	E4C	EJP6
	8205	E6C	
	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify Mode-2 (2 )ESA1/ESA2 for EXP24 #5887	8202	E4C	EJP7
	8205	E6C	
	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify Left Half 12X I/O Drawer to ESA1/ESA2	8202	E4C	EJPY
	8205	E6C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify Right Half 12X I/O Drawer to ESA1/ESA2	8202	E4C	EJPZ
	8205	E6C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
PCIe x8 Cable 1.5m	8202	E4C	EN05
	8205	E6C	
	8231	E1C	
	8231	E2C	
PCIe x8 Cable 3m	8202	E4C	EN07
	8205	E6C	
	8231	E1C	
	8231	E2C	
PCIe2 LP 8Gb 4-port Fibre Channel Adapter	8202	E4B	EN0Y
	8202	E4C	
	8205	E6B	
	8205	E6C	
	8231	E1C	
	8231	E2C	
Quantity 150 of #ES0A	9117	MMB	EQ0A
	9117	MMC	
	9119	FHB	



	9179	MHB	
	9179	MHC	
Quantity of 150 #ES0B	9117	MMB	EQ0B
	9117	MMC	
	9119	FHB	
	9179	MHB	
	9179	MHC	
Quantity of 150 #ES0C	8202	E4C	EQ0C
	8205	E6B	
	8205	E6C	
	8231	E2C	
	8233	E8B	
	9117	MMB	
	9117	MMC	
	9119	FHB	
	9179	MHB	
	9179	MHC	
Quantity of 150 #ES0D	8202	E4C	EQ0D
	8205	E6B	
	8205	E6C	
	8231	E2C	
	8233	E8B	
	9117	MMB	
	9117	MMC	
	9119	FHB	
	9179	MHB	
	9179	MHC	
Power Cable - Drawer to IBM PDU, 200-240V/10A	9117	MMA	EQ77
	9117	MMB	
	9117	MMC	
	9119	FHA	
	9119	FHB	
	9179	MHB	
	9179	MHC	
387GB 1.8" SAS SSD for AIX/Linux with eMLC	8202	E4C	ES02
	8205	E6C	
	8231	E1C	
	8231	E2C	
387GB SFF-1 SSD for AIX/Linux with eMLC	8202	E4B	ES0A
	8202	E4C	
	8205	E6B	
	8205	E6C	
	8231	E1C	
	8231	E2B	
	8231	E2C	
	8233	E8B	
	8236	E8C	
	9117	MMB	
	9117	MMC	
	9119	FHB	
	9179	MHB	
	9179	MHC	
387GB SFF-1 SSD for IBM i with eMLC	8202	E4B	ES0B
	8202	E4C	
	8205	E6B	
	8205	E6C	
	8231	E1C	
	8231	E2B	
	8231	E2C	
	8233	E8B	
	9117	MMB	
	9117	MMC	
	9119	FHB	
	9179	MHB	
	9179	MHC	
387GB SFF-2 SSD for AIX/Linux with eMLC	8202	E4B	ES0C
	8202	E4C	
	8205	E6B	
	8205	E6C	
	8231	E1C	
	8231	E2C	
	8233	E8B	
	8236	E8C	
	9117	MMB	

	9117	MMC	
	9119	FHB	
	9179	MHB	
	9179	MHC	
387GB SFF-2 SSD for IBM i with eMLC	8202	E4B	ES0D
	8202	E4C	
	8205	E6B	
	8205	E6C	
	8231	E1C	
	8231	E2C	
	8233	E8B	
	9117	MMB	
	9117	MMC	
	9119	FHB	
	9179	MHB	
	9179	MHC	
PCIe2 RAID SAS Adapter Dual-port 6Gb	8202	E4C	ESA1
	8205	E6C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
PCIe2 LP RAID SAS Adapter Dual-port 6Gb	8202	E4C	ESA2
	8205	E6C	
	8231	E1C	
	8231	E2C	
RDX 320 GB Removable Disk Drive	8202	E4B	EU08
	8202	E4C	
	8203	E4A	
	8204	E8A	
	8205	E6B	
	8205	E6C	
	8231	E1C	
	8231	E2B	
	8231	E2C	
	8233	E8B	
	8234	EMA	
	8261	E4S	
	9117	MMA	
	9117	MMB	
	9117	MMC	
	9179	MHB	
	9179	MHC	
80/160GB DAT160 USB Tape Drive	8202	E4B	EU16
	8202	E4C	
	8205	E6B	
	8205	E6C	
	8233	E8B	
	8236	E8C	
12X Cable Performance Specify	9117	MMB	EUC5
	9117	MMC	
	9179	MHB	
	9179	MHC	

The following are newly announced features on the specific models of the IBM Power Systems 1164, 7014, 7042, 7316, 7778, 7779, 7809, 7863, 7891, 7893, 7895, 7953, 7955, 7989, 7998, 8202, 8203, 8204, 8205, 8231, 8233, 8234, 8236, 8261, 8406, 9117, 9119, and 9179 machine types:

### **Planned availability date June 22, 2012**

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

Description	MT	Model	Feature
Specify mode-2 (1) ESA1/ESA2 for EXP24 #5887	8202	E4C	EJPA
	8205	E6C	
	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	

Specify mode-2 (2)ESA1/ESA2 for EXP24#5887	8202	E4C	EJPB
	8205	E6C	
	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify mode-4 (1)ESA1/ESA2 for EXP24 #5887	8202	E4C	EJPC
	8205	E6C	
	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify mode-4 (2)ESA1/ESA2 for EXP24 #5887	8202	E4C	EJPD
	8205	E6C	
	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify mode-4 (3)ESA1/ESA2 for EXP24 #5887	8202	E4C	EJPE
	8205	E6C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
	Specify mode-2 (1)5901/5278 for EXP24 #5887	8202	
8205		E6C	
8231		E1C	
8231		E2C	
9117		MMC	
9119		FHB	
9179		MHC	
Spec Specify mode-2 (2)5901/5278 for EXP24 #5887	8202	E4C	EJPK
	8205	E6C	
	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify mode-4 (1)5901/5278 for EXP24 #5887	8202	E4C	EJPL
	8205	E6C	
	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify mode-4 (2)5901/5278 for EXP24 #5887	8202	E4C	EJPM
	8205	E6C	
	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify mode-4 (3)5901/5278 for EXP24 #5887	8202	E4C	EJPN
	8205	E6C	
	8231	E1C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
Specify mode-2 (2)5903/5805 for EXP24 #5887	8202	E4C	EJPR
	8205	E6C	
	8231	E2C	
	9117	MMC	
	9119	FHB	
	9179	MHC	
	Specify mode-2 (2)5901/5278 for EXP24 #5887	8202	
8205		E6C	
8231		E2C	
9117		MMC	
9119		FHB	
9179		MHC	

---

## Business Partner information

---

If you are a Direct Reseller - System Reseller acquiring products from IBM , you may link directly to Business Partner information for this announcement. A PartnerWorld® ID and password are required (use IBM ID).

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=112-069>

---

## Publications

---

No publications are shipped with these features.

---

## 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*

For physical specifications refer to the *Sales Manual*.

### Security, auditability, and control

---

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

---

## IBM Electronic Services

---

IBM has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a Web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service

and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring. Electronic Services comprises two separate, but complementary, elements: Electronic Services news page and Electronic Services Agent.

The Electronic Services news page is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The Electronic Service Agent™ is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to deliver proactive service that may result in higher system availability and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBM Electronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

To learn how Electronic Services can work for you, visit

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

---

## Terms and conditions

---

### ***MES discount applicable***

No

Equal to the volume commitment discount

### ***Field installable feature***

Yes

### ***Warranty period***

These features assume the same warranty or maintenance terms as the machine in which they are installed for the full warranty or maintenance period announced for such machine.

### ***Customer setup***

Yes, except for feature code EQ77 under machine type 9119

### ***Machine code***

Same license terms and conditions as base machine

---

## Pricing

---

For all local charges, contact your IBM representative.

The following are newly announced features on the specific models of the IBM Power Systems 1164, 7014, 7042, 7316, 7778, 7779, 7809, 7863, 7891, 7893, 7895, 7953, 7955, 7989, 7998, 8202, 8203, 8204, 8205, 8231, 8233, 8234, 8236, 8261, 8406, 9117, 9119, 9179 machine type:

Description	Model	Feature	Initial/ MES/ Both	RP
-------------	-------	---------	--------------------------	----

Machine type 7014	number	number	support	CSU	MES
Rack Content Specify: 5888-1U					
	B42	0458	Initial	N/A	No
	S25		Initial	N/A	No
	T00		Initial	N/A	No
	T42		Initial	N/A	No

			Initial/ MES/ Both		RP
Description	Model	Feature	support	CSU	MES
Machine type 7989	number	number			
CSC Routing Indicator					
	BCH	0712	Initial	N/A	No
CAT5E Ethernet Cable 3M BLUE	BCH	1111	Both	Yes	No
CAT5E Ethernet Cable 10M BLUE	BCH	1112	Both	Yes	No
CAT5E Ethernet Cable 3M GREEN	BCH	1115	Both	Yes	No
CAT5E Ethernet Cable 10M GREEN	BCH	1116	Both	Yes	No
CAT5E Ethernet Cbl 25M YELLOW	BCH	1121	Both	Yes	No

			Initial/ MES/ Both		RP
Description	Model	Feature	support	CSU	MES
Machine type 8202	number	number			
#5888 Load Source Specify					
	E4C	0729	Both	Yes	No
#ES0B Load Source Specify					
	E4B	0893	Both	Yes	No
	E4C		Both	Yes	No
#ES0D Load Source Specify					
	E4B	0894	Both	Yes	No
	E4C		Both	Yes	No
PCIe2 LP 4-port 1GbE Adapter					
	E4B	5260	Both	Yes	No
	E4C		Both	Yes	No
EXP30 Ultra SSD I/O Drawer					
	E4C	5888	Both	Yes	No
PCIe2 4-port 1GbE Adapter					
	E4B	5899	Both	Yes	No
	E4C		Both	Yes	No
Shared #5888 EXP30 Indicator					
	E4C	5925	Both	Yes	No
Remote #5888 EXP30 Indicator					
	E4C	5927	Both	Yes	No
PCIe2 LP 2-Port 10GbE RoCE SFP					
	E4C	EC27	Both	Yes	No
PCIe2 2-Port 10GbE RoCE SFP+ A					
	E4C	EC28	Both	Yes	No
GX++ 2-port PCIe2 x8 Adapter					
	E4C	EJ03	Both	Yes	No
Mode-1 & (1)ESA1/ESA2 for 5887					
	E4C	EJP1	Both	Yes	No
Mode-1 & (2)ESA1/ESA2 for 5887					
	E4C	EJP2	Both	Yes	No
Mode-2 & (2)ESA1/ESA2 for 5887					
	E4C	EJP3	Both	Yes	No
Mode-2 & (4)ESA1/ESA2 for 5887					
	E4C	EJP4	Both	Yes	No
Mode-4 & (4)ESA1/ESA2 for 5887					
	E4C	EJP5	Both	Yes	No
Mode-2 & (1)ESA1/ESA2 for 5887					
	E4C	EJP6	Both	Yes	No
Specify Mode-2(2)ESA1/ESA2					
	E4C	EJP7	Both	Yes	No

Specify mode-2(1) ESA1/ESA2	E4C	EJPA	Both	Yes	No
Specify mode-2 (2) ESA1/ESA2	E4C	EJPB	Both	Yes	No
Specify mode-4 (1)ESA1/ESA2	E4C	EJPC	Both	Yes	No
Specify mode-4(2)ESA1/ESA2	E4C	EJPD	Both	Yes	No
Specify mode-4 (3)ESA1/ESA2	E4C	EJPE	Both	Yes	No
Specify mode-2 (1)5901/5278	E4C	EJPJ	Both	Yes	No
Specify mode-2(2)5901/5278	E4C	EJPK	Both	Yes	No
Specify mode-4 (1)5901/5278	E4C	EJPL	Both	Yes	No
Specify mode-4 (2) 5901/5278	E4C	EJPM	Both	Yes	No
Specify mode-4 (3) 5901/5278	E4C	EJPN	Both	Yes	No
Specify mode-2 (2)5903/5805	E4C	EJPR	Both	Yes	No
Specify mode-2 (2) 5913	E4C	EJPT	Both	Yes	No
Specify Left Half 12X I/O Draw	E4C	EJPY	Both	Yes	No
Specify Right Half 12X I/O Dra	E4C	EJPZ	Both	Yes	No
PCIe x8 Cable 1.5m	E4C	EN05	Both	Yes	No
PCIe x8 Cable 3m	E4C	EN07	Both	Yes	No
PCIe2 LP 8Gb 4-port Fibre Chan	E4B	EN0Y	Both	Yes	No
	E4C		Both	Yes	No
Quantity of 150 #ES0C	E4C	EQ0C	Both	Yes	No
Quantity of 150 #ES0D	E4C	EQ0D	Both	Yes	No
387GB 1.8" SAS SSD (AIX/Linux)	E4C	ES02	Both	Yes	No
387GB SFF-1 SSD for AIX/Linux	E4B	ES0A	Both	Yes	No
	E4C		Both	Yes	No
387GB SFF-1 SSD for IBMi	E4B	ES0B	Both	Yes	No
	E4C		Both	Yes	No
387GB SFF-2 SSD for AIX/Linux	E4B	ES0C	Both	Yes	No
	E4C		Both	Yes	No
387GB SFF-2 SSD for IBM i	E4B	ES0D	Both	Yes	No
	E4C		Both	Yes	No
PCIe2 RAID SAS Adapter 6Gb	E4C	ESA1	Both	Yes	No
PCIe2 LP RAID SAS Adapter 6Gb	E4C	ESA2	Both	Yes	No
RDX 320 GB Removable Disk Driv	E4B	EU08	Both	Yes	No
	E4C		Both	Yes	No
80/160GB DAT160 USB Tape Drive	E4B	EU16	Both	Yes	No
	E4C		Both	Yes	No
				Initial/	
				MES/	
Description	Model	Feature	Both	RP	
Machine type 8203	number	number	support	CSU	MES
RDX 320 GB Removable Disk Driv	E4A	EU08	MES	Yes	No
				Initial/	

Description	Model	Feature	MES/	RP
Machine type	number	number	Both	CSU MES
RDX 320 GB Removable Disk Driv	E8A	EU08	MES	Yes No
				Initial/
Description	Model	Feature	Both	RP
Machine type	number	number	support	CSU MES
x	E6B	0712	Initial	N/A No
	E6C		Initial	N/A No
#5888 Load Source Specify	E6C	0729	Both	Yes No
#ES0B Load Source Specify	E6B	0893	MES	Yes No
	E6C		Both	Yes No
#ES0D Load Source Specify	E6B	0894	MES	Yes No
	E6C		Both	Yes No
x	E6B	1121	Both	Yes No
	E6C		Both	Yes No
PCIe2 LP 4-port 1GbE Adapter	E6B	5260	Both	Yes No
	E6C		Both	Yes No
EXP30 Ultra SSD I/O Drawer	E6C	5888	Both	Yes No
PCIe2 4-port 1GbE Adapter	E6B	5899	Both	Yes No
	E6C		Both	Yes No
Shared #5888 EXP30 Indicator	E6C	5925	Both	Yes No
Remote #5888 EXP30 Indicator	E6C	5927	Both	Yes No
PCIe2 LP 2-Port 10GbE RoCE SFP	E6C	EC27	Both	Yes No
PCIe2 2-Port 10GbE RoCE SFP+ A	E6C	EC28	Both	Yes No
GX++ 2-port PCIe2 x8 Adapter	E6C	EJ03	Both	Yes No
Mode-1 & (1)ESA1/ESA2 for 5887	E6C	EJP1	Both	Yes No
Mode-1 & (2)ESA1/ESA2 for 5887	E6C	EJP2	Both	Yes No
Mode-2 & (2)ESA1/ESA2 for 5887	E6C	EJP3	Both	Yes No
Mode-2 & (4)ESA1/ESA2 for 5887	E6C	EJP4	Both	Yes No
Mode-4 & (4)ESA1/ESA2 for 5887	E6C	EJP5	Both	Yes No
Mode-2 & (1)ESA1/ESA2 for 5887	E6C	EJP6	Both	Yes No
Specify Mode-2(2)ESA1/ESA2	E6C	EJP7	Both	Yes No
Specify mode-2(1) ESA1/ESA2	E6C	EJPA	Both	Yes No
Specify mode-2 (2) ESA1/ESA2	E6C	EJPB	Both	Yes No
Specify mode-4 (1)ESA1/ESA2	E6C	EJPC	Both	Yes No
Specify mode-4(2)ESA1/ESA2	E6C	EJPD	Both	Yes No
Specify mode-4 (3)ESA1/ESA2	E6C	EJPE	Both	Yes No
Specify mode-2 (1)5901/5278	E6C	EJPJ	Both	Yes No
Specify mode-2(2)5901/5278	E6C	EJPK	Both	Yes No



Specify mode-4 (1)5901/5278	E6C	EJPL	Both	Yes	No
Specify mode-4 (2) 5901/5278	E6C	EJPM	Both	Yes	No
Specify mode-4 (3) 5901/5278	E6C	EJPN	Both	Yes	No
Specify mode-2 (2)5903/5805	E6C	EJPR	Both	Yes	No
Specify mode-2 (2) 5913	E6C	EJPT	Both	Yes	No
Specify Left Half 12X I/O Draw	E6C	EJPY	Both	Yes	No
Specify Right Half 12X I/O Dra	E6C	EJPZ	Both	Yes	No
PCIe x8 Cable 1.5m	E6C	EN05	Both	Yes	No
PCIe x8 Cable 3m	E6C	EN07	Both	Yes	No
PCIe2 LP 8Gb 4-port Fibre Chan	E6B	EN0Y	Both	Yes	No
	E6C		Both	Yes	No
Quantity of 150 #ES0C	E6B	EQ0C	MES	Yes	No
	E6C		Both	Yes	No
Quantity of 150 #ES0D	E6B	EQ0D	MES	Yes	No
	E6C		Both	Yes	No
387GB 1.8" SAS SSD (AIX/Linux)	E6C	ES02	Both	Yes	No
387GB SFF-1 SSD for AIX/Linux	E6B	ES0A	Both	Yes	No
	E6C		Both	Yes	No
387GB SFF-1 SSD for IBMi	E6B	ES0B	Both	Yes	No
	E6C		Both	Yes	No
387GB SFF-2 SSD for AIX/Linux	E6B	ES0C	Both	Yes	No
	E6C		Both	Yes	No
387GB SFF-2 SSD for IBM i	E6B	ES0D	Both	Yes	No
	E6C		Both	Yes	No
PCIe2 RAID SAS Adapter 6Gb	E6C	ESA1	Both	Yes	No
PCIe2 LP RAID SAS Adapter 6Gb	E6C	ESA2	Both	Yes	No
RDX 320 GB Removable Disk Driv	E6B	EU08	Both	Yes	No
	E6C		Both	Yes	No
80/160GB DAT160 USB Tape Drive	E6B	EU16	MES	Yes	No
	E6C		Both	Yes	No

Description	Model	Feature	Initial/ MES/ Both	RP	
Machine type 8231	number	number	support	CSU	MES
#5888 Load Source Specify	E1C	0729	Both	Yes	No
	E2C		Both	Yes	No
#ES0B Load Source Specify	E1C	0893	Both	Yes	No
	E2B		MES	Yes	No
	E2C		Both	Yes	No
#ES0D Load Source Specify	E1C	0894	Both	Yes	No
	E2C		Both	Yes	No
USB External Docking Station R	E1C	1104	Both	Yes	No
	E2C		Both	Yes	No
1m QDR IB/E'Net Copper Cable	E1C	3287	Both	Yes	No
	E2C		Both	Yes	No
3m QDR IB/E'Net Copper Cable					

	E1C	3288	Both	Yes	No
	E2C		Both	Yes	No
5m QDR IB/E'Net Copper Cable	E1C	3289	Both	Yes	No
	E2C		Both	Yes	No
10m QDR IB Optic Cable	E1C	3290	Both	Yes	No
	E2C		Both	Yes	No
30m QDR IB Optic Cable	E1C	3293	Both	Yes	No
	E2C		Both	Yes	No
PCIe2 LP 4-port 1GbE Adapter	E1C	5260	Both	Yes	No
	E2B		Both	Yes	No
	E2C		Both	Yes	No
EXP30 Ultra SSD I/O Drawer	E1C	5888	Both	Yes	No
	E2C		Both	Yes	No
PCIe2 4-port 1GbE Adapter	E2C	5899	Initial	Yes	No
Shared #5888 EXP30 Indicator	E1C	5925	Both	Yes	No
	E2C		Both	Yes	No
Remote #5888 EXP30 Indicator	E1C	5927	Both	Yes	No
	E2C		Both	Yes	No
PCIe2 LP 2-Port 10GbE RoCE SFP	E1C	EC27	Both	Yes	No
	E2C		Both	Yes	No
GX++LP 1-port PCIe2 x8 Adapter	E1C	EJ0H	Both	Yes	No
	E2C		Both	Yes	No
Mode-1 & (1)ESA1/ESA2 for 5887	E1C	EJP1	Both	Yes	No
	E2C		Both	Yes	No
Mode-1 & (2)ESA1/ESA2 for 5887	E1C	EJP2	Both	Yes	No
	E2C		Both	Yes	No
Mode-2 & (2)ESA1/ESA2 for 5887	E1C	EJP3	Both	Yes	No
	E2C		Both	Yes	No
Mode-2 & (4)ESA1/ESA2 for 5887	E2C	EJP4	Both	Yes	No
Mode-4 & (4)ESA1/ESA2 for 5887	E2C	EJP5	Both	Yes	No
Mode-2 & (1)ESA1/ESA2 for 5887	E1C	EJP6	Both	Yes	No
	E2C		Both	Yes	No
Specify Mode-2(2)ESA1/ESA2	E1C	EJP7	Both	Yes	No
	E2C		Both	Yes	No
Specify mode-2(1) ESA1/ESA2	E1C	EJPA	Both	Yes	No
	E2C		Both	Yes	No
Specify mode-2 (2) ESA1/ESA2	E1C	EJPB	Both	Yes	No
	E2C		Both	Yes	No
Specify mode-4 (1)ESA1/ESA2	E1C	EJPC	Both	Yes	No
	E2C		Both	Yes	No
Specify mode-4(2)ESA1/ESA2	E1C	EJPD	Both	Yes	No
	E2C		Both	Yes	No
Specify mode-4 (3)ESA1/ESA2	E2C	EJPE	Both	Yes	No
Specify mode-2 (1)5901/5278	E1C	EJPJ	Both	Yes	No
	E2C		Both	Yes	No
Specify mode-2(2)5901/5278	E1C	EJPK	Both	Yes	No
	E2C		Both	Yes	No
Specify mode-4 (1)5901/5278	E1C	EJPL	Both	Yes	No

	E2C		Both	Yes	No
Specify mode-4 (2) 5901/5278	E1C	EJPM	Both	Yes	No
	E2C		Both	Yes	No
Specify mode-4 (3) 5901/5278	E1C	EJPN	Both	Yes	No
	E2C		Both	Yes	No
Specify mode-2 (2) 5903/5805	E2C	EJPR	Both	Yes	No
Specify mode-2 (2) 5913	E2C	EJPT	Both	Yes	No
Specify Left Half 12X I/O Draw	E2C	EJPY	Both	Yes	No
Specify Right Half 12X I/O Dra	E2C	EJPZ	Both	Yes	No
PCIe x8 Cable 1.5m					
	E1C	EN05	Both	Yes	No
	E2C		Both	Yes	No
PCIe x8 Cable 3m					
	E1C	EN07	Both	Yes	No
	E2C		Both	Yes	No
PCIe2 LP 8Gb 4-port Fibre Chan	E1C	EN0Y	Both	Yes	No
	E2C		Both	Yes	No
Quantity of 150 #ES0C					
	E2C	EQ0C	Both	Yes	No
Quantity of 150 #ES0D					
	E2C	EQ0D	Both	Yes	No
387GB 1.8" SAS SSD (AIX/Linux)	E1C	ES02	Both	Yes	No
	E2C		Both	Yes	No
387GB SFF-1 SSD for AIX/Linux					
	E1C	ES0A	Both	Yes	No
	E2B		Both	Yes	No
	E2C		Both	Yes	No
387GB SFF-1 SSD for IBMi					
	E1C	ES0B	Both	Yes	No
	E2B		Both	Yes	No
	E2C		Both	Yes	No
387GB SFF-2 SSD for AIX/Linux					
	E1C	ES0C	Both	Yes	No
	E2C		Both	Yes	No
387GB SFF-2 SSD for IBM i					
	E1C	ES0D	Both	Yes	No
	E2C		Both	Yes	No
PCIe2 RAID SAS Adapter 6Gb					
	E2C	ESA1	Both	Yes	No
PCIe2 LP RAID SAS Adapter 6Gb					
	E1C	ESA2	Both	Yes	No
	E2C		Both	Yes	No
RDX 320 GB Removable Disk Driv					
	E1C	EU08	Both	Yes	No
	E2B		Both	Yes	No
	E2C		Both	Yes	No

Description	Model	Feature	Initial/ MES/ Both	RP	
Machine type	8233	number	number	support	CSU MES
#ES0B Load Source Specify					
	E8B	0893	Both	Yes	No
#ES0D Load Source Specify					
	E8B	0894	Both	Yes	No
PCIe2 4-port 1GbE Adapter					
	E8B	5899	Both	Yes	No
Quantity of 150 #ES0C					
	E8B	EQ0C	Both	Yes	No
Quantity of 150 #ES0D					
	E8B	EQ0D	Both	Yes	No
387GB SFF-1 SSD for AIX/Linux					
	E8B	ES0A	Both	Yes	No
387GB SFF-1 SSD for IBMi					

	E8B	ES0B	Both	Yes	No
387GB SFF-2 SSD for AIX/Linux	E8B	ES0C	Both	Yes	No
387GB SFF-2 SSD for IBM i	E8B	ES0D	Both	Yes	No
RDX 320 GB Removable Disk Drive	E8B	EU08	Both	Yes	No
80/160GB DAT160 USB Tape Drive	E8B	EU16	Both	Yes	No

Initial/  
MES/  
Both RP  
support CSU MES

RDX 320 GB Removable Disk Drive	EMA	EU08	MES	Yes	No
---------------------------------	-----	------	-----	-----	----

Initial/  
MES/  
Both RP  
support CSU MES

PCIE2 4-port 1GbE Adapter	E8C	5899	Both	Yes	No
387GB SFF-1 SSD for AIX/Linux	E8C	ES0A	Both	Yes	No
387GB SFF-2 SSD for AIX/Linux	E8C	ES0C	Both	Yes	No
80/160GB DAT160 USB Tape Drive	E8C	EU16	Both	Yes	No

Initial/  
MES/  
Both RP  
support CSU MES

#ES0B Load Source Specify	MMB	0893	Both	Yes	No
	MMC		Both	Yes	No
#ES0D Load Source Specify	MMB	0894	Both	Yes	No
	MMC		Both	Yes	No
PCIE2 4-port 1GbE Adapter	MMB	5899	Both	Yes	No
	MMC		Both	Yes	No
PCIE2 2-Port 10GbE RoCE SFP+ A	MMC	EC28	Both	Yes	No

Mode-1 & (1)ESA1/ESA2 for 5887	MMC	EJP1	Both	Yes	No
Mode-1 & (2)ESA1/ESA2 for 5887	MMC	EJP2	Both	Yes	No
Mode-2 & (2)ESA1/ESA2 for 5887	MMC	EJP3	Both	Yes	No
Mode-2 & (4)ESA1/ESA2 for 5887	MMC	EJP4	Both	Yes	No
Mode-4 & (4)ESA1/ESA2 for 5887	MMC	EJP5	Both	Yes	No
Mode-2 & (1)ESA1/ESA2 for 5887	MMC	EJP6	Both	Yes	No
Specify Mode-2(2)ESA1/ESA2	MMC	EJP7	Both	Yes	No
Specify mode-2(1) ESA1/ESA2	MMC	EJPA	Both	Yes	No
Specify mode-2 (2) ESA1/ESA2	MMC	EJPB	Both	Yes	No
Specify mode-4 (1)ESA1/ESA2	MMC	EJPC	Both	Yes	No
Specify mode-4(2)ESA1/ESA2	MMC	EJPD	Both	Yes	No
Specify mode-4 (3)ESA1/ESA2					

Specify mode-2 (1)5901/5278	MMC	EJPE	Both	Yes	No
Specify mode-2(2)5901/5278	MMC	EJPJ	Both	Yes	No
Specify mode-4 (1)5901/5278	MMC	EJPK	Both	Yes	No
Specify mode-4 (2) 5901/5278	MMC	EJPL	Both	Yes	No
Specify mode-4 (3) 5901/5278	MMC	EJPM	Both	Yes	No
Specify mode-2 (2)5903/5805	MMC	EJPN	Both	Yes	No
Specify mode-2 (2) 5913	MMC	EJPR	Both	Yes	No
Specify Left Half 12X I/O Draw	MMC	EJPT	Both	Yes	No
Specify Right Half 12X I/O Dra	MMC	EJPY	Both	Yes	No
Quantity 150 of #ES0A	MMC	EJPZ	Both	Yes	No
Quantity of 150 #ES0B	MMB	EQQA	Both	Yes	No
Quantity of 150 #ES0C	MMC		Both	Yes	No
Quantity of 150 #ES0D	MMB	EQQB	Both	Yes	No
Power Cable Drawer to IBM PD	MMC		Both	Yes	No
387GB SFF-1 SSD for AIX/Linux	MMA	EQ77	MES	Yes	No
387GB SFF-1 SSD for IBMi	MMB		Both	Yes	No
387GB SFF-1 SSD for IBM i	MMC		Both	Yes	No
387GB SFF-2 SSD for AIX/Linux	MMB	ES0A	Both	Yes	No
387GB SFF-2 SSD for IBM i	MMC		Both	Yes	No
PCIe2 RAID SAS Adapter 6Gb	MMB	ES0B	Both	Yes	No
RDX 320 GB Removable Disk Driv	MMC		Both	Yes	No
12X Cable Performance Specify	MMB	ES0C	Both	Yes	No
	MMC		Both	Yes	No
	MMB	ES0D	Both	Yes	No
	MMC		Both	Yes	No
	MMB	ESA1	Both	Yes	No
	MMA	EU08	MES	Yes	No
	MMB		Both	Yes	No
	MMC		Both	Yes	No
	MMB	EUC5	Initial	N/A	No
	MMC		Initial	N/A	No
			Initial/		
			MES/		
			Both	RP	
			support	CSU	MES
#ES0B Load Source Specify	FHB	0893	Both	Yes	No
#ES0D Load Source Specify	FHB	0894	Both	Yes	No
Mode-1 & (1)ESA1/ESA2 for 5887	FHB	EJP1	Both	Yes	No
Mode-1 & (2)ESA1/ESA2 for 5887	FHB	EJP2	Both	Yes	No
Mode-2 & (2)ESA1/ESA2 for 5887	FHB	EJP3	Both	Yes	No
Mode-2 & (4)ESA1/ESA2 for 5887					

Mode-4 & (4)ESA1/ESA2 for 5887	FHB	EJP4	Both	Yes	No
Mode-2 & (1)ESA1/ESA2 for 5887	FHB	EJP5	Both	Yes	No
Specify Mode-2(2)ESA1/ESA2	FHB	EJP6	Both	Yes	No
Specify mode-2(1) ESA1/ESA2	FHB	EJP7	Both	Yes	No
Specify mode-2 (2) ESA1/ESA2	FHB	EJPA	Both	Yes	No
Specify mode-4 (1)ESA1/ESA2	FHB	EJPB	Both	Yes	No
Specify mode-4(2)ESA1/ESA2	FHB	EJPC	Both	Yes	No
Specify mode-4 (3)ESA1/ESA2	FHB	EJPD	Both	Yes	No
Specify mode-2 (1)5901/5278	FHB	EJPE	Both	Yes	No
Specify mode-2(2)5901/5278	FHB	EJPJ	Both	Yes	No
Specify mode-4 (1)5901/5278	FHB	EJPK	Both	Yes	No
Specify mode-4 (2) 5901/5278	FHB	EJPL	Both	Yes	No
Specify mode-4 (3) 5901/5278	FHB	EJPM	Both	Yes	No
Specify mode-2 (2)5903/5805	FHB	EJPN	Both	Yes	No
Specify mode-2 (2) 5913	FHB	EJPR	Both	Yes	No
Specify Left Half 12X I/O Draw	FHB	EJPT	Both	Yes	No
Specify Right Half 12X I/O Dra	FHB	EJPY	Both	Yes	No
Quantity 150 of #ES0A	FHB	EJPZ	Both	Yes	No
Quantity of 150 #ES0B	FHB	EQ0A	Both	Yes	No
Quantity of 150 #ES0C	FHB	EQ0B	Both	Yes	No
Quantity of 150 #ES0D	FHB	EQ0C	Both	Yes	No
Power Cable Drawer to IBM PD	FHB	EQ0D	Both	Yes	No
	FHA	EQ77	MES	No	No
387GB SFF-1 SSD for AIX/Linux	FHB		Both	No	No
387GB SFF-1 SSD for IBMi	FHB	ES0A	Both	Yes	No
387GB SFF-2 SSD for AIX/Linux	FHB	ES0B	Both	Yes	No
387GB SFF-2 SSD for IBM i	FHB	ES0C	Both	Yes	No
PCIe2 RAID SAS Adapter 6Gb	FHB	ES0D	Both	Yes	No
	FHB	ESA1	Both	Yes	No

Description	Model	Feature	Initial/ MES/ Both	RP	
Machine type 9179	number	number	support	CSU	MES
#ES0B Load Source Specify	MHB	0893	Both	Yes	No
	MHC		Both	Yes	No
#ES0D Load Source Specify	MHB	0894	Both	Yes	No
	MHC		Both	Yes	No
PCIe2 4-port 1GbE Adapter	MHB	5899	Both	Yes	No
	MHC		Both	Yes	No
PCIe2 2-Port 10GbE RoCE SFP+ A	MHC	EC28	Both	Yes	No

Mode-1 & (1)ESA1/ESA2 for 5887	MHC	EJP1	Both	Yes	No
Mode-1 & (2)ESA1/ESA2 for 5887	MHC	EJP2	Both	Yes	No
Mode-2 & (2)ESA1/ESA2 for 5887	MHC	EJP3	Both	Yes	No
Mode-2 & (4)ESA1/ESA2 for 5887	MHC	EJP4	Both	Yes	No
Mode-4 & (4)ESA1/ESA2 for 5887	MHC	EJP5	Both	Yes	No
Mode-2 & (1)ESA1/ESA2 for 5887	MHC	EJP6	Both	Yes	No
Specify Mode-2(2)ESA1/ESA2	MHC	EJP7	Both	Yes	No
Specify mode-2(1) ESA1/ESA2	MHC	EJPA	Both	Yes	No
Specify mode-2 (2) ESA1/ESA2	MHC	EJPB	Both	Yes	No
Specify mode-4 (1)ESA1/ESA2	MHC	EJPC	Both	Yes	No
Specify mode-4(2)ESA1/ESA2	MHC	EJPD	Both	Yes	No
Specify mode-4 (3)ESA1/ESA2	MHC	EJPE	Both	Yes	No
Specify mode-2 (1)5901/5278	MHC	EJPJ	Both	Yes	No
Specify mode-2(2)5901/5278	MHC	EJPK	Both	Yes	No
Specify mode-4 (1)5901/5278	MHC	EJPL	Both	Yes	No
Specify mode-4 (2) 5901/5278	MHC	EJPM	Both	Yes	No
Specify mode-4 (3) 5901/5278	MHC	EJPN	Both	Yes	No
Specify mode-2 (2)5903/5805	MHC	EJPR	Both	Yes	No
Specify mode-2 (2) 5913	MHC	EJPT	Both	Yes	No
Specify Left Half 12X I/O Draw	MHC	EJPY	Both	Yes	No
Specify Right Half 12X I/O Dra	MHC	EJPZ	Both	Yes	No
Quantity 150 of #ES0A	MHB	EQQA	Both	Yes	No
	MHC		Both	Yes	No
Quantity of 150 #ES0B	MHB	EQQB	Both	Yes	No
	MHC		Both	Yes	No
Quantity of 150 #ES0C	MHB	EQQC	Both	Yes	No
	MHC		Both	Yes	No
Quantity of 150 #ES0D	MHB	EQQD	Both	Yes	No
	MHC		Both	Yes	No
Power Cable Drawer to IBM PD	MHB	EQ77	Both	Yes	No
	MHC		Both	Yes	No
387GB SFF-1 SSD for AIX/Linux	MHB	ES0A	Both	Yes	No
	MHC		Both	Yes	No
387GB SFF-1 SSD for IBMi	MHB	ES0B	Both	Yes	No
	MHC		Both	Yes	No
387GB SFF-2 SSD for AIX/Linux	MHB	ES0C	Both	Yes	No
	MHC		Both	Yes	No
387GB SFF-2 SSD for IBM i	MHB	ES0D	Both	Yes	No
	MHC		Both	Yes	No
PCIe2 RAID SAS Adapter 6Gb	MHC	ESA1	Both	Yes	No
RDX 320 GB Removable Disk Driv	MHB	EU08	Both	Yes	No
	MHC		Both	Yes	No

## 12X Cable Performance Specify

MHB	EUC5	Initial	N/A	No
MHC		Initial	N/A	No

The following are features already announced for the IBM Power Systems 8231 machine type:

Description	Model	Feature	Initial/		
Machine type	8231	number	Both	RP	
		number	support	CSU	MES
SAS YO Cable 1.5m - HD 6Gb Ada					
		E1C	3450	Both	Yes No
SAS YO Cable 3m - HD 6Gb Adapt					
		E1C	3451	Both	Yes No
SAS YO Cable 6m - HD 6Gb Adapt					
		E1C	3452	Both	Yes No
SAS YO Cable 10m - HD 6Gb Adap					
		E1C	3453	Both	Yes No
SAS X Cable 3m - HD 6Gb 2-Adap					
		E1C	3454	Both	Yes No
SAS X Cable 6m - HD 6Gb 2-Adap					
		E1C	3455	Both	Yes No
SAS X Cable 10m - HD 6Gb 2-Ada					
		E1C	3456	Both	Yes No

## Pricing terms

---

Prices in the following PDF prices link are suggested list prices on day of announcement for the US only. They are provided for your information only. Dealer prices may vary, and prices may also vary by country. IBM list price does not include tax or shipping and is subject to change without notice.

[ENUS-112-069-LIST\\_PRICES\\_2012\\_04\\_24.PDF](#)

## Trademarks

Power Systems, POWER6+, Easy Tier and Electronic Service Agent are trademarks of IBM Corporation in the United States, other countries, or both.

Power, AIX, IBM, POWER, PowerHA, POWER6, POWER7, DS8000, FlashCopy and PartnerWorld are registered trademarks of IBM Corporation in the United States, other countries, or both.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Other company, product, and service names may be trademarks or service marks of others.

## Terms of use

IBM products and services which are announced and available in your country can be ordered under the applicable standard agreements, terms, conditions, and prices in effect at the time. IBM reserves the right to modify or withdraw this announcement at any time without notice. This announcement is provided for your information only. Additional terms of use are located at

<http://www.ibm.com/legal/us/en/>

For the most current information regarding IBM products, consult your IBM representative or reseller, or visit the IBM worldwide contacts page

<http://www.ibm.com/planetwide/us/>

---

## Corrections



**(Corrected on July 6, 2012)**

The Product Number section was revised.