



IBM Power Systems: Significant I/O enhancements

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At a glance

New I/O options are introduced for IBM® POWER6[™] processor-based servers:

- 19-inch 12X I/O drawers with PCIe and small form factor (SFF) bays
- 24-inch 12X I/O drawer with PCIe and optional SFF bays
- PCIe SAS adapters: one with no cache and one with cache and RAID 5/6
- PCIe 10 Gb Ethernet adapters and a 4-port asynchronous adapter
- PCI-X 1.5 GB RAID SAS (serial attached SCSI) adapter for solid state drive (SSD) and SAS disk
- Incredibly high-speed 69 GB SSD
- Power 520 CEC support for SFF disk
- Three SFF SAS disk drives
- SATA DVD for Power 520¹, 550¹, 560, and 570
- Enhanced split backplane adapter for Power 570
- New LCD monitor

For ordering, contact your IBM representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: YE001).

Overview

Numerous enhancements for POWER6 processor-based servers expand configuration options and offer I/O performance enhancements. Key enhancements include new 12X I/O drawers, new PCIe adapters, a new large cache disk adapter, and high-speed solid state drives (SSD). Additionally, the Power 520 can now support SFF disk bays in the system unit. SFF disk drives are offered for the Power 520, 550, and new 12X I/O drawers. The Power 520¹, 550¹, 560 and 570 have refreshed DVD options. The Power 570 has enhanced split backplane capabilities and a new monitor is being announced.

New 12X I/O drawers expand server I/O performance and capability in both 19-inch (#5802) and 24-inch (#5803 and #5873) environments by supporting higher-speed connections to the server and by supporting PCIe 8x adapters and SFF disks. The 24-inch I/O drawer is available with (#5803) or without SFF disk bays (#5873). New 12X DDR (Double Data Rate) cables supporting the higher-speed connection are required for the new 12X I/O drawers and are available in four lengths.

With the new 24-inch 12X I/O drawers, the Power 595 supports PCIe adapters previously available on other POWER6 servers as well as new PCIe adapters. This includes support for the 8 Gb Fibre Channel adapter (#5735) that supports NPIV, with proper OS levels.

New PCIe I/O adapters are announced for the Power 520, 550, 560, 570, 575, and 595, including:

- The PCIe Dual - x4 SAS Adapter (#5901) controls SAS disk (SFF or 3.5-inch), tape, or removable media. The PCIe adapter feature 5901 is functionally similar to the PCI-X DDR Dual - x4 SAS Adapter (#5912 and #5900).
- The PCIe 380 MB Cache Dual-4X SAS RAID Adapter (#5903) is an excellent solution for higher-performance applications controlling SAS disk (SFF or 3.5-inch) drives. It also supports SSDs. Pairs of these adapters are required when used to provide mirrored write cache data and mirrored RAID parity footprints between the adapters for superior availability. The PCIe adapter feature 5903 is functionally similar to the PCI-X DDR Dual - x4 3 Gb SAS RAID Adapter (#5902).
- Two additional PCIe 10 Gb Ethernet adapters provide either SR optic (#5769) or a CX4 twinax copper (#5732) cabling.
- The PCIe 4-Port Async EIA-232 Adapter (#5785) connects asynchronous data terminal equipment and data circuit terminating equipment.

The PCI-X DDR 1.5 GB cache SAS RAID Adapters (#5904, #5906, and #5908) have extremely large write and read caches to help SAS disk drives and SSDs provide a higher level of I/O performance to the server. This is a double-slot adapter, which includes auxiliary write cache protection. Three features are available, two for the different blind swap cassette and one without cassette. The PCI-X features 5904, 5906, and 5908 are functionally similar to the PCI-X Disk Controller 1.5 GB features 5778, 5780, and 5782, which control SCSI disk drives.

New solid state drives provide for storage and retrieval of data that is much faster than spinning disk drives. These 69 GB drives leap over bottlenecks in disk drive technology. The root cause for disk's slower performance is waiting for the movement of the disk platter and the disk arm. SSD random reads/writes can occur in microseconds, not the milliseconds that it takes for spinning drives (also called *hard disk drives* or *HDD*). I/O performance increases, resulting in overall system performance (depending upon configuration and applications).

SSD has more than just performance advantages. SSD has no moving parts, increasing its reliability. SSD has no motor and needs far less electrical power or cooling than disk drives. Moreover, unlike HDDs that are often run at 50% or less of their storage capacity to help maintain consistent performance, SSD can be run much closer to 100% storage capacity and still provide excellent performance.

The 69 GB SSD plugs into a standard SAS drive bay slot and is controlled by a SAS controller. SSD is available in two form factors, a 3.5-inch (#3586, #3587) and in SFF (#1890, #1909). The 3.5-inch SSD is used in the EXP 12S Enclosure Drawer (#5886) and is controlled by the PCI-X 1.5 GB Cache RAID adapter or a pair of PCIe 380 MB Cache RAID adapters. The 3.5-inch SSD is also used in the Power 560/570 CEC and is controlled by either the imbedded controller or the PCI-X 1.5 GB Cache controller. The SFF SSD is used in Power 520/550 CEC SFF slots and is controlled by the imbedded controller or the PCI-X 1.5 GB Cache controller.

Power 520 can be ordered with either the new eight 2.5-inch SFF SAS drive slots or the previously announced six 3.5-inch SAS drive slots. Split backplane options are supported with either SFF or 3.5-inch slots. The SFF slots can support either SFF disk drives or SSDs. System unit SFF capability is now consistent between both the Power 520¹ and 550¹. Three SFF disks are available for the Power 520 and 550 and for the new 12X I/O drawers with SFF disk bays: 10K RPM 146 GB (#1882) and 15K RPM 73.4 GB (#1883) with AIX/Linux, and 15K RPM 69.7 GB (#1884) with IBM i. All of these features are available on Power 575 except for feature 1884.

The Power 520, 550, 560, and 570 system units have refreshed DVD options using a SATA interface. Select from two DVDs: the SATA Slimline DVD-ROM Drive (#5743)

and the SATA Slimline DVD-RAM Drive (#5762). The Power 560 and 570 use a new media backplane (#5674) for support of one SATA media device in a single CEC enclosure.

The Power 560 and 570 CEC enclosures have an enhanced SAS adapter for internal Split DASD option (#5911) that supports attachment of a removable media device external to the CEC enclosure. This is in addition to providing a connection for three SAS disk drives in the system unit such as the feature 5909 provides.

A new wide-screen, flat-panel LCD monitor (#3632) replaces previously offered monitors for the Power 520, 550, 560, 570, and 595.

¹ Refer to Hardware Announcement [109-183](#), dated April 28, 2009, for Power 520/550 I/O features 1882, 1883, 1884, 1890, 1909, 3586, 3587, 5743, 5762, and 5923.

Key prerequisites

Refer to the [Software requirements](#) section.

Planned availability dates

- May 22, 2009, except for the following features:
- Feature 5802 on 8203-E4A, 8204-E8A, 8234-EMA, and 9117-MMA is available on June 19, 2009, for Argentina, Mexico, and Russia.
- Feature 5803 in quantities greater than 17 and feature 5873 in quantities greater than 16 are available on the 9119-FHA on June 9, 2009.

Description

PCIe 12X I/O Drawer (#5802)

The PCIe 12X I/O drawer is a 19-inch I/O and storage drawer containing 10 PCIe 8x I/O adapter slots and 18 SAS hot-swap small form factor (SFF) drive bays. Using 146 GB drives, the PCIe 12X I/O Drawer provides up to 2.6 TB of storage. The 18 disk bays can be organized either into one group of 18 bays (AIX/Linux), two groups of nine bays (AIX/IBM i/Linux), or four groups of four or five bays (AIX/Linux). Selecting either one or two or four groups of bays is done with a mode switch on the drawer.

These groups of SFF bays are controlled by a SAS storage adapter located in a PCIe slot in the same feature 5802. If either the one-group or two-group setting is used, each group of disk bays is controlled by one feature 5901 or one pair of feature 5903 of PCIe SAS storage adapters. If the four-group setting is used, each group of disk slots is controlled by one feature 5901 PCIe SAS storage adapter. Note each feature 5901 or each pair of feature 5903's can control up to two groups. Additional feature 5901 adapters can be added for redundancy in high availability applications where one-group and two-group configurations are installed.

The PCIe 12X I/O Drawer (#5802) is a 4 EIA unit tall, full-width drawer with physical dimensions of 444.5 mm (17.5 in) wide by 177.8 mm (7.0 in) high by 711.2 mm (28.0 in) deep for use in a 482.6 mm (19 in) rack. The PCIe adapter slots use Gen 3 blind swap cassettes and support hot plugging of adapter cards. A minimum configuration of two 12X DDR cables and two dc power cables and two SPCN cables is required to ensure proper redundancy. 12X SDR cables are not supported. The drawer attaches to the host CEC enclosure with a 12X adapter in a GX slot via 12X DDR cables available in three different cable lengths: 1.5 (#1862), 3.0 (#1865), or 8.0 meters (#1864).

POWER6 520 and POWER6 550 use GX Dual-port 12X-DDR Channel Attach (#5609) or GX Dual-port 12X-SDR Channel Attach (#5616) to attach a feature 5802 12X I/O Drawer. The feature 5608 GX adapter is not supported with the feature 5802 drawer.

The feature 5609 channel provides higher bandwidth (DDR), but is available only with 4-core or larger servers. POWER6 560 and POWER6 570 use GX Dual-Port 12X-SDR Channel Attach (#1802).

There are two 24-inch PCIe 12X I/O drawers:

- PCIe 12X I/O Drawer with SFF disk storage capacity (#5803)
- PCIe 12X I/O Drawer with no SFF disk storage capacity (#5873)

The PCIe 12X I/O drawer (#5803) is a 609.6 mm (24 inches) I/O and storage drawer containing 20 PCIe 8x I/O adapter slots and 26 SAS hot-swap SFF drive bays. Using 146 GB drives, the feature 5803 provides up to 3.8 TB storage. The 26 drive bays can be organized either into one group of 26 bays (AIX/Linux), two groups of 13 bays (AIX/IBM i/Linux), or four groups of six or seven bays (AIX/Linux). Selecting either one or two or four groups of bays is done with a mode switch on the drawer.

These groups of SFF bays are controlled by a SAS storage adapter located in a PCIe slot in the same feature 5803. If either the one-group or two-group setting is used, each group of disk bays is controlled by one feature 5901 or one pair of feature 5903 of PCIe SAS storage adapters. If the four-group setting is used, each group of disk bays is controlled by one feature 5901 PCIe SAS storage adapter. Note each feature 5901 or each pair of feature 5903 can control up to two groups.

Features 5803 and 5873 can logically be considered two I/O drawers, each with 10 PCIe slots. Each logical drawer has its own 12X connections. For highest performance/bandwidth, each half of the feature 5803 or 5873 is connected to a separate GX adapter. To increase the maximum number of PCIe slots per 12X loop, the two sides of the feature 5803 or 5873 are connected using a 0.6 M DDR 12X cable. A maximum of one feature 5803 or 5873 can be placed on the same 12X loop.

Feature 5803 or 5873 provides a 4 EIA unit tall, full-width drawer with physical dimensions of the drawer measuring 571.5 mm (22.5 in) wide by 177.8 mm (7.0 in) high by 177.2 mm (28.0 in) deep for use in a 609.6 mm (24 in) frame/rack. The adapter slots use blind swap cassettes Gen 3.0 and support hot plugging of adapter cards. A minimum configuration of three 12X DDR cables and four internal rack dc power/control cables is required to ensure proper redundancy. 12X SDR cables are not supported. The POWER6 595 server uses one or more of the GX Dual-port 12X HCA (#1816) adapters to attach to features 5803 or 5873. The drawer attaches to the host CEC enclosure with one or two 12X adapters in GX slots via 12X DDR cables available in three different cable lengths: 0.6 (#1861), 2.5 (#1863), or 8.0 meters (#1864).

12X DDR cables are required for the PCIe 12X I/O drawers.

Clients requiring exact component placement for their 4-group mode PCIe 12X PCIe I/O drawer (#5803) can use System Planning Tool (SPT), which is particularly useful for designing logical disk group partitions available April 28, 2009, and supported by Customer Specified Placement (CSP), eConfig, and IBM Manufacturing on July 14, 2009. To prevent reconfiguration in the field, we recommend that CSP be utilized when ordering feature 5802 or 5803 because of the numerous possible configurations.

PCIe Adapters

Select from the list of 16 available PCI Express adapters.

- WAN
 - PCIe 2-Line WAN with Modem (#2893, IBM i)
 - PCIe 2-Line WAN with Modem CIM (#2894, IBM i)
 - 4-Port Async EIA-232 PCIe Adapter (#5785, AIX/Linux)
- LAN

- 4-Port 10/100/1000 Base-TX PCI Express Adapter (#5717, AIX/Linux)
- 10 Gigabit Ethernet-CX4 PCI Express Adapter (#5732 AIX/Linux)
- 2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter (#5767, AIX/Linux)
- 2-Port Gigabit Ethernet-SX PCI Express Adapter (#5768, AIX/IBM i/Linux)
- 10 Gigabit Ethernet-SR PCI Express Adapter (#5769, AIX/Linux)
- 10 Gigabit Ethernet-LR PCI Express Adapter (#5772, AIX/IBM i/Linux)
- Fibre Channel
 - 8 Gigabit PCI Express Dual Port Fibre Channel Adapter (#5735, AIX/IBM i/Linux)
 - 4 Gigabit PCI Express Single Port Fibre Channel Adapter (#5773, AIX/Linux)
 - 4 Gigabit PCI Express Dual Port Fibre Channel Adapter (#5774 AIX/IBM i/Linux)
- Graphics
 - POWER[™] GXT145 PCI Express Graphics Accelerator (#5748, AIX/Linux)
- USB
 - 4 Port USB PCIe Adapter (#2728, AIX/Linux)
- SAS
 - PCIe Dual-x4 SAS Adapter (#5901, AIX/IBM i/Linux)
 - PCIe 380 MB Cache Dual-x4 3 Gb SAS RAID Adapter (#5903, AIX/Linux) (IBM i SOD)

Three 10 Gb PCIe Ethernet adapters provide a range of options to fit different client needs. All three options provide improved LAN, SAN, backbone, or clustering performance capability compared to 1 Gb Ethernet adapters. Three options also provide additional flexibility to leverage existing cabling that may already be installed, lowering site installation costs. The existing feature 5772 Long Range (LR) adapter uses single-mode (1310 nm) optical fiber for up to 10 km. The new feature 5769 Short Range (SR) adapter uses multi-mode (850 nm) optical fiber for up to 300 meters. The new feature 5732 CX4 uses twinax copper (different from the AS/400® heritage twinax cabling) for up to 15 meters. Both the feature 5769 SR and feature 5732 CX4 adapters provide Linux® with additional function compared to the feature 5772 LR adapter, including iSCSI hardware initiator support and RDMA (Remote Direct Memory Access).

PCIe 380 MB Cache RAID Adapter (#5903) details

The PCIe 380 MB Cache RAID Adapter (#5903) is a high-performance SAS controller for attaching SAS hard disk drives or solid state drives to Power servers. Its performance is due to a powerful processor in the adapter, and it is augmented by 380 MB of write cache. A pair of feature 5903's must be configured together. See the feature descriptions for more detail. The adapter has two SAS ports, which are used to attach SAS drives located in the feature 5802 or 5803 12X I/O Drawer, feature 5886 EXP 12S Disk Drawer, or Power 560/570 CEC (8234-EMA/9117-MMA). A SAS AE cable attaches the adapter port to the drive enclosure.

- A feature 3688 SAS cable provides connection into the feature 5802 or 5803 12X I/O drawer drive slots when the I/O drawer's mode switch is set for one or two groups of disk bays (not four groups)
- A SAS X cable is used to attach to a feature 5886 EXP 12S Disk Drawer.
- A SAS YR feature 3667 connects to a feature 3650 or 3651, giving access to the 560/570 drive bays.

Assuming disk drives are being controlled, each port of the adapter could be attached to a different set of drives on the same system; for example, up to:

- Two ports (two groups) of the feature 5802 or 5803
- One port of the feature 5802 or 5803 and one² EXP 12S
- Two² EXP 12S

- Two sets of 570 CEC disk drives
- One set of 570 CEC drives one² EXP 12S

Note that the paired set of feature 5903 adapters physically has four ports, but logically are thought of as just two ports.

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Additional EXP 12S can be attached by attaching two EXP 12S drawers together using SAS EE cables. A maximum of two EXP 12S drawers (up to 24 disk drives) can be attached to a port of the feature 5903 (or to a pair of ports on a pair of feature 5903's). There is a maximum of four EXP 12S drawers per adapter (or per pair of adapters).

If SSDs are attached to the feature 5903, the rules are different.

- A maximum of one EXP 12S drawer containing SSDs can be attached per pair of adapters (with a maximum of eight SSD in the feature 5886 EXP 12S). No HDDs can be located in the EXP 12S. No HDDs or SSD can be attached to the other adapter ports.
- The feature 5903 adapter can control up to three (via feature 3651 or up to six (via feature 3650 3.5-inch SSDs located in the Power 560/570 CEC)). The adapters for these drives must be located in the 560/570 CEC. No HDDs or SSDs can be attached to the other two adapter ports. No HDD can be mixed with the SSDs.

PCI-X Large Cache SAS Adapter

The PCI-X 1.5 GB Cache RAID Adapter is the most powerful SAS controller available as of 2009 for attaching SAS HDDs or SSDs to Power servers. A powerful processor augmented by 1.5 GB of write cache and 1.6 GB of read cache provides the power for the controller. See the feature descriptions for more detail.

The adapter has three SAS ports, which are used to attach SAS drives located in the feature 5886 EXP 12S Disk Drawer or Power 560/570 CEC (8234-EMA/9117-MMA) or Power 520/550 CEC (8203-E4A/8204-E8A). A SAS cable attaches the adapter port to the drive enclosure. A SAS YO cable is used to attach to a feature 5886 EXP 12S Disk Drawer. A SAS AI cable (#3679) connects to Power 520/550 or Power 560/570 drive slots. Assuming disk drives are being controlled, each port of the adapter could be attached to a different set of drives on the same system; for example, up to one of the following:

- Three³ EXP 12S,
- Two³ EXP 12S and 520/550 internal drives
- Three sets of 570 CEC disk drives
- Two sets of 570 CEC drives and one³ EXP 12S

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Additional two EXP 12S drawers can be connected together using SAS EE cables. A maximum of two EXP 12S drawers (up to 24 disk drives) can be attached to a port of the PCI-X 1.5 GB Cache RAID adapter. (Maximum of five EXP 12S drawers per adapter.)

If SSDs are attached to the feature 5904, 5906, or 5908, the rules are different.

- A maximum of one EXP 12S drawer containing SSDs can be attached per adapter (with a maximum of eight SSDs in the feature 5886 EXP 12S). No HDD can be located in the EXP 12S. No HDD or SSD can be attached to the other two adapter ports.
- Using the Power 520/550 split backplane capability, the feature 5904 adapter can control up to four SFF SSDs located in the second set of CEC disk bays, which are not controlled by the Power 520/550 embedded controller. This is an AIX/Linux option. The adapter for these drives must be located in the 520/550 CEC. No HDDs or SSDs can be attached to the other two adapter ports. No HDDs can be mixed with the SSD.
- The feature 5908 adapter can control up to three (via feature 3650) or up to six (via feature 3651) 3.5-inch SSDs located in the Power 560/570 CEC. Feature 3651 is an AIX/IBM i/Linux option and feature 3650 is an AIX/Linux option. The

adapter for these drives must be located in the 560/570 CEC. No HDD or SSD can be attached to the other two adapter ports. No HDD can be mixed with the SSD.)

The 1.5 GB Cache RAID adapter can be placed in PCI-X slots on the Power 520, 550, 560, or 570. It can also be placed in the following I/O drawers/towers with the following maximum adapters per I/O drawer/tower:

- 12X I/O drawers
 - #5796 Max 2 (#5908)
 - 7314-G30 Max 2 (#5908)
 - #5797/5798 Max 8 (#5906)
- RIO/HSL I/O drawers
 - #0595/5095 Max 2 (#5904)
 - #5094/5096 Max 1 (#5904)
 - #5294/5296 Max 2 (#5904)
 - #5790 Max 2 (#5908)

The PCI-X 1.5 GB Cache RAID Adapter (#5904/5906/5908) contains a battery that protects write cache contents in case of short power outages. The battery can be replaced while the system is running. To further protect the write cache contents, there is another 1.5 GB of cache called auxiliary write cache that is included in the adapter. If the write cache on the adapter fails, the auxiliary write cache has a copy of the data that can be retrieved and loaded onto a replacement adapter. Although the drives controlled by the adapter would not be available until the adapter is replaced, restoring the write cache can avoid the need for recovery/reload, minimizing the duration of the outage. Mirrored pairs of the PCI-X 1.5 GB Cache RAID Adapter (#5904/5906/5908) along with mirrored drives provide additional redundancy.

69 GB Solid State Drive

A 69 GB SSD is located in the same 3.5-inch or SFF SAS drive bay in which a HDD might be located in and is controlled by a SAS controller. Normal protection considerations/rules are the same for SSDs as HDDs. With AIX/Linux, mirroring or RAID 5 or RAID 6 is highly recommended. RAID 5, RAID 6, and mirroring under IBM i is required.

Use of SSD as a boot drive or load source is supported. To indicate this usage under IBM i for IBM configuration tools, use one of the load source specify features, feature 0844 or 0855.

SAS controllers that support SSD are the:

- PCI-X 1.5 GB Cache RAID Adapter (#5904, #5906, or #5908)
- PCIe 380 MB Cache RAID adapter (#5903)
- Embedded controller of Power 520/550/560/570 CEC

SSDs mounted on a 3.5-inch carrier (#3586 or #3587) can be located in the feature 5886 EXP 12S Disk Drawer or in the Power 560/570 CEC. A maximum of eight SSDs can be located in an EXP 12S Drawer and will be controlled by one PCI-X 1.5 GB Cache RAID Adapter (#5904, #5906, or #5908). Up to six SSDs can be located in the Power 560/570 CEC. When using the split backplane, three slots will be controlled by the embedded 560/570 controller and the other three slots by a feature 5908 or pair of feature 5903's with a feature 3650. If not split, the 560/570 SSD slots will be driven by either the embedded controller or the feature 5908 or a pair of feature 5903's with a feature 3651. SSDs mounted in a 2.5-inch (SFF) carrier (#1890 or #1909) can be located in the Power 520/550 SFF bays. It is almost always recommended for SSD performance that the 175 MB write cache and RAID 5/6 enabling feature 5679 be used. If the 520/550 split backplane capability is used, the second set of four SFF bays is controlled by a feature 5904.

Mixing HDDs and SDDs in the same feature 5886 EXP 12S or the same SAS controller is not supported. Mixing HDDs and SDDs in the same Power 520/550/560/570 CEC without using split backplane is supported. With split backplane, mixing HDDs and SSDs within a half of the split back plane is not supported, and using SSDs on one half and HDDs on the other half is supported.

SFF Disk Drives

Pack more HDDs in a smaller footprint using the following SAS disks.

- 146.8 GB 10K RPM SAS SFF Disk Drive (#1882, AIX/Linux)
- 73.4 GB 15K RPM SAS SFF Disk Drive (#1883, AIX/Linux)
- 69.7 GB 15K RPM SAS SFF Disk Drive (#1884, IBM i)

These SFF drives are used in the Power 520/550 CEC or feature 5802 or 5803 12X I/O Drawers.

Power 520 can be ordered with either the new eight 2.5-inch SFF SAS bays or the previously announced six 3.5-inch SAS disk bays. Split backplane options are supported with either SFF or 3.5-inch slots. The SFF bays can support either SFF disk drives or SSDs. System unit SFF capability is now consistent between both the Power 520 and 550.

Three SFF disks are available for the Power 520 or 550 and for the new 12X I/O drawers with SFF disk bays: 10K RPM 146 GB (#1882) and 15K RPM 73.4 GB (#1883) with AIX/Linux, and 15K RPM 69.7 GB (#1884) with IBM i. All of these features are available on Power 575 except for feature 1884.

The Power 520, 550, 560, and 570 system units have refreshed DVD options using a SATA interface. You can select from two DVDs: the SATA Slimline DVD-ROM Drive (#5743) and the SATA Slimline DVD-RAM Drive (#5762). The Power 560 and 570 use a new media backplane (#5674) for supporting one SATA media device in a single CEC enclosure.

The Power 570 CEC enclosure has an enhanced SAS adapter for internal Split DASD option (#5911) that supports attachment of a removable media device external to the CEC enclosure. This is in addition to providing a connection for three SAS disk drives in the system unit such as the feature 5909 provides.

A new widescreen, flat-panel LCD monitor (#3632) replaces previously offered monitors for the Power 520, 550, 560, 570, and 595.

Feature 5802 I/O Drawer feature maximum

AIX®	Linux	IBM	i
1881	18	18	
1882	18	18	
1883	18	18	
1884			18
2728	8	8	
2893		10	10
2894		10	10
5748	4	4	
5767	10	10	10
5768	10	10	10
5772	10	10	10
5717	10	10	
5769	10	10	
5732	10	10	
5774	10	10	10
5901	10	10	10
5903	10	10	10
5785	10	10	

Feature 5803 I/O Drawer feature maximum

AIX	Linux	IBM	i
1881	26	26	
1882	26	26	

1883	26	26	
1884			26
2728	8	8	
2893		20	20
2894		20	20
5748	4	4	
5767	20	20	20
5768	20	20	20
5772	20	20	20
5717	20	20	
5769	20	20	
5732	20	20	
5774	20	20	20
5901	20	20	20
5903	20	20	20
5785	18	18	

Refer to the server sales manuals for the system feature maximums.

Product positioning

PCIe 12X I/O Drawers:

The new 12X I/O drawers provide potential performance advantages and are recommended for most client configurations. Especially when attached to DDR (double data rate) GX adapters in the server, the maximum bandwidth to the drawer is significantly increased compared to the SDR (single data rate) 12X adapter. The Power 595 12X GX adapters are all DDR. The Power 575, 570, and 560 12X GX adapters are all SDR. The Power 550 and 520 (4-core and larger) can support one feature 5609 DDR 12X GX adapter.

The 24-inch PCIe 12X I/O Drawer is available either with disk bays (#5803) or diskless (#5873). If you do not require disk bays due to a SAN storage strategy or a partition mobility strategy, or if you simply need lots of PCIe slots, the diskless drawer offers a lower purchase price and lower maintenance cost compared to the disk-capable drawer.

Compared to the 24-inch PCI-X 12X I/O drawer (#5797 or #5798), the new 12X I/O drawer (#5803 or #5873) has the same number of PCI slots (20), but these are all PCIe 8x slots, which can provide higher data rates than the six PCI-X and 14 PCI-X DDR slots. Both the PCIe and PCI-X 12X I/O drawers have a maximum of one drawer per 12X loop or both can be logically split into two drawers, each half on a 12X loop. The feature 5803 has 26 SFF disk bays compared to the 16 SCSI bays of the feature 5797 or 5798, providing more disk capacity in the I/O drawer, assuming equivalent capacity drives are used in both drawers.

Also note both I/O drawers can drive 19-inch EXP 12S SAS (Serial Attached SCSI) Disk Drawers with their PCIe SAS controllers located in the 12X 24-inch I/O drawers. The feature 5803 SFF bays have more configuration flexibility than the feature 5797 or 5798. The feature 5797 or 5798 provides four imbedded disk controllers with zero write cache, no RAID 5 capability, and no support for IBM i. The feature 5803 has zero imbedded controllers, but by using either feature 5901 or by using pairs of feature 5903 SAS Disk Adapters located in its PCIe slots, you can select different levels of functionality and OS support, including highly resilient RAID 6.

Compared to the 19-inch PCI-X 12X I/O drawer (#5796 or 7314-G30), the 19-inch PCIe 12X I/O Drawer (#5802) has four more PCI slots and all 10 slots are PCIe 8x, which can provide more bandwidth than PCI-X DDR slots. However, the maximum number of PCI-X DDR 12X I/O drawers per 12X loop is four, providing $4 \times 6 = 24$ PCI-X DDR slots while the maximum PCIe 12X I/O drawers per loop is two, providing $2 \times 10 = 20$ PCIe slots. However, the total bandwidth of the PCIe 12X I/O drawer loop is higher and runs at DDR speed, while the PCI-X 12X loop runs at SDR speed. The PCI-X and PCIe 12X I/O drawers differ greatly in disk bays. The feature 5802 has 18 SFF disk bays where the feature 5796 or 7314-G30 has zero disk bays. Note both I/O drawers can drive EXP 12S SAS Disk Drawers with SAS controllers located in the 12X I/O drawers.

SAS Disk and SAS Disk Controllers

First, comparing 15k RPM to 15k RPM drives, SAS drives will be slightly faster than SCSI drives. Second, SAS disk prices and maintenance are generally better than SCSI prices. Third, IBM plans to withdraw the last SCSI disk drive from marketing later in 2009, whereas SAS drives are planned to be available for a much longer time. Thus SAS should be preferred in almost every POWER6 configuration scenario. The one exception might be if only one or two disk drives are needed and there is no additional disk growth planned. Then if there are empty SCSI slots and no empty SAS slots, the higher price and maintenance of SCSI drives is overcome by the price of SAS disk and SAS disk controller. But typically, additional drives will be needed over time and the SAS preference is obvious.

The SAS 1.5 GB Write Cache RAID Disk Controller (#5904, #5906, or #5908) provides a great alternative to the SCSI 1.5 GB Write Cache Disk controller (#5778, #5780, or #5782). Though both controllers have the same 1.5 GB write cache and 1.6 GB read cache and both are PCI-X DDR adapters, faster technology is used in the SAS controller, allowing it to provide better performance for many configurations. Note a PCIe 1.5 GB cache adapter is not announced and this may impact some I/O drawer decisions. Both SAS and SCSI controllers are double-slot cards. Both have three ports for attachment of drives, but more than one SAS EXP 12S Disk drawer can be attached to one SAS port, resulting in a larger number of SAS disk drives that can be attached to the SAS controller than SCSI drives to the SCSI controller. Only the SAS controller supports SSD. The SAS controller is supported by AIX, IBM i, and Linux, whereas the SCSI controller is supported only by IBM i. The maximum number of drives per controller is higher with the SAS controller.

The PCIe "medium" size write cache controller (380 MB, #5903) has twice the write cache of the PCI-X medium size write cache controller (175 MB, #5902). Functionally, these SAS disk adapters are very similar. Both have two SAS ports and both have the same write cache protection rules requiring pairs of controllers to be used together. Both controllers support the attachment of the EXP 12S Disk Drawer. But the PCIe controller can support SFF disk drives located in the PCIe 12X I/O drawer and it can support SSD located in an EXP 12S Disk Drawer. Both controllers are supported by AIX and Linux. A statement of direction for IBM i support of the PCIe controller has been shared.

The zero write cache controllers, PCI-X feature 5912 and PCIe feature 5901, provide essentially the same function. But the PCIe controller can support SFF disk drives located in the PCIe 12X I/O drawer. Little performance difference is expected between the two adapters in most client scenarios.

Solid state drives

Solid state drives are a new category of storage, far faster than disk and slower than memory. SSDs represent an opportunity to do things differently. This might be running an application interactively that had been a batch disk-bound job previously to provide new levels of customer service or competitive advantage. Or it might be using a mixture of SSD and HDD (hard disk drives or spinning disk), putting high-use or "hot" data on SSD and putting low-use or "cold" data on HDD to provide a solution with better price/performance than 100% SSD. Do not bother comparing the price of SSD and HDD storage on a "per GB" basis as SSD is significantly more expensive looking at just this aspect. Performance, better capacity utilization, lower energy, and mixed SSD/HDD all need to be considered together to determine this product's value to you.

Statement of general direction

By year end 2009, IBM plans to provide the following:

- A version of the 19-inch 12X I/O drawer (#5802) without the SAS SFF disk capacity.

- IBM i support for the PCIe 380 MB Cache Dual-4X SAS RAID Adapter (#5903).

All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice. Any reliance on these statements of general direction is at the relying party's sole risk and will not create liability or obligation for IBM.

Reference information

Refer to Hardware Announcement [109-183](#), dated April 28, 2009.

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=109-305>

Product number

The following are newly announced features on the specific models of the IBM Power Systems 7014, 7042, 7314, 8203, 8204, 8234, 9117, 9119, and 9125 machine types:

Description	MT	Model	Feature number
RACK SPECIFY FC 5802	7014	B42 S25 T00 T42	0303
SSD Placement Indicator - CEC	8203 8204 8234 9117	E4A E8A EMA MMA	0462
SSD Placement Indicator - 5886	8203 8204 8234 9117 9119 9125	E4A E8A EMA MMA FHA F2A	0464
Specify Load Source in #5802/5803	8203 8204 8234 9117 9119	E4A E8A EMA MMA FHA	0726
#1884 Load Source Specify	8234 9117 9119	EMA MMA FHA	0851
#3587 Load Source Specify	8234 9117 9119	EMA MMA FHA	0855
0.6 Meter 12X DDR Cable	8203 8204 8234 9117 9119 9125	E4A E8A EMA MMA FHA F2A	1861
1.5 Meter 12X DDR Cable	8203 8204 8234 9117 9125	E4A E8A EMA MMA F2A	1862
2.5 Meter 12X DDR Cable	9119 9125	FHA F2A	1863

8.0 Meter 12X DDR Cable	8203	E4A	1864
	8204	E8A	
	8234	EMA	
	9117	MMA	
	9119	FHA	
3.0 Meter 12X DDR Cable	8203	E4A	1865
	8204	E8A	
	8234	EMA	
	9117	MMA	
	9119	FHA	
146.8GB 10K RPM SAS SFF Disk Drive	8234	EMA	1882
	9117	MMA	
	9119	FHA	
	9119	FHA	
73.4 GB 15K RPM SAS SFF Disk Drive	8234	EMA	1883
	9117	MMA	
	9119	FHA	
	9125	F2A	
69.7 GB 15K RPM SAS SFF Disk Drive	8234	EMA	1884
	9117	MMA	
	9119	FHA	
	9119	FHA	
QUANTITY 150 OF #1883	9117	MMA	1891
	9119	FHA	
	9119	FHA	
QUANTITY 150 OF #1882	9117	MMA	1899
	9119	FHA	
	9119	FHA	
4 port USB PCIe Adapter	9119	FHA	2728
	9119	FHA	2893
69GB 3.5" SAS Solid State Drive	8234	EMA	3586
	9117	MMA	
	9119	FHA	
	9125	F2A	
	9119	FHA	
69GB 3.5" SAS Solid State Drive	8234	EMA	3587
	9117	MMA	
	9119	FHA	
Widescreen LCD Monitor	7042	C07	3632
		CR4	
	7314	G30	
	8203	E4A	
	8204	E8A	
	8234	EMA	
	9117	MMA	
	9119	FHA	
	9119	FHA	
	9125	F2A	
SAS SFF Cable	8203	E4A	3656
SAS Cable (AT) 0.6 Meter	8203	E4A	3688
	8204	E8A	
	8234	EMA	
	9117	MMA	
	9119	FHA	
	9125	F2A	
	8234	EMA	
	9117	MMA	
SATA Media Enclosure and Backplane	8234	EMA	5674
	9117	MMA	
4-Port 10/100/1000 Base-TX PCI Express Adapter	9119	FHA	5717
10 Gigabit Ethernet-CX4 PCI Express Adapter	8203	E4A	5732
	8204	E8A	
	8234	EMA	
	9117	MMA	
	9119	FHA	
	9125	F2A	
8 Gigabit PCI Express Dual Port Fibre Channel Adapter	9119	FHA	5735
SATA Slimline DVD-ROM Drive	8234	EMA	5743
	9117	MMA	
	9119	FHA	
POWER GXT145 PCI Express Graphics Accelerator	9119	FHA	5748
SATA Slimline DVD-RAM Drive	8234	EMA	5762
	9117	MMA	
2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter	9119	FHA	5767
2-Port Gigabit Ethernet-SX PCI Express Adapter	9119	FHA	5768
10 Gigabit Ethernet-SR PCI Express Adapter	8203	E4A	5769
	8204	E8A	
	8234	EMA	
	9117	MMA	
	9119	FHA	
	9119	FHA	
	9125	F2A	

10 Gigabit Ethernet-LR PCI Express Adapter	9119	FHA	5772
4 Gigabit PCI Express Single Port Fibre Channel Adapter	9119	FHA	5773
4 Gigabit PCI Express Dual Port Fibre Channel Adapter	9119	FHA	5774
4 Port Async EIA-232 PCIe Adapter	8203	E4A	5785
	8204	E8A	
	8234	EMA	
	9117	MMA	
	9119	FHA	
	9125	F2A	
12X I/O Drawer PCIe, SFF disk	8203	E4A	5802
	8204	E8A	
	8234	EMA	
	9117	MMA	
12X I/O Drawer PCIe, SFF disk	9119	FHA	5803
	9125	F2A	
12X I/O Drawer PCIe, no disk	9119	FHA	5873
	9125	F2A	
SAS Disk Backplane -6 slot	8234	EMA	5878
	9117	MMA	
PCIe Dual-x4 SAS Adapter	8203	E4A	5901
	8204	E8A	
	8234	EMA	
	9117	MMA	
	9119	FHA	
	9125	F2A	
PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	8203	E4A	5903
	8204	E8A	
	8234	EMA	
	9117	MMA	
	9119	FHA	
	9125	F2A	
PCI-X DDR 1.5GB Cache SAS RAID Adapter	8203	E4A	5904
	8204	E8A	
	9117	MMA	
	9119	FHA	
PCI-X DDR 1.5GB Cache SAS RAID Adapter (BSC)	9119	FHA	5906
PCI-X DDR 1.5GB Cache SAS RAID Adapter (BSC)	7314	G30	5908
	8203	E4A	
	8204	E8A	
	8234	EMA	
	9117	MMA	
	9119	FHA	
SAS adapter for internal split DASD option	8234	EMA	5911
	9117	MMA	
Non-paired PCIe SAS RAID Indicator	8234	EMA	5923
	9117	MMA	
	9119	FHA	
	9125	F2A	
UPIC Y-Cable Group, BPC to I/O Drawer at A29	9119	FHA	6973
UPIC Y-Cable Group, BPC to I/O Drawer at Z29	9119	FHA	6974
Quantity 150 of #3676	9119	FHA	7517
Quantity 150 of #3677	9119	FHA	7518
Quantity 150 of #3678	9119	FHA	7519
Quantity 150 of #3587	8234	EMA	7536
	9117	MMA	
	9119	FHA	
Quantity 150 of #1884	9117	MMA	7543
	9119	FHA	
Linux Software Preinstall	8234	EMA	8143
	9117	MMA	
Linux Software Preinstall (SDIs)	8234	EMA	8144
	9117	MMA	

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 9117-570 to 9117-MMA media devices features:

From FC:	To FC:	Return parts
7869 - Media Enclosure And Backplane	5674 - SATA Media Enclosure and Backplane	Yes
2640 - IDE Slimline DVD-ROM Drive	5743 - SATA Slimline DVD-ROM Drive	Yes

Feature conversions for 9119-590 to 9119-FHA memory features:

From FC:	To FC:	Return parts
8195 - 256GB DDR1 Memory (32 X 8GB)	8203 - 0/512 GB 533MHz DDR2 Memory Package (32x#5695)	Yes
8151 - 0/512 GB 533MHz DDR2 Memory Package	8204 - 0/512 GB 400MHz DDR2 Memory Package (16x#5696)	Yes
8153 - 0/256 GB 533MHz DDR2 Memory Package	8204 - 0/512 GB 400MHz DDR2 Memory Package (16x#5696)	Yes
8197 - 512GB DDR1 Memory (32 X 16GB Cards)	8204 - 0/512 GB 400MHz DDR2 Memory Package (16x#5696)	Yes

Feature conversions for 9119-595 to 9119-FHA memory features:

From FC:	To FC:	Return parts
8195 - 256GB DDR1 Memory (32 X 8GB)	8203 - 0/512 GB 533MHz DDR2 Memory Package (32x#5695)	Yes
8151 - 0/512 GB 533MHz DDR2 Memory Package	8204 - 0/512 GB 400MHz DDR2 Memory Package (16x#5696)	Yes
8153 - 0/256 GB 533MHz DDR2 Memory Package	8204 - 0/512 GB 400MHz DDR2 Memory Package (16x#5696)	Yes
8197 - 512GB DDR1 Memory (32 X 16GB Cards)	8204 - 0/512 GB 400MHz DDR2 Memory Package (16x#5696)	Yes

Feature conversions for 9119-FHA rack-related features:

From FC:	To FC:	Return parts
5798 - 12X I/O Drawer PCI-X, no repeater	5797 - 12X I/O Drawer PCI-X, with repeater	Yes

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.

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<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

Software requirements

See the specific feature description for the required operating system level support.

Planning information

Customer responsibilities

This product is customer setup and contains Licensed Machine Code (LIC: 2).

Security, auditability, and control

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

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

IBM Electronic Services

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.

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for problem reporting enables IBM to provide better support and service for your IBM server.

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Terms and conditions

MES Discount applicable

No. Equal to the volume commitment discount.

Field-installable features

Yes

Warranty period

This feature or features assume the same warranty or maintenance terms as the machine in which it is installed for the full warranty or maintenance period announced for such machine.

Customer setup

Yes, this product is customer setup and contains Licensed Machine Code (LIC: 2).

Licensed machine code

Same license terms and conditions as designated machine.

Prices

The following are newly announced features on the specific models of the IBM Power Systems 7014, 7042, 7314, 8203, 8204, 8234, 9117, 9119, and 9125 machine type:

Description	Model number	Feature number	Purchase price	Initial/MES/Both/Support	RP CSU	MES
RACK SPECIFY FC 5802						
	B42	0303	NC	Initial	N/A	No
	S25			Initial	N/A	No
	T00			Initial	N/A	No
	T42			Initial	N/A	No

Description	Model number	Feature number	Initial/MES/Both/Support	RP CSU	MES
Widescreen LCD Monitor					
	C07	3632	Both	Yes	No
	CR4		Both	Yes	No

Description	Model number	Feature number	Initial/MES/Both/Support	RP CSU	MES
Widescreen LCD Monitor					
	G30	3632	Both	Yes	No
PCI-X DDR 1.5GB Cache SAS RAID Adapter (BSC)					
	G30	5908	Both	Yes	No
			Initial/		

Description	Model	Feature	MES/ Both/ Support	RP CSU	MES
Machine type 8203	number	number			
SSD Placement Indicator - CEC	E4A	0462	Initial	N/A	No
SSD Placement Indicator - 5886	E4A	0464	Initial	N/A	No
Specify Load Source in #5802/5803	E4A	0726	Both	Yes	No
0.6 Meter 12X DDR Cable	E4A	1861	Both	Yes	No
1.5 Meter 12X DDR Cable	E4A	1862	Both	Yes	No
8.0 Meter 12X DDR Cable	E4A	1864	Both	Yes	No
3.0 Meter 12X DDR Cable	E4A	1865	Both	Yes	No
Widescreen LCD Monitor	E4A	3632	Both	Yes	No
SAS SFF Cable	E4A	3656	Both	Yes	No
SAS Cable (AT) 0.6 Meter	E4A	3688	Both	Yes	No
10 Gigabit Ethernet-CX4 PCI Express Adapter	E4A	5732	Both	Yes	No
10 Gigabit Ethernet-SR PCI Express Adapter	E4A	5769	Both	Yes	No
4 Port Async EIA-232 PCIe Adapter	E4A	5785	Both	Yes	No
12X I/O Drawer PCIe, SFF disk	E4A	5802	Both	Yes	No
PCIe Dual-x4 SAS Adapter	E4A	5901	Both	Yes	No
PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter	E4A	5903	Both	Yes	No
PCI-X DDR 1.5GB Cache SAS RAID Adapter	E4A	5904	Both	Yes	No
PCI-X DDR 1.5GB Cache SAS RAID Adapter (BSC)	E4A	5908	Both	Yes	No

Description	Model	Feature	MES/ Both/ Support	RP CSU	MES
Machine type 8204	number	number			
SSD Placement Indicator - CEC	E8A	0462	Initial	N/A	No
SSD Placement Indicator - 5886	E8A	0464	Initial	N/A	No
Specify Load Source in #5802/5803	E8A	0726	Both	Yes	No
0.6 Meter 12X DDR Cable	E8A	1861	Both	Yes	No
1.5 Meter 12X DDR Cable	E8A	1862	Both	Yes	No
8.0 Meter 12X DDR Cable	E8A	1864	Both	Yes	No
3.0 Meter 12X DDR Cable	E8A	1865	Both	Yes	No
Widescreen LCD Monitor	E8A	3632	Both	Yes	No
SAS Cable (AT) 0.6 Meter	E8A	3688	Both	Yes	No
10 Gigabit Ethernet-CX4 PCI Express Adapter	E8A	5732	Both	Yes	No
10 Gigabit Ethernet-SR PCI Express Adapter	E8A	5769	Both	Yes	No
4 Port Async EIA-232 PCIe Adapter	E8A	5785	Both	Yes	No
12X I/O Drawer PCIe, SFF disk	E8A	5802	Both	Yes	No
PCIe Dual-x4 SAS Adapter	E8A	5901	Both	Yes	No
PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter					

	E8A	5903	Both	Yes	No
PCI-X DDR 1.5GB Cache	SAS RAID Adapter				
	E8A	5904	Both	Yes	No
PCI-X DDR 1.5GB Cache	SAS RAID Adapter (BSC)				
	E8A	5908	Both	Yes	No

Description	Model number	Feature number	Initial/MES/Both/Support	RP	CSU	MES
SSD Placement Indicator - CEC	EMA	0462	Initial	N/A	No	
SSD Placement Indicator - 5886	EMA	0464	Initial	N/A	No	
Specify Load Source in #5802/5803	EMA	0726	Both	Yes	No	
#1884 Load Source Specify	EMA	0851	Both	Yes	No	
#3587 Load Source Specify	EMA	0855	Both	Yes	No	
0.6 Meter 12X DDR Cable	EMA	1861	Both	Yes	No	
1.5 Meter 12X DDR Cable	EMA	1862	Both	Yes	No	
8.0 Meter 12X DDR Cable	EMA	1864	Both	Yes	No	
3.0 Meter 12X DDR Cable	EMA	1865	Both	Yes	No	
146.8GB 10K RPM SAS SFF Disk Drive	EMA	1882	Both	Yes	No	
73.4 GB 15K RPM SAS SFF Disk Drive	EMA	1883	Both	Yes	No	
69.7 GB 15K RPM SAS SFF Disk Drive	EMA	1884	Both	Yes	No	
69 GB 3.5" SAS Solid State Drive	EMA	3586	Both	Yes	No	
69 GB 3.5" SAS Solid State Drive	EMA	3587	Both	Yes	No	
Widescreen LCD Monitor	EMA	3632	Both	Yes	No	
SAS Cable (AT) 0.6 Meter	EMA	3688	Both	Yes	No	
SATA Media Enclosure and Backplane	EMA	5674	Both	Yes	No	
10 Gigabit Ethernet-CX4 PCI Express Adapter	EMA	5732	Both	Yes	No	
SATA Slimline DVD-ROM Drive	EMA	5743	Both	Yes	No	
SATA Slimline DVD-RAM Drive	EMA	5762	Both	Yes	No	
10 Gigabit Ethernet-SR PCI Express Adapter	EMA	5769	Both	Yes	No	
4 Port Async EIA-232 PCIE Adapter	EMA	5785	Both	Yes	No	
12X I/O Drawer PCIE, SFF disk	EMA	5802	Both	Yes	No	
SAS Disk Backplane -6 slot	EMA	5878	Both	Yes	No	
PCIE Dual-x4 SAS Adapter	EMA	5901	Both	Yes	No	
PCIE 380MB Cache Dual - x4 3Gb SAS RAID Adapter	EMA	5903	Both	Yes	No	
PCI-X DDR 1.5GB Cache SAS RAID Adapter (BSC)	EMA	5908	Both	Yes	No	
SAS adapter for internal Split DASD option	EMA	5911	Both	Yes	No	
Non-paired PCIE SAS RAID Indicator	EMA	5923	Both	Yes	No	
Quantity 150 of #3587	EMA	7536	Both	Yes	No	
Linux Software Preinstall	EMA	8143	Initial	N/A	No	
Linux Software Preinstall (SDIs)						

Description	Model number	Feature number	Initial/MES/Both/Support	RP CSU	MES
	EMA	8144	Initial	N/A	No
Machine type 9117			Initial/MES/Both/Support	CSU	MES
SSD Placement Indicator - CEC	MMA	0462	Initial	N/A	No
SSD Placement Indicator - 5886	MMA	0464	Initial	N/A	No
Specify Load Source in #5802/5803	MMA	0726	Both	Yes	No
#1884 Load Source Specify	MMA	0851	Both	Yes	No
#3587 Load Source Specify	MMA	0855	Both	Yes	No
0.6 Meter 12X DDR Cable	MMA	1861	Both	Yes	No
1.5 Meter 12X DDR Cable	MMA	1862	Both	Yes	No
8.0 Meter 12X DDR Cable	MMA	1864	Both	Yes	No
3.0 Meter 12X DDR Cable	MMA	1865	Both	Yes	No
146.8GB 10K RPM SAS SFF Disk Drive	MMA	1882	Both	Yes	No
73.4 GB 15K RPM SAS SFF Disk Drive	MMA	1883	Both	Yes	No
69.7 GB 15K RPM SAS SFF Disk Drive	MMA	1884	Both	Yes	No
QUANTITY 150 OF #1883	MMA	1891	Both	Yes	No
QUANTITY 150 OF #1882	MMA	1899	Both	Yes	No
69 GB 3.5" SAS Solid State Drive	MMA	3586	Both	Yes	No
69 GB 3.5" SAS Solid State Drive	MMA	3587	Both	Yes	No
Widescreen LCD Monitor	MMA	3632	Both	Yes	No
SAS Cable (AT) 0.6 Meter	MMA	3688	Both	Yes	No
SATA Media Enclosure and Backplane	MMA	5674	Both	Yes	No
10 Gigabit Ethernet-CX4 PCI Express Adapter	MMA	5732	Both	Yes	No
SATA Slimline DVD-ROM Drive	MMA	5743	Both	Yes	No
SATA Slimline DVD-RAM Drive	MMA	5762	Both	Yes	No
10 Gigabit Ethernet-SR PCI Express Adapter	MMA	5769	Both	Yes	No
4 Port Async EIA-232 PCIE Adapter	MMA	5785	Both	Yes	No
12X I/O Drawer PCIE, SFF disk	MMA	5802	Both	Yes	No
SAS Disk Backplane -6 slot	MMA	5878	Both	Yes	No
PCIE Dual-x4 SAS Adapter	MMA	5901	Both	Yes	No
PCIE 380MB Cache Dual - x4 3Gb SAS RAID Adapter	MMA	5903	Both	Yes	No
PCI-X DDR 1.5GB Cache SAS RAID Adapter	MMA	5904	Both	Yes	No
PCI-X DDR 1.5GB Cache SAS RAID Adapter (BSC)	MMA	5908	Both	Yes	No
SAS adapter for internal split DASD option	MMA	5911	Both	Yes	No
Non-paired PCIE SAS RAID Indicator	MMA	5923	Both	Yes	No
Quantity 150 of #3587	MMA	7536	Both	Yes	No
Quantity 150 of #1884					

	MMA	7543	Both	Yes	No
Linux Software Preinstall					
	MMA	8143	Initial	N/A	No
Linux Software Preinstall (SDIs)					
	MMA	8144	Initial	N/A	No

Description	Model	Feature	Initial/ MES/ Both/ Support	RP	CSU	MES
Machine type 9119	number	number				
SSD Placement Indicator - 5886						
	FHA	0464	Initial	N/A	No	
Specify Load Source in #5802/5803						
	FHA	0726	Both	Yes	No	
#1884 Load Source Specify						
	FHA	0851	Both	Yes	No	
#3587 Load Source Specify						
	FHA	0855	Both	Yes	No	
0.6 Meter 12X DDR Cable						
	FHA	1861	Both	No	No	
2.5 Meter 12X DDR Cable						
	FHA	1863	Both	No	No	
8.0 Meter 12X DDR Cable						
	FHA	1864	Both	No	No	
146.8GB 10K RPM SAS SFF Disk Drive						
	FHA	1882	Both	No	No	
73.4 GB 15K RPM SAS SFF Disk Drive						
	FHA	1883	Both	No	No	
69.7 GB 15K RPM SAS SFF Disk Drive						
	FHA	1884	Both	No	No	
QUANTITY 150 OF #1883						
	FHA	1891	Both	No	No	
QUANTITY 150 OF #1882						
	FHA	1899	Both	No	No	
4 port USB PCIe Adapter						
	FHA	2728	Both	No	No	
PCIe 2-Line WAN w/Modem						
	FHA	2893	Both	No	No	
69 GB 3.5" SAS Solid State Drive						
	FHA	3586	Both	Yes	No	
69 GB 3.5" SAS Solid State Drive						
	FHA	3587	Both	Yes	No	
Widescreen LCD Monitor						
	FHA	3632	Both	Yes	No	
SAS Cable (AT) 0.6 Meter						
	FHA	3688	Both	No	No	
4-Port 10/100/1000 Base-TX PCI Express Adapter						
	FHA	5717	Both	No	No	
10 Gigabit Ethernet-CX4 PCI Express Adapter						
	FHA	5732	Both	No	No	
8 Gigabit PCI Express Dual Port Fibre Channel Adapter						
	FHA	5735	Both	No	No	
POWER GXT145 PCI Express Graphics Accelerator						
	FHA	5748	Both	No	No	
2-Port 10/100/1000 Base-TX Ethernet PCI Express Adapter						
	FHA	5767	Both	No	No	
2-Port Gigabit Ethernet-SX PCI Express Adapter						
	FHA	5768	Both	No	No	
10 Gigabit Ethernet-SR PCI Express Adapter						
	FHA	5769	Both	No	No	
10 Gigabit Ethernet-LR PCI Express Adapter						
	FHA	5772	Both	No	No	
4 Gigabit PCI Express Single Port Fibre Channel Adapter						
	FHA	5773	Both	No	No	
4 Gigabit PCI Express Dual Port Fibre Channel Adapter						
	FHA	5774	Both	No	No	
4 Port Async EIA-232 PCIe Adapter						
	FHA	5785	Both	No	No	
12X I/O Drawer PCIe, SFF disk						
	FHA	5803	Both	No	No	
12X I/O Drawer PCIe, no disk						
	FHA	5873	Both	No	No	

PCIe Dual-x4 SAS Adapter					
	FHA	5901	Both	No	No
PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter					
	FHA	5903	Both	No	No
PCI-X DDR 1.5GB Cache SAS RAID Adapter					
	FHA	5904	MES	No	No
PCI-X DDR 1.5GB Cache SAS RAID Adapter (BSC)					
	FHA	5906	Both	No	No
PCI-X DDR 1.5GB Cache SAS RAID Adapter (BSC)					
	FHA	5908	MES	No	No
Non-paired PCIe SAS RAID Indicator					
	FHA	5923	Both	Yes	No
UPIC Y-Cable Group, BPC to I/O Drawer at A29					
	FHA	6973	Both	No	No
UPIC Y-Cable Group, BPC to I/O Drawer at Z29					
	FHA	6974	Both	No	No
Quantity 150 of #3676					
	FHA	7517	Support	Yes	No
Quantity 150 of #3677					
	FHA	7518	Both	Yes	No
Quantity 150 of #3678					
	FHA	7519	Both	Yes	No
Quantity 150 of #3587					
	FHA	7536	Both	Yes	No
Quantity 150 of #1884					
	FHA	7543	Both	No	No

Description	Model	Feature	Initial/ MES/ Both/ Support	RP	CSU	MES
Machine type 9125						
SSD Placement Indicator - 5886						
	F2A	0464	Initial	N/A	No	
0.6 Meter 12X DDR Cable						
	F2A	1861	Both	No	No	
1.5 Meter 12X DDR Cable						
	F2A	1862	Both	No	No	
2.5 Meter 12X DDR Cable						
	F2A	1863	Both	No	No	
73.4 GB 15K RPM SAS SFF Disk Drive						
	F2A	1883	Both	No	No	
69 GB 3.5" SAS Solid State Drive						
	F2A	3586	Both	Yes	No	
SAS Cable (AT) 0.6 Meter						
	F2A	3688	Both	No	No	
10 Gigabit Ethernet-CX4 PCI Express Adapter						
	F2A	5732	Both	No	No	
10 Gigabit Ethernet-SR PCI Express Adapter						
	F2A	5769	Both	No	No	
4 Port Async EIA-232 PCIe Adapter						
	F2A	5785	Both	No	No	
12X I/O Drawer PCIe, SFF disk						
	F2A	5803	Both	No	No	
12X I/O Drawer PCIe, no disk						
	F2A	5873	Both	No	No	
PCIe Dual-x4 SAS Adapter						
	F2A	5901	Both	No	No	
PCIe 380MB Cache Dual - x4 3Gb SAS RAID Adapter						
	F2A	5903	Both	No	No	
Non-paired PCIe SAS RAID Indicator						
	F2A	5923	Both	Yes	No	

Machine type	Model	Feature number	Description	List price
7042	C07	3632	Widescreen LCD Monitor	\$999
7042	CR4	3632	Widescreen LCD Monitor	\$999
7314	G30	3632	Widescreen LCD Monitor	\$999

7314	G30	5908	PCI-X DDR 1.5GB cache SAS	\$8,500
8203	E4A	0462	SSD Placement Indicator CEC	\$0
8203	E4A	0464	SSD Placement Indacator 5886	\$0
8203	E4A	0726	Specify Load Source in #5802	\$0
8203	E4A	1861	0.6 Meter 12X DDR Cable	\$350
8203	E4A	1862	1.5 Meter 12X DDR Cable	\$400
8203	E4A	1864	8.0 Meter 12X DDR Cable	\$725
8203	E4A	1865	3.0 Meter 12X DDR Cable	\$475
8203	E4A	3632	Widescreen LCD Monitor	\$999
8203	E4A	3656	SAS SFF Cable	\$40
8203	E4A	3688	SAS Cable (AT) 0.6 Meter	\$90
8203	E4A	5732	10 Gigabit Ethernet-CX4 PCI	\$3,626
8203	E4A	5769	10 Gigabit Ethernet-SR PCI E	\$4,003
8203	E4A	5785	4 Port Async EIA-232 PCIe Ad	\$699
8203	E4A	5802	12X I/O Drawer PCIe, SFF dis	\$10,900
8203	E4A	5901	PCIe Dual-x4 SAS Adapter	\$749
8203	E4A	5903	PCIe Dual -x4 3Gb SAS RAID	\$2,199
8203	E4A	5904	PCI-X DDR 1.5GB CACHE SAS	\$8,500
8203	E4A	5908	PCI-X DDR 1.5GB cache SAS	\$8,500
8204	E8A	0462	SSD Placement Indicator CEC	\$0
8204	E8A	0464	SSD Placement Indicator 5887	\$0
8204	E8A	0726	Specify Load Source in #5802	\$0
8204	E8A	1861	0.6 Meter 12X DDR Cable	\$350
8204	E8A	1862	1.5 Meter 12X DDR Cable	\$400
8204	E8A	1864	8.0 Meter 12X DDR Cable	\$725
8204	E8A	1865	3.0 Meter 12X DDR Cable	\$475
8204	E8A	3632	Widescreen LCD Monitor	\$999
8204	E8A	3688	SAS Cable (AT) 0.6 Meter	\$90
8204	E8A	5732	10 Gigabit Ethernet-CX4 PCI	\$3,626

8204	E8A	5769	10 Gigabit Ethernet-SR PCI E	\$4,003
8204	E8A	5785	4 Port Async EIA-232 PCIe Ad	\$699
8204	E8A	5802	12X I/O Drawer PCIe, SFF dis	\$10,900
8204	E8A	5901	PCIe Dual-x4 SAS Adapter	\$749
8204	E8A	5903	PCIe Dual -x4 3Gb SAS RAID	\$2,199
8204	E8A	5904	PCI-X DDR 1.5GB CACHE SAS	\$8,500
8204	E8A	5908	PCI-X DDR 1.5GB cache SAS	\$8,500
8234	EMA	0462	SSD Placement Indicator CEC	\$0
8234	EMA	0464	SSD Placement Indicator 5886	\$0
8234	EMA	0726	Specify Load Source in #5802	\$0
8234	EMA	0851	1884 Load Source Specify	\$0
8234	EMA	0855	3587 Load Source Specify	\$0
8234	EMA	1861	0.6 Meter 12X DDR Cable	\$350
8234	EMA	1862	1.5 Meter 12X DDR Cable	\$400
8234	EMA	1864	8.0 Meter 12X DDR Cable	\$725
8234	EMA	1865	3.0 Meter 12X DDR Cable	\$475
8234	EMA	1882	146.8GB 10K RPM SAS SFF Disk	\$650
8234	EMA	1883	73.4GB 15K RPM SAS SFF Disk	\$498
8234	EMA	1884	69.7 GB 15K RPM SAS SFF Disk	\$498
8234	EMA	3586	69GB 3.5" SAS Solid State	\$10,000
8234	EMA	3587	69GB 3.5" SAS Solid State	\$10,000
8234	EMA	3632	Widescreen LCD Monitor	\$999
8234	EMA	3688	SAS Cable (AT) 0.6 Meter	\$90
8234	EMA	5674	SATA Media Enclosure	\$140
8234	EMA	5732	10 Gigabit Ethernet-CX4 PCI	\$3,626
8234	EMA	5743	SATA Slimline DVD-ROM Drive	\$208
8234	EMA	5762	SATA DVD-RAM Drive	\$399
8234	EMA	5769	10 Gigabit Ethernet-SR PCI E	\$4,003

8234	EMA	5785	4 Port Async EIA-232 PCIe Ad	\$699
8234	EMA	5802	12X I/O Drawer PCIe, SFF dis	\$10,900
8234	EMA	5878	SAS Disk Backplane-6slot	\$794
8234	EMA	5901	PCIe Dual-x4 SAS Adapter	\$749
8234	EMA	5903	PCIe Dual -x4 3Gb SAS RAID	\$2,199
8234	EMA	5908	PCI-X DDR 1.5GB cache SAS	\$8,500
8234	EMA	5911	SAS adapter for internal spl	\$1,058
8234	EMA	5923	Non-paired PCIe SAS RAID Ind	\$0
8234	EMA	7536	Quantity 150 of #3587	\$1,500,000
8234	EMA	8143	Linux Software Preinstall	\$60
8234	EMA	8144	Linux Software Preinstall	\$60
8234	EMA	9742	Customer Install MES	\$0
8234	EMA	9743	Notify CSO After Install	\$0
9117	MMA	0462	SSD Placement Indicator CEC	\$0
9117	MMA	0464	SSD Placement Indicator 5886	\$0
9117	MMA	0726	Specify Load Source in #5802	\$0
9117	MMA	0851	1884 Load Source Specify	\$0
9117	MMA	0855	3587 Load Source Specify	\$0
9117	MMA	1861	0.6 Meter 12X DDR Cable	\$463
9117	MMA	1862	1.5 Meter 12X DDR Cable	\$529
9117	MMA	1864	8.0 Meter 12X DDR Cable	\$960
9117	MMA	1865	3.0 Meter 12X DDR Cable	\$629
9117	MMA	1882	146.8GB 10K RPM SAS SFF Disk	\$860
9117	MMA	1883	73.4GB 15K RPM SAS SFF Disk	\$659
9117	MMA	1884	69.7 GB 15K RPM SAS SFF Disk	\$659
9117	MMA	1891	Quantity 150 of #1883	\$98,850
9117	MMA	1899	Quantity 150 of #1882	\$129,000
9117	MMA	3586	69GB 3.5" SAS Solid State	\$13,235
9117	MMA	3587	69GB 3.5" SAS Solid State	\$13,235

9117	MMA	3632	Widescreen LCD Monitor	\$1,322
9117	MMA	3688	SAS Cable (AT) 0.6 Meter	\$119
9117	MMA	5674	SATA Media Enclosure	\$185
9117	MMA	5732	10 Gigabit Ethernet-CX4 PCI	\$4,799
9117	MMA	5743	SATA Slimline DVD-ROM Drive	\$275
9117	MMA	5762	SATA DVD-RAM Drive	\$528
9117	MMA	5769	10 Gigabit Ethernet-SR PCI E	\$5,299
9117	MMA	5785	4 Port Async EIA-232 PCIe Ad	\$925
9117	MMA	5802	12X I/O Drawer PCIe, SFF dis	\$14,426
9117	MMA	5878	SAS Disk Backplane-6slot	\$1,051
9117	MMA	5901	PCIe Dual-x4 SAS Adapter	\$991
9117	MMA	5903	PCIe Dual -x4 3Gb SAS RAID	\$2,910
9117	MMA	5904	PCI-X DDR 1.5GB CACHE SAS	\$11,250
9117	MMA	5908	PCI-X DDR 1.5GB cache SAS	\$11,250
9117	MMA	5911	SAS adapter for internal spl	\$1,400
9117	MMA	5923	Non-paired PCIe SAS RAID Ind	\$0
9117	MMA	7536	Quantity 150 of #3587	\$1,985,250
9117	MMA	7543	Quantity 150 of #1884	\$98,850
9117	MMA	8143	Linux Software Preinstall	\$60
9117	MMA	8144	Linux Software Preinstall	\$60
9117	MMA	9742	Customer Install MES	\$0
9117	MMA	9743	Notify CSO After Install	\$0
9119	FHA	0464	SSD Placement Indicator 5886	\$0
9119	FHA	0726	Specify Load Source in #5802	\$0
9119	FHA	0851	1884 Load Source Specify	\$0
9119	FHA	0855	3587 Load Source Specify	\$0
9119	FHA	1861	0.6 Meter 12X DDR Cable	\$463
9119	FHA	1863	2.5 Meter 12X DDR Cable	\$650
9119	FHA	1864	8.0 Meter 12X DDR Cable	\$960

9119	FHA	1882	146.8GB 10K RPM SAS SFF Disk	\$860
9119	FHA	1883	73.4GB 15K RPM SAS SFF Disk	\$659
9119	FHA	1884	69.7 GB 15K RPM SAS SFF Disk	\$659
9119	FHA	1891	Quantity 150 of #1883	\$98,850
9119	FHA	1899	Quantity 150 of #1882	\$129,000
9119	FHA	2728	4 port USB PCIe Adapter	\$199
9119	FHA	2893	PCIe 2-LIne WAN w/Modem	\$766
9119	FHA	3586	69GB 3.5" SAS Solid State	\$13,235
9119	FHA	3587	69GB 3.5" SAS Solid State	\$13,235
9119	FHA	3632	Widescreen LCD Monitor	\$1,322
9119	FHA	3688	SAS Cable (AT) 0.6 Meter	\$119
9119	FHA	5717	4-Port 10/100/1000 Base-TX P	\$1,099
9119	FHA	5732	10 Gigabit Ethernet-CX4 PCI	\$4,799
9119	FHA	5735	8 Gigabit PCI Express Dual	\$4,631
9119	FHA	5748	Power GXT145 PCI Express	\$500
9119	FHA	5767	2-Port 10/100/1000 Base-TX E	\$699
9119	FHA	5768	2-Port Gigabit Ethernet-SX P	\$1,750
9119	FHA	5769	10 Gigabit Ethernet-SR PCI E	\$5,299
9119	FHA	5772	10 Gigabit Ethernet-LR PCI E	\$6,276
9119	FHA	5773	4 Gigabit PCI Express Single	\$1,999
9119	FHA	5774	4 Gigabit PCI Express Dual	\$3,308
9119	FHA	5785	4 Port Async EIA-232 PCIe Ad	\$925
9119	FHA	5803	12X I/O Drawer PCIe, SFF disk	\$32,000
9119	FHA	5873	12X I/O Drawer PCIe,no disk	\$28,500
9119	FHA	5901	PCIe Dual-x4 SAS Adapter	\$991
9119	FHA	5903	PCIe Dual -x4 3Gb SAS RAID	\$2,910
9119	FHA	5904	PCI-X DDR 1.5GB CACHE SAS	\$11,250

9119	FHA	5906	PCI-X DDR 1.5GB cache SAS	\$11,250
9119	FHA	5908	PCI-X DDR 1.5GB cache SAS	\$11,250
9119	FHA	5923	Non-paired PCIe SAS RAID Ind	\$0
9119	FHA	6973	UPIC Y-Cable Group, BPC	\$650
9119	FHA	6974	UPIC Y-Cable Group, BPC	\$400
9119	FHA	7517	Quantity 150 of #3676	\$98,850
9119	FHA	7518	Quantity 150 of #3677	\$98,850
9119	FHA	7519	Quantity 150 of #3678	\$228,300
9119	FHA	7536	Quantity 150 of #3587	\$1,985,250
9119	FHA	7543	Quantity 150 of #1884	\$98,850
9119	FHA	9742	Customer Install MES	\$0
9119	FHA	9743	Notify CSO After Install	\$0
9125	F2A	0464	SSD Placement Indicator 5886	\$0
9125	F2A	1861	0.6 Meter 12X DDR Cable	\$463
9125	F2A	1862	2.5 Meter 12X DDR Cable	\$529
9125	F2A	1863	2.5 Meter 12X DDR Cable	\$650
9125	F2A	1883	73.4GB 15K RPM SAS SFF Disk	\$659
9125	F2A	3586	69GB 3.5" SAS Solid State	\$13,235
9125	F2A	3688	SAS Cable (AT) 0.6 Meter	\$119
9125	F2A	5732	10 Gigabit Ethernet-CX4 PCI	\$4,799
9125	F2A	5769	10 Gigabit Ethernet-SR PCI E	\$5,299
9125	F2A	5785	4 Port Async EIA-232 PCIe Ad	\$925
9125	F2A	5803	12X I/O Drawer PCIe, SFF disk	\$32,000
9125	F2A	5873	12X I/O Drawer PCIe,no disk	\$28,500
9125	F2A	5901	PCIe Dual-x4 SAS Adapter	\$991
9125	F2A	5903	PCIe Dual -x4 3Gb SAS RAID	\$2,910
9125	F2A	5923	Non-paired PCIe SAS RAID Ind	\$0

Maintenance**MMMC:**

Type	Model	Feature number	MMMC
8203	E4A	5802	\$371
8204	E8A	5802	\$371
8234	EMA	3586	\$104
8234	EMA	3587	\$104
8234	EMA	5802	\$371
8234	EMA	7536	\$15,600
9117	MMA	3586	\$104
9117	MMA	3587	\$104
9117	MMA	5802	\$371
9117	MMA	7536	\$15,600
9119	FHA	3586	\$103
9119	FHA	3587	\$103
9119	FHA	5803	\$423
9119	FHA	5873	\$244
9119	FHA	7536	\$15,390
9125	F2A	3586	\$96
9125	F2A	5803	\$423
9125	F2A	5873	\$244

MMMC = Minimum monthly maintenance charge

Feature conversions**Feature conversions for 9117-570 to 9117-MMA media devices features:**

From FC:	To FC:	Parts returned
7869 - Media Enclosure And Backplane	5674 - SATA Media Enclosure and Backplane	Yes
2640 - IDE Slimline DVD-ROM Drive	5743 - SATA Slimline DVD-ROM Drive	Yes

Feature conversions for 9119-590 to 9119-FHA memory features:

From FC:	To FC:	Parts returned
8195 - 256GB DDR1 Memory (32 X 8GB)	8203 - 0/512 GB 533MHZ DDR2 Memory Package (32x#5695)	Yes
8151 - 0/512 GB 533MHZ DDR2 Memory Package	8204 - 0/512 GB 400MHZ DDR2 Memory Package (16x#5696)	Yes
8153 - 0/256 GB 533MHZ DDR2 Memory Package	8204 - 0/512 GB 400MHZ DDR2 Memory Package (16x#5696)	Yes
8197 - 512GB DDR1 Memory (32 X 16GB Cards)	8204 - 0/512 GB 400MHZ DDR2 Memory Package (16x#5696)	Yes

Feature conversions for 9119-595 to 9119-FHA memory features:

From FC:	To FC:	Parts returned
8195 - 256GB DDR1 Memory (32 X 8GB)	8203 - 0/512 GB 533MHZ DDR2 Memory Package (32x#5695)	Yes
8151 - 0/512 GB 533MHZ DDR2 Memory Package	8204 - 0/512 GB 400MHZ DDR2 Memory Package (16x#5696)	Yes
8153 - 0/256 GB 533MHZ DDR2 Memory Package	8204 - 0/512 GB 400MHZ DDR2 Memory Package (16x#5696)	Yes
8197 - 512GB DDR1 Memory (32 X 16GB Cards)	8204 - 0/512 GB 400MHZ DDR2 Memory Package	Yes

Feature conversions for 9119-FHA rack-related features:

From FC:	To FC:	Parts returned
5798 - 12X I/O Drawer PCI-X, no repeater	5797 - 12X I/O Drawer PCI-X, with repeater	Yes

Feature conversions:

To: Type	To: Model	From machine type	From and to feature number	Price
9117	MMA	9117	7869 to 5674	\$140
9117	MMA	9117	2640 to 5743	\$220
9119	FHA	9119	8195 to 8203	\$106,240
9119	FHA	9119	8151 to 8204	\$108,009
9119	FHA	9119	8153 to 8204	\$124,848
9119	FHA	9119	8197 to 8204	\$49,405
9119	FHA	9119	5798 to 5797	\$6,500

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Corrections**(Corrected on June 3, 2009)**

The planned availability date information for feature 5803 and feature 5873 was revised.