

# IBM Power System S922 server offers large memory footprint of up to 4 TB in a dense form factor, helps deliver high security and reliability, and is now cloud-enabled with integrated virtualization capabilities

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## At a glance

The IBM<sup>(R)</sup> Power<sup>(R)</sup> System S922 (9009-22A) server easily integrates into your organization's cloud and cognitive strategy and delivers industry-leading price/performance for your mission-critical workloads.

- Gain insights faster from your data with 4 TB in-memory database capabilities for SAP HANA, IBM Db2<sup>(R)</sup>, and Oracle.
- Deliver superior price/performance for your mission-critical applications with room to scale in IBM AIX<sup>(R)</sup>, IBM i, and Linux<sup>(R)</sup> environments.
- Help guard against security threats because of the server's features, reliability, and performance.
- Harness the integrated virtualization capabilities of the server to rapidly deploy, optimize, and recover workloads.
- Migrate from previous IBM Power Systems<sup>TM</sup> servers with Live Partition Mobility capabilities. Every new Power S922 server comes with a temporary IBM PowerVM<sup>(R)</sup> license for your old server to support a seamless move to IBM POWER9<sup>TM</sup> technology-based servers.
- Use this cloud-enabled server to build an agile, containerized cloud on a server platform that is optimized for data and cognitive services.
- Extend IBM i, the integrated operating system, and connect to the cognitive capabilities of the IBM Cloud using secure APIs.

The Power S922 server is a powerful 2-socket server that ships with up to 20 activated cores and I/O configuration flexibility to meet today's growth and tomorrow's processing needs. The server features:

- The following fully activated POWER9 processor module configurations in a 19-inch rack-mount, 2U (EIA units) form factor.
  - 4-core typical 2.8 to 3.8 GHz (max)
  - 8-core typical 3.4 to 3.9 GHz (max)
  - 10-core typical 2.9 to 3.8 GHz (max)
- Up to 4096 GB of DDR4 memory
- Storage backplane options:
  - Base Storage Backplane 8 SFF-3 Bays.

- Split feature to 4+4 SFF-3 Bays: Add a second SAS Controller.
- Expanded Function Storage Backplane 8 SFF-3 Bays/Single IOA with Write Cache.
- Optional PCIe3 NVMe carrier card with two M.2 module slots
- Expansion capabilities for the EXP12SX/EXP24SX SFF Gen2 bay Drawer
- Hot-plug PCIe Gen4 and Gen3 slots
- Integrated:
  - Service processor
  - EnergyScale™ technology
  - Hot-plug and redundant cooling
  - USB 3.0 ports
  - Two HMC ports
  - One system port with RJ45 connector
- Two hot-plug, redundant power supplies
- 19-inch rack-mounting hardware (2U)

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## Overview

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The next generation of Power Systems servers with POWER9 technology is built with innovations that can help deliver security and reliability for the data-intensive workloads of today's enterprises. POWER9 technology is designed from the ground up for data-intensive workloads like databases and analytics.

This new server generation has twice the memory footprint of IBM POWER8<sup>(R)</sup> servers, making it an ideal platform for in-memory and data-centric applications. Changes in the memory subsystem and the use of industry standard memory DIMMs take POWER9 technology to the next level by superseding a number of existing price/performance offerings. Designed to run commercial, cognitive, and database workloads, POWER9 technology provides a highly competitive server platform. Client references indicate POWER<sup>(R)</sup> servers help provide a robust and secure backbone for their IT infrastructure. More companies are using POWER technology in their IT infrastructure down from the shop level to large data center deployments.

The Power S922 server by default has its Power Management mode set to Max Performance. This mode can dynamically optimize the processor frequency at any given time based on CPU utilization and operating environmental conditions. For a description of this feature and other power management options available for this server, see the [IBM EnergyScale for POWER9 Processor-Based Systems](#) website.

The Power S922 server supports two processor sockets, offering 10-core or 20-core typical 2.9 to 3.8 GHz (max), or 8-core or 16-core typical 3.4 to 3.9 GHz (max), or 4-core typical 2.8 to 3.8 GHz (max) POWER9 configurations in a 19-inch rack-mount, 2U (EIA units) drawer configuration. All the cores are active.

The Power S922 server supports a maximum of 32 DDR4 DIMM slots. Memory features supported are 16 GB, 32 GB, 64 GB, and 128 GB, and run at different speeds of 2133, 2400, and 2666 Mbps, offering a maximum system memory of 4096 GB.

- I/O options in the system unit include:
  - Three x16 Gen4 low-profile, half-length slots (CAPI)
  - Two x8 Gen4 low-profile, half-length slots (with x16 connectors) (CAPI)
  - Two x8 Gen3 low-profile, half-length slots (with x16 connectors)
  - Two x8 Gen3 low-profile, half-length slots (One of these slots is used for the required base LAN adapter.)
  - Eight 2.5-inch SFF-3 (Gen3 carrier) disk bays

- RAID 0, 5, 6, 10, 5T2, 6T2, and 10T2 support
- PCIe3 NVMe carrier card with two M.2 module slots
- Two front and two rear USB 3.0 ports
- Service processor
- 1+1 Redundant hot-swap AC power supplies in each enclosure
- 19-inch rack-mount 2U configuration
- IBM PowerVM

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## Feature exchange

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Not applicable

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## Key prerequisites

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An IBM i or IBM AIX operating system. See the [Software requirements](#) section for details.

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## Planned availability date

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March 20, 2018

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## Description

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The POWER9 scale-out family is the first set of entry servers that comes completely cloud-enabled out of the box with integrated PowerVM Enterprise capabilities. Additionally, on-chip analytics and algorithms help clients run their workloads at an optimized processor frequency for performance and throughput. In combination with the DDR4 memory footprint of 4 TB, IBM provides systems that are unmatched by the competition in terms of memory scaling as well as the core to memory ratio needed for data-centric and in-memory workloads. Live Partition Mobility capabilities are built in to cloud-enable your POWER9 infrastructure and help you migrate from previous Power Systems. Every new S922 also has the option of a temporary PowerVM license for your old server to support a seamless move of workloads to POWER9. The Power S922 server has built-in security that can help you to be ready for current and future security threats.

The Power S922 server supports two processor sockets, offering 10-core or 20-core typical 2.9 to 3.8 GHz (max), or 8-core or 16-core typical 3.4 to 3.9 GHz (max), or 4-core typical 2.8 to 3.8 GHz (max) POWER9 processor-based configurations in a 19-inch rack-mount, 2U (EIA units) drawer configuration. All the cores are active. The Power S922 server supports a maximum of 32 DDR4 DIMM slots. Memory features supported are 16 GB, 32 GB, 64 GB, and 128 GB, allowing for a maximum system memory of 4096 GB.

### Summary of standard features for Power S922:

- POWER9 processor modules:
  - 4-core typical 2.8 to 3.8 GHz (max) POWER9 Processor (#EP16)
  - 8-core typical 3.4 to 3.9 GHz (max) POWER9 Processor (#EP18)
  - 10-core typical 2.9 to 3.8 GHz (max) POWER9 Processor (#EP19)
- High-performance Mbps DDR4 ECC memory
  - 16 GB (#EM62), 32 GB (#EM63), 64 GB (#EM64), or 128 GB (#EM65) memory features - different sizes/configurations run at different frequencies of 2133, 2400, and 2666 Mbps

- Up to 4 TB of DDR4 memory with two Power Systems processors
- Up to 2 TB of DDR4 memory with one Power Systems processor
- Storage feature: eight SFF bays, one integrated SAS controller without cache, and JBOD RAID 0, RAID 5, RAID 6, or RAID 10
  - Optionally, split the above SFF-3 bays and add a second integrated SAS controller without cache.
  - Expanded Function Storage Backplane 8 SFF-3 Bays/Single IOA with Write Cache.
  - Optionally, attach an EXP12SX/EXP24SX SAS HDD/SSD Expansion Drawer to the single IOA.
- Up to two PCIe3 NVMe carrier cards with two M.2 module slots (with up to four Mainstream 400 GB SSD NVMe M.2 modules)
  - Quantity of one PCIe3 NVMe carrier card can be ordered only with storage backplane. If a PCIe3 NVMe carrier card is ordered with a storage backplane, then the optional split feature is not supported.
- PCIe slots with single processor:
  - One x16 Gen4 low-profile, half-length slot (CAPI)
  - One x8 Gen4 low-profile, half-length slot (with x16 connector) (CAPI)
  - Two x8 Gen3 low-profile, half-length slots (with x16 connectors)
  - Two x8 Gen3 low-profile, half-length slots (One of these slots is used for the required base LAN adapter.)
- PCIe slots with two processors:
  - Three x16 Gen4 low-profile, half-length slots (CAPI)
  - Two x8 Gen4 low-profile, half-length slots (with x16 connectors) (CAPI)
  - Two x8 Gen3 low-profile, half-length slots (with x16 connectors)
  - Two x8 Gen3 low-profile, half-length slots (One of these slots is used for the required base LAN adapter.)
- Integrated:
  - Service processor
  - EnergyScale technology
  - Hot-plug and redundant cooling
  - Two front USB 3.0 ports
  - Two rear USB 3.0 ports
  - Two HMC 1 GbE RJ45 ports
  - One system port with RJ45 connector
  - Two hot-plug, redundant power supplies
  - 19-inch rack-mounting hardware (2U)

## **PowerVM**

PowerVM, which delivers industrial-strength virtualization for AIX and Linux environments on POWER processor-based systems, has been enhanced with a virtualization-oriented performance monitor, and performance statistics are available through the HMC. These performance statistics can be used to understand the workload characteristics and to prepare for capacity planning.

## **Power S922 Capacity Backup (CBU) for IBM i**

The Power S922 (9009-22A) CBU designation enables you to temporarily transfer IBM i processor license entitlements and IBM i user license entitlements purchased for a primary machine to a secondary CBU-designated system for HA/DR operations. Temporarily transferring these resources instead of purchasing them for your secondary system may result in significant savings. Processor activations cannot be transferred.

The CBU specify feature 0444 is available only as part of a new server purchase. Certain system prerequisites must be met, and system registration and approval are required before the CBU specify feature can be applied on a new server. Standard IBM i terms and conditions do not allow either IBM i processor license entitlements or IBM i user license entitlements to be transferred permanently or temporarily. These entitlements remain with the machine they were ordered for. When you register the association between your primary and on-order CBU system, you must agree to certain terms and conditions regarding the temporary transfer.

After a new CBU system is registered as a pair with the proposed primary system and the configuration is approved, you can temporarily move your optional IBM i processor license entitlement and IBM i user license entitlements from the primary system to the CBU system when the primary system is down or while the primary system processors are inactive. The CBU system can then support failover and role swapping for a full range of test, disaster recovery, and high availability scenarios. Temporary entitlement transfer means that the entitlement is a property transferred from the primary system to the CBU system and may remain in use on the CBU system as long as the registered primary and CBU system are in deployment for the high availability or disaster recovery operation. The intent of the CBU offering is to enable regular role-swap operations.

The primary systems for a Power S922 (9009-22A) CBU server with its IBM i P10 software tier can be a POWER9 or POWER8 server with a P10 or P20 software tier listed below:

- Power S824 (8286-42A)
- Power S814 6-core or 8-core (8286-41A)
- Power S822 (8284-22A)
- Power S924 (9009-42A)
- Power S914 6-core or 8-core (9009-41A)
- Power S922 (9009-22A)

The primary machine must be in the same enterprise as the CBU system. The Solution Editions are not eligible for CBU status.

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

Before you can temporarily transfer IBM i user entitlements, you must have more than the minimum number of IBM i user entitlements on a primary server. You can then transfer any IBM i user entitlements above the minimum, assuming the total IBM i users on the primary system do not require the IBM i entitlement you want to transfer during the time of the transfer. The Power S824 and S924 servers do not have user entitlements that can be transferred, and only processor license entitlements can be transferred. The minimum number of IBM i users on the POWER9 and POWER8 with IBM i user entitlements are:

- Power S814 6-core or 8-core (8286-41A): 10 users
- Power S822 (8284-22A): 10 users
- Power S914 6-core or 8-core (9009-41A): 10 users
- Power S922 (9009-22A): 10 users

For example, if you have a Power S914 6-core server as your primary system with two IBM i processor license entitlements (one above the minimum) and 40 IBM i user entitlements (30 above the minimum), you can temporarily transfer up to one IBM i entitlement and up to 30 user entitlements. During this temporary transfer, the CBU system's internal records of its total number of IBM i processor and user license entitlements is not updated, and you may see IBM i license noncompliance warning messages from the CBU system.

If your primary or CBU machine is sold or discontinued from use, any temporary entitlement transfers must be returned to the machine on which they were originally acquired. For CBU registration, terms and conditions, and further information, see the [IBM Power Systems: Capacity BackUp](#) website.

### Power S922 and IBM i

IBM i support is provided at a price-attractive P10 software tier even though the S922 has two sockets. However, there are limitations to the maximum size of the partition, and all I/O must be virtualized through VIOS. Up to four cores (real or virtual) per IBM i partition are supported. Multiple IBM i partitions can be created and run concurrently, and each individual partition can have up to four cores.

IBM i QPRCRFEAT values are the same numeric value as the processor feature code. IBM i does not support the 4-core processor feature EP16

- The 8-core processor (#EP18, QPRCRFEAT EP18) is IBM i SW tier P10.
- The 10-core processor (#EP19, QPRCRFEAT EP19) is IBM i SW tier P10.

### Power S922 system configuration

The minimum Power S922 initial order must include a processor module, two 16 GB DIMMs, two power supplies and line cords, an operating system indicator, a cover set indicator, and a Language Group Specify. Also, it must include one of the storage options and one of the network options below:

Storage options:

- For boot from NVMe: One NVMe carrier and one NVMe M.2 Module.
- For boot from local SFF-3 HDD/SDD: One storage backplane and one SFF-3 HDD or SDD.
- For boot from SAN: Internal HDD or SSD and RAID card are not required if feature 0837 (Boot from SAN) is selected. A Fibre Channel adapter must be ordered if feature 0837 is selected.

Network options:

- One PCIe2 4-port 1 Gb Ethernet adapter.
- One of the supported 10 Gb Ethernet adapters

AIX or Linux is the primary operating system. The minimum defined initial order configuration is as follows:

Feature number	Description	Quantity	Notes
EU0B	Operator Panel LCD Display	1	
Processors			
EP16	4-core typical 2.8 to 3.8 GHz (max) POWER9 Processor	1	
or			
EP18	8-core typical 3.4 to 3.9 GHz (max) POWER9 Processor	1	
or			

Feature number	Description	Quantity	Notes
EP19	10-core typical 2.9 to 3.8 GHz (max) POWER9 Processor	1	
Processor activations			
EP46	One Processor Core Activation for #EP16	4	
or			
EP48	One Processor Core Activation for #EP18	8	
or			
EP49	One Processor Core Activation for #EP19	10	
Memory DIMMs			
EM62	16 GB DDR4 Memory	2	
or			
EM63	32 GB DDR4 Memory	2	
or			
EM64	64 GB DDR4 Memory	2	
or			
EM65	128 GB DDR4 Memory	2	
Storage Backplane			
EJ1F	Storage Backplane 8 SFF-3 Bays	1	Optional split card EJ1H
or			
EC59	PCIe3 NVMe carrier card w/2 M.2 module slots	1	Must order, at a minimum, one of feature ES14
Disk Drive			
ESDB	300 GB 15K RPM SAS SFF-3 Disk Drive (AIX/Linux)	1	
LAN Adapter			
5260	PCIe2 LP 4-port 1 GbE Adapter	1	
Power supplies/ Power cord			
EB2M	AC Power Supply - 1400 W for Server (200 - 240 V AC)	2	
6458	Power Cord 4.3 m (14 ft), Drawer to IBM PDU (250V/10A)	2	6458 - (default)
9300/97xx	Language Group Specify		9300 - (default)
Front Bezel			
EJU6	Front IBM Bezel for 8-Bay BackPlane		
or			

Feature number	Description	Quantity	Notes
EJU7	Front OEM Bezel for 8-Bay BackPlane		
2146	Primary Operating System Indicator - AIX		
or			
2147	Primary Operating System Indicator - Linux		

- The racking approach for the initial order must be either a 7014-T00, 7014-T42, 7965-S42, or 7953-94Y. If an additional rack is required for I/O expansion drawers as an MES to an existing system, either a feature 0551, 0553, or ER05 rack must be ordered.
- If NVMe carrier card feature EC59 is selected, no disk units are required to be ordered. If neither feature EC59 nor feature 0837 (SAN boot) is ordered, then at least one disk unit is required to be ordered. If no HDD/SSD/SAN boot (#0837) is ordered, then feature EC59 (with at least one of #ES14) is the load source.
- Adapter feature 5260 is the default 1 Gb Ethernet adapter. Options of a 10 Gb Ethernet adapter include one of either EC2R, EC2T, EN0J, EN0L, EN0T, EN0V, or EN0X.
- Feature ES14 is not supported by IBM i virtualized through VIOS. If using IBM i (#2148), a storage option supported by IBM i with VIOS must be used with IBM i.

### Processor modules

A maximum of one processor with four processor cores (#EP16), or a maximum of two processors of either eight processor cores (#EP18), or ten processor cores (#EP19) is allowed. All processor cores must be activated. The following defines the allowed quantities of processor activation entitlements.

- One 4-core, typical 2.8 to 3.8 GHz (max) processor (#EP16) requires that four processor activation codes be ordered. A maximum of four processor activations (#EP46) is allowed.
- One 8-core, typical 3.4 to 3.9 GHz (max) processor (#EP18) requires that eight processor activation codes be ordered. A maximum of eight processor activations (#EP48) is allowed.
- Two 8-core, typical 3.4 to 3.9 GHz (max) processors (#EP18) require that sixteen processor activation codes be ordered. A maximum of 16 processor activations (#EP48) is allowed.
- One 10-core, typical 2.9 to 3.8 GHz (max) processor (#EP19) requires that ten processor activation codes be ordered. A maximum of 10 processor activation features (#EP49) is allowed.
- Two 10-core, typical 2.9 to 3.8 GHz (max) processors (#EP19) require that twenty processor activation codes be ordered. A maximum of 20 processor activation features (#EP49) is allowed.

### System memory

- A minimum of 32 GB of memory is required on the Power S922 system.
- Memory upgrades require memory pairs. Base memory is two 16 GB DDR4 memory modules (#EM62).

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

Feature description	Feature number	Minimum DIMM quantity	Maximum DIMM quantity
16 GB DDR4 Memory	EM62	0	32



Feature description	Feature number	Minimum DIMM quantity	Maximum DIMM quantity
32 GB DDR4 Memory	EM63	0	32
64 GB DDR4 Memory	EM64	0	32
128 GB DDR4 Memory	EM65	0	32

**Note:** Different sizes/configurations run at different frequencies of 2133, 2400, and 2666 Mbps.

### Power supply

- Two power supplies supporting a rack: 1+1 1400 Watt 200 - 240 Volt (#EB2M)

### Redundant fans

Redundant fans are standard.

### Power cords

Two power cords are required. A maximum of two feature 6458 cords is allowed on the system unless a valid I/O drawer or tower is attached to the system. The Power S922 server supports power cord 4.3 m (14 ft), Drawer to Wall/IBM PDU (250V/10A) in the base shipment group. See the feature listing for other options.

### PCIe slots

The Power S922 server has up to nine PCIe hot-plug slots, providing excellent configuration flexibility and expandability. For more information about the PCIe slots, see the **Rack-integrated system with I/O expansion drawer** section below.

With two POWER9 processor single-chip modules (SCM), nine PCIe slots are available: three are x16 Gen4 low-profile, half-length slots (CAPI), two are x8 Gen4 low-profile, half-length slots (with x16 connectors) (CAPI), two are x8 Gen3 low-profile, half-length slots (with x16 connectors), and two are x8 Gen3 low-profile, half-length slots (one of these slots is used for the required base LAN adapter).

With one POWER9 processor SCM, six PCIe slots are available: one is x16 Gen4 low-profile, half-length slot (CAPI), one is x8 Gen4 low-profile, half-length slot (with x16 connector) (CAPI), two are x8 Gen3 low-profile, half-length slots (with x16 connectors), and two are x8 Gen3 low-profile, half-length slots (one of these slots is used for the required base LAN adapter).

The x16 slots can provide up to twice the bandwidth of x8 slots because they offer twice as many PCIe lanes. PCIe Gen4 slots can support up to twice the bandwidth of a PCIe Gen3 slot, and PCIe Gen3 slots can support up to twice the bandwidth of a PCIe Gen2 slot, assuming an equivalent number of PCIe lanes.

At least one PCIe Ethernet adapter is required on the server by IBM to ensure proper manufacture, test, and support of the server. One of the x8 PCIe slots is used for this required adapter.

These servers are smarter about energy efficiency when cooling the PCIe adapter environment. They sense which IBM PCIe adapters are installed in their PCIe slots and, if an adapter requires higher levels of cooling, they automatically speed up fans to increase airflow across the PCIe adapters. Note that faster fans increase the sound level of the server. Higher wattage PCIe adapters include the PCIe3 SAS adapters and SSD/flash PCIe adapters (#EJ10, #EJ11, #EJ14, #EJ0J, and #EJ0M).

### SAS bays and storage backplane options

- Base Storage Backplane 8 SFF-3 Bays (#EJ1F)
- Feature EJ1H (4 + 4 SFF-3 Bays split backplane)

- Expanded function Storage Backplane 8 SFF-3 Bays/Single IOA with Write Cache (#EJ1G)

The backplane option provides SFF-3 SAS bays in the system unit. These 2.5-inch or small form factor (SFF) SAS bays can contain SAS drives (HDD or SSD) mounted on a Gen3 tray or carrier. Thus the drives are designated SFF-3. SFF-1 or SFF-2 drives do not fit in an SFF-3 bay. All SFF-3 bays support concurrent maintenance or hot-plug capability.

This backplane option uses leading-edge, integrated SAS RAID controller technology designed and patented by IBM. A custom-designed PowerPC<sup>(R)</sup> based ASIC chip is the basis of these SAS RAID controllers and provides RAID 0/RAID 5/RAID 6/RAID 10 functionality with HDDs and SSDs. Internally, SAS ports are implemented and provide plenty of bandwidth. The integrated SAS controllers are placed in dedicated slots and do not reduce the number of available PCIe slots.

The feature EJ1F Storage Backplane option provides eight SFF-3 bays and one SAS controller with zero write cache.

By optionally adding the feature EJ1H Split Backplane, a second integrated SAS controller with no write cache is provided, and the eight SFF-3 bays are logically divided into two sets of four bays. Each SAS controller independently runs one of the four-bay sets of drives.

This backplane option support HDDs or SSDs or a mixture of HDDs and SSDs in the SFF-3 bays. "Mixing" HDDs and SSDs applies even within a single set of four bays of the split backplane option. Note, if you are mixing HDDs and SSDs, they must be in separate arrays (unless using the Easy Tier<sup>(R)</sup> function).

This backplane option can offer different drive protection options: RAID 0, RAID 5, RAID 6, or RAID 10. RAID 5 requires a minimum of three drives of the same capacity. RAID 6 requires a minimum of four drives of the same capacity. RAID 10 requires a minimum of two drives. Hot spare capability is supported with RAID 5, or RAID 6, or RAID 10.

Note that RAID 5 and RAID 6 result in more drive write activity than mirroring or than unprotected drives.

This backplane option is supported by AIX, Linux, and VIOS. It is highly recommended but not required that the drives be protected.

If the client needs a change after the server is installed, the backplane option can be changed. For example, the feature EJ1H Split Backplane feature can be added to an existing feature EJ1F base storage backplane.

Unlike the hot-plug PCIe slots and SAS bays, concurrent maintenance is not available for the integrated SAS controllers. Scheduled downtime is required if a service action is required for these integrated resources.

In addition to supporting HDDs and SSDs in the SFF-3 SAS bays, the Expanded Function Storage Backplane feature EJ1G supports the optional attachment of an EXP12SX/EXP24SX drawer. All bays are accessed by both of the integrated SAS controllers. The bays support concurrent maintenance (hot plug).

### **Cable management arm**

A folding arm is attached to the server's rails at the rear of the server. The server's power cords and the cables from the PCIe adapters or integrated ports run through the arm and into the rack. The arm enables the server to be pulled forward on its rails for service access to PCIe slots, memory, processors, and so on without disconnecting the cables from the server. Approximately 1 meter (3 feet) of cord/cable length is needed for the arm.

### **Integrated I/O ports**

In addition to the integrated SAS controllers and SAS ports associated with the storage backplane, there are two HMC ports, one system port, and four USB ports. The two HMC ports are RJ45 supporting 1 Gb Ethernet connections.

The one system port is RJ45 and is supported by AIX and Linux for attaching serial devices such as an asynchronous device like a console. If the device does not have an RJ45 connection, a converter cable such as feature 3930 can provide a 9-pin D-shell connection. Note that serial devices can have very individual characteristics (different pin outs), and the feature 3930 may not be appropriate for all possible devices. In this case, the user should acquire an OEM converter cable appropriate for their device.

Four USB-3 ports are available for general client use; two are located in front and two in the rear. Additionally, there are two USB-2 ports in the service processor located in the rear of the system. These ports are for limited client use. A converter cable ECCF provides a USB-to-9-pin D-Shell connection for this function.

### **Rack-integrated system with I/O expansion drawer**

Regardless of the rack-integrated system to which the PCIe Gen3 I/O Expansion Drawer is attached, if the expansion drawer is ordered as factory integrated, the PDUs in the rack will be defaulted to be placed horizontally to enhance cable management.

Expansion drawers complicate the access to vertical PDUs if located at the same height. IBM recommends accommodating PDUs horizontally on racks containing one or more PCIe Gen3 I/O Expansion Drawers.

After the rack with expansion drawers is delivered to the client, the client is allowed to rearrange the PDUs from horizontal to vertical. However, the configurator will continue to consider the PDUs as being placed horizontally for the matter of calculating the free space still available in the rack.

Vertical PDUs can be used only if CSRP (#0469) is on the order. When specifying CSRP, the client will provide the locations where the PCIe Gen3 I/O Expansion Drawers must be placed, avoiding locating those adjacent to vertical PDU locations, EIA 6 through 16 and 21 through 31.

### **RDX docking station**

The RDX docking station EUA4 accommodates RDX removable disk cartridges of any capacity. The disk is in a protective rugged cartridge enclosure that plugs into the docking station. The docking station holds one removable rugged disk drive/cartridge at a time. The rugged removable disk cartridge and docking station performs saves, restores, and backups similar to a tape drive. This docking station can be an excellent entry capacity/performance option.

### **EXP24SX SAS Storage Enclosure (#ESLS/#ELLS)**

The EXP24SX is a storage expansion enclosure with twenty-four 2.5-inch SFF SAS bays. It supports up to 24 hot-plug HDDs or SSDs in only 2 EIA of space in a 19-inch rack. The EXP24SX SFF bays use SFF Gen2 (SFF-2) carriers or trays.

The EXP24SX drawer feature ESLS is supported on the Power S914, S922, and S924 servers by AIX, IBM i, Linux, and VIOS. The EXP24SX drawer feature ELLS is supported on the Linux-only Power L922 server.

With AIX/Linux/VIOS, the EXP24SX can be ordered with four sets of six bays (mode 4), two sets of twelve bays (mode 2), or one set of twenty-four bays (mode 1). With IBM i, only one set of twenty-four bays (mode 1) is supported. It is possible to change the mode setting in the field using software commands along with a specifically documented procedure. The predecessor EXP24S did not support this mode change in the field.

**Important:** When changing modes, a skilled, technically qualified person should follow the special documented procedures. Improperly changing modes can

potentially destroy existing RAID sets, prevent access to existing data, or allow other partitions to access another partition's existing data. Hire an expert to assist if you are not familiar with this type of reconfiguration work.

Four mini-SAS HD ports on the EXP24SX are attached to PCIe Gen3 SAS adapters or attached to an integrated SAS controller in a POWER9 scale-out server such as the Power S914, S922, or S924 servers. The following PCIe3 SAS adapters support the EXP24SX:

- PCIe3 RAID SAS Adapter Quad-port 6 Gb x8 (#EJ0J, #EJ0M, #EL3B, or #EL59)
- PCIe3 12 GB Cache RAID Plus SAS Adapter Quad-port 6 Gb x8 (#EJ14)

Earlier generation PCIe2 or PCIe1 SAS adapters are not supported with the EXP24SX.

The attachment between the EXP24SX and the PCIe3 SAS adapters or integrated SAS controllers is through SAS YO12 or X12 cables. X12 and YO12 cables are designed to support up to 12 Gb SAS. The PCIe Gen3 SAS adapters support up to 6 Gb throughput. The EXP24SX has been designed to support up to 12 Gb throughput if future SAS adapters support that capability. All ends of the YO12 and X12 cables have mini-SAS HD narrow connectors. Cable options are:

- X12 cable: 3-meter copper (#ECDJ)
- YO12 cables: 1.5-meter copper (#ECDT), 3-meter copper (#ECDU)
- 3M 100 GbE Optical Cable QSFP28 (AOC) (#EB5R)
- 5M 100 GbE Optical Cable QSFP28 (AOC) (#EB5S)
- 10M 100 GbE Optical Cable QSFP28 (AOC) (#EB5T)
- 15M 100 GbE Optical Cable QSFP28 (AOC) (#EB5U)
- 20M 100 GbE Optical Cable QSFP28 (AOC) (#EB5V)
- 30M 100 GbE Optical Cable QSFP28 (AOC) (#EB5W)
- 50M 100 GbE Optical Cable QSFP28 (AOC) (#EB5X)
- 100M 100 GbE Optical Cable QSFP28 (AOC) (#EB5Y)

An AA12 cable interconnecting a pair of PCIe3 12 GB cache adapters (two #EJ14) is not attached to the EXP24SX. These higher-bandwidth cables could support 12 Gb throughput if future adapters support that capability. Copper feature ECE0 is 0.6 meters long, ECE3 is 3 meters long, and optical AA12 feature ECE4 is 4.5-meter long.

One no-charge specify code is used with each EXP24SX I/O Drawer (#ESLS/#ELLS) to communicate to IBM configurator tools and IBM Manufacturing which mode setting, adapter, and SAS cable are needed. With this specify code, no hardware is shipped. The physical adapters, controllers, and cables must be ordered with their own chargeable feature numbers. There are more technically supported configurations than are represented by these specify codes. IBM Manufacturing and IBM configurator tools such as e-config only understand and support EXP24SX configurations represented by these specify codes.

Specify code	Mode	Adapter/ Controller	Cable to Drw	Environment
#EJW0	Mode 1	CEC SAS Ports	2 YO12 cables	AIX/IBM i/ Linux/VIOS
#EJW1	Mode 1	One (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	1 YO12 cable	AIX/IBM i/ Linux/VIOS
#EJW2	Mode 1	Two (one pair) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 YO12 cables	AIX/IBM i/ Linux/VIOS

<b>Specify code</b>	<b>Mode</b>	<b>Adapter/ Controller</b>	<b>Cable to Drw</b>	<b>Environment</b>
#EJW3	Mode 2	Two (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 X12 cables	AIX/Linux/ VIOS
#EJW4	Mode 2	Four (two pair) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 X12 cables	AIX/Linux/ VIOS
#EJW5	Mode 4	Four (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 X12 cables	AIX/Linux/ VIOS
#EJW6	Mode 2	One (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 YO12 cables	AIX/Linux/ VIOS
#EJW7	Mode 2	Two (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 YO12 cables	AIX/Linux/ VIOS
#EJWF	Mode 1	Two (one pair) #EJ14	2 YO12 cables	AIX/IBM i/ Linux/VIOS
#EJWG	Mode 2	Two (one pair) #EJ14	2 X12 cables	AIX/Linux/ VIOS
#EJWJ	Mode 2	Four (two pair) #EJ14	2 X12 cables	AIX/Linux/ VIOS
#EJWU	Mode 1	Controller EJ1G/EL67	1 YO12 cables	Linux

All of the above EXP24SX specify codes assume a full set of adapters and cables able to run all the SAS bays configured. The following specify codes communicate to IBM Manufacturing a lower-cost partial configuration is to be configured where the ordered adapters and cables can run only a portion of the SAS bays. The future MES addition of adapters and cables can enable the remaining SAS bays for growth. The following specify codes are used:

<b>Specify</b>	<b>Mode</b>	<b>Adapter/ Controller</b>	<b>Cable to Drw</b>	<b>Environment</b>
#EJWA (1/2 of #EJW7)	Mode 2	One (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	1 YO12 cables	AIX/Linux/ VIOS
#EJWB (1/2 of #EJW4)	Mode 2	Two (one pair) #EJ0J/ #EJ0M/ #EL3B/ #EL59	1 X12 cable	AIX/Linux/ VIOS
#EJWC (1/4 of #EJW5)	Mode 4	One (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	1 X12 cable	AIX/Linux/ VIOS
#EJWD (1/2 of #EJW5)	Mode 4	Two (unpaired) #EJ0J/	1 X12 cables	AIX/Linux/ VIOS

Specify	Mode	Adapter/ Controller	Cable to Drw	Environment
		#EJ0M/ #EL3B/ #EL59		
#EJWE (3/4 of #EJW5)	Mode 4	Three (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 X12 cables	AIX/Linux/ VIOS
#EJWH (1/2 of #EJWJ)	Mode 2	Two (one pair) #EJ14	1 X12 cables	AIX/Linux/ VIOS

An EXP24SX drawer in mode 4 can be attached to two or four SAS controllers and provide a great deal of configuration flexibility. For example, if using unpaired feature EJ0J adapters, these EJ0J adapters could be in the same server in the same partition, same server in different partitions, or even different servers.

An EXP24SX drawer in mode 2 has similar flexibility. If the I/O drawer is in mode 2, then half of its SAS bays can be controlled by one pair of PCIe3 SAS adapters, such as a 12 GB write cache adapter pair (#EJ14), and the other half can be controlled by a different PCIe3 SAS 12 GB write cache adapter pair or by zero-write-cache PCIe3 SAS adapters.

Note that for simplicity, IBM configurator tools such as e-config assume that the SAS bays of an individual I/O drawer are controlled by one type of SAS adapter. As a client, you have more flexibility than e-config understands.

A maximum of twenty-four 2.5-inch SSDs or 2.5-inch HDDs is supported in the EXP24SX 24 SAS bays. There can be no mixing of HDDs and SSDs in the same mode 1 drawer. HDDs and SSDs can be mixed in a mode 2 or mode 4 drawer, but they cannot be mixed within a logical split of the drawer. For example, in a mode 2 drawer with two sets of 12 bays, one set could hold SSDs and one set could hold HDDs, but you cannot mix SSDs and HDDs in the same set of 12 bays.

The indicator feature EHS2 helps IBM Manufacturing understand where SSDs are placed in a mode 2 or a mode 4 EXP24SX drawer. On one mode 2 drawer, use a quantity of one feature EHS2 to have SSDs placed in just half the bays, and use two EHS2 features to have SSDs placed in any of the bays. Similarly, on one mode 4 drawer, use a quantity of one, two, three, or four EHS2 features to indicate how many bays can have SSDs. With multiple EXP24SX orders, IBM Manufacturing will have to guess which quantity of feature ESH2 is associated with each EXP24SX. Consider using CSP (#0456) to reduce guessing.

Two-and-a-half-inch small form factor (SFF) SAS HDDs and SSDs are supported in the EXP24SX. All drives are mounted on Gen2 carriers/trays and thus named SFF-2 drives.

The EXP24SX drawer has many high-reliability design points:

- SAS drive bays that support hot swap
- Redundant and hot-plug-capable power and fan assemblies
- Dual line cords
- Redundant and hot-plug enclosure service modules (ESMs)
- Redundant data paths to all drives
- LED indicators on drives, bays, ESMs, and power supplies that support problem identification
- Through the SAS adapters/controllers, drives that can be protected with RAID and mirroring and hot-spare capability

Order two ESLA features for AC power supplies. The enclosure is shipped with adjustable depth rails and can accommodate 19-inch rack depths from 59.5 - 75 cm

(23.4 - 29.5 in.). Slot filler panels are provided for empty bays when initially shipped from IBM.

### **EXP12SX SAS Storage Enclosure (#ESLL/#ELL)**

The EXP12SX is a storage expansion enclosure with twelve 3.5-inch LFF SAS bays. It supports up to 12 hot-plug HDDs in only 2 EIA of space in a 19-inch rack. The EXP12SX SFF bays use LFF Gen1 (LFF-1) carriers/trays. The 4k byte sector drives (#4096 or #4224) are supported. SSDs are not supported.

The EXP12SX drawer feature ESLL is supported on the Power S914, S922, and S924 servers by AIX, Linux, and VIOS. The EXP24SX drawer feature ELLL is supported on the Linux-only Power L922 server.

With AIX/Linux/VIOS, the EXP12SX enclosure can be ordered with four sets of 3 bays (mode 4), two sets of 6 bays (mode 2), or one set of 12 bays (mode 1). The mode setting can be changed in the field using software commands along with a specifically documented procedure.

**Important:** When changing modes, it is very important that you follow the documented procedures. Improperly changing modes can potentially destroy existing RAID sets, prevent access to existing data, or allow other partitions to access another partition's existing data. Hire an expert to assist if you are not familiar with this type of reconfiguration work.

Four mini-SAS HD ports on the EXP12SX are attached to PCIe Gen3 SAS adapters or attached to an integrated SAS controller in a POWER9 scale-out server such as the Power S914, S922, or S924 server. The following PCIe3 SAS adapters support the EXP12SX:

- PCIe3 RAID SAS Adapter Quad-port 6 Gb x8 (#EJ0J or #EJ0M or #EL3B or #EL59)
- PCIe3 12 GB Cache RAID Plus SAS Adapter Quad-port 6 Gb x8 (#EJ14)

Earlier generation PCIe2 or PCIe1 SAS adapters are not supported with the EXP12SX drawer.

The EXP12SX drawer and the PCIe3 SAS adapters or integrated SAS controllers are attached through SAS YO12 or X12 cables. X12 and YO12 cables are designed to support up to 12 Gb. The PCIe Gen3 SAS adapters support up to 6 Gb throughput. The EXP12SX has been designed to support up to 12 Gb throughput if future SAS adapters support that capability. All ends of the YO12 and X12 cables have mini-SAS HD narrow connectors. Cable options are:

- X12 cable: 3-meter copper (#ECDJ)
- YO12 cables: 1.5-meter copper (#ECDT), 3-meter copper (#ECDU)
- 3M 100 GbE Optical Cable QSFP28 (AOC) (#EB5R)
- 5M 100 GbE Optical Cable QSFP28 (AOC) (#EB5S)
- 10M 100 GbE Optical Cable QSFP28 (AOC) (#EB5T)
- 15M 100 GbE Optical Cable QSFP28 (AOC) (#EB5U)
- 20M 100 GbE Optical Cable QSFP28 (AOC) (#EB5V)
- 30M 100 GbE Optical Cable QSFP28 (AOC) (#EB5W)
- 50M 100 GbE Optical Cable QSFP28 (AOC) (#EB5X)
- 100M 100 GbE Optical Cable QSFP28 (AOC) (#EB5Y)

An AA12 cable interconnecting a pair of PCIe3 12 GB cache adapters (two #EJ14) is not attached to the EXP12SX drawer. These higher-bandwidth cables could support 12 Gb throughput if future adapters support that capability. Copper feature ECE0 is 0.6-meter long, feature ECE3 is 3-meter long, and optical AA12 feature ECE4 is 4.5-meter long.

One no-charge specify code is used with each EXP12SX I/O Drawer (#ELL/#ESLL) to communicate to IBM configurator tools and IBM Manufacturing which mode setting, adapter, and SAS cable are needed. With this specify code, no hardware is shipped. The physical adapters, controllers, and cables must be ordered with their own chargeable feature numbers. There are more technically supported configurations than are represented by these specify codes. IBM Manufacturing and IBM configurator tools such as e-config only understand and support EXP12SX configurations represented by these specify codes.

<b>Specify</b>	<b>Mode</b>	<b>Adapter/ Controller</b>	<b>Cable to Drw</b>	<b>Environment</b>
#EJV0	Mode 1	CEC SAS Ports	2 YO12 cables	AIX/Linux/ VIOS
#EJV1	Mode 1	One (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	1 YO12 cable	AIX/Linux/ VIOS
#EJV2	Mode 1	Two (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 YO12 cables	AIX/Linux/ VIOS
#EJV3	Mode 2	Two (one pair) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 X12 cables	AIX/Linux/ VIOS
#EJV4	Mode 2	Four (two pair) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 X12 cables	AIX/Linux/ VIOS
#EJV5	Mode 4	Four (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 X12 cables	AIX/Linux/ VIOS
#EJV6	Mode 2	One (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 YO12 cables	AIX/Linux/ VIOS
#EJV7	Mode 2	Two (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 YO12 cables	AIX/Linux/ VIOS
#EJV8	Mode 1	Two #EJ14 (one pair)	2 YO12 cables	AIX/Linux/ VIOS
#EJV9	Mode 2	Two #EJ14 (one pair)	2 X12 cables	AIX/Linux/ VIOS
#EJV0	Mode 2	Four #EJ14 (two pair)	2 X12 cable	AIX/Linux/ VIOS
#EJVU	Mode 1	Controller EJ1G/EL67	1 YO12 cables	Linux

All of the above EXP12SX specify codes assume a full set of adapters and cables able to run all the SAS bays configured. The following specify codes communicate to IBM Manufacturing a lower cost, partial configuration is to be configured where the ordered adapters and cables can run only a portion of the SAS bays. The future MES addition of adapters and cables can enable the remaining SAS bays for growth. The following specify codes are used:



Specify	Mode	Adapter/ Controller	Cable to Drw	Environment
#EJVA (1/2 of #EJV7)	Mode 2	One (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	1 YO12 cables	AIX/Linux/ VIOS
#EJVB (1/2 of #EJV4)	Mode 2	One pair #EJ0J/ #EJ0M/ #EL3B/ #EL59	1 X12 cable	AIX/Linux/ VIOS
#EJVC (1/4 of #EJV5)	Mode 4	One (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	1 X12 cable	AIX/Linux/ VIOS
#EJVD (2/4 of #EJV5)	Mode 4	Two (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	1 X12 cables	AIX/Linux/ VIOS
#EJVE (3/4 of #EJV5)	Mode 4	Three (unpaired) #EJ0J/ #EJ0M/ #EL3B/ #EL59	2 X12 cables	AIX/Linux/ VIOS

An EXP12SX drawer in mode 4 can be attached to two or four SAS controllers and provide a great deal of configuration flexibility. For example, if using unpaired feature EJ0J adapters, these EJ0J adapters could be in the same server in the same partition, same server in different partitions, or even different servers.

An EXP12SX drawer in mode 2 has similar flexibility. If the I/O drawer is in mode 2, then half of its SAS bays can be controlled by one pair of PCIe3 SAS adapters, such as a 12 GB write cache adapter pair (#EJ14), and the other half can be controlled by a different PCIe3 SAS 12 GB write cache adapter pair or by zero-write-cache PCIe3 SAS adapters.

Note that for simplicity, IBM configurator tools such as e-config assume that the SAS bays of an individual I/O drawer are controlled by one type of SAS adapter. As a client, you have more flexibility than e-config understands.

The 3.5-inch large form factor (LFF) SAS HDDs are supported in the EXP24SX. All drives are mounted on Gen1 carriers/trays and thus named LFF-1 drives. Only 4k byte sector drives are supported in the EXP24SX drawer. The 5xx byte sector drives are not announced or planned. Drives are 7200 rpm and sometimes referred to as *nearline*. These drives provide excellent cost per gigabyte. Note that formatting or rebuilding arrays on large disk drives can take hours. If higher performance is required, consider higher rpm disks or SSDs in the EXP24SX drawer.

EXP12SX drives for feature ESLL (multi-OS) are the 3.86 TB/4.0 TB 4k 7200 RPM (#ES62) and 7.72 TB/8.0 TB 4k 7200 RPM (#ES64) drives. Drives for feature ELLL (Linux-only) are the 3.86 TB/4.0 TB 4k 7200 RPM (#EL62) and the 7.72 TB/8.0 TB 4k 7200 RPM (#EL64) drives.

The EXP12SX drawer has many high-reliability design points:

- SAS bays that support hot swap
- Redundant and hot-plug power and fan assemblies
- Dual line cords
- Redundant and hot-plug ESMs

- Redundant data paths to all drives
- LED indicators on drives, bays, ESMS, and power supplies that support problem identification
- Through the SAS adapters/controllers, drives that can be protected with RAID and mirroring and hot-spare capability

Order two ESLA features for AC power supplies. The enclosure is shipped with adjustable depth rails and can accommodate 19-inch rack depths from 59.5 - 75 cm (23.4 - 29.5 in.). Slot filler panels are provided for empty bays when initially shipped from IBM.

EXP24SX and EXP12SX enclosures can be mixed on the same server. EXP24SX and EXP12SX enclosures can be mixed on the same PCIe3 adapter.

### PCIe Gen3 I/O Drawer Cabling Option

A copper cabling option (#ECCS) is available for the scale-out servers. The cable option offers a much lower-cost connection between the server and the PCIe Gen3 I/O drawer fanout modules. The currently available Active Optical Cable (AOC) offers much longer length cables, providing rack placement flexibility. Plus AOC cables are much thinner and have tighter bend radius and thus are much easier to cable in the rack.

The 3M Copper CXP Cable Pair (#ECCS) has the same performance and same reliability, availability, and serviceability (RAS) characteristics as the AOC cables. One copper cable length of 3 m is offered. Note that the cable management arm of the scale-out servers requires about 1 m of cable.

Like the AOC cable pair, the copper pair is cabled in the same manner. One cable attaches to the top CXP port in the PCIe adapter in the x16 PCIe slot in the server system unit and then attaches to the top CXP port in the fanout module in the I/O drawer. Its cable pair attaches to the bottom CXP port of the same PCIe adapter and to the bottom CXP port of the same fanout module. Note that the PCIe adapter providing the CXP ports on the server was named a PCIe3 "Optical" Cable Adapter. In hindsight, this naming was unfortunate as the adapter's CXP ports are not unique to optical. But at the time, optical cables were the only connection option planned.

Copper and AOC cabling can be mixed on the same server. However, they cannot be mixed on the same PCIe Gen3 I/O drawer or mixed on the same fanout module.

Copper cables have the same operating system software prerequisites as AOC cables.

### High-function (switched and monitored) PDUs

The high-function PDUs (power distribution units) provide switching, better monitoring, and 50% more C19 receptacles than previous Power System PDUs. Depending on country wiring standards, either two or four full-price features are orderable.

	<b>208 V 3-phase delta</b>	<b>200 V -240 V 1-phase or 3-phase wye</b>
<b>12 x C13</b>	#EPTQ	#EPTN
<b>9 x C19</b>	#EPTL	#EPTJ

These PDUs can be mounted vertically in rack-side pockets or they can be mounted horizontally. If mounted horizontally, they each use 1 EIA (1U) of rack space. See feature EPTH for horizontal mounting hardware, which is used when IBM Manufacturing doesn't automatically factory-install the PDU. Two RJ45 ports on the front of the PDU enable the client to monitor each receptacle's electrical power usage and to remotely switch any receptacle on or off. The PDU is shipped with a generic PDU password, and IBM strongly urges clients to change it upon installation. These PDUs do provide the same low price as the low-function 12xC13 PDU feature (#7188).

### Reliability, Availability, and Serviceability

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

The reliability of systems starts with components, devices, and subsystems that are designed to be highly reliable. During the design and development process, subsystems go through rigorous verification and integration testing processes. During system manufacturing, systems go through a thorough testing process to help ensure the highest level of product quality.

### **Memory subsystem RAS**

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

### **Mutual surveillance**

The service processor monitors the operation of the firmware during the boot process and also monitors the hypervisor for termination. The hypervisor monitors the service processor and reports a service reference code when it detects surveillance loss. In the PowerVM environment, it will perform a reset/reload if it detects the loss of the service processor.

### **Environmental monitoring functions**

The Power Systems family does ambient and over temperature monitoring and reporting.

### **POWER9 processor functions**

As in POWER8, the POWER9 processor has the ability to do processor instruction retry for some transient errors.

### **Cache availability**

The L2 and L3 caches in the POWER9 processor in the memory buffer chip are protected with double-bit detect, single-bit correct error detection code (ECC). In addition, a threshold of correctable errors detected on cache lines can result in the data in the cache lines being purged and the cache lines removed from further operation without requiring a reboot in the PowerVM environment.

Modified data would be handled through Special Uncorrectable Error handling. L1 data and instruction caches also have a retry capability for intermittent errors and a cache set delete mechanism for handling solid failures.

### **Special Uncorrectable Error handling**

Special Uncorrectable Error (SUE) handling prevents an uncorrectable error in memory or cache from immediately causing the system to terminate. Rather, the system tags the data and determines whether it will ever be used again. If the error is irrelevant, it will not force a check stop. If the data is used, termination may be limited to the program/kernel or hypervisor owning the data; or the I/O adapters controlled by an I/O hub controller would freeze if data were transferred to an I/O device.

### **PCI extended error handling**

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

### **Uncorrectable error recovery**

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

## **Serviceability**

The purpose of serviceability is to efficiently repair the system while attempting to minimize or eliminate impact to system operation. Serviceability includes system installation, MES (system upgrades/downgrades), and system maintenance/repair. Depending upon the system and warranty contract, service may be performed by the client, an IBM representative, or an authorized warranty service provider.

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

- Design for Customer Set Up (CSU), Customer Installed Features (CIF), and Customer Replaceable Units (CRU)
- Error Detection and Fault Isolation (ED/FI)
- First Failure Data Capture (FFDC)
- Lightpath service indicators
- Service labels and service diagrams available on the system and delivered through IBM Knowledge Center
- Step-by-step service procedures documented in IBM Knowledge Center or available through the Hardware Management Console
- Automatic reporting of serviceable events to IBM through the Electronic Service Agent™ Call Home application
- CRU videos planned to be available on the web at general availability
- Mobile access to important customer service functions available by scanning a QR label

## **Service environment**

In the PowerVM environment, the HMC is a dedicated server that provides functions for configuring and managing servers for either partitioned or full-system partition using a GUI or command-line interface (CLI) or REST API. An HMC attached to the system allows support personnel (with client authorization) to remotely, or locally to the physical HMC that is in proximity of the server being serviced, log in to review error logs and perform remote maintenance if required.

The POWER9 processor-based platforms support several service environments:

- Attachment to one or more HMCs or vHMCs is a supported option by the system with PowerVM. This is the default configuration for servers supporting logical partitions with dedicated or virtual I/O. In this case, all servers have at least one logical partition.
- For non-HMC systems.
  - Full-system partition with PowerVM: A single partition owns all the server resources, and only one operating system may be installed. The primary service interface is through the operating system and the service processor.

## **Service interface**

Support personnel can use the service interface to communicate with the service support applications in a server using an operator console, a graphical user interface on the management console or service processor, or an operating system terminal. The service interface helps to deliver a clear, concise view of available service applications, helping the support team to manage system resources and service information in an efficient and effective way. Applications available through the service interface are carefully configured and placed to give service providers access to important service functions.

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

- LEDs
- Operator Panel
- Service Processor menu
- Operating system service menu
- Service Focal Point on the HMC or vHMC with PowerVM

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

### **First Failure Data Capture and error data analysis**

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

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

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

### **Diagnostics**

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

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

### **Automatic diagnostics**

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

### **Stand-alone diagnostics with PowerVM**

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

- Booting from the diagnostics CD, DVD, USB, or network
- Interactively selecting steps from a list of choices

### **Concurrent maintenance**

The determination of whether a firmware release can be updated concurrently is identified in the readme information file that is released with the firmware. An HMC is required for the concurrent firmware update with PowerVM. In addition,

concurrent maintenance of PCIe adapters is supported with PowerVM. Concurrent maintenance of the Operator Panel is supported through ASMI. Additional concurrent maintenance includes power supplies, fans, and HDD/SSD drives.

## Service labels

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

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

## QR labels

QR labels are placed on the system to provide access to key service functions through a mobile device. When the QR label is scanned, it will go to a landing page specific to that server which contains many of the service functions of interest while physically located at the server. These include things such as installation and repair instructions, service diagrams, reference code look up, and so on.

## Packaging for service

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

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

## Error handling and reporting

In the event of system hardware or environmentally induced failure, the system runtime error capture capability systematically analyzes the hardware error signature to determine the cause of failure. The analysis result will be stored in system NVRAM. When the system can be successfully restarted either manually or automatically, or if the system continues to operate, the error will be reported to the operating system. Hardware and software failures are recorded in the system log. When an HMC is attached in the PowerVM environment, an ELA routine analyzes the error, forwards the event to the Service Focal Point (SFP) application running

on the HMC, and notifies the system administrator that it has isolated a likely cause of the system problem. The service processor event log also records unrecoverable checkstop conditions, forwards them to the SFP application, and notifies the system administrator.

The system has the ability to call home through the operating system to report platform-recoverable errors and errors associated with PCI adapters/devices.

In the HMC-managed environment, a call home service request will be initiated from the HMC and the pertinent failure data with service parts information and part locations will be sent to an IBM service organization. Customer contact information and specific system-related data such as the machine type, model, and serial number, along with error log data related to the failure, are sent to IBM Service.

### **Live Partition Mobility**

With Live Partition Mobility, users can migrate an AIX or IBM i partition running on one POWER partition system to another POWER system without disrupting services. The migration transfers the entire system environment, including processor state, memory, attached virtual devices, and connected users. It provides continuous operating system and application availability during planned partition outages for repair of hardware and firmware faults.

### **Service processor**

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

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

### **Call home**

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

### **IBM Electronic Services**

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

System configuration and inventory information collected by Electronic Service Agent also can be viewed on the secure Electronic Services web portal and used to improve problem determination and resolution between the client and the IBM support team. As part of an increased focus to provide even better service to IBM clients, Electronic Service Agent tool configuration and activation comes standard

with the system. In support of this effort, a new HMC External Connectivity security whitepaper has been published, which describes data exchanges between the HMC and the IBM Service Delivery Center (SDC) and the methods and protocols for this exchange. To read the whitepaper and prepare for Electronic Service Agent installation, see the "Security" section at the [IBM Electronic Service Agent](#) website.

Select your country. Click "IBM Electronic Service Agent Connectivity Guide."

### **Benefits: increased uptime**

Electronic Service Agent is designed to enhance the warranty and maintenance service by potentially providing faster hardware error reporting and uploading system information to IBM Support. This can optimize the time monitoring the symptoms, diagnosing the error, and manually calling IBM Support to open a problem record. And 24x7 monitoring and reporting means no more dependency on human intervention or off-hours client personnel when errors are encountered in the middle of the night.

**Security:** The Electronic Service Agent tool is designed to help secure the monitoring, reporting, and storing of the data at IBM. The Electronic Service Agent tool is designed to help securely transmit either through the internet (HTTPS or VPN) or modem to provide clients a single point of exit from their site. Communication is one way. Activating Electronic Service Agent does not enable IBM to call into a client's system.

For additional information, see the [IBM Electronic Service Agent](#) website.

### **More accurate reporting**

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

### **Customized support**

By using the IBMid entered during activation, clients can view system and support information in the "My Systems" and "Premium Search" sections of the Electronic Services website.

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

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

For more information on how to utilize the power of IBM Electronic Services, see the following website or contact an [IBM Systems Services Representative](#).

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

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A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be found on the [Product accessibility information](#) website.

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## Section 508 of the US Rehabilitation Act

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The Power S922 server (9009-22A) is capable as of March 20, 2018, when used in accordance with IBM's associated documentation, of satisfying the applicable requirements of Section 508 of the Rehabilitation Act, provided that any assistive technology used with the product properly interoperates with it. A US Section 508 Voluntary Product Accessibility Template (VPAT) can be found on the [Product accessibility information](#) website.

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## Product positioning

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IBM is leading the cognitive and cloud space. Integrated cloud capabilities in POWER9 go in line with IBM's cloud strategy and enable you to connect current enterprise data with cloud-based AI or analytics offerings like Watson™. IBM gives you best-in-class on-premises cloud deployment possibilities with this announcement in addition to the off-premises portfolio already maintained. And IBM applies that innovation to cognitive infrastructure, helping you on your journey to AI.

IBM aligns cutting-edge innovation with enterprise dependability: IBM has over 105 years of aligning continuous innovation with clients' business needs.

The POWER9 scale-out family delivers a set of entry servers that comes cloud enabled out of the box with integrated PowerVM Enterprise capabilities. Additionally, on-chip analytics and algorithms help clients run their workloads at an optimized processor frequency for performance and throughput. In combination with the DDR4 memory footprint of 4 TB, IBM provides systems that are unmatched by the competition in terms of memory scaling as well as the core to memory ratio needed for data-centric and in-memory workloads. Live Partition Mobility capabilities are built in to cloud-enable your POWER9 infrastructure and help you migrate from previous Power Systems. Every new S922 also has the option of a temporary PowerVM license for your old server to support a seamless move of workloads to POWER9. The new server has built-in security that can help you be ready for current and future security threats.

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## Statement of general direction

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### IBM Power System S922 (9009-22A) for SAP HANA production use

IBM intends to support SAP HANA on the IBM Power System S922 server (9009-22A) in production mode, with the following Linux operating systems, following near-term certification of the environment:

- Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.4
- SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 SP3

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 remain at our sole discretion.

## Product number

The following are newly announced features on the specific models of the IBM Power Systems 9009 machine type:

Description	Machine type	Model	Feature number
IBM Power System S922	9009	22A	
One CSC Billing Unit	9009	22A	0010
Ten CSC Billing Units	9009	22A	0011
AIX Partition Specify	9009	22A	0265
Linux Partition Specify	9009	22A	0266
IBM i Operating System Partition Specify	9009	22A	0267
V.24/EIA232 6.1m (20-Ft) PCI Cable	9009	22A	0348
V.35 6.1m (20-Ft) PCI Cable	9009	22A	0353
X.21 6.1m (20-Ft) PCI Cable	9009	22A	0359
CBU Specify	9009	22A	0444
Customer Specified Placement	9009	22A	0456
19 inch, 1.8 meter high rack	9009	22A	0551
19 inch, 2.0 meter high rack	9009	22A	0553
Rack Filler Panel Kit	9009	22A	0599
Load Source Not in CEC	9009	22A	0719
SAN Load Source Specify	9009	22A	0837
US TAA Compliance Indicator	9009	22A	0983
Product assembled in USA manufacturing plant	9009	22A	0984
Modem Cable - US/Canada and General Use	9009	22A	1025
USB 500 GB Removable Disk Drive	9009	22A	1107
Custom Service Specify, Rochester Minn, USA	9009	22A	1140
Quantity 150 of #1964	9009	22A	1818
Quantity 150 of #1953	9009	22A	1929
300GB 15k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9009	22A	1953
600GB 10k RPM SAS SFF-2 Disk Drive (AIX/Linux)	9009	22A	1964
Primary OS - AIX	9009	22A	2146
Primary OS - Linux	9009	22A	2147
IBM i with VIOS Only System Indicator	9009	22A	2148
Factory Deconfiguration of 1-core	9009	22A	2319
2M LC-SC 50 Micron Fiber Converter Cable	9009	22A	2456
2M LC-SC 62.5 Micron Fiber Converter Cable	9009	22A	2459
3M Asynchronous Terminal/Printer Cable EIA-232	9009	22A	2934
Asynchronous Cable EIA-232/V.24 3M	9009	22A	2936
Serial-to-Serial Port Cable for Drawer/Drawer- 3.7M	9009	22A	3124
Serial-to-Serial Port Cable for Rack/Rack- 8M	9009	22A	3125
Widescreen LCD Monitor	9009	22A	3632
0.3M Serial Port Converter Cable, 9-Pin to 25-Pin	9009	22A	3925
Serial Port Null Modem Cable, 9-pin to 9-pin, 3.7M	9009	22A	3927
Serial Port Null Modem Cable, 9-pin to 9-pin, 10M	9009	22A	3928
System Serial Port Converter Cable	9009	22A	3930
1.8 M (6-ft) Extender Cable for Displays (15-pin D-shell to 15-pin D-shell)	9009	22A	4242
Extender Cable - USB Keyboards, 1.8M	9009	22A	4256
VGA to DVI Connection Converter	9009	22A	4276
Rack Integration Services: BP only	9009	22A	4648
Rack Integration Services	9009	22A	4649
Rack Indicator- Not Factory Integrated	9009	22A	4650
Rack Indicator, Rack #1	9009	22A	4651
Rack Indicator, Rack #2	9009	22A	4652
Rack Indicator, Rack #3	9009	22A	4653
Rack Indicator, Rack #4	9009	22A	4654
Rack Indicator, Rack #5	9009	22A	4655
Rack Indicator, Rack #6	9009	22A	4656
Rack Indicator, Rack #7	9009	22A	4657

Rack Indicator, Rack #8	9009	22A	4658
Rack Indicator, Rack #9	9009	22A	4659
Rack Indicator, Rack #10	9009	22A	4660
Rack Indicator, Rack #11	9009	22A	4661
Rack Indicator, Rack #12	9009	22A	4662
Rack Indicator, Rack #13	9009	22A	4663
Rack Indicator, Rack #14	9009	22A	4664
Rack Indicator, Rack #15	9009	22A	4665
Rack Indicator, Rack #16	9009	22A	4666
Power Active Memory Expansion Enablement	9009	22A	4793
Software Preload Required	9009	22A	5000
PowerVM Enterprise Edition	9009	22A	5228
PCIe2 LP 4-port 1GbE Adapter	9009	22A	5260
PCIe LP POWER GXT145 Graphics Accelerator	9009	22A	5269
PCIe LP 8Gb 2-Port Fibre Channel Adapter	9009	22A	5273
PCIe2 8Gb 4-port Fibre Channel Adapter	9009	22A	5729
8 Gigabit PCI Express Dual Port Fibre Channel Adapter	9009	22A	5735
4 Port Async EIA-232 PCIe Adapter	9009	22A	5785
PCIe2 4-port 1GbE Adapter	9009	22A	5899
Opt Front Door for 1.8m Rack	9009	22A	6068
Opt Front Door for 2.0m Rack	9009	22A	6069
1.8m Rack Acoustic Doors	9009	22A	6248
2.0m Rack Acoustic Doors	9009	22A	6249
1.8m Rack Trim Kit	9009	22A	6263
2.0m Rack Trim Kit	9009	22A	6272
Power Cord 4.3m (14-ft), Drawer to IBM PDU (250V/10A)	9009	22A	6458
Power Cord 4.3m (14-ft), Drawer To OEM PDU (125V, 15A)	9009	22A	6460
Power Cord 4.3m (14-ft), Drawer to wall/OEM PDU (250V/15A) U. S.	9009	22A	6469
Power Cord 1.8m (6-ft), Drawer to wall (125V/15A)	9009	22A	6470
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU (250V/10A)	9009	22A	6471
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU (250V/16A)	9009	22A	6472
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU (250V/10A)	9009	22A	6473
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/13A)	9009	22A	6474
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/16A)	9009	22A	6475
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/10A)	9009	22A	6476
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/16A)	9009	22A	6477
Power Cord 2.7 M(9-foot), To wall/OEM PDU, (250V, 16A)	9009	22A	6478
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (125V/15A or 250V/10A )	9009	22A	6488
4.3m (14-Ft) 3PH/24A 380-415V Power Cord	9009	22A	6489
4.3m (14-Ft) 1PH/63A 200-240V Power Cord	9009	22A	6491
4.3m (14-Ft) 1PH/48-60A 200-240V Power Cord	9009	22A	6492
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/10A)	9009	22A	6493
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/10A)	9009	22A	6494
Power Cord 2.7M (9-foot), To wall/OEM PDU, (250V, 10A)	9009	22A	6496
Power Cable - Drawer to IBM PDU, 200-240V/10A	9009	22A	6577
Optional Rack Security Kit	9009	22A	6580
Power Cord 2.7M (9-foot), To wall/OEM PDU, (125V, 15A)	9009	22A	6651
4.3m (14-Ft) 3PH/16A 380-415V Power Cord	9009	22A	6653
4.3m (14-Ft) 1PH/24-30A Pwr Cord	9009	22A	6654
4.3m (14-Ft) 1PH/24-30A WR Pwr Cord	9009	22A	6655
4.3m (14-Ft) 1PH/24A Power Cord	9009	22A	6656
4.3m (14-Ft) 1PH/32A Power Cord	9009	22A	6657
4.3m (14-Ft) 1PH/24A Pwr Cd-Korea	9009	22A	6658
Power Cord 2.7M (9-foot), To wall/OEM PDU, (250V, 15A)	9009	22A	6659
Power Cord 4.3m (14-ft), Drawer to wall/OEM PDU (125V/15A)	9009	22A	6660

Power Cord 2.8m (9.2-ft), Drawer to IBM PDU, (250V/10A)	9009	22A	6665
4.3m (14-Ft) 3PH/32A 380-415V Power Cord-Australia	9009	22A	6667
Power Cord 4.3M (14-foot), Drawer to OEM PDU, (250V, 15A)	9009	22A	6669
Power Cord 2.7M (9-foot), Drawer to IBM PDU, 250V/10A	9009	22A	6671
Power Cord 2M (6.5-foot), Drawer to IBM PDU, 250V/10A	9009	22A	6672
Power Cord 2.7m (9-ft), Drawer to wall/OEM PDU, (250V/10A)	9009	22A	6680
Intelligent PDU+, 1 EIA Unit, Universal UTG0247 Connector	9009	22A	7109
Environmental Monitoring Probe	9009	22A	7118
Power Distribution Unit	9009	22A	7188
Power Distribution Unit (US) - 1 EIA Unit, Universal, Fixed Power Cord	9009	22A	7196
Ethernet Cable, 15m, Hardware Management Console to System Unit	9009	22A	7802
Linux Software Preinstall	9009	22A	8143
Linux Software Preinstall (Business Partners)	9009	22A	8144
USB Mouse	9009	22A	8845
Order Routing Indicator- System Plant	9009	22A	9169
Language Group Specify - US English	9009	22A	9300
New AIX License Core Counter	9009	22A	9440
New IBM i License Core Counter	9009	22A	9441
New Red Hat License Core Counter	9009	22A	9442
New SUSE License Core Counter	9009	22A	9443
Other AIX License Core Counter	9009	22A	9444
Other Linux License Core Counter	9009	22A	9445
3rd Party Linux License Core Counter	9009	22A	9446
VIOS Core Counter	9009	22A	9447
Other License Core Counter	9009	22A	9449
Ubuntu Linux License Core Counter	9009	22A	9450
Month Indicator	9009	22A	9461
Day Indicator	9009	22A	9462
Hour Indicator	9009	22A	9463
Minute Indicator	9009	22A	9464
Qty Indicator	9009	22A	9465
Countable Member Indicator	9009	22A	9466
Language Group Specify - Dutch	9009	22A	9700
Language Group Specify - French	9009	22A	9703
Language Group Specify - German	9009	22A	9704
Language Group Specify - Polish	9009	22A	9705
Language Group Specify - Norwegian	9009	22A	9706
Language Group Specify - Portuguese	9009	22A	9707
Language Group Specify - Spanish	9009	22A	9708
Language Group Specify - Italian	9009	22A	9711
Language Group Specify - Canadian French	9009	22A	9712
Language Group Specify - Japanese	9009	22A	9714
Language Group Specify - Traditional Chinese (Taiwan)	9009	22A	9715
Language Group Specify - Korean	9009	22A	9716
Language Group Specify - Turkish	9009	22A	9718
Language Group Specify - Hungarian	9009	22A	9719
Language Group Specify - Slovakian	9009	22A	9720
Language Group Specify - Russian	9009	22A	9721
Language Group Specify - Simplified Chinese (PRC)	9009	22A	9722
Language Group Specify - Czech	9009	22A	9724
Language Group Specify - Romanian	9009	22A	9725
Language Group Specify - Croatian	9009	22A	9726
Language Group Specify - Slovenian	9009	22A	9727
Language Group Specify - Brazilian Portuguese	9009	22A	9728
Language Group Specify - Thai	9009	22A	9729
10m (30.3-ft), IBM Passive QSFP+ MTP Optical Cable	9009	22A	EB2J
30m (90.3-ft), IBM Passive QSFP+ MTP Optical Cable	9009	22A	EB2K
AC Power Supply - 1400W for Server (200-240 VAC)	9009	22A	EB2M
Lift tool based on GenieLift GL-8 (standard)	9009	22A	EB3Z
10Gb Optical Transceiver SFP+	9009	22A	EB46
25Gb Optical Transceiver SFP28	9009	22A	EB47

0.5m SFP28/25GbE copper Cable	9009	22A	EB4J
1.0m SFP28/25GbE copper Cable	9009	22A	EB4K
1.5m SFP28/25GbE copper Cable	9009	22A	EB4L
2.0m SFP28/25GbE copper Cable	9009	22A	EB4M
2.0m QSFP28/100GbE copper split Cable to SFP28 4x25GbE	9009	22A	EB4P
Service wedge shelf tool kit for EB3Z	9009	22A	EB4Z
0.5m EDR IB Copper Cable QSFP28	9009	22A	EB50
1.0m EDR IB Copper Cable QSFP28	9009	22A	EB51
2.0M EDR IB Copper Cable QSFP28	9009	22A	EB52
1.5M EDR IB Copper Cable QSFP28	9009	22A	EB54
100Gb Optical Transceiver QSFP28	9009	22A	EB59
3M EDR IB Optical Cable QSFP28	9009	22A	EB5A
5M EDR IB Optical Cable QSFP28	9009	22A	EB5B
10M EDR IB Optical Cable QSFP28	9009	22A	EB5C
15M EDR IB Optical Cable QSFP28	9009	22A	EB5D
20M EDR IB Optical Cable QSFP28	9009	22A	EB5E
30M EDR IB Optical Cable QSFP28	9009	22A	EB5F
50M EDR IB Optical Cable QSFP28	9009	22A	EB5G
100M EDR IB Optical Cable QSFP28	9009	22A	EB5H
0.5M 100GbE copper Cable QSFP28	9009	22A	EB5J
1.0M 100GbE Copper Cable QSFP28	9009	22A	EB5K
1.5M 100GbE Copper Cable QSFP28	9009	22A	EB5L
2.0M 100GbE Copper Cable QSFP28	9009	22A	EB5M
25M EDR IB optical Cable QSFP28	9009	22A	EB5N
3M 100GbE optical Cable QSFP28 (AOC)	9009	22A	EB5R
5M 100GbE optical Cable QSFP28 (AOC)	9009	22A	EB5S
10M 100GbE optical Cable QSFP28 (AOC)	9009	22A	EB5T
15M 100GbE optical Cable QSFP28 (AOC)	9009	22A	EB5U
20M 100GbE optical Cable QSFP28 (AOC)	9009	22A	EB5V
30M 100GbE optical Cable QSFP28 (AOC)	9009	22A	EB5W
50M 100GbE Optical Cable QSFP28 (AOC)	9009	22A	EB5X
100M 100GbE optical Cable QSFP28 (AOC)	9009	22A	EB5Y
IBM i 7.2 Indicator	9009	22A	EB72
IBM i 7.3 Indicator	9009	22A	EB73
Rack Front Door (Black)	9009	22A	EC01
Rack Rear Door	9009	22A	EC02
Rack Side Cover	9009	22A	EC03
Rack suite Attachment Kit	9009	22A	EC04
Slim Rear Acoustic Door	9009	22A	EC07
Slim Front Acoustic Door	9009	22A	EC08
Rear Door Heat Exchanger for 2.0 Meter Slim Rack	9009	22A	EC15
PCIe3 LP 2-Port 10Gb NIC&ROCE SR/Cu Adapter	9009	22A	EC2R
PCIe3 2-Port 10Gb NIC&ROCE SR/Cu Adapter	9009	22A	EC2S
PCIe3 LP 2-Port 25/10Gb NIC&ROCE SR/Cu Adapter	9009	22A	EC2T
PCIe3 2-Port 25/10Gb NIC&ROCE SR/Cu Adapter	9009	22A	EC2U
PCIe3 LP 2-port 100GbE (NIC & RoCE) QSFP28 Adapter x16	9009	22A	EC3L
PCIe3 NVMe carrier card w/2 M.2 module slots	9009	22A	EC59
PCIe4 LP 1-port 100Gb EDR IB CAPI adapter	9009	22A	EC62
PCIe4 LP 2-port 100Gb EDR IB CAPI adapter	9009	22A	EC64
SAS X Cable 3m - HD Narrow 6Gb 2-Adapters to Enclosure	9009	22A	ECBJ
SAS X Cable 6m - HD Narrow 6Gb 2-Adapters to Enclosure	9009	22A	ECBK
SAS X Cable 10m - HD Narrow 6Gb 2-Adapters to Enclosure	9009	22A	ECBL
SAS X Cable 15m - HD Narrow 3Gb 2-Adapters to Enclosure	9009	22A	ECBM
SAS YO Cable 1.5m - HD Narrow 6Gb Adapter to Enclosure	9009	22A	ECBT
SAS YO Cable 3m - HD Narrow 6Gb Adapter to Enclosure	9009	22A	ECBU
SAS YO Cable 6m - HD Narrow 6Gb Adapter to Enclosure	9009	22A	ECBV
SAS YO Cable 10m - HD Narrow 6Gb Adapter to Enclosure	9009	22A	ECBW
SAS YO Cable 15m - HD Narrow 3Gb Adapter to Enclosure	9009	22A	ECBX
SAS AE1 Cable 4m - HD Narrow 6Gb Adapter to Enclosure	9009	22A	ECBY
SAS YE1 Cable 3m - HD Narrow 6Gb Adapter to Enclosure	9009	22A	ECBZ
SAS AA Cable 0.6m - HD Narrow 6Gb Adapter to			

Adapter	9009	22A	ECC0
SAS AA Cable 1.5m - HD Narrow 6Gb Adapter to Adapter	9009	22A	ECC2
SAS AA Cable 3m - HD Narrow 6Gb Adapter to Adapter	9009	22A	ECC3
SAS AA Cable 6m - HD Narrow 6Gb Adapter to Adapter	9009	22A	ECC4
3M Optical Cable Pair for PCIe3 Expansion Drawer	9009	22A	ECC7
10M Optical Cable Pair for PCIe3 Expansion Drawer	9009	22A	ECC8
System Port Converter Cable for UPS	9009	22A	ECCF
Variable Length, Blue Cat5e Cable	9009	22A	ECCG
Variable Length, Green Cat5e Cable	9009	22A	ECCH
3M Copper CXP Cable Pair for PCIe3 Expansion Drawer	9009	22A	ECCS
3.0M SAS X12 Cable (Two Adapter to Enclosure)	9009	22A	ECDJ
4.5M SAS X12 Active Optical Cable (Two Adapter to Enclosure)	9009	22A	ECDK
10M SAS X12 Active Optical Cable (Two Adapter to Enclosure)	9009	22A	ECDL
1.5M SAS Y012 Cable (Adapter to Enclosure)	9009	22A	ECDT
3.0M SAS Y012 Cable (Adapter to Enclosure)	9009	22A	ECDU
4.5M SAS Y012 Active Optical Cable (Adapter to Enclosure)	9009	22A	ECDV
10M SAS Y012 Active Optical Cable (Adapter to Enclosure)	9009	22A	ECDW
0.6M SAS AA12 Cable (Adapter to Adapter)	9009	22A	ECE0
3.0M SAS AA12 Cable	9009	22A	ECE3
4.5M SAS AA12 Active Optical Cable (Adapter to Adapter)	9009	22A	ECE4
2.0 Meter Slim Rack	9009	22A	ECR0
Rack Front Door High-End appearance	9009	22A	ECRF
Rack Rear Door Black	9009	22A	ECRG
Rack Side Cover	9009	22A	ECRJ
Rack Rear Extension 5-In	9009	22A	ECRK
Rack Front Door for Rack (Black/Flat)	9009	22A	ECRM
Indicator Assembled and Tested in China	9009	22A	ECS0
Custom Service Specify, Montpellier, France	9009	22A	ECSF
NeuCloud Indicator/Specify	9009	22A	ECSJ
Custom Service Specify, Mexico	9009	22A	ECSM
Custom Service Specify, Poughkeepsie, USA	9009	22A	ECSP
Integrated Solution Packing	9009	22A	ECSS
Optical wrap Plug	9009	22A	ECW0
Boot Drive / Load Source in EXP12SX Specify (in #ESLL or #ELLL)	9009	22A	EHR1
Boot Drive / Load Source in EXP24SX Specify (in #ESLS or #ELLS)	9009	22A	EHR2
SSD Placement Indicator - #ESLS/#ELLS	9009	22A	EHS2
SAS Port/Cabling for single IOA Backplane	9009	22A	EJ00
PCIe3 Optical Cable Adapter for PCIe3 Expansion Drawer	9009	22A	EJ05
PCIe3 RAID SAS Adapter Quad-port 6Gb x8	9009	22A	EJ0J
PCIe3 LP RAID SAS Adapter Quad-Port 6Gb x8	9009	22A	EJ0M
PCIe3 SAS Tape/DVD Adapter Quad-port 6Gb x8	9009	22A	EJ10
PCIe3 LP SAS Tape/DVD Adapter Quad-port 6Gb x8	9009	22A	EJ11
PCIe3 12GB Cache RAID PLUS SAS Adapter Quad-port 6Gb x8	9009	22A	EJ14
Base Storage Backplane 8 SFF-3 Bays	9009	22A	EJ1F
Expanded function Storage Backplane 8 SFF-3 Bays/ Single IOA with write Cache	9009	22A	EJ1G
Split #EJ1F to 4+4 SFF-3 Bays: Add 2nd SAS Controller	9009	22A	EJ1H
PCIe3 Crypto Coprocessor BSC-Gen3 4767	9009	22A	EJ33
Non-paired Indicator EJ14 PCIe SAS RAID+ Adapter	9009	22A	EJRL
Front IBM Bezel for 8-Bay BackPlane	9009	22A	EJU6
Front OEM Bezel for 8-Bay BackPlane	9009	22A	EJU7
Specify Mode-1 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)Y012 for EXP12SX #ESLL/ELLL	9009	22A	EJV1
Specify Mode-1 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)Y012 for EXP12SX #ESLL/ELLL	9009	22A	EJV2
Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL	9009	22A	EJV3
Specify Mode-2 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL	9009	22A	EJV4
Specify Mode-4 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12			

for EXP12SX #ESLL/ELLL	9009	22A	EJV5
Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (2)Y012 for EXP12SX #ESLL/ELLL	9009	22A	EJV6
Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)Y012 for EXP12SX #ESLL/ELLL	9009	22A	EJV7
Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)Y012 for EXP12SX #ESLL/ELLL	9009	22A	EJVA
Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP12SX #ESLL/ELLL	9009	22A	EJVB
Specify Mode-4 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP12SX #ESLL/ELLL	9009	22A	EJVC
Specify Mode-4 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP12SX #ESLL/ELLL	9009	22A	EJVD
Specify Mode-4 & (3)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL	9009	22A	EJVE
Specify Mode-1 & (2)EJ14 & (2)Y012 for EXP12SX #ESLL/ELLL	9009	22A	EJVF
Specify Mode-1 & Controller & (1)Y012 for EXP12SX #ESLL/ELLL	9009	22A	EJVU
Specify Mode-1 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)Y012 for EXP24SX #ESLS/ELLS	9009	22A	EJW1
Specify Mode-1 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)Y012 for EXP24SX #ESLS/ELLS	9009	22A	EJW2
Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS	9009	22A	EJW3
Specify Mode-2 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS	9009	22A	EJW4
Specify Mode-4 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS	9009	22A	EJW5
Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (2)Y012 for EXP24SX #ESLS/ELLS	9009	22A	EJW6
Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)Y012 for EXP24SX #ESLS/ELLS	9009	22A	EJW7
Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)Y012 for EXP24SX #ESLS/ELLS	9009	22A	EJWA
Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP24SX #ESLS/ELLS	9009	22A	EJWB
Specify Mode-4 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP24SX #ESLS/ELLS	9009	22A	EJWC
Specify Mode-4 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP24SX #ESLS/ELLS	9009	22A	EJWD
Specify Mode-4 & (3)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS	9009	22A	EJWE
Specify Mode-1 & (2)EJ14 & (2)Y012 for EXP24SX #ESLS/ELLS	9009	22A	EJWF
Specify Mode-2 & (2)EJ14 & (2)X12 for EXP24SX #ESLS/ELLS	9009	22A	EJWG
Specify Mode-2 & (2)EJ14 & (1)X12 for EXP24SX #ESLS/ELLS	9009	22A	EJWH
Specify Mode-2 & (4)EJ14 & (2)X12 for EXP24SX #ESLS/ELLS	9009	22A	EJWJ
Specify Mode-1 & Controller & (1)Y012 for EXP24SX #ESLS/ELLS	9009	22A	EJWU
PDU Access Cord 0.38m	9009	22A	ELC0
16 GB DDR4 Memory	9009	22A	EM62
32 GB DDR4 Memory	9009	22A	EM63
64 GB DDR4 Memory	9009	22A	EM64
128 GB DDR4 Memory	9009	22A	EM65
PCIe Gen3 I/O Expansion Drawer	9009	22A	EMX0
AC Power Supply Conduit for PCIe3 Expansion Drawer	9009	22A	EMXA
PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	9009	22A	EMXF
PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer	9009	22A	EMXG
1m (3.3-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper	9009	22A	EN01
3m (9.8-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper	9009	22A	EN02
5m (16.4-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper	9009	22A	EN03
PCIe3 16Gb 2-port Fibre Channel Adapter	9009	22A	EN0A
PCIe3 LP 16Gb 2-port Fibre Channel Adapter	9009	22A	EN0B
PCIe3 4-port (10Gb FCoE & 1GbE) SR&RJ45	9009	22A	EN0H

PCIe3 LP 4-port (10Gb FCoE & 1GbE) SR&RJ45	9009	22A	EN0J
PCIe3 4-port (10Gb FCoE & 1GbE) SFP+Copper&RJ45	9009	22A	EN0K
PCIe3 LP 4-port(10Gb FCoE & 1GbE) SFP+Copper&RJ45	9009	22A	EN0L
PCIe3 LP 4-port(10Gb FCoE & 1GbE) LR&RJ45 Adapter	9009	22A	EN0N
PCIe2 4-Port (10Gb+1GbE) SR+RJ45 Adapter	9009	22A	EN0S
PCIe2 LP 4-Port (10Gb+1GbE) SR+RJ45 Adapter	9009	22A	EN0T
PCIe2 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter	9009	22A	EN0U
PCIe2 LP 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter	9009	22A	EN0V
PCIe2 2-port 10/1GbE BaseT RJ45 Adapter	9009	22A	EN0W
PCIe2 LP 2-port 10/1GbE BaseT RJ45 Adapter	9009	22A	EN0X
PCIe2 LP 8Gb 4-port Fibre Channel Adapter	9009	22A	EN0Y
PCIe3 4-port 10GbE SR Adapter	9009	22A	EN15
PCIe3 32Gb 2-port Fibre Channel Adapter	9009	22A	EN1A
PCIe3 LP 32Gb 2-port Fibre Channel Adapter	9009	22A	EN1B
PCIe3 16Gb 4-port Fibre Channel Adapter	9009	22A	EN1C
PCIe3 LP 16Gb 4-port Fibre Channel Adapter	9009	22A	EN1D
4-core Typical 2.8 to 3.8 GHz (max) POWER9 Processor	9009	22A	EP16
8-core Typical 3.4 to 3.9 Ghz (max) POWER9 Processor	9009	22A	EP18
10-core Typical 2.9 to 3.8 Ghz (max) POWER9 Processor	9009	22A	EP19
One Processor Core Activation for #EP16	9009	22A	EP46
One Processor Core Activation for #EP18	9009	22A	EP48
One Processor Core Activation for #EP19	9009	22A	EP49
Horizontal PDU Mounting Hardware	9009	22A	EPTH
High Function 9xC19 PDU: Switched, Monitoring	9009	22A	EPTJ
High Function 9xC19 PDU 3-Phase: Switched, Monitoring	9009	22A	EPTL
High Function 12xC13 PDU: Switched, Monitoring	9009	22A	EPTN
High Function 12xC13 PDU 3-Phase: Switched, Monitoring	9009	22A	EPTQ
Quantity 150 of #ES62 3.86-4.0 TB 7200 rpm 4k LFF-1 Disk	9009	22A	EQ62
Quantity 150 of #ES64 7.72-8.0 TB 7200 rpm 4k LFF-1 Disk	9009	22A	EQ64
Quantity 150 of #ES78 387GB SFF-2 SSD 5xx	9009	22A	EQ78
Quantity 150 of #ES7E 775GB SFF-2 SSD 5xx	9009	22A	EQ7E
Quantity 150 of #ES80 1.9TB SFF-2 SSD 4k	9009	22A	EQ80
Quantity 150 of #ES85 387GB SFF-2 SSD 4k	9009	22A	EQ85
Quantity 150 of #ES8C 775GB SFF-2 SSD 4k	9009	22A	EQ8C
Quantity 150 of #ES8F 1.55TB SFF-2 SSD 4k	9009	22A	EQ8F
Quantity 150 of #ES8Y 931GB SFF-2 SSD 4k	9009	22A	EQ8Y
Quantity 150 of ES96 1.86TB SFF-2 SSD 4k	9009	22A	EQ96
Quantity 150 of #ESE7 3.72TB SFF-2 SSD 4k	9009	22A	EQE7
Quantity 150 of #ESEV (600GB 10k SFF-2)	9009	22A	EQEV
Quantity 150 of #ESEZ (300GB SFF-2)	9009	22A	EQEZ
Quantity 150 of #ESF3 (1.2TB 10k SFF-2)	9009	22A	EQF3
Quantity 150 of #ESFP (600GB SFF-2)	9009	22A	EQFP
Quantity 150 of #ESFT (1.8TB 10k SFF-2)	9009	22A	EQFT
Quantity 150 of #ESG5 (387GB SAS 5xx)	9009	22A	EQG5
Quantity 150 of #ESGB (387GB SAS 4k)	9009	22A	EQGB
Quantity 150 of #ESGF (775GB SAS 5xx)	9009	22A	EQGF
Quantity 150 of #ESGK (775GB SAS 4k)	9009	22A	EQGK
Quantity 150 of #ESGP (1.55TB SAS 4k)	9009	22A	EQGP
42U Slim Rack	9009	22A	ER05
Bulk Packaging Request ID	9009	22A	ERB0
Bulk Packaging ID #1	9009	22A	ERB1
Bulk Packaging ID #2	9009	22A	ERB2
Bulk Packaging ID #3	9009	22A	ERB3
Bulk Packaging ID #4	9009	22A	ERB4
Bulk Packaging ID #5	9009	22A	ERB5
Bulk Packaging ID #6	9009	22A	ERB6
Bulk Packaging ID #7	9009	22A	ERB7
Bulk Packaging ID #8	9009	22A	ERB8
Bulk Packaging ID #9	9009	22A	ERB9
Bulk Packaging ID #10	9009	22A	ERBA
Bulk Packaging ID #11	9009	22A	ERBB
Bulk Packaging ID #12	9009	22A	ERBC
Bulk Packaging ID #13	9009	22A	ERBD
Bulk Packaging ID #14	9009	22A	ERBE
Bulk Packaging ID #15	9009	22A	ERBF
Bulk Packaging ID #16	9009	22A	ERBG



Bulk Packaging ID #17	9009	22A	ERBH
Bulk Packaging ID #18	9009	22A	ERBJ
Bulk Packaging ID #19	9009	22A	ERBK
Bulk Packaging ID #20	9009	22A	ERBL
No Bulk Packaging Specify	9009	22A	ERBZ
RFID Tags for Servers, Compute Nodes, Chassis, Racks, and HMCs	9009	22A	ERF1
Rear rack extension	9009	22A	ERG0
Mainstream 400GB SSD NVMe M.2 module	9009	22A	ES14
3.86-4.0 TB 7200 RPM 4K SAS LFF-1 Nearline Disk Drive (AIX/Linux)	9009	22A	ES62
7.72-8.0 TB 7200 RPM 4K SAS LFF-1 Nearline Disk Drive (AIX/Linux)	9009	22A	ES64
387GB SFF-2 SSD 5xx eMLC4 for AIX/Linux	9009	22A	ES78
775GB SFF-2 SSD 5xx eMLC4 for AIX/Linux	9009	22A	ES7E
387GB SFF-3 SSD 5xx eMLC4 for AIX/Linux	9009	22A	ES7K
775GB SFF-3 SSD 5xx eMLC4 for AIX/Linux	9009	22A	ES7P
1.9TB Read Intensive SAS 4k SFF-2 SSD for AIX/ Linux	9009	22A	ES80
931GB Mainstream SAS 4k SFF-3 SSD for AIX/Linux	9009	22A	ES83
387GB SFF-2 SSD 4k eMLC4 for AIX/Linux	9009	22A	ES85
775GB SFF-2 SSD 4k eMLC4 for AIX/Linux	9009	22A	ES8C
1.55TB SFF-2 SSD 4k eMLC4 for AIX/Linux	9009	22A	ES8F
1.9TB Read Intensive SAS 4k SFF-3 SSD for AIX/ Linux	9009	22A	ES8J
387GB SFF-3 SSD 4k eMLC4 for AIX/Linux	9009	22A	ES8N
775GB SFF-3 SSD 4k eMLC4 for AIX/Linux	9009	22A	ES8Q
1.55TB SFF-3 SSD 4k eMLC4 for AIX/Linux	9009	22A	ES8V
931GB Mainstream SAS 4k SFF-2 SSD for AIX/Linux	9009	22A	ES8Y
1.86TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux	9009	22A	ES92
1.86TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux	9009	22A	ES96
S&H - No Charge	9009	22A	ESC0
S&H-a	9009	22A	ESC5
600GB 10K RPM SAS SFF-3 Disk Drive (AIX/Linux)	9009	22A	ESD5
300GB 15K RPM SAS SFF-3 Disk Drive (AIX/Linux)	9009	22A	ESDB
3.72TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux	9009	22A	ESE1
3.72TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux	9009	22A	ESE7
600GB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096	9009	22A	ESEV
300GB 15K RPM SAS SFF-2 4K Block - 4096 Disk Drive	9009	22A	ESEZ
1.2TB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096	9009	22A	ESF3
600GB 10K RPM SAS SFF-3 Disk Drive 4K Block - 4096	9009	22A	ESF5
1.2TB 10K RPM SAS SFF-3 Disk Drive 4K Block - 4096	9009	22A	ESF9
300GB 15K RPM SAS SFF-3 4K Block - 4096 Disk Drive	9009	22A	ESFB
600GB 15K RPM SAS SFF-3 4K Block - 4096 Disk Drive	9009	22A	ESFF
600GB 15K RPM SAS SFF-2 4K Block - 4096 Disk Drive	9009	22A	ESFP
1.8TB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096	9009	22A	ESFT
1.8TB 10K RPM SAS SFF-3 Disk Drive 4K Block - 4096	9009	22A	ESFV
387GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux	9009	22A	ESG5
387GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux	9009	22A	ESG9
387GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux	9009	22A	ESGB
387GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux	9009	22A	ESGD
775GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux	9009	22A	ESGF
775GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux	9009	22A	ESGH
775GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux	9009	22A	ESGK
775GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux	9009	22A	ESGM
1.55TB Enterprise SAS 4k SFF-2 SSD for AIX/Linux	9009	22A	ESGP
1.55TB Enterprise SAS 4k SFF-3 SSD for AIX/Linux	9009	22A	ESGR
Specify AC Power Supply for EXP12SX/EXP24SX			
Storage Enclosure	9009	22A	ESLA
EXP12SX SAS Storage Enclosure	9009	22A	ESLL
EXP24SX SAS Storage Enclosure	9009	22A	ESLS
300GB 15K RPM SAS SFF-3 4k Block Cached Disk Drive (AIX/Linux)	9009	22A	ESNK
300GB 15K RPM SAS SFF-2 4k Block Cached Disk			

Drive (AIX/Linux)	9009	22A	ESNM
600GB 15K RPM SAS SFF-3 4k Block Cached Disk			
Drive (AIX/Linux)	9009	22A	ESNP
600GB 15K RPM SAS SFF-2 4k Block Cached Disk			
Drive (AIX/Linux)	9009	22A	ESNR
Quantity 150 of #ESNM (300GB 15k SFF-2)	9009	22A	ESPM
Quantity 150 of #ESNR (600GB 15k SFF-2)	9009	22A	ESPR
1TB Removable Disk Drive Cartridge	9009	22A	EU01
RDX USB External Docking Station for Removable Disk Cartridge	9009	22A	EU04
RDX 320 GB Removable Disk Drive	9009	22A	EU08
Operator Panel LCD Display	9009	22A	EU0B
1.5TB Removable Disk Drive Cartridge	9009	22A	EU15
Cable Ties & Labels	9009	22A	EU19
2TB Removable Disk Drive Cartridge (RDX)	9009	22A	EU2T
RDX USB External Docking Station	9009	22A	EUA4
Standalone USB DVD drive w/cable	9009	22A	EUA5
Core Use HW Feature	9009	22A	EUC6
Core Use HW Feature 10X	9009	22A	EUC7

The following are newly announced features on the specific models of the IBM Power Systems 7014 and 7965 machine type:

### New feature available March 20, 2018

Description	Machine type	Model	Feature number
Rack Content Specify: 9009-22A - 2EIA	7014	T00	ER2V
	7014	T42	
	7965	94Y	
	7965	S42	

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## Business Partner information

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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<sup>(R)</sup> ID and password are required (use IBMid).

[BP Attachment for Announcement Letter 118-021](#)

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## Publications

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Power Systems hardware documentation provides clients with the following topical information:

- Licenses, notices, safety, and warranty information
- Planning for the system
- Installing and configuring the system
- Troubleshooting, service, and support
- Installing, configuring, and managing consoles, terminals, and interfaces
- Installing operating systems
- Creating a virtual computing environment
- Enclosures and expansion units
- Glossary

You can access the product documentation at [IBM Knowledge Center](#).

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

The following information is shipped with the 9009-22A:

- Power Hardware Information DVD SK5T-7087
- Installing the 9009-22A
- Important Notices
- Warranty Information
- License Agreement for Machine Code

Hardware documentation such as installation instructions, user's information, and service information is available to download or view at the [IBM Support](#) website.

You can access IBM i documentation at the [IBM](#) website.

You can access AIX documentation at the [AIX](#) website.

You can access documentation about Linux on IBM systems at the [Linux information for IBM systems](#) website.

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## Services

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### IBM Systems Lab Services

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IBM Systems Lab Services offers a wide array of services available for your enterprise. It brings expertise on the latest technologies from the IBM development community and can help with your most difficult technical challenges.

IBM Systems Lab Services exists to help you successfully implement emerging technologies so as to accelerate your return on investment and improve your satisfaction with your IBM systems and solutions. Services examples include initial implementation, integration, migration, and skills transfer on IBM systems solution capabilities and recommended practices. IBM Systems Lab Services is one of the service organizations of IBM's world-renowned IBM Systems Group development labs.

For details on available services, contact your IBM representative or go to the [Lab Services](#) website.

### Global Technology Services

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

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

For details on available services, contact your IBM representative or go to the [IBM Global Technology Services<sup>\(R\)</sup>](#) website.

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or go to the [Resiliency Services](#) website.

Details on education offerings related to specific products can be found on the [IBM authorized training](#) website.

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## Technical information

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### Specified operating environment

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#### *Physical specifications*

- Width: 482 mm (18.97 in.)
- Depth: 766.5 mm (30.2 in.)
- Height: 86.7 mm (3.4 in.)
- Weight: 30.4 kg (67 lb)

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

#### *Operating environment*

- Temperature: (nonoperating) 5°C - 45°C (41°F - 113°F); recommended temperature (operating) 18°C - 27°C (64°F - 80°F); allowable operating temperature 5°C - 40°C (41°F - 104°F)
- Relative humidity: Nonoperating 8% - 80%; recommended 5.5°C (42°F) dew point to 60% RH and 15°C (59°F) dew point
- Maximum dew point: 21°C (70°F)(allowable operating)
- Operating voltage: 1400 W PSU: 200 - 240 V AC
- Operating frequency: 47/63 Hz
- Maximum power consumption: 1880 watts (maximum)
- Power factor: 0.98
- Thermal output: 6,416 Btu/hour (maximum)
- Power-source loading
  - 1.94 kVa (maximum configuration)
  - Maximum altitude: 3,050 m (10,000 ft)

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

### Noise levels and declared A-weighted sound power level

- Rack-mount system: 6.5 bels operating; 5.3 bels idling

See the *Installation Planning Guide* in [IBM Knowledge Center](#) for additional detail.

For example, the actual power noise level is impacted by multiple factors, including:

- Enablement of the Turbo mode increases fan speed, which increases power noise levels.
- Usage of the Turbo mode further increases fan speed, which further increases power noise levels.
- Using higher wattage PCIe adapters increases fan speed, which increases power noise levels.
- Placing multiple servers in a rack increases the total power noise level.
- Placing servers in racks with acoustic doors reduces the power noise levels.

### **EMC conformance classification**

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

- US: FCC Class A
- Europe: CISPR 22 Class A
- Japan: VCCI-A
- Korea: Korean Requirement Class A
- China: People's Republic of China commodity inspection law Class A

### **Homologation -- Telecom environmental testing (Safety and EMC):**

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

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

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

- UL 60950-1:2007 Underwriters Laboratory, Safety Information
- CSA C22.2 No. 60950-1-07, Canadian Standards Association
- EN60950 European Norm
- IEC 60950, Edition 1, International Electrotechnical Commission, Safety Information
- Nordic deviations to IEC 60950-1 1st Edition

### **General requirements**

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

### **Homologation**

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

## Hardware requirements

### Power S922 system configuration

The minimum Power S922 initial order must include a processor module, two 16 GB DIMMs, two power supplies and line cords, an operating system indicator, a cover set indicator, and a Language Group Specify. Also, it must include one of the storage options and the network options below:

Storage options:

- For boot from NVMe: One NVMe carrier and one NVMe M.2 Module.
- For boot from local SFF-3 HDD/SDD: One storage backplane and one SFF-3 HDD or SDD.
- For boot from SAN: Internal HDD or SSD and RAID card are not required if feature 0837 (Boot from SAN) is selected. A Fibre Channel adapter must be ordered if feature 0837 is selected.

Network options:

- One PCIe2 4-port 1 Gb Ethernet adapter.
- One of the supported 10 Gb Ethernet adapters

AIX or Linux is the primary operating system. The minimum defined initial order configuration is as follows:

Feature number	Description	Quantity	Notes
EU0B	Operator Panel LCD Display	1	
Processors			
EP16	4-core typical 2.8 to 3.8 GHz (max) POWER9 Processor	1	
or			
EP18	8-core typical 3.4 to 3.9 GHz (max) POWER9 Processor	1	
or			
EP19	10-core typical 2.9 to 3.8 GHz (max) POWER9 Processor	1	
Processor activations			
EP46	One Processor Core Activation for #EP16	4	
or			
EP48	One Processor Core Activation for #EP18	8	
or			
EP49	One Processor Core Activation for #EP19	10	
Memory DIMMs			
EM62	16 GB DDR4 Memory	2	
or			
EM63	32 GB DDR4 Memory	2	
or			
EM64	64 GB DDR4 Memory	2	

Feature number	Description	Quantity	Notes
or			
EM65	128 GB DDR4 Memory	2	
Storage Backplane			
EJ1F	Storage Backplane 8 SFF-3 Bays	1	Optional split card EJ1H
or			
EC59	PCIe3 NVMe carrier card w/2 M.2 module slots	1	Must order, at a minimum, one of feature ES14
Disk Drive			
ESDB	300 GB 15K RPM SAS SFF-3 Disk Drive (AIX/Linux)	1	
LAN Adapter			
5260	PCIe2 LP 4-port 1 GbE Adapter	1	
Power supplies/ Power cord			
EB2M	AC Power Supply - 1400 W for Server (200 - 240 V AC)	2	
6458	Power Cord 4.3 m (14 ft), Drawer to IBM PDU (250V/10A)	2	6458 - (default)
9300/97xx	Language Group Specify		9300 - (default)
Front Bezel			
EJU6	Front IBM Bezel for 8-Bay BackPlane		
or			
EJU7	Front OEM Bezel for 8-Bay BackPlane		
2146	Primary Operating System Indicator - AIX		
or			
2147	Primary Operating System Indicator - Linux		

- The racking approach for the initial order must be either a 7014-T00, 7014-T42, 7965-S42, or 7953-94Y. If an additional rack is required for I/O expansion drawers as an MES to an existing system, either a feature 0551, 0553, or ER05 rack must be ordered.
- If NVMe carrier card feature EC59 is selected, no disk units are required to be ordered. If neither feature EC59 nor feature 0837 (SAN boot) is ordered, then at least one disk unit is required to be ordered. If no HDD/SSD/SAN boot (#0837) is ordered, then feature EC59 (with at least one of #ES14) is the load source.
- Adapter feature 5260 is the default 1 Gb Ethernet adapter. Options of a 10 Gb Ethernet adapter include one of either EC2R, EC2T, EN0J, EN0L, EN0T, EN0V, or EN0X.
- Feature ES14 is not supported by IBM i virtualized through VIOS. If using IBM i (#2148), a storage option supported by IBM i with VIOS must be used with IBM i.

### Hardware Management Console (HMC) machine code

An HMC is required to manage the Power S922 server implementing partitioning. Multiple POWER7<sup>(R)</sup>, POWER8, and POWER9 processor-based servers can be supported by a single HMC. Planned HMC hardware and software support:

- X86 based - 7042-CR7, 7042-CR8, 7042-CR9
  - vHMC x86
- POWER8 based Open Power: 7063-CR1
  - vHMC PowerVM based LPAR

If you are attaching an HMC to a new server or adding function to an existing server that requires a firmware update, the HMC machine code may need to be updated because HMC code must always be equal to or higher than the managed server's firmware. Access to firmware and machine code updates is conditioned on entitlement and license validation in accordance with IBM policy and practice. IBM may verify entitlement through customer number, serial number, electronic restrictions, or any other means or methods employed by IBM at its discretion.

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

If a single HMC is attached to multiple servers, the HMC machine code level must be updated to be at or higher than the server with the most recent firmware level. All prior levels of server firmware are supported with the latest HMC machine code level.

The HMC code latest level contains the following:

- Support for managing Power S922, S924, S914, and L922 systems.
- Support for the new HMC model 7063-CR1.
- Support for PowerVM functions such as the new HMC GUI interface for VIOS management.
- GUI for HMC's Performance and Capacity Monitoring function.
- An HMC command to initiate a remote restart operation. This removes the requirement of VMControl for the PowerVM Remote Restart function.
- For PowerVM GUI functions, VIOS is recommended.

For clients installing systems higher than the EIA 29 position (location of the rail that supports the rack-mounted server) in any IBM or non-IBM rack, acquire approved tools outlined in the server specifications section at [IBM Knowledge Center](#). In situations where IBM service is required and the recommended tools are not available, there could be delays in repair actions.

### **Software requirements**

If installing the Linux operating system LPAR:

- Red Hat Enterprise Linux 7 for Power LE, version 7.4, or later (Power8-mode)
- SUSE Linux Enterprise Server 12 Service Pack 3, or later
- Ubuntu Server 16.04.4, or later (Power8-mode)

If installing the Linux operating systems LPAR in nonproduction SAP implementations:

- SUSE Linux Enterprise Server 12 Service Pack 3, or later
- SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later
- Red Hat Enterprise Linux 7 for Power LE, version 7.4, or later (Power8-mode)



- Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.4, or later (Power8-mode)

If installing IBM i, VIOS is required and the IBM i operating system levels supported are:

- IBM i 7.3 TR4
- IBM i 7.2 TR8

If installing the AIX operating system LPAR with any I/O configuration (one of these):

- AIX Version 7.2 with the 7200-02 Technology Level and Service Pack 7200-02-02-1810, or later
- AIX Version 7.1 with the 7100-05 Technology Level and Service Pack 7100-05-02-1810, or later
- AIX Version 6.1 with the 6100-09 Technology Level and Service Pack 6100-09-11-1810, or later (AIX 6.1 service extension required)
- AIX Version 7.2 with the 7200-01 Technology Level and Service Pack 7200-01-04-1806, or later (planned availability May 4, 2018)
- AIX Version 7.2 with the 7200-00 Technology Level and Service Pack 7200-00-06-1806, or later (planned availability May 4, 2018)
- AIX Version 7.1 with the 7100-04 Technology Level and Service pack 7100-04-06-1806, or later (planned availability May 4, 2018)

If installing the AIX operating system Virtual I/O only LPAR (one of these):

- AIX Version 7.2 with the 7200-02 Technology Level and Service Pack 7200-02-01-1732, or later
- AIX Version 7.2 with the 7200-01 Technology Level and Service Pack 7200-01-01-1642, or later
- AIX Version 7.2 with the 7200-00 Technology Level and Service Pack 7200-00-01-1543, or later
- AIX Version 7.1 with the 7100-05 Technology Level and Service Pack 7100-05-01-1731, or later
- AIX Version 7.1 with the 7100-04 Technology Level and Service Pack 7100-04-01-1543, or later
- AIX Version 6.1 with the 6100-09 Technology Level and Service Pack 6100-09-06-1543, or later (AIX 6.1 service extension required)

If installing VIOS:

- VIOS 2.2.6.21, or later

### **Limitations**

- Integrated system port is not supported under AIX or Linux when the HMC ports are connected to an HMC. Either the HMC ports or the integrated system ports can be used, but not both. The FSP2 USB 2.0 port is used for communication to a UPS.
- The integrated system port is supported for modem and TTY terminal connections by AIX or Linux. Any other application using serial ports requires a serial port adapter to be installed in a PCI slot. The integrated system port does not support HACMP™ configurations.

### **Boot requirements**

- If IBM i (#2145) is selected as the primary operating system and SAN boot is not selected (#0837), one of the following load source specify codes must be specified.
- If IBM i (#2145) is selected and the load source disk unit is not in the CEC (system unit), one of the specify codes must also be selected:

- #0719 Load Source Not in CEC and are to be placed in I/O drawers or in external SAN-attached disk
- #EHR2 Load Source Specifies DASD are placed in an EXP24SX SFF Gen 2 bay Drawer (#ESLS or ELLS)
- #0837 SAN Operating System Load Source Specify
- If IBM i (#2145) is selected, one of the following system console specify codes must be selected:
  - #5550 -- System Console on HMC
  - #5557 -- System Console - Internal LAN

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## **Planning information**

### ***Cable orders***

No additional cables are required.

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

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

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

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## **IBM Systems Lab Services**

For details on available services, contact your IBM representative or go to the [Lab Services](#) website.

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## **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, go to the [IBM Electronic Support](#) website.

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## Terms and conditions

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### Volume orders

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Contact your IBM representative.

### IBM Global Financing

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Yes

### Products - terms and conditions

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#### Warranty period

Warranty and additional coverage options:	Coverage summary <sup>1</sup> :
Warranty Period:	3 years
Service Level:	IBM On-Site Limited, 9x5 Next Business Day
<b>Service Upgrade Options :</b>	
Warranty Service Upgrade	IBM On-Site Repair, 9x5 Same Day <sup>2</sup> and 24x7 Same Day options
Maintenance Services (Post-Warranty):	IBM On-Site Repair, Next Business Day and Same Day options
IBM Hardware Maintenance Services - committed maintenance <sup>3</sup> :	Y

<sup>1</sup> See complete coverage details below.

<sup>2</sup> Offered in US and EMEA only.

<sup>3</sup> Not offered in the US.

Three years

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM.

An IBM part or feature installed during the initial installation of an IBM machine is subject to the full warranty period specified by IBM. An IBM part or feature that replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature are the same as those for the machine in which it is installed.

Any IBM Mainstream devices (previously called *read intensive device*) identified in this document have a maximum number of write cycles. IBM Mainstream device failures will be replaced during standard warranty and maintenance period for devices that have not reached the maximum number of write cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense. Individual service life may vary and can be monitored using an operating system command.

The IBM warranty covers feature EB4Z. For warranty terms associated with feature EB3Z and the Lift tool based on GenieLift GL-8, see the separate warranty terms provided by Genie found in the Genie Operator's Manual at the [Genie](#) website.

For clients installing systems higher than the EIA 29 position (location of the rail that supports the rack-mounted server) in any IBM or non-IBM rack, acquire approved tools outlined in the server specifications section at [IBM Knowledge Center](#). In

situations where IBM service is required and the recommended tools are not available, there could be delays in repair actions.

### ***Warranty services***

If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone, or electronically through an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. If applicable to your product, parts considered Customer Replaceable Units (CRUs) will be provided as part of the machine's standard warranty service.

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

### ***CRU Service***

IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request. CRUs are designated as being either a Tier 1 (mandatory) or a Tier 2 (optional) CRU.

#### ***Tier 1 (mandatory) CRU***

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

The following parts have been designated as Tier 1 CRUs:

- DASD SFF Drive
- DASD SSD Drive
- NVMe M.2 Carrier card and Flash Modules
- SAS Card
- Op Panel -- Base
- Op Panel -- LCD
- Memory DIMM
- All PCI Adapters
- FAN
- TPM Card
- Power Supplies
- Service Processor Card/FSP
- TOD Battery
- Air Baffles
- Bezel
- SAS Cable Front
- Heatsink
- Service Cover
- DASD Backplane Power Cable
- DASD Backplane Signal Cable

#### ***Tier 2 (optional) CRU***

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

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

### ***CRU and On-site Service***

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

Service level is:

- 9 hours per day, Monday through Friday, excluding holidays, next-business-day response. Calls must be received by 3:00 PM local time in order to qualify for next-business-day response.

### ***Warranty service***

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

### ***International Warranty Service***

International Warranty Service allows you to relocate any machine that is eligible for International Warranty Service and receive continued warranty service in any country where the IBM machine is serviced. If you move your machine to a different country, you are required to report the machine information to your Business Partner or IBM representative.

The warranty service type and the service level provided in the servicing country may be different from that provided in the country in which the machine was purchased. Warranty service will be provided with the prevailing warranty service type and service level available for the eligible machine type in the servicing country, and the warranty period observed will be that of the country in which the machine was purchased.

The following types of information can be found on the [International Warranty Service](#) website

- Machine warranty entitlement and eligibility
- Directory of contacts by country with technical support contact information
- Announcement Letters

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

During the warranty period, warranty service upgrades provide an enhanced level of On-site Service for an additional charge. Service levels are response-time objectives and are not guaranteed. See the [Warranty services](#) section for additional details.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service

is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts.

### ***Maintenance service options***

#### ***CRU and On-site Service***

At IBM's discretion, you will receive CRU service or IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose. The following on-site response-time objectives are available as warranty service upgrades for your machine. Available offerings are:

- On-Site Repair, Monday through Friday (excluding holidays), 8 AM to 5 PM, 4-hour on-site response objective. Response times are objectives and are not guaranteed
- On-Site Repair, 7 days a week, 24hrs/day.
- On-Site Repair, 7 days a week, 24hrs/day, 2-hour response objective. Response times are objectives and are not guaranteed.

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

#### ***Maintenance services***

If required, IBM provides repair or exchange service depending on the types of maintenance service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically, through an IBM website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. Service levels are response-time objectives and are not guaranteed. The specified level of maintenance service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country-specific and location-specific information.

The following service selections are available as maintenance options, at additional cost, for your machine type.

- On-Site Repair, Monday through Friday (excluding holidays), 8 AM to 5 PM, next business day.
- On-Site Repair, Monday through Friday (excluding holidays), 8 AM to 5 PM, 4-hour response objective. Response times are objectives and are not guaranteed.
- On-Site Repair, 7 days a week, 24hrs/day.
- On-Site Repair, 7 days a week, 24hrs/day, 2-hour response objective. Response times are objectives and are not guaranteed.

#### ***On-site Service***

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

#### ***Customer Replaceable Unit (CRU) Service***

If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive), and depending upon the maintenance service

offerings in your geography, IBM will ship the replacement CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request.

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

CRUs are designated as being either a Tier 1 (mandatory) or a Tier 2 (optional) CRU.

Tier 1 (mandatory) CRUs: Installation of Tier 1 CRUs, as specified in this announcement, is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

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

The following parts have been designated as Tier 1 CRUs:

- DASD SFF Drive
- DASD SSD Drive
- NVMe M.2 Carrier card and Flash Modules
- SAS Card
- Op Panel - Base
- Op Panel - LCD
- Memory DIMM
- All PCI Adapters
- FAN
- TPM Card
- Power Supplies
- Service Processor Card/FSP
- TOD Battery
- Air Baffles
- Bezel
- SAS Cable Front
- Heatsink
- Service Cover
- DASD Backplane Power Cable
- DASD Backplane Signal Cable

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

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

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

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

If IBM has a Technical Service Agreement with the manufacturer of the failing part, or if the failing part is an accommodations part (a part with an IBM FRU label), IBM may also source and replace the failing part at no additional charge. For all other

non-IBM parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or a maintenance service.

**Usage plan machine**

No

**IBM hourly service rate classification**

Two

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

**General terms and conditions**

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**Field-installable features**

Yes

**Model conversions**

No

**Machine installation**

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

**Graduated program license charges apply**

Yes

The applicable processor group is: Small

**Licensed Machine Code**

IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement by contacting your IBM representative. It can also be found on the [License Agreement for Machine Code and Licensed Internal Code](#) website.

Machine using LMC Type Model 9009-22A

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

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

**Machine Code License Acceptance Requirement**

B.) Acceptance-By-Use Machine: No, the Machine Code license requires signed acceptance by the machine's end user directly with IBM, applicable to orders for a new machine, machine type conversion MES, and to machines transferred to another user.



### **Educational allowance**

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

The educational allowance is 8% for the products in this announcement.

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## **Prices**

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

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The following are newly announced features on the specific models of the IBM Power Systems 9009 machine type:

Description	Model number	Feature number	Purchase price	Minimum Monthly Charge	Initial/Monthly Maint. Charge	MES/Both/Support	RP CSU	MES
IBM Power System S922	22A							Yes
One CSC Billing Unit	22A	0010			Both	Yes	No	
Ten CSC Billing Units	22A	0011			Both	Yes	No	
AIX Partition Specify	22A	0265			Both	Yes	No	
Linux Partition Specify	22A	0266			Both	Yes	No	
IBM i Partition Specify	22A	0267			Both	Yes	No	
V.24/EIA232 6.1m (20 Ft) PCI C	22A	0348			Both	Yes	No	
V.35 6.1m (20 Ft) PCI Cable	22A	0353			Both	Yes	No	
X.21 6.1m (20 Ft) PCI Cable	22A	0359			Both	Yes	No	
CBU Specify	22A	0444			Initial	N/A	No	
Customer Specified Placement	22A	0456			Initial	N/A	No	
19 inch, 1.8 meter high rack	22A	0551			MES	Yes	No	
19 inch, 2.0 meter high rack	22A	0553			MES	Yes	No	
Rack Filler Panel Kit	22A	0599			Both	Yes	No	
Load Source Not in CEC	22A	0719			Both	Yes	No	
SAN Load Source Specify	22A	0837			Both	Yes	No	
US TAA Compliance Indicator	22A	0983			Both	Yes	No	
Asm in USA manufacturing plant	22A	0984			Both	Yes	No	
Modem Cable US/Canada and GU	22A	1025			Both	Yes	No	
USB 500 GB Removable Disk Dr	22A	1107			Both	Yes	No	
Custom Serv. Specify, Roch								

	22A	1140	Both	Yes	No
Quantity 150 of #1964	22A	1818	Both	Yes	No
Quantity 150 of #1953	22A	1929	Both	Yes	No
300GB 15k RPM SAS SFF-2 Disk	22A	1953	Both	Yes	No
600GB 10k RPM SAS SFF-2 Disk	22A	1964	Both	Yes	No
Primary OS AIX	22A	2146	Both	Yes	No
Primary OS Linux	22A	2147	Both	Yes	No
IBM i with VIOS Only Ind.	22A	2148	Both	Yes	No
Factory Deconfiguration of 1 c	22A	2319	Initial	N/A	No
LC-SC 50 Micron Fiber Conv Cab	22A	2456	Both	Yes	No
LC-SC 62.5 Mic.Fib.Conv.Cable	22A	2459	Both	Yes	No
Asynch.Termin/Print.Cbl EIA232	22A	2934	Both	Yes	No
Asynchronous Cable EIA 232/V	22A	2936	Both	Yes	No
Ser to Ser Port Cab Draw/Draw	22A	3124	Both	Yes	No
Serial to Se.Port Cbl Rack 8M	22A	3125	Both	Yes	No
Widescreen LCD Monitor	22A	3632	Support	Yes	No
0.3M Serial Prt Converter Cbl	22A	3925	Both	Yes	No
Serial Port Null Mod Cab 3.7M	22A	3927	Both	Yes	No
Ser.Port Null Modem Cable,10M	22A	3928	Both	Yes	No
System Serial Port Converter C	22A	3930	Both	Yes	No
6Foot Extend.Cbl for Displays	22A	4242	Support	Yes	No
Extender Cable USB Keybo 1.8M	22A	4256	Both	Yes	No
VGA to DVI Connection Converte	22A	4276	Both	Yes	No
Rack Integration Services: BP	22A	4648	Initial	N/A	No
Rack Integration Services	22A	4649	Initial	N/A	No
One and only one rack indicator feature is required on all orders (#4650 to #4666). No Factory Integration Ind.	22A	4650	Initial	N/A	No
Rack Indicator, Rack 1	22A	4651	Initial	N/A	No
Rack Indicator, Rack 2	22A	4652	Initial	N/A	No
Rack Indicator, Rack 3	22A	4653	Initial	N/A	No
Rack Indicator, Rack 4	22A	4654	Initial	N/A	No
Rack Indicator, Rack 5	22A	4655	Initial	N/A	No
Rack Indicator, Rack 6	22A	4656	Initial	N/A	No
Rack Indicator, Rack 7	22A	4657	Initial	N/A	No
Rack Indicator, Rack 8	22A	4658	Initial	N/A	No
Rack Indicator, Rack 9	22A	4659	Initial	N/A	No
Rack Indicator, Rack 10	22A	4660	Initial	N/A	No
Rack Indicator, Rack 11					

Rack Indicator, Rack 12	22A	4661	Initial	N/A	No
Rack Indicator, Rack 13	22A	4662	Initial	N/A	No
Rack Indicator, Rack 14	22A	4663	Initial	N/A	No
Rack Indicator, Rack 15	22A	4664	Initial	N/A	No
Rack Indicator, Rack 16	22A	4665	Initial	N/A	No
Power Active Memory Expansion	22A	4666	Initial	N/A	No
Software Preload Required	22A	4793	Both	Yes	No
PowerVM Enterprise Edition	22A	5000	Initial	N/A	No
PCIe2 LP 4-port 1GbE Adapter	22A	5228	Both	Yes	No
PCIe LP POWER GXT145 Graphics	22A	5260	Both	Yes	No
PCIe LP 8Gb 2 Port Fibre Chann	22A	5269	Both	Yes	No
PCIe2 8Gb 4-port Fibre Channel	22A	5273	Both	Yes	No
8 Gigabit PCI Express Dual Por	22A	5729	Both	Yes	No
4 Port Async EIA 232 PCIe Adap	22A	5735	Both	Yes	No
PCIe2 4-port 1GbE Adapter	22A	5785	Both	Yes	No
Opt Front Door for 1.8m Rack	22A	5899	Both	Yes	No
Opt Front Door for 2.0m Rack	22A	6068	MES	Yes	No
1.8m Rack Acoustic Doors	22A	6069	MES	Yes	No
2.0m Rack Acoustic Doors	22A	6248	MES	Yes	No
1.8m Rack Trim Kit	22A	6249	MES	Yes	No
2.0m Rack Trim Kit	22A	6263	MES	Yes	No
Pwr Crd 4.3m 14ft to IBM PDU	22A	6272	MES	Yes	No
Pwr Crd (14FT), Drwr - OEM PDU	22A	6458	Both	Yes	No
Pwr Crd 4.3m 14ft wall OEM PDU	22A	6460	Both	Yes	No
Pwr Crd 1.8m 6ft wall 125V/15A	22A	6469	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	22A	6470	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	22A	6471	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	22A	6472	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	22A	6473	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	22A	6474	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	22A	6475	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	22A	6476	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	22A	6477	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	22A	6478	Both	Yes	No
4.3m (14 Ft) 3PH/24A Power Cor	22A	6488	Both	Yes	No
4.3m (14 Ft) 1PH/63A Pwr Cord	22A	6489	MES	Yes	No
4.3m (14 Ft) 1PH/48 60A Pwr Co	22A	6491	MES	Yes	No

	22A	6492	MES	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	22A	6493	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	22A	6494	Both	Yes	No
Pwr Crd 2.7m 9ft wall 250V,10A	22A	6496	Both	Yes	No
Power Cable Drawer to IBM PD	22A	6577	Both	Yes	No
Optional Rack Security Kit	22A	6580	MES	Yes	No
Pwr Crd 2.7m 9ft wall 125V,15A	22A	6651	Both	Yes	No
4.3m 3PH/16A Power Cord	22A	6653	MES	Yes	No
4.3m 1PH/24-30A Pwr Cord	22A	6654	MES	Yes	No
4.3m 14Ft 1PH/24 30A WR Pwr	22A	6655	MES	Yes	No
4.3m 14Ft 1PH/24A Power Cord	22A	6656	MES	Yes	No
4.3m 14Ft 1PH/32A Power Cord	22A	6657	MES	Yes	No
4.3m 14Ft 1PH/24A Pwr Cd Kor	22A	6658	MES	Yes	No
Pwr.Cord(9ft),To wall/OEM PDU	22A	6659	Both	Yes	No
Pwr Crd 14ft 4.3m wallOEM PDU	22A	6660	Both	Yes	No
Pwr Crd 2.8m 9.2ft PDU	22A	6665	Both	Yes	No
4.3m 14Ft 3PH/32A Pwr Cd Aus	22A	6667	MES	Yes	No
Pwr Crd 4.3M, Drwr - OEM PDU	22A	6669	Both	Yes	No
Pwr Crd 2.7m, Drwr - IBM PDU	22A	6671	Both	Yes	No
Pwr Crd 2M, Drwr - IBM PDU	22A	6672	Both	Yes	No
Pwr Crd 2.7m 9ft wall OEM PDU	22A	6680	Both	Yes	No
IIntelligent PDU+ 1 EIA Unit	22A	7109	MES	Yes	No
Environmental Monitoring Probe	22A	7118	Both	Yes	No
Power Distribution Unit	22A	7188	MES	Yes	No
PowDistribUnit(US)Fixed PowCrd	22A	7196	Both	Yes	No
Eth Cbl 15M HW Management	22A	7802	Both	Yes	No
Linux Software Preinstall	22A	8143	Initial	N/A	No
Linux Software Preinstall BP	22A	8144	Initial	N/A	No
USB Mouse	22A	8845	Support	Yes	No
Order Routing Indicator Syste	22A	9169	Initial	N/A	No
Language Group Spcf-US Eng	22A	9300	Initial	N/A	No
New AIX License Core Counter	22A	9440	Initial	N/A	No
New IBM i Lic Core Counter	22A	9441	Initial	N/A	No
New Red Hat Lic Core Counter	22A	9442	Initial	N/A	No
New SUSE Lic Core Counter	22A	9443	Initial	N/A	No
Other AIX Lic Core Counter	22A	9444	Initial	N/A	No
Other Linux Lic Core Counter	22A	9445	Initial	N/A	No
3rd Party Linux Lic Core Cnt					

	22A	9446	Initial	N/A	No
VIOS Core Counter	22A	9447	Initial	N/A	No
Other License Core Counter	22A	9449	Initial	N/A	No
Ubuntu Linux License Core Cntr	22A	9450	Initial	N/A	No
Month Indicator	22A	9461	Initial	N/A	No
Day Indicator	22A	9462	Initial	N/A	No
Hour Indicator	22A	9463	Initial	N/A	No
Minute Indicator	22A	9464	Initial	N/A	No
Qty Indicator	22A	9465	Initial	N/A	No
Countable Member Indicator	22A	9466	Initial	N/A	No
Language Group Spcf-Dutch	22A	9700	Initial	N/A	No
Language Group Spcf-French	22A	9703	Initial	N/A	No
Language Group Spcf-German	22A	9704	Initial	N/A	No
Language Group Spcf-Polish	22A	9705	Initial	N/A	No
Lang Group Specify - Norwegian	22A	9706	Initial	N/A	No
Lang.Group Spcf-Portuguese	22A	9707	Initial	N/A	No
Language Group Spcf-Spanish	22A	9708	Initial	N/A	No
Language Group Spcf-Italian	22A	9711	Initial	N/A	No
Langua Gr Speci Canadian Frenc	22A	9712	Initial	N/A	No
Language Group Spcf-Japanese	22A	9714	Initial	N/A	No
Language Group Specify Tr Chin	22A	9715	Initial	N/A	No
Language Group Spcf-Korean	22A	9716	Initial	N/A	No
Language Group Spcf-Turkish	22A	9718	Initial	N/A	No
Language Group Spcf-Hungarian	22A	9719	Initial	N/A	No
Language Group Spcf-Slovakian	22A	9720	Initial	N/A	No
Language Group Spcf-Russian	22A	9721	Initial	N/A	No
Lang Group Spcf Simpl Chinese	22A	9722	Initial	N/A	No
Language Group Spcf-Czech	22A	9724	Initial	N/A	No
Language Group Spcf-Romanian	22A	9725	Initial	N/A	No
Lang Group Specify - Croatian	22A	9726	Initial	N/A	No
Language Group Spcf-Slovenian	22A	9727	Initial	N/A	No
Lang Group Specify - Braz Port	22A	9728	Initial	N/A	No
Lang Group Specify - Thai	22A	9729	Initial	N/A	No
10m QSFP+ MTP Optical Cable	22A	EB2J	Both	Yes	No
30m QSFP+ MTP Optical Cable	22A	EB2K	Both	Yes	No
Power Supply 1400W 200-240 VAC	22A	EB2M	Both	Yes	No
Lift tool GenieLift GL-8	22A	EB3Z	Both	Yes	No

10Gb Optical Transceiver SFP+	22A	EB46	Both	Yes	No
25Gb Opt Transceiver SFP28	22A	EB47	Both	Yes	No
0.5 SFP/25GbE CU Cable	22A	EB4J	Both	Yes	No
1.0 SFP/25GbE CU Cable	22A	EB4K	Both	Yes	No
1.5 SFP/25GbE CU Cable	22A	EB4L	Both	Yes	No
2.0 SFP/25GbE CU Cable	22A	EB4M	Both	Yes	No
2.5 QSFP28/100GbE CU Cable	22A	EB4P	Both	Yes	No
Service wedge shelf for EB3Z	22A	EB4Z	Both	No	No
0.5m EDR IB Copper Cable	22A	EB50	Both	Yes	No
1.0m EDR IB Copper Cable	22A	EB51	Both	Yes	No
2.0M EDR IB Copper Cable	22A	EB52	Both	Yes	No
1.5M EDR IB Copper Cable	22A	EB54	Both	Yes	No
100Gb optic Transceiver QSFP28	22A	EB59	Both	Yes	No
3M EDR IB optical Cable	22A	EB5A	Both	Yes	No
5M EDR IB optical Cable	22A	EB5B	Both	Yes	No
10M EDR IB optical Cable	22A	EB5C	Both	Yes	No
15M EDR IB optical Cable	22A	EB5D	Both	Yes	No
20M EDR IB optical Cable	22A	EB5E	Both	Yes	No
30M EDR IB optical Cable	22A	EB5F	Both	Yes	No
50M EDR IB optical Cable	22A	EB5G	Both	Yes	No
100M EDR IB optical Cable	22A	EB5H	Both	Yes	No
0.5M 100GbE Cu Cable QSFP28	22A	EB5J	Both	Yes	No
1.0M 100GbE Cu Cable QSFP28	22A	EB5K	Both	Yes	No
1.5M 100GbE Cu Cable QSFP28	22A	EB5L	Both	Yes	No
2.0M 100GbE Cu Cable QSFP28	22A	EB5M	Both	Yes	No
25M EDR IB optical Cable	22A	EB5N	Both	Yes	No
3M 100GbE optic Cable QSFP28	22A	EB5R	Both	Yes	No
5M 100GbE optic Cable QSFP28	22A	EB5S	Both	Yes	No
10M 100GbE optic Cable QSFP28	22A	EB5T	Both	Yes	No
15M 100GbE optic Cable QSFP28	22A	EB5U	Both	Yes	No
20M 100GbE optic Cable QSFP28	22A	EB5V	Both	Yes	No
30M 100GbE optic Cable QSFP28	22A	EB5W	Both	Yes	No
50M 100GbE optic Cable QSFP28	22A	EB5X	Both	Yes	No
100M 100GbE optic Cable QSFP28	22A	EB5Y	Both	Yes	No
IBM i 7.2 Indicator	22A	EB72	Both	Yes	No
IBM i 7.3 Indicator	22A	EB73	Both	Yes	No
Rack Front Door (Black)	22A	EC01	MES	Yes	No

Rack Rear Door					
	22A	EC02	MES	Yes	No
Rack Side Cover					
	22A	EC03	MES	Yes	No
Rack Suite Attachment Kit					
	22A	EC04	MES	Yes	No
Slim Rear Acoustic Door					
	22A	EC07	MES	Yes	No
Slim Front Acoustic Door					
	22A	EC08	MES	Yes	No
Rear Door Heat Exchanger					
	22A	EC15	MES	Yes	No
PCIe3 LP 2-port 10GbE NIC Ro					
	22A	EC2R	Both	Yes	No
PCIe3 2-Port 10Gb NIC&ROCE					
	22A	EC2S	Both	Yes	No
PCIe3 LP 2-port 25/10GbE NIC					
	22A	EC2T	Both	Yes	No
PCIe3 2-Port 25/10Gb NIC&Ro					
	22A	EC2U	Both	Yes	No
PCIe3 LP 2-port 100GbE Adptx16					
	22A	EC3L	Both	Yes	No
PCIe3 NVMe carrier card					
	22A	EC59	Both	Yes	No
PCIe4 LP 1-port 100Gb EDR					
	22A	EC62	Both	Yes	No
PCIe4 LP 2-port 100Gb EDR					
	22A	EC64	Both	Yes	No
SAS X Cable 3m - HD Narrow					
	22A	ECBJ	Both	Yes	No
SAS X Cable 6m - HD Narrow					
	22A	ECBK	Both	Yes	No
SAS X Cable 10m - HD Narrow					
	22A	ECBL	Both	Yes	No
SAS X Cable 15m -HD Narrow 3Gb					
	22A	ECBM	Both	Yes	No
SAS YO Cable 1.5m - HD Narrow					
	22A	ECBT	Both	Yes	No
SAS YO Cable 3m - HD Narrow					
	22A	ECBU	Both	Yes	No
SAS YO Cable 6m - HD Narrow					
	22A	ECBV	Both	Yes	No
SAS YO Cable 10m - HD Narrow					
	22A	ECBW	Both	Yes	No
SAS YO Cable 15m-HD Narrow 3Gb					
	22A	ECBX	Both	Yes	No
SAS AE1 Cable 4m - HD Narrow					
	22A	ECBY	Both	Yes	No
SAS YE1 Cable 3m - HD Narrow					
	22A	ECBZ	Both	Yes	No
SAS AA Cable 0.6m - HD Narrow					
	22A	ECC0	Both	Yes	No
SAS AA Cable 1.5m - HD Narrow					
	22A	ECC2	Both	Yes	No
SAS AA Cable 3m - HD Narrow					
	22A	ECC3	Both	Yes	No
SAS AA Cable 6m - HD Narrow					
	22A	ECC4	Both	Yes	No
3M Optical Cable Pair					
	22A	ECC7	Both	Yes	No
10M Optical Cable Pair					
	22A	ECC8	Both	Yes	No
Port Converter Cable for UPS					
	22A	ECCF	Both	N/A	No
Var 1th Blue Cat5e Cable					
	22A	ECCG	Initial	N/A	No
Var 1th Green Cat5e Cable					
	22A	ECCH	Initial	N/A	No
3M Copper CXP Cable Pair					
	22A	ECCS	Both	Yes	No
3.0M SAS x12 Cable					
	22A	ECDJ	Both	Yes	No
4.5M SAS x12 Cable					
	22A	ECDK	Both	Yes	No

10M SAS X12 Cable					
	22A	ECDL	Both	Yes	No
1.5M SAS Y012 Cable					
	22A	ECDT	Both	Yes	No
3.0M SAS Y012 Cable					
	22A	ECDU	Both	Yes	No
4.5M SAS Y012 Cable					
	22A	ECDV	Both	Yes	No
10M SAS Y012 Cable					
	22A	ECDW	Both	Yes	No
0.6M SAS AA12 Cable					
	22A	ECE0	Both	Yes	No
3.0M SAS AA12 Cable					
	22A	ECE3	Both	Yes	No
4.5M SAS AA12 Cable					
	22A	ECE4	Both	Yes	No
2.0 M Slim Rack					
	22A	ECR0	MES	Yes	No
Rack Front Door					
	22A	ECRF	MES	Yes	No
Rack Rear Door Black					
	22A	ECRG	MES	Yes	No
Rack Side Cover					
	22A	ECRJ	MES	Yes	No
Rack Rear Extension 5-In					
	22A	ECRK	MES	Yes	No
Rack Front Door (Black/Flat)					
	22A	ECRM	MES	Yes	No
Assembled and Tested in China					
	22A	ECS0	Both	Yes	No
Custom Serv. Specify, France					
	22A	ECSF	Both	Yes	No
NeuCloud Indicator/Specify					
	22A	ECSJ	Both	N/A	No
Custom Serv. Specify, Mexico					
	22A	ECSM	Both	Yes	No
Custom Serv. Spec Poughkeepsie					
	22A	ECSP	Both	Yes	No
Integrated Solution Packing					
	22A	ECSS	Initial	N/A	No
Optical wrap Plug					
	22A	ECW0	Both	Yes	No
Boot Drive in EXP12SX Specify					
	22A	EHR1	Both	Yes	No
Boot / Load in EXP24SX Specify					
	22A	EHR2	Both	Yes	No
SSD Placement Ind- #ESLS/#ELLS					
	22A	EHS2	Both	Yes	No
SAS Port/single Backplane					
	22A	EJ00	Both	Yes	No
PCIe3 Optical Cable Adapter					
	22A	EJ05	Both	Yes	No
PCIe3 RAID SAS Adapter 4-port					
	22A	EJ0J	Both	Yes	No
PCIe3 LP RAID SAS ADAPTER					
	22A	EJ0M	Both	Yes	No
PCIe3 SAS Tape/DVD Adapter					
	22A	EJ10	Both	Yes	No
PCIe3 LP SAS Tape/DVD Adapter					
	22A	EJ11	Both	Yes	No
PCIe3 12GB Cache RAID+ SAS Ada					
	22A	EJ14	Both	Yes	No
Storage Backplane 8 SFF-3					
	22A	EJ1F	Both	No	No
Backplane 8 SFF & Single IOA					
	22A	EJ1G	Both	No	No
Split#EJ1F Add 2nd Control					
	22A	EJ1H	Both	No	No
PCIe3 Crypto Coproc BSC-3 4767					
	22A	EJ33	Both	Yes	No
Non-paired Indicator EJ0L PCIe					
	22A	EJRL	Both	Yes	No
Front IBM Bezel 8-Bay BackPl					
	22A	EJU6	Both	Yes	No



Front OEM Bezel 8-Bay BackP					
	22A	EJU7	Both	Yes	No
Specify Mode-1 for EXP12SX 1&1	22A	EJV1	Both	Yes	No
Specify Mode-1 for EXP12SX 2&2	22A	EJV2	Both	Yes	No
Specify Mode-2 for EXP12SX 2&2	22A	EJV3	Both	Yes	No
Specify Mode-2 for EXP12SX 4&2	22A	EJV4	Both	Yes	No
Specify Mode-4 for EXP12SX 4&2	22A	EJV5	Both	Yes	No
Specify Mode-2 for EXP12SX 1&2	22A	EJV6	Both	Yes	No
Specify Mode-2 for EXP12SX 2&2	22A	EJV7	Both	Yes	No
Specify Mode-2 for EXP12SX 1&1	22A	EJVA	Both	Yes	No
Specify Mode-2 for EXP12SX 2&1	22A	EJVB	Both	Yes	No
Specify Mode-4 for EXP12SX 1&1	22A	EJVC	Both	Yes	No
Specify Mode-4 for EXP12SX 2&1	22A	EJVD	Both	Yes	No
Specify Mode-4 for EXP12SX 3&2	22A	EJVE	Both	Yes	No
Specify Mode-1 for EXP12SX 2&2	22A	EJVF	Both	Yes	No
Specify Mode-1 for EXP12SX	22A	EJVV	Initial	N/A	No
Specify Mode-1 for EXP24SX 1&1	22A	EJW1	Both	Yes	No
Specify Mode-1 for EXP24SX 2&2	22A	EJW2	Both	Yes	No
Specify Mode-2 for EXP24SX 2&2	22A	EJW3	Both	Yes	No
Specify Mode-2 for EXP24SX 4&2	22A	EJW4	Both	Yes	No
Specify Mode-4 for EXP24SX 4&2	22A	EJW5	Both	Yes	No
Specify Mode-2 for EXP24SX 1&2	22A	EJW6	Both	Yes	No
Specify Mode-2 for EXP24SX 2&2	22A	EJW7	Both	Yes	No
Specify Mode-2 for EXP24SX 1&1	22A	EJWA	Both	Yes	No
Specify Mode-2 for EXP24SX 2&1	22A	EJWB	Both	Yes	No
Specify Mode-4 for EXP24SX 1&1	22A	EJWC	Both	Yes	No
Specify Mode-4 for EXP24SX 2&1	22A	EJWD	Both	Yes	No
Specify Mode-4 for EXP24SX 3&2	22A	EJWE	Both	Yes	No
Specify Mode-1 for EXP24SX 2&2	22A	EJWF	Both	Yes	No
Specify Mode-2 for EXP24SX 2&2	22A	EJWG	Both	Yes	No
Specify Mode-2 for EXP24SX 2&1	22A	EJWH	Both	Yes	No
Specify Mode-2 for EXP24SX 4&2	22A	EJWJ	Both	Yes	No
Specify Mode-1 for EXP24SX	22A	EJWU	Initial	N/A	No
PDU Access Cord 0.38m	22A	ELC0	MES	Yes	No
16 GB DDR4 Memory	22A	EM62	Both	Yes	No
32 GB DDR4 Memory	22A	EM63	Both	Yes	No
64 GB DDR4 Memory	22A	EM64	Both	Yes	No
128 GB DDR4 Memory	22A	EM65	Both	Yes	No

PCIe Gen3 I/O Expansion Drawer	22A	EMX0	Both	Yes	No
AC Power Supply Conduit	22A	EMXA	Both	Yes	No
PCIe3 6-slot Fanout Module	22A	EMXF	Support	Yes	No
PCIe3 6-slot Fanout Module	22A	EMXG	Both	Yes	No
1m 10GbE Cable SFP+ Act Twinax	22A	EN01	Both	Yes	No
3m 10GbE Cable SFP+ Act Twinax	22A	EN02	Both	Yes	No
5m 10GbE Cable SFP+ Act Twinax	22A	EN03	Both	Yes	No
PCIe3 16Gb 2-port Fibre Channe	22A	EN0A	Both	Yes	No
PCIe3 LP 16Gb 2-port Fibre Cha	22A	EN0B	Both	Yes	No
PICe3 4-port 10Gb FCoE & 1GbE	22A	EN0H	Both	Yes	No
PCIe3 LP 4-port 10GB FCoE & 1G	22A	EN0J	Both	Yes	No
PCIe3 4-port 10GB FCoE & 1GbE	22A	EN0K	Both	Yes	No
PCIe3 LP 4-port 10GB FCoE &1GE	22A	EN0L	Both	Yes	No
PCIe3 LP 4-port 10Gb FCoE &1GE	22A	EN0N	Support	Yes	No
PCIe2 4-pt(10+1 GbE)SR+RJ45	22A	EN0S	Both	Yes	No
PCIe2 LP4-pt(10+1 GbE)SR+RJ45	22A	EN0T	Both	Yes	No
PCIe2 4-pt(10+1GbE)CRSR+RJ45	22A	EN0U	Both	Yes	No
PCIe2 LP4-pt(10+1GbE)CRSR+RJ45	22A	EN0V	Both	Yes	No
PCIe2 2-pt 10/1GbE BaseT RJ45	22A	EN0W	Both	Yes	No
PCIe2 LP2-pt10/1GbE BaseT RJ45	22A	EN0X	Both	Yes	No
PCIe2 LP 8Gb 4-port Fibre Chan	22A	EN0Y	Both	Yes	No
PCIe3 4-port 10GbE SR Adapter	22A	EN15	Both	Yes	No
PCIe3 32Gb 2-port FC Adapter	22A	EN1A	Both	Yes	No
PCIe3 LP 32Gb 2-port FC Adap	22A	EN1B	Both	Yes	No
PCIe3 16Gb 4-port FC Adapter	22A	EN1C	Both	Yes	No
PCIe3 LP 16Gb 4-port FC Adap	22A	EN1D	Both	Yes	No
4-core 2.8/3.8 GHZ POWER9	22A	EP16	Both	No	No
8-core 3.4/3.9 GHZ POWER9	22A	EP18	Both	No	No
10-core 2.9/3.8 GHZ POWER9	22A	EP19	Both	No	No
One Proc Activation for EP16	22A	EP46	Both	Yes	No
One Proc Activation for EP18	22A	EP48	Both	Yes	No
One Proc Activation for EP19	22A	EP49	Both	Yes	No
Horizontal PDU Mounting Hardwr	22A	EPTH	Both	Yes	No
High Function 9xC19 PDU	22A	EPTJ	Both	Yes	No
High Function 9xC19 PDU 3Phase	22A	EPTL	Both	Yes	No
High Function 12xC13 PDU	22A	EPTN	Both	Yes	No
High Function 12xC13 PDU 3-Phs	22A	EPTQ	Both	Yes	No

Qty 150 #ES62 3.86TB LFF Dsk	22A	EQ62	Both	Yes	No
Qty 150 #ES64 7.72TB LFF Dsk	22A	EQ64	Both	Yes	No
Qty 150 #ES78 SSD 387GB 5xx	22A	EQ78	Both	Yes	No
Qty 150 #ES7E SSD 775GB 5xx	22A	EQ7E	Both	Yes	No
Quantity 150 of ES80 1.9TB SSD	22A	EQ80	Support	Yes	No
Qty 150 #ES85 SSD 387GB 4k	22A	EQ85	Both	Yes	No
Qty 150 #ES8C SSD 775GB 4k	22A	EQ8C	Both	Yes	No
Qty 150 #ES8F SSD 1.55TB 4k	22A	EQ8F	Both	Yes	No
Quantity 150 of ES8Y 931GB	22A	EQ8Y	Both	Yes	No
Quantity 150 of ES96 1.86TB	22A	EQ96	Both	Yes	No
Quantity 150 of #ESE7 3.72TB	22A	EQE7	Both	Yes	No
Quantity 150 of #ESEV 600GB	22A	EQEV	Both	Yes	No
Quantity 150 of #ESEZ 300GB	22A	EQEZ	Both	Yes	No
Quantity 150 of #ESF3 1.2TB	22A	EQF3	Both	Yes	No
Quantity 150 of #ESFP 600GB	22A	EQFP	Both	Yes	No
Quantity 150 of #ESFT 1.8TB	22A	EQFT	Both	Yes	No
Quantity 150 of #ESG5	22A	EQG5	Both	Yes	No
Quantity 150 of #ESGB	22A	EQGB	Both	Yes	No
Quantity 150 of #ESGF	22A	EQGF	Both	Yes	No
Quantity 150 of #ESGK	22A	EQGK	Both	Yes	No
Quantity 150 of #ESGP	22A	EQGP	Both	Yes	No
42U Slim Rack	22A	ER05	MES	Yes	No
Bulk Pack Request Indicator	22A	ERB0	Initial	N/A	No
Bulk Packaging Identifier #1	22A	ERB1	Initial	N/A	No
Bulk Packaging Identifier #2	22A	ERB2	Initial	N/A	No
Bulk Packaging Identifier #3	22A	ERB3	Initial	N/A	No
Bulk Packaging Identifier #4	22A	ERB4	Initial	N/A	No
Bulk Packaging Identifier #5	22A	ERB5	Initial	N/A	No
Bulk Packaging Identifier #6	22A	ERB6	Initial	N/A	No
Bulk Packaging Identifier #7	22A	ERB7	Initial	N/A	No
Bulk Packaging Identifier #8	22A	ERB8	Initial	N/A	No
Bulk Packaging Identifier #9	22A	ERB9	Initial	N/A	No
Bulk Packaging Identifier #10	22A	ERBA	Initial	N/A	No
Bulk Packaging Identifier #11	22A	ERBB	Initial	N/A	No
Bulk Packaging Identifier #12	22A	ERBC	Initial	N/A	No
Bulk Packaging Identifier #13	22A	ERBD	Initial	N/A	No
Bulk Packaging Identifier #14	22A	ERBE	Initial	N/A	No

Bulk Packaging Identifier #15	22A	ERBF	Initial	N/A	No
Bulk Packaging Identifier #16	22A	ERBG	Initial	N/A	No
Bulk Packaging Identifier #17	22A	ERBH	Initial	N/A	No
Bulk Packaging Identifier #18	22A	ERBJ	Initial	N/A	No
Bulk Packaging Identifier #19	22A	ERBK	Initial	N/A	No
Bulk Packaging Identifier #20	22A	ERBL	Initial	N/A	No
Single Pack Request Indicator	22A	ERBZ	Initial	N/A	No
RFID Tags for Compute Nodes	22A	ERF1	Initial	N/A	No
Rear rack extension	22A	ERG0	MES	Yes	No
Mainstream 400GB SSD NVMe	22A	ES14	Both	Yes	No
3.86TB 7200 RPM SAS LFF Disk	22A	ES62	Both	Yes	No
7.72TB 7200 RPM SAS LFF Disk	22A	ES64	Both	Yes	No
387GB SFF-2 SSD 5xx for AIX/L	22A	ES78	Both	Yes	No
775GB SFF-2 SSD 5xx for AIX/L	22A	ES7E	Both	Yes	No
387GB SFF-3 SSD 5xx for AIX/L	22A	ES7K	Both	Yes	No
775GB SFF-3 SSD 5xx for AIX/L	22A	ES7P	Both	Yes	No
1.9TB RI SAS 4k SFF-2 SSD AIX	22A	ES80	Support	Yes	No
931GB Mainstream SAS 4k SSD	22A	ES83	Both	Yes	No
387GB SFF-2 SSD 4k for AIX/Li	22A	ES85	Both	Yes	No
775GB SFF-2 SSD 4k for AIX/Li	22A	ES8C	Both	Yes	No
1.55TB SFF-2 SSD 4k for AIX/L	22A	ES8F	Both	Yes	No
1.9TB RI SAS 4k SFF-3 SSD AIX	22A	ES8J	Support	Yes	No
387GB SFF-3 SSD 4k for AIX/Li	22A	ES8N	Both	Yes	No
775GB SFF-3 SSD 4k for AIX/Li	22A	ES8Q	Both	Yes	No
1.55TB SFF-3 SSD 4k for AIX/L	22A	ES8V	Both	Yes	No
931GB Mainstream SAS 4k SSD	22A	ES8Y	Both	Yes	No
1.86TB Mainstream SAS 4k SSD	22A	ES92	Both	Yes	No
1.86TB Mainstream SAS 4k SSD	22A	ES96	Both	Yes	No
S&H - No Charge	22A	ESC0	Both	Yes	No
S&H-a	22A	ESC5	Initial	N/A	No
600GB 10K RPM SAS SFF3 Disk	22A	ESD5	Both	Yes	No
300GB 15K RPM SAS SFF-3 Disk	22A	ESDB	Both	Yes	No
3.72TB Mainstream SAS 4k SSD	22A	ESE1	Both	Yes	No
3.72TB Mainstream SAS 4k SSD	22A	ESE7	Both	Yes	No
600GB 10K RPM SFF-2 Disk 4K	22A	ESEV	Both	Yes	No
300GB 15K SAS SFF-2 4K BLK HDD	22A	ESEZ	Both	Yes	No
1.2TB 10K RPM SFF-2 Disk 4K	22A	ESF3	Both	Yes	No

600GB 10K RPM SFF-3 Disk 4K						
	22A	ESF5	Both	Yes	No	
1.2TB 10K RPM SFF-3 Disk 4K						
	22A	ESF9	Both	Yes	No	
300GB 15K SAS SFF-3 4K BLK HDD						
	22A	ESFB	Both	Yes	No	
600GB 15K SAS SFF-3 4K BLK HDD						
	22A	ESFF	Both	Yes	No	
600GB 15K SAS SFF-2 4K BLK HDD						
	22A	ESFP	Both	Yes	No	
1.8TB 10K RPM SFF-2 Disk 4K						
	22A	ESFT	Both	Yes	No	
1.8TB 10K RPM SFF-3 Disk 4K						
	22A	ESFV	Both	Yes	No	
387GB Enterprise SAS 5xx SSD						
	22A	ESG5	Both	Yes	No	
387GB Enterprise SAS 5xx SSD						
	22A	ESG9	Both	Yes	No	
387GB Enterprise SAS 4k SSD						
	22A	ESGB	Both	Yes	No	
387GB Enterprise SAS 4k SSD						
	22A	ESGD	Both	Yes	No	
775GB Enterprise SAS 5xx SSD						
	22A	ESGF	Both	Yes	No	
775GB Enterprise SAS 5xx SSD						
	22A	ESGH	Both	Yes	No	
775GB Enterprise SAS 4k SSD						
	22A	ESGK	Both	Yes	No	
775GB Enterprise SAS 4k SSD						
	22A	ESGM	Both	Yes	No	
1.55TB Enterprise SAS 4k SSD						
	22A	ESGP	Both	Yes	No	
1.55TB Enterprise SAS 4k SSD						
	22A	ESGR	Both	Yes	No	
Specify AC Power Supply						
	22A	ESLA	Both	Yes	No	
EXP12SX SAS Storage Enclosure						
	22A	ESLL	Both	Yes	No	
EXP24SX SAS Storage Enclosure						
	22A	ESLS	Both	Yes	No	
300GB 15K SAS SFF-3 4k HDD						
	22A	ESNK	Both	Yes	No	
300GB 15K SAS SFF-2 4k HDD						
	22A	ESNM	Both	Yes	No	
600GB 15K SAS SFF-3 4k HDD						
	22A	ESNP	Both	Yes	No	
600GB 15K SAS SFF-2 4k HDD						
	22A	ESNR	Both	Yes	No	
Quantity 150 of #ESNM 300GB						
	22A	ESPM	Both	Yes	No	
Quantity 150 of #ESNR 600GB						
	22A	ESPR	Both	Yes	No	
1TB Removable Disk Cartridge						
	22A	EU01	Both	Yes	No	
RDX USB External Docking						
	22A	EU04	Support	Yes	No	
RDX 320 GB Removable Disk Driv						
	22A	EU08	Support	Yes	No	
Operator Panel LCD Display						
	22A	EU0B	Both	Yes	No	
1.5TB Removable Disk Cartridge						
	22A	EU15	Support	Yes	No	
Cable Ties & Labels						
	22A	EU19	Both	Yes	No	
2TB Removable Disk Cartrdg-RDX						
	22A	EU2T	Both	Yes	No	
RDX USB External Docking Sta						
	22A	EUA4	Both	Yes	No	
Standalone USB DVD drive w/c						
	22A	EUA5	Both	Yes	No	
Core Use HW Feature						

Core Use HW Feature 10	22A	EUC6		MES	Yes	No
	22A	EUC7		MES	Yes	No

The following are newly announced features on the specific models of the IBM Power Systems 7014 and 7965 machine type:

Description Machine type	Model number	Feature number	Purchase price	Minimum Monthly Charge	Initial/ Monthly MES/ Maint. Charge	Both/ Support	RP CSU MES
Rack Specify	9009-22A	-2EIA T00 T42					
		ER2V			Initial	N/A	No
					Initial	N/A	No

Description Machine type	Model number	Feature number	Purchase price	Minimum Monthly Charge	Initial/ Monthly MES/ Maint. Charge	Both/ Support	RP CSU MES
Rack Specify	9009-22A	-2EIA 94Y S42					
		ER2V			Initial	N/A	No
					Initial	N/A	No

CSU = Customer setup

RP MES = Return parts, miscellaneous equipment specifications

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[ENUS-118-021-LIST\\_PRICES\\_2018\\_02\\_13.PDF](#)

### **Annual minimum maintenance charges**

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Not applicable.

### **ServiceElect (ESA) charges**

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## Corrections

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**(Corrected on February 23, 2018)**

The Description and Hardware requirements sections were revised.