

# Family 9008+01 IBM Power System L922 (9008-22L)

IBM United States Sales Manual  
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## Product life cycle dates

Type Model	Announced	Available	Marketing Withdrawn	Service Discontinued
9008-22L	2018-02-13	2018-03-20	2021-01-29	-

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## Abstract

**Note: The Model 9008-22L is not withdrawn in South Korea.**

The next generation of Power Systems servers with POWER9 technology is built with innovations that can help deliver secure workloads of today's enterprises. POWER9 technology is designed from the ground up for data-intensive workloads like data analytics, artificial intelligence, and machine learning.

This new server generation has twice the memory footprint of IBM POWER8 servers, making it an ideal platform for in-memory analytics. Changes in the memory subsystem and the use of industry standard memory DIMMs take POWER9 technology to the next level, offering price/performance offerings. Designed to run commercial, cognitive, and database workloads, POWER9 technology provides a robust and secure backbone of their IT infrastructure. Client references indicate POWER servers provide a robust and secure backbone of their IT infrastructure. More technology in their IT infrastructure down from the shop level to large data center deployments.

The Power L922 server by default has its Power Management mode set to Max Performance. This mode can dynamically adjust power consumption over time based on CPU utilization and operating environmental conditions. For a description of this feature and as other features of this server, see the "IBM EnergyScale for POWER9 Processor-Based Systems" website.

The Power L922 server supports two processor sockets offering 8-core or 16-core typical 3.4 to 3.9 GHz (max), or 10-core or 24-core typical 2.7 to 3.8 GHz (max) POWER9 cores in a 19-inch rack-mount, 2U (EIA units) drawer configuration. All the server features are available in the 2U configuration.

The server supports a maximum of 32 DDR4 DIMM slots. Memory features supported are 8 GB, 16 GB, 32 GB, 64 GB, and 128 GB, offering a maximum system memory of 4096 GB.

- I/O options in the system unit, including:
  - Three x16 Gen4 low-profile, half-length (Coherent Accelerator Processor Interface (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 (IBM PowerVM for IBM PowerLinux)
- Red Hat Enterprise Linux (RHEL), SUSE Linux Enterprise Server (SUSE), and Ubuntu Server operating system support

## Model abstract 9008-22L

The Power L922 server supports two processor sockets offering 8-core or 16-core typical 3.4 to 3.9 GHz (max), or 10-core or 24-core typical 2.7 to 3.8 GHz (max) POWER9 cores in a 19-inch rack-mount, 2U (EIA units) drawer configuration. All the server supports a maximum of 32 DDR4 DIMM slots. Memory features supported are 8 GB, 16 GB, 32 GB, 64 GB, and 128 GB and run at 2666 Mbps, offering a maximum system memory of 4096 GB.

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## Highlights

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The IBM Power System L922 (9008-22L) server easily integrates into your organization's cloud and cognitive strategy and price/performance for your mission-critical workloads.

- 8 GB (#EM60), 16 GB (#EM62), 32 GB (#EM63), 64 GB (#EM64), or 128 GB (#EM65) memory features - different size frequencies of 2133, 2400, and 2666 Mbps
- Gain insights faster from your data with 4 TB in-memory database capabilities.
- Deliver superior price/performance for your mission-critical applications with room to scale in Linux environments.
- Help guard against security threats with the server's features, reliability, and performance.
- Harness the integrated virtualization capabilities of the L922 to enable enterprises to rapidly deploy, optimize, and recover
- Save on licensing cost with the strongest per-core performance in the industry.

The Power L922 server is a powerful 2-socket server that ships with up to 24 fully activated cores and I/O configuration flexible to meet tomorrow's processing needs. The server features:

- The following fully activated IBM POWER9 processor module configurations in a 19-inch rack-mount, 2U (EIA units) form factor:
  - 8-core typical 3.4 to 3.9 GHz (max)
  - 10-core typical 2.9 to 3.8 GHz (max)
  - 12-core typical 2.7 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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## Description

The POWER9 scale-out family is the first set of entry servers that comes completely cloud enabled out of the box with integrated security. Additionally, on-chip analytics and algorithms help clients run their workloads at an optimized processor frequency for performance. With the DDR4 memory footprint of 4 TB, IBM provides systems that are unmatched by the competition in terms of memory capacity and ratio needed for data-centric and in-memory workloads. The Power System L922 server has built-in security that can help protect against security threats.

Power Systems servers running Linux are designed to provide the ideal foundation for private and public cloud infrastructure.

### Summary of standard features for Power L922:

- POWER9 processor modules:
  - 8-core, typical 3.4 to 3.9 GHz (max) POWER9 Processor (#ELPV)
  - 10-core, typical 2.9 to 3.8 GHz (max) POWER9 Processor (#ELPW)
  - 12-core, typical 2.7 to 3.8 GHz (max) POWER9 Processor (#ELPX)
- High-performance Mbps DDR4 ECC memory
  - 8 GB (#EM60), 16 GB (#EM62), 32 GB (#EM63), 64 GB (#EM64), or 128 GB (#EM65) memory features - 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, 5, 6, or 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)
  - A quantity of one PCIe3 NVMe carrier card can be ordered only with a storage backplane. If a PCIe3 NVMe carrier card is ordered without a storage backplane, then the optional split feature is not supported.
- PCIe slots with single processor:
  - One x16 Gen4 low-profile, half-length (CAPI)
  - One x8 Gen4 low-profile, half-length (with x16 connector) (CAPI)
  - Two x8 Gen3 low-profile, half-length (with x16 connectors)
  - Two x8 Gen3 low-profile, half-length (One of these slots is used for the required base LAN adapter.)
- PCIe slots with two processors:
  - Three x16 Gen4 low-profile, half-length (CAPI)
  - Two x8 Gen4 low-profile, half-length (with x16 connectors) (CAPI)
  - Two x8 Gen3 low-profile, half-length (with x16 connectors)
  - Two x8 Gen3 low-profile, half-length (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 IBM AIX and Linux environments on POWER processor-base virtualization-oriented performance monitor, and performance statistics are available through the HMC. These performance the workload characteristics and to prepare for capacity planning. **Power L922 system configuration**

The minimum Power L922 initial order must include a processor module, two 16 GB DIMMs, two power supplies and line cover set indicator, and a Language Group Specify. Also, it must include one of the storage options and the network option

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. ordered if feature 0837 is selected.

Network options:

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

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 ELPV	8-core, typical 3.4 to 3.9 GHz (max) POWER9 Processor	1	
or ELPW	10-core, typical 2.9 to 3.8 GHz (max) POWER9 Processor	1	
Processor activations ELAV	One Processor Core Activation for #ELPV	8	
or ELAW	One Processor Core Activation for #ELPW	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 EL66	Storage Backplane 8 SFF-3 Bays	1	Optional split card EL68
or EC59	PCIe3 NVMe carrier card w/2 M.2 module slots	1	Must order, at a minimum, one of feature ES14

Disk Drive			
ELDB	300 GB 15K RPM	1	
	SAS SFF-3 Disk		
	Drive (Linux)		
LAN Adapter			
EL4M	PCIe2 LP 4-port	1 1	
	GbE Adapter		
Power supplies/Power cord			
EL1B	AC Power Supply -	2	
	1400 W for Server		
	(200 - 240 V AC)		
6458	Power Cord 4.3 m	2	6458 - (default)
	(14 ft), Drawer		
	to IBM PDU		
	(250V/10A)		
9300/97xx	Language Group		9300 - (default)
	Specify		
Front Bezel			
EJUC	Front IBM Bezel		
	for 8-Bay		
	BackPlane		
or			
EJU7	Front OEM Bezel		
	for 8-Bay		
	BackPlane		
Operating System			
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 addition 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 at least one disk unit is required to be ordered. If no HDD/SSD/SAN boot (0837) is ordered, then feature EC59 (with a
- Adapter feature EL4M is the default 1 Gb Ethernet adapter. Options of a 10 Gb Ethernet adapter include one of either EN0T, or EN0V.

## Processor modules

A maximum of two processors with eight processor cores (#ELPV), or two processors with ten processor cores (#ELPW), or two processors with twelve processor cores (#ELPX) is allowed. All processor cores must be activated. The following defines the allowed quantities of processor activation

- One 8-core, typical 3.4 to 3.9 GHz (max) processor (#ELPV) requires that eight processor activation codes be ordered. Feature #ELAV is allowed.
- Two 8-core, typical 3.4 to 3.9 GHz (max) processors (#ELPV) require that sixteen processor activation codes be ordered. Feature #ELAV is allowed.
- One 10-core, typical 2.9 to 3.8 GHz (max) processor (#ELPW) requires that ten processor activation codes be ordered. Feature #ELAW is allowed.
- Two 10-core, typical 2.9 to 3.8 GHz (max) processors (#ELPW) require that twenty processor activation codes be ordered. Feature #ELAW is allowed.
- Two 12-core, typical 2.7 to 3.8 GHz (max) processors (#ELPX) require that twenty-four processor activation codes be ordered. Feature #ELAX is allowed.

## System memory

- A minimum of 32 GB of memory is required on the Power L922 system.
- Memory upgrades require memory pairs. Base memory is 2x 8 GB DIMMs (#EM60) with one socket installed and 4x 8 GB DIMMs installed (2 per socket).

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

Feature	Feature number	Minimum DIMM	Maximum DIMM
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		quantity	quantity
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8 GB DDR4 Memory	EM60	0	32
16 GB DDR4 Memory	EM62	0	32
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.**

Care should be exercised in mixing DIMMS of different size, density, and type in the system. For additional information refer to the plugging rules at [https://www.ibm.com/support/knowledgecenter/9009-42G/p9han/p9han\\_914\\_922\\_924\\_memory\\_placer](https://www.ibm.com/support/knowledgecenter/9009-42G/p9han/p9han_914_922_924_memory_placer)

### Power supply

- Two power supplies supporting a rack: 1+1 1400 Watt 200 - 240 Volt (#EL1B)

### 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 Power L922 server supports power cord 4.3 m (14 ft), Drawer to Wall/IBM PDU (250V/10A) in the base shipment group. See the I/O drawer section.

### PCIe slots

The Power L922 server has up to nine PCIe hot-plug slots, providing excellent configuration flexibility and expandability. For more information, see the I/O drawer section.

With two POWER9 processor single-chip modules (SCM), nine PCIe slots are available: three are x16 Gen4 low-profile, half-length slots (with x16 connectors) (CAPI), two are x8 Gen3 low-profile, half-length slots (with x16 connectors) (CAPI), and four 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 slots (CAPI), one is x8 Gen3 low-profile, half-length slots (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 provide 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 the same configuration.

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

These servers are smarter about energy efficiency for cooling the PCIe adapter environment. They sense which IBM PCIe adapters are installed and if an adapter requires higher levels of cooling, they automatically speed up fans to increase airflow across the PCIe adapters and reduce the sound level of the server. Higher wattage PCIe adapters include the PCIe3 SAS adapters and SSD/flash PCIe adapters (see #EJ14).

### SAS bays and storage backplane options

- Storage Backplane 8 SFF-3 Bays (#EL66)
- Feature EL68 (4 + 4 SFF-3 Bays split backplane)
- Expanded Function Storage Backplane 8 SFF-3 Bays/Single IOA with Write Cache (#EL67)

The backplane option provides SFF-3 SAS bays in the system unit. These 2.5-inch or small form factor (SFF) SAS bays are 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 and do not have hot-plug or hot-swap capability.

This backplane option uses leading-edge, integrated SAS RAID controller technology designed and patented by IBM. A custom chip is the basis of these SAS RAID controllers and provides industry-leading RAID 5 and RAID 6 performance levels, especially for write-intensive workloads. The integrated SAS controllers are placed in dedicated slots and do not require hot-plug capability.

The feature EL66 Storage Backplane option provides eight SFF-3 bays and one SAS controller with zero write cache.

By optionally adding the feature EL68 Split Backplane, a second integrated SAS controller with no write cache is provided, divided into two sets of four bays. Each SAS controller independently runs one of the four-bay sets of drives.

This backplane option supports HDDs or SSDs or a mixture of HDDs and SSDs in the SFF-3 bays. "Mixing" HDDs and SSDs in four bays of the split backplane option. Note, if you are mixing HDDs and SSDs, they must be in separate arrays (unless using RAID 0 or RAID 6).

This backplane option can offer different drive protection options: RAID 0, RAID 5, RAID 6, or RAID 10. RAID 5 requires a minimum of four 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-plug is supported for RAID 0, RAID 5, 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 Linux and VIOS. It is highly recommended but not required that the drives be protected by RAID.

If the client needs a change after the server is already installed, the backplane option can be changed. For example, the feature EL68 can be added to an existing feature EL66 backplane.

Unlike the hot-plug PCIe slots and SAS bays, concurrent maintenance is not available for the integrated SAS controllers. 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 EL68 supports the EXP12SX/EXP24SX drawer. All bays are accessed by both of the integrated SAS controllers. The bays support concurrent access.

### **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 slots pass 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 without disconnecting the cables from the server. Approximately 1 meter (3 feet) of cord/cable length is needed for the arm to be fully extended.

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

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

The one system port is RJ45 and is supported by Linux for attaching serial devices such as an asynchronous device like a modem. A RJ45 connection, a converter cable such as feature 3930 can provide a 9-pin D-shell connection. Note that serial devices come in many configurations (different pin outs), and the feature 3930 may not be appropriate for all possible devices. In this case, the user should acquire the correct cable 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 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-sub connector.

### **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 installed in the rack, 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 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. Clients should 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 location of the expansion drawers. Expansion drawers must be placed, avoiding locating those adjacent to vertical PDU locations, EIA 6 through 16 and 21 through 31.

The I/O expansion drawer can be migrated from a POWER8 to a POWER9 processor-based system. Only I/O cards supported by the POWER8 system are allowed. Clients migrating the I/O expansion drawer configuration might have one or two PCIe3 6-slot fanout modules connected to the rear of the I/O expansion drawer.

For a 2U server configuration with two processor modules, up to one I/O expansion drawer and two fanout modules (#ELM1) are supported. For a 2U server configuration with one processor module, up to one I/O expansion drawer and one fanout module (#ELMG) connected to one Optical Cable Adapter (#EJ05) are supported (the right PCIe module bay must be populated by a filler module).

For a 2U server configuration with two processor modules, up to two I/O expansion drawers and three fanout modules (#ELM1) are supported (the right PCIe module bay for the second I/O expansion drawer must be populated by a filler module). For a 2U server configuration with one processor module, up to one I/O expansion drawer and one fanout module (#EMXH) connected to one Optical Cable Adapter (#EJ05) are supported (the right PCIe module bay must be populated by a filler module).

**Limitations:**

- Mixing of prior PCIe3 fanout modules (#ELMF, #ELMG) with PCIe3 fanout module (feature #EMXH) in the same I/O E
- Mixing of I/O Expansion Drawer with prior PCIe3 fanout modules (#ELMF, #ELMG) and I/O Expansion Drawer with PC configuration is allowed
- PCIe3 Optical Cable Adapters (#EJ1R) requires to use Optical Cables (#ECCX or #ECCY), or copper cable (#ECCS)
- Firmware 9.30, or later for copper CXP cables

**RDX docking station**

The RDX docking station EU04 accommodates RDX removable disk cartridges of any capacity. The disk is in a protective into the docking station. The docking station holds one removable rugged disk drive/cartridge at a time. The rugged remov performs saves, restores, and backups similar to a tape drive. This docking station can be an excellent entry capacity/perf

**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 HD 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 V 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), 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 usi specifically documented procedure. The predecessor EXP24S did not support this mode change in the field.

**Important:** When changing modes, it is very important that a skilled, technically qualified person follow the special docume modes can potentially destroy existing RAID sets, prevent access to existing data, or allow other partitions to access anoth 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 cont 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 c designed to support up to 12 Gb SAS. The PCIe Gen3 SAS adapters support up to 6 Gb throughput. The EXP24SX has b throughput if future SAS adapters support that capability. All ends of the YO12 and X12 cables have mini-SAS HD narrow c

- 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 12 Gb throughput if future adapters support that capability. Copper feature ECE0 is 0.6 meters long, ECE3 is 3 meters long meter long.

One no-charge specify code is used with each EXP24SX I/O Drawer (#ESLS/#ELLS) to communicate to IBM configurator mode setting, adapter, and SAS cable are needed. With this specify code, no hardware is shipped. The physical adapters,



with their own chargeable feature numbers. There are more technically supported configurations than are represented by t and IBM configurator tools such as e-config only understand and support EXP24SX configurations represented by these s

Specify	Mode	Adapter/Controller	Cable to Drw	Environment
#EJW0	Mode 1	CEC SAS Ports	2 Y012 cables	AIX/IBM i/Linux/VIOS
#EJW1	Mode 1	One (unpaired) #EJ0J/#EJ0M/#EL3B/#EL5	1 Y012 cable	AIX/IBM i/Linux/VIOS
#EJW2	Mode 1	Two (one pair) #EJ0J/#EJ0M/#EL3B/#EL5	2 Y012 cables	AIX/IBM i/Linux/VIOS
#EJW3	Mode 2	Two (unpaired) #EJ0J/#EJ0M/#EL3B/#EL5	2 X12 cables	AIX/Linux/VIOS
#EJW4	Mode 2	Four (two pair) #EJ0J/#EJ0M/#EL3B/#EL5	2 X12 cables	AIX/Linux/VIOS
#EJW5	Mode 4	Four (unpaired) #EJ0J/#EJ0M/#EL3B/#EL5	2 X12 cables	AIX/Linux/VIOS
#EJW6	Mode 2	One (unpaired) #EJ0J/#EJ0M/#EL3B/#EL5	2 Y012 cables	AIX/Linux/VIOS
#EJW7	Mode 2	Two (unpaired) #EJ0J/#EJ0M/#EL3B/#EL5	2 Y012 cables	AIX/Linux/VIOS
#EJWF	Mode 1	Two (one pair) #EJ14	2 Y012 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 Y012 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. communicate to IBM Manufacturing a lower-cost partial configuration is to be configured where the ordered adapters and c bays. The future MES addition of adapters and cables can enable the remaining SAS bays for growth. The following specif

Specify	Mode	Adapter/Controller	Cable to Drw	Environment
#EJWA (1/2 of #EJW7)	Mode 2	One (unpaired) #EJ0J/#EJ0M/#EL3B/#EL	1 Y012 cables	AIX/Linux/VIOS
#EJWB (1/2 of #EJW4)	Mode 2	Two (one pair) #EJ0J/#EJ0M/#EL3B/#EL	1 X12 cable	AIX/Linux/VIOS
#EJWC (1/4 of #EJW5)	Mode 4	One (unpaired) #EJ0J/#EJ0M/#EL3B/#EL	1 X12 cable	AIX/Linux/VIOS
#EJWD (1/2 of #EJW5)	Mode 4	Two (unpaired) #EJ0J/#EJ0M/#EL3B/#EL	1 X12 cables	AIX/Linux/VIOS
#EJWE (3/4 of #EJW5)	Mode 4	Three (unpaired) #EJ0J/#EJ0M/#EL3B/#EL	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 fle feature EJ0J adapters, these EJ0J adapters could be in the same server in the same partition, same server in different par

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 contrc such as a 12 GB write cache adapter pair (#EJ14), and the other half can be controlled by a different PCIe3 SAS 12 GB wr 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 c 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 n 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 sp 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

The indicator feature EHS2 helps IBM Manufacturing understand where SSDs are placed in a mode 2 or a mode 4 EXP24 a quantity of one feature EHS2 to have SSDs placed in just half the bays, and use two EHS2 features to have SSDs place mode 4 drawer, use a quantity of one, two, three, or four EHS2 features to indicate how many bays can have SSDs. With r Manufacturing will have to guess which quantity of feature ESH2 is associated with each EXP24SX. Consider using CSP (

Two-and-a-half inch small form factor (SFF) SAS HDDs and SSDs are supported in the EXP24SX. All drives are mounted i 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 23.4 - 29.5 in.). Slot filler panels are provided for empty bays when initially shipped from IBM.

### EXP12SX SAS Storage Enclosure (#ESLL/#ELLL)

The EXP12SX is a storage expansion enclosure with twelve 3.5-inch LFF SAS bays. It supports up to 12 hot-plug HDDs in The EXP12SX SFF bays use LFF Gen1 (LFF-1) carriers/trays. The 4k byte sector drives (#4096 or #4224) are supported.

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

With AIX/Linux/VIOS, the EXP12SX enclosure can be ordered with four sets of three bays (mode 4), two sets of six bays (mode 2), or one set of twelve 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, follow the documented procedures. Improperly changing modes can potentially destroy existing data, or allow other partitions to access another partition's existing data. Hire an expert to assist if you are not familiar with the procedure.

Four mini-SAS HD ports on the EXP12SX are attached to PCIe Gen3 SAS adapters or attached to an integrated SAS controller 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 Y012 or X12 cables 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 Y012 and X12 cables have mini-SAS HD narrow connectors.

- X12 cable: 3-meter copper (#ECDJ)
- Y012 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 support 12 Gb throughput if future adapters support that capability. Copper feature ECE0 is 0.6-meter long, feature ECE3 is 1.5-meter long, and feature ECE4 is 4.5-meter long.

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

Specify	Mode	Adapter/Controller	Cable to Drw	Environment
#EJV0	Mode 1	CEC SAS Ports	2 Y012 cables	AIX/Linux/VIOS
#EJV1	Mode 1	One (unpaired) #EJ0J/#EJ0M/#EL3B/#EL59	1 Y012 cable	AIX/Linux/VIOS
#EJV2	Mode 1	Two (unpaired) #EJ0J/#EJ0M/#EL3B/#EL59	2 Y012 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 Y012 cables	AIX/Linux/VIOS
#EJV7	Mode 2	Two (unpaired) #EJ0J/#EJ0M/#EL3B/#EL59	2 Y012 cables	AIX/Linux/VIOS
#EJV8	Mode 1	Two #EJ14 (one pair)	2 Y012 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 Y012 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. communicate to IBM Manufacturing a lower cost, partial configuration is to be configured where the ordered adapters and bays. The future MES addition of adapters and cables can enable the remaining SAS bays for growth. The following specif

Specify	Mode	Adapter/Controller	Cable to Drw	Environment
#EJVA (1/2 of #EJV7)	Mode 2	One (unpaired) #EJ0J/#EJ0M/#EL3B/#EL59	1 Y012 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 fle feature EJ0J adapters, these EJ0J adapters could be in the same server in the same partition, same server in different par

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 contrc such as a 12 GB write cache adapter pair (#EJ14), and the other half can be controlled by a different PCIe3 SAS 12 GB wr 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 c 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/tr 4k byte sector drives are supported in the EXP24SX drawer. The 5xx byte sector drives are not announced or planned. Dri referred to as **nearline**. These drives provide excellent cost per gigabyte. Note that formatting or rebuilding arrays on large performance is required, consider higher rpm disks or SSDs in the EXP24SX drawer.

EXP12SX drives for feature ELL (multi-OS) are the 3.86 TB/4.0 TB 4k 7200 RPM (#ES62) and 7.72 TB/8.0 TB 4k 7200 F ELL (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 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

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 connecti Gen3 I/O drawer fanout modules. The currently available Active Optical Cable (AOC) offers much longer length cables, prc 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 (R One copper cable length of 3 m is offered. Note that the cable management arm of the scale-out servers requires about 1 m

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 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 t adapter and to the bottom CXP port of the same fanout module. Note that the PCIe adapter providing the CXP ports on the Cable Adapter. In hindsight, this naming was unfortunate as the adapter's CXP ports are not unique to optical. But at the tir 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 d 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 tha Depending on country wiring standards, either two or four full-price features are orderable.

	208 v 3-phase delta	200 v -240 v 1-phase or 3-phase wye
-----	-----	-----
12 x C13 #EPTQ		#EPTN
9 x C19 #EPTL		#EPTJ

These PDUs can be mounted vertically in rack-side pockets or they can be mounted horizontally. If mounted horizontally, t See feature EPTH for horizontal mounting hardware, which is used when IBM Manufacturing doesn't automatically factory-front of the PDU enable the client to monitor each receptacle's electrical power usage and to remotely switch any receptacle generic PDU password, and IBM strongly urges clients to change it upon installation. These PDUs do provide the same low 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 t subsystems go through rigorous verification and integration testing processes. During system manufacturing, systems go t 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 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 service processor and reports a service reference code when it detects surveillance loss. In the PowerVM environment, it v 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 addition, a threshold of correctable errors detected on cache lines can result in the data in the cache lines being purged an 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 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 system tags the data and determines whether it will ever be used again. If the error is irrelevant, it will not force a check stc be limited to the program/kernel or hypervisor owning the data; or the I/O adapters controlled by an I/O hub controller would 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 which will examine the affected bus, allow the device driver to reset it, and continue without a system reboot. For Linux, EE 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 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, MES (system upgrades/downgrades), and system maintenance/repair. Depending upon the system and warranty 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

- 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 partition using a GUI or command-line interface (CLI) or REST API. An HMC attached to the system allows support person remotely, or locally to the physical HMC that is in proximity of the server being serviced, log in to review error logs and performance.

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 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 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 interface on the management console or service processor, or an operating system terminal. The service interface helps to available service applications, helping the support team to manage system resources and service information in an efficient manner. The service interface is available through the service interface are carefully configured and placed to give service providers access to important service information.

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 LEDs. The system can also use the identify function to blink the FRU-level LED. When this function is activated, a roll-up to the blue enclosure LEDs will turn on solid and can be used to follow the light path from the system to the enclosure or 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 can be identified. FFDC helps to re-create the problem or run any sort of extended tracing or diagnostics program. For the vast majority of faults, a cause can also be detected automatically without service intervention.

FFDC information, error data analysis, and fault isolation are necessary to implement the advanced serviceability techniques 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 failure cause.

### Diagnostics

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

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

### Automatic diagnostics

Because of the FFDC technology designed into IBM servers, it is not necessary to perform re-create diagnostics for failure. Intermittent errors are designed to be correctly detected and isolated at the time the failure occurs. Runtime and boot-time diagnostics are supported.

### Stand-alone diagnostics with PowerVM

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

- 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 provided with the firmware. Concurrent maintenance of the HMC is required for the concurrent firmware update with PowerVM. In addition, concurrent maintenance of PCIe adapters and the Operator Panel is supported through ASMI. Additional concurrent maintenance includes power supply and fan replacement.

### Service labels

Service providers use these labels to assist them in performing maintenance actions. Service labels are found in various forms and locations. They transmit readily available information to the service provider during the repair process. Following are some of these service labels:

- Location diagrams: Location diagrams are located on the system hardware, relating information regarding the placement of components. Location diagrams may include location codes, drawings of physical locations, concurrent maintenance status, or other data pertinent to the location of components.

are especially useful when multiple components such as DIMMs, CPUs, processor books, fans, adapter cards, LEDs,

- **Remove/replace procedures:** Service labels that contain remove/replace procedures are often found on a cover of the the server. These labels provide systematic procedures, including diagrams detailing how to remove or replace certain components.
- **Arrows:** Numbered arrows are used to indicate the order of operation and the serviceability direction of components. Some levers, and touch points need to be pulled or pushed in a certain direction and in a certain order for the mechanical mechanism. 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. Once the QR label is scanned, the user is taken to a specific to that server which contains many of the service functions of interest while physically located at the server. These functions include 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 is to be serviced, 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 to service the hardware components.
- **Positive retention:** Positive retention mechanisms help to assure proper connections between hardware components such as between two cards that attach to each other. Without positive retention, hardware components run the risk of becoming loose, preventing a good electrical connection. Positive retention mechanisms like latches, levers, thumb-screws, pop Nylataps, 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 captures the error signature to determine the cause of failure. The analysis result will be stored in system NVRAM. When the system can be restarted automatically, or if the system continues to operate, the error will be reported to the operating system. Hardware and software error logs are maintained. When an HMC is attached in the PowerVM environment, an ELA routine analyzes the error, forwards the event to the HMC, and notifies the system administrator that it has isolated a likely cause of the system problem. The system administrator can then take appropriate action. In the event of 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 the system.

In the HMC-managed environment, a call home service request will be initiated from the HMC and the pertinent failure data and error log data will be sent to an IBM service organization. Customer contact information and specific system-related data such as system model 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 a Linux partition running on one POWER partition system to another POWER partition system. The migration transfers the entire system environment, including processor state, memory, attached virtual devices, and the 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. The service processor is a separate processor that is not shared with the system processor 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). The service processor supports remote power control options, environmental monitoring, reset, restart, remote maintenance, and diagnostic functions, including the ability to access the system processor menus (ASMI) can be accessed concurrently with system operation, allowing nondisruptive abilities to change the system configuration.

## Call home

**Call home** refers to an automatic or manual call from a client location to the IBM support structure with error log data, service request information. Call home invokes the service organization in order for the appropriate service action to begin. Call home can be implemented on HMC-managed systems through Electronic Service Agent running on top of the operating system. While configuring call home, the user can choose to implement this feature in order to obtain service enhancements such as reduced problem determination and faster and more accurate error information. In general, using the call home feature can result in increased system availability. The Electronic Service Agent can be configured to automatically 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 exceptional support to IBM clients. IBM Electronic Service Agent is a no-charge tool that proactively monitors and reports performance issues, and inventory. Electronic Service Agent can help focus on the client's company business initiatives, such as 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 Service Agent website to improve problem determination and resolution between the client and the IBM support team. As part of an increased focus on security, Electronic Service Agent tool configuration and activation comes standard with the system. In support of this effort, a security whitepaper has been published, which describes data exchanges between the HMC and the IBM Service Delivery protocols for this exchange. To read the whitepaper and prepare for Electronic Service Agent installation, see the "Security Agent" website.

1. Select your country.
2. 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 hard system information to IBM Support. This can optimize the time monitoring the symptoms, diagnosing the error, and manual problem record. And 24x7 monitoring and reporting means no more dependency on human intervention or off-hours client 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 is designed to help securely transmit either through the internet (HTTPS or VPN) or modem to provide clients a single point of contact in 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 system, it is easier to find and send system information, decreasing the risk of misreported or misdiagnosed errors. Once inside IBM, problem 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" on 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 support. This web portal enables you to gain easier access to IBM resources for assistance in resolving technical problems. Premium Search functions make it even easier for Electronic Service Agent-enabled clients to track system inventory and find relevant information.

My Systems provides valuable reports of installed hardware and software using information collected from the systems by the Electronic Service Agent. These reports are available for any system associated with the client's IBMid. Premium Search combines the function of search and the view of system information, providing advanced search of the technical support knowledgebase. Using Premium Search and the Service Agent, information 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 Sales Representative](#).

## Accessibility by people with disabilities

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

## Section 508 of the US Rehabilitation Act

The Power L922 server (9008-22L) is capable as of March 20, 2018, when used in accordance with IBM's associated documentation, to meet the requirements of Section 508 of the Rehabilitation Act, provided that any assistive technology used with the product properly is configured. A US Section 508 Voluntary Product Accessibility Template (VPAT) can be found on the [Product accessibility information](#) website.

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## Product positioning



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

IBM aligns cutting-edge innovation with enterprise dependability: IBM has over 105 years of aligning continuous innovation

The POWER9 scale-out family delivers a set of entry servers that comes cloud enabled out of the box with integrated Power. Additionally, on-chip analytics and algorithms help clients run their workloads at an optimized processor frequency for performance with the DDR4 memory footprint of 4 TB, IBM provides systems that are unmatched by the competition in terms of memory ratio needed for data-centric and in-memory workloads. The Power L922 server has built-in security that can help you be resilient to threats.

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## Models

### Model summary matrix

Model	Processor	Processor sockets	Memory
22L	POWER9	Two	4096 GB

### Customer setup (CSU)

Yes.

### Devices supported

The 7226-1U3 that offers a 1U rack-mountable dual bay enclosure with storage device options of LTO5, 6, 7, and 8 tape drive interface; the 7226 also offers DVD-RAM SAS and USB drive features as well as RDX 500GB, 1TB, and 2TB drive options can be installed in any combination in the 7226 enclosure.

### Model conversions

Not available.

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## Technical description

↓ (#ESLS/#ELLS)

↓ Physical specifications

↓ Operating environment

↓ Limitations

↓ Hardware requirements

↓ Software requirements

Power Systems servers running Linux are designed to provide the ideal foundation for private and public cloud infrastructure

### Summary of standard features for Power L922:

- POWER9 processor modules:
  - 8-core, typical 3.4 to 3.9 GHz (max) POWER9 Processor (#ELPV)
  - 10-core, typical 2.9 to 3.8 GHz (max) POWER9 Processor (#ELPW)
  - 12-core, typical 2.7 to 3.8 GHz (max) POWER9 Processor (#ELPX)
- High-performance Mbps DDR4 ECC memory

- 8 GB (#EM60), 16 GB (#EM62), 32 GB (#EM63), 64 GB (#EM64), or 128 GB (#EM65) memory features - 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, 5, 6, or 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)
  - A quantity of one PCIe3 NVMe carrier card can be ordered only with a storage backplane. If a PCIe3 NVMe carrier card is ordered without a storage backplane, then the optional split feature is not supported.
- PCIe slots with single processor:
  - One x16 Gen4 low-profile, half-length (CAPI)
  - One x8 Gen4 low-profile, half-length (with x16 connector) (CAPI)
  - Two x8 Gen3 low-profile, half-length (with x16 connectors)
  - Two x8 Gen3 low-profile, half-length (One of these slots is used for the required base LAN adapter.)
- PCIe slots with two processors:
  - Three x16 Gen4 low-profile, half-length (CAPI)
  - Two x8 Gen4 low-profile, half-length (with x16 connectors) (CAPI)
  - Two x8 Gen3 low-profile, half-length (with x16 connectors)
  - Two x8 Gen3 low-profile, half-length (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 IBM AIX and Linux environments on POWER processor-based virtualization-oriented performance monitor, and performance statistics are available through the HMC. These performance statistics are used to analyze the workload characteristics and to prepare for capacity planning.

## Power L922 system configuration

The minimum Power L922 initial order must include a processor module, base memory is 2x 8 GB DIMMs (#EM60) with or without (#EM60) with two sockets installed (2 per socket), two power supplies and line cords, an operating system indicator, a cover, and a power cord. Specify. Also, it must include one of these storage options and one of these network options:

### 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. If feature 0837 is selected, the RAID card must be ordered if feature 0837 is selected.

### Network options:

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

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 ELPV	8-core, typical 3.4 to 3.9 GHz (max) POWER9 Processor	1	
or ELPW	10-core, typical 2.9 to 3.8 GHz (max) POWER9 Processor	1	
Processor activations ELAV	One Processor Core Activation for #ELPV	8	
or ELAW	One Processor Core Activation for #ELPW	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 EL66	Storage Backplane 8 SFF-3 Bays	1	Optional split card EL68
or EC59	PCIe3 NVMe carrier card w/2 M.2 module slots	1	Must order, at a minimum, one of feature ES14
Disk Drive ELDB	300 GB 15K RPM SAS SFF-3 Disk Drive (Linux)	1	
LAN Adapter EL4M	PCIe2 LP 4-port GbE Adapter	1	
Power supplies/Power cord EL1B	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 EJUC	Front IBM Bezel for 8-Bay BackPlane		
or EJU7	Front OEM Bezel for 8-Bay		

## Operating System 2147

## BackPlane

### 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 addition 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 EC58 is selected, at least one disk unit is required to be ordered. If no HDD/SSD/SAN boot (0837) is ordered, then feature EC59 (with a bootable image) is required.
- Adapter feature EL4M is the default 1 Gb Ethernet adapter. Options of a 10 Gb Ethernet adapter include one of either EN0T, or EN0V.

## Processor modules

A maximum of two processors with eight processor cores (#ELPV), or two processors with ten processor cores (#ELPW), or two processors with twelve processor cores (#ELPX) is allowed. All processor cores must be activated. The following defines the allowed quantities of processor activations.

- One 8-core, typical 3.4 to 3.9 GHz (max) processor (#ELPV) requires that eight processor activation codes be ordered. Feature ELAV is allowed.
- Two 8-core, typical 3.4 to 3.9 GHz (max) processors (#ELPV) require that sixteen processor activation codes be ordered. Feature ELAV is allowed.
- One 10-core, typical 2.9 to 3.8 GHz (max) processor (#ELPW) requires that ten processor activation codes be ordered. Feature ELAW is allowed.
- Two 10-core, typical 2.9 to 3.8 GHz (max) processors (#ELPW) require that twenty processor activation codes be ordered. Feature ELAW is allowed.
- Two 12-core, typical 2.7 to 3.8 GHz (max) processors (#ELPX) require that twenty-four processor activation codes be ordered. Feature ELAX is allowed.

## System memory

- A minimum of 32 GB of memory is required on the Power L922 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 ordering.

Feature	Feature number	Minimum DIMM quantity	Maximum DIMM quantity
16 GB DDR4 Memory	EM62	0	32
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 (#EL1B)

## 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 Power L922 server supports power cord 4.3 m (14 ft), Drawer to Wall/IBM PDU (250V/10A) in the base shipment group. See the I/O drawer section.

## PCIe slots

The Power L922 server has up to nine PCIe hot-plug slots, providing excellent configuration flexibility and expandability. For more information, see the I/O drawer section.

With two POWER9 processor single-chip modules (SCM), nine PCIe slots are available: three are x16 Gen4 low-profile, half-length slots (with x16 connectors) (CAPI), two are x8 Gen3 low-profile, half-length slots (with x16 connectors) (CAPI), 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 slots (CAPI), one (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 provide 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 the same configuration.

At least one PCIe Ethernet adapter is required on the server by IBM to ensure proper manufacture, test, and support of the server. The server must be configured to use the required adapter.

These servers are smarter about energy efficiency for cooling the PCIe adapter environment. They sense which IBM PCIe adapters are installed and if an adapter requires higher levels of cooling, they automatically speed up fans to increase airflow across the PCIe adapters and reduce the sound level of the server. Higher wattage PCIe adapters include the PCIe3 SAS adapters and SSD/flash PCIe adapters (see #EJ14).

### SAS bays and storage backplane options

- Storage Backplane 8 SFF-3 Bays (#EL66)
- Feature EL68 (4 + 4 SFF-3 Bays split backplane)
- Expanded Function Storage Backplane 8 SFF-3 Bays/Single IOA with Write Cache (#EL67)

The backplane option provides SFF-3 SAS bays in the system unit. These 2.5-inch or small form factor (SFF) SAS bays are 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 and do not support hot-plug capability.

This backplane option uses leading-edge, integrated SAS RAID controller technology designed and patented by IBM. A custom chip is the basis of these SAS RAID controllers and provides industry-leading RAID 5 and RAID 6 performance levels, especially in terms of bandwidth. The integrated SAS controllers are placed in dedicated slots and do not require additional slots.

The feature EL66 Storage Backplane option provides eight SFF-3 bays and one SAS controller with zero write cache.

By optionally adding the feature EL68 Split Backplane, a second integrated SAS controller with no write cache is provided, divided into two sets of four bays. Each SAS controller independently runs one of the four-bay sets of drives.

This backplane option supports HDDs or SSDs or a mixture of HDDs and SSDs in the SFF-3 bays. "Mixing" HDDs and SSDs in the four bays of the split backplane option. Note, if you are mixing HDDs and SSDs, they must be in separate arrays (unless using RAID 10).

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-plug is supported for RAID 0, RAID 5, and RAID 6.

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 Linux and VIOS. It is highly recommended but not required that the drives be protected with RAID.

If the client needs a change after the server is already installed, the backplane option can be changed. For example, the feature EL68 can be added to an existing feature EL66 backplane.

Unlike the hot-plug PCIe slots and SAS bays, concurrent maintenance is not available for the integrated SAS controllers. 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 EL67 supports the EXP12SX/EXP24SX drawer. All bays are accessed by both of the integrated SAS controllers. The bays support concurrent access.

### 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 pass through the arm and into the rack. The arm enables the server to be pulled forward on its rails for service access to PCIe adapters without disconnecting the cables from the server. Approximately 1 meter (3 feet) of cord/cable length is needed for the arm to be fully extended.

### Integrated I/O ports

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

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

### **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 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 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 continue to consider the PDUs as being placed horizontally for the matter of calculating the free space still available in the

Vertical PDUs can be used only if CSRP (#0469) is on the order. When specifying CSRP, the client will provide the location. 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 EU04 accommodates RDX removable disk cartridges of any capacity. The disk is in a protective sleeve that is inserted into the docking station. The docking station holds one removable rugged disk drive/cartridge at a time. The rugged removable drive performs saves, restores, and backups similar to a tape drive. This docking station can be an excellent entry capacity/performance solution.

### **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 HD drives 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. 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 the specifically documented procedure. The predecessor EXP24S did not support this mode change in the field.

**Important:** When changing modes, it is very important that a skilled, technically qualified person follow the special documentation. Changing modes can potentially destroy existing RAID sets, prevent access to existing data, or allow other partitions to access another partition. An expert should 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 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 Y012 cables designed to support up to 12 Gb SAS. The PCIe Gen3 SAS adapters support up to 6 Gb throughput. The EXP24SX has been tested for 12 Gb throughput if future SAS adapters support that capability. All ends of the Y012 and X12 cables have mini-SAS HD narrow connectors.

- X12 cable: 3-meter copper (#ECDJ)
- Y012 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 12 Gb throughput if future adapters support that capability. Copper feature ECE0 is 0.6 meters long, ECE3 is 3 meters long meter long.

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

Specify code	Mode	Adapter/Controller	Cable to Drw	Environment
#EJW0	Mode 1	CEC SAS Ports	2 Y012 cables	AIX/IBM i/Linux/VIOS
#EJW1	Mode 1	One (unpaired) #EJ0J/#EJ0M/#EL3B/#EL5	1 Y012 cable	AIX/IBM i/Linux/VIOS
#EJW2	Mode 1	Two (one pair) #EJ0J/#EJ0M/#EL3B/#EL5	2 Y012 cables	AIX/IBM i/Linux/VIOS
#EJW3	Mode 2	Two (unpaired) #EJ0J/#EJ0M/#EL3B/#EL5	2 X12 cables	AIX/Linux/VIOS
#EJW4	Mode 2	Four (two pair) #EJ0J/#EJ0M/#EL3B/#EL5	2 X12 cables	AIX/Linux/VIOS
#EJW5	Mode 4	Four (unpaired) #EJ0J/#EJ0M/#EL3B/#EL5	2 X12 cables	AIX/Linux/VIOS
#EJW6	Mode 2	One (unpaired) #EJ0J/#EJ0M/#EL3B/#EL5	2 Y012 cables	AIX/Linux/VIOS
#EJW7	Mode 2	Two (unpaired) #EJ0J/#EJ0M/#EL3B/#EL5	2 Y012 cables	AIX/Linux/VIOS
#EJWF	Mode 1	Two (one pair) #EJ14	2 Y012 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 Y012 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. communicate to IBM Manufacturing a lower-cost partial configuration is to be configured where the ordered adapters and c bays. The future MES addition of adapters and cables can enable the remaining SAS bays for growth. The following specif

Specify	Mode	Adapter/Controller	Cable to Drw	Environment
#EJWA (1/2 of #EJW7)	Mode 2	One (unpaired) #EJ0J/#EJ0M/#EL3B/#EL	1 Y012 cables	AIX/Linux/VIOS
#EJWB (1/2 of #EJW4)	Mode 2	Two (one pair) #EJ0J/#EJ0M/#EL3B/#EL	1 X12 cable	AIX/Linux/VIOS
#EJWC (1/4 of #EJW5)	Mode 4	One (unpaired) #EJ0J/#EJ0M/#EL3B/#EL	1 X12 cable	AIX/Linux/VIOS
#EJWD (1/2 of #EJW5)	Mode 4	Two (unpaired) #EJ0J/#EJ0M/#EL3B/#EL	1 X12 cables	AIX/Linux/VIOS
#EJWE (3/4 of #EJW5)	Mode 4	Three (unpaired) #EJ0J/#EJ0M/#EL3B/#EL	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 fle feature EJ0J adapters, these EJ0J adapters could be in the same server in the same partition, same server in different par

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 contrc such as a 12 GB write cache adapter pair (#EJ14), and the other half can be controlled by a different PCIe3 SAS 12 GB wr

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 c 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 n 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 sp 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

The indicator feature EHS2 helps IBM Manufacturing understand where SSDs are placed in a mode 2 or a mode 4 EXP24 a quantity of one feature EHS2 to have SSDs placed in just half the bays, and use two EHS2 features to have SSDs placed mode 4 drawer, use a quantity of one, two, three, or four EHS2 features to indicate how many bays can have SSDs. With r Manufacturing will have to guess which quantity of feature ESH2 is associated with each EXP24SX. Consider using CSP (

Two-and-a-half inch small form factor (SFF) SAS HDDs and SSDs are supported in the EXP24SX. All drives are mounted i 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 accommoda cm (23.4 - 29.5 in.). Slot filler panels are provided for empty bays when initially shipped from IBM.

### EXP12SX SAS Storage Enclosure (#ESLL/#ELLL)

The EXP12SX is a storage expansion enclosure with twelve 3.5-inch LFF SAS bays. It supports up to 12 hot-plug HDDs in The EXP12SX SFF bays use LFF Gen1 (LFF-1) carriers/trays. The 4k byte sector drives (#4096 or #4224) are supported.

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

With AIX/Linux/VIOS, the EXP12SX enclosure can be ordered with four sets of three bays (mode 4), two sets of six bays ( mode 1). The mode setting can be changed in the field using software commands along with a specifically documented pr

**Important:** When changing modes, follow the documented procedures. Improperly changing modes can potentially destro existing data, or allow other partitions to access another partition's existing data. Hire an expert to assist if you are not fami work.

Four mini-SAS HD ports on the EXP12SX are attached to PCIe Gen3 SAS adapters or attached to an integrated SAS cont 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 designed to support up to 12 Gb. The PCIe Gen3 SAS adapters support up to 6 Gb throughput. The EXP12SX has been d throughput if future SAS adapters support that capability. All ends of the YO12 and X12 cables have mini-SAS HD narrow c

- 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 support 12 Gb throughput if future adapters support that capability. Copper feature ECE0 is 0.6-meter long, feature ECE3 is 1.5-meter long, feature ECE4 is 4.5-meter long.

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

Specify	Mode	Adapter/Controller	Cable to Drw	Environment
#EJV0	Mode 1	CEC SAS Ports	2 Y012 cables	AIX/Linux/VIOS
#EJV1	Mode 1	One (unpaired) #EJ0J/#EJ0M/#EL3B/#EL59	1 Y012 cable	AIX/Linux/VIOS
#EJV2	Mode 1	Two (unpaired) #EJ0J/#EJ0M/#EL3B/#EL59	2 Y012 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 Y012 cables	AIX/Linux/VIOS
#EJV7	Mode 2	Two (unpaired) #EJ0J/#EJ0M/#EL3B/#EL59	2 Y012 cables	AIX/Linux/VIOS
#EJVF	Mode 1	Two #EJ14 (one pair)	2 Y012 cables	AIX/Linux/VIOS
#EJVG	Mode 2	Two #EJ14 (one pair)	2 X12 cables	AIX/Linux/VIOS
#EJVJ	Mode 2	Four #EJ14 (two pair)	2 X12 cable	AIX/Linux/VIOS
#EJVU	Mode 1	Controller EJ1G/EL67	1 Y012 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. communicate to IBM Manufacturing a lower cost, partial configuration is to be configured where the ordered adapters and c bays. The future MES addition of adapters and cables can enable the remaining SAS bays for growth. The following specif

Specify	Mode	Adapter/Controller	Cable to Drw	Environment
#EJVA (1/2 of #EJV7)	Mode 2	One (unpaired) #EJ0J/#EJ0M/#EL3B/#EL59	1 Y012 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 fle feature EJ0J adapters, these EJ0J adapters could be in the same server in the same partition, same server in different par

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 contrc such as a 12 GB write cache adapter pair (#EJ14), and the other half can be controlled by a different PCIe3 SAS 12 GB wr 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 c 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/tr 4k byte sector drives are supported in the EXP24SX drawer. The 5xx byte sector drives are not announced or planned. Dri referred to as **nearline**. These drives provide excellent cost per gigabyte. Note that formatting or rebuilding arrays on large performance is required, consider higher rpm disks or SSDs in the EXP24SX drawer.

EXP12SX drives for feature ESSL (multi-OS) are the 3.86 TB/4.0 TB 4k 7200 RPM (#ES62) and 7.72 TB/8.0 TB 4k 7200 F 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 accommoda 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 mixec

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 connecti Gen3 I/O drawer fanout modules. The currently available Active Optical Cable (AOC) offers much longer length cables, prc 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 (R One copper cable length of 3 m is offered. Note that the cable management arm of the scale-out servers requires about 1 m

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 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 t adapter and to the bottom CXP port of the same fanout module. Note that the PCIe adapter providing the CXP ports on the Cable Adapter. In hindsight, this naming was unfortunate as the adapter's CXP ports are not unique to optical. But at the tir 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 d 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 tha Depending on country wiring standards, either two or four full-price features are orderable.

208 v 3-phase delta 200 v -240 v 1-phase or 3-phase wye			
-----	-----	-----	-----
12 x C13	#EPTQ		#EPTN
9 x C19	#EPTL		#EPTJ

These PDUs can be mounted vertically in rack-side pockets or they can be mounted horizontally. If mounted horizontally, tt See feature EPTH for horizontal mounting hardware, which is used when IBM Manufacturing doesn't automatically factory-front of the PDU enable the client to monitor each receptacle's electrical power usage and to remotely switch any receptacl generic PDU password, and IBM strongly urges clients to change it upon installation. These PDUs do provide the same lov feature (#7188).

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 requirements.

## Operating environment

- Temperature: (nonoperating) 5 to 45 degrees C (41 to 113 F); recommended temperature (operating) 18 to 27 degrees C (64 to 81 F); maximum temperature 5 to 40 degrees C (41 to 104 F)
- Relative humidity: 8% - 85% (allowable operating humidity range); recommended 5.5 degrees C (42 F) dew point to 61 degrees C (142 F) dew point
- Maximum dew point: 24 degrees C (75 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 rack. The maximum measured value also accounts for component tolerance and non-ideal operating conditions. Power consumption varies greatly by server configuration and utilization. The [IBM Systems Energy Estimator](#) should be used to obtain 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 Maximum Performance mode increases fan speed, which increases power noise levels
- Usage of Maximum Performance 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 end user.

- 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. Power Systems model and applicable features meet the environmental testing requirements of the country telecom and have compliance with the Full Quality Assurance Approval (FQAA) process as delivered by the British Approval Board for Telecommunications authority.

This product is not certified for connection by any means whatsoever to interfaces of public telecommunications networks. 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 Standards.

## Limitations

- The integrated system port is not supported under Linux when the HMC ports are connected to an HMC. Either the HMC 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 Linux. Any other application using the integrated system port requires a USB-to-serial adapter to be installed in a PCI slot. The integrated system port does not support HACMP configurations.

## Hardware requirements

### Power L922 system configuration

The minimum Power L922 initial order must include a processor module, base memory is 2x 8 GB DIMMs (#EM60) with or without (#EM60) with two sockets installed (2 per socket), two power supplies and line cords, an operating system indicator, a cover, and a power cord. Specify. Also, it must include one of these storage options and one of these network options:

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. If feature 0837 is selected, a RAID card is required.

Network options:

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

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 ELPV	8-core, typical 3.4 to 3.9 GHz (max) POWER9 Processor	1	
or ELPW	10-core, typical 2.9 to 3.8 GHz (max) POWER9 Processor	1	
Processor activations ELAV	One Processor Core Activation for #ELPV	8	
or ELAW	One Processor	10	

## Core Activation for #ELPW

### Memory DIMMs

EM60	8 GB DDR4 Memory	2
or		
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

EL66	Storage Backplane 8 SFF-3 Bays	1	Optional split card EL68
or			
EC59	PCIe3 NVMe carrier card w/2 M.2 module slots	1	Must order, at a minimum, one of feature ES14

### Disk Drive

ELDB	300 GB 15K RPM SAS SFF-3 Disk Drive (Linux)	1
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### LAN Adapter

EL4M	PCIe2 LP 4-port GbE Adapter	1 1
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### Power supplies/Power cord

EL1B	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

EJUC	Front IBM Bezel for 8-Bay BackPlane	
or		
EJU7	Front OEM Bezel for 8-Bay BackPlane	

### Operating System

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 addition 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 ES14 at least one disk unit is required to be ordered. If no HDD/SSD/SAN boot (0837) is ordered, then feature EC59 (with a
- Adapter feature EL4M is the default 1 Gb Ethernet adapter. Options of a 10 Gb Ethernet adapter include one of either EN0T, or EN0V.

### Hardware Management Console (HMC) machine code

If the system is ordered with 950 Firmware level or higher and is capable to be HMC managed, then, the managing HMC ( 9.2.950 or higher.

This level only supports hardware appliance types 7063, or virtual appliances (vHMC) on x86 or PowerVM. The 7042 hard

An HMC is required to manage the Power L922 server (9008-22L) implementing partitioning. Multiple POWER7, POWER8 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 must be updated because HMC code must always be equal to or higher than the managed server's firmware. Access to firmware is subject to entitlement and license validation in accordance with IBM policy and practice. IBM may verify entitlement through customer 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 FLRT Tool (FLRT) on or after the planned availability date for this product. FLRT will identify the correct HMC machine code for the server.

<https://www14.software.ibm.com/support/customercare/flrt/> 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's 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 IBM Power System 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.
- For PowerVM GUI functions, VIOS is recommended.

## Software requirements

If installing the Linux operating system LPAR:

- Red Hat Enterprise Linux 7 for Power LE, version 7.4, or later
- SUSE Linux Enterprise Server 12 Service Pack 3, or later
- Ubuntu Server 16.04.4, or later
- SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 11 Service Pack 4

If installing the Linux operating systems LPAR in nonproduction SAP implementations, (see statement of direction on plan mode):

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

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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 9008-22L:

- Power Hardware Information DVD SK5T-7087
- Installing the 9008-22L
- 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.

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

The IBM Systems Information Center provides you with a single information center where you can access product documentation for IBM operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access by using the IBM Information Center at [IBM Knowledge Center](#).

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## Features

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↓ [Features - No charge](#)

↓ [Features - Chargeable](#)

↓ [Feature availability matrix](#)

↓ [Feature descriptions](#)

↓ [Feature exchanges](#)

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### Features - No charge

- NONE

### Features - Chargeable

### Special Features - Initial Orders

- Administrative
  - (#ECL0) -Power ACP solution specify
  - (#ECP0) -Cloud Private Solution
  - (#ESC5) -S&H-a
- Cable
  - (#ECCG) -Variable Length, Blue Cat5e Cable
  - (#ECCH) -Variable Length, Green Cat5e Cable
  - (#ECCJ) -Variable Length, Yellow Cat5e Cable
- Languages
  - (#9300) -Language Group Specify - US English
  - (#9700) -Language Group Specify - Dutch
  - (#9703) -Language Group Specify - French
  - (#9704) -Language Group Specify - German
  - (#9705) -Language Group Specify - Polish
  - (#9706) -Language Group Specify - Norwegian
  - (#9707) -Language Group Specify - Portuguese
  - (#9708) -Language Group Specify - Spanish
  - (#9711) -Language Group Specify - Italian
  - (#9712) -Language Group Specify - Canadian French
  - (#9714) -Language Group Specify - Japanese
  - (#9715) -Language Group Specify - Traditional Chinese (Taiwan)
  - (#9716) -Language Group Specify - Korean
  - (#9718) -Language Group Specify - Turkish
  - (#9719) -Language Group Specify - Hungarian
  - (#9720) -Language Group Specify - Slovakian
  - (#9721) -Language Group Specify - Russian
  - (#9722) -Language Group Specify - Simplified Chinese (PRC)
  - (#9724) -Language Group Specify - Czech
  - (#9725) -Language Group Specify - Romanian
  - (#9726) -Language Group Specify - Croatian
  - (#9727) -Language Group Specify - Slovenian
  - (#9728) -Language Group Specify - Brazilian Portuguese
  - (#9729) -Language Group Specify - Thai
- Manufacturing Instruction
  - (#EJVU) - Specify Mode-1 & CEC SAS port Controller EJ1G/EL67 & (1)YO12 for EXP12SX #ESLL/ELLL
  - (#EJWU) - Specify Mode-1 & CEC SAS port Controller EJ1G/EL67 & (1)YO12 for EXP24SX #ESLS/ELLS
- Miscellaneous
  - (#5000) -Software Preload Required
  - (#8143) -Linux Software Preinstall
  - (#9461) -Month Indicator
  - (#9462) -Day Indicator
  - (#9463) -Hour Indicator
  - (#9464) -Minute Indicator
  - (#9465) -Qty Indicator
  - (#9466) -Countable Member Indicator
  - (#ECSS) -Integrated Solution Packing
  - (#EHLU) -IBM Power Systems for SAS Viya (Linux)
  - (#EUC0) -Software preload define



- (#EUC1) -Software preload define
- (#EUC2) -Software preload define
- (#EUC3) -Software preload define
- Packaging
  - (#ERB0) -Bulk Packaging Request ID
  - (#ERB1) -Bulk Packaging ID #1
  - (#ERB2) -Bulk Packaging ID #2
  - (#ERB3) -Bulk Packaging ID #3
  - (#ERB4) -Bulk Packaging ID #4
  - (#ERB5) -Bulk Packaging ID #5
  - (#ERB6) -Bulk Packaging ID #6
  - (#ERB7) -Bulk Packaging ID #7
  - (#ERB8) -Bulk Packaging ID #8
  - (#ERB9) -Bulk Packaging ID #9
  - (#ERBA) -Bulk Packaging ID #10
  - (#ERBB) -Bulk Packaging ID #11
  - (#ERBC) -Bulk Packaging ID #12
  - (#ERBD) -Bulk Packaging ID #13
  - (#ERBE) -Bulk Packaging ID #14
  - (#ERBF) -Bulk Packaging ID #15
  - (#ERBG) -Bulk Packaging ID #16
  - (#ERBH) -Bulk Packaging ID #17
  - (#ERBJ) -Bulk Packaging ID #18
  - (#ERBK) -Bulk Packaging ID #19
  - (#ERBL) -Bulk Packaging ID #20
  - (#ERBZ) -No Bulk Packaging Specify
- Processor
  - (#2319) -Factory Deconfiguration of 1-core
- Services
  - (#0456) -Customer Specified Placement
  - (#ERF1) -RFID Tags for Servers, Compute Nodes, Chassis, Racks, and HMCs
- Specify Codes
  - (#4650) -Rack Indicator-Not Factory Integrated  
**One and only one rack indicator feature is required on all orders (#4650 to #4666).**
  - (#4651) -Rack Indicator, Rack #1
  - (#4652) -Rack Indicator, Rack #2
  - (#4653) -Rack Indicator, Rack #3
  - (#4654) -Rack Indicator, Rack #4
  - (#4655) -Rack Indicator, Rack #5
  - (#4656) -Rack Indicator, Rack #6
  - (#4657) -Rack Indicator, Rack #7
  - (#4658) -Rack Indicator, Rack #8
  - (#4659) -Rack Indicator, Rack #9
  - (#4660) -Rack Indicator, Rack #10
  - (#4661) -Rack Indicator, Rack #11
  - (#4662) -Rack Indicator, Rack #12
  - (#4663) -Rack Indicator, Rack #13

- (#4664) -Rack Indicator, Rack #14
- (#4665) -Rack Indicator, Rack #15
- (#4666) -Rack Indicator, Rack #16
- (#9169) -Order Routing Indicator-System Plant
- (#9442) -New Red Hat License Core Counter
- (#9443) -New SUSE License Core Counter
- (#9445) -Other Linux License Core Counter
- (#9446) -3rd Party Linux License Core Counter
- (#9447) -VIOS Core Counter
- (#9449) -Other License Core Counter
- (#9450) -Ubuntu Linux License Core Counter
- Standard Factory Services
  - (#4648) -Rack Integration Services: BP only
  - (#4649) -Rack Integration Services

## Special Features - Plant and/or Field Installable

- Accessory
  - (#EU19) -Cable Ties & Labels
- Adapters
  - (#5269) -PCIe LP POWER GXT145 Graphics Accelerator
  - (#5729) -PCIe2 8Gb 4-port Fibre Channel Adapter
  - (#5785) -4 Port Async EIA-232 PCIe Adapter
  - (#5899) -PCIe2 4-port 1GbE Adapter
  - (#EC2R) -PCIe3 LP 2-Port 10Gb NIC&ROCE SR/Cu Adapter
  - (#EC2S) -PCIe3 2-Port 10Gb NIC&ROCE SR/Cu Adapter
  - (#EC2T) -PCIe3 LP 2-Port 25/10Gb NIC&ROCE SR/Cu Adapter
  - (#EC2U) -PCIe3 2-Port 25/10Gb NIC&ROCE SR/Cu Adapter
  - (#EC3A) -PCIe3 LP 2-Port 40GbE NIC RoCE QSFP+ Adapter
  - (#EC3B) -PCIe3 2-Port 40GbE NIC RoCE QSFP+ Adapter
  - (#EC3E) -PCIe3 LP 2-port 100Gb EDR IB Adapter x16
  - (#EC3L) -PCIe3 LP 2-port 100GbE (NIC& RoCE) QSFP28 Adapter x16
  - (#EC3T) -PCIe3 LP 1-port 100Gb EDR IB Adapter x16
  - (#EC45) -PCIe2 LP 4-Port USB 3.0 Adapter
  - (#EC46) -PCIe2 4-Port USB 3.0 Adapter
  - (#EC51) -PCIe3 LP 3D Graphics Adapter x16
  - (#EC59) -PCIe3 NVMe carrier card w/2 M.2 module slots
  - (#EC5C) -PCIe3 LP 3.2 TB SSD NVMe adapter
  - (#EC5E) -PCIe3 LP 6.4 TB SSD NVMe adapter
  - (#EC5G) -PCIe3 LP 1.6 TB SSD NVMe Adapter
  - (#EC62) -PCIe4 LP 1-port 100Gb EDR IB CAPI adapter
  - (#EC64) -PCIe4 LP 2-port 100Gb EDR IB CAPI adapter
  - (#EC67) -PCIe4 LP 2-port 100Gb ROCE EN LP adapter
  - (#EC6J) -PCIe2 LP 2-Port USB 3.0 Adapter
  - (#EC6K) -PCIe2 2-Port USB 3.0 Adapter
  - (#EC7A) -PCIe4 LP 1.6TB NVMe Flash Adapter x8 for AIX/Linux
  - (#EC7C) -PCIe4 LP 3.2TB NVMe Flash Adapter x8 for AIX/Linux
  - (#EC7E) -PCIe4 LP 6.4TB NVMe Flash Adapter x8 for AIX/Linux

- (#EJ05) -PCIe3 Optical Cable Adapter for PCIe3 Expansion Drawer
- (#EJ0L) -PCIe3 12GB Cache RAID SAS Adapter Quad-port 6Gb x8
- (#EJ10) -PCIe3 SAS Tape/DVD Adapter Quad-port 6Gb x8
- (#EJ14) -PCIe3 12GB Cache RAID PLUS SAS Adapter Quad-port 6Gb x8
- (#EJ1N) -PCIe1 LP SAS Tape/DVD Dual-port 3Gb x8 Adapter
- (#EJ1P) -PCIe1 SAS Tape/DVD Dual-port 3Gb x8 Adapter
- (#EJ1R) -PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer
- (#EJ33) -PCIe3 Crypto Coprocessor BSC-Gen3 4767
- (#EL2N) -PCIe LP 8Gb 2-Port Fibre Channel Adapter
- (#EL38) -PCIe3 LP 4-port (10Gb FCoE & 1GbE) SRIOV SR&RJ45
- (#EL3B) -PCIe3 LP RAID SAS Adapter Quad-Port 6Gb x8
- (#EL3C) -PCIe3 LP 4-port(10Gb FCoE & 1GbE) SFP+Copper&RJ45
- (#EL3X) -PCIe3 LP 2-port 10GbE NIC&RoCE SFP+ Copper Adapter
- (#EL3Z) -PCIe2 LP 2-port 10/1GbE BaseT RJ45 Adapter
- (#EL43) -PCIe3 LP 2-port 16Gb Fibre Channel Adapter
- (#EL4L) -PCIe2 4-port 1GbE Adapter
- (#EL4M) -PCIe2 LP 4-port 1GbE Adapter
- (#EL53) -PCIe3 2-port 10GbE NIC&RoCE SFP+ Copper Adapter
- (#EL55) -PCIe2 2-port 10/1GbE BaseT RJ45 Adapter
- (#EL56) -PCIe3 4-port (10Gb FCoE & 1GbE) SR&RJ45
- (#EL57) -PCIe3 4-port (10Gb FCoE & 1GbE) SFP+Copper&RJ45
- (#EL58) -PCIe 8Gb 2-port Fibre Channel Adapter
- (#EL59) -PCIe3 RAID SAS Adapter Quad-port 6Gb x8
- (#EL5B) -PCIe3 16Gb 2-port Fibre Channel Adapter
- (#EL5U) -PCIe3 32Gb 2-port Fibre Channel Adapter
- (#EL5V) -PCIe3 LP 32Gb 2-port Fibre Channel Adapter
- (#EL5W) -PCIe3 16Gb 4-port Fibre Channel Adapter
- (#EL5X) -PCIe3 LP 16Gb 4-port Fibre Channel Adapter
- (#EL5Y) -PCIe2 LP 8Gb 2-Port Fibre Channel Adapter
- (#EL5Z) -PCIe2 8Gb 2-Port Fibre Channel Adapter
- (#EL60) -PCIe3 LP SAS Tape/DVD Adapter Quad-port 6Gb x8
- (#EN0N) -PCIe3 LP 4-port(10Gb FCoE & 1GbE) LR&RJ45 Adapter
- (#EN0S) -PCIe2 4-Port (10Gb+1GbE) SR+RJ45 Adapter
- (#EN0T) -PCIe2 LP 4-Port (10Gb+1GbE) SR+RJ45 Adapter
- (#EN0U) -PCIe2 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter
- (#EN0V) -PCIe2 LP 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter
- (#EN0Y) -PCIe2 LP 8Gb 4-port Fibre Channel Adapter
- (#EN12) -PCIe2 8Gb 4-port Fibre Channel Adapter
- (#EN2A) -PCIe3 16Gb 2-port Fibre Channel Adapter
- (#EN2B) -PCIe3 LP 16Gb 2-port Fibre Channel Adapter
- Administrative
  - (#0719) -Load Source Not in CEC
  - (#EHS2) -SSD Placement Indicator - #ESLS/#ELLS
  - (#ESC0) -S&H - No Charge
- Cable
  - (#0348) -V.24/EIA232 6.1m (20-Ft) PCI Cable
  - (#0353) -V.35 6.1m (20-Ft) PCI Cable

- (#0359) -X.21 6.1m (20-Ft) PCI Cable
- (#1111) -3m, Blue Cat5e Cable
- (#1112) -10m, Blue Cat5e Cable
- (#1113) -25m, Blue Cat5e Cable
- (#1115) -CAT5E Ethernet Cable, 3M GREEN
- (#1116) -CAT5E Ethernet Cable, 10M GREEN
- (#1118) -3m, Yellow Cat5e Cable
- (#1119) -10m, Yellow Cat5e Cable
- (#2456) -2M LC-SC 50 Micron Fiber Converter Cable
- (#2459) -2M LC-SC 62.5 Micron Fiber Converter Cable
- (#2934) -3M Asynchronous Terminal/Printer Cable EIA-232
- (#2936) -Asynchronous Cable EIA-232/V.24 3M
- (#3124) -Serial-to-Serial Port Cable for Drawer/Drawer-3.7M
- (#3125) -Serial-to-Serial Port Cable for Rack/Rack-8M
- (#3925) -0.3M Serial Port Converter Cable, 9-Pin to 25-Pin
- (#3927) -Serial Port Null Modem Cable, 9-pin to 9-pin, 3.7M
- (#3928) -Serial Port Null Modem Cable, 9-pin to 9-pin, 10M
- (#3930) -System Serial Port Converter Cable
- (#4242) -1.8 M (6-ft) Extender Cable for Displays (15-pin D-shell to 15-pin D-shell)
- (#4256) -Extender Cable - USB Keyboards, 1.8M
- (#4276) -VGA to DVI Connection Converter
- (#7802) -Ethernet Cable, 15m, Hardware Management Console to System Unit
- (#EB27) -QSFP+ 40GbE Base-SR Transceiver
- (#EB2B) -1m (3.3-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)
- (#EB2H) -3m (9.8-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)
- (#EB2J) -10m (30.3-ft), IBM Passive QSFP+ MTP Optical Cable
- (#EB2K) -30m (90.3-ft), IBM Passive QSFP+ MTP Optical Cable
- (#EB46) -10GbE Optical Transceiver SFP+ SR
- (#EB47) -25GbE Optical Transceiver SFP28
- (#EB4J) -0.5m SFP28/25GbE copper Cable
- (#EB4K) -1.0m SFP28/25GbE copper Cable
- (#EB4L) -1.5m SFP28/25GbE copper Cable
- (#EB4M) -2.0m SFP28/25GbE copper Cable
- (#EB4P) -2.0m QSFP28/100GbE copper split Cable to SFP28 4x25GbE
- (#EB50) -0.5m EDR IB Copper Cable QSFP28
- (#EB52) -2.0M EDR IB Copper Cable QSFP28
- (#EB54) -1.5M EDR IB Copper Cable QSFP28
- (#EB59) -100GbE Optical Transceiver QSFP28
- (#EB5A) -3M EDR IB Optical Cable QSFP28
- (#EB5B) -5M EDR IB Optical Cable QSFP28
- (#EB5C) -10M EDR IB Optical Cable QSFP28
- (#EB5D) -15M EDR IB Optical Cable QSFP28
- (#EB5E) -20M EDR IB Optical Cable QSFP28
- (#EB5F) -30M EDR IB Optical Cable QSFP28
- (#EB5G) -50M EDR IB Optical Cable QSFP28
- (#EB5H) -100M EDR IB Optical Cable QSFP28

- (#EB5J) -0.5M 100GbE Copper Cable QSFP28
- (#EB5K) -1.0M 100GbE Copper Cable QSFP28
- (#EB5L) -1.5M 100GbE Copper Cable QSFP28
- (#EB5M) -2.0M 100GbE Copper Cable QSFP28
- (#EB5N) -25M EDR IB Optical Cable QSFP28
- (#EB5R) -3M 100GbE Optical Cable QSFP28 (AOC)
- (#EB5S) -5M 100GbE Optical Cable QSFP28 (AOC)
- (#EB5T) -10M 100GbE Optical Cable QSFP28 (AOC)
- (#EB5U) -15M 100GbE Optical Cable QSFP28 (AOC)
- (#EB5V) -20M 100GbE Optical Cable QSFP28 (AOC)
- (#EB5W) -30M 100GbE Optical Cable QSFP28 (AOC)
- (#EB5X) -50M 100GbE Optical Cable QSFP28 (AOC)
- (#EB5Y) -100M 100GbE Optical Cable QSFP28 (AOC)
- (#ECBJ) -SAS X Cable 3m - HD Narrow 6Gb 2-Adapters to Enclosure
- (#ECBK) -SAS X Cable 6m - HD Narrow 6Gb 2-Adapters to Enclosure
- (#ECBL) -SAS X Cable 10m - HD Narrow 6Gb 2-Adapters to Enclosure
- (#ECBM) -SAS X Cable 15m - HD Narrow 3Gb 2-Adapters to Enclosure
- (#ECBN) -5m (16.4-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)
- (#ECBT) -SAS YO Cable 1.5m - HD Narrow 6Gb Adapter to Enclosure
- (#ECBU) -SAS YO Cable 3m - HD Narrow 6Gb Adapter to Enclosure
- (#ECBV) -SAS YO Cable 6m - HD Narrow 6Gb Adapter to Enclosure
- (#ECBW) -SAS YO Cable 10m - HD Narrow 6Gb Adapter to Enclosure
- (#ECBX) -SAS YO Cable 15m - HD Narrow 3Gb Adapter to Enclosure
- (#ECBY) -SAS AE1 Cable 4m - HD Narrow 6Gb Adapter to Enclosure
- (#ECBZ) -SAS YE1 Cable 3m - HD Narrow 6Gb Adapter to Enclosure
- (#ECC0) -SAS AA Cable 0.6m - HD Narrow 6Gb Adapter to Adapter
- (#ECC2) -SAS AA Cable 1.5m - HD Narrow 6Gb Adapter to Adapter
- (#ECC3) -SAS AA Cable 3m - HD Narrow 6Gb Adapter to Adapter
- (#ECC4) -SAS AA Cable 6m - HD Narrow 6Gb Adapter to Adapter
- (#ECCF) -System Port Converter Cable for UPS
- (#ECCS) -3M Copper CXP Cable Pair for PCIe3 Expansion Drawer
- (#ECCX) -3M Active Optical Cable Pair for PCIe3 Expansion Drawer
- (#ECCY) -10M Active Optical Cable Pair for PCIe3 Expansion Drawer
- (#ECDJ) -3.0M SAS X12 Cable (Two Adapter to Enclosure)
- (#ECDK) -4.5M SAS X12 Active Optical Cable (Two Adapter to Enclosure)
- (#ECDL) -10M SAS X12 Active Optical Cable (Two Adapter to Enclosure)
- (#ECDT) -1.5M SAS YO12 Cable (Adapter to Enclosure)
- (#ECDU) -3.0M SAS YO12 Cable (Adapter to Enclosure)
- (#ECDV) -4.5M SAS YO12 Active Optical Cable (Adapter to Enclosure)
- (#ECDW) -10M SAS YO12 Active Optical Cable (Adapter to Enclosure)
- (#ECE0) -0.6M SAS AA12 Cable (Adapter to Adapter)
- (#ECE3) -3.0M SAS AA12 Cable
- (#ECE4) -4.5M SAS AA12 Active Optical Cable (Adapter to Adapter)
- (#ECW0) -Optical Wrap Plug
- (#EJ00) -SAS Port/Cabling for single IOA Backplane
- (#EN01) -1m (3.3-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper

- (#EN02) -3m (9.8-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper
- (#EN03) -5m (16.4-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper
- Disk
  - (#EL1P) -300GB 15k RPM SAS SFF-2 Disk Drive (Linux)
  - (#EL1Q) -600GB 10k RPM SAS SFF-2 Disk Drive (Linux)
  - (#EL62) -3.82-4.0 TB 7200 RPM 4K SAS LFF-1 Nearline Disk Drive (Linux)
  - (#EL64) -7.72-8.0 TB 7200 RPM 4K SAS LFF-1 Nearline Disk Drive (Linux)
  - (#ELD3) -1.2TB 10K RPM SAS SFF-2 Disk Drive (Linux)
  - (#ELD5) -600GB 10K RPM SAS SFF-3 Disk Drive (Linux)
  - (#ELDB) -300GB 15K RPM SAS SFF-3 Disk Drive (Linux)
  - (#ELDP) -600GB 15K RPM SAS SFF-2 Disk Drive - 5xx Block
  - (#ELEV) -600GB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096
  - (#ELEZ) -300GB 15K RPM SAS SFF-2 4K Block - 4096 Disk Drive
  - (#ELF3) -1.2TB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096
  - (#ELF5) -600GB 10K RPM SAS SFF-3 Disk Drive 4K Block - 4096
  - (#ELF9) -1.2TB 10K RPM SAS SFF-3 Disk Drive 4K Block - 4096
  - (#ELFB) -300GB 15K RPM SAS SFF-3 4K Block - 4096 Disk Drive
  - (#ELFF) -600GB 15K RPM SAS SFF-3 4K Block - 4096 Disk Drive
  - (#ELFP) -600GB 15K RPM SAS SFF-2 4K Block - 4096 Disk Drive
  - (#ELFT) -1.8TB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096
  - (#ELFV) -1.8TB 10K RPM SAS SFF-3 Disk Drive 4K Block - 4096
  - (#ELQ0) -Quantity 150 of #ELDP 600GB 15k RPM SFF-2 Disk
  - (#ELQ1) -Quantity 150 of #ELFP (600GB SSD SFF-2)
  - (#ELQ2) -Quantity 150 of #ELF3 (1.2TB 10k SFF-2)
  - (#ELQ3) -Quantity 150 of #ELD3 (1.2TB 10k SFF-2)
  - (#ELQP) -Quantity 150 of #EL1P
  - (#ELQQ) -Quantity 150 of #EL1Q
  - (#ELQT) -Quantity 150 of #ELFT (1.8TB 10k SFF-2)
  - (#ELQV) -Quantity 150 of #ELEV (600GB 10k SFF-2)
  - (#ELQZ) -Quantity 150 of #ELEZ (300GB SSD SFF-2)
  - (#ELR4) -Quantity 150 of #EL64 7.72-8.0 TB 7200 rpm 4k LFF-1 Disk
  - (#ESRL) -300GB 15K RPM SAS SFF-3 4k Block Cached Disk Drive (Linux)
  - (#ESRM) -300GB 15K RPM SAS SFF-2 4k Block Cached Disk Drive (Linux)
  - (#ESRP) -600GB 15K RPM SAS SFF-3 4k Block Cached Disk Drive (Linux)
  - (#ESRR) -600GB 15K RPM SAS SFF-2 4k Block Cached Disk Drive (Linux)
  - (#ESVM) -Quantity 150 of #ESRM (300GB 15k SFF-2)
  - (#ESVR) -Quantity 150 of #ESRR (600GB 15k SFF-2)
- Display
  - (#3632) -Widescreen LCD Monitor
- Drive
  - (#1107) -USB 500 GB Removable Disk Drive
  - (#EU01) -1TB Removable Disk Drive Cartridge
  - (#EU04) -RDX USB External Docking Station for Removable Disk Cartridge
  - (#EU08) -RDX 320 GB Removable Disk Drive
  - (#EU15) -1.5TB Removable Disk Drive Cartridge
  - (#EU2T) -2TB Removable Disk Drive Cartridge (RDX)
  - (#EUA4) -RDX USB External Docking Station

- Linecords
  - (#6458) -Power Cord 4.3m (14-ft), Drawer to IBM PDU (250V/10A)
  - (#6460) -Power Cord 4.3m (14-ft), Drawer To OEM PDU (125V, 15A)
  - (#6469) -Power Cord 4.3m (14-ft), Drawer to Wall/OEM PDU (250V/ 15A) U. S.
  - (#6470) -Power Cord 1.8m (6-ft), Drawer to Wall (125V/15A)
  - (#6471) -Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/ 10A)
  - (#6472) -Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/ 16A)
  - (#6473) -Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/ 10A)
  - (#6474) -Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/ 13A)
  - (#6475) -Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/ 16A)
  - (#6476) -Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/ 10A)
  - (#6477) -Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/ 16A)
  - (#6478) -Power Cord 2.7 M(9-foot), To Wall/OEM PDU, (250V, 16A)
  - (#6488) -Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (125V/ 15A or 250V/10A )
  - (#6489) -4.3m (14-Ft) 3PH/32A 380-415V Power Cord
  - (#6491) -4.3m (14-Ft) 1PH/63A 200-240V Power Cord
  - (#6492) -4.3m (14-Ft) 1PH/48A 200-240V Power Cord
  - (#6493) -Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/ 10A)
  - (#6494) -Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/ 10A)
  - (#6496) -Power Cord 2.7M (9-foot), To Wall/OEM PDU, (250V, 10A)
  - (#6577) -Power Cable - Drawer to IBM PDU, 200-240V/10A
  - (#6651) -Power Cord 2.7M (9-foot), To Wall/OEM PDU, (125V, 15A)
  - (#6653) -4.3m (14-Ft) 3PH/16A 380-415V Power Cord
  - (#6654) -4.3m (14-Ft) 1PH/24A Power Cord
  - (#6655) -4.3m (14-Ft) 1PH/24A WR Power Cord
  - (#6656) -4.3m (14-Ft) 1PH/32A Power Cord
  - (#6657) -4.3m (14-Ft) 1PH/32A Power Cord
  - (#6658) -4.3m (14-Ft) 1PH/24A Power Cord-Korea
  - (#6659) -Power Cord 2.7M (9-foot), To Wall/OEM PDU, (250V, 15A)
  - (#6660) -Power Cord 4.3m (14-ft), Drawer to Wall/OEM PDU (125V/ 15A)
  - (#6665) -Power Cord 2.8m (9.2-ft), Drawer to IBM PDU, (250V/10A)
  - (#6667) -4.3m (14-Ft) 3PH/32A 380-415V Power Cord-Australia
  - (#6669) -Power Cord 4.3M (14-foot), Drawer to OEM PDU, (250V, 15A)
  - (#6671) -Power Cord 2.7M (9-foot), Drawer to IBM PDU, 250V/10A
  - (#6672) -Power Cord 2M (6.5-foot), Drawer to IBM PDU, 250V/10A
  - (#6680) -Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/ 10A)
  - (#ECJ5) - 4.3m (14-Ft) PDU to Wall 3PH/24A 200-240V Delta-wired Power Cord
  - (#ECJ7) - 4.3m (14-Ft) PDU to Wall 3PH/48A 200-240V Delta-wired Power Cord
  - (#ELC0) -PDU Access Cord 0.38m
  - (#ELC5) -Power Cable - Drawer to IBM PDU (250V/10A)
- Manufacturing Instruction
  - (#9387) -Specify mode-1 & CEC SAS port for EXP24 #5887/EL1S
  - (#EJR1) -Specify Mode-1 & (1)EJ0J/EJ0M/EL3B for EXP24S (#5887/ EL1S)
  - (#EJR2) -Specify Mode-1 & (2)EJ0J/EJ0M/EL3B for EXP24S (#5887/ EL1S)
  - (#EJR3) -Specify Mode-2 & (2)EJ0J/EJ0M/EL3B & (2) X for EXP24S (#5887/EL1S)
  - (#EJR4) -Specify Mode-2 & (4)EJ0J/EJ0M/EL3B for EXP24S (#5887/ EL1S)
  - (#EJR5) -Specify Mode-4 & (4)EJ0J/EJ0M/EL3B for EXP24S (#5887/ EL1S)

- (#EJR6) -Specify Mode-2 & (1)EJ0J/EJ0M/EL3B & (2) YO for EXP24S (#5887/EL1S)
- (#EJR7) -Specify Mode-2 & (2)EJ0J/EJ0M/EL3B & (2) YO for EXP24S (#5887/EL1S)
- (#EJRA) -Specify Mode-2 & (1)EJ0J/EJ0M/EL3B & (1) YO for EXP24S (#5887/EL1S)
- (#EJRB) -Specify Mode-2 & (2)EJ0J/EJ0M/EL3B & (1) X for EXP24S (#5887/EL1S)
- (#EJRC) -Specify Mode-4 & (1)EJ0J/EJ0M/EL3B for EXP24S (#5887/ EL1S)
- (#EJRD) -Specify Mode-4 & (2)EJ0J/EJ0M/EL3B for EXP24S (#5887/ EL1S)
- (#EJRE) -Specify Mode-4 & (3)EJ0J/EJ0M/EL3B for EXP24S (#5888/ EL1S)
- (#EJRF) -Specify Mode-1 & (2)EJ14 for EXP24S (#5887/EL1S)
- (#EJRG) -Specify Mode-2 & (2)EJ14 & (2) X for EXP24S (#5887/EL1S)
- (#EJRH) -Specify Mode-2 & (2)EJ14 & (1) X for EXP24S (#5887/EL1S)
- (#EJRJ) -Specify Mode-2 & (4)EJ14 for EXP24S (#5887/EL1S)
- (#EJRL) -Non-paired Indicator EJ14 PCIe SAS RAID+ Adapter
- (#EJSU) -Specify Mode-1 & CEC SAS port Controller EJ1G/EL67& (1) 6G YO for EXP24S (#5887/EL1S)
- (#EJV1) -Specify Mode-1 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)YO12 for EXP12SX #ESLL/ELLL
- (#EJV2) -Specify Mode-1 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP12SX #ESLL/ELLL
- (#EJV3) -Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL
- (#EJV4) -Specify Mode-2 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL
- (#EJV5) -Specify Mode-4 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL
- (#EJV6) -Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP12SX #ESLL/ELLL
- (#EJV7) -Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP12SX #ESLL/ELLL
- (#EJVA) -Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)YO12 for EXP12SX #ESLL/ELLL
- (#EJVB) -Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP12SX #ESLL/ELLL
- (#EJVC) -Specify Mode-4 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP12SX #ESLL/ELLL
- (#EJVD) -Specify Mode-4 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP12SX #ESLL/ELLL
- (#EJVE) -Specify Mode-4 & (3)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL
- (#EJVF) -Specify Mode-1 & (2)EJ14 & (2)YO12 for EXP12SX #ESLL/ ELLL
- (#EJW1) -Specify Mode-1 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)YO12 for EXP24SX #ESLS/ELLS
- (#EJW2) -Specify Mode-1 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP24SX #ESLS/ELLS
- (#EJW3) -Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS
- (#EJW4) -Specify Mode-2 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS
- (#EJW5) -Specify Mode-4 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS
- (#EJW7) -Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP24SX #ESLS/ELLS
- (#EJWA) -Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)YO12 for EXP24SX #ESLS/ELLS
- (#EJWB) -Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP24SX #ESLS/ELLS
- (#EJWC) -Specify Mode-4 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP24SX #ESLS/ELLS
- (#EJWD) -Specify Mode-4 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP24SX #ESLS/ELLS
- (#EJWE) -Specify Mode-4 & (3)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS
- (#EJWF) -Specify Mode-1 & (2)EJ14 & (2)YO12 for EXP24SX #ESLS/ ELLS
- (#EJWG) -Specify Mode-2 & (2)EJ14 & (2)X12 for EXP24SX #ESLS/ELLS
- (#EJWH) -Specify Mode-2 & (2)EJ14 & (1)X12 for EXP24SX #ESLS/ELLS
- (#EJWJ) -Specify Mode-2 & (4)EJ14 & (2)X12 for EXP24SX #ESLS/ELLS
- (#EJRP) -Specify Mode-1 & (2)EJ0L for EXP24S (#5887/EL1S)
- (#EJRR) -Specify mode-2 & (4) EJ0L for EXP24S #5887/EL1S
- (#EJRS) -Specify Mode-2 & (2)EJ0L & (2) X for EXP24S (#5887/EL1S)
- (#EJRT) -Specify Mode-2 & (2)EJ0L & (1) X for EXP24S (#5887/EL1S)
- (#EJRU) -Non-paired Indicator EJ0L PCIe SAS RAID Adapter



- (#EJVP) -Specify Mode-1 & (2)EJ0L & (2)YO12 for EXP12SX #ESLL/ ELLL
- (#EJWP) -Specify Mode-1 & (2)EJ0L & (2)YO12 for EXP24SX #ESLS/ ELLS
- (#EJWR) -Specify Mode-2 & (4)EJ0L & (2)X12 for EXP24SX #ESLS/ELLS
- (#EJWS) -Specify Mode-2 & (2)EJ0L & (2)X12 for EXP24SX #ESLS/ELLS
- (#EJWT) -Specify Mode-2 & (2)EJ0L & (1)X12 for EXP24SX #ESLS/ELLS
- Media Devices
  - (#EUA5) -Standalone USB DVD drive w/cable
- Memory
  - (#EM60) -8 GB DDR4 Memory
  - (#EM62) -16 GB DDR4 Memory
  - (#EM63) -32 GB DDR4 Memory
  - (#EM64) -64 GB DDR4 Memory
  - (#EM65) -128 GB DDR4 Memory
  - (#EM7B) -64 GB DDR4 Memory Dimm
  - (#EM7C) -128 GB DDR4 Memory Dimm
- Miscellaneous
  - (#0983) -US TAA Compliance Indicator
  - (#0984) -Product assembled in USA manufacturing plant
  - (#1140) -Custom Service Specify, Rochester Minn, USA
  - (#2147) -Primary OS - Linux
  - (#ECS0) -Indicator Assembled and Tested in China
  - (#ECSF) -Custom Service Specify, Montpellier, France
  - (#ECSJ) -NeuCloud Indicator/Specify
  - (#ECSM) -Custom Service Specify, Mexico
  - (#ECSP) -Custom Service Specify, Poughkeepsie, USA
  - (#EHKV) -SAP HANA TRACKING FEATURE
  - (#EU0B) -Operator Panel LCD Display
- Pointing Device
  - (#8845) -USB Mouse
- Power
  - (#7109) -Intelligent PDU+, 1 EIA Unit, Universal UTG0247 Connector
  - (#7188) -Power Distribution Unit
  - (#7196) -Power Distribution Unit (US) - 1 EIA Unit, Universal, Fixed Power Cord
  - (#ECJJ) - High Function 9xC19 Single-Phase or Three-Phase Wye PDU plus
  - (#ECJL) - High Function 9xC19 PDU plus 3-Phase Delta
  - (#ECJN) - High Function 12xC13 Single-Phase or Three-Phase Wye PDU plus
  - (#ECJQ) - High Function 12xC13 PDU plus 3-Phase Delta
  - (#EL1B) -AC Power Supply - 1400W (200-240 VAC)
  - (#EMXA) -AC Power Supply Conduit for PCIe3 Expansion Drawer
  - (#EPTJ) -High Function 9xC19 PDU: Switched, Monitoring
  - (#EPTL) -High Function 9xC19 PDU 3-Phase: Switched, Monitoring
  - (#EPTN) -High Function 12xC13 PDU: Switched, Monitoring
  - (#EPTQ) -High Function 12xC13 PDU 3-Phase: Switched, Monitoring
  - (#ESLA) -Specify AC Power Supply for EXP12SX/EXP24SX Storage Enclosure
- Processor
  - (#ELAV) -One Processor Core Activation for #ELPV
  - (#ELAW) -One Processor Core Activation for #ELPW
  - (#ELAX) -One Processor Core Activation for #ELPX

- (#ELPV) -8-core Typical 3.4 to 3.9 Ghz (max) POWER9 Processor
- (#ELPW) -10-core Typical 2.9 to 3.8 Ghz (max) POWER9 Processor
- (#ELPX) -12-core Typical 2.7 to 3.8 Ghz (max) POWER9 Processor
- Rack Related
  - (#0551) -19 inch, 1.8 meter high rack
  - (#0553) -19 inch, 2.0 meter high rack
  - (#0599) -Rack Filler Panel Kit
  - (#6068) -Opt Front Door for 1.8m Rack
  - (#6069) -Opt Front Door for 2.0m Rack
  - (#6248) -1.8m Rack Acoustic Doors
  - (#6249) -2.0m Rack Acoustic Doors
  - (#6263) -1.8m Rack Trim Kit
  - (#6272) -2.0m Rack Trim Kit
  - (#6580) -Optional Rack Security Kit
  - (#7118) -Environmental Monitoring Probe
  - (#EB3Z) -Lift tool based on GenieLift GL-8 (standard)
  - (#EB4Z) -Service wedge shelf tool kit for EB3Z
  - (#EC01) -Rack Front Door (Black)
  - (#EC02) -Rack Rear Door
  - (#EC03) -Rack Side Cover
  - (#EC04) -Rack Suite Attachment Kit
  - (#EC07) -Slim Rear Acoustic Door
  - (#EC08) -Slim Front Acoustic Door
  - (#EC15) -Rear Door Heat Exchanger for 2.0 Meter Slim Rack
  - (#ECR0) -2.0 Meter Slim Rack
  - (#ECRF) -Rack Front Door High-End appearance
  - (#ECRG) -Rack Rear Door Black
  - (#ECRJ) -Rack Side Cover
  - (#ECRK) -Rack Rear Extension 5-In
  - (#ECRM) -Rack Front Door for Rack (Black/Flat)
  - (#EJU7) -Front OEM Bezel for 8-Bay BackPlane
  - (#EJUC) -Front IBM Bezel for 8-Bay BackPlane
  - (#EL1S) -EXP24S SFF Gen2-bay Drawer
  - (#ELLL) -EXP12SX SAS Storage Enclosure
  - (#ELLS) -EXP24SX SAS Storage Enclosure
  - (#ELMF) -PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer
  - (#ELMG) -PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer
  - (#ELMX) -PCIe Gen3 I/O Expansion Drawer
  - (#EMXH) -PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer
  - (#EPth) -Horizontal PDU Mounting Hardware
  - (#ER05) -42U Slim Rack
  - (#ERG0) -Rear rack extension
- Services
  - (#0010) -One CSC Billing Unit
  - (#0011) -Ten CSC Billing Units
  - (#EUC6) -Core Use HW Feature
  - (#EUC7) -Core Use HW Feature 10X

- Solid State Drive
  - (#EL4Q) -387GB SFF-2 4K SSD for Linux
  - (#EL4S) -775GB SFF-2 4K SSD for Linux
  - (#EL78) -387GB SFF-2 SSD 5xx eMLC4 for Linux
  - (#EL7E) -775GB SFF-2 SSD 5xx eMLC4 for Linux
  - (#EL7K) -387GB SFF-3 SSD 5xx eMLC4 for Linux
  - (#EL7P) -775GB SFF-3 SSD 5xx eMLC4 for Linux
  - (#EL80) -1.9TB Read Intensive SAS 4k SFF-2 SSD for Linux
  - (#EL83) -931GB Mainstream SAS 4k SFF-3 SSD for Linux
  - (#EL85) -387GB SFF-2 SSD 4k eMLC4 for Linux
  - (#EL8C) -775GB SFF-2 SSD 4k eMLC4 for Linux
  - (#EL8F) -1.55TB SFF-2 SSD 4k eMLC4 for Linux
  - (#EL8J) -1.9TB Read Intensive SAS 4k SFF-3 SSD for Linux
  - (#EL8N) -387GB SFF-3 SSD 4k eMLC4 for Linux
  - (#EL8Q) -775GB SFF-3 SSD 4k eMLC4 for Linux
  - (#EL8V) -1.55TB SFF-3 SSD 4k eMLC4 for Linux
  - (#EL8Y) -931GB Mainstream SAS 4k SFF-2 SSD for Linux
  - (#EL96) -1.86TB Mainstream SAS 4k SFF-2 SSD for Linux
  - (#ELE1) -3.72TB Mainstream SAS 4k SFF-3 SSD for Linux
  - (#ELE7) -3.72TB Mainstream SAS 4k SFF-2 SSD for Linux
  - (#ELG9) -387GB Enterprise SAS 5xx SFF-3 SSD for Linux
  - (#ELGB) -387GB Enterprise SAS 4k SFF-2 SSD for Linux
  - (#ELGD) -387GB Enterprise SAS 4k SFF-3 SSD for Linux
  - (#ELGF) -775GB Enterprise SAS 5xx SFF-2 SSD for Linux
  - (#ELGH) -775GB Enterprise SAS 5xx SFF-3 SSD for Linux
  - (#ELGK) -775GB Enterprise SAS 4k SFF-2 SSD for Linux
  - (#ELGM) -775GB Enterprise SAS 4k SFF-3 SSD for Linux
  - (#ELGP) -1.55TB Enterprise SAS 4k SFF-2 SSD for Linux
  - (#ELGR) -1.55TB Enterprise SAS 4k SFF-3 SSD for Linux
  - (#ELHJ) -931 GB Mainstream SAS 4k SFF-2 SSD for Linux
  - (#ELHL) -1.86 TB Mainstream SAS 4k SFF-2 SSD for Linux
  - (#ELHN) -7.45 TB Mainstream SAS 4k SFF-2 SSD for Linux
  - (#ELHS) -931 GB Mainstream SAS 4k SFF-3 SSD for Linux
  - (#ELHU) -1.86 TB Mainstream SAS 4k SFF-3 SSD for Linux
  - (#ELHW) -7.45 TB Mainstream SAS 4k SFF-3 SSD for Linux
  - (#ELM8) -3.72 TB Mainstream SAS 4k SFF-2 SSD for Linux
  - (#ELMQ) -3.72 TB Mainstream SAS 4k SFF-3 SSD for Linux
  - (#ELQ5) -Quantity 150 of #EL85 387GB SFF-2 SSD 4k
  - (#ELQ6) -Quantity 150 of #EL96 (1.86TB SFF-2)
  - (#ELQC) -Quantity 150 of #EL8C 775GB SFF-2 SSD 4k
  - (#ELQE) -Quantity 150 of #EL7E 775GB SFF-2 SSD 5xx
  - (#ELQF) -Quantity 150 of #EL8F 1.55TB SFF-2 SSD 4k
  - (#ELQS) -Quantity 150 of #EL4S 775GB SFF-2 4k SSD (Linux)
  - (#ELQY) -Quantity 150 of #EL8Y (931GB SFF-2)
  - (#ELR0) -Quantity 150 of EL80 1.9TB SSD
  - (#ELR8) -Quantity 150 of #ELM8 3.72 TB SSD 4k SFF-2
  - (#ELRQ) -Quantity 150 of #EL4Q 387GB SFF-2 4k SSD (Linux)

- (#ELRB) -Quantity 150 of #ELGB (387GB SAS 4k)
- (#ELRF) -Quantity 150 of #ELGF (775GB SAS 5xx)
- (#ELRJ) -Quantity 150 of #ELHJ 931 GB SSD 4k SFF-2
- (#ELRK) -Quantity 150 of #ELGK (775GB SAS 4k)
- (#ELRL) -Quantity 150 of #ELHL 1.86 TB SSD 4k SFF-2
- (#ELRN) -Quantity 150 of #ELHN 7.45 TB SSD 4k SFF-2
- (#ELRP) -Quantity 150 of #ELGP (1.55TB SAS 4k)
- (#ER94) -Quantity 150 of ES94 387GB SAS 4k
- (#ERGV) -Quantity 150 of ESGV 387GB SSD 4k
- (#ERGZ) -Quantity 150 of ESGZ 775GB SSD 4k
- (#ERJ0) -Quantity 150 of ESJ0 931GB SAS 4k
- (#ERJ2) -Quantity 150 of ESJ2 1.86TB SAS 4k
- (#ERJ4) -Quantity 150 of ESJ4 3.72TB SAS 4k
- (#ERJ6) -Quantity 150 of ESJ6 7.45TB SAS 4k
- (#ERNA) -Quantity 150 of ESNA 775GB SSD 4k
- (#ERNE) -Quantity 150 of ESNE 1.55TB SSD 4k
- (#ES14) -Mainstream 400GB SSD NVMe M.2 module
- (#ES90) -387GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
- (#ES94) -387GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
- (#ESB0) -387GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux
- (#ESB2) -387GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux
- (#ESB4) -775GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux
- (#ESB6) -775GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux
- (#ESB8) -387GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
- (#ESBA) -387GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
- (#ESBE) -775GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
- (#ESBG) -775GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
- (#ESBJ) -1.55TB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
- (#ESBL) -1.55TB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
- (#ESGT) -387GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux
- (#ESGV) -387GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux
- (#ESGX) -775GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux
- (#ESGZ) -775GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux
- (#ESJ0) -931GB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
- (#ESJ2) -1.86TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
- (#ESJ4) -3.72TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
- (#ESJ6) -7.45TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
- (#ESJ8) -931GB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
- (#ESJA) -1.86TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
- (#ESJC) -3.72TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
- (#ESJE) -7.45TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
- (#ESJJ) -931GB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
- (#ESJL) -1.86TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
- (#ESJN) -3.72TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
- (#ESJQ) -7.44TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
- (#ESJS) -931GB Mainstream SAS 4k SFF-3 SSD for AIX/Linux

- (#ESJU) -1.86TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
- (#ESJW) -3.72TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
- (#ESJY) -7.44TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
- (#ESK0) -387GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux
- (#ESK1) -387GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux
- (#ESK2) -775GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux
- (#ESK3) -775GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux
- (#ESK6) -387GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
- (#ESK8) -387GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
- (#ESKA) -775GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
- (#ESKC) -775GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
- (#ESKE) -1.55TB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
- (#ESKG) -1.55TB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
- (#ESKJ) -931GB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
- (#ESKK) -931GB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
- (#ESKN) -1.86TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
- (#ESKP) -1.86TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
- (#ESKS) -3.72TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
- (#ESKT) -3.72TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
- (#ESKW) -7.44TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
- (#ESKX) -7.44TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
- (#ESNA) -775GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
- (#ESNC) -775GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
- (#ESNE) -1.55TB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
- (#ESNG) -1.55TB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
- (#ESQ2) -Quantity 150 of ESB2 387GB SAS 4k
- (#ESQ6) -Quantity 150 of ESB6 775GB SAS 4k
- (#ESQA) -Quantity 150 of ESBA 387GB SAS 4k
- (#ESQG) -Quantity 150 of ESBG 775GB SAS 4k
- (#ESQL) -Quantity 150 of ESBL 1.55TB SAS 4k
- Specify Codes
  - (#0266) -Linux Partition Specify
  - (#0728) -EXP24S SFF Gen2 Load Source Specify (#5887 or #EL1S)
  - (#0837) -SAN Load Source Specify
  - (#EHR1) -Boot Drive / Load Source in EXP12SX Specify (in #ESLL or #ELLL)
  - (#EHR2) -Boot Drive / Load Source in EXP24SX Specify (in #ESLS or #ELLS)
- Virtualization Engine
  - (#EC22) -IBM PowerVM for IBM PowerLinux

## Feature availability matrix

The following feature availability matrix for MT 9008 uses the letter "A" to indicate features that are available and orderable feature that is supported on the new model during a model conversion; these features will work on the new model, but add cannot be ordered on the new model; they can only be removed. "N" indicates that the feature is not supported on the new model conversion. As additional features are announced, supported, or withdrawn, this list will be updated. Please check v additional information.

2	A = AVAILABLE	S = SUPPORTED
2	N = NOT SUPPORTED, MUST BE REMOVED	
L		

FEAT/PN	DESCRIPTION
0010	A One CSC Billing Unit
0011	A Ten CSC Billing Units
0266	A Linux Partition Specify
0348	A V.24/EIA232 6.1m (20-Ft) PCI Cable
0353	S V.35 6.1m (20-Ft) PCI Cable
0359	S X.21 6.1m (20-Ft) PCI Cable
0456	S Customer Specified Placement
0551	A 19 inch, 1.8 meter high rack
0553	A 19 inch, 2.0 meter high rack
0599	S Rack Filler Panel Kit
0719	A Load Source Not in CEC
0728	S EXP24S SFF Gen2 Load Source Specify (#5887 or #EL1S)
0837	A SAN Load Source Specify
0983	A US TAA Compliance Indicator
0984	A Product assembled in USA manufacturing plant
1107	A USB 500 GB Removable Disk Drive
1111	A 3m, Blue Cat5e Cable
1112	S 10m, Blue Cat5e Cable
1113	S 25m, Blue Cat5e Cable
1115	S CAT5E Ethernet Cable, 3M GREEN
1116	S CAT5E Ethernet Cable, 10M GREEN
1118	A 3m, Yellow Cat5e Cable
1119	S 10m, Yellow Cat5e Cable
1140	A Custom Service Specify, Rochester Minn, USA
2147	A Primary OS - Linux
2319	S Factory Deconfiguration of 1-core
2456	S 2M LC-SC 50 Micron Fiber Converter Cable
2459	S 2M LC-SC 62.5 Micron Fiber Converter Cable
2934	S 3M Asynchronous Terminal/Printer Cable EIA-232
2936	S Asynchronous Cable EIA-232/V.24 3M
3124	S Serial-to-Serial Port Cable for Drawer/Drawer- 3.7M
3125	S Serial-to-Serial Port Cable for Rack/Rack- 8M
3632	S Widescreen LCD Monitor
3925	S 0.3M Serial Port Converter Cable, 9-Pin to 25-Pin
3927	S Serial Port Null Modem Cable, 9-pin to 9-pin, 3.7M
3928	S Serial Port Null Modem Cable, 9-pin to 9-pin, 10M
3930	A System Serial Port Converter Cable
4242	S 1.8 M (6-ft) Extender Cable for Displays (15-pin D-shell to 15-pin D-shell)
4256	A Extender Cable - USB Keyboards, 1.8M
4276	A VGA to DVI Connection Converter
4648	S Rack Integration Services: BP only
4649	S Rack Integration Services
One and only one rack indicator feature is required on all orders (#4650 to #4666).	
4650	S Rack Indicator- Not Factory Integrated
4651	S Rack Indicator, Rack #1
4652	S Rack Indicator, Rack #2
4653	S Rack Indicator, Rack #3
4654	S Rack Indicator, Rack #4
4655	S Rack Indicator, Rack #5
4656	S Rack Indicator, Rack #6
4657	S Rack Indicator, Rack #7
4658	S Rack Indicator, Rack #8
4659	S Rack Indicator, Rack #9
4660	S Rack Indicator, Rack #10
4661	S Rack Indicator, Rack #11
4662	S Rack Indicator, Rack #12
4663	S Rack Indicator, Rack #13
4664	S Rack Indicator, Rack #14
4665	S Rack Indicator, Rack #15
4666	S Rack Indicator, Rack #16

5000	S	Software Preload Required
5269	A	PCIe LP POWER GXT145 Graphics Accelerator
5729	S	PCIe2 8Gb 4-port Fibre Channel Adapter
5785	A	4 Port Async EIA-232 PCIe Adapter
5899	S	PCIe2 4-port 1GbE Adapter
6068	A	Opt Front Door for 1.8m Rack
6069	A	Opt Front Door for 2.0m Rack
6248	A	1.8m Rack Acoustic Doors
6249	A	2.0m Rack Acoustic Doors
6263	A	1.8m Rack Trim Kit
6272	A	2.0m Rack Trim Kit
6458	A	Power Cord 4.3m (14-ft), Drawer to IBM PDU (250V/10A)
6460	A	Power Cord 4.3m (14-ft), Drawer To OEM PDU (125V, 15A)
6469	A	Power Cord 4.3m (14-ft), Drawer to Wall/OEM PDU (250V/15A)
		U. S.
6470	A	Power Cord 1.8m (6-ft), Drawer to Wall (125V/15A)
6471	A	Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/10A)
6472	A	Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/16A)
6473	A	Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/10A)
6474	A	Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/13A)
6475	A	Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/16A)
6476	A	Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)
6477	A	Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/16A)
6478	A	Power Cord 2.7 M(9-foot), To wall/OEM PDU, (250V, 16A)
6488	A	Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (125V/15A or 250V/10A )
6489	A	4.3m (14-Ft) 3PH/32A 380-415V Power Cord
6491	A	4.3m (14-Ft) 1PH/63A 200-240V Power Cord
6492	A	4.3m (14-Ft) 1PH/48A 200-240V Power Cord
6493	A	Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)
6494	A	Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)
6496	A	Power Cord 2.7M (9-foot), To wall/OEM PDU, (250V, 10A)
6577	A	Power Cable - Drawer to IBM PDU, 200-240V/10A
6580	A	Optional Rack Security Kit
6651	A	Power Cord 2.7M (9-foot), To wall/OEM PDU, (125V, 15A)
6653	A	4.3m (14-Ft) 3PH/16A 380-415V Power Cord
6654	A	4.3m (14-Ft) 1PH/24A Power Cord
6655	A	4.3m (14-Ft) 1PH/24A WR Power Cord
6656	A	4.3m (14-Ft) 1PH/32A Power Cord
6657	A	4.3m (14-Ft) 1PH/32A Power Cord
6658	A	4.3m (14-Ft) 1PH/24A Power Cord-Korea
6659	A	Power Cord 2.7M (9-foot), To wall/OEM PDU, (250V, 15A)
6660	A	Power Cord 4.3m (14-ft), Drawer to Wall/OEM PDU (125V/15A)
6665	A	Power Cord 2.8m (9.2-ft), Drawer to IBM PDU, (250V/10A)
6667	A	4.3m (14-Ft) 3PH/32A 380-415V Power Cord-Australia
6669	A	Power Cord 4.3M (14-foot), Drawer to OEM PDU, (250V, 15A)
6671	A	Power Cord 2.7M (9-foot), Drawer to IBM PDU, 250V/10A
6672	A	Power Cord 2M (6.5-foot), Drawer to IBM PDU, 250V/10A
6680	A	Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)
7109	S	Intelligent PDU+, 1 EIA Unit, Universal UTG0247 Connector
7118	A	Environmental Monitoring Probe
7188	A	Power Distribution Unit
7196	S	Power Distribution Unit (US) - 1 EIA Unit, Universal, Fixed Power Cord
7802	S	Ethernet Cable, 15m, Hardware Management Console to System Unit
8143	S	Linux Software Preinstall
8845	S	USB Mouse
9169	S	Order Routing Indicator- System Plant
9300	S	Language Group Specify - US English
9387	S	Specify mode-1 & CEC SAS port for EXP24 #5887/EL1S
9442	S	New Red Hat License Core Counter
9443	S	New SUSE License Core Counter
9445	S	Other Linux License Core Counter
9446	S	3rd Party Linux License Core Counter

9447	S	VIOS Core Counter
9449	S	Other License Core Counter
9450	S	Ubuntu Linux License Core Counter
9461	S	Month Indicator
9462	S	Day Indicator
9463	S	Hour Indicator
9464	S	Minute Indicator
9465	S	Qty Indicator
9466	S	Countable Member Indicator
9700	S	Language Group Specify - Dutch
9703	S	Language Group Specify - French
9704	S	Language Group Specify - German
9705	S	Language Group Specify - Polish
9706	S	Language Group Specify - Norwegian
9707	S	Language Group Specify - Portuguese
9708	S	Language Group Specify - Spanish
9711	S	Language Group Specify - Italian
9712	S	Language Group Specify - Canadian French
9714	S	Language Group Specify - Japanese
9715	S	Language Group Specify - Traditional Chinese (Taiwan)
9716	S	Language Group Specify - Korean
9718	S	Language Group Specify - Turkish
9719	S	Language Group Specify - Hungarian
9720	S	Language Group Specify - Slovakian
9721	S	Language Group Specify - Russian
9722	S	Language Group Specify - Simplified Chinese (PRC)
9724	S	Language Group Specify - Czech
9725	S	Language Group Specify - Romanian
9726	S	Language Group Specify - Croatian
9727	S	Language Group Specify - Slovenian
9728	S	Language Group Specify - Brazilian Portuguese
9729	S	Language Group Specify - Thai
EB27	S	QSFP+ 40GbE Base-SR Transceiver
EB2B	S	1m (3.3-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)
EB2H	S	3m (9.8-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)
EB2J	A	10m (30.3-ft), IBM Passive QSFP+ MTP Optical Cable
EB2K	A	30m (90.3-ft), IBM Passive QSFP+ MTP Optical Cable
EB3Z	A	Lift tool based on GenieLift GL-8 (standard)
EB46	A	10GbE Optical Transceiver SFP+ SR
EB47	A	25GbE Optical Transceiver SFP28
EB4J	A	0.5m SFP28/25GbE copper Cable
EB4K	A	1.0m SFP28/25GbE copper Cable
EB4L	S	1.5m SFP28/25GbE copper Cable
EB4M	A	2.0m SFP28/25GbE copper Cable
EB4P	A	2.0m QSFP28/100GbE copper split Cable to SFP28 4x25GbE
EB4Z	A	Service wedge shelf tool kit for EB3Z
EB50	S	0.5m EDR IB Copper Cable QSFP28
EB51	A	1.0m EDR IB Copper Cable QSFP28
EB52	A	2.0M EDR IB Copper Cable QSFP28
EB54	A	1.5M EDR IB Copper Cable QSFP28
EB59	A	100GbE Optical Transceiver QSFP28
EB5A	A	3M EDR IB Optical Cable QSFP28
EB5B	A	5M EDR IB Optical Cable QSFP28
EB5C	A	10M EDR IB Optical Cable QSFP28
EB5D	A	15M EDR IB Optical Cable QSFP28
EB5E	A	20M EDR IB Optical Cable QSFP28
EB5F	A	30M EDR IB Optical Cable QSFP28
EB5G	A	50M EDR IB Optical Cable QSFP28
EB5H	A	100M EDR IB Optical Cable QSFP28
EB5J	S	0.5M 100GbE Copper Cable QSFP28
EB5K	A	1.0M 100GbE Copper Cable QSFP28
EB5L	A	1.5M 100GbE Copper Cable QSFP28
EB5M	A	2.0M 100GbE Copper Cable QSFP28
EB5N	S	25M EDR IB Optical Cable QSFP28
EB5R	A	3M 100GbE optical cable QSFP28 (AOC)



EB5S	A	5M 100GbE Optical Cable QSFP28 (AOC)
EB5T	A	10M 100GbE Optical Cable QSFP28 (AOC)
EB5U	A	15M 100GbE Optical Cable QSFP28 (AOC)
EB5V	A	20M 100GbE Optical Cable QSFP28 (AOC)
EB5W	A	30M 100GbE Optical Cable QSFP28 (AOC)
EB5X	A	50M 100GbE Optical Cable QSFP28 (AOC)
EB5Y	S	100M 100GbE Optical Cable QSFP28 (AOC)
EC01	S	Rack Front Door (Black)
EC02	S	Rack Rear Door
EC03	S	Rack Side Cover
EC04	S	Rack Suite Attachment Kit
EC07	A	Slim Rear Acoustic Door
EC08	A	Slim Front Acoustic Door
EC15	S	Rear Door Heat Exchanger for 2.0 Meter Slim Rack
EC22	A	IBM PowerVM for IBM PowerLinux
EC2R	S	PCIe3 LP 2-Port 10Gb NIC&ROCE SR/Cu Adapter
EC2S	S	PCIe3 2-Port 10Gb NIC&ROCE SR/Cu Adapter
EC2T	A	PCIe3 LP 2-Port 25/10Gb NIC&ROCE SR/Cu Adapter
EC2U	A	PCIe3 2-Port 25/10Gb NIC&ROCE SR/Cu Adapter
EC3A	S	PCIe3 LP 2-Port 40GbE NIC RoCE QSFP+ Adapter
EC3B	S	PCIe3 2-Port 40GbE NIC RoCE QSFP+ Adapter
EC3E	S	PCIe3 LP 2-port 100Gb EDR IB Adapter x16
EC3L	S	PCIe3 LP 2-port 100GbE (NIC& RoCE) QSFP28 Adapter x16
EC3T	S	PCIe3 LP 1-port 100Gb EDR IB Adapter x16
EC45	S	PCIe2 LP 4-Port USB 3.0 Adapter
EC46	S	PCIe2 4-Port USB 3.0 Adapter
EC51	S	PCIe3 LP 3D Graphics Adapter x16
EC59	S	PCIe3 NVMe carrier card w/2 M.2 module slots
EC5C	A	PCIe3 LP 3.2 TB SSD NVMe adapter
EC5E	A	PCIe3 LP 6.4 TB SSD NVMe adapter
EC5G	A	PCIe3 LP 1.6 TB SSD NVMe Adapter
EC62	A	PCIe4 LP 1-port 100Gb EDR IB CAPI adapter
EC64	A	PCIe4 LP 2-port 100Gb EDR IB CAPI adapter
EC67	A	PCIe4 LP 2-port 100Gb ROCE EN LP adapter
EC6J	A	PCIe2 LP 2-Port USB 3.0 Adapter
EC6K	A	PCIe2 2-Port USB 3.0 Adapter
EC7A	A	PCIe4 LP 1.6TB NVMe Flash Adapter x8 for AIX/Linux
EC7C	A	PCIe4 LP 3.2TB NVMe Flash Adapter x8 for AIX/Linux
EC7E	A	PCIe4 LP 6.4TB NVMe Flash Adapter x8 for AIX/Linux
ECBJ	A	SAS X Cable 3m - HD Narrow 6Gb 2-Adapters to Enclosure
ECBK	A	SAS X Cable 6m - HD Narrow 6Gb 2-Adapters to Enclosure
ECBL	S	SAS X Cable 10m - HD Narrow 6Gb 2-Adapters to Enclosure
ECBM	S	SAS X Cable 15m - HD Narrow 3Gb 2-Adapters to Enclosure
ECBN	S	5m (16.4-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)
ECBT	A	SAS YO Cable 1.5m - HD Narrow 6Gb Adapter to Enclosure
ECBU	A	SAS YO Cable 3m - HD Narrow 6Gb Adapter to Enclosure
ECBV	A	SAS YO Cable 6m - HD Narrow 6Gb Adapter to Enclosure
ECBW	A	SAS YO Cable 10m - HD Narrow 6Gb Adapter to Enclosure
ECBX	S	SAS YO Cable 15m - HD Narrow 3Gb Adapter to Enclosure
ECBY	A	SAS AE1 Cable 4m - HD Narrow 6Gb Adapter to Enclosure
ECBZ	A	SAS YE1 Cable 3m - HD Narrow 6Gb Adapter to Enclosure
ECC0	A	SAS AA Cable 0.6m - HD Narrow 6Gb Adapter to Adapter
ECC2	A	SAS AA Cable 1.5m - HD Narrow 6Gb Adapter to Adapter
ECC3	A	SAS AA Cable 3m - HD Narrow 6Gb Adapter to Adapter
ECC4	S	SAS AA Cable 6m - HD Narrow 6Gb Adapter to Adapter
ECC5	S	SAS Cable
ECC7	S	3M Optical Cable Pair for PCIe3 Expansion Drawer
ECC8	S	10M Optical Cable Pair for PCIe3 Expansion Drawer
ECCF	A	System Port Converter Cable for UPS
ECCG	S	Variable Length, Blue Cat5e Cable
ECCH	S	Variable Length, Green Cat5e Cable
ECCJ	S	Variable Length, Yellow Cat5e Cable
ECCS	A	3M Copper CXP Cable Pair for PCIe3 Expansion Drawer
ECCX	A	3M Active Optical Cable Pair for PCIe3 Expansion Drawer
ECCY	A	10M Active Optical Cable Pair for PCIe3 Expansion Drawer

ECDJ	A	3.0M SAS X12 Cable (Two Adapter to Enclosure)
EC DK	A	4.5M SAS X12 Active Optical Cable (Two Adapter to Enclosure)
ECDL	A	10M SAS X12 Active Optical Cable (Two Adapter to Enclosure)
ECDT	A	1.5M SAS Y012 Cable (Adapter to Enclosure)
ECDU	A	3.0M SAS Y012 Cable (Adapter to Enclosure)
ECDV	A	4.5M SAS Y012 Active Optical Cable (Adapter to Enclosure)
ECDW	A	10M SAS Y012 Active Optical Cable (Adapter to Enclosure)
ECE0	A	0.6M SAS AA12 Cable (Adapter to Adapter)
ECE3	A	3.0M SAS AA12 Cable
ECE4	A	4.5M SAS AA12 Active Optical Cable (Adapter to Adapter)
ECJ5	A	4.3m (14-Ft) PDU to Wall 3PH/24A 200-240V Delta-wired Power Cord
ECJ7	A	4.3m (14-Ft) PDU to Wall 3PH/48A 200-240V Delta-wired Power Cord
ECJJ	A	High Function 9xC19 Single-Phase or Three-Phase Wye PDU plus
ECJL	A	High Function 9xC19 PDU plus 3-Phase Delta
ECJN	A	High Function 12xC13 Single-Phase or Three-Phase Wye PDU plus
ECJQ	A	High Function 12xC13 PDU plus 3-Phase Delta
ECL0	S	Power ACP solution specify
ECP0	S	Cloud Private Solution
ECR0	A	2.0 Meter Slim Rack
ECRF	A	Rack Front Door High-End appearance
ECRG	A	Rack Rear Door Black
ECRJ	A	Rack Side Cover
ECRK	A	Rack Rear Extension 5-In
ECRM	A	Rack Front Door for Rack (Black/Flat)
ECS0	S	Indicator Assembled and Tested in China
ECSF	S	Custom Service Specify, Montpellier, France
ECSJ	S	NeuCloud Indicator/Specify
ECSM	A	Custom Service Specify, Mexico
ECSP	A	Custom Service Specify, Poughkeepsie, USA
ECSS	S	Integrated Solution Packing
ECW0	A	Optical wrap Plug
EHKV	A	SAP HANA TRACKING FEATURE
EHLU	S	IBM Power Systems for SAS Viya (Linux)
EHR1	A	Boot Drive / Load Source in EXP12SX Specify (in #ESLL or #ELLL)
EHR2	A	Boot Drive / Load Source in EXP24SX Specify (in #ESLS or #ELLS)
EHS2	A	SSD Placement Indicator - #ESLS/#ELLS
EJ00	A	SAS Port/Cabling for single IOA Backplane
EJ05	A	PCIe3 Optical Cable Adapter for PCIe3 Expansion Drawer
EJ0L	S	PCIe3 12GB Cache RAID SAS Adapter Quad-port 6Gb x8
EJ10	A	PCIe3 SAS Tape/DVD Adapter Quad-port 6Gb x8
EJ14	A	PCIe3 12GB Cache RAID PLUS SAS Adapter Quad-port 6Gb x8
EJ1N	S	PCIe1 LP SAS Tape/DVD Dual-port 3Gb x8 Adapter
EJ1P	S	PCIe1 SAS Tape/DVD Dual-port 3Gb x8 Adapter
EJ1R	A	PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer
EJ33	S	PCIe3 Crypto Coprocessor BSC-Gen3 4767
EJR1	S	Specify Mode-1 & (1)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)
EJR2	S	Specify Mode-1 & (2)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)
EJR3	S	Specify Mode-2 & (2)EJ0J/EJ0M/EL3B & (2) X for EXP24S (#5887/EL1S)
EJR4	S	Specify Mode-2 & (4)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)
EJR5	S	Specify Mode-4 & (4)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)
EJR6	S	Specify Mode-2 & (1)EJ0J/EJ0M/EL3B & (2) Y0 for EXP24S (#5887/EL1S)
EJR7	S	Specify Mode-2 & (2)EJ0J/EJ0M/EL3B & (2) Y0 for EXP24S (#5887/EL1S)
EJRA	S	Specify Mode-2 & (1)EJ0J/EJ0M/EL3B & (1) Y0 for EXP24S (#5887/EL1S)
EJRB	S	Specify Mode-2 & (2)EJ0J/EJ0M/EL3B & (1) X for EXP24S (#5887/EL1S)

EJRC	S	Specify Mode-4 & (1)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)
EJRD	S	Specify Mode-4 & (2)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)
EJRE	S	Specify Mode-4 & (3)EJ0J/EJ0M/EL3B for EXP24S (#5888/EL1S)
EJRF	S	Specify Mode-1 & (2)EJ14 for EXP24S (#5887/EL1S)
EJRG	S	Specify Mode-2 & (2)EJ14 & (2) X for EXP24S (#5887/EL1S)
EJRH	S	Specify Mode-2 & (2)EJ14 & (1) X for EXP24S (#5887/EL1S)
EJRJ	S	Specify Mode-2 & (4)EJ14 for EXP24S (#5887/EL1S)
EJRL	A	Non-paired Indicator EJ14 PCIe SAS RAID+ Adapter
EJRP	S	Specify Mode-1 & (2)EJ0L for EXP24S (#5887/EL1S)
EJRR	S	Specify mode-2 & (4) EJ0L for EXP24S #5887/EL1S
EJRS	S	Specify Mode-2 & (2)EJ0L & (2) X for EXP24S (#5887/EL1S)
EJRT	S	Specify Mode-2 & (2)EJ0L & (1) X for EXP24S (#5887/EL1S)
EJRU	A	Non-paired Indicator EJ0L PCIe SAS RAID Adapter
EJSU	S	Specify Mode-1 & CEC SAS port Controller EJ1G/EL67& (1) 6G YO for EXP24S (#5887/EL1S)
EJU7	A	Front OEM Bezel for 8-Bay BackPlane
EJUC	A	Front IBM Bezel for 8-Bay BackPlane
EJV1	S	Specify Mode-1 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)YO12 for EXP12SX #ESLL/ELLL
EJV2	S	Specify Mode-1 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP12SX #ESLL/ELLL
EJV3	S	Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL
EJV4	S	Specify Mode-2 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL
EJV5	S	Specify Mode-4 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL
EJV6	S	Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP12SX #ESLL/ELLL
EJV7	S	Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP12SX #ESLL/ELLL
EJVA	S	Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)YO12 for EXP12SX #ESLL/ELLL
EJVB	S	Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP12SX #ESLL/ELLL
EJVC	S	Specify Mode-4 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP12SX #ESLL/ELLL
EJVD	S	Specify Mode-4 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP12SX #ESLL/ELLL
EJVE	S	Specify Mode-4 & (3)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL
EJVF	S	Specify Mode-1 & (2)EJ14 & (2)YO12 for EXP12SX #ESLL/ELLL
EJVP	S	Specify Mode-1 & (2)EJ0L & (2)YO12 for EXP12SX #ESLL/ELLL
EJVV	S	Specify Mode-1 & CEC SAS port Controller EJ1G/EL67 & (1)YO12 for EXP12SX #ESLL/ELLL
EJW1	A	Specify Mode-1 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)YO12 for EXP24SX #ESLS/ELLS
EJW2	A	Specify Mode-1 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP24SX #ESLS/ELLS
EJW3	A	Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS
EJW4	A	Specify Mode-2 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS
EJW5	A	Specify Mode-4 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS
EJW6	A	Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP24SX #ESLS/ELLS
EJW7	A	Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP24SX #ESLS/ELLS
EJWA	A	Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)YO12 for EXP24SX #ESLS/ELLS
EJWB	A	Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP24SX #ESLS/ELLS
EJWC	A	Specify Mode-4 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP24SX #ESLS/ELLS

EJWD	A	Specify Mode-4 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP24SX #ESLS/ELLS
EJWE	A	Specify Mode-4 & (3)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS
EJWF	A	Specify Mode-1 & (2)EJ14 & (2)Y012 for EXP24SX #ESLS/ELLS
EJWG	A	Specify Mode-2 & (2)EJ14 & (2)X12 for EXP24SX #ESLS/ELLS
EJWH	A	Specify Mode-2 & (2)EJ14 & (1)X12 for EXP24SX #ESLS/ELLS
EJWJ	A	Specify Mode-2 & (4)EJ14 & (2)X12 for EXP24SX #ESLS/ELLS
EJWP	S	Specify Mode-1 & (2)EJ0L & (2)Y012 for EXP24SX #ESLS/ELLS
EJWR	S	Specify Mode-2 & (4)EJ0L & (2)X12 for EXP24SX #ESLS/ELLS
EJWS	S	Specify Mode-2 & (2)EJ0L & (2)X12 for EXP24SX #ESLS/ELLS
EJWT	S	Specify Mode-2 & (2)EJ0L& (1)X12 for EXP24SX #ESLS/ELLS
EJWU	A	Specify Mode-1 & CEC SAS port Controller EJ1G/EL67 & (1)Y012 for EXP24SX #ESLS/ELLS
ESK0	A	387GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux
ESK1	A	387GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux
ESK2	A	775GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux
ESK3	A	775GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux
ESK6	A	387GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
ESK8	A	387GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
ESKA	A	775GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
ESKC	A	775GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
ESKE	A	1.55TB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
ESKG	A	1.55TB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
ESKJ	A	931GB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
ESKK	A	931GB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
ESKN	A	1.86TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
ESKP	A	1.86TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
ESKS	A	3.72TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
ESKT	A	3.72TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
ESKW	A	7.44TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
ESKX	A	7.44TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
EL1B	S	AC Power Supply - 1400w (200-240 VAC)
EL1P	S	300GB 15k RPM SAS SFF-2 Disk Drive (Linux)
EL1Q	S	600GB 10k RPM SAS SFF-2 Disk Drive (Linux)
EL1S	S	EXP24S SFF Gen2-bay Drawer
EL2N	S	PCIe LP 8Gb 2-Port Fibre Channel Adapter
EL38	S	PCIe3 LP 4-port (10Gb FCoE & 1GbE) SRIOV SR&RJ45
EL3B	S	PCIe3 LP RAID SAS Adapter Quad-Port 6Gb x8
EL3C	S	PCIe3 LP 4-port(10Gb FCoE & 1GbE) SFP+Copper&RJ45
EL3X	S	PCIe3 LP 2-port 10GbE NIC&RoCE SFP+ Copper Adapter
EL3Z	A	PCIe2 LP 2-port 10/1GbE BaseT RJ45 Adapter
EL43	S	PCIe3 LP 2-port 16Gb Fibre Channel Adapter
EL4L	A	PCIe2 4-port 1GbE Adapter
EL4M	A	PCIe2 LP 4-port 1GbE Adapter
EL4Q	S	387GB SFF-2 4K SSD for Linux
EL4S	S	775GB SFF-2 4K SSD for Linux
EL53	S	PCIe3 2-port 10GbE NIC&RoCE SFP+ Copper Adapter
EL55	S	PCIe2 2-port 10/1GbE BaseT RJ45 Adapter
EL56	S	PCIe3 4-port (10Gb FCoE & 1GbE) SR&RJ45
EL57	S	PCIe3 4-port (10Gb FCoE & 1GbE) SFP+Copper&RJ45
EL58	S	PCIe 8Gb 2-port Fibre Channel Adapter
EL59	S	PCIe3 RAID SAS Adapter Quad-port 6Gb x8
EL5B	S	PCIe3 16Gb 2-port Fibre Channel Adapter
EL5U	A	PCIe3 32Gb 2-port Fibre Channel Adapter
EL5V	A	PCIe3 LP 32Gb 2-port Fibre Channel Adapter
EL5W	S	PCIe3 16Gb 4-port Fibre Channel Adapter
EL5X	S	PCIe3 LP 16Gb 4-port Fibre Channel Adapter
EL5Y	S	PCIe2 LP 8Gb 2-Port Fibre Channel Adapter
EL5Z	S	PCIe2 8Gb 2-Port Fibre Channel Adapter
EL60	S	PCIe3 LP SAS Tape/DVD Adapter Quad-port 6Gb x8
EL62	S	3.82-4.0 TB 7200 RPM 4K SAS LFF-1 Nearline Disk Drive (Linux)
EL64	S	7.72-8.0 TB 7200 RPM 4K SAS LFF-1 Nearline Disk Drive (Linux)

EL66	S	Base Storage Backplane 8 SFF-3 Bays
EL67	S	Expanded Function Storage Backplane 8 SFF-3 Bays/Single IOA with Write Cache
EL68	S	Split #EL66 to 4+4 SFF-3 Bays: Add 2nd SAS Controller
EL78	A	387GB SFF-2 SSD 5xx eMLC4 for Linux
EL7E	S	775GB SFF-2 SSD 5xx eMLC4 for Linux
EL7K	S	387GB SFF-3 SSD 5xx eMLC4 for Linux
EL7P	S	775GB SFF-3 SSD 5xx eMLC4 for Linux
EL80	S	1.9TB Read Intensive SAS 4k SFF-2 SSD for Linux
EL83	S	931GB Mainstream SAS 4k SFF-3 SSD for Linux
EL85	S	387GB SFF-2 SSD 4k eMLC4 for Linux
EL8C	S	775GB SFF-2 SSD 4k eMLC4 for Linux
EL8F	S	1.55TB SFF-2 SSD 4k eMLC4 for Linux
EL8J	S	1.9TB Read Intensive SAS 4k SFF-3 SSD for Linux
EL8N	S	387GB SFF-3 SSD 4k eMLC4 for Linux
EL8Q	S	775GB SFF-3 SSD 4k eMLC4 for Linux
EL8V	S	1.55TB SFF-3 SSD 4k eMLC4 for Linux
EL8Y	S	931GB Mainstream SAS 4k SFF-2 SSD for Linux
EL92	S	1.86TB Mainstream SAS 4k SFF-3 SSD for Linux
EL96	S	1.86TB Mainstream SAS 4k SFF-2 SSD for Linux
ELAV	A	One Processor Core Activation for #ELPV
ELAW	A	One Processor Core Activation for #ELPW
ELAX	A	One Processor Core Activation for #ELPX
ELC0	A	PDU Access Cord 0.38m
ELC5	A	Power Cable - Drawer to IBM PDU (250V/10A)
ELD3	S	1.2TB 10K RPM SAS SFF-2 Disk Drive (Linux)
ELD5	S	600GB 10K RPM SAS SFF-3 Disk Drive (Linux)
ELDB	S	300GB 15K RPM SAS SFF-3 Disk Drive (Linux)
ELDP	S	600GB 15K RPM SAS SFF-2 Disk Drive - 5xx Block
ELE1	S	3.72TB Mainstream SAS 4k SFF-3 SSD for Linux
ELE7	S	3.72TB Mainstream SAS 4k SFF-2 SSD for Linux
ELEV	S	600GB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096
ELEZ	E	300GB 15K RPM SAS SFF-2 4K Block - 4096 Disk Drive
ELF3	S	1.2TB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096
ELF5	S	600GB 10K RPM SAS SFF-3 Disk Drive 4K Block - 4096
ELF9	S	1.2TB 10K RPM SAS SFF-3 Disk Drive 4K Block - 4096
ELFB	S	300GB 15K RPM SAS SFF-3 4K Block - 4096 Disk Drive
ELFF	S	600GB 15K RPM SAS SFF-3 4K Block - 4096 Disk Drive
ELFP	S	600GB 15K RPM SAS SFF-2 4K Block - 4096 Disk Drive
ELFT	S	1.8TB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096
ELFV	S	1.8TB 10K RPM SAS SFF-3 Disk Drive 4K Block - 4096
ELG5	S	387GB Enterprise SAS 5xx SFF-2 SSD for Linux
ELG9	S	387GB Enterprise SAS 5xx SFF-3 SSD for Linux
ELGB	S	387GB Enterprise SAS 4k SFF-2 SSD for Linux
ELGD	S	387GB Enterprise SAS 4k SFF-3 SSD for Linux
ELGF	S	775GB Enterprise SAS 5xx SFF-2 SSD for Linux
ELGH	S	775GB Enterprise SAS 5xx SFF-3 SSD for Linux
ELGK	S	775GB Enterprise SAS 4k SFF-2 SSD for Linux
ELGM	S	775GB Enterprise SAS 4k SFF-3 SSD for Linux
ELGP	S	1.55TB Enterprise SAS 4k SFF-2 SSD for Linux
ELGR	S	1.55TB Enterprise SAS 4k SFF-3 SSD for Linux
ELHJ	S	931 GB Mainstream SAS 4k SFF-2 SSD for Linux
ELHL	S	1.86 TB Mainstream SAS 4k SFF-2 SSD for Linux
ELHN	S	7.45 TB Mainstream SAS 4k SFF-2 SSD for Linux
ELHS	S	931 GB Mainstream SAS 4k SFF-3 SSD for Linux
ELHU	S	1.86 TB Mainstream SAS 4k SFF-3 SSD for Linux
ELHW	S	7.45 TB Mainstream SAS 4k SFF-3 SSD for Linux
ELLL	S	EXP12SX SAS Storage Enclosure
ELLS	S	EXP24SX SAS Storage Enclosure
ELM8	S	3.72 TB Mainstream SAS 4k SFF-2 SSD for Linux
ELMF	S	PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer
ELMG	A	PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer
ELMQ	S	3.72 TB Mainstream SAS 4k SFF-3 SSD for Linux
ELMX	S	PCIe Gen3 I/O Expansion Drawer
ELPV	A	8-core Typical 3.4 to 3.9 Ghz (max) POWER9 Processor

ELPW	A	10-core Typical 2.9 to 3.8 Ghz (max) POWER9 Processor
ELPX	A	12-core Typical 2.7 to 3.8 Ghz (max) POWER9 Processor
ELQ0	S	Quantity 150 of #ELDP 600GB 15k RPM SFF-2 Disk
ELQ1	S	Quantity 150 of #ELFP (600GB SSD SFF-2)
ELQ2	S	Quantity 150 of #ELF3 (1.2TB 10k SFF-2)
ELQ3	S	Quantity 150 of #ELD3 (1.2TB 10k SFF-2)
ELQ5	S	Quantity 150 of #EL85 387GB SFF-2 SSD 4k
ELQ6	S	Quantity 150 of #EL96 (1.86TB SFF-2)
ELQ7	S	Quantity 150 of #ELE7 (3.72TB SFF-2)
ELQ8	S	Quantity 150 of #EL78 387GB SFF-2 SSD 5xx
ELQC	S	Quantity 150 of #EL8C 775GB SFF-2 SSD 4k
ELQE	S	Quantity 150 of #EL7E 775GB SFF-2 SSD 5xx
ELQF	S	Quantity 150 of #EL8F 1.55TB SFF-2 SSD 4k
ELQP	S	Quantity 150 of #EL1P
ELQQ	S	Quantity 150 of #EL1Q
ELQS	S	Quantity 150 of #EL4S 775GB SFF-2 4k SSD (Linux)
ELQT	S	Quantity 150 of #ELFT (1.8TB 10k SFF-2)
ELQV	S	Quantity 150 of #ELEV (600GB 10k SFF-2)
ELQY	S	Quantity 150 of #EL8Y (931GB SFF-2)
ELQZ	S	Quantity 150 of #ELEZ (300GB SSD SFF-2)
ELR0	S	Quantity 150 of EL80 1.9TB SSD
ELR2	S	Quantity 150 of #EL62 3.86-4.0 TB 7200 rpm 4k LFF-1 Disk
ELR4	S	Quantity 150 of #EL64 7.72-8.0 TB 7200 rpm 4k LFF-1 Disk
ELR5	S	Quantity 150 of #ELG5 (387GB SAS 5xx)
ELR8	S	Quantity 150 of #ELM8 3.72 TB SSD 4k SFF-2
ELRB	S	Quantity 150 of #ELGB (387GB SAS 4k)
ELRF	S	Quantity 150 of #ELGF (775GB SAS 5xx)
ELRJ	S	Quantity 150 of #ELHJ 931 GB SSD 4k SFF-2
ELRK	S	Quantity 150 of #ELGK (775GB SAS 4k)
ELRL	S	Quantity 150 of #ELHL 1.86 TB SSD 4k SFF-2
ELRN	S	Quantity 150 of #ELHN 7.45 TB SSD 4k SFF-2
ELRP	S	Quantity 150 of #ELGP (1.55TB SAS 4k)
ELRQ	S	Quantity 150 of #EL4Q 387GB SFF-2 4k SSD (Linux)
EM60	S	8 GB DDR4 Memory
EM62	A	16 GB DDR4 Memory
EM63	A	32 GB DDR4 Memory
EM64	S	64 GB DDR4 Memory
EM65	S	128 GB DDR4 Memory
EM7B	A	64 GB DDR4 Memory Dimm
EM7C	A	128 GB DDR4 Memory Dimm
EMXA	A	AC Power Supply Conduit for PCIe3 Expansion Drawer
EMXH	A	PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer
EN01	A	1m (3.3-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper
EN02	A	3m (9.8-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper
EN03	A	5m (16.4-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper
EN0N	S	PCIe3 LP 4-port(10Gb FCoE & 1GbE) LR&RJ45 Adapter
EN0S	A	PCIe2 4-Port (10Gb+1GbE) SR+RJ45 Adapter
EN0T	A	PCIe2 LP 4-Port (10Gb+1GbE) SR+RJ45 Adapter
EN0U	A	PCIe2 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter
EN0V	A	PCIe2 LP 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter
EN0Y	S	PCIe2 LP 8Gb 4-port Fibre Channel Adapter
EN12	S	PCIe2 8Gb 4-port Fibre Channel Adapter
EN15	A	PCIe3 4-port 10GbE SR Adapter
EN2A	A	PCIe3 16Gb 2-port Fibre Channel Adapter
EN2B	A	PCIe3 LP 16Gb 2-port Fibre Channel Adapter
EPTH	A	Horizontal PDU Mounting Hardware
EPTJ	S	High Function 9xC19 PDU: Switched, Monitoring
EPTL	S	High Function 9xC19 PDU 3-Phase: Switched, Monitoring
EPTN	S	High Function 12xC13 PDU: Switched, Monitoring
EPTQ	S	High Function 12xC13 PDU 3-Phase: Switched, Monitoring
ER05	S	42U Slim Rack
ER94	S	Quantity 150 of ES94 387GB SAS 4k
ERB0	S	Bulk Packaging Request ID
ERB1	S	Bulk Packaging ID #1
ERB2	S	Bulk Packaging ID #2

ERB3	S	Bulk Packaging ID #3
ERB4	S	Bulk Packaging ID #4
ERB5	S	Bulk Packaging ID #5
ERB6	S	Bulk Packaging ID #6
ERB7	S	Bulk Packaging ID #7
ERB8	S	Bulk Packaging ID #8
ERB9	S	Bulk Packaging ID #9
ERBA	S	Bulk Packaging ID #10
ERBB	S	Bulk Packaging ID #11
ERBC	S	Bulk Packaging ID #12
ERBD	S	Bulk Packaging ID #13
ERBE	S	Bulk Packaging ID #14
ERBF	S	Bulk Packaging ID #15
ERBG	S	Bulk Packaging ID #16
ERBH	S	Bulk Packaging ID #17
ERBJ	S	Bulk Packaging ID #18
ERBK	S	Bulk Packaging ID #19
ERBL	S	Bulk Packaging ID #20
ERBZ	S	No Bulk Packaging Specify
ERF1	S	RFID Tags for Servers, Compute Nodes, Chassis, Racks, and HMCs
ERGO	A	Rear rack extension
ERGV	S	Quantity 150 of ESGV 387GB SSD 4k
ERGZ	S	Quantity 150 of ESGZ 775GB SSD 4k
ERJ0	S	Quantity 150 of ESJ0 931GB SAS 4k
ERJ2	S	Quantity 150 of ESJ2 1.86TB SAS 4k
ERJ4	S	Quantity 150 of ESJ4 3.72TB SAS 4k
ERJ6	S	Quantity 150 of ESJ6 7.45TB SAS 4k
ERNA	S	Quantity 150 of ESNA 775GB SSD 4k
ERNE	S	Quantity 150 of ESNE 1.55TB SSD 4k
ES14	S	Mainstream 400GB SSD NVMe M.2 module
ES90	S	387GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
ES94	S	387GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
ESB0	S	387GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux
ESB2	S	387GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux
ESB4	S	775GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux
ESB6	S	775GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux
ESB8	S	387GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
ESBA	S	387GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
ESBE	S	775GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
ESBG	S	775GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
ESBJ	S	1.55TB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
ESBL	S	1.55TB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
ESC0	A	S&H - No Charge
ESC5	S	S&H-a
ESGT	S	387GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux
ESGV	S	387GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux
ESGX	S	775GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux
ESGZ	S	775GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux
ESJ0	S	931GB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
ESJ2	S	1.86TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
ESJ4	S	3.72TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
ESJ6	S	7.45TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
ESJ8	S	931GB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
ESJA	S	1.86TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
ESJC	S	3.72TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
ESJE	S	7.45TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
ESJJ	A	931GB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
ESJL	A	1.86TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
ESJN	A	3.72TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
ESJQ	A	7.44TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux
ESJS	A	931GB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
ESJU	A	1.86TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
ESJW	A	3.72TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux
ESJY	A	7.44TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux

ESLA	A	Specify AC Power Supply for EXP12SX/EXP24SX Storage Enclosure
ESNA	S	775GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
ESNC	S	775GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
ESNE	S	1.55TB Enterprise SAS 4k SFF-2 SSD for AIX/Linux
ESNG	S	1.55TB Enterprise SAS 4k SFF-3 SSD for AIX/Linux
ESQ2	S	Quantity 150 of ESB2 387GB SAS 4k
ESQ6	S	Quantity 150 of ESB6 775GB SAS 4k
ESQA	S	Quantity 150 of ESBA 387GB SAS 4k
ESQG	S	Quantity 150 of ESBG 775GB SAS 4k
ESQL	S	Quantity 150 of ESBL 1.55TB SAS 4k
ESRL	S	300GB 15K RPM SAS SFF-3 4k Block Cached Disk Drive (Linux)
ESRM	S	300GB 15K RPM SAS SFF-2 4k Block Cached Disk Drive (Linux)
ESRP	S	600GB 15K RPM SAS SFF-3 4k Block Cached Disk Drive (Linux)
ESRR	S	600GB 15K RPM SAS SFF-2 4k Block Cached Disk Drive (Linux)
ESVM	S	Quantity 150 of #ESRM (300GB 15k SFF-2)
ESVR	S	Quantity 150 of #ESRR (600GB 15k SFF-2)
EU01	A	1TB Removable Disk Drive Cartridge
EU04	S	RDX USB External Docking Station for Removable Disk Cartridge
EU08	S	RDX 320 GB Removable Disk Drive
EU0B	A	Operator Panel LCD Display
EU15	S	1.5TB Removable Disk Drive Cartridge
EU19	A	Cable Ties & Labels
EU2T	A	2TB Removable Disk Drive Cartridge (RDX)
EUA4	A	RDX USB External Docking Station
EUA5	A	Standalone USB DVD drive w/cable
EUC0	S	Software preload define
EUC1	S	Software preload define
EUC2	S	Software preload define
EUC3	S	Software preload define
EUC6	A	Core Use HW Feature
EUC7	A	Core Use HW Feature 10X

## Feature descriptions

**Note: Not all of the following features are available in all countries. Check with your country representative for specific feature**  
The following is a list of all feature codes in numeric order for the IBM Power Systems 9008 machine type.

Attributes, as defined in the following feature descriptions, state the interaction of requirements among features.

Minimums and maximums are the absolute limits for a single feature without regard to interaction with other features. The minimums may be different than for initial orders. The maximums listed below refer to the largest quantity of these two possibilities.

The order type defines if a feature is orderable only on initial orders, only on MES orders, on both initial and MES orders, or due to a model conversion. Supported features cannot be ordered on the converted model, only left on or removed from the model.

### (#0010) - One CSC Billing Unit

One Billing Unit used by the Customer Solution Center.

- Attributes provided: One CSC Billing Unit
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: Does not apply



## **(#0011) - Ten CSC Billing Units**

Ten Billing Units used by the Customer Solutions Center.

- Attributes provided: Ten CSC Billing Units
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 100 (Initial order maximum: 100)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: Does not apply

## **(#0266) - Linux Partition Specify**

This feature indicates customers intend to create a partition on the system that will use the Linux operating system. This feature indicates the intended Linux partition. This feature is an indicator and does not deliver parts, software, or services.

- Attributes provided: None
- Attributes required: Customers intend to create a partition on the system that will run the Linux operating system.
- Minimum required: 0
- Maximum allowed: 480 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#0348) - V.24/EIA232 6.1m (20-Ft) PCI Cable**

This feature provides a 20-foot WAN PCI cable that supports a V.24 or a EIA232 electrical connection interface.

- Attributes provided: N/A
- Attributes required: N/A
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#0353) - V.35 6.1m (20-Ft) PCI Cable**

(No longer available as of March 5, 2021)

This feature provides a 20-foot WAN PCI cable that supports a V.35 electrical connection interface.

- Attributes provided: N/A
- Attributes required: N/A
- Minimum required: 0

- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#0359) - X.21 6.1m (20-Ft) PCI Cable**

(No longer available as of March 5, 2021)

This feature provides a 20-foot WAN PCI cable that supports a X.21 electrical connection interface.

- Attributes provided: N/A
- Attributes required: N/A
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#0456) - Customer Specified Placement**

(No longer available as of January 29, 2021)

1. Requests that IBM deliver the system to the customer according to the slot in drawer hardware placement defined by i
2. Eliminates the need to have these parts relocated in the customers environment as may happen if the order is placed
3. Client placement specifications are collected using the System Planning Tool (SPT) and processed through the marke required).
4. Requires account team to submit the output of the marketing configurator into IBM manufacturing via the CSP website (US Business Partners and Distributors can bypass this step.)
5. Requires account team to assure that the marketing configurator output submitted reflects the actual order placed.

- Attributes provided: I/O component placement
- Attributes required: Marketing Configurator output submitted to the CSP Web site. (US Business Partners and Distrib
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#0551) - 19 inch, 1.8 meter high rack**

Provides a 19 inch, 1.8 meter high rack with 36 EIA units of total space for installing rack mounted CECs and/or expansion equipped with a standard rear door and (2x) side covers. #0551 racks, however, do not come equipped with a front door or or trim kit features is therefore required with every #0551:

- #6068 - Optional Front Door for 1.8m Rack
- #6263 - 1.8m Rack Trim Kit
- #6248 - 1.8m Rack Acoustic Doors

The following features are also orderable on the #0551:

- #0599 - Rack Filler Panel Kit
- #6580 - Optional Rack Security Kit
- #6586 - Modem Tray

The #0551 can support up to eight PDUs, four mounted vertically and four mounted horizontally. Each PDU mounted horizontally. The following PDUs are supported:

- #7188 - Power Distribution Unit (12, C-13 sockets)
- #7109 - Power Distribution Unit (12, C-13 sockets)
- #7196 - Power Distribution Unit (6, C-19 sockets)
- #EPTJ - Power Distribution Unit (9, C-19 sockets)
- #EPTL - Power Distribution Unit (9, C-19 sockets)
- #EPTN - Power Distribution Unit (12, C-13 sockets)
- #EPTQ - Power Distribution Unit (12, C-13 sockets)
- #EPAA - HVDC Power Distribution Unit (6, Rong Feng sockets)
- Attributes provided: 19 inch, 1.8M, 36 EIA Rack with standard rear door and (2x) standard side covers.
- Attributes required: #6068 or #6248 or #6263.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#0553) - 19 inch, 2.0 meter high rack**

Provides a 19-inch, 2.0 meter high rack with 42 EIA units of total space for installing rack mounted CECs and/or expansion modules. #0553 racks, however, do not come equipped with a front door or trim kit. One of the features is therefore required with every #0553:

- #6069 - Optional Front Door for 2.0m Rack
- #6247 - 2.0m Rack Trim Kit (w/d 5/28/2010)
- #6272 - 2.0m Rack Trim Kit
- #6249 - 2.0m Rack Acoustic Doors
- #EC08 - Slim Front Acoustic Door

The following optional features on the #0553 rack:

- #EC07 - Slim Rear Acoustic Door
- #6238 - High-End Appearance Side Covers (Note: #6238 is limited to high-end servers).
- # ERG0 - Rear rack extension
- #6580 - Rack Security Kit
- #0599 - Rack Filler Panel Kit
- #6586 - Modem Tray

The #0553 can support up to nine power distribution units (PDU), four mounted vertically and five mounted horizontally. Each PDU mounted horizontally. The following PDUs are supported:

- #7188 - Power Distribution Unit (12, C13 sockets)
- #7109 - Power Distribution Unit (12, C13 sockets)
- #7196 - Power Distribution Unit (6, C19 sockets)
- #EPTJ - Power Distribution Unit (9, C19 sockets)
- #EPTL - Power Distribution Unit (9, C19 sockets)

- #EPTN-Power Distribution Unit (12, C13 sockets)
- #EPTQ-Power Distribution Unit (12, C13 sockets)
- #EPAA - HVDC Power Distribution Unit (6, Rong Feng sockets)

The manufacturing practice and recommended configuration of the rack is:

- Reserve 2U Rack Space at Bottom of Rack
- Reserve 1U rack horizontal space - 1 EIA. Supports horizontally mounted PDU if needed.
- Attributes provided: 19 inch, 2.0M, 42 EIA Rack, standard rear door and standard side covers.
- Attributes required: #6069 or #6247 or #6272 or #6249 or #EC08.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#0599) - Rack Filler Panel Kit**

(No longer available as of March 5, 2021)

Provides rack filler panels for IBM 19-inch racks. The #0599 provides three 1-EIA -unit filler panels and one 3-EIA-unit filler

- Attributes provided: Snap on rack filler panels
- Attributes required: 19-inch rack
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#0719) - Load Source Not in CEC**

This specify feature indicates to the IBM Marketing configurator tools and IBM manufacturing that disk drives will not be placed in I/O drawers or in external SAN attached disk.

- Attributes provided: System unit(s) are shipped with no disk units placed inside.
- Attributes required: Alternate load source specified
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#0728) - EXP24S SFF Gen2 Load Source Specify (#5887 or #EL1S)**

(No longer available as of December 31, 2020)

Indicates that Load Source DASD are placed in an EXP24S SFF Gen2-bay Drawer.

- Attributes provided: External load source placement specify

- Attributes required: DASD Slot 1 open in drawer
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#0837) - SAN Load Source Specify**

Indicates that a SAN drive is being used as the Load Source for the operating system.

- Attributes provided: SAN load source placement specify
- Attributes required: Fiber Channel adapter
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#0983) - US TAA Compliance Indicator**

This feature indicates that the product was assembled in a manufacturing plant in the USA or in a country approved under on U.S. orders.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#0984) - Product assembled in USA manufacturing plant**

This feature indicates that the product was assembled in a manufacturing plant in the USA.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#1107) - USB 500 GB Removable Disk Drive**

Provides an RDX disk drive in a rugged cartridge to be used in an RDX Internal and External docking station such as the #EU23 or #EU07. 500 GB is uncompressed. With typical 2X compression, capacity would be 1000 GB. Compression/ decompression system, not the drive itself. Feature 1107 is not entitled under the IBM Maintenance Agreement, if one is purchased.

- Attributes provided: 500 GB RDX rugged disk/cartridge
- Attributes required: None.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#1111) - 3m, Blue Cat5e Cable

This 3m Cat5e cable is used with ports/transceivers that have RJ-45 connectors.

- Attributes provided: 3m Cat5e Ethernet Cable
  - Attributes required: RJ45 ports/transceivers
  - Minimum required: 0
  - Maximum allowed: 9999 (Initial order maximum: 250)
  - OS level required: None
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Cable is only used for Solution machine type 5146.**

### (#1112) - 10m, Blue Cat5e Cable

(No longer available as of March 5, 2021)

This 10m Blue Cat5e cable is used with ports/transceivers that have RJ-45 connectors.

- Attributes provided: 10m Cat5e Ethernet Cable
  - Attributes required: RJ45 ports/transceivers
  - Minimum required: 0
  - Maximum allowed: 9999 (Initial order maximum: 250)
  - OS level required: None
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Only used with Solution machine type 5146.**

### (#1113) - 25m, Blue Cat5e Cable

(No longer available as of March 5, 2021)

This 25m Blue Cat5e cable is used with ports/transceivers that have RJ-45 connectors.

- Attributes provided: 25m Cat5e Ethernet Cable
- Attributes required: RJ45 ports/transceivers

- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Only used with Solution machine type 5146.**

### (#1115) - CAT5E Ethernet Cable, 3M GREEN

(No longer available as of March 5, 2021)

This 3m Green Cat5e cable is used with ports/transceivers that have RJ-45 connectors.

- Attributes provided: 3m Cat5e Ethernet Cable
- Attributes required: RJ45 ports/transceivers
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Only used with Solution machine type 5146.**

### (#1116) - CAT5E Ethernet Cable, 10M GREEN

(No longer available as of March 5, 2021)

This 10m Green Cat5e cable is used with ports/transceivers that have RJ-45 connectors.

- Attributes provided: 10m Cat5e Ethernet Cable
- Attributes required: RJ45 ports/transceivers
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Only used with Solution machine type 5146.**

### (#1118) - 3m, Yellow Cat5e Cable

This 3m Yellow Cat5e cable is used with ports/transceivers that have RJ-45 connectors.

- Attributes provided: 3m Cat5e Ethernet Cable
- Attributes required: RJ45 ports/transceivers
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Only used with Solution machine type 5146.**

## (#1119) - 10m, Yellow Cat5e Cable

(No longer available as of March 5, 2021)

This 10m Yellow Cat5e cable is used with ports/transceivers that have RJ-45 connectors.

- Attributes provided: 10m Cat5e Ethernet Cable
- Attributes required: RJ45 ports/transceivers
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Only used with Solution machine type 5146.**

## (#1140) - Custom Service Specify, Rochester Minn, USA

Having #1140 on the order, will cause the order to be routed to Rochester and the machine to be internally routed to the C&S (Rochester).

- Attributes provided: Customization
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#2147) - Primary OS - Linux

Indicates clients intend to use the Linux operating system on the primary system partition. This feature is used as a Manufacturer deliver parts, software or services.

- Attributes provided: None
- Attributes required: Indicates clients intend to use the Linux operating system on the primary system partition.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 1)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#2319) - Factory Deconfiguration of 1-core

(No longer available as of January 29, 2021)

Factory deconfiguration of 1 processor core to assist with optimization of software licensing. The maximum number of this feature is less than the number of cores on the system, e.g. 7 for an 8-core system and 15 for a 16-core system.



- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 23 (Initial order maximum: 23)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#2456) - 2M LC-SC 50 Micron Fiber Converter Cable**

(No longer available as of March 5, 2021)

The 50 micron fiber cable is used to convert from LC type to SC type connectors. The 2 meter cable has a male LC type connector on the other.

- Attributes provided: Cable with (1X) LC type plug and (1X) SC type receptacle
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#2459) - 2M LC-SC 62.5 Micron Fiber Converter Cable**

(No longer available as of March 5, 2021)

The 62.5 micron fiber cable is used to convert from LC type to SC type connectors. The 2 meter cable has a male LC type connector on the other.

- Attributes provided: Cable with (1X) LC type plug and (1X) SC type receptacle
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#2934) - 3M Asynchronous Terminal/Printer Cable EIA-232**

(No longer available as of March 5, 2021)

The Asynchronous Printer/Terminal Cable is used for attaching printers, plotters, and terminals that support the EIA-232 standard. This cable is the equivalent of the combination of FC 2936 (modem cable) and FC 2937 (printer/terminal interposer) and re attachment.

This cable is 3m (9.8 feet) long, uses DB25 connectors and is supported on all RS/6000 systems using any asynchronous

- Attributes provided: EIA232 device attachment capability
- Attributes required: Any Asynchronous port
- Minimum required: 0

- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#2936) - Asynchronous Cable EIA-232/V.24 3M**

(No longer available as of March 5, 2021)

Used to attach a modem to the standard I/O ports with the 10-pin to 25-pin converter cable (#3925), 8-port Cable Assembly, 3 meters (9.8 feet) in length.

- Attributes provided: Modem attachment to async or serial port
- Attributes required: Async or serial port
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#3124) - Serial-to-Serial Port Cable for Drawer/Drawer- 3.7M**

(No longer available as of March 5, 2021)

This 3.7 meter cable is available to provide a null-modem connection between the serial ports of two system drawers that a cable provides a DB25 female connector at each end.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#3125) - Serial-to-Serial Port Cable for Rack/Rack- 8M**

(No longer available as of March 5, 2021)

This 8 meter cable is available to provide a null-modem connection between the serial ports of two system drawers that are provides a DB25 female connector at each end.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#3632) - Widescreen LCD Monitor

The Widescreen LCD Monitor has the following general characteristics:

- Black color
  - Minimum 533mm (21 inch) diagonal LCD digital screen
  - Maximum native resolution of 1680 x 1050 (widescreen format 1.6:1)
  - Can display traditional resolutions (1024x768 and 1280x1024) without stretching
  - Tilt, swivel, and height stand adjustments
  - Industry standard analog input (15-pin D) and a DVI to VGA converter
  - Attributes provided: Color Flat-panel Monitor
  - Attributes required: Graphics Adapter
  - Attributes provided: Color Flat-panel Monitor
  - Attributes required: Graphics Adapter
  - Minimum required: 0
  - Maximum allowed: 9999 (Initial order maximum: 0)
  - OS level required: None
  - Initial Order/MES/Both/Supported: Supported
  - CSU: Yes
  - Return parts MES: No
- Note: Not supported in Mainland China.**

### (#3925) - 0.3M Serial Port Converter Cable, 9-Pin to 25-Pin

(No longer available as of March 5, 2021)

This cable converts the 9-pin serial port on the system to a 25-pin serial port which allows the user to attach 25-pin serial d

- Attributes provided: 9-Pin to 25-Pin connectivity
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#3927) - Serial Port Null Modem Cable, 9-pin to 9-pin, 3.7M

(No longer available as of March 5, 2021)

This 3.7 meter 9 pin to 9 pin Null modem Serial cable allows two EIA-232 communications ports to exchange data with one modem.

- Attributes provided: 9 pin female connector at each end of the cable
- Attributes required: none
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes

- Return parts MES: No

### **(#3928) - Serial Port Null Modem Cable, 9-pin to 9-pin, 10M**

(No longer available as of March 5, 2021)

This 10 meter 9 pin to 9 pin Null Modem Serial cable allows two EIA-232 communications ports to exchange data with one modem.

- Attributes provided: 9 pin female connector at each end of the cable
- Attributes required: none
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#3930) - System Serial Port Converter Cable**

This cable is used to connect the System port/UPS Conversion Cable (#1827) to the CEC serial port. Also used to connect serial port which is physically an RJ45 connection on the Power 710/720/730/740 and Power S824/S822/S814/ S822L/S81

- Attributes provided: Attachment of #1827 to CEC serial port; attachment of ASCII terminal or modem to the serial port
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#4242) - 1.8 M (6-ft) Extender Cable for Displays (15-pin D-shell to 15-pin D-shell)**

This cable is required to connect displays with a 15-pin "D" shell connector to the appropriate accelerator connector when i monitor cable can reach. Rack mounted systems are likely candidates for this extender cable.

- Attributes provided: 6-foot extension cable
- Attributes required: Supported monitor and adapter with a 15-pin "D" shell connector.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

### **(#4256) - Extender Cable - USB Keyboards, 1.8M**

This feature provides a 1.8M extension cable for use with USB keyboards.

- Attributes provided: 1.8M Extension Cable
- Attributes required: USB Keyboard
- Minimum required: 0

- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#4276) - VGA to DVI Connection Converter**

This feature is a plug converter that will allow a Video device with a 15 pin D-shell VGA cable plug (such as a KVM switch) 28 pin D-shell DVI receptacle connector. This device has both a 28 pin D-Shell DVI plug and a 15 pin D-shell VGA receptacle.

- Attributes provided: VGA to DVI connection converter
- Attributes required: VGA device and graphics adapter with DVI connector.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#4648) - Rack Integration Services**

(No longer available as of January 29, 2021)

BP only

#4648 is a prerequisite for business partner integration: #4651-4666.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: No

### **(#4649) - Rack Integration Services**

(No longer available as of January 29, 2021)

#4649 is a prerequisite for #4651-4666.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: No

**One and only one rack indicator feature is required on all orders (#4650 to #4666).**

## (#4650) - Rack Indicator- Not Factory Integrated

(No longer available as of January 29, 2021)

This indicator is used to specify that the rack mountable device in this initial order should not be merged into a rack within 1 is ordered with a rack, the device will not be factory integrated in the ordered rack and will ship uninstalled in the rack.

**Note: This "no additional charge" feature will be placed on an initial order for a rack mountable device by the Conf not ship from IBM Manufacturing in a Rack.**

A rack integration indicator is required on all 19" Rack mountable device initial orders. One feature code from the group 46 More than one feature code from this group is not allowed.

- Attributes provided: System will not be shipped in a rack.
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#4651) - Rack Indicator, Rack #1

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the first rack for a multi rack order, or the only rack for a

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a server) is mounted in rack #1.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order. More than one feature code from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group 4650 to 4666 must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must equal the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack Integration/ Rack Specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#4652) - Rack Indicator, Rack #2

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the second rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a server) is mounted in rack #2 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order. More than one feature code from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group 4650 to 4666 must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must equal the number of rack mountable devices to be installed in the rack by IBM Mfg.

number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack Integration/Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#4653) - Rack Indicator, Rack #3

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the third rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a rack mountable power supply) is to be mounted in rack #3 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the c from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group is required for each rack mountable device ordered in the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code option must equal the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

**(#4654) - Rack Indicator, Rack #4**

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the fourth rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a rack mountable power supply) is to be mounted in rack #4 of a multi rack order.

**Note:** For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order. No other feature code from this group is not allowed.

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group is required for each rack mountable device ordered in the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code option must equal the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A

- Return parts MES: Does not apply

### (#4655) - Rack Indicator, Rack #5

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the fifth rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a server) is to be mounted in rack #5 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order. No other feature code from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group 4650 to 4666 must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must equal the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#4656) - Rack Indicator, Rack #6

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the sixth rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a server) is to be mounted in rack #6 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order. No other feature code from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group 4650 to 4666 must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must equal the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#4657) - Rack Indicator, Rack #7

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the seventh rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a server) is to be mounted in rack #7 of a multi rack order.



**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must equal the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#4658) - Rack Indicator, Rack #8**

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the eighth rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a server) is to be mounted in rack #8 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must equal the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#4659) - Rack Indicator, Rack #9**

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the ninth rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a server) is to be mounted in rack #9 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must equal the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0

- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#4660) - Rack Indicator, Rack #10

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the tenth rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a server) is to be mounted in rack #10 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order. No other feature code from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group 4650 to 4666 must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must be equal to the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#4661) - Rack Indicator, Rack #11

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the eleventh rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a server) is to be mounted in rack #11 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order. No other feature code from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group 4650 to 4666 must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must be equal to the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#4662) - Rack Indicator, Rack #12

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the twelfth rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a device) is to be mounted in rack #12 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order. More than one feature code from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group 4650 to 4666 must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must be equal to the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#4663) - Rack Indicator, Rack #13

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the thirteenth rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a device) is to be mounted in rack #13 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order. More than one feature code from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group 4650 to 4666 must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must be equal to the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#4664) - Rack Indicator, Rack #14

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the fourteenth rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a device) is to be mounted in rack #14 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order. More than one feature code from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group 4650 to 4666 must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must be equal to the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#4665) - Rack Indicator, Rack #15**

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the fifteenth rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a server) is to be mounted in rack #15 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order. No other feature code from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group 4650 to 4666 must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must equal the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#4666) - Rack Indicator, Rack #16**

(No longer available as of January 29, 2021)

When added to an initial rack order, this indicator is used to specify the sixteenth rack for a multi rack order.

When added to an initial rack mountable device order, this indicator is used to specify that the rack mountable device (such as a server) is to be mounted in rack #16 of a multi rack order.

**Note: For 19" rack mountable device orders: One feature code from the group 4650 to 4666 must be listed on the order. No other feature code from this group is not allowed.**

For 19" rack orders: If IBM Mfg. is to assemble a rack mountable device into the rack, one feature code selection from the group 4650 to 4666 must be listed on the order. More than one feature code selection from this group is not allowed. The quantity of this selected feature code must equal the number of rack mountable devices to be installed in the rack by IBM Mfg.

- Attributes provided: Rack specify
- Attributes required: Rack
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#5000) - Software Preload Required

(No longer available as of January 29, 2021)

Indicates that preloaded software and/or consolidated I/O is shipped with the initial order. A maximum of one (#5000) is supported for specific usage.

- Attributes provided: Software Pre-load
- Attributes required: N/A
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#5269) - PCIe LP POWER GXT145 Graphics Accelerator

This feature is the Low Profile (LP) equivalent of feature number 5748. The POWER GXT145 is a versatile, low-priced 2D graphics adapter configured to operate in either 8-bit or 24-bit color modes. This adapter supports both analog and digital monitors. The adapter requires attaching a device that requires a 15 pin D-Shell receptacle for a VGA connection (eg. when the graphic adapter output is connected indirectly through a KVM switch), order a VGA to DVI Connection Converter, feature number 4276 to accommodate the adapter. The adapter is included which adapts the 2nd 28-pin port on the adapter to 15-pin D-Shell receptacle.

- Hardware Description
  - 128-bit graphics processor
  - 8-bit indexed, 8-bit true color, or 24-bit true color
  - 32 MB SDRAM
  - x1 PCI Express interface
  - 2 DVI-I (analog/digital video) connectors
  - 1 converter cable
- Features Supported
  - Up to approximately 16.7 million colors
  - Rectangular clipping
  - 1 monitor connected analog at up to 2048 x 1536 resolution
  - 1 monitor connected digital at up to 1280 x 1024 resolution
  - 2nd monitor supported on secondary connector at up to 1600 x 1200 analog or 1280 x 1024 digital
  - 2nd monitor support in AIX is only in clone mode with an analog connection
- APIs Supported
  - X-Windows and Motif
- Software Requirements
  - The total number of graphics adapters in any one partition may not exceed four.
- Attributes provided: 2D Graphics Adapter
- Attributes required: 1 Low Profile (LP) slot
- Minimum required: 0
- Maximum allowed: 7 (Initial order maximum: 7)
- OS level required:
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 11 Service Pack 4
- Initial Order/MES/Both/Supported: Both
- CSU: Yes

- Return parts MES: No

## (#5729) - PCIe2 8Gb 4-port Fibre Channel Adapter

(No longer available as of December 13, 2019)

PCIe Gen2 8 Gigabit quad port Fibre Channel Adapter is a high-performance 8x short form adapter based on the Emulex L (HBA). Each port provides single initiator capability over a fibre link or with NPIV, multiple initiator capability is provided. The adapter utilizes shortwave laser optics. The adapter operates at link speeds of 2, 4, and 8 Gbps and will automatically negotiate to the highest supported link speed. Each port provides information on the status and link speed of the port.

The adapter connects to a Fibre Channel switch. Direct device attachment has not been tested and is not supported.

N\_Port ID Virtualization (NPIV) capability is supported through VIOS.

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following standards:

- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth

Because core sizes are different, OM1 cables can only be connected to other OM1 cables. For best results, OM2 cables should be connected to OM2 cables. However, if an OM2 cable is connected to an OM3 cable, the characteristics of the OM2 cable apply to the entire length of the connection.

The following table shows the supported distances for the three different cable types at the three different link speeds.

Cable	2.125 Gbps	4.25 Gbps	8.5 Gbps
OM3	.5m - 500m	.5m - 380m	.5m - 150m
OM2	.5m - 300m	.5m - 150m	.5m - 50m
OM1	.5m - 150m	.5m - 70m	.5m - 21m

#5729 feature indicates a full high adapter. CCIN is 5729.

A Gen2 PCIe slot is required to provide the bandwidth for all four ports to operate at full speed.

Consult with your IBM representative or Business Partner for additional information relative to any third party attachment.

- Attributes provided: Four Port Fibre Channel Adapter
- Attributes required: 1 Empty PCIe Gen2 slot
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No
  - VIOS supported
  - KVM - supported, refer to the Software Requirements section for the supported KVM levels

## (#5785) - 4 Port Async EIA-232 PCIe Adapter

Connection for 4 asynchronous EIA-232 devices. Ports are programmable to support EIA-232 protocols, at a line speed of 115,200 bps. The adapter provides attachment for a fan-out cable (provided) which provides four EIA-232 ports.

Note #5785 and # 5277 are physically and electrically identical adapters, except for the type of PCIe slot used (full-high or low-profile). #5277/5785 is functionally nearly identical to the 2-port #5289/5290 except for the number and type of connectors.

- Attributes provided: 4-Port Asynchronous EIA-232 via 4-Port DB9 DTE Fan-Out Cable 1.2 M (4 ft.), 4 x 9-pin D-Sub (168)
- Attributes required: 1 full high PCIe Slot
- Minimum required: 0
- Maximum allowed: 3 (Initial order maximum: 3)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#5899) - PCIe2 4-port 1GbE Adapter**

This short PCIe Gen2 adapter provides four 1Gb Ethernet ports that can be configured to run at 1000, 100 or 10 Mbps. 4-p (UTP) cables up to 100 meters in length are attached to the copper RJ45 connectors. Each port is independent of one another and duplex. 1000 Mbps speed is not supported in Half Duplex (HDX) mode.

Feature #5260 and #5899 are electronically identical and have the same CCIN of 576F. #5260 indicates a low profile tail stock.

Details for the ports include: for 5260 & 5899

- AIX NIM support
- IEEE 802.3ab (1 GbE), 802.1p priority, 802.1Q VLAN tagging, 802.3x flow control, 802.3ad load-balancing and failover
- Link aggregation, IEEE 802.3ad 802.3
- Multiple MAC addresses per interface
- MSI-X, MSI and support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6
- TCP segmentation Offload (TSO) for IPv4 and IPv6
- UDP checksum offload for IPv4 and IPv6
- AIX, IBM i and Linux provide software iSCSI support through the adapter. Linux can also leverage adapter hardware scatter/gather (CRC) generation and checking
- Attributes provided: Four-port 1 Gb Ethernet
- Attributes required: 1 Full High Profile PCIe slot (Gen1 or Gen2)
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:
  - Bare Metal Systems (#EC16): Not supported.
  - PowerKVM 3.1 Systems (#EC40): Not supported.
  - PowerKVM 2.1 Systems: (#EC20): Not supported.

All other Systems:

- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- Ubuntu server
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

### **(#6068) - Opt Front Door for 1.8m Rack**

#6068 provides an attractive black full height rack door on the #0551 19 Inch 1.8m Rack. The door is steel, with a perforate pattern extends from the bottom to the top of the door to enhance ventilation and provide some visibility into the rack.

- Attributes provided: Front Door
- Attributes required: #0551 19 inch 1.8m Rack
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#6069) - Opt Front Door for 2.0m Rack**

#6069 provides an attractive black full height rack door on the #0553 19 inch 2.0m Rack. The door is steel, with a perforate pattern extends from the bottom to the top of the door to enhance ventilation and provide some visibility into the rack.

- Attributes provided: Front Door
- Attributes required: #0553 19 inch 2.0 meter Rack
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#6248) - 1.8m Rack Acoustic Doors**

#6248 provides front and rear doors for use with the #0551 19 inch 1.8m Rack. This door kit provides additional acoustic d environment is desired. #6248 results in a larger footprint and requires additional space.

- Attributes provided: Acoustic Door Kit
- Attributes required: #0551 19 inch 1.8m Rack
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#6249) - 2.0m Rack Acoustic Doors**

#6249 provides front and rear doors for use with the #0553 19 inch 2.0m Rack. This door kit provides additional acoustic d environment is desired. #6249 results in a larger footprint and requires additional space.

- Attributes provided: Acoustic Door Kit
- Attributes required: #0553 19 inch 2.0 meter Rack
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None



- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#6263) - 1.8m Rack Trim Kit**

This feature provides a decorative trim kit for the front of feature number 0551 (19 inch 1.8m Rack).

- Attributes provided: Decorative trim kit
  - Attributes required: #0551 19 inch 1.8m Rack
  - Minimum required: 0
  - Maximum allowed: 9999 (Initial order maximum: 0)
  - OS level required: None
  - Initial Order/MES/Both/Supported: MES
  - CSU: Yes
  - Return parts MES: No
- Note: 1x#6263 per #0551**

### **(#6272) - 2.0m Rack Trim Kit**

This feature provides a decorative trim kit for the front of feature number 0553 (19 inch 2.0m Rack).

- Attributes provided: Decorative trim kit
  - Attributes required: #0553 19 inch 2.0 meter Rack
  - Minimum required: 0
  - Maximum allowed: 9999 (Initial order maximum: 0)
  - OS level required: None
  - Initial Order/MES/Both/Supported: MES
  - CSU: Yes
  - Return parts MES: No
- Note: 1X#6272 per #0553**

### **(#6458) - Power Cord 4.3m (14-ft), Drawer to IBM PDU (250V/10A)**

Standard IBM rack power cable that goes from the system or I/O drawer to the rack power distribution unit (PDU). Cable has a power supply connector on system unit or I/O drawer) and C14 on the other end (for IBM PDU C13 receptacle). Note for different lengths: #6458 (2.7M) or #6672 (2.0M).

- Attributes provided: Power jumper cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6460) - Power Cord 4.3m (14-ft), Drawer To OEM PDU (125V, 15A)**

This power cord goes from the system or I/O drawer to the rack OEM power distribution unit or wall socket outlet. Cable has a power supply connector on system unit or I/O drawer) and plug type #4 (NEMA 5-15) on the other end.

The following countries/regions use the #6460 power cord to power the system and/or peripheral features requiring a power cord: Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Bonaire, Calicos Islands, Canada, Cayman Islands, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia, Nicaragua, Panama, Peru, Philippines, St. Kitts/Nevis, St. Martin, Taiwan, Tortola (BVI), Trinidad/Tobago, Venezuela.

- Attributes provided: Power cord.
- Attributes required: None.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6469) - Power Cord 4.3m (14-ft), Drawer to Wall/OEM PDU (250V/15A) U.S.**

This power cord goes from the system or I/O drawer to the wall or rack OEM power distribution unit. Cable has C13 on one end (on system unit or I/O drawer) and plug type #5 (NEMA 6-15) on the other end for wall or OEM PDU.

The following countries/regions use the #6469 power cord to power the system and/or peripheral features requiring a power cord:

United States, Anguilla, Antigua & Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Bonaire, Caicos Is., Canada, Cuba, Curacao, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, St. Martin NA, Taiwan, Tortola (BVI), Thailand, Venezuela.

- Attributes provided: Power cord.
- Attributes required: None.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6470) - Power Cord 1.8m (6-ft), Drawer to Wall (125V/15A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #4 (NEMA 5-15). Refer to description of plug types. 6-foot length.

The following countries/regions use the #6470 power cord to power the system and/or peripheral features requiring a power cord:

United States, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Bonaire, Calicos Islands, Canada, Cuba, Curacao, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, St. Kitts/Nevis, St. Martin, Taiwan, Tortola (BVI), Trinidad/Tobago, Venezuela.

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6471) - Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/10A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #73 (InMetro NBR 14136) 4700-009 for a description of plug types.

The following countries/regions use the #6471 power cord to power the system and/or peripheral features requiring a power

#### Brazil

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6472) - Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/16A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #18 (CEE 7 VII). Refer to description of plug types.

The following countries/regions use the #6472 power cord to power the system and/or peripheral features requiring a power

Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Belarus, Belgium, Benin, Bosnia/Herzegovina, Bulgaria, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Croatia, Czech Republic, Dahomey, Djibouti, Estonia, Ethiopia, Finland, France, French Polynesia, French Guyana, Gabon, Georgia, Germany, Greece, Guadeloupe, Iceland, Indonesia, Iran, Ivory Coast, Kazakhstan, Kyrgyzstan, Laos, Latvia, Lebanon, Lithuania, Luxembourg, Macau, Maldives, Mauritius, Mayotte, Moldova, Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, North Korea, Principe, Reunion, Romania, Russia, Rwanda, St. Thomas, Saudi Arabia, Senegal, Serbia, Slovenia, Somalia, South Korea, Syria, Tahiti, Tajikistan, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis & Futuna

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6473) - Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU (250V/10A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #19 (CEE). Refer to Corporate description of plug types.

The following countries/regions use the #6473 power cord to power the system and/or peripheral features requiring a power

#### Denmark

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes

- Return parts MES: No

### **(#6474) - Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/13A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #23 (BS 1364A). Refer to description of plug types.

The following countries/regions use the #6474 power cord to power the system and/or peripheral features requiring a power

Abu Dhabi, Bahrain, Botswana, Brunei, Channel Islands, Cyprus, Dominica, Gambia, Grenada, Grenadines, Guyana, Hong Kong, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar, Nigeria, Oman, Qatar, Sierra Leone, Singapore, St. Kitts, St. Lucia, St. Vincent and the Grenadines, St. John's, Tobago, United Arab Emirates, United Kingdom, Yemen, Zambia

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6475) - Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/16A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #32 (SII 32-1971). Refer to a description of plug types.

The following countries/regions use the #6475 power cord to power the system and/or peripheral features requiring a power

Israel

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6476) - Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #24 (SEV 24507). Refer to a description of plug types.

The following countries/regions use the #6476 power cord to power the system and/or peripheral features requiring a power

Lichtenstein, Switzerland

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both

- CSU: Yes
- Return parts MES: No

### **(#6477) - Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/16A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #22 (SABS 164). Refer to description of plug types.

The following countries/regions use the #6477 power cord to power the system and/or peripheral features requiring a power

Bangladesh, LeSotho, Maceo, Maldives, Namibia, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda.

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6478) - Power Cord 2.7 M(9-foot), To Wall/OEM PDU, (250V, 16A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #25 (CEI 23-16). Refer to description of plug types. The following countries/regions use the #6478 power cord to power the system and/or peripheral Italy Libya

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6488) - Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (125V/15A or 250V/10A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. 125V, 15A or 250V, 10A, Plug Type 4700-009 for a description of plug types.

The following countries/regions use the #6488 power cord to power the system and/or peripheral features requiring a power

Argentina, Paraguay, Uruguay.

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#6489) - 4.3m (14-Ft) 3PH/32A 380-415V Power Cord**

#6489 is a 14-FT/4.3m 3PH/32A power cable with a Type 46 plug which distributes power from a power source to a Power

- Attributes provided: power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#6491) - 4.3m (14-Ft) 1PH/63A 200-240V Power Cord**

#6491 is a 14-FT/4.3m 200-240V/63A power cord with a Type 46 plug which distributes power from a power source to a Pc

- Attributes provided: power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#6492) - 4.3m (14-Ft) 1PH/60A (48A derated) 200-240V Power Cord**

Feature #6492 is a 14-FT/4.3m 200-240V/48-60A power cord with a Type 46 plug which distributes power from a power so

- Attributes provided: Power Cord PDU to wall
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#6493) - Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #62 (GB 1053). Refer to C description of plug types.

The following countries/regions use the #6493 power cord to power the system and/or peripheral features requiring a power cord:  
People's Republic of China.

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None

- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6494) - Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #69 (IS 6538). Refer to Corp description of plug types.

The following countries/regions use the #6494 power cord to power the system and/or peripheral features requiring a power

India

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6496) - Power Cord 2.7M (9-foot), To Wall/OEM PDU, (250V, 10A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #66 (KETI). Refer to Corp description of plug types. The following countries/regions use the #6496 power cord to power the system and/or peripheral Korea South Korea

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6577) - Power Cable - Drawer to IBM PDU, 200-240V/10A**

This feature permits manufacturing to select the optimum PDU power jumper cord length (1.0M, 2.0M, 2.7M, or 4.3M) for r mandatory on initial order specifying factory integration with IBM racks (such as with 7014-T00 or T42 racks). Feature is not integrated feature 4650. Power jumper cord has C13 on one end (for C14 power supply connector on system unit or I/O drawer PDU receptacle).

**Note: This feature is not used for MES orders except for bulk orders by SDI clients only. See C13/C14 jumper cord #6672 (2.0M) when not using factory integration.**

- Attributes provided: One power jumper cord.
- Attributes required: At least one rack and the absence of #4650.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes

- Return parts MES: No
- Note: 1 or 2 per I/O drawer or CEC. MES orderable for SDI's only. The MES order will ship the 14 foot cable eq**

### **(#6580) - Optional Rack Security Kit**

This feature provides hardware that can be added to a rack to prevent unauthorized access. It includes keyed front and rear doors. It also includes two sliding bars that mount inside the left and right rack side panels. The sliding bars are accessible and can be moved to a position that disables the external latches on the rack side panels, and prevents removal of the side panels.

- Attributes provided: Locking hardware for rack doors and sidepanels
- Attributes required: #0551 or #0553 19-Inch Rack
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#6651) - Power Cord 2.7M (9-foot), To Wall/OEM PDU, (125V, 15A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #75 (KETI). Refer to Corporate description of plug types. The following countries/regions use the #6651 power cord to power the system and/or peripheral features.

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6653) - 4.3m (14-Ft) 3PH/16A 380-415V Power Cord**

#6653 is a 14-FT/4.3m 3PH/16A power cord with a Type 46 plug which distributes power from a power source to a Power I/O drawer.

- Attributes provided: power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6654) - 4.3m (14-Ft) 1PH/30A (24A derated) Power Cord**

Feature #6654 is a 14-FT/4.3m 200-240V/24A-30A locking power cord with a Type 12 plug which distributes power from a Power I/O drawer to a Unit.

- Attributes provided: Power Cord
- Attributes required: None
- Minimum required: 0



- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6655) - 4.3m (14-Ft) 1PH/30A (24A derated) WR Power Cord**

Feature #6655 is a 14-FT/4.3m 200-240V/24A-30A water-resistant power cord with a Type 40 plug which distributes power Distribution Unit.

- Attributes provided: Power Cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6656) - 4.3m (14-Ft) 1PH/32A Power Cord**

#6656 is a 14-FT/4.3m 200-240V/32A power cord with a Type 46 plug which distributes power from a power source to a Pc

- Attributes provided: PDU power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6657) - 4.3m (14-Ft) 1PH/32A Power Cord-Australia**

This power cord provides power to a #5889, #7188, #9188, #7109, #EPTG, #EPTM, #EPTJ, #ECJM, #ECJG, #ECJJ, #EC. connects to a wall power outlet with a PDL plug.

- Attributes provided: Power connection for a PDU
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6658) - 4.3m (14-Ft) 1PH/30A (24A derated) Power Cord-Korea**

This power cord provides power to a #5889, #7188, #9188, #7109, #EPTG, #EPTM, #EPTJ, #ECJM, #ECJG, #ECJJ, #EC. connects to a wall power outlet with a Korean plug.

- Attributes provided: Power connection for a PDU
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6659) - Power Cord 2.7M (9-foot), To Wall/OEM PDU, (250V, 15A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #76 (KETI). Refer to Corporate description of plug types. The following countries/regions use the #6659 power cord to power the system and/or peripheral

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6660) - Power Cord 4.3m (14-ft), Drawer to Wall/OEM PDU (125V/15A)**

This power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #59 (NEMA 5-15). Refer to Corporate description of plug types. 14-foot length.

This power cord meets the DENAN marking requirement in Japan.

- Attributes provided: Power Cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6665) - Power Cord 2.8m (9.2-ft), Drawer to IBM PDU, (250V/10A)**

Standard IBM rack power jumper cord that goes from the system or I/O drawer to the rack power distribution unit (PDU). C power supply connector on system unit or I/O drawer) and C20 on the other end (for IBM PDU C19 receptacle).

**Note: For power jumper cord which attach to PDUs with C13 receptacles, use features such as #6577, #6458, #667**

- Attributes provided: Power jumper cord.
- Attributes required: None.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes

- Return parts MES: No

### **(#6667) - 4.3m (14-Ft) 3PH/32A 380-415V Power Cord-Australia**

#6667 is a 14-FT/4.3m 380-45V/32A power cord with a Type PDL plug which distributes power from a power source to a P

- Attributes provided: PDU power cable
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6669) - Power Cord 4.3M (14-foot), Drawer to OEM PDU, (250V, 15A)**

This power cord goes from the system or I/O drawer to the rack power distribution unit. Plug type #57 (NEMA 6-15). Refer for a description of plug types. 14-foot length. This power cord meets the DENAN marking requirement in Japan.

- Attributes provided: Power Cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6671) - Power Cord 2.7M (9-foot), Drawer to IBM PDU, 250V/10A**

Standard IBM rack power cable that goes from the system or I/O drawer to the rack power distribution unit (PDU). Cable has supply connector on system unit or I/O drawer) and C14 on the other end (for IBM PDU C13 receptacle). Note for different (4.3M) or #6672 (2.0M).

- Attributes provided: Power jumper cord.
- Attributes required: None.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6672) - Power Cord 2M (6.5-foot), Drawer to IBM PDU, 250V/10A**

Standard rack power cable that goes from the system or I/O drawer to the rack power distribution unit (PDU). Cable has C connector on system unit or I/O drawer) and C14 on the other end (for IBM PDU C13 receptacle). Note for different length #6671 (2.7M).

- Attributes provided: Power jumper cord.
- Attributes required: None.
- Minimum required: 0

- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#6680) - Power Cord 2.7m (9-ft), Drawer to Wall/OEM PDU, (250V/10A)**

This insulated power cord goes from the system and/or peripheral features to a wall-type outlet. Plug type #6 (AS 3112-196 C-B-2-4700-009 for a description of plug types.

The following countries/regions use the #6680 power cord to power the system and/or peripheral features requiring a power

Australia, Fiji Islands, Kiribati, Nauru, New Zealand, Papua New Guinea, W. Samoa.

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#7109) - Intelligent PDU+, 1 EIA Unit, Universal UTG0247 Connector**

(No longer available as of April 24, 2020)

This feature is for an intelligent AC power distribution unit (PDU+) that will allow the user to monitor the amount of power being plugged in to this PDU+. This AC power distribution unit provides twelve C13 power outlets. It receives power through a Universal PDU to Wall Power Cord, which must be ordered separately. Each Cord. Supported power cords include the following features: #6489, #6491, #6492, #6653, #6654, #6655, #6656, #6657, a

Limitation: Some configurations of the Elastic Storage Server (ESS) are delivered with a Intelligent PDU. At this time, the intelligent PDU are not configured or used by the ESS system. If the ESS Customer would like to use this capability, it is the Customer's responsibility to ensure the PDU is properly configured. In any case the ethernet port on the Intelligent PDU must not be connected to the ESS Management switch.

- Attributes provided: Twelve C13 outlets with Power Monitoring Capability
- Attributes required: none
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: When purchased on an MES order with a feature code rack. This PDU will be mounted in the rear side panel of the rack. If the rear side panel of the rack has been filled. Any additional PDUs on the order will be mounted in 1 unit of EIA rack space. When purchased on a rack in the field. This PDU may not fit in the side pockets of your rack due to a hardware interference with the side pockets. Insure rack space is available before placing the MES order for this PDU when it is**

### **(#7118) - Environmental Monitoring Probe**

The Environmental Monitoring Probe (EMP) enables you to remotely monitor environmental conditions. Using a standard V temperature and humidity of the remote environment, as well as the status of two additional contact devices, such as a smart temperature/humidity probe plugs into a RJ45 connector on a PDU+. The EMP can be used with any Powerware UPS equipped with a Web/SNMP Card (firmware 3.01 or higher). The EMP can be located up to 20m (65.6 feet) away.

- Attributes provided: Monitoring of temperature, humidity, and status of two contacts/ sensors. A one meter cat5 Etherr fabric, often called VELCRO(R) tape, two tie-wraps, and screw with wall anchor for mounting.
  - Attributes required: None
  - Minimum required: 0
  - Maximum allowed: 9999 (Initial order maximum: 250)
  - OS level required: N/A
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Maximum support is 8x 7118 per 0553 rack and 8x 7118 per 0551 rack. Maximum of one 7118 per 7109 is**

## (#7188) - Power Distribution Unit

An AC Power Distribution Unit (PDU) which mounts in a 19" rack and provides twelve C13 power outlets. The #7188 has s outlets per circuit breaker. System units and/or expansion units must use a power cord with a C14 plug to connect to the #

One of the following line cords must be used to distribute power from a wall outlet to the #7188;

- #6489 - 14-Ft 3PH/32A Power Cord
- #6491 - 14-Ft 1PH/63A Power Cord
- #6492 - 14-Ft 1PH/48-60A Power Cord
- #6653 - 14-Ft 3PH/16A Power Cord
- #6654 - 14-Ft 1PH/24-30A Power Cord
- #6655 - 14-Ft 1PH/24-30A WR Power Cord
- #6656 - 14-Ft 1PH/32A Power Cord
- #6657 - 14-Ft 1PH/24A Power Cord
- #6658 - 14-Ft 1PH/24A Power Cord-Korea
- Attributes provided: Power Distribution Unit withTwelve C13 power outlets.
- Attributes required: none
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#7196) - Power Distribution Unit (US) - 1 EIA Unit, Universal, Fixed Power Cord

(No longer available as of April 24, 2020)

This AC power distribution unit provides six C19 power outlets. Fixed power cord (IEC309 60A plug (3P+G). This PDU req

Limitation: Some configurations of the Elastic Storage Server (ESS) are delivered with a Intelligent PDU. At this time, the ir this PDU are not configured or used by the ESS system. If the ESS Customer would like to use this capability, it is the Cusi PDU. In any case the ethernet port on the Intelligent PDU must not be connected to the ESS Management switch.

- Attributes provided: Six C19 power outlets
- Attributes required: 3 phase electrical service
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: N/A
- Initial Order/MES/Both/Supported: Both
- CSU: Yes

- Return parts MES: No

## **(#7802) - Ethernet Cable, 15m, Hardware Management Console to System Unit**

(No longer available as of March 5, 2021)

This feature provides a fifteen meter long Ethernet cable for attachment of a Hardware Management Console to the system

- Attributes provided: 15M Ethernet Cable
- Attributes required: Ethernet port on Hardware Management Console
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#8143) - Linux Software Preinstall**

(No longer available as of January 29, 2021)

This feature indicates that the Linux operating system is to be preinstalled on the system. Requires feature number 5000.

- Attributes provided: Linux preinstall
- Attributes required: Feature number 5000.
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Refer to Software Requirements for specific O/S levels supported
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## **(#8845) - USB Mouse**

The optical LED USB Mouse has 2 buttons and a scroll wheel that acts as a third button. Mouse cable is 1.8 meters long. (wheel. Business black with red scroll wheel.

- Attributes provided: 2-Button USB Mouse w/scroll wheel that acts as 3rd button.
- Attributes required: USB attachment Port
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Refer to Software Requirements for specific O/S levels supported
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

**(#9169) - Order Routing Indicator- System Plant**

(No longer available as of January 29, 2021)

This feature will be auto-selected by the Configurator Tool when required. Use of this feature will affect the routing of the order to a system plant for fulfillment.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

**(#9300) - Language Group Specify - US English**

(No longer available as of January 29, 2021)

English language group for nomenclature and standard publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

**(#9387) - Specify mode-1 & CEC SAS port for EXP24 #5887/EL1S**

(No longer available as of December 31, 2020)

Feature indicates that EXP24S SFF Gen2 Drawer (#5887 or EL1S) will be configured by IBM Manufacturing in Mode 1 (Or internal 6G SAS ports on the rear of the system unit. Dual IOA high performance/function storage backplane provides the t

Two YO cables connect the EXP24S to the SAS ports. Use the cable length appropriate to the configuration and select from #ECBV or #ECBW.

IBM does not provide changes to the mode setting after #5887 or EL1S is shipped.

- Attributes provided: Mode 1 configuration define to IBM Manufacturing
- Attributes required: Dual IOA Storage Backplane, two SAS ports on rear of server, two Y0 cables, EXP24S drawer in r
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

**(#9442) - New Red Hat License Core Counter**

(No longer available as of January 29, 2021)

This feature is used to count the number of cores licensed to run Red Hat Linux.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 24 (Initial order maximum: 24)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9443) - New SUSE License Core Counter**

(No longer available as of January 29, 2021)

This feature is used to count the number of cores licensed to run SUSE Linux.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 24 (Initial order maximum: 24)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9445) - Other Linux License Core Counter**

(No longer available as of January 29, 2021)

This feature is used to count the number of existing Linux licenses transferred from another server.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 24 (Initial order maximum: 24)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9446) - 3rd Party Linux License Core Counter**

(No longer available as of January 29, 2021)

This feature is used to count the number of cores licensed to run 3rd party Linux.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 24 (Initial order maximum: 24)
- OS level required: None



- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9447) - VIOS Core Counter**

(No longer available as of January 29, 2021)

This feature is used to count the number of cores licensed to run VIOS (Virtual I/O Server).

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 24 (Initial order maximum: 24)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9449) - Other License Core Counter**

(No longer available as of January 29, 2021)

This feature is used to count the number of other cores licensed.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 24 (Initial order maximum: 24)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9450) - Ubuntu Linux License Core Counter**

(No longer available as of January 29, 2021)

This feature is used to count the number of cores licensed to run Ubuntu Linux.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 24 (Initial order maximum: 24)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9461) - Month Indicator**

(No longer available as of January 29, 2021)

This month indicator is used to create a date stamp to enable CFR splitting and rejoining in order to circumvent the AAS m on any one order. The quantity ordered for this feature is generated by eConfig.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 12 (Initial order maximum: 12)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9462) - Day Indicator**

(No longer available as of January 29, 2021)

This day indicator is used to create a date stamp to enable CFR splitting and rejoining in order to circumvent the AAS maxi on any one order. The quantity ordered for this feature is generated by eConfig.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 31 (Initial order maximum: 31)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9463) - Hour Indicator**

(No longer available as of January 29, 2021)

This hour indicator is used to create a time stamp to enable CFR splitting and rejoining in order to circumvent the AAS max on any one order. The quantity ordered for this feature is generated by eConfig.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 24 (Initial order maximum: 24)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9464) - Minute Indicator**

(No longer available as of January 29, 2021)

This hour indicator is used to create a time stamp to enable CFR splitting and rejoining in order to circumvent the AAS max on any one order. The quantity ordered for this feature is generated by eConfig.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0

- Maximum allowed: 60 (Initial order maximum: 60)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9465) - Qty Indicator**

(No longer available as of January 29, 2021)

This quantity indicator is used to specify the remaining, or N-1 quantity of CFR entities that need to be accumulated for rejection feature is generated by eConfig, and is equal to N-1, where 'N' equals the total quantity of CFRs being rejoined.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9466) - Countable Member Indicator**

(No longer available as of January 29, 2021)

This administrative indicator used to identify each CFR associated with a date/time stamp that is eligible for splitting and rejection feature is generated by eConfig.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9700) - Language Group Specify - Dutch**

(No longer available as of January 29, 2021)

Dutch language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

**(#9703) - Language Group Specify - French**

(No longer available as of January 29, 2021)

French language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

**(#9704) - Language Group Specify - German**

(No longer available as of January 29, 2021)

German language group for Nomenclature and Standard Publications.

- Attributes provided: Language specify
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

**(#9705) - Language Group Specify - Polish**

(No longer available as of January 29, 2021)

Polish language group for Nomenclature and Standard Publications.

- Attributes provided: Language specify
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

**(#9706) - Language Group Specify - Norwegian**

(No longer available as of January 29, 2021)

Norwegian language group for Nomenclature and Standard Publications.

- Attributes provided: Language specify
- Attributes required: None
- Minimum required: 0

- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9707) - Language Group Specify - Portuguese**

(No longer available as of January 29, 2021)

Portuguese language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9708) - Language Group Specify - Spanish**

(No longer available as of January 29, 2021)

Spanish language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9711) - Language Group Specify - Italian**

(No longer available as of January 29, 2021)

Italian language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9712) - Language Group Specify - Canadian French**

(No longer available as of January 29, 2021)

Canadian French language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9714) - Language Group Specify - Japanese**

(No longer available as of January 29, 2021)

Japanese language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9715) - Language Group Specify - Traditional Chinese (Taiwan)**

(No longer available as of January 29, 2021)

Traditional Chinese language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9716) - Language Group Specify - Korean**

(No longer available as of January 29, 2021)

Korean language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)

- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9718) - Language Group Specify - Turkish**

(No longer available as of January 29, 2021)

Turkish language group for nomenclature and publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9719) - Language Group Specify - Hungarian**

(No longer available as of January 29, 2021)

Hungarian language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9720) - Language Group Specify - Slovakian**

(No longer available as of January 29, 2021)

Slovakian language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9721) - Language Group Specify - Russian**

(No longer available as of January 29, 2021)

Russian language group for nomenclature and standard publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9722) - Language Group Specify - Simplified Chinese (PRC)**

(No longer available as of January 29, 2021)

Simplified Chinese language group for nomenclature and standard publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9724) - Language Group Specify - Czech**

(No longer available as of January 29, 2021)

Czech language group for nomenclature and standard publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9725) - Language Group Specify - Romanian**

(No longer available as of January 29, 2021)

Romanian language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None



- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9726) - Language Group Specify - Croatian**

(No longer available as of January 29, 2021)

Croatian language group for Nomenclature and Standard Publications.

- Attributes provided: Language specify
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9727) - Language Group Specify - Slovenian**

(No longer available as of January 29, 2021)

Slovenian language group for Nomenclature and Standard Publications.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9728) - Language Group Specify - Brazilian Portuguese**

(No longer available as of January 29, 2021)

Brazilian Portuguese language group for Nomenclature and Standard Publications.

- Attributes provided: Language specify
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#9729) - Language Group Specify - Thai**

(No longer available as of January 29, 2021)

Thai language group for Nomenclature and Standard Publications.

- Attributes provided: Language specify
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#EB27) - QSFP+ 40GbE Base-SR Transceiver**

(No longer available as of March 5, 2021)

IBM QSFP+ optical transceiver required for 40 Gbs ports which are not using copper QSFP+ transceiver.

- Attributes provided: QSFP+ transceiver for 40 Gbs ports.
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB2B) - 1m (3.3-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)**

(No longer available as of March 5, 2021)

QSFP+ cable is used for 40Gb-to-40Gb Ethernet connectivity. Clients can use this QSFP+ Direct Attach Cable for Ethernet QSFP+ transceivers already attached to each end.

- Attributes provided: 1m QSFP+ to QSFP+ Cable
- Attributes required: QSFP/QSFP+ ports
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB2H) - 3m (9.8-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)**

(No longer available as of March 5, 2021)

QSFP+ cable is used for 40Gb-to-40Gb Ethernet connectivity. Clients can use this QSFP+ Direct Attach Cable for Ethernet QSFP+ transceivers already attached to each end.

**Note: Do not use this cable between switches.**

- Attributes provided: 3m QSFP+ to QSFP+ Cable
- Attributes required: QSFP/QSFP+ ports
- Minimum required: 0

- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EB2J) - 10m (30.3-ft), IBM Passive QSFP+ MTP Optical Cable**

QSFP+ cable is used for 40Gb-to-40Gb Ethernet connectivity. Clients can use this QSFP+ Direct Attach Cable for Ethernet

- Attributes provided: 10m QSFP+ to QSFP+ Cable
- Attributes required: QSFP/QSFP+ ports with optical transceivers
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## #EB2K) - 30m (90.3-ft), IBM Passive QSFP+ MTP Optical Cable

QSFP+ cable is used for 40Gb-to-40Gb Ethernet connectivity. Clients can use this QSFP+ Direct Attach Cable for Ethernet

- Attributes provided: 30m QSFP+ to QSFP+ Cable
- Attributes required: QSFP/QSFP+ ports with optical transceivers
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EB3Z) - Lift tool based on GenieLift GL-8 (standard)**

This feature delivers the Low-Cost Lift Tool (based on GenieLift GL-8 (standard)) for IBM servers.

Feature #EB3Z is a feature that is available on multiple server types (POWER S812L, S822L, S824L, S814, S824, S812, S814, E880, and E870, also the rack models 7965-S42, 7014-T00, and 7014-T42). Failure to have at least one Lift tool available prolonged maintenance times.

A lift tool raises and lowers servers and I/O drawers so they can be placed into or removed from standard 19-inch racks. It more safely by fewer people. Lift tool feature EB3Z has a hand crank to lift and position up to 181 kg (400 lbs). The lift tool width are 88.3 cm x 62.9 cm (34 3/4 x 24 3/4 in). It has rollers which allow it to be moved to different racks in the data center.

- Attributes provided: Lift Tool
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EB46) - 10GbE Optical Transceiver SFP+ SR

One optical transceiver for 10Gb Ethernet adapter such as #EC2S or #EC2R and also #EC2U or #EC2T using SFP+ SR. I

The 10 Gb optical transceiver is capable up to 300 M through the OM3 cable or 82 M through OM2 cable. Either one or bo be populated.

- Attributes provided: Optical Transceiver SFP+ SR 10Gb
- Attributes required: SFP+ socket
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EB47) - 25GbE Optical Transceiver SFP28

One optical transceiver for 25Gb Ethernet adapter such as #EC2U or #EC2T using SFP28. Does not include cable.

The 25 Gb optical transceiver is capable up to 100 m through the OM4 cable or 70 M through OM3 cable. Either one or bo be populated.

**Note: The SFP28 25GbE transceiver only supports 25GbE speeds.**

- Attributes provided: SFP28 optical transceiver
- Attributes required: SFP28 socket
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EB4J) - 0.5m SFP28/25GbE copper Cable

Feature EB4J is a passive 0,5 meter copper cable that contains a single high-speed copper pair, operating at data rates of for either 25Gb Ethernet adapters or switches. Built onto each end of the cable is a passive SFP28 copper cable transceiver. Lengths: 0.5M - #EB4J, 1.0M=#EB4K, 1.5M=#EB4L, 2.0M=#EB4M

- Attributes provided: Copper cable with SFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EB4K) - 1.0m SFP28/25GbE copper Cable

Feature EB4K is a passive 1.0 meter copper cable that contains a single high-speed copper pair, operating at data rates of for either 25Gb Ethernet adapters or switches. Built onto each end of the cable is a passive SFP28 copper cable transceiver. Lengths: 0.5M - #EB4J, 1.0M=#EB4K, 1.5M=#EB4L, 2.0M=#EB4M

- Attributes provided: Copper cable with SFP28 transceivers

- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB4L) - 1.5m SFP28/25GbE copper Cable**

(No longer available as of December 31, 2020)

Feature EB4L is a passive 1.5 meter copper cable that contains a single high-speed copper pair, operating at data rates of for either 25Gb Ethernet adapters or switches. Built onto each end of the cable is a passive SFP28 copper cable transceiver. Lengths: 0.5M - #EB4J, 1.0M=#EB4K, 1.5M=#EB4L, 2.0M=#EB4M

- Attributes provided: Copper cable with SFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB4M) - 2.0m SFP28/25GbE copper Cable**

Feature EB4M is a passive 2.0 meter copper cable that contains a single high-speed copper pair, operating at data rates of for either 25Gb Ethernet adapters or switches. Built onto each end of the cable is a passive SFP28 copper cable transceiver. Lengths: 0.5M - #EB4J, 1.0M=#EB4K, 1.5M=#EB4L, 2.0M=#EB4M

- Attributes provided: Copper cable with SFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB4P) - 2.0m QSFP28/100GbE copper split Cable to SFP28 4x25GbE**

Feature EB4P is a 2.0 meter, active optical 100Gb E to 4x25Gb E splitter cable. It provides connectivity between system up to four different SFP28 ports on the other side, such as a switch and four servers.

- Attributes provided: Copper splitter cable with QSFP28 and 4x SFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes

- Return parts MES: No

## **(#EB4Z) - Service wedge shelf tool kit for EB3Z**

This feature provides a separate tool kit to replace the flat shelf with a wedge/angle shelf at the client site.

**Note: EB4Z wedge shelf is IBM SSR use only (due to safety labels/ instructions/certifications only for IBM and not feature EB4Z to ensure the tool is conveniently located on site in case an IBM SSR needed to use it and do not wa bring in an EB4Z or to schedule additional personnel to manually handle server installation/removal from the rack**

Client is free to use EB3Z (without EB4Z) for their normal work.

- Attributes provided: Wedge/angle shelf
- Attributes required: Feature EB3Z
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: No
- Return parts MES: No

## **(#EB50) - 0.5m EDR IB Copper Cable QSFP28**

(No longer available as of January 18, 2019)

0.5 meter length copper twinax cable, also called a DAC (Direct Attached Copper) cable. The cable can be used for either IB switches. Built onto each end of the cable is a passive Quad (4-channel) Small Form-Factor Pluggable (QSFP28) copper connector used for FDR IB (56Gb). Cables are available in various lengths: 0.5m = #EB50, 1m = #EB51, 2m = #EB52, 1.5m = #EB54 lengths such as #EB5A through #EB5H.

- Attributes provided: Copper twinax cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EB51) - 1.0m EDR IB Copper Cable QSFP28**

1.0 meter length copper twinax cable, also called a DAC (Direct Attached Copper) cable. The cable can be used for either IB switches. Built onto each end of the cable is a passive Quad (4-channel) Small Form-Factor Pluggable (QSFP28) copper connector used for FDR IB (56Gb). Cables are available in various lengths: 0.5m = #EB50, 1m = #EB51, 2m = #EB52, 1.5m = #EB54 lengths such as #EB5A through #EB5H.

- Attributes provided: Copper twinax cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EB52) - 2.0M EDR IB Copper Cable QSFP28**

2.0 meter length copper twinax cable, also called a DAC (Direct Attached Copper) cable. The cable can be used for either IB switches. Built onto each end of the cable is a passive Quad (4-channel) Small Form-Factor Pluggable (QSFP28) copper used for FDR IB (56Gb). Cables are available in various lengths: 0.5M = #EB50, 1M = #EB51, 2M = #EB52, 1.5M = #EB54 lengths such as #EB5A through #EB5H.

- Attributes provided: Copper twinax cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EB54) - 1.5M EDR IB Copper Cable QSFP28**

1.5 meter length copper twinax cable, also called a DAC (Direct Attached Copper) cable. The cable can be used for either IB switches. Built onto each end of the cable is a passive Quad (4-channel) Small Form-Factor Pluggable (QSFP28) copper used for FDR IB (56Gb). Cables are available in various lengths: 0.5M = #EB50, 1M = #EB51, 2M = #EB52, 1.5M = #EB54 lengths such as #EB5A through #EB5H.

- Attributes provided: Copper twinax cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EB59) - 100GbE Optical Transceiver QSFP28**

One optical transceiver for 100Gb Ethernet adapter such as #EC3L or #EC3M or #EC66 or #EC67 using QSFP28. Does not

See also AOC fiber cables which include QSFP28 transceivers EB5R - EB5Y.

- Attributes provided: Optical Transceiver QSFP28 100Gb.
- Attributes required: Port on adapter with QSFP28 socket.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EB5A) - 3M EDR IB Optical Cable QSFP28**

3 meter length optical fiber cable, also called an AOC (Active Optical Cable). The cable can be used for either 100Gb EDR. Built onto each end of the cable is a active Quad (4-channel) Small Form-Factor Pluggable (QSFP28) optical cable transceiver. Cables are available in various lengths: 3m = #EB5A, 5M = #EB5B, 10M = #EB5C, 15M = #EB5D, 20M = #EB5E, 30M = #EB5F, and 50M = #EB5G, 100M cables for shorter lengths such as #EB50 through #EB54. Limitation: Adapter and switch must have been manufactured by supported for FDR IB (56Gb).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB5B) - 5M EDR IB Optical Cable QSFP28**

5 meter length optical fiber cable, also called an AOC (Active Optical Cable). The cable can be used for either 100Gb EDR switches. Built onto each end of the cable is a active Quad (4-channel) Small Form-Factor Pluggable (QSFP28) optical cable transceiver. Various lengths: 3m = #EB5A, 5M = #EB5B, 10M = #EB5C, 15M = #EB5D, 20M = #EB5E, 30M = #EB5F, and 50M = #EB5G, 100M = #EB5H, and 150M = #EB5I. Limitation: Adapter and switch must have been manufactured for FDR IB (56Gb).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB5C) - 10M EDR IB Optical Cable QSFP28**

10 meter length optical fiber cable, also called an AOC (Active Optical Cable). The cable can be used for either 100Gb EDR switches. Built onto each end of the cable is a active Quad (4-channel) Small Form-Factor Pluggable (QSFP28) optical cable transceiver. Various lengths: 3m = #EB5A, 5M = #EB5B, 10M = #EB5C, 15M = #EB5D, 20M = #EB5E, 30M = #EB5F, and 50M = #EB5G, 100M = #EB5H, and 150M = #EB5I. Limitation: Adapter and switch must have been manufactured for FDR IB (56Gb).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB5D) - 15M EDR IB Optical Cable QSFP28**

15 meter length optical fiber cable, also called an AOC (Active Optical Cable). The cable can be used for either 100Gb EDR switches. Built onto each end of the cable is a active Quad (4-channel) Small Form-Factor Pluggable (QSFP28) optical cable transceiver. Various lengths: 3m = #EB5A, 5M = #EB5B, 10M = #EB5C, 15M = #EB5D, 20M = #EB5E, 30M = #EB5F, and 50M = #EB5G, 100M = #EB5H, and 150M = #EB5I. Limitation: Adapter and switch must have been manufactured for FDR IB (56Gb).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0



- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB5E) - 20M EDR IB Optical Cable QSFP28**

20 meter length optical fiber cable, also called an AOC (Active Optical Cable). The cable can be used for either 100Gb EDI switches. Built onto each end of the cable is a active Quad (4-channel) Small Form-Factor Pluggable (QSFP28) optical cat various lengths: 3m = #EB5A, 5M = #EB5B, 10M = #EB5C, 15M = #EB5D, 20M = #EB5E, 30M = #EB5F, and 50M = #EB5 twinax cables for shorter lengths such as #EB50 through #EB54. Limitation: Adapter and switch must have been manufact Cable is not supported for FDR IB (56Gb).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB5F) - 30M EDR IB Optical Cable QSFP28**

30 meter length optical fiber cable, also called an AOC (Active Optical Cable). The cable can be used for either 100Gb EDI switches. Built onto each end of the cable is a active Quad (4-channel) Small Form-Factor Pluggable (QSFP28) optical cat various lengths: 3m = #EB5A, 5M = #EB5B, 10M = #EB5C, 15M = #EB5D, 20M = #EB5E, 30M = #EB5F, and 50M = #EB5 twinax cables for shorter lengths such as #EB50 through #EB54. Limitation: Adapter and switch must have been manufact Cable is not supported for FDR IB (56Gb).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB5G) - 50M EDR IB Optical Cable QSFP28**

50 meter length optical fiber cable, also called an AOC (Active Optical Cable). The cable can be used for either 100Gb EDI switches. Built onto each end of the cable is a active Quad (4-channel) Small Form-Factor Pluggable (QSFP28) optical cat various lengths: 3m = #EB5A, 5M = #EB5B, 10M = #EB5C, 15M = #EB5D, 20M = #EB5E, 30M = #EB5F, and 50M = #EB5 twinax cables for shorter lengths such as #EB50 through #EB54. Limitation: Adapter and switch must have been manufact Cable is not supported for FDR IB (56Gb).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both

- CSU: Yes
- Return parts MES: No

### **(#EB5H) - 100M EDR IB Optical Cable QSFP28**

100 meter length optical fiber cable, also called an AOC (Active Optical Cable). The cable can be used for either 100Gb Ethernet switches. Built onto each end of the cable is a active Quad (4-channel) Small Form-Factor Pluggable (QSFP28) optical connector. Various lengths: 3m = #EB5A, 5M = #EB5B, 10M = #EB5C, 15M = #EB5D, 20M = #EB5E, 30M = #EB5F, and 50M = #EB5G. Limitation: Adapter and switch must have been manufactured for FDR IB (56Gb). Cable is not supported for FDR IB (56Gb).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB5J) - 0.5M 100GbE Copper Cable QSFP28**

(No longer available as of March 5, 2021)

0.5 meter length passive copper cable with QSFP28 transceivers on each end. The cable used for 100Gb Ethernet adapters called "copper twinax" or "DAC" (Direct Attach Copper).

Cables are available in various lengths. See shorter passive copper cables #EB5J - #EB5M (0.5M - 2.0M) or see active optical cables (100M).

- Attributes provided: Copper cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB5K) - 1.0M 100GbE Copper Cable QSFP28**

1.0 meter length passive copper cable with QSFP28 transceivers on each end. The cable used for 100Gb Ethernet adapters called "copper twinax" or "DAC" (Direct Attach Copper).

Cables are available in various lengths. See shorter passive copper cables #EB5J - #EB5M (0.5M - 2.0M) or see active optical cables (100M).

- Attributes provided: Copper cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EB5L) - 1.5M 100GbE Copper Cable QSFP28**

1.5 meter length passive copper cable with QSFP28 transceivers on each end. The cable used for 100Gb Ethernet adapters called "copper twinax" or "DAC" (Direct Attach Copper).

Cables are available in various lengths. See shorter passive copper cables #EB5J - #EB5M (0.5M - 2.0M) or see active op 100M).

- Attributes provided: Copper cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EB5M) - 2.0M 100GbE Copper Cable QSFP28**

2.0 meter length passive copper cable with QSFP28 transceivers on each end. The cable used for 100Gb Ethernet adapters called "copper twinax" or "DAC" (Direct Attach Copper).

Cables are available in various lengths. See shorter passive copper cables #EB5J - #EB5M (0.5M - 2.0M) or see active op 100M).

- Attributes provided: Copper cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EB5N) - 25M EDR IB Optical Cable QSFP28**

(No longer available as of December 31, 2020)

25 meter length optical fiber cable, also called an AOC (Active Optical Cable). The cable can be used for either 100Gb EDI switches. Built onto each end of the cable is a active Quad (4-channel) Small Form-Factor Pluggable (QSFP28) optical cable.

Cables are available in various lengths: 3m = #EB5A, 5M = #EB5B, 10M = #EB5C, 15M = #EB5D, 20M = #EB5E, 25M = #EB5G, 100M = #EB5H. See also copper twinax cables for shorter lengths such as #EB50 through #EB54.

Limitation: Adapter and switch must have been manufactured by Mellanox to use this cable. Cable is not supported for FDI

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EB5R) - 3M 100GbE Optical Cable QSFP28 (AOC)**

3 meter length Active Optical fiber Cable (AOC) with QSFP28 transceivers on each end. The cable used for 100Gb Ethernet

Cables are available in various lengths. See shorter passive copper cables #EB5J - #EJM (0.5M - 2.0M) or see active optical (100M).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EB5S) - 5M 100GbE Optical Cable QSFP28 (AOC)**

5 meter length Active Optical fiber Cable (AOC) with QSFP28 transceivers on each end. The cable used for 100Gb Ethernet

Cables are available in various lengths. See shorter passive copper cables #EB5J - #EJM (0.5M - 2.0M) or see active optical (100M).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EB5T) - 10M 100GbE Optical Cable QSFP28 (AOC)**

10 meter length Active Optical fiber Cable (AOC) with QSFP28 transceivers on each end. The cable used for 100Gb Ethernet

Cables are available in various lengths. See shorter passive copper cables #EB5J - #EJM (0.5M - 2.0M) or see active optical (100M).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EB5U) - 15M 100GbE Optical Cable QSFP28 (AOC)**

15 meter length Active Optical fiber Cable (AOC) with QSFP28 transceivers on each end. The cable used for 100Gb Ethernet

Cables are available in various lengths. See shorter passive copper cables #EB5J - #EJM (0.5M - 2.0M) or see active optical (100M).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB5V) - 20M 100GbE Optical Cable QSFP28 (AOC)**

20 meter length Active Optical fiber Cable (AOC) with QSFP28 transceivers on each end. The cable used for 100Gb Ethernet

Cables are available in various lengths. See shorter passive copper cables #EB5J - #EJM (0.5M - 2.0M) or see active optical (100M).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB5W) - 30M 100GbE Optical Cable QSFP28 (AOC)**

30 meter length Active Optical fiber Cable (AOC) with QSFP28 transceivers on each end. The cable used for 100Gb Ethernet

Cables are available in various lengths. See shorter passive copper cables #EB5J - #EJM (0.5M - 2.0M) or see active optical (100M).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB5X) - 50M 100GbE Optical Cable QSFP28 (AOC)**

50 meter length Active Optical fiber Cable (AOC) with QSFP28 transceivers on each end. The cable used for 100Gb Ethernet

Cables are available in various lengths. See shorter passive copper cables #EB5J - #EJM (0.5M - 2.0M) or see active optical (100M).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None

- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EB5Y) - 100M 100GbE Optical Cable QSFP28 (AOC)**

(No longer available as of March 5, 2021)

100 meter length Active Optical fiber Cable (AOC) with QSFP28 transceivers on each end. The cable used for 100Gb Ethernet Cables are available in various lengths. See shorter passive copper cables #EB5J - #EJM (0.5M - 2.0M) or see active optical (100M).

- Attributes provided: Optical fiber cable with QSFP28 transceivers
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EC01) - Rack Front Door (Black)**

(No longer available as of December 31, 2020)

This feature provides a front door in flat black color with an IBM logo for the 7965-94Y rack. A front door such as #EC01 is the full width of the rack and the hinges and lockplate can be moved from side to side allowing the door to be opened on either the left side or right side). IBM ships rack with the handle on the right and hinges on the left viewed facing the front of which is keyed the same as the rear door or side panels. Uniquely keyed locks can be obtained by the client directly from Southco, the vendor from whom IBM purchased the lock.

- Attributes provided: Front Door with lock
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EC02) - Rack Rear Door**

(No longer available as of December 31, 2020)

This feature provides a rear door in flat black color for the 7965-94Y rack. Either feature number EC02 or feature EC05 is the full width of the rack and the hinges and lockplate can be moved from side to side allowing the door to be opened on either the left side or right side). IBM ships rack with the handle on the right and hinges on the left viewed facing the rear of and side panels come with a lock which is keyed the same as the front door or side panels. Uniquely keyed locks can be obtained from Southco, the vendor from whom IBM purchased the lock.

- Attributes provided: Rear Door with lock
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None

- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EC03) - Rack Side Cover**

(No longer available as of December 31, 2020)

This feature provides two side panels in black color for the 7953-94X rack. Each side panel can cover either the left or the right side of the rack. The side panels are optional but recommended for optimal airflow through a rack and for physical security. The front door, rear doors and side panels are keyed the same as the front door or side panels. Uniquely keyed locks can be obtained by the client directly from Southco, Inc. for the lock.

- Attributes provided: Left and Right side panels for 7953 rack.
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EC04) - Rack Suite Attachment Kit**

(No longer available as of December 31, 2020)

This feature provides the attachment hardware to allow two IBM PureFlex System 42U Racks with or without side panels to be joined in a rack suite. Order one EC04 feature for each 42U rack attached to the starting rack. For example, in a three-rack suite, order two EC04 features. When two racks are joined in this way without internal side panels, cables can be more easily run between racks without having to exit the racks. When side panels are installed optimum thermal efficiencies are gained. If the optional rear door heat exchanger is chosen, side panels must be used on the leftmost and rightmost racks of the suite.

- Attributes provided: Hardware and trim to attach two racks
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EC07) - Slim Rear Acoustic Door**

Slim rear acoustic door for use on the 7014-T42 or server feature #0553 2.0M racks. Depth of this acoustic door is only about 1.5 inches.

Physically #EC07 and #EC08 are identical, but have two feature codes to assist IBM sales configurator logic. #EC07 designates a front door.

- Attributes provided: Rear Acoustic door
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes

- Return parts MES: No

## **(#EC08) - Slim Front Acoustic Door**

Slim front acoustic door for use on the 7014-T42 or server feature #0553 2.0M racks. Depth of this acoustic door is only ab

Physically #EC07 and #EC08 are identical, but have two feature codes to assist IBM sales configurator logic. #EC07 designates a front door.

- Attributes provided: Acoustic front door
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## **(#EC15) - Rear Door Heat Exchanger for 2.0 Meter Slim Rack**

(No longer available as of December 31, 2020)

This feature indicates that the rear door heat exchanger (1164-95X) is ordered for the 7965-94Y rack. Either feature EC02 94Y. This door hinges on the right side. ("Right" is as you face the door from the outside of the rack).

- Attributes provided: RDHX
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## **(#EC22) - IBM PowerVM for IBM PowerLinux**

This feature allows the customer to create partitions that are in units of less than 1 CPU (sub-CPU LPARs) and allows the : to these partitions. When IBM PowerVM for IBM PowerLinux is installed in the system, all activated processors must have 16-core system requires that sixteen of this feature be ordered. An encrypted key is supplied to the customer and is install partitioning at the sub-processor level. IBM PowerVM for IBM PowerLinux includes Live Partition Mobility, which allows for one POWER7 server to another with no application downtime. Note: If feature EC22 is ordered, the quantity ordered must processors.

- Attributes provided: Capability to partition processor
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 32 (Initial order maximum: 32)
- OS level required:
  - Red Hat Enterprise Linux 8 for Power, or later
  - 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)
- Initial Order/MES/Both/Supported: Both
- CSU: Yes



- Return parts MES: Does not apply

## (#EC2R) - PCIe3 LP 2-Port 10Gb NIC&ROCE SR/Cu Adapter

(No Longer Available as of August 31, 2021)

This PCIe Gen3 Ethernet adapter provides two 10 Gb SFP+ ports. The adapter supports both NIC and IBTA RoCE standard Access (RDMA) over Converged Ethernet. Using RoCE, the adapter can support significantly greater bandwidth with low latency more efficiently using memory access. This offloads the CPU from I/O networking tasks, improving performance and scalability.

Cables: For 10GbE, IBM offers Direct Attach (DAC) cables up to 5m. SFP-based transceivers are included on each end of EN03.

Transceivers: IBM qualifies and supports SFP+ optical transceiver (FC EB46) to install into the adapter. Customers can also use SFP+ optical transceiver for the other end. The 10 Gb optical transceiver is capable up to 300 M through the OM3 cable or both of the adapter's two SFP+ ports can be populated.

Feature code #EC2R and #EC2S have identical electronics and function and CCIN (58FA), but have different tail stock branding. The adapter is based on a Mellanox ConnectX-4 adapter which uses a ConnectX-4 Lx EN Network Controller.

**Note: PowerVM SR-IOV support for the NIC function.**

**Note: VNIC supported with SUSE Linux Enterprise Server 12, Service Pack 3, with all available maintenance updates.**

Attributes:

- PCI Express 3.0 (up to 8GT/s) x8
- PCIe Gen 3.0 compliant, 1.1 and 2.0 compatible
- RDMA over Converged Ethernet (RoCE)
- NIC and RoCE are concurrently supported
- RoCE supported on Linux and AIX (7.2 and later)
- NIC supported on all OSes
- IEEE 802.3ae (10Gb Ethernet), IEEE 802.3ad (Link Aggregation & Failover), IEEE 802.3az (Energy Efficient Ethernet), IEEE 802.10au (Congestion Notification), IEEE 802.1Qbg, IEEE 802.3Qaz D0.2 (ETS), IEEE 802.1Qbb D1.0 (PFC), IEEE 1588 (PTP)
- Jumbo frame support up to 9.6KB
- VXLAN and NVGRE Overlay Network offload support
- TCP/UDP/IP stateless offload
- TCP checksum offload
- TCP segmentation offload
- UDP checksum offload
- MSI-X, MSI and support of legacy pin interrupts
- NIM boot support
- PowerVM SR-IOV support
- Attributes provided: 2-port 10Gb Ethernet
- Attributes required: Low profile PCIe Gen3 slot
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.3, or later
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.3, or later
  - Red Hat Enterprise Linux, with MLNX\_OFED 4.3, or later
  - Ubuntu Server, with MLNX\_OFED 4.3, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: VIOS supported, NIC capability only.**

## (#EC2S) - PCIe3 2-Port 10Gb NIC&ROCE SR/Cu Adapter

(No Longer Available as of August 31, 2021)

This PCIe Gen3 Ethernet adapter provides two 10 Gb SFP+ ports. The adapter supports both NIC and IBTA RoCE standard Access (RDMA) over Converged Ethernet. Using RoCE, the adapter can support significantly greater bandwidth with low latency more efficiently using memory access. This offloads the CPU from I/O networking tasks, improving performance and scalability.

**Cables:** For 10GbE, IBM offers Direct Attach (DAC) cables up to 5m. SFP-based transceivers are included on each end of EN03.

**Transceivers:** IBM qualifies and supports SFP+ optical transceiver (FC EB46) to install into the adapter. Customers can also use a SFP+ optical transceiver for the other end. The 10 Gb optical transceiver is capable up to 300 M through the OM3 cable or both of the adapter's two SFP+ ports can be populated.

Feature code #EC2R and #EC2S have identical electronics and function and CCIN (58FA), but have different tail stock branding. The adapter is based on a Mellanox ConnectX-4 adapter which uses a ConnectX-4 Lx EN Network Controller.

**Note: PowerVM SR-IOV support for the NIC function.**

**Note: VNIC supported with SUSE Linux Enterprise Server 12, Service Pack 3, with all available maintenance updates.**

Attributes:

- PCI Express 3.0 (up to 8GT/s) x8
  - PCIe Gen 3.0 compliant, 1.1 and 2.0 compatible
  - RDMA over Converged Ethernet (RoCE)
  - NIC and RoCE are concurrently supported
  - RoCE supported on Linux and AIX (7.2 and later)
  - NIC supported on all OSes
  - IEEE 802.3ae (10Gb Ethernet), IEEE 802.3ad (Link Aggregation & Failover), IEEE 802.3az (Energy Efficient Ethernet), IEEE 802.10au (Congestion Notification), IEEE 802.1Qbg, IEEE 802.3Qaz D0.2 (ETS), IEEE 802.1Qbb D1.0 (PFC), IEEE 1588-2008 (PTP)
  - Jumbo frame support up to 9.6KB
  - VXLAN and NVGRE Overlay Network offload support
  - TCP/UDP/IP stateless offload
  - TCP checksum offload
  - TCP segmentation offload
  - UDP checksum offload
  - MSI-X, MSI and support of legacy pin interrupts
  - NIM boot support
  - PowerVM SR-IOV support
  - Attributes provided: 2-port 10Gb Ethernet Adapter
  - Attributes required: Full high PCIe Gen3 slot
  - Minimum required: 0
  - Maximum allowed: 18 (Initial order maximum: 18)
  - OS level required:
    - SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.3, or later
    - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.3, or later
    - Red Hat Enterprise Linux, with MLNX\_OFED 4.3, or later
    - Ubuntu Server, with MLNX\_OFED 4.3, or later
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: VIOS supported, NIC capability only.**

## (#EC2T) - PCIe3 LP 2-Port 25/10Gb NIC&ROCE SR/Cu Adapter

This PCIe Gen3 Ethernet adapter provides two 25/10 Gb SFP28 ports. The adapter supports both NIC and IBTA RoCE stateful Access (RDMA) over Converged Ethernet. Using RoCE, the adapter can support significantly greater bandwidth with low latency by more efficiently using memory access. This offloads the CPU from I/O networking tasks, improving performance and scalability.

**Cables:** For 25GbE, IBM offers SFP28 Passive Copper 25Gb Ethernet cables up to 2m. SFP28 based transceivers are included in the adapter features EB4J, EB4K, EB4L, and EB4M for a 0.5M, 1.0M, 1.5M and 2.0M copper cable.

For 10GbE, IBM offers Direct Attach (DAC) cables up to 5m. SFP-based transceivers are included on each end of the cable.

**Transceivers:** For 25 GbE, IBM qualifies and supports SFP28 optical transceiver (FC EB47) to install into the adapter. Customers can also use a SFP28 optical transceiver for the other end. The 25 Gb optical transceiver is capable up to 100 m through the OM3 cable. Either one or both of the adapter's two SFP28 ports can be populated.

**Note: The (FC EB47) SFP28 25GbE transceiver only supports 25GbE speeds.**

For 10 GbE, IBM qualifies and supports SFP+ optical transceiver (FC EB46) to install into the adapter. Customers can also use a SFP+ optical transceiver for the other end. The 10 Gb optical transceiver is capable up to 300 M through the OM3 cable or 82 m through the OM4 cable. Either one or both of the adapter's two SFP28 ports can be populated.

Feature code #EC2T and #EC2U have identical electronics and function and CCIN (58FB), but have different tail stock braiding. The adapter is based on a Mellanox ConnectX-4 adapter which uses a ConnectX-4 Lx EN Network Controller.

**Note: PowerVM SR-IOV support for the NIC function.**

**Note: VNIC supported with SUSE Linux Enterprise Server 12, Service Pack 3, with all available maintenance updates.**

Attributes:

- PCI Express 3.0 (up to 8GT/s) x8
- PCIe Gen 3.0 compliant, 1.1 and 2.0 compatible
- RDMA over Converged Ethernet (RoCE)
- NIC and RoCE are concurrently supported
- RoCE supported on Linux and AIX (7.2 and later)
- NIC supported on all OSes
- IEEE 802.3ae (25Gb or 10Gb Ethernet), IEEE 802.3ad (Link Aggregation & Failover), IEEE 802.3az (Energy Efficient Ethernet), IEEE 802.10au (Congestion Notification), IEEE 802.1Qbg, IEEE 802.3Qaz D0.2 (ETS), IEEE 802.1Qbb D1.1
- Jumbo frame support up to 9.6KB
- VXLAN and NVGRE Overlay Network offload support
- TCP/UDP/IP stateless offload
- TCP checksum offload
- TCP segmentation offload
- UDP checksum offload
- MSI-X, MSI and support of legacy pin interrupts
- NIM boot support
- PowerVM SR-IOV support
- Attributes provided: 2-port 25/10Gb Ethernet
- Attributes required: Low profile PCIe Gen3 slot
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.3, or later
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.3, or later
  - Red Hat Enterprise Linux, with MLNX\_OFED 4.3, or later
  - Ubuntu Server, with MLNX\_OFED 4.3, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EC2U) - PCIe3 2-Port 25/10Gb NIC&ROCE SR/Cu Adapter

This PCIe Gen3 Ethernet adapter provides two 25/10 Gb SFP28 ports. The adapter supports both NIC and IBTA RoCE sta Access (RDMA) over Converged Ethernet. Using RoCE, the adapter can support significantly greater bandwidth with low l; more efficiently using memory access. This offloads the CPU from I/O networking tasks, improving performance and scalal

Cables: For 25GbE, IBM offers SFP28 Passive Copper 25Gb Ethernet cables up to 2m. SFP28 based transceivers are inc features EB4J, EB4K, EB4L, and EB4M for a 0.5M, 1.0M, 1.5M and 2.0M copper cable.

For 10GbE, IBM offers Direct Attach (DAC) cables up to 5m. SFP-based transceivers are included on each end of the cabl

Transceivers: For 25 GbE, IBM qualifies and supports SFP28 optical transceiver (FC EB47) to install into the adapter. Cust cabling and SFP28 optical transceiver for the other end. The 25 Gb optical transceiver is capable up to 100 m through the Either one or both of the adapter's two SFP28 ports can be populated.

**Note: The (FC EB47) SFP28 25GbE transceiver only supports 25GbE speeds.**

For 10 GbE, IBM qualifies and supports SFP+ optical transceiver (FC EB46) to install into the adapter. Customers can also optical transceiver for the other end. The 10 Gb optical transceiver is capable up to 300 M through the OM3 cable or 82 m of the adapter's two SFP28 ports can be populated.

Feature code #EC2T and #EC2U have identical electronics and function and CCIN (58FB), but have different tail stock bra is full high. The adapter is based on a Mellanox ConnectX-4 adapter which uses a ConnectX-4 Lx EN Network Controller.

**Note: PowerVM SR-IOV support for the NIC function.**

**Note: VNIC supported with SUSE Linux Enterprise Server 12, Service Pack 3, with all available maintenance updat**

Attributes:

- PCI Express 3.0 (up to 8GT/s) x8
- PCIe Gen 3.0 compliant, 1.1 and 2.0 compatible
- RDMA over Converged Ethernet (RoCE)
- NIC and RoCE are concurrently supported
- RoCE supported on Linux and AIX (7.2 and later)
- NIC supported on all OSes
- IEEE 802.3ae (25Gb or 10Gb Ethernet), IEEE 802.3ad (Link Aggregation & Failover), IEEE 802.3az (Energy Efficient Tagging), IEEE 802.10au (Congestion Notification), IEEE 802.1Qbg, IEEE 802.3Qaz D0.2 (ETS), IEEE 802.1Qbb D1.
- Jumbo frame support up to 9.6KB
- VXLAN and NVGRE Overlay Network offload support
- TCP/UDP/IP stateless offload
- TCP checksum offload
- TCP segmentation offload
- UDP checksum offload
- MSI-X, MSI and support of legacy pin interrupts
- NIM boot support
- PowerVM SR-IOV support
- Attributes provided: 2-port 25/10Gb Ethernet Adapter
- Attributes required: Full high PCIe Gen3 slot
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:
  - SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.3, or later
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLN
  - Red Hat Enterprise Linux, with MLNX\_OFED 4.3, or later
  - Ubuntu Server, with MLNX\_OFED 4.3, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes

- Return parts MES: No

## (#EC3A) - PCIe3 LP 2-Port 40GbE NIC RoCE QSFP+ Adapter

(No longer available as of February 28, 2020)

PCIe Gen3 adapter provides two 40 Gb Ethernet QSFP+ ports. NIC and IBTA RoCE protocols are supported.

RoCE is Remote Direct Memory Access (RDMA) over Converged Ethernet. RoCE can support significantly greater bandwidth overhead by more efficiently using memory access. This offloads the CPU from I/O networking tasks, improving performance.

The #EC3A/EC3B adapter does not include transceivers. Shorter distance copper cables include transceivers on the end connectors (#EB2H (3m), #ECBN (5m)). For longer distance use two optical SR transceiver (two #EB27). QSFP+ optical cables to be used are #EB2J (10m) or #EB2K (30m). Do not mix copper and optical on the same adapter.

Feature code #EC3A and #EC3B have identical electronics and function and the same CCIN (57BD), but they have different form factors. #EC3B is full height.

AIX NIM and Linux Network Install are supported.

- Attributes provided: 2-Port 40GbE NIC and RoCE (no transceiver)
  - Attributes required: PCIe Gen2 or Gen3 slot (Gen3 preferred); Two Transceivers; QSFP+ cabling
  - Minimum required: 0
  - Maximum allowed: 8 (Initial order maximum: 8)
  - OS level required:
    - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 11, Service Pack 4, or later, with Mellanox OFED 4.3, or later
    - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12, Service Pack 3, or later, with Mellanox OFED 4.3, or later
    - SUSE Linux Enterprise Server 12, Service Pack 3, or later, with Mellanox OFED 4.3, or later
    - SUSE Linux Enterprise Server 15, or later, with Mellanox OFED 4.3, or later
    - Red Hat Enterprise Linux 8 for Power, or later, with Mellanox OFED 4.6, or later
    - Red Hat Enterprise Linux 7 for Power LE, version 7.5, or later, with Mellanox OFED 4.3, or later
    - Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.5, or later, with Mellanox OFED 4.3, or later
    - Red Hat Enterprise Linux 7 for Power LE, version 7.5, for POWER9, or later, with Mellanox OFED 4.3, or later
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Assignment to the VIOS supported. NIC capability only.**

## (#EC3B) - PCIe3 2-Port 40GbE NIC RoCE QSFP+ Adapter

(No longer available as of December 31, 2020)

PCIe Gen3 adapter provides two 40 Gb Ethernet QSFP+ ports. NIC and IBTA RoCE protocols are supported.

RoCE is Remote Direct Memory Access (RDMA) over Converged Ethernet. RoCE can support significantly greater bandwidth overhead by more efficiently using memory access. This offloads the CPU from I/O networking tasks, improving performance.

The #EC3A/EC3B adapter does not include transceivers. Shorter distance copper cables include transceivers on the end connectors (#EB2H (3m), #ECBN (5m)). For longer distance use two optical SR transceiver (two #EB27). QSFP+ optical cables to be used are #EB2J (10m) or #EB2K (30m). Do not mix copper and optical on the same adapter.

Feature code #EC3A and #EC3B have identical electronics and function and the same CCIN (57BD), but they have different form factors. #EC3B is full height.

AIX NIM and Linux Network Install are supported.

- Attributes provided: 2-Port 40GbE NIC and RoCE (no transceiver)
- Attributes required: PCIe Gen2 or Gen3 slot (Gen3 preferred). Two Transceivers; QSFP+ cabling

- Minimum required: 0
  - Maximum allowed: 18 (Initial order maximum: 18)
  - OS level required:
    - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 11, Service Pack 4, or later, with Mellanox OFED 4.3, or later
    - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12, Service Pack 3, or later, with Mellanox OFED 4.3, or later
    - SUSE Linux Enterprise Server 12, Service Pack 3, or later, with Mellanox OFED 4.3, or later
    - SUSE Linux Enterprise Server 15, or later, with Mellanox OFED 4.3, or later
    - Red Hat Enterprise Linux 8 for Power, or later, with Mellanox OFED 4.6, or later
    - Red Hat Enterprise Linux 7 for Power LE, version 7.5, or later, with Mellanox OFED 4.3, or later
    - Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.5, or later, with Mellanox OFED 4.3, or later
    - Red Hat Enterprise Linux 7 for Power LE, version 7.5, for POWER9, or later, with Mellanox OFED 4.3, or later
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Assignment to the VIOS supported. NIC capability only.**

## (#EC3E) - PCIe3 LP 2-port 100Gb EDR IB Adapter x16

(No longer available as of December 20, 2020)

The PCIe Gen3 x16 2-port InfiniBand EDR adapter provides high speed connectivity with other servers or IB switches. Each other system and/or switch bottlenecks are present. A PCIe Gen3 x16 PCIe slot is required. This adapter is sourced from Mellanox ConnectX-4 technology. The adapter supports the InfiniBand Trade Association (IBTA) specification version 2.

The two 100Gb ports have QSFP+ connections which support EDR cables, either EDR DAC or EDR optical. One adapter requires one cable. The user can choose to cable up just one port if they desire. Transceivers are included in the cables. IBM cable features distance) and #EB5A-EB5H (optical longer distance) are supported or their copper or optical Mellanox equivalents are supported.

#EC3E and #EC3F adapters are electronically and functionally identical with the same CCIN of 2CEA. #EC3E has a low price high tailstock bracket. See also #EC3T and #EC3U for a 1-port version of this adapter. Limitation: Adapter does not fit in x8 PCIe Gen3 I/O drawer.

- Attributes provided: EDR InfiniBand PCIe Adapter
- Attributes required: available x16 PCIe Gen3 slot
- Minimum required: 0
- Maximum allowed: 3 (Initial order maximum: 3)
- OS level required:
  - SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.4, or later
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.4, or later
  - Red Hat Enterprise Linux, with MLNX\_OFED 4.4, or later
  - Ubuntu Server, with MLNX\_OFED 4.4, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EC3L) - PCIe3 LP 2-port 100GbE (NIC& RoCE) QSFP28 Adapter x16

(No longer available as of June 25, 2021)

This PCIe Gen3 Ethernet x16 adapter provides two 100 Gb QSFP28 ports. The adapter supports both NIC and IBTA RoCE Memory Access (RDMA) over Converged Ethernet. Using RoCE, the adapter can support significantly greater bandwidth with less overhead by more efficiently using memory access. This offloads the CPU from I/O networking tasks, improving performance.

IBM offers either passive copper twinax cables up to 2 meter in length or active optical cables up to 100 meters in length. See 1.0M, 1.5M and 2.0M copper cable. See features #EB5R - #EB5Y for a 3M, 5M, 10M, 15M, 20M, 30M, 50M or 100M active optical cable.

included on each end of these QSFP28 cables. Alternatively to the above supported cables, you may chose to order an IBM optical transceiver (feature #EB59) to put into the adapter and provide your own 100GE optical cabling with your own QSP

Either one or both of the adapter's two QSP28 ports can be populated. When two ports are filled, both can have copper cal one can be copper and one can be optical.

Feature code #EC3L and #EC3M have identical electronics and function and CCIN (2CEC), but have different tail stock br is full high. The adapter is based on a Mellanox ConnectX-4 adapter which uses a ConnectX-4 EN Network Controller.

**Note: PowerVM SR-IOV support for the NIC function.**

**Note: VNIC supported with SUSE Linux Enterprise Server 12, Service Pack 3, with all available maintenance updat**

Attributes:

- PCI Express 3.0 (up to 8GT/s) x16
- PCIe Gen 3.0 compliant, 1.1 and 2.0 compatible
- RDMA over Converged Ethernet (RoCE)
- NIC and RoCE are concurrently supported
- RoCE supported on Linux and AIX (7.2 and later)
- NIC supported on all OSes
- TCP/UDP/IP stateless offload
- LSO, LRO, checksum offload
- NIM boot support
- Backward compatible with 40Gb Ethernet when using compatible cables/transceivers.
- Attributes provided: 2-port 100Gb Ethernet
- Attributes required: x16 PCIe Gen3 slot
- Minimum required: 0
- Maximum allowed: 3 (Initial order maximum: 3)
- OS level required:
  - SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.3, or later
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLN
  - Red Hat Enterprise Linux, with MLNX\_OFED 4.3, or later
  - Ubuntu Server, with MLNX\_OFED 4.3, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EC3T) - PCIe3 LP 1-port 100Gb EDR IB Adapter x16

(No longer available as of December 31, 2020)

The PCIe Gen3 x16 1-port InfiniBand EDR adapter provides high speed connectivity with other servers or IB switches. The other system and/or switch bottlenecks are present. A PCIe Gen3 x16 PCIe slot is required. This adapter is sourced from M ConnectX-4 technology. The adapter supports the InfiniBand Trade Association (IBTA) specification version 2.

The 100Gb port has a QSFP+ connection which supports EDR cables, either EDR DAC or EDR optical. Transceivers are i features EB50-EB54 (copper shorter distance) and #EB5A-EB5H (optical longer distance) are supported or their copper or supported. Other cables are not supported. #EC3T and #EC3U adapters are electronically and functionally identical with th low profile tailstock bracket. Limitation: Adapter does not fit in x8 PCIe slot. Adapter is not supported in a PCIe Gen3 I/O dr

- Attributes provided: EDR InfiniBand PCIe Adapter
- Attributes required: available x16 PCIe Gen3 slot
- Minimum required: 0
- Maximum allowed: 3 (Initial order maximum: 3)
- OS level required:
  - SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.4, or later
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLN

- Red Hat Enterprise Linux, with MLNX\_OFED 4.4, or later
- Ubuntu Server, with MLNX\_OFED 4.4, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EC45) - PCIe2 LP 4-Port USB 3.0 Adapter**

(No longer available as of December 31, 2020)

The PCIe Gen2 x8 short 4-port USB 3.0 adapter provides support for USB devices. In applications that require the use of a use one #4256 per port. The #EC45 and #EC46 USB adapters are electronically identical with the same 58F9 CCIN. They is low profile and #EC46 is full high.

- Attributes provided: Connectivity with USB 2.0 - 3.0 capable devices
- Attributes required: One low profile available PCIe slot.
- Minimum required: 0
- Maximum allowed: 4 (Initial order maximum: 4)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EC46) - PCIe2 4-Port USB 3.0 Adapter**

(No longer available as of December 31, 2020)

The PCIe Gen2 x8 short 4-port USB 3.0 adapter provides support for USB devices. In applications that require the use of a use one #4256 per port. The #EC45 and #EC46 USB adapters are electronically identical with the same 58F9 CCIN. They is low profile and #EC46 is full high.

- Attributes provided: Connectivity with USB 2.0 - 3.0 capable devices
- Attributes required: One available full height PCIe slot.
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EC51) - PCIe3 LP 3D Graphics Adapter x16**

(No longer available as of March 24, 2020)

When using graphic adapter for Partition Firmware Console to select an install or boot device use FC 3632 display or rack display FC 3644 or withdrawn rack mount 7316-TF3 display may also be used.

Limit of one adapter per LPAR.



- Attributes provided: Provides 2x DISPLAY port outputs
- Attributes required: Available PCIe2 slot
- Minimum required: 0
- Maximum allowed: 3 (Initial order maximum: 3)
- OS level required:
  - Red Hat Enterprise Linux 7 for Power LE, version 7.6, or later
  - Red Hat Enterprise Linux 7, for POWER9, version 7.6, or later
  - Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.6, or later
  - SUSE Linux Enterprise Server 12 Service Pack 4, or later
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 4, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EC59) - PCIe3 NVMe carrier card w/2 M.2 module slots**

(No longer available as of March 24, 2020)

NVMe carrier card for 400 GB Mainstream solid state drive (SSD) feature code #ES14. Maximum quantity of 2 of feature #

- Attributes provided: PCIe3 NVMe card with 2 M.2 module slots
- Attributes required: Feature ES14
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required:
  - 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
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EC5C) - PCIe3 x8 LP 3.2 TB NVMe Flash adapter for AIX/Linux**

The PCIe3 x8 3.2 TB NVMe Adapter is a Peripheral Component Interconnect Express (PCIe) generation 3 (Gen3) x8 adapter that fits into an x8 or x16 PCIe slot in the system and uses Non-Volatile Memory Express (NVMe). NVMe is a high performance software interface for solid state memory. Compared to a SAS or SATA SSD, the NVMe Flash adapter provides more read/write input/output operations per second (IOPS) and higher throughput (GB/sec).

CCIN is 58FD.

Feature #EC5C and #EC5D are identical cards except that the tailstock bracket is different. #EC5C fits a low profile PCIe slot, while #EC5D fits a full height PCIe slot. #EC5E is also EC5C for a card with more memory.

The nature of the workload has a great impact on the maximum write capacity. If a high percentage of more sequentially or random writes, the maximum write capacity will be larger. To extend the life of the device, the application that is using the device should be configured to use larger sequential writes. Writes past the adapter's maximum write capacity will continue to work for some period of time, but the device may experience performance degradation. If the application uses sequential or random reads from the device does not affect the life of the device. A Predictive Failure Analysis (PFA) feature is available on the adapter that allows the system administrator to replace the adapter if enabled by the system administrator. Customers are recommended to monitor the smart log via the command 'lsdev -l nvme -v' which shows the percentage used.

IBM NVMe adapter failures will be replaced during the standard warranty and maintenance period for adapters that have not reached their maximum write cycles. Adapters that reach this limit may fail to operate according to specifications and must be replaced at the client's expense. Data protection is implemented in the card; protection is provided by OS mirroring or software RAID wherever applicable.

This adapter is not supported in the PCIe I/O drawer.

**Note: NVMe Flash adapters #EC5C can be used to meet minimum AIX/Linux SSD/HDD and backplane requirement**

This PCIe NVMe device can have 32 namespaces per device.

- Attributes provided: 3.2 TB of low latency flash memory with boot capability
- Attributes required: PCIe slot in system unit
- Minimum required: 0
- Maximum allowed: 5 (Initial order maximum: 5)
- OS level required:
  - Red Hat Enterprise Linux 7 for Power LE, version 7.5, or later
  - Red Hat Enterprise Linux 7, for POWER9, version 7.6, or later
  - Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.5, or later
  - 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
  - SUSE Linux Enterprise Server 15, or later

### (#EC5E) - PCIe3 x8 LP 6.4 TB NVMe Flash adapter for AIX/Linux

The PCIe3 x8 6.4 TB NVMe Adapter is a Peripheral Component Interconnect Express (PCIe) generation 3 (Gen3) x8 adapter that fits into an x8 or x16 PCIe slot in the system and uses Non-Volatile Memory Express (NVMe). NVMe is a high performance software interface for accessing non-volatile memory. Compared to a SAS or SATA SSD, the NVMe Flash adapter provides more read/write input/output operations per second (IOPS) and higher throughput (GB/sec).

CCIN is 58FE.

Feature #EC5E and #EC5F are identical cards except that the tailstock bracket is different. #EC5E fits a low profile PCIe slot, while #EC5F fits a full height PCIe slot. Both also EC5C for a card with less memory.

The nature of the workload has a great impact on the maximum write capacity. If a high percentage of more sequentially or random writes, the maximum write capacity will be larger. To extend the life of the device, the application that is using the device should be configured to write past the adapter's maximum write capacity will continue to work for some period of time, but application uses sequential or random reads from the device does not affect the life of the device. A Predictive Failure Analysis (PFA) is implemented in the card; protection is provided by OS mirroring or software RAID wherever applicable. Customers are recommended to monitor the smart log via the command 'smartctl -l

IBM NVMe adapter failures will be replaced during the standard warranty and maintenance period for adapters that have reached their maximum write cycles. Adapters that reach this limit may fail to operate according to specifications and must be replaced at the client's expense. Data protection is provided by OS mirroring or software RAID wherever applicable.

This adapter is not supported in the PCIe I/O drawer.

**Note: NVMe Flash adapters #EC5E can be used to meet minimum AIX/Linux SSD/HDD and backplane requirement**

This PCIe NVMe device can have 32 namespaces per device.

- Attributes provided: 6.4 TB of low latency flash memory with boot capability
- Attributes required: PCIe slot in system unit
- Limitations: Not supported in PCIe Gen3 I/O drawer. Data protection not implemented in the card and protection provided by OS mirroring or software RAID wherever applicable.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No
- **Note: Assignment to the VIOS requires VIOS 3.1.0.21, or later; VIOS 2.2.6.41, or later.**
- Minimum required: 0
- Maximum allowed: 5 (Initial order maximum: 5)
- OS level required:
  - Red Hat Enterprise Linux 7 for Power LE, version 7.5, or later
  - Red Hat Enterprise Linux 7, for POWER9, version 7.6, or later
  - Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.5, or later

- 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
- SUSE Linux Enterprise Server 15, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Assignment to the VIOS requires VIOS 3.1.0.21, or later; VIOS 2.2.6.41, or later.**

## (#EC5G) - PCIe3 x8 LP 1.6 TB NVMe Flash Adapter for AIX/Linux

The PCIe3 x8 1.6 TB NVMe Adapter is a Peripheral Component Interconnect Express (PCIe) generation 3 (Gen3) x8 adapter that fits into an x8 or x16 PCIe slot in the system and uses Non-Volatile Memory Express (NVMe). NVMe is a high performance software interface for solid state memory. Compared to a SAS or SATA SSD, the NVMe Flash adapter provides more read/write input/output operations per second (GB/sec).

CCIN is 58FC.

Feature #EC5G and #EC5B are identical cards except that the tailstock bracket is different. #EC5G fits a low profile PCIe slot. #EC5D and #EC5F are also #EC5D/EC5F for a card with more memory.

The nature of the workload has a great impact on the maximum write capacity. If a high percentage of more sequentially or random writes, the maximum write capacity will be larger. To extend the life of the device, the application that is using the device should be configured to larger sequential writes. Writes past the adapter's maximum write capacity will continue to work for some period of time, but the application uses sequential or random reads from the device does not affect the life of the device. A Predictive Failure Analysis (PFA) can be implemented to replace the adapter if enabled by the system administrator. Customers are recommended to monitor the smart log via the command 'lsdev -C -l nvme0 -s' which shows the percentage used.

IBM NVMe adapter failures will be replaced during the standard warranty and maintenance period for adapters that have not reached their maximum write cycles. Adapters that reach this limit may fail to operate according to specifications and must be replaced at the client's expense. Data protection is implemented in the card; protection is provided by OS mirroring or software RAID wherever applicable.

This adapter is not supported in the PCIe I/O drawer.

**Note: NVMe Flash adapters #EC5G can be used to meet minimum AIX/Linux SSD/HDD and backplane requirements.**

This PCIe NVMe device can have 32 namespaces per device.

- Attributes provided: 1.6 TB of low latency flash memory with boot capability
- Attributes required: PCIe slot in system unit
- Limitations: Not supported in PCIe Gen3 I/O drawer. Data protection not implemented in the card and protection provided by OS.
- Minimum required: 0
- Maximum allowed: 5 (Initial order maximum: 5)
- OS level required:
  - Red Hat Enterprise Linux 7 for Power LE, version 7.5, or later
  - Red Hat Enterprise Linux 7, for POWER9, version 7.6, or later
  - Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.5, or later
  - 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
  - SUSE Linux Enterprise Server 15, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Assignment to the VIOS requires VIOS 3.1.0.21, or later; VIOS 2.2.6.41, or later.**

## (#EC62) - PCIe4 LP 1-port 100Gb EDR IB CAPI adapter

The PCIe Gen4 x16 1-port InfiniBand EDR adapter provides high speed connectivity with other servers or IB switches. The adapter is sourced from Mellanox and other system and/or switch bottlenecks are present. A PCIe Gen4 x16 PCIe slot is required. This adapter is sourced from Mellanox ConnectX-5 technology. The adapter supports the InfiniBand Trade Association (IBTA) specification version 2.

The 100Gb port has a QSFP+ connection which supports EDR cables, either EDR DAC or EDR optical. Transceivers are i features EB50-EB54 (copper shorter distance) and #EB5A-EB5H (optical longer distance) are supported or their copper or supported. Other cables are not supported.

#EC62 and #EC63 adapters are electronically and functionally identical with the same CCIN of 2CF1. #EC62 is low profile

Limitation: Adapter does not fit in x8 PCIe slot. Adapter is not supported in a PCIe Gen3 I/O drawer.

- Attributes provided: EDR InfiniBand PCIe Adapter
- Attributes required: available x16 PCIe Gen4 slot
- Minimum required: 0
- Maximum allowed: 3 (Initial order maximum: 3)
- OS level required:
  - SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.3, or later
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLN
  - Red Hat Enterprise Linux, with MLNX\_OFED 4.3, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EC64) - PCIe4 LP 2-port 100Gb EDR IB CAPI adapter**

The PCIe Gen4 x16 2-port InfiniBand EDR adapter provides high speed connectivity with other servers or IB switches. Eac other system and/or switch bottlenecks are present. A PCIe Gen4 x16 PCIe slot is required. This adapter is sourced from M ConnectX-5 technology. The adapter supports the InfiniBand Trade Association (IBTA) specification version 2.

The two 100Gb ports have QSFP+ connections which support EDR cables, either EDR DAC or EDR optical. One adapter i cable. The user can choose to cable up just one port if they desire. Transceivers are included in the cables. IBM cable feat distance) and #EB5A-EB5H (optical longer distance) are supported or their copper or optical Mellanox equivalents are sup

#EC64 and #EC65 adapters are electronically and functionally identical with the same CCIN of 2CF2. #EC64 is low profile

Limitation: Adapter does not fit in x8 PCIe slot. Adapter is not supported in a PCIe Gen3 I/O drawer.

- Attributes provided: EDR InfiniBand PCIe Adapter
- Attributes required: available x16 PCIe Gen4 slot
- Minimum required: 0
- Maximum allowed: 3 (Initial order maximum: 3)
- OS level required:
  - SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.3, or later
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLN
  - Red Hat Enterprise Linux, with MLNX\_OFED 4.3, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EC67) - PCIe4 LP 2-port 100Gb ROCE EN LP adapter**

This PCIe Gen4 Ethernet x16 adapter provides two 100 GbE QSFP28 ports. The adapter supports both NIC and IBTA RoC Memory Access (RDMA) over Converged Ethernet. Using RoCE, the adapter can support significantly greater bandwidth v overhead by more efficiently using memory access. This offloads the CPU from I/O networking tasks, improving performan

For 100GbE network connectivity, IBM offers either passive copper twinax cables up to 2 meters in length or active optical features #EB5J - #EB5M for a 0.5M, 1.0M, 1.5M and 2.0M copper cable. See features #EB5R - #EB5Y for a 3M, 5M, 10M, optical cable. Transceivers are included on each end of these QSFP28 cables. Alternatively to the above supported cables qualified and supported QSFP28 optical transceiver (feature #EB59) to put into the adapter ports and MTP/MPO cable 10M #EB2K) optical cabling to use with your own QSP28 optical transceiver for the other end.

For 40GbE network connectivity, IBM offers either passive copper twinax cables up to 3 meters in length. See features #EE copper cable. Transceivers are included on each end of these QSFP+ cables. Alternatively to the above supported cables, qualified and supported QSFP+ 40G BASE-SR optical transceiver (feature #EB27) to put into the adapter ports and MTP/ #EB2J or #EB2K) optical cabling to use with your own QSP28 optical transceiver for the other end.

Either one or both of the adapter's two QSP28 ports can be populated. When two ports are filled, both can have copper cable or one can be copper and one can be optical.

Feature code #EC66 and #EC67 have identical electronics and function and CCIN (2CF3), but have different tail stock bracket. The low profile adapter is low profile. The adapter is based on a Mellanox ConnectX-5 adapter which uses a ConnectX-5 EN Network Controller.

#### Attributes:

- PCI Express 4.0 (up to 16GT/s) x16
- PCIe Gen 4.0 compliant, 1.1, 2.0 and 3.0 compatible
- RDMA over Converged Ethernet (RoCE)
- NIC and RoCE are concurrently supported
- RoCE supported on Linux and AIX
- NIC supported on all OSes
- TCP/UDP/IP stateless offload
- LSO, LRO, checksum offload
- NIM boot support
- Backward compatible with 40Gb Ethernet when using compatible cables/transceivers
- PowerVM SR-IOV support

For SR-IOV FAQs visit <https://community.ibm.com/community/user/power/viewdocument/sr-iov-faq-s-test?CommunityKey=277834a183b0&tab=librarydocument&docId=277834a183b0>

- Attributes provided: Dual-port 100 GbE Adapter with RoCE capability
  - Attributes required: Available Gen4 PCIe Slot
  - Minimum required: 0
  - Maximum allowed: 3 (Initial order maximum: 3)
  - OS level required:
    - Red Hat Enterprise Linux 8 for Power, or later, with Mellanox OFED 4.6, or later
    - Red Hat Enterprise Linux 7.5 for Power LE (p8compat) or later, with Mellanox OFED 4.4, or later
    - Red Hat Enterprise Linux 7.5 for POWER9 or later, with Mellanox OFED 4.4, or later
    - Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.5, or later, with Mellanox OFED 4.4, or later
    - SUSE Linux Enterprise Server 12 Service Pack 3, or later, with Mellanox OFED 4.4, or later
    - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later, with Mellanox OFED 4.4, or later
    - SUSE Linux Enterprise Server 15, or later, with Mellanox OFED 4.4, or later
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: VIOS 2.2.6.23, or later**

### (#EC6J) - PCIe2 LP 2-Port USB 3.0 Adapter

The PCIe Gen2 x8 short 2-port USB 3.0 adapter provides support for USB devices. In applications that require the use of a single USB device per port. The #EC6J and #EC6K USB adapters are electronically identical with the same 590F CCIN. They are both low profile and #EC6K is full high.

- Attributes provided: Connectivity with USB 2.0 - 3.0 capable devices
- Attributes required: One low profile available PCIe slot
- Minimum required: 0

- Maximum allowed: 8 (Initial order maximum: 8)
  - OS level required:
    - Red Hat Enterprise Linux 8, for POWER LE, version 8.3, or later
    - SUSE Linux Enterprise Server 15, Service Pack 2, or later
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Assignment to the VIOS requires VIOS 3.1.2.10, or later**

### (#EC6K) - PCIe2 2-Port USB 3.0 Adapter

The PCIe Gen2 x8 short 2-port USB 3.0 adapter provides support for USB devices. In applications that require the use of a low profile adapter, use one #4256 per port. The #EC6J and #EC6K USB adapters are electronically identical with the same 590F CCIN. They are both low profile and #EC6K is full high.

- Attributes provided: Connectivity with USB 2.0 - 3.0 capable devices
  - Attributes required: One low profile available PCIe slot
  - Minimum required: 0
  - Maximum allowed: 18 (Initial order maximum: 18)
  - OS level required:
    - Red Hat Enterprise Linux 8, for POWER LE, version 8.3, or later
    - SUSE Linux Enterprise Server 15, Service Pack 2, or later
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Assignment to the VIOS requires VIOS 3.1.2.10, or later**

### (#EC7A) - PCIe4 LP 1.6TB NVMe Flash Adapter x8 for AIX/Linux

The PCIe4 x8 1.6 TB NVMe Adapter is a Peripheral Component Interconnect Express (PCIe) generation 4 (Gen4) x8 adapter that fits into an x8 or x16 PCIe slot in the system and uses Non-Volatile Memory Express (NVMe). NVMe is a high performance software interface for non-volatile memory. Compared to a SAS or SATA SSD, the NVMe Flash adapter provides more read/write input/output operations per second (IOPS) and higher throughput (GB/sec).

CCIN is 594A.

Feature #EC7A and #EC7B are identical cards except that the tailstock bracket is different. #EC7A fits a low profile PCIe slot, while #EC7B fits a full height PCIe slot. #EC7C or #EC7D for a card with more memory.

The nature of the workload has a great impact on the maximum write capacity. If a high percentage of more sequentially or random writes, the maximum write capacity will be larger. To extend the life of the device, the application that is using the device should rotate writes. Writes past the adapter's maximum write capacity will continue to work for some period of time, but the application uses sequential or random reads from the device does not affect the life of the device. A Predictive Failure Analysis (PFA) can be enabled to replace the adapter if enabled by the system administrator. Customers are recommended to monitor the smart log via the command 'lsdev -l nvme' which shows the percentage used.

IBM NVMe adapter failures will be replaced during the standard warranty and maintenance period for adapters that have not reached their maximum write cycles. Adapters that reach this limit may fail to operate according to specifications and must be replaced at the client's expense. Protection is provided by OS mirroring or software RAID wherever applicable.

This adapter is not supported in the PCIe I/O drawer.

**Note: NVMe Flash adapters #EC7A or #EC7B can be used to meet minimum AIX/ Linux SSD/HDD and backplane requirements.**

This PCIe NVMe device can have 64 namespaces per device.

- Attributes provided: NVMe Flash Adapter
- Attributes required: one slot available
- Minimum required: 0

- Maximum allowed: 5 (Initial order maximum: 5)
  - OS level required:
    - Red Hat Enterprise Linux 8.2 for Power LE, or later
    - SUSE Linux Enterprise Server 15 Service Pack 2, or later
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Assignment to the VIOS requires VIOS 3.1.2.10, or later**

### (#EC7C) - PCIe4 LP 3.2TB NVMe Flash Adapter x8 for AIX/Linux

The PCIe4 x8 3.2 TB NVMe Adapter is a Peripheral Component Interconnect Express (PCIe) generation 4 (Gen4) x8 adapter that fits into an x8 or x16 PCIe slot in the system and uses Non-Volatile Memory Express (NVMe). NVMe is a high performance software interface for accessing memory. Compared to a SAS or SATA SSD, the NVMe Flash adapter provides more read/write input/output operations per second (IOPS) and GB/sec.

CCIN is 594B.

Feature #EC7C and #EC7D are identical cards except that the tailstock bracket is different. #EC7C fits a low profile PCIe slot, while #EC7D fits a full height PCIe slot. #EC7E or #EC7F for a card with more memory.

The nature of the workload has a great impact on the maximum write capacity. If a high percentage of more sequentially or random writes, the maximum write capacity will be larger. To extend the life of the device, the application that is using the device should be configured to do larger sequential writes. Writes past the adapter's maximum write capacity will continue to work for some period of time, but the application uses sequential or random reads from the device does not affect the life of the device. A Predictive Failure Analysis (PFA) can be implemented to replace the adapter if enabled by the system administrator. Customers are recommended to monitor the smart log via the command 'lsdev -l nvme' which shows the percentage used.

IBM NVMe adapter failures will be replaced during the standard warranty and maintenance period for adapters that have reached their maximum write cycles. Adapters that reach this limit may fail to operate according to specifications and must be replaced at the client's expense. Protection is provided by OS mirroring or software RAID wherever applicable.

This adapter is not supported in the PCIe I/O drawer.

**Note: NVMe Flash adapters #EC7C or #EC7D can be used to meet minimum AIX/ Linux SSD/HDD and backplane requirements.**

This PCIe NVMe device can have 64 namespaces per device.

- Attributes provided: NVMe Flash Adapter
  - Attributes required: one slot available
  - Minimum required: 0
  - Maximum allowed: 5 (Initial order maximum: 5)
  - OS level required:
    - Red Hat Enterprise Linux 8.2 for Power LE, or later
    - SUSE Linux Enterprise Server 15 Service Pack 2, or later
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Assignment to the VIOS requires VIOS 3.1.2.10, or later**

### (#EC7E) - PCIe4 LP 6.4TB NVMe Flash Adapter x8 for AIX/Linux

The PCIe4 x8 6.4 TB NVMe Adapter is a Peripheral Component Interconnect Express (PCIe) generation 4 (Gen4) x8 adapter that fits into an x8 or x16 PCIe slot in the system and uses Non-Volatile Memory Express (NVMe). NVMe is a high performance software interface for accessing memory. Compared to a SAS or SATA SSD, the NVMe Flash adapter provides more read/write input/output operations per second (IOPS) and GB/sec.

CCIN is 594C.

Feature #EC7E and #EC7F are identical cards except that the tailstock bracket is different. #EC7E fits a low profile PCIe slot, while #EC7F fits a full height PCIe slot.

The nature of the workload has a great impact on the maximum write capacity. If a high percentage of more sequentially or random writes, the maximum write capacity will be larger. To extend the life of the device, the application that is using the device should be configured to use larger sequential writes. Writes past the adapter's maximum write capacity will continue to work for some period of time, but the application uses sequential or random reads from the device does not affect the life of the device. A Predictive Failure Analysis (PFA) can be used to replace the adapter if enabled by the system administrator. Customers are recommended to monitor the smart log via the smartmontools utility which shows the percentage used.

IBM NVMe adapter failures will be replaced during the standard warranty and maintenance period for adapters that have not reached their write cycle limit. Adapters that reach this limit may fail to operate according to specifications and must be replaced at the client's expense. Protection is provided by OS mirroring or software RAID wherever applicable.

This adapter is not supported in the PCIe I/O drawer.

**Note: NVMe Flash adapters #EC7E or #EC7F can be used to meet minimum AIX/ Linux SSD/HDD and backplane requirements.**

This PCIe NVMe device can have 64 namespaces per device.

- Attributes provided: NVMe Flash Adapter
  - Attributes required: one slot available
  - Minimum required: 0
  - Maximum allowed: 5 (Initial order maximum: 5)
  - OS level required:
    - Red Hat Enterprise Linux 8.2 for Power LE, or later
    - SUSE Linux Enterprise Server 15 Service Pack 2, or later
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Assignment to the VIOS requires VIOS 3.1.2.10, or later**

### (#ECBJ) - SAS X Cable 3m - HD Narrow 6Gb 2-Adapters to Enclosure

This 3 meter SAS cable connects two PCIe2 SAS adapters or two PCIe3 SAS adapters to a SAS I/O enclosure. This X cable has a HD (High Density) Narrow connector and two Mini SAS connectors. The Mini-SAS HD Narrow connectors attach to two SAS I/O drawers #EJ0L or two #5913. Both Mini SAS connectors attach to the same I/O drawer (enclosure) such as a #5886 EXP12S or #5913. The cable can support up to 6Gb throughput.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapters. See the cabling documentation for the length of each leg of the cable. The SAS adapters can be in the same or in different PCIe I/O drawers supported Power System CEC and the other adapter can be in a PCIe I/O drawer. Or both adapters can be in a supported Power System CEC.

This cable is almost identical to the #3454 3m SAS X cable, except #ECBJ connectors for the SAS adapters are more narrow for PCIe3 SAS adapters.

- Attributes provided: Connection between PCIe3 SAS adapter with Mini-SAS HD Narrow connectors and a SAS I/O drawer or connection between PCIe2 SAS adapter with Mini-SAS HD connectors and a SAS I/O drawer with Mini-SAS connectors.
- Attributes required: available connectors on SAS controllers and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ECBK) - SAS X Cable 6m - HD Narrow 6Gb 2-Adapters to Enclosure

This 3 meter SAS cable connects two PCIe2 SAS adapters or two PCIe3 SAS adapters to a SAS I/O enclosure. This X cable has a HD (High Density) Narrow connector and two Mini SAS connectors. The Mini-SAS HD Narrow connectors attach to two SAS I/O drawers #EJ0L or two #5913. Both Mini SAS connectors attach to the same I/O drawer (enclosure) such as a #5886 EXP12S or #5913. The cable can support up to 6Gb throughput.



Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter cabling documentation for the length of each leg of the cable. The SAS adapters can be in the same or in different PCIe I/O supported Power System CEC and the other adapter can be in a PCIe I/O drawer. Or both adapters can be in a supported

This cable is almost identical to the #3454 3m SAS X cable, except #ECBJ connectors for the SAS adapters are more narrow PCIe3 SAS adapters.

This 6 meter SAS cable connects two SAS adapters to a SAS I/O enclosure. This X cable has four connectors, two Mini-SAS HD connectors and two Mini SAS connectors. The Mini-SAS HD connectors attach to two SAS adapters such as the #5913 1.8GB RAID SAS Adapter to the same I/O drawer (enclosure) such as a #5886 EXP12S or #5887 EXP24S SAS I/O drawer. This cable can support up to

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter cabling documentation for the length of each leg of the cable. The SAS adapters can be in the same or in different PCIe I/O supported Power System CEC and the other adapter can be in a PCIe I/O drawer. Or both adapters can be in a supported

Limitation: When this cable is ordered with a system in a rack specifying IBM Plant integration, IBM Manufacturing will ship in a separate box and not attempt to place the cable in the rack.

- Attributes provided: Connection between PCIe3 SAS adapter with Mini-SAS HD Narrow connectors and a SAS I/O drawer or between PCIe2 SAS adapter with Mini-SAS HD connectors and a SAS I/O drawer with Mini-SAS connectors.
- Attributes required: available connectors on SAS controllers and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECBL) - SAS X Cable 10m - HD Narrow 6Gb 2-Adapters to Enclosure**

(No longer available as of December 31, 2020)

This 3 meter SAS cable connects two PCIe2 SAS adapters or two PCIe3 SAS adapters to a SAS I/O enclosure. This X cable has one Mini-SAS HD (High Density) Narrow connector and two Mini SAS connectors. The Mini-SAS HD Narrow connectors attach to two SAS adapters such as the #EJ0L or two #5913. Both Mini SAS connectors attach to the same I/O drawer (enclosure) such as a #5886 EXP12S or #5887 EXP24S SAS I/O drawer. This cable can support up to 6Gb throughput.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter cabling documentation for the length of each leg of the cable. The SAS adapters can be in the same or in different PCIe I/O supported Power System CEC and the other adapter can be in a PCIe I/O drawer. Or both adapters can be in a supported

This cable is almost identical to the #3454 3m SAS X cable, except #ECBJ connectors for the SAS adapters are more narrow PCIe3 SAS adapters.

Limitation: When this cable is ordered with a system in a rack specifying IBM Plant integration, IBM Manufacturing will ship in a separate box and not attempt to place the cable in the rack.

- Attributes provided: Connection between PCIe3 SAS adapter with Mini-SAS HD Narrow connectors and a SAS I/O drawer or between PCIe2 SAS adapter with Mini-SAS HD connectors and a SAS I/O drawer with Mini-SAS connectors.
- Attributes required: available connectors on SAS controllers and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECBM) - SAS X Cable 15m - HD Narrow 3Gb 2-Adapters to Enclosure**

(No Longer Available as of June 30, 2021)

This 15 meter SAS cable connects two PCIe2 SAS adapters or two PCIe3 SAS adapters to a SAS I/O enclosure. This X cable has a Mini-SAS HD (High Density) Narrow connector and two Mini SAS connectors. The Mini-SAS HD Narrow connectors attach to two SAS adapters or two #EJ0L or two #5913. Both Mini SAS connectors attach to the same I/O drawer (enclosure) such as a #5886 EXP12S or #5887 EXP24S. This cable can support up to 6Gb throughput.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapters. See the cabling documentation for the length of each leg of the cable. The SAS adapters can be in the same or in different PCIe I/O drawers supported by the Power System CEC and the other adapter can be in a PCIe I/O drawer. Or both adapters can be in a supported PCIe I/O drawer.

This cable is almost identical to the #3458 15m SAS X cable, except #ECBM connectors for the SAS adapters are more for PCIe3 SAS adapters.

Limitation: When this cable is ordered with a system in a rack specifying IBM Plant integration, IBM Manufacturing will ship the cable in a separate box and not attempt to place the cable in the rack.

- Attributes provided: Connection between PCIe3 SAS adapter with Mini-SAS HD Narrow connectors and a SAS I/O drawer or connection between PCIe2 SAS adapter with Mini-SAS HD connectors and a SAS I/O drawer with Mini-SAS connectors.
- Attributes required: available connectors on SAS controllers and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECBN) - 5m (16.4-ft), IBM Passive QSFP+ to QSFP+ Cable (DAC)**

(No longer available as of January 18, 2019)

QSFP+ cable is used for 40Gb-to-40Gb Ethernet connectivity. Clients can use this QSFP+ Direct Attach Cable for Ethernet ports with QSFP+ transceivers already attached to each end.

- Attributes provided: 5m QSFP+ to QSFP+ Cable
- Attributes required: QSFP/QSFP+ ports
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECBT) - SAS YO Cable 1.5m - HD Narrow 6Gb Adapter to Enclosure**

This 1.5 meter SAS cable connects a PCIe2 SAS adapter or a PCIe3 SAS adapter to a SAS I/O enclosure. This YO cable has a Mini-SAS HD (High Density) Narrow connector and two Mini SAS connectors. The Mini-SAS HD Narrow connector attaches to a SAS adapter or #5913. Both Mini SAS connectors attach to the same I/O drawer (enclosure) such as a #5886 EXP12S or #5887 EXP24S. This cable can support up to 6Gb throughput.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapters. See the cabling documentation for the length of each leg of the cable.

This cable is almost identical to the #3450 1.5m SAS YO cable, except the #ECBT connector for the SAS adapters is more for PCIe3 SAS adapters.

- Attributes provided: Connection between PCIe3 SAS adapter with Mini-SAS HD Narrow connectors and a SAS I/O drawer or connection between PCIe2 SAS adapter with Mini-SAS HD connectors and a SAS I/O drawer with Mini-SAS connectors.
- Attributes required: available connectors on SAS controller and SAS I/O drawer
- Minimum required: 0

- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECBU) - SAS YO Cable 3m - HD Narrow 6Gb Adapter to Enclosure**

This 3 meter SAS cable connects a PCIe2 SAS adapter or a PCIe3 SAS adapter to a SAS I/O enclosure. This YO cable has a (High Density) Narrow connector and two Mini SAS connectors. The Mini-SAS HD Narrow connector attaches to a SAS adapter #5913. Both Mini SAS connectors attach to the same I/O drawer (enclosure) such as a #5886 EXP12S or #5887 EXP24S providing up to 6Gb throughput.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter and the enclosure. See the cabling documentation for the length of each leg of the cable.

This cable is almost identical to the #3451 3m SAS YO cable, except the #ECBU connector for the SAS adapters is more robust for PCIe3 SAS adapters.

- Attributes provided: Connection between PCIe3 SAS adapter with Mini-SAS HD Narrow connectors and a SAS I/O drawer or connection between PCIe2 SAS adapter with Mini-SAS HD connectors and a SAS I/O drawer with Mini-SAS connectors.
- Attributes required: available connectors on SAS controller and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECBV) - SAS YO Cable 6m - HD Narrow 6Gb Adapter to Enclosure**

This 6 meter SAS cable connects a PCIe2 SAS adapter or a PCIe3 SAS adapter to a SAS I/O enclosure. This YO cable has a (High Density) Narrow connector and two Mini SAS connectors. The Mini-SAS HD Narrow connector attaches to a SAS adapter #5913. Both Mini SAS connectors attach to the same I/O drawer (enclosure) such as a #5886 EXP12S or #5887 EXP24S providing up to 6Gb throughput.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter and the enclosure. See the cabling documentation for the length of each leg of the cable.

This cable is almost identical to the #3452 6m SAS YO cable, except the #ECBV connector for the SAS adapters is more robust for PCIe3 SAS adapters.

Limitation: When this cable is ordered with a system in a rack specifying IBM Plant integration, IBM Manufacturing will ship the cable in a separate box and not attempt to place the cable in the rack.

- Attributes provided: Connection between PCIe3 SAS adapter with Mini-SAS HD Narrow connectors and a SAS I/O drawer or connection between PCIe2 SAS adapter with Mini-SAS HD connectors and a SAS I/O drawer with Mini-SAS connectors.
- Attributes required: available connectors on SAS controller and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECBW) - SAS YO Cable 10m - HD Narrow 6Gb Adapter to Enclosure**

This 10 meter SAS cable connects a PCIe2 SAS adapter or a PCIe3 SAS adapter to a SAS I/O enclosure. This YO cable has a (High Density) Narrow connector and two Mini SAS connectors. The Mini-SAS HD Narrow connector attaches to a SAS adapter #5913. Both Mini SAS connectors attach to the same I/O drawer (enclosure) such as a #5886 EXP12S or #5887 EXP24S : up to 6Gb throughput.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter and the enclosure. See the cabling documentation for the length of each leg of the cable.

This cable is almost identical to the #3453 10m SAS YO cable, except the #ECBW connector for the SAS adapters is more suitable for PCIe3 SAS adapters.

Limitation: When this cable is ordered with a system in a rack specifying IBM Plant integration, IBM Manufacturing will ship the cable in a separate box and not attempt to place the cable in the rack.

- Attributes provided: Connection between PCIe3 SAS adapter with Mini-SAS HD Narrow connectors and a SAS I/O drawer or connection between PCIe2 SAS adapter with Mini-SAS HD connectors and a SAS I/O drawer with Mini-SAS connectors.
- Attributes required: available connectors on SAS controller and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECBX) - SAS YO Cable 15m - HD Narrow 3Gb Adapter to Enclosure**

(No longer available as of December 31, 2020)

This 15 meter SAS cable connects a PCIe2 SAS adapter or a PCIe3 SAS adapter to a SAS I/O enclosure. This YO cable has a (High Density) Narrow connector and two Mini SAS connectors. The Mini-SAS HD Narrow connector attaches to a SAS adapter #5913. Both Mini SAS connectors attach to the same I/O drawer (enclosure) such as a #5887 EXP24S SAS I/O drawer. Throughput is up to 3Gb.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter and the enclosure. See the cabling documentation for the length of each leg of the cable.

This cable is almost identical to the #3457 15m SAS YO cable, except the #ECBX connector for the SAS adapters is more suitable for PCIe3 SAS adapters.

Limitation

- Does not support 6Gb throughput.
- When this cable is ordered with a system in a rack specifying IBM Plant integration, IBM Manufacturing will ship the cable in a separate box and not attempt to place the cable in the rack.
- Attributes provided: Connection between PCIe3 SAS adapter with Mini-SAS HD Narrow connectors and a SAS I/O drawer or connection between PCIe2 SAS adapter with Mini-SAS HD connectors and a SAS I/O drawer with Mini-SAS connectors.
- Attributes required: available connectors on SAS controller and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECBY) - SAS AE1 Cable 4m - HD Narrow 6Gb Adapter to Enclosure**

This 4 meter SAS cable connects a PCIe3 SAS adapter to a SAS tape drive or DVD. The tape drive or DVD is probably in a 1U media enclosure or tape library. This AE cable has two connectors, one Mini-SAS HD (High Density) Narrow connector and one Mini-SAS connector.

Mini-SAS HD Narrow connector attaches to a SAS adapter such as the #EJ0X. The Mini-SAS connector attaches to a SAS cable can support up to 6Gb throughput.

Use #ECBY when ordering the cable as a feature code on a Power System. Alternatively the same cable can be ordered u enclosure or DVD.

- Attributes provided: connection between PCIe3 SAS adapter with Mini-SAS HD Narrow connectors and a SAS tape di
- Attributes required: available connectors on SAS controller such as #EJ0X, #EJ10 or #EJ11 for use with an available S
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECBZ) - SAS YE1 Cable 3m - HD Narrow 6Gb Adapter to Enclosure**

This 3 meter SAS cable connects a PCIe3 SAS adapter to one or two SAS tape drives. The tape drive(s) is probably in an 1U media enclosure or tape library. This YO cable has three connectors, one Mini-SAS HD (High Density) Narrow connect Mini-SAS HD Narrow connector attaches to a SAS adapter such as the #EJ0X. Each Mini-SAS connector attaches to a diff cable can support up to 6Gb throughput.

Use #ECBZ when ordering the cable as a feature code on a Power System. Alternatively the same cable can be ordered u enclosure.

- Attributes provided: connection between PCIe3 SAS adapter with Mini-SAS HD Narrow connectors and one or two SA connectors.
- Attributes required: available connectors on SAS controller such as #EJ0X, #EJ10 or #EJ11 for use with an available S
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECC0) - SAS AA Cable 0.6m - HD Narrow 6Gb Adapter to Adapter**

This 0.6m SAS cable connects a pair of PCIe SAS adapters with write cache to each other. The pair can be two PCIe3 SAS adapters. This AA cable has two Mini-SAS HD (High Density) Narrow connectors which connect the top connectors of the performance path of all the dual controller communication including mirroring the write cache and status awareness of each throughput.

Two AA cables are always required between a pair of PCIe3 SAS adapters with write cache such as #EJ0L unless six (three pair) are used to attach I/O drawers. One AA cable is always required between a pair of PCIe2 SAS adapters with write cache unless all six (three pair) of ports are used to attach I/O drawers. If an AA cable fails or is disconnected, then the informatic cables attached to the I/O drawers, sharing their bandwidth.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the two

This cable is almost identical to the #5918 0.6m SAS AA cable, except #ECC0 connectors for the SAS adapters are more i PCIe3 SAS adapters.

- Attributes provided: high speed connection between two PCIe2 or two PCIe3 SAS adapters with write cache
- Attributes required: available top connectors on pair of PCIe2 or PCIe3 SAS adapters with write cache
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None

- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECC2) - SAS AA Cable 1.5m - HD Narrow 6Gb Adapter to Adapter**

This 1.5m SAS cable connects a pair of PCIe SAS adapters with write cache to each other. The pair can be two PCIe3 SAS adapters. This AA cable has two Mini-SAS HD (High Density) Narrow connectors which connect the top connectors of the performance path of all the dual controller communication including mirroring the write cache and status awareness of each throughput.

Two AA cables are always required between a pair of PCIe3 SAS adapters with write cache such as #EJ0L unless six (three pair) are used to attach I/O drawers. One AA cable is always required between a pair of PCIe2 SAS adapters with write cache unless all six (three pair) of ports are used to attach I/O drawers. If an AA cable fails or is disconnected, then the information cables attached to the I/O drawers, sharing their bandwidth.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the two

This cable is almost identical to the #5917 1.5m SAS AA cable, except #ECC2 connectors for the SAS adapters are more for PCIe3 SAS adapters.

- Attributes provided: high speed connection between two PCIe2 or two PCIe3 SAS adapters with write cache
- Attributes required: available top connectors on pair of PCIe2 or PCIe3 SAS adapters with write cache
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECC3) - SAS AA Cable 3m - HD Narrow 6Gb Adapter to Adapter**

This 3m SAS cable connects a pair of PCIe SAS adapters with write cache to each other. The pair can be two PCIe3 SAS adapters. This AA cable has two Mini-SAS HD (High Density) Narrow connectors which connect the top connectors of the performance path of all the dual controller communication including mirroring the write cache and status awareness of each throughput.

Two AA cables are always required between a pair of PCIe3 SAS adapters with write cache such as #EJ0L unless six (three pair) are used to attach I/O drawers. One AA cable is always required between a pair of PCIe2 SAS adapters with write cache unless all six (three pair) of ports are used to attach I/O drawers. If an AA cable fails or is disconnected, then the information cables attached to the I/O drawers, sharing their bandwidth.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the two

This cable is almost identical to the #5915 3m SAS AA cable, except #ECC3 connectors for the SAS adapters are more for PCIe3 SAS adapters.

- Attributes provided: high speed connection between two PCIe2 or two PCIe3 SAS adapters with write cache
- Attributes required: available top connectors on pair of PCIe2 or PCIe3 SAS adapters with write cache
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECC4) - SAS AA Cable 6m - HD Narrow 6Gb Adapter to Adapter**

(No longer available as of December 31, 2020)

This 6m SAS cable connects a pair of PCIe SAS adapters with write cache to each other. The pair can be two PCIe3 SAS adapters. This AA cable has two Mini-SAS HD (High Density) Narrow connectors which connect the top connectors of the performance path of all the dual controller communication including mirroring the write cache and status awareness of each throughput.

Two AA cables are always required between a pair of PCIe3 SAS adapters with write cache such as #EJ0L unless six (three pair) are used to attach I/O drawers. One AA cable is always required between a pair of PCIe2 SAS adapters with write cache unless all six (three pair) of ports are used to attach I/O drawers. If an AA cable fails or is disconnected, then the information cables attached to the I/O drawers, sharing their bandwidth.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the two

This cable is almost identical to the #5916 6m SAS AA cable, except #ECC4 connectors for the SAS adapters are more native PCIe3 SAS adapters.

- Attributes provided: high speed connection between two PCIe2 or two PCIe3 SAS adapters with write cache
- Attributes required: available top connectors on pair of PCIe2 or PCIe3 SAS adapters with write cache
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ECC5) - SAS Cable

(No longer available as of December 31, 2020)

This cable is used to attach DCS3700 to PCIe3 LP RAID SAS adapter #EL3B.

- Attributes provided: SAS Cable
- Attributes required: One EL3B
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: One per adapter when attaching DC3700**

### (#ECC7) - 3M Optical Cable Pair for PCIe3 Expansion Drawer

(No longer available as of March 5, 2021)

The 3.0 meter active optical cable (AOC) pair connects a PCIe3 module in the PCIe Gen3 I/O Expansion Drawer to a PCIe system unit. There are two identical cables in the cable pair, each with two CXP connectors. One of the cables attaches to and to the top CXP port of the PCIe3 Optical Converter Adapter. The other cable attaches to the bottom CXP ports. See also as the feature #ECC8 (10 meter).

- Attributes provided: Pair of 3 meter active optical cables
- Attributes required: CXP ports on a PCIe3 Optical Cable Adapter and on a PCIe3 module in a PCIe Gen3 Expansion
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES

- CSU: Yes
- Return parts MES: No

## **(#ECC8) - 10M Optical Cable Pair for PCIe3 Expansion Drawer**

(No longer available as of March 5, 2021)

The 10.0 meter active optical cable (AOC) pair connects a PCIe3 module in the PCIe Gen3 I/O Expansion Drawer to a PCI system unit. There are two identical cables in the cable pair, each with two CXP connectors. One of the cables attaches to and to the top CXP port of the PCIe3 Optical Converter Adapter. The other cable attaches to the bottom CXP ports. See also the feature #ECC6 (2 meter). The 10 meter length is suggested for cabling to a different rack.

- Attributes provided: Pair of 10 meter active optical cables
- Attributes required: CXP ports on a PCIe3 Optical Cable Adapter (#EJ07) and on a PCIe3 module such as a #EMXF i (#EMX0)
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## **(#ECCF) - System Port Converter Cable for UPS**

Converter cable allows a serial cable attached to a Uninterruptible Power Supply (UPS) to connect to a USB port on the system unit. The connectors are USB (Male) and 9 PIN D SHELL (Female) and the cable's length is about 1.6m (60 inches). The UPS can use the cable to IBM i.

- Attributes provided: Converter Cable
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ECCG) - Variable Length, Blue Cat5e Cable**

(No longer available as of January 29, 2021)

This feature allows manufacturing to select the appropriate length Cat5e cable, Blue during the assembly process.

- Attributes provided: Cat5e Ethernet Cable.
  - Attributes required: RJ45 ports/transceivers.
  - Minimum required: 0
  - Maximum allowed: 9999 (Initial order maximum: 250)
  - OS level required: None.
  - Initial Order/MES/Both/Supported: Initial
  - CSU: N/A
  - Return parts MES: Does not apply
- Note: Cable is only used for Solution.**

## **(#ECCH) - Variable Length, Green Cat5e Cable**



(No longer available as of January 29, 2021)

This feature allows manufacturing to select the appropriate length Cat5e cable, Green during the assembly process.

- Attributes provided: Cat5e Ethernet Cable.
  - Attributes required: RJ45 ports/transceivers.
  - Minimum required: 0
  - Maximum allowed: 9999 (Initial order maximum: 250)
  - OS level required: None.
  - Initial Order/MES/Both/Supported: Initial
  - CSU: N/A
  - Return parts MES: Does not apply
- Note: Cable is only used for Solution.**

### **(#ECCJ) - Variable Length, Yellow Cat5e Cable**

(No longer available as of January 29, 2021)

This feature allows manufacturing to select the appropriate length Cat5e cable, Yellow during the assembly process.

- Attributes provided: Cat5e Ethernet Cable.
  - Attributes required: RJ45 ports/transceivers.
  - Minimum required: 0
  - Maximum allowed: 9999 (Initial order maximum: 250)
  - OS level required: None.
  - Initial Order/MES/Both/Supported: Initial
  - CSU: N/A
  - Return parts MES: Does not apply
- Note: Cable is only used for Solution.**

### **(#ECCS) - 3M Copper CXP Cable Pair for PCIe3 Expansion Drawer**

This 3.0 meter cable pair connects a PCIe3 fan-out module in the PCIe Gen3 I/O Expansion Drawer to a PCIe3 Optical Co. There are two identical copper cables in the cable pair, each with two CXP connectors. One of the cables attaches to the top module and to the top CXP port of the PCIe3 Optical Converter Adapter. The other cable attaches to the bottom CXP ports

"Optical" Converter Adapter features were named when only optical cables were announced and copper cables were not p CXP interface which can also be used for this copper cable pair.

See also optical AOC cables features for cables which are much thinner and can be longer such as the feature #ECC8 (10

Limitation: Cannot mix copper and optical cables on the same PCIe Gen3 I/O drawer. Both fan-out modules use copper ca

- Attributes provided: Pair of 3 meter CXP copper cables
- Attributes required:
  - CXP ports on a PCIe3 Optical Cable Adapter (#EJ05 or #EJ08) and on a PCIe3 module such as a #EMXF or EM Expansion Drawer (#EMX0/ELMX).
  - Firmware level 8.40 or later.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ECCX) - 3M Active Optical Cable Pair for PCIe3 Expansion Drawer**

The 3.0 meter active optical cable (AOC) pair connects a PCIe3 module in the PCIe Gen3 I/O Expansion Drawer to a PCIe system unit. There are two identical cables in the cable pair, each with two CXP connectors. One of the cables attaches to and to the top CXP port of the PCIe3 Optical Converter Adapter. The other cable attaches to the bottom CXP ports.

- Attributes provided: Pair of 3 meter active optical cables
- Attributes required: CXP ports on a PCIe3 Optical Cable Adapter and on a PCIe3 module in a PCIe Gen3 Expansion
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ECCY) - 10M Active Optical Cable Pair for PCIe3 Expansion Drawer**

The 10.0 meter active optical cable (AOC) pair connects a PCIe3 module in the PCIe Gen3 I/O Expansion Drawer to a PCIe system unit. There are two identical cables in the cable pair, each with two CXP connectors. One of the cables attaches to and to the top CXP port of the PCIe3 Optical Converter Adapter. The other cable attaches to the bottom CXP ports.

- Attributes provided: Pair of 10 meter active optical cables
- Attributes required: CXP ports on a PCIe3 Optical Cable Adapter and on a PCIe3 module in a PCIe Gen3 Expansion I
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ECDJ) - 3.0M SAS X12 Cable (Two Adapter to Enclosure)**

This 3 meter SAS cable connects two SAS adapters to a SAS I/O enclosure. This X cable has four Mini-SAS HD (High Density) connectors. Two connectors attach to two SAS adapters such as in the PCIe3 SAS Adapter. The other two connectors attach to one SAS I/O Enclosure or EXP24SX (#ESLS/ #ELLS). This cable is designed for high speed (DHS) to support up to 12Gb throughput if the adapter

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter and the enclosure. See the cabling documentation for the length of each leg of the cable. The SAS adapters can be in the same or in different PCIe I/O Expansion Drawers supported by the Power System CEC and the other adapter can be in a PCIe I/O drawer. Or both adapters can be in a supported

Limitation: This cable cannot be used with the EXP24S I/O drawer (#5887 or #EL1S) which uses Mini-SAS connectors which

- Attributes provided: Connection between two SAS adapters with Mini-SAS HD connectors and a SAS I/O drawer with
- Attributes required: Available connectors on SAS controllers and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ECDK) - 4.5M SAS X12 Active Optical Cable (Two Adapter to Enclosure)**

This 4.5 meter SAS cable connects two SAS adapters to a SAS I/O enclosure. This X cable has four Mini-SAS HD (High Density) connectors. Two connectors attach to two SAS adapters such as in the PCIe3 SAS Adapter. The other two connectors attach to one SAS I/O Enclosure or EXP24SX (#ESLS/ #ELLS). This cable is designed for high speed (DHS) to support up to 12Gb throughput if the adapter

or EXP24SX (#ESLS/ #ELLS). This cable is designed for high speed (DHS) to support up to 12Gb throughput if the adapter

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter and the cabling documentation for the length of each leg of the cable. The SAS adapters can be in the same or in different PCIe I/O supported Power System CEC and the other adapter can be in a PCIe I/O drawer. Or both adapters can be in a supported

Limitation: This cable cannot be used with the EXP24S I/O drawer (#5887 or# EL1S) which uses Mini-SAS connectors which  
**Note: AOC cables require minimum level of SAS Adapter firmware. Refer to the latest prerequisites at**

[http://www-912.ibm.com/e\\_dir/eServerPrereq.nsf](http://www-912.ibm.com/e_dir/eServerPrereq.nsf)

- Attributes provided: Connection between two SAS adapters with Mini-SAS HD connectors and a SAS I/O drawer with
- Attributes required: Available connectors on SAS controllers and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ECDL) - 10M SAS X12 Active Optical Cable (Two Adapter to Enclosure)

This 10 meter SAS cable connects two SAS adapters to a SAS I/O enclosure. This X cable has four Mini-SAS HD (High Density) connectors. Two connectors attach to two SAS adapters such as in the PCIe3 SAS Adapter. The other two connectors attach to one SAS I/O Enclosure such as EXP24SX (#ESLS/ #ELLS). This cable is designed for high speed (DHS) to support up to 12Gb throughput if the adapter

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter and the cabling documentation for the length of each leg of the cable. The SAS adapters can be in the same or in different PCIe I/O supported Power System CEC and the other adapter can be in a PCIe I/O drawer. Or both adapters can be in a supported

Limitation: This cable cannot be used with the EXP24S I/O drawer (#5887 or# EL1S) which uses Mini-SAS connectors which  
**Note: AOC cables require minimum level of SAS Adapter firmware. Refer to the latest prerequisites at**

[http://www-912.ibm.com/e\\_dir/eServerPrereq.nsf](http://www-912.ibm.com/e_dir/eServerPrereq.nsf)

- Attributes provided: Connection between two SAS adapters with Mini-SAS HD connectors and a SAS I/O drawer with
- Attributes required: Available connectors on SAS controllers and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ECDT) - 1.5M SAS YO12 Cable (Adapter to Enclosure)

This 1.5 meter SAS cable connects one SAS adapter to a SAS I/O enclosure. This YO cable has three Mini-SAS HD (High Density) connectors. One connector attaches to a SAS adapter such as in the PCIe3 SAS Adapter. The other two connectors attach to one SAS I/O Enclosure such as EXP24SX (#ESLS/ #ELLS). This cable is designed for high speed (DHS) to support up to 12Gb throughput if the adapter

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter and the cabling documentation for the length of each leg of the cable. The SAS adapters can be in the same or in different PCIe I/O supported Power System CEC and the other adapter can be in a PCIe I/O drawer. Or both adapters can be in a supported

Limitation: This cable cannot be used with the EXP24S I/O drawer (#5887 or# EL1S) which uses Mini-SAS connectors which

- Attributes provided: Connection between a SAS adapters with Mini-SAS HD connectors and a SAS I/O drawer with M
- Attributes required: Available connectors on SAS controllers and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)

- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ECDU) - 3.0M SAS YO12 Cable (Adapter to Enclosure)

This 3 meter SAS cable connects one SAS adapter to a SAS I/O enclosure. This YO cable has three Mini-SAS HD (High Density) connectors. One connector attach to a SAS adapter such as in the PCIe3 SAS Adapter. The other two connectors attach to one SAS I/O Enclosure such as EXP24SX (#ESLS/ #ELLS). This cable is designed for high speed (DHS) to support up to 12Gb throughput if the adapter has

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter and the enclosure. See the cabling documentation for the length of each leg of the cable. The SAS adapters can be in the same or in different PCIe I/O Enclosures supported Power System CEC and the other adapter can be in a PCIe I/O drawer. Or both adapters can be in a supported

Limitation: This cable cannot be used with the EXP24S I/O drawer (#5887 or# EL1S) which uses Mini-SAS connectors which

- Attributes provided: Connection between a SAS adapters with Mini-SAS HD connectors and a SAS I/O drawer with Mini-SAS HD connectors
- Attributes required: Available connectors on SAS controllers and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ECDV) - 4.5M SAS YO12 Active Optical Cable (Adapter to Enclosure)

This 4.5 meter SAS cable connects one SAS adapter to a SAS I/O enclosure. This YO cable has three Mini-SAS HD (High Density) connectors. One connector attach to a SAS adapter such as in the PCIe3 SAS Adapter. The other two connectors attach to one SAS I/O Enclosure such as EXP24SX (#ESLS/ #ELLS). This cable is designed for high speed (DHS) to support up to 12Gb throughput if the adapter has

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter and the enclosure. See the cabling documentation for the length of each leg of the cable. The SAS adapters can be in the same or in different PCIe I/O Enclosures supported Power System CEC and the other adapter can be in a PCIe I/O drawer. Or both adapters can be in a supported

Limitation: This cable cannot be used with the EXP24S I/O drawer (#5887 or# EL1S) which uses Mini-SAS connectors which

**Note: AOC cables require minimum level of SAS Adapter firmware. Refer to the latest prerequisites at**

[http://www-912.ibm.com/e\\_dir/eServerPrereq.nsf](http://www-912.ibm.com/e_dir/eServerPrereq.nsf)

- Attributes provided: Connection between a SAS adapters with Mini-SAS HD connectors and a SAS I/O drawer with Mini-SAS HD connectors
- Attributes required: Available connectors on SAS controllers and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ECDW) - 10M SAS YO12 Active Optical Cable (Adapter to Enclosure)

This 10 meter SAS cable connects one SAS adapter to a SAS I/O enclosure. This YO cable has three Mini-SAS HD (High Density) connectors. One connector attach to a SAS adapter such as in the PCIe3 SAS Adapter. The other two connectors attach to one SAS I/O Enclosure such as EXP24SX (#ESLS/ #ELLS). This cable is designed for high speed (DHS) to support up to 12Gb throughput if the adapter has

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the adapter and the enclosure. See the cabling documentation for the length of each leg of the cable. The SAS adapters can be in the same or in different PCIe I/O

supported Power System CEC and the other adapter can be in a PCIe I/O drawer. Or both adapters can be in a supported

Limitation: This cable cannot be used with the EXP24S I/O drawer (#5887 or# EL1S) which uses Mini-SAS connectors whi

**Note: AOC cables require minimum level of SAS Adapter firmware. Refer to the latest prerequisites at**

[http://www-912.ibm.com/e\\_dir/eServerPrereq.nsf](http://www-912.ibm.com/e_dir/eServerPrereq.nsf)

- Attributes provided: Connection between a SAS adapters with Mini-SAS HD connectors and a SAS I/O drawer with M
- Attributes required: Available connectors on SAS controllers and SAS I/O drawer
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ECE0) - 0.6M SAS AA12 Cable (Adapter to Adapter)

This 0.6 meter SAS cable connects a pair of SAS adapters to each other. This AA cable has two Mini-SAS HD (High Densi connectors of two PCIe3 SAS adapters with write cachce such as #EJ0L or #EJ14. The cable provides a high performance communication including mirroring the write cache and status awareness of each card. This cable is designed for high spe Note EJ0L/EJ14 support 6Gb.

Two AA cables are always required between a pair of PCIe3 SAS adapters with write cache when just one or two I/O draw required if three I/O drawers are attached. If four drawers are attached or if an AA cable fails or is disconnected, then the ir over the cables attached to the I/O drawers, sharing their bandwidth. AA cables are not used with SAS adapters with no wr

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the two

The 6Gb version of this cable is feature #5918. #5918 and #ECE0 can be mixed on the same PCIe3 adapter pair.

- Attributes provided: Connection between two SAS adapters with Mini-SAS HD connectors
- Attributes required: Available connectors on SAS controllers
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ECE3) - 3.0M SAS AA12 Cable

This 3.0 meter SAS cable has two Mini-SAS HD (High Density) connectors, and is designed for high speed to support up to cable (in contrast with X or YO cables) that has two distinct uses:

1. For Elastic Storage Server (ESS) solutions that have a 5147-024 I/O drawer, this cable is used to attach the 5147-024
2. For POWER Servers with #5887, #EL1S, #ESLS, #ESLL, #ELLS, or #ELLL I/O drawers driven by paired PCIe control #EJ14, this cable is used to connect the top connectors of the paired controllers. The cable provides a high performan communication including mirroring the write cache and status awareness of each card.

Note that X or YO cables are always used to attach I/O drawers #5887, #EL1S, #ESLS, #ESLL, #ELLS, or #ELLL to contr cables (such as #ECE3) are not allowed to directly attach to I/O drawers on POWER Servers.

Two AA cables are always required between a pair of PCIe3 SAS adapters with write cache when just one or two I/O draw required if three I/O drawers are attached. If four drawers are attached or if an AA cable fails or is disconnected, then the ir over the cables attached to the I/O drawers, sharing their bandwidth. On POWER Servers, AA cables are not used with SA

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the two

The 6Gb version of this cable is feature #5915. #5915 and #ECE3 can be mixed on the same PCIe3 adapter pair.

- Attributes provided: For ESS solutions, connection between a SAS controller and one 5174-024 I/O drawer. For POW paired SAS controllers with write cache and Mini-SAS HD connectors.
- Attributes required: For ESS solutions, a 5147-024 I/O drawer and appropriate controller. For POWER Systems, avail:
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ECE4) - 4.5M SAS AA12 Active Optical Cable (Adapter to Adapter)

This 4.5 meter SAS cable connects a pair of SAS adapters to each other. This AA cable has two Mini-SAS HD (High Density) connectors of two PCIe3 SAS adapters with write cache such as #EJ0L or #EJ14. The cable provides a high performance communication including mirroring the write cache and status awareness of each card. This cable is designed for high speed. Note EJ0L/EJ14 support 6Gb.

Two AA cables are always required between a pair of PCIe3 SAS adapters with write cache when just one or two I/O drawers required if three I/O drawers are attached. If four drawers are attached or if an AA cable fails or is disconnected, then the information over the cables attached to the I/O drawers, sharing their bandwidth. AA cables are not used with SAS adapters with no write cache.

Multiple cable length feature codes are available. Choose the cable length that best matches the distance between the two adapters.  
**Note: AOC cables require minimum level of SAS Adapter firmware. Refer to the latest prerequisites at**

[http://www-912.ibm.com/e\\_dir/eServerPrereq.nsf](http://www-912.ibm.com/e_dir/eServerPrereq.nsf)

- Attributes provided: Connection between two SAS adapters with Mini-SAS HD connectors
- Attributes required: Available connectors on SAS controllers
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ECJ5) - 4.3m (14-Ft) PDU to Wall 3PH/24A 200-240V Delta-wired Power Cord

This power cord feature ECJ5 contains an Amphenol type of connector and only supported on PDUs ECJK or ECJL, and ECJP or ECJQ.

ECJ5 has a 4-pin IEC 60309 style plug, 430P9W. It contains three line conductors and a protective earth, but no neutral. It provides a delta electrical distribution. ECJ5 is not supported in China, Hong Kong, and other countries that use a wye electrical distribution.

- Attributes provided: Power cord
- Attributes required: PDU features ECJK or ECJL, and ECJP or ECJQ.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ECJ7) - 4.3m (14-Ft) PDU to Wall 3PH/48A 200-240V Delta-wired Power Cord

This power cord feature ECJ7 contains an Amphenol type of connector and only supported on PDUs ECJK or ECJL, and ECJP or ECJQ.

ECJ7 has a 4-pin IEC 60309 style plug, 460P9W. It contains three line conductors and a protective earth, but no neutral. E delta electrical distribution. ECJ7 is not supported in China, Hong Kong, and other countries that use a wye electrical distri

- Attributes provided: Power cord
- Attributes required: PDU features ECJK or ECJL, and ECJP or ECJQ.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ECJJ) - High Function 9xC19 Single-Phase or Three-Phase Wye PDU plus**

This is an intelligent, switched 200-240 volt single-phase or 380-415/220-240 volt three-phase wye AC Power Distribution I receptacles on the front of the PDU. The PDU is mounted on the rear of the rack making the nine C19 receptacles easily a amp circuit breaker. Depending on country wiring standards the PDU is single-phase or three-phase wye. Three-phase wye three line conductors, a neutral, and a protective earth. The input is 380-415 volt line-to-line and the output is 220-240 volt PDUs.

See three-phase #ECJK/ECJL for countries which do not use wye wiring.

The PDU can be mounted vertically in rack side pockets or it can be mounted horizontally. If mounted horizontally, it uses 1 #EPTH for horizontal mounting hardware.

Device power cords with a C20 plug connect to C19 PDU receptacles and are ordered separately. One country-specific wa and attaches to a UTG524-7 connector on the front of the PDU. Supported line cords include features #6489, #6491, #649 #6658, and #6667.

Two RJ45 ports on the front of the PDU enable the client to monitor each receptacle's electrical power usage and to remot PDU is shipped with a generic PDU password and IBM strongly urges clients to change it upon installation.

There are also three C13 receptacles on the rear of the PDU positioned toward the middle of the rack. These are generally does not generally recommend their use.

#ECJG and #ECJJ are identical PDUs. Up to one lower price #ECJG can be ordered with a new 7014-T42/T00 rack in plac

For comparison, this is most similar to the earlier generation #EPTJ PDU.

- Limitation: Some configurations of the Elastic Storage Server (ESS) are delivered with an Intelligent PDU. At this time of this PDU are not configured or used by the ESS system. If the ESS Customer would like to use this capability, it is t this PDU. In any case the ethernet port on the Intelligent PDU must not be connected to the ESS Management switch
- Attributes provided: Nine C19 PDU plus - switched, power monitoring
- Attributes required: PDU wall line cord and space in 19-inch rack
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ECJL) - High Function 9xC19 PDU plus 3-Phase Delta**

This is an intelligent, switched 200-240 volt 3-phase delta AC Power Distribution Unit (PDU) plus with nine C19 receptacles mounted on the rear of the rack making the nine C19 receptacles easily accessible. Each receptacle has a 20 amp circuit b connectors have 4-pins and use three line conductors and a protective earth. The input is 200-240 volt line-to-line and the three-phase delta PDUs.

The PDU can be mounted vertically in rack side pockets or it can be mounted horizontally. If mounted horizontally, it uses 1 #EPH for horizontal mounting hardware.

Device power cords with a C20 plug connect to C19 PDU receptacles and are ordered separately. One wall line cord is also an Amphenol inlet connector. Supported line cords include features #ECJ5 and #ECJ7.

Two RJ45 ports on the front of the PDU enable the client to monitor each receptacle's electrical power usage and to remotely manage the PDU. The PDU is shipped with a generic PDU password and IBM strongly urges clients to change it upon installation.

There are also three C13 receptacles on the rear of the PDU positioned toward the middle of the rack. These are generally not recommended for use.

#ECJK and #ECJL are identical PDUs. Up to one lower price #ECJK can be ordered with a new 7014-T42/T00 rack in place of the #EPTL PDU.

For comparison, this is most similar to the earlier generation #EPTL PDU.

Not supported in China, Hong Kong, and other countries that use a wye electrical distribution.

- Limitation: Some configurations of the Elastic Storage Server (ESS) are delivered with an Intelligent PDU. At this time of this PDU are not configured or used by the ESS system. If the ESS Customer would like to use this capability, it is the responsibility of the customer to ensure the PDU is properly configured. In any case the ethernet port on the Intelligent PDU must not be connected to the ESS Management switch.
- Attributes provided: Nine C19 PDU plus - switched, power monitoring
- Attributes required: space in rack, 3-phase 208V AC delta electrical service
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ECJN) - High Function 12xC13 Single-Phase or Three-Phase Wye PDU plus**

This is an intelligent, switched 200-240 volt single-phase or 380-415/220-240 volt three-phase wye AC Power Distribution Unit (PDU) with 12 C13 receptacles on the front of the PDU. The PDU is mounted on the rear of the rack making the twelve C13 receptacles easily accessible. The PDU includes a 12-amp circuit breaker. Depending on country wiring standards the PDU is single-phase or three-phase wye. Three-phase wye has three line conductors, a neutral, and a protective earth. The input is 380-415 volt line-to-line and the output is 220-240 volt line-to-line. The PDU is shipped with a generic PDU password and IBM strongly urges clients to change it upon installation.

See three-phase #ECJP/ECJQ for countries which do not use wye wiring.

The PDU can be mounted vertically in rack side pockets or it can be mounted horizontally. If mounted horizontally, it uses 1 #EPH for horizontal mounting hardware.

Device power cords with a C14 plug connect to C13 PDU receptacles and are ordered separately. One country-specific wall line cord is also attached to a UTG524-7 connector on the front of the PDU. Supported line cords include features #6489, #6491, #6493, #6658, and #6667.

Two RJ45 ports on the front of the PDU enable the client to monitor each receptacle's electrical power usage and to remotely manage the PDU. The PDU is shipped with a generic PDU password and IBM strongly urges clients to change it upon installation.

Feature #ECJM and #ECJN are identical PDUs. Up to one lower price #ECJM can be ordered with a new 7014-T42/T00 rack in place of the #EPTN PDU.

For comparison, this is most similar to the earlier generation #EPTN PDU.

- Limitation: Some configurations of the Elastic Storage Server (ESS) are delivered with an Intelligent PDU. At this time of this PDU are not configured or used by the ESS system. If the ESS Customer would like to use this capability, it is the responsibility of the customer to ensure the PDU is properly configured. In any case the ethernet port on the Intelligent PDU must not be connected to the ESS Management switch.
- Attributes provided: Twelve C13 PDU plus - switched, power monitoring
- Attributes required: PDU wall line cord and space in 19-inch rack
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)



- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ECJQ) - High Function 12xC13 PDU plus 3-Phase Delta**

This is an intelligent, switched 200-240 volt 3-phase delta AC Power Distribution Unit (PDU) plus with twelve C13 receptacles mounted on the rear of the rack making the twelve C13 receptacles easily accessible. Each receptacle has a 20 amp circuit breakers and use three line conductors and a protective earth. The input is 200-240 volt line-to-line and the three-phase delta PDUs.

The PDU can be mounted vertically in rack side pockets or it can be mounted horizontally. If mounted horizontally, it uses 1 #EPH for horizontal mounting hardware.

Device power cords with a C20 plug connect to C19 PDU receptacles and are ordered separately. One wall line cord is also available with an Amphenol inlet connector. Supported line cords include features #ECJ5 and #ECJ7.

Two RJ45 ports on the front of the PDU enable the client to monitor each receptacle's electrical power usage and to remotely manage the PDU. The PDU is shipped with a generic PDU password and IBM strongly urges clients to change it upon installation.

#ECJP and #ECJQ are identical PDUs. Up to one lower price #ECJP can be ordered with a new 7014-T42/T00 rack in place of the older rack.

For comparison, this is most similar to the earlier generation #EPTP PDU.

Not supported in China, Hong Kong, and other countries that use a wye electrical distribution.

- Limitation: Some configurations of the Elastic Storage Server (ESS) are delivered with an Intelligent PDU. At this time, the PDU is not configured or used by the ESS system. If the ESS Customer would like to use this capability, it is the responsibility of the customer to configure the PDU. In any case the ethernet port on the Intelligent PDU must not be connected to the ESS Management switch.
- Attributes provided: Twelve C13 PDU plus - switched, power monitoring
- Attributes required: space in rack, 3-phase 208V AC delta electrical service
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ECL0) - Power ACP Solution specify**

(No longer available as of February 01, 2019)

This is an indicator for Power Accelerated Computing Platform.

- Attributes provided: Solution Indicator
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: No

## **(#ECP0) - Cloud Private Solution**

(No longer available as of January 29, 2021)

This feature indicates that it is a Cloud Private Solution.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required:
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES:

## (#ECR0) - 2.0 Meter Slim Rack

Provides a 19-inch, 2.0 meter high rack with 42 EIA units of total space for installing rack mounted CECs and/or expansion equipped with a standard front door, rear door or side covers. The following features are required for every #ECR0 rack:

- 1x #ECRF (high-end appearance front door ) or ECRM (Basic Front Door)
- 1x #ECRG (Rear Door)
- 2x ECRJ (Side Covers)

The following optional feature is also offered for the ECR0 rack:

- ECRK - Rack Rear Extension.

Up to four vertically mounted Power Distribution Units (PDU) are supported and every vertically mounted PDU requires #E consume 1U of rack space.

- Attributes provided: 19 inch, 2.0M, 42 EIA Rack
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

**Note: One of feature #ECRF, and one of feature #ECRG and two of feature #ECRJ are required per one #ECR0**

## (#ECRF) - Rack Front Door High-End appearance

This feature provides a front door in High-End appearance with an IBM logo for the S42 rack. A front door such as #ECRF front door is required on ECR0 rack. IBM ships rack with the handle on the right and hinges on the left viewed facing the fr

The door comes with a lock which is keyed the same as the rear door or side panels. Uniquely keyed locks can be obtained from vendor from whom IBM purchased the lock.

- Attributes provided: Front Door with lock
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## **(#ECRG) - Rack Rear Door Black**

This feature provides a rear door in flat black color for the S42 rack. Feature number ECRF and ECR0 rack and ECRG are and rear door is required on the ECR0 rack.

The door is the full width of the rack and the hinges and lockplate can be moved from side to side allowing the door to be opened with the handle on the right and hinges on the left viewed facing the rear of the rack.

The front doors , rear doors and side panels come with a lock which is keyed the same as the front door or side panels. Unless the client directly from Southco, the vendor from whom IBM purchased the lock.

- Attributes provided: Rear Door with lock
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## **(#ECRJ) - Rack Side Cover**

This feature provides one side panels in black color for the S42 or feature #ECR0 rack. Each side panel can cover either the left or right side covers are optional but recommended on S42 rack. 2x ECRJ are required on every ECR0 for optimal airflow through the rack.

The front door, rear doors and side panels come with a lock which is keyed the same as the front door or side panels. Unless the client directly from Southco, the vendor from whom IBM purchased the lock.

- Attributes provided: One side panel for rack.
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## **(#ECRK) - Rack Rear Extension 5-In**

- Attributes provided: Rack Rear Extension
- Attributes required: Maximum one per feature #ECR0 rack
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## **(#ECRM) - Rack Front Door for Rack (Black/Flat)**

- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)

- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#ECS0) - Indicator Assembled and Tested in China**

(No longer available as of August 9, 2020)

This is indicator that the product was assembled and tested in China.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0000
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECSF) - Custom Service Specify, Montpellier, France**

(No longer available as of March 5, 2021)

Having #ECSF on the order, will cause the order to be routed to France and the machine to be internally routed to the CSC

- Attributes provided: Customization
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: N/A
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECSJ) - NeuCloud Indicator/Specify**

(No longer available as of May 12, 2020)

This is a no-charge specify code for helping IBM track orders for reporting purposes

- Attributes provided: none
- Attributes required: used in mainland China
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: N/A
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ECSM) - Custom Service Specify, Mexico**

Having #ECSM on the order, will cause the order to be routed to Mexico and the machine to be internally routed to the CS

- Attributes provided: Customization
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ECSP) - Custom Service Specify, Poughkeepsie, USA**

Having #ECSP on the order, will cause the order to be routed to Poughkeepsie, USA and the machine to be internally routed.

- Attributes provided: Customization
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ECSS) - Integrated Solution Packing**

(No longer available as of January 29, 2021)

This is a routing indicator for Solution packing.

- Attributes provided: Routing instruction for manufacturing
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## **(#ECW0) - Optical Wrap Plug**

A wrap plug is a small connector designed to perform a diagnostic test called a loopback test. This wrap plug is inserted into a Channel adapter or a SR or LR optical port on a PCIe Ethernet adapter.

This is a multi-mode LC fiber optic wrap plug with an inside/ outside optics diameter of 50/125. Its IBM part number as of equivalent function IBM part number which is no longer shipped is 11P3847.

It is strongly recommended that Fibre Channel adapters (HBAs) fill any empty adapter ports with a wrap plug. There is no technical issue with filling all ports with a cable to a device/switch or with a wrap plug can speed the booting/IPLing of a partition and pointing to a planned empty port.

There is no technical issue leaving an Ethernet port empty. Whether an Ethernet port is empty or contains a wrap plug should not generate empty-port messages.

- Attributes provided: Wrap plug
- Attributes required: None

- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EHKV) - SAP HANA TRACKING FEATURE**

SAP HANA tracking feature that defines manufacturing routing.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: N/A
- Return parts MES: Does not apply

## **(#EHLU) - IBM Power Systems for SAS Viya (Linux)**

(No Longer Available as of March 23, 2021)

This feature is applicable to IBM Power Systems for SAS Viya deals only. This is a no-cost feature for tracking purposes of

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 1)
- OS level required:
  - Red Hat Enterprise Linux 7.4
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EHR1) - Boot Drive / Load Source in EXP12SX Specify (in #ESLL or #ELLL)**

Indicates that boot drive (disks or SSDs) are placed in an EXP12SX SAS Storage Enclosure

- Attributes provided: Boot drive location specify
- Attributes required: Available SAS bay and supported disk/SSD
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EHR2) - Boot Drive / Load Source in EXP24SX Specify (in #ESLS or #ELLS)**

Indicates that boot drive or load source (disks or SSDs) are placed in an EXP24SX SAS Storage Enclosure

- Attributes provided: Boot drive / load source location specify
- Attributes required: Available SAS bay and supported disk/SSD
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EHS2) - SSD Placement Indicator - #ESLS/#ELLS**

This is an IBM internal automatic generated SSD specify indicator for placement and it is not selectable.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EJ00) - SAS Port/Cabling for single IOA Backplane**

One SAS port on the rear of the 2U server and SAS cable inside the server to the single IOA SAS controllers in the higher EXP24SX SAS storage drawer can be attached to SAS port using a pair of SAS-mini HD Narrow YO cables. YO cables must remember the cable management arm needs about 1 meter.

Note that the SAS port is physically located in the same space as one of the PCIE x8 slots and reduce the total number of 2U server.

- Attributes provided: One SAS port, Internal SAS cables
- Attributes required: 2U POWER9 server with high performance storage backplane EJ1G. Available PCIe slot.
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: see feature EL67
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EJ05) - PCIe3 Optical Cable Adapter for PCIe3 Expansion Drawer**

PCIe3 x16 adapter provides two CXP ports for the attachment of two active optical CXP cables (AOC) or two CXP copper cables or the attachment of one PCIe3 fan-out module in a PCIe Gen3 I/O Expansion Drawer. CCIN is 2B1C.

Card is a double-wide adapter which plugs into a x16 slot and physically overlaps an adjacent slot. EJ05 is similar to EJ07 and different CCIN.

- Attributes provided: PCIe3 adapter with two CXP ports to attach two active optical cables or two CXP copper cables.
- Attributes required:  
Two PCIe3 slots of which at least one is a x16 slot in system unit plus a pair of CXP cables (one cable pair feature such as require Firmware 8.40 or later).
- Minimum required: 0

- Maximum allowed: 2 (Initial order maximum: 0)
  - OS level required:
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: MES
  - CSU: Yes
  - Return parts MES: No
- Note: Not available with BareMetal or KVM**

## (#EJ0L) - PCIe3 12GB Cache RAID SAS Adapter Quad-port 6Gb x8

The PCIe3 12GB Cache RAID SAS Adapter provides high performance HDD and/or SSD controller function using PCIe Gen3 required to provide mirrored write cache data and adapter redundancy. Integrated flash memory provides protection of the power failure. Effectively up to 12GB of write cache is provided using compression of 4 GB of physical cache.

The adapter provides four Mini-SAS HD (high density) narrow connectors for the attachment of SAS drives located in the S storage enclosures or #5802/5803/EL36 12X PCIe I/O drawers. X, YO or AT SAS cables with HD narrow connectors are used. 4 EXP24S/ EXP12SX/EXP24SX can be attached with a maximum of 96 HDD or a maximum of 48 SSD. Two AA SAS cables are attached to the #EJ0L pair to communicate status and cache content information and are required unless three or four ports are used.

The #EJ0L provides RAID 0, RAID 5, RAID 6 and RAID 10 for AIX and Linux and VIOS. The adapter provides RAID 5 and provides RAID 10 for later levels of IBM i. IBM i provides both OS mirroring and data spreading. AIX/Linux/VIOS provide OS support the Easy Tier function (RAID 52T, 62T or 102T) for AIX and Linux. The adapter's CCIN is 57CE.

Both 5xx and 4k byte sector HDD/SSD are supported for POWER8 servers. 5xx byte sector HDD/SSD are supported for POWER9 servers. Drives can not be mixed in the same array.

### Limitations:

- HDD and SSD can not be mixed on the same SAS port, but can be mixed on the same adapter.
  - #5886 3.5-inch SAS I/O Drawer is not supported.
  - 177GB SSD are not supported.
  - Running SAS bays for both a #5887 EXP24S I/O drawer and a 12X-attached #5802/5803 I/O drawer on the same adapter is not supported. EXP24S or EXP12SX or EXP24SX is supported.
  - If controlling drives in a #5802/5803/EL36 at least one of the #EJ0L pairs must be located in that #5802/5803/EL36 drawer.
  - Attributes provided: Full high PCIe3 four port x8 adapter with up to 12GB write cache
  - Attributes required: One PCIe slot per adapter and Mini-SAS HD narrow connector SAS cables such as #ECBJ-ECBL or #ECDU.
  - Minimum required: 0
  - Maximum allowed: 12 (Initial order maximum: 0)
  - OS level required:
    - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 11 Service Pack 4 , or later
    - 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
    - SUSE Linux Enterprise Server 15, or later
    - Red Hat Enterprise Linux 8 for Power, or later
    - Red Hat Enterprise Linux 7.5 for Power LE (p8compat), or later
    - Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.6, or later
  - Initial Order/MES/Both/Supported: Supported
  - CSU: Yes
  - Return parts MES: No
- Note: VIOS supported.**

## (#EJ10) - PCIe3 SAS Tape/DVD Adapter Quad-port 6Gb x8



The PCIe3 SAS Adapter is a high performance SAS tape controller using PCIe Gen3 x8 technology. The adapter supports LTO-5, LTO-6, LTO-7, and LTO-8 found in the IBM 7226-1U3 Multimedia drawers, or tape units such as the TS2250, TS2200, TS2900, TS3100, TS3200, and TS3310. Other removable media devices supported include IBM SAS/SATA DVD IBM 7226-1U3 Storage Enclosure. The adapter provides four Mini-SAS HD (high density) connectors to which AE1 SAS cables such as #ECBZ with HD narrow connectors can be attached. A max of 4 tape drives per adapter can be attached and 4 drives can be attached using four YE1 cables.

#EJ10 (full high) and #EJ11 (low profile) are electronically the same adapter with the same 57B4 CCIN, but differ in that the

#EJ0J and #EJ10 are the same adapter with the same 57B4 CCIN, but have different feature code numbers to indicate different supported tape drives and DVD. Support of both tape/DVD and HDD/SSD on the same adapter is not supported.

**Note: The original #EJ0X adapter does not support DVD but also has the same CCIN.**

**Note: Adapter uses a Mini-SAS HD narrow connector and AE1 #ECBZ or YE1 #ECBY SAS cable.**

Limitation: LTO-4 or earlier drives are not supported.

- Attributes provided: full high PCIe3 four port x8 SAS adapter
- Attributes required: One PCIe slot per adapter
- Minimum required: 0
- Maximum allowed: 12 (Initial order maximum: 12)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EJ14) - PCIe3 12GB Cache RAID PLUS SAS Adapter Quad-port 6Gb x8

The PCIe3 12GB Cache RAID PLUS SAS Adapter provides high performance HDD and/or SSD controller function using FlashCopy. The adapter is required to provide mirrored write cache data and adapter redundancy. Integrated flash memory provides protection for the write cache in case of power failure. Effectively up to 12GB of write cache is provided using compression of 4 GB of physical cache. The adapter provides four Mini-SAS HD (high density) narrow connectors for the attachment of SAS drives located in the SAS EXP24S, EXP12SX, or EXP12L drawers. SAS cables with HD narrow connectors are used to attach to these drawers. A max of 4 EXP24S can be attached with a max of 4 EXP12SX or EXP12L per pair of #EJ14. If more than 48 SSD are attached, no HDD can be attached. A mix of EXP24S, EXP12SX or EXP12L per pair. Two AA SAS cable with HD narrow connectors are attached to the #EJ14 pair to communicate status and cache control. Three or four ports are being used to attach HDD/SSD. Feature #EJ14 provides RAID 0, RAID 5, RAID 6, and RAID 10, RAID 1, RAID 1E, RAID 10E, RAID 5E, RAID 6E, and RAID 10E for AIX and Linux and VIOS. Two tier arrays (5T2, 6T2 and 10T2) combine both HDD and SSD into a single array with Easy Tier. The adapter provides OS mirroring (LVM). On systems that support IBM i, the adapter provides RAID 5 and RAID 6 for IBM i. RAID 10 is both OS mirroring and data spreading. This adapter is very similar to the #EJ0L SAS adapter, but #EJ14 uses a second CPU and can attach more SSD. The #EJ14 adapter's CCIN is 57B1. Both 5xx and 4k byte sector HDD/SSD are supported in the same array. Limitations:

- Not supported on POWER7/POWER7+ servers.
- HDD and SSD cannot be mixed on the same SAS port, but can be mixed on the same adapter.
- Attributes provided: Full high PCIe3 four port x8 adapter with up to 12 GB write cache
- Attributes required: One PCIe slot per adapter and Mini-SAS HD narrow connector SAS cables such as #ECBJ-ECBL or #ECDU.
- Minimum required: 0
- Maximum allowed: 12 (Initial order maximum: 12)
- OS level required:
  - Bare Metal Systems (indicated by #EC16): Not Supported
  - PowerKVM 3.1 Systems (indicated by #EC40): Not Supported
 Other environments, including PowerVM:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server

- Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No
  - VIOS 2.2.4.20 or later
  - PowerKVM - No support currently provided with PowerKVM

## **(#EJ1N) - PCIe1 LP SAS Tape/DVD Dual-port 3Gb x8 Adapter**

(No longer available as of December 31, 2021)

This is a PCIe Gen1 short x8 form factor adapter. It supports the attachment of SAS tape and DVD using a pair of mini SAS for external tape drives which are not supported on the newer and faster 4-port 6Gb PCIe3 adapter (see feature code #EJ1P) external SAS tape drives such as the DAT72, DAT160, LTO-4, LTO-5, LTO-6, and LTO-7 found in the IBM multimedia draw or tape units such as the TS2240, TS2340, TS3100, TS3200, and TS3310. Other removable media devices supported include drives.

SAS adapter-to-enclosure (AE) 3Gb cables with mini-SAS connectors are used to attach these drives. See feature codes #EJ1N and #EJ1P. The same AE cables can often alternatively be ordered under the tape enclosure or multimedia drawer.

Feature EJ1N and EJ1P are electrically and functionally identical with the same CCIN of 57B3. EJ1N has a low profile tails tailstock bracket. Feature EJ1N/EJ1P is the same adapter as #5278/5901 but designates to IBM configurator tools that the adapter is used for disk.

- Attributes provided: Two mini SAS 4x connectors
- Attributes required: One PCIe slot
- Minimum required: 0
- Maximum allowed: 5 (Initial order maximum: 5)
- OS level required:
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12, Service Pack 3, or later
  - SUSE Linux Enterprise Server 12, Service Pack 3, or later
  - Red Hat Enterprise Linux 8 for Power, or later
  - Red Hat Enterprise Linux 7 for Power LE, version 7.5, or later
  - Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.5, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EJ1P) - PCIe1 SAS Tape/DVD Dual-port 3Gb x8 Adapter**

(No longer available as of December 31, 2021)

This is a PCIe Gen1 short x8 form factor adapter. It supports the attachment of SAS tape and DVD using a pair of mini SAS for external tape drives which are not supported on the newer and faster 4-port 6Gb PCIe3 adapter (see feature code #EJ1N) external SAS tape drives such as the DAT72, DAT160, LTO-4, LTO-5, LTO-6, and LTO-7 found in the IBM multimedia draw or tape units such as the TS2240, TS2340, TS3100, TS3200, and TS3310. Other removable media devices supported include drives.

SAS adapter-to-enclosure (AE) 3Gb cables with mini-SAS connectors are used to attach these drives. See feature codes #EJ1N and #EJ1P. The same AE cables can often alternatively be ordered under the tape enclosure or multimedia drawer.

Feature EJ1P and EJ1N are electrically and functionally identical with the same CCIN of 57B3. EJ1P has a full-high tails tailstock bracket. Feature EJ1P/EJ1N is the same adapter as #5901/5278 but designates to IBM configurator tools that the adapter is used for disk.

- Attributes provided: Two mini SAS 4x connectors
- Attributes required: One PCIe slot
- Minimum required: 0

- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12, Service Pack 3, or later
  - SUSE Linux Enterprise Server 12, Service Pack 3, or later
  - Red Hat Enterprise Linux 8 for Power, or later
  - Red Hat Enterprise Linux 7 for Power LE, version 7.5, or later
  - Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.5, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EJ1R) - PCIe x16 to CXP Optical or CU converter Adapter for PCIe3 Expansion Drawer**

PCIe3 x16 adapter provides two CXP ports for the attachment of two active optical CXP cables (AOC) or two CXP copper cables, or the attachment of one PCIe3 fan-out module in a PCIe Gen3 I/O Expansion Drawer. CCIN is 58FF.

Feature EJ1R is a follow on product to the EJ05. Feature EJ1R is only supported on I/O expansion drawer with the new PCIe3 (EMXH).

- Attributes provided: PCIe3 adapter with two CXP ports to attach two active optical cables or two CXP copper cables.
- Attributes required: PCIe3 x16 slot in system unit plus a pair of CXP cables (one cable pair feature such as optical cat #ECCS).
- Minimum required: 0
- Maximum allowed: 3 (Initial order maximum: 3)
- OS level required:
  - Linux supported
  - AIX not supported
  - IBM i not supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EJ33) - PCIe3 Crypto Coprocessor BSC-Gen3 4767**

(No longer available as of December 31, 2021)

Secure-key adapter provides both cryptographic coprocessor and cryptographic accelerator functions in a single PCIe card for applications requiring high-speed, security-sensitive, RSA acceleration, cryptographic operations for data encryption and decryption, use of cryptographic keys, or custom cryptographic applications. It provides secure storage of cryptographic keys in a tamper-resistant design to meet FIPS 140-2 level 4 security requirements. The adapter is a PCIe Gen 3 x4 full height - short card. The adapter is not supported in PowerVM virtualization).

#EJ32 and #EJ33 are both feature codes representing the same physical card with the same CCIN of 4767. Different feature swap cassette is used and its type. #EJ32 indicates no blind swap cassette. #EJ33 indicates a Gen 3 blind swap cassette.

### **IBM PCIe Cryptographic Coprocessor adapter highlights**

- Integrated Dual processors that operate in parallel for higher reliability, often 2x performance improvement over prior generation cards
- Uses newer level Power Processor (PPC) processor than previous generation cards
- Supports IBM Common Cryptographic Architecture (CCA 5.3) and PKCS#11 standard
- Ability to configure adapter as coprocessor or accelerator
- Support for smart card applications using Europay, MasterCard and Visa
- Cryptographic key generation and random number generation
- PIN processing - generation, verification, translation
- Encrypt/Decrypt using AES and DES keys

Please refer to the following URL for the latest firmware and software updates <http://www-03.ibm.com/security/cryptocards>,

- Attributes provided: Cryptographic Coprocessor and Accelerator Functions
- Attributes required: One full-high PCIe Gen3 slot which uses a blind swap cassette
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server 12 SP3, or later
  - Ubuntu Server
- Linux software support can be downloaded from the following location:  
<http://www-03.ibm.com/security/cryptocards/pciecc2/ordersoftware.shtml>
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJR1) - Specify Mode-1 & (1)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 1 and be using one PCIe3 RAID SAS adapter (#EJ0J/ EJ0M/EL3B )

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, one PCIe3 RAID SAS adapter, one SAS YO cable
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJR2) - Specify Mode-1 & (2)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 1 and be using two (one pair) PCIe3 RAID SAS adapters (#EJ0J/EJ0M/EL3B )

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, two PCIe3 RAID SAS adapters, two SAS YO cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJR3) - Specify Mode-2 & (2)EJ0J/EJ0M/EL3B & (2) X for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 2 and be using two (one pair) RAID PCIe3 SAS adapters (#EJ0J/EJ0M/EL3B)

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, two PCIe3 RAID SAS adapters, two SAS X cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

#### **(#EJR4) - Specify Mode-2 & (4)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 2 and be using four (two pair) PCIe3 RAID SAS adapters (#EJ0J/EJ0M/EL3B)

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, four PCIe3 RAID SAS adapters, two SAS X cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

#### **(#EJR5) - Specify Mode-4 & (4)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 4 and be using four (unpaired) PCIe3 RAID SAS adapters (#EJ0J/EJ0M/EL3B)

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, four PCIe3 RAID SAS adapters, two SAS X cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

#### **(#EJR6) - Specify Mode-2 & (1)EJ0J/EJ0M/EL3B & (2) YO for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 2 and be using one PCIe3 RAID SAS adapter (#EJ0J/ EJ0M/EL3B) and two SAS YO cables

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, one PCIe3 RAID SAS adapter, two SAS YO cables
- Minimum required: 0

- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJR7) - Specify Mode-2 & (2)EJ0J/EJ0M/EL3B & (2) YO for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 2 and be using two (nonpaired) PCIe3 RAID SAS adapters (#EJ0J/E Cables).

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, two PCIe3 RAID SAS adapters, two SAS YO cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRA) - Specify Mode-2 & (1)EJ0J/EJ0M/EL3B & (1) YO for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 2 and be using one PCIe3 RAID SAS adapter (#EJ0J/ EJ0M/EL3B) :

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the EXP24S. to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify feature added to expanded usage, probably specify feature #EJR7.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, one PCIe3 RAID SAS Adapter, one 6G YO SAS cable
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRB) - Specify Mode-2 & (2)EJ0J/EJ0M/EL3B & (1) X for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 2 and be using two PCIe3 RAID SAS adapters (#EJ0J ) and one 6G

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the EXP24S. to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify feature added to expanded usage, probably specify feature #EJR4.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, two PCIe3 RAID SAS Adapters, one 6G X SAS cable

- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRC) - Specify Mode-4 & (1)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 4 and be using one PCIe3 RAID SAS adapter (#EJ0J/ EJ0M/EL3B) ; the X cable is left unattached at the adapter end.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the EXP24S. to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify feature added to expanded usage, probably specify feature #EJR5, #EJRD or #EJRE.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, one PCIe3 RAID SAS Adapter, one 6G X SAS cable
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRD) - Specify Mode-4 & (2)EJ0J/EJ0M/EL3B for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 4 and be using two (nonpaired) PCIe RAID SAS adapters (#EJ0J/EJ0M/EL3B).

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the EXP24S. to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify feature added to expanded usage, probably specify feature #EJR5 or #EJRE.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, two PCIe3 RAID SAS Adapters, one 6G X SAS cable
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRE) - Specify Mode-4 & (3)EJ0J/EJ0M/EL3B for EXP24S (#5888/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 4 and be using three (nonpaired) PCIe3 RAID SAS adapter (#EJ0J/EJ0M/EL3B). One leg of one X cable is left unattached at the adapter end.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the EXP24S. to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify feature added to expanded usage, probably specify feature #EJR5.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, three PCIe3 RAID SAS Adapters, two 6G X SAS cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRF) - Specify Mode-1 & (2)EJ14 for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 1 and be using two PCIe3 12GB Cache RAID PLUS SAS Adapter Q YO SAS Cables.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer in mode1, two PCIe3 #EJ14, two SAS YO cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRG) - Specify Mode-2 & (2)EJ14 & (2) X for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 2 and be using two PCIe3 12GB Cache RAID PLUS SAS Adapter Q SAS Cables.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer in mode 2, two PCIe3 #EJ14, two SAS X cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRH) - Specify Mode-2 & (2)EJ14 & (1) X for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 2 and be using two PCIe3 12GB Cache RAID PLUS SAS Adapter Q SAS Cable.



This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the EXP24S. To support the rest of the SAS bays, then this specify code should be removed and the appropriate specify feature added to expanded usage.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer in mode2, two PCIe3 #EJ14, one SAS X cable
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRJ) - Specify Mode-2 & (4)EJ14 for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 2 and be using four PCIe3 12GB Cache RAID PLUS SAS Adapter G SAS Cable.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer in mode2, four PCIe3 #EJ14, two SAS X cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: see feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRL) - Non-paired Indicator EJ14 PCIe SAS RAID+ Adapter**

(No longer available as of December 31, 2020)

Feature EJRL must be added for every instance of a non-paired SAS RAID adapter #EJ14. It identifies a specific high avail Linux which has one #EJ14 on one system and the paired #EJ14 located on a second system. IBM i does not support pair

SAS RAID adapter firmware disables write cache until a second SAS RAID adapter is recognized as its pair. This specify in one server.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: Only one #EJ14 on a server and its pair on a different server.
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required: Refer to #EJ14
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJRP) - Specify Mode-1 & (2)EJ0L for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 1 and be using two PCIe3 12GB Cache RAID SAS adapters (#EJ0L).

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, two PCIe3 12GB Cache SAS RAID adapters, two SAS YO cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: See feature 5887 or EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRR) - Specify mode-2 & (4) EJ0L for EXP24S #5887/EL1S**

(No longer available as of December 31, 2020)

Specify feature EJRR (Specify mode-2 & (4) EJ0L for EXP24S #5887 or #EL1S) directs manufacturing to configure SFF drives and four PCIe2 12GB Cache RAID SAS Adapter Quad-port 6Gb. Select #EJ0L and two appropriate length HD narrow two AA cables (#ECC0 - #ECC4) between each pair of SAS adapters (total of 4 AA cables). Note: IBM does not provide cabling or #EL1S is shipped.

- Attributes provided: Configure #5887/EL1S in Mode 2
- Attributes required: Two dual X cables, four AA cables and one port on each of four #EJ0Ls dedicated to the single #5887/EL1S
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: See feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRS) - Specify Mode-2 & (2)EJ0L & (2) X for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 2 and be using two PCIe3 12GB RAID SAS adapters (#EJ0L) and two X cables.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: EXP24S Drawer, two PCIe3 12GB Cache SAS RAID adapters, two SAS X cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: See feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRT) - Specify Mode-2 & (2)EJ0L & (1) X for EXP24S (#5887/EL1S)**

(No longer available as of December 31, 2020)

This feature does not order or ship any hardware, but indicates to IBM config tools and to IBM Manufacturing that in this cc Drawer (#5887/#EL1S) should be configured in Mode 2 and be using two 12GB Cache RAID SAS adapters (#EJ0L) and one X cable.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the EXP24S. To support the rest of the SAS bays, then this specify code should be removed and the appropriate specify feature added to expanded usage.

- Attributes provided: Communicate configuration information to IBM Manufacturing

- Attributes required: EXP24S Drawer, two PCIe3 12GB Cache SAS RAID adapters, one SAS X cable
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: See feature EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJRU) - Non-paired Indicator EJ0L PCIe SAS RAID Adapter**

Feature EJRU must be added for every instance of a non-paired SAS RAID adapter #EJ0L. It identifies a specific high availability or Linux which has one #EJ0L on one system and the paired #EJ0L located on a second system. IBM i does not support p

- Attributes provided: SAS RAID adapter firmware disables write cache until a second SAS RAID adapter is recognized
- Attributes required: Every #EJ0L requires a 6Gb/s SAS RAID adapter (#EJ0L) on both this server and on another server adapter and enable the onboard caches to function.
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 0)
- OS level required: See feature EJ0L
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJSU) - Specify Mode-1 & CEC SAS port Controller EJ1G/EL67& (1) 6G YO for EXP24S (#5887**

(No longer available as of December 31, 2020)

Feature indicates that EXP24S SFF Gen2 Drawer (#5887 or EL1S) will be configured in Mode 1 (One group of 24 drive bays and one 6G YO SAS cable).

- Attributes provided: Communicate configuration information to the field
- Attributes required: EXP24S Drawer, one SAS Controller, one 6G YO SAS cable
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: See feature #EL1S
- Initial Order/MES/Both/Supported: MES
- CSU: N/A
- Return parts MES: Does not apply

### **(#EJU7) - Front OEM Bezel for 8-Bay BackPlane**

Front bezel with no IBM logo plus rails for 2U rack mounted system. Bezel fits Storage Backplane and its 8 SAS bays. Rail inches in depth.

- Attributes provided: Bezel
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EJUC) - Front IBM Bezel for 8-Bay BackPlane**

Front bezel with IBM logo plus rails for 2U rack mounted system. Bezel fits Storage Backplane and its 8 SAS bays. Rails are in depth.

- Attributes provided: Bezel
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EJV1) - Specify Mode-1 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)YO12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mode 1 to be connected to one #EJ0J/#EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapter.

One YO12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the enclosure, such as #ECDT, #ECDU, #ECDV or #ECDW.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware to IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration with a subset of adapters and cables is used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLL or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EJV2) - Specify Mode-1 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mode 1 to be connected to two (one pair) #EJ0J/#EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

Two YO12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the enclosure, such as #ECDT, #ECDU, #ECDV or #ECDW.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware to IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration with a subset of adapters and cables is used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description

- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLL or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJV3) - Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mo be connected to two (one pair) #EJ0J/#EL59/ #EJ0M/#EL36 PCIe3 RAID SAS adapters.

Two X12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the con as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware to IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration with a subset of adapters and cables is used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLL or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJV4) - Specify Mode-2 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mo be connected to four (two pair) #EJ0J/ #EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

Two X12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the con as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware to IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration with a subset of adapters and cables is used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLL or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EJV5) - Specify Mode-4 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mode 4 to be connected to four (unpaired) #EJ0J/#EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

Two X12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware to IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration with a subset of adapters and cables is used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLL or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EJV6) - Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mode 2 to be connected to one #EJ0J/#EL59/#EJ0M/ #EL36 PCIe3 RAID SAS adapter.

Two YO12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector such as #ECDT, #ECDU, #ECDV or #ECDW.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware to IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration with a subset of adapters and cables is used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLL or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EJV7) - Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mode 2 to be connected to two (nonpaired) #EJ0J/ #EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

Two YO12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector such as #ECBT, #ECBU, #ECBV or #ECBW.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware to IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration with a subset of adapters and cables is used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLL or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJVA) - Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)YO12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mode 2 to be connected to one #EJ0J/#EL59/#EJ0M/ #EL36 PCIe3 RAID SAS adapter.

One YO12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the enclosure, such as #ECBT, #ECBU, #ECBV or #ECBW.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays. If adapters/cables are MES added later to support the rest of the SAS bays, then this specify code should be removed and this helps IBM config tools understand the expanded usage, probably specify feature #EJV7.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLL or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJVB) - Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mode 2 to be connected to two (one pair) #EJ0J/#EL59/ #EJ0M/#EL36 PCIe3 RAID SAS adapters.

One X12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the enclosure, such as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays. If adapters/cables are MES added later to support the rest of the SAS bays, then this specify code should be removed and this helps IBM config tools understand the expanded usage, probably specify feature #EJV4.

- Attributes provided: Communicate configuration information to IBM Manufacturing

- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLL or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJVC) - Specify Mode-4 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mode 4 to be connected to one #EJ0J/#EL59/ #EJ0M/#EL36 PCIe3 RAID SAS adapter.

One X12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector as #ECBJ, #ECBK or #ECBL. One leg of the X12 cable is left unattached at the adapter end.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the SAS Storage Enclosure. MES added later to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify code used to understand the expanded usage, probably specify feature #EJV5, #EJVD or #EJVE. This feature does not order or ship any hardware, but to IBM Manufacturing that in this configuration one EXP12SX Drawer (#ESLL/ELLL) should be configured in Mode 4 to be connected to one #EJ0J/EL59/EJ0M/EL3B) and one X12 SAS Cables. One leg of the X cable is left unattached at the adapter end.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the EXP12SX Drawer later to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify feature added to understand the expanded usage, probably specify feature #EJV5, #EJVD or #EJVE.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLL or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJVD) - Specify Mode-4 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mode 4 to be connected to Two (nonpaired) #EJ0J/#EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

One X12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the SAS Storage Enclosure. MES added later to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify code used to understand the expanded usage, probably specify feature #EJV5 or #EJVE.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor



- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLL or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJVE) - Specify Mode-4 & (3)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mo be connected to Three (nonpaired) #EJ0J/#EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

Two X12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the cor as #ECBJ, #ECBK or #ECBL. One leg of one of the two X12 cables is left unattached at the adapter end.

One specify feature should ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, b IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the SAS Stor MES added later to support the rest of the SAS bays, then this specify code should be removed and the appropriate specif understand the expanded usage, probably specify feature #EJV5.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLL or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJVF) - Specify Mode-1 & (2)EJ14 & (2)YO12 for EXP12SX #ESLL/ELLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mo be connected to two #EJ14 PCIe3 RAID SAS adapters.

Two YO12 cables connect the SAS Storage Enclsoure to the SAS adapter ports. Use the cable length appropriate to the co such as #ECDT, #ECDU, #ECDV or #ECDW.

One specify feature should ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, b IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature co configuration with a subset of adapters and cables is used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #EJ14 and #ELLS or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EJVU) - Specify Mode-1 & CEC SAS port Controller EJ1G/EL67 & (1)YO12 for EXP12SX #ESLL**

(No Longer Available as of December 31, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mo be connected to an integrated SAS controller adapter.

One YO12 cable connect the SAS Storage Enclosure to the SAS adapter port. Use the cable length appropriate to the con as #ECDT, #ECDU, #ECDV or #ECDW.

One specify feature should ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, b IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: Refer to #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: Does not apply

**(#EJW1) - Specify Mode-1 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)YO12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mo be connected to one #EJ0J/#EL59/#EJ0M/ #EL36 PCIe3 RAID SAS adapter.

One YO12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the c such as #ECDT, #ECDU, #ECDV or #ECDW.

One specify feature should ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, b IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature co configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLS or #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EJW2) - Specify Mode-1 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mo be connected to two (one pair) #EJ0J/ #EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

Two YO12 cables connect the SAS Storage Enclsoure to the SAS adapter ports. Use the cable length appropriate to the c such as #ECDT, #ECDU, #ECDV or #ECDW.

One specify feature should ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, b IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature co configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLS or #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJW3) - Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode-2 and will be connected to two (one pair) #EJ0J/ #EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

Two X12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing will provide the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature code is used for configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLS or #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJW4) - Specify Mode-2 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode-2 and will be connected to four (two pair) #EJ0J/ #EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

Two X12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing will provide the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature code is used for configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLS or #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EJW5) - Specify Mode-4 & (4)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode 4. It will be connected to four (unpaired) #EJ0J/#EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

Two X12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLS or #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EJW6) - Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode 2. It will be connected to one #EJ0J/#EL59/#EJ0M/ #EL36 PCIe3 RAID SAS adapter.

Two YO12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector such as #ECDT, #ECDU, #ECDV or #ECDW.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLS or #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#EJW7) - Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (2)YO12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode 2. It will be connected to two (nonpaired) #EJ0J/ #EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

Two YO12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector such as #ECBT, #ECBU, #ECBV or #ECBW.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLS or #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJWA) - Specify Mode-2 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)YO12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode 2 and will be connected to one #EJ0J/#EL59/#EJ0M/ #EL36 PCIe3 RAID SAS adapter.

One YO12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the enclosure, such as #ECBT, #ECBU, #ECBV or #ECBW.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays; adapters/cables are MES added later to support the rest of the SAS bays, then this specify code should be removed and this will help IBM config tools understand the expanded usage, probably specify feature #EJW7.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLS or #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJWB) - Specify Mode-2 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode 2 and will be connected to two (one pair) #EJ0J/ #EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

One X12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the enclosure, such as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays; adapters/cables are MES added later to support the rest of the SAS bays, then this specify code should be removed and this will help IBM config tools understand the expanded usage, probably specify feature #EJW4.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLS or #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EJWC) - Specify Mode-4 & (1)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode 4 and be connected to one #EJ0J/#EL59/ #EJ0M/#EL36 PCIe3 RAID SAS adapter.

One X12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector as #ECBJ, #ECBK or #ECBL. One leg of the X12 cable is left unattached at the adapter end.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the SAS Storage Enclosure. If MES added later to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify feature added to understand the expanded usage, probably specify feature #EJW5, #EJWD or #EJWE. This feature does not order or ship any hardware, config tools and to IBM Manufacturing that in this configuration one EXP24SX Drawer (#ESLS/ELLS) should be configured with one RAID SAS adapter (#EJ0J/EL59/EJ0M/ EL3B) and one X12 SAS Cables. One leg of the X cable is left unattached at the adapter end.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the EXP24SX Drawer. If MES added later to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify feature added to understand the expanded usage, probably specify feature #EJW5, #EJWD or #EJWE.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLS or #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EJWD) - Specify Mode-4 & (2)EJ0J/EJ0M/EL3B/EL59 & (1)X12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode 4 and be connected to Two (nonpaired) #EJ0J/#EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

One X12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the SAS Storage Enclosure. If MES added later to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify feature added to understand the expanded usage, probably specify feature #EJW5 or #EJWE.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLS or #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EJWE) - Specify Mode-4 & (3)EJ0J/EJ0M/EL3B/EL59 & (2)X12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode 4 and be connected to Three (nonpaired) #EJ0J/#EL59/#EJ0M/#EL36 PCIe3 RAID SAS adapters.

Two X12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the core as #ECBJ, #ECBK or #ECBL. One leg of one of the two X12 cables is left unattached at the adapter end.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the SAS Storage Enclosure added later to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify code used to understand the expanded usage, probably specify feature #EJW5.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #ESLS or #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJWF) - Specify Mode-1 & (2)EJ14 & (2)YO12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode 1 to be connected to two #EJ14 PCIe3 RAID SAS adapters.

Two YO12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the core as #ECDT, #ECDU, #ECDV or #ECDW.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature code configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #EJ14 and #ELLS or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJWG) - Specify Mode-2 & (2)EJ14 & (2)X12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode 2 to be connected to two #EJ14 PCIe3 RAID SAS adapters.

Two X12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the core as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature code configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description

- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #EJ14 and #ELLS or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJWH) - Specify Mode-2 & (2)EJ14 & (1)X12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode-2 and will be connected to two #EJ14 PCIe3 RAID SAS adapters.

One X12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing will determine the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the SAS Storage Enclosure. MES added later to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify code used to understand the expanded usage, probably specify feature #EJWG.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #EJ14 and #ELLS or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJWJ) - Specify Mode-2 & (4)EJ14 & (2)X12 for EXP24SX #ESLS/ELLS**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode-2 and will be connected to four #EJ14 PCIe3 RAID SAS adapters.

Two X12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing will determine the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature code is required for a configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in descriptor
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: Refer to #EJ14 and #ELLS or #ELLL to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EJVP) - Specify Mode-1 & (2)EJ0L & (2)YO12 for EXP12SX #ESLL/ELLL**



(No Longer Available as of June 30, 2021)

Feature indicates that EXP12SX SAS Storage Enclosure (#ESLL or #ELLL) will be configured by IBM Manufacturing in Mode 1 and will be connected to two #EJ0L PCIe3 RAID SAS adapters.

Two YO12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the enclosure, such as #ECDT, #ECDU, #ECDV or #ECDW.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration with a subset of adapters and cables is used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: See feature #ELLL
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJWP) - Specify Mode-1 & (2)EJ0L & (2)YO12 for EXP24SX #ESLS/ELLS**

(No Longer Available as of June 30, 2021)

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode 1 and will be connected to two #EJ0L PCIe3 RAID SAS adapters.

Two YO12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the enclosure, such as #ECDT, #ECDU, #ECDV or #ECDW.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: See feature #ELLS
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJWR) - Specify Mode-2 & (4)EJ0L & (2)X12 for EXP24SX #ESLS/ELLS**

(No longer available as of March 5, 2021)

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode 2 and will be connected to four #EJ0L PCIe3 RAID SAS adapters.

Two X12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the enclosure, such as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: See feature ELLS
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJWS) - Specify Mode-2 & (2)EJ0L & (2)X12 for EXP24SX #ESLS/ELLS**

(No Longer Available as of June 30, 2021)

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode-2 and will be connected to two #EJ0L PCIe3 RAID SAS adapters.

Two X12 cables connect the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware to IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This specify feature indicates a full set of adapters plus SAS cables is used for the enclosure. A different specify feature configuration when a subset of adapters and cables are used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: See feature ELLS
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJWT) - Specify Mode-2 & (2)EJ0L & (1)X12 for EXP24SX #ESLS/ELLS**

(No Longer Available as of June 30, 2021)

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode-2 and will be connected to two #EJ0L PCIe3 RAID SAS adapters.

One X12 cable connects the SAS Storage Enclosure to the SAS adapter ports. Use the cable length appropriate to the connector as #ECBJ, #ECBK or #ECBL.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware to IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

This indicates a "partial" configuration where there are not enough adapters/cables to run all the SAS bays in the SAS Storage Enclosure. MES added later to support the rest of the SAS bays, then this specify code should be removed and the appropriate specify feature added to understand the expanded usage, probably specify feature #EJWG.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: SAS Storage Enclosure, PCIe3 RAID SAS adapter(s) and SAS cable(s) as indicated in description
- Minimum required: 0

- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required: See feature ELLS
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EJWU) - Specify Mode-1 & CEC SAS port Controller EJ1G/EL67 & (1)YO12 for EXP24SX #ESL**

Feature indicates that EXP24SX SAS Storage Enclosure (#ESLS or #ELLS) will be configured by IBM Manufacturing in Mode-1 to be connected to an integrated SAS controller adapter.

One YO12 cable connect the SAS Storage Enclosure to the SAS adapter port. Use the cable length appropriate to the connector as #ECDT, #ECDU, #ECDV or #ECDW.

One specify feature should be ordered with each SAS Storage Enclosure. This feature does not order or ship any hardware, but IBM Manufacturing the combination of enclosure mode, SAS adapter and SAS cable type which will be used.

- Attributes provided: Communicate configuration information to IBM Manufacturing
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: Refer to #ELLS to find the supported O/S levels.
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: Does not apply

### **(#EL1B) - AC Power Supply - 1400W (200-240 VAC)**

(No longer available as of January 29, 2021)

This feature provides one 200 - 240V, 1400 watt AC power supply.

The power supply is configured in a one plus one for a 2U server or two plus two for a 4U server configuration to provide only.

To be operational, a minimum power supply in the CEC base enclosure is required. If there is a power supply failure, any or without interrupting the operation of the system.

This power supply is not supported on all models.

- Attributes provided: AC Power Supply.
- Attributes required: Requires input voltage of 200 - 240 VAC.
- Minimum required: 2
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EL1P) - 300GB 15k RPM SAS SFF-2 Disk Drive (Linux)**

(No longer available as of January 29, 2021)

300 GB SFF 15k RPM SAS disk drive mounted in a Gen-2 carrier and supported in SFF SAS bay such as used in the #EL1 drawer. Disk can be formatted for either 512 bytes or 528 byte sectors and is thus called having 5xx drive sectors. 528 byte IBM Manufacturing will ship pre-formatted with 528 or with 512 byte sectors. Selection of the formatting is selected by IBM

rules, but the client may change at their location. In the EPX24SX IBM Manufacturing will ship using 528 byte sectors. Cap and is 283GB with 528 byte sector. CCIN is 19B1.

Limitations: physical difference in carriers prevent this drive from being used in SFF-1 bays such as used in the #5802/580 used in POWER8/POWER9 system units.

- Attributes provided: 300GB/283GB of SFF (2.5-inch) SAS disk storage mounted in Gen-2 carrier.
- Attributes required: one SFF-2 drive bay.
- Minimum required: 0
- Maximum allowed: 672 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EL1Q) - 600GB 10k RPM SAS SFF-2 Disk Drive (Linux)**

(No longer available as of January 29, 2021)

600 GB SFF 10k RPM SAS disk drive mounted in a Gen-2 carrier and supported in SFF SAS bay such as used in the #EL drawer. Disk can be formatted for either 512 bytes or 528 byte sectors and is thus called having 5xx drive sectors. 528 byte IBM Manufacturing will ship pre-formatted with 528 or with 512 byte sectors. Selection of the formatting is selected by IBM rules, but the client may change at their location. In the EPX24SX IBM Manufacturing will ship using 528 byte sectors. Cap and is 571GB with 528 byte sector.

Limitation: physical difference in carriers prevent this drive from being used in SFF-1 bays such as used in the #5802/5803 used in POWER8/POWER9 system units.

- Attributes provided: 600GB/571GB of SFF (2.5-inch) SAS disk storage mounted in Gen-2 carrier.
- Attributes required: one SFF-2 drive bay
- Minimum required: 0
- Maximum allowed: 672 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EL1S) - EXP24S SFF Gen2-bay Drawer**

The EXP24S SFF Gen2-bay Drawer is an expansion drawer with twenty- four 2.5-inch form factor SAS bays. #EL1S supports Disk Drives (HDD). It uses only 2 EIA of space in a 19-inch rack. The EXP24S includes redundant AC power supplies and bays use Gen-2 or SFF-2 SAS bays.

With Linux or VIOS, the EXP24S can be ordered with four sets of 6 bays, two sets of 12 bays or one set of 24 bays (mode

The EXP24S SAS ports are attached to SAS controller(s) which can be a SAS or PCIe adapter or pair of adapters. The EXP24S is imbedded SAS controller in a server with an imbedded SAS port. Attachment between the SAS controller and the EXP24S or X cables.

Limitations: The mode is set at the IBM factory. The capability to change modes after manufacture is not offered.

- Attributes provided: 24 SFF SAS bays, slot filler panels are provided for empty bays when initially shipped from IBM. # depth - 25.25 to 29.875 inches.
- Attributes required:
  - Available SAS controller (PCI or imbedded server controller)
  - Power System server
  - Available 2U 19-inch rack space
  - Appropriate SAS cables for configuration mode selected
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 0)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

## (#EL2N) - PCIe LP 8Gb 2-Port Fibre Channel Adapter

(No longer available as of December 13, 2019)

This feature is the Low Profile (LP) equivalent of feature number 5273.

The 8 Gigabit PCI Express Dual Port Fibre Channel Adapter is a high-performance 8x short form adapter based on the Emulex (HBA). Each port provides single initiator capability over a fibre link. The ports have LC type connectors and utilize shortwave link speeds of 2, 4, and 8 Gbps and will automatically negotiate to the highest speed possible. LEDs on each port provide status of the port.

The adapter connects to a Fibre Channel switch (AIX, IBM i, Linux, VIOS). If in an IBM i environment, devices can also be connected. N\_Port ID Virtualization (NPIV) capability is supported through VIOS.

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following:

- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth

Because core sizes are different, OM1 cables can only be connected to other OM1 cables. For best results, OM2 cables should be connected to OM2 cables. However, if an OM2 cable is connected to an OM3 cable, the characteristics of the OM2 cable apply to the entire length of the cable.

The following table shows the supported distances for the three different cable types at the three different link speeds.

Cable	2.125 Gbps	4.25 Gbps	8.5 Gbps
OM3	.5m - 500m	.5m - 380m	.5m - 150m
OM2	.5m - 300m	.5m - 150m	.5m - 50m
OM1	.5m - 150m	.5m - 70m	.5m - 21m

#5735 feature indicates a full high adapter. #5273 feature indicates a low profile adapter which is electronically identical. Contact your representative or Business Partner for additional information relative to any third party attachment.

- Attributes provided: Dual port fibre channel
- Attributes required: 1 Low Profile (LP) slot
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server

- Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Supports PowerKVM and VIOS. Refer to Software Requirements for specific code levels supported.**

## (#EL38) - PCIe3 LP 4-port (10Gb FCoE & 1GbE) SRIOV SR&RJ45

(No longer available as of December 31, 2020)

This PCIe Gen3 Converged Network Adapter (CNA) supports both Ethernet NIC (Network Interface Card) traffic and Fibre Channel traffic. The adapter provides two 10 Gb SR optical ports and two 1 Gb RJ45 ports in a PCIe 8x short form adapter. The 10Gb ports have Ethernet capability. The adapter was initially announced as PCIe Gen2, but upgrades to the adapter firmware and integrations have enabled PCIe Gen3.

NPIV capability is provided through VIOS

The 10Gb ports are SFP+ and include an optical SR transceiver. The ports have LC Duplex type connectors and utilize short reach fiber cabling. With 62.5 micron OM1, up to 33 meter length fiber cables are supported. With 50 micron OM2, up to 82 meter length fiber cables are supported. With 50 micron OM3 or OM4, up to 300 meter fiber cable lengths are supported. Note that an FCoE switch is required for any FCoE traffic.

For the 1Gb RJ45 ports, 4-pair CAT-5 Unshielded Twisted Pair (UTP) cable or higher is supported for distances of up to 100 meters. 100 Mb networks are also supported, but 10Mb networks are not supported.

#EL38 is a low profile adapter and its CCIN is 2B93.

Details for the ports include:

- IEEE 802.3ae (10 GbE), 802.3ab (1 GbE), 802.1p priority, 802.1Q VLAN tagging, 802.3x flow control, 802.3ad load-balancing
- Link aggregation, IEEE 802.3ad 802.3
- Multiple MAC addresses per interface
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6
- TCP segmentation Offload (TSO) for IPv4
- UDP checksum offload for IPv4 and IPv6
- The adapter supports OS software iSCSI. Linux can also leverage adapter hardware support including initiator and hardware offload and checking

Important: There is no FCoE support on POWER9 systems.

- Attributes provided: Four ports - two 10Gb CNA and two 1Gb E
  - Attributes required: 1 Empty PCIe Gen2 or Gen3 slot
  - Minimum required: 0
  - Maximum allowed: 9 (Initial order maximum: 9)
  - OS level required:
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Supports PowerKVM and VIOS. Refer to Software Requirements for specific code levels supported.**

## (#EL3B) - PCIe3 LP RAID SAS Adapter Quad-Port 6Gb x8

(No longer available as of January 29, 2021)

The PCIe3 RAID SAS LP Adapter is a high performance SSD/HDD controller using PCIe Gen3 x8 technology. The adapter pairing with another PCIe3 RAID SAS Adapter (#EL3B or #EL59) is optional. Pairing can provide controller redundancy and batteries in the adapter to maintain.

The adapter provides four Mini-SAS HD (high density) narrow connectors for the attachment of SAS drives located in the E storage enclosure or #5802/EL36 12X PCIe I/O drawers. X, YO or AT SAS cables with HD narrow connectors are used to EXP24S, EXP12SX, or EXP24SX can be attached. A maximum of 48 SSD can be attached and a maximum of 96 HDD can be attached to an adapter pair.

The #EL59/#EL3B provides RAID 0, RAID 5, RAID 6 and RAID 10 for Linux and VIOS. Linux can also provide OS mirroring.

Features #EL59 and #EL3B are electronically identical with the same CCIN of 57B4. #EL59 has a full-high tailstock bracket and #EL3B has a low tailstock bracket.

#EL65 and #EL59 are the same adapter with the same 57B4 CCIN, but have different feature code numbers to indicate different capabilities. #EL65 runs SAS LTO-5/LTO-6 tape drives and DVD whereas #EL59 runs HDD or SSD. Support of both tape/DVD and HDD is supported.

Both 5xx and 4k byte sector HDD/SSD are supported for POWER8/POWER9 servers. 5xx byte sector HDD/SSD are supported and 4k drives cannot be mixed in the same array.

#### Limitations:

- HDD/SSD workloads which are performance sensitive to WRITES should consider using SAS adapters with write cache.
- HDD and SSD cannot be mixed on the same SAS port, but can be mixed on the same adapter.
- 177GB SSD are not supported.
- Running SAS bays for both a #5887 EXP24S storage drawer and a 12X-attached #5802/EL36 I/O drawer on the same adapter is not supported.
- A single #EL3B cannot control drives in a #5802/5803/EL36 because the adapter must be located in that #5802/5803/EL36 slot. Controlling drives in a #5802/5803/EL36 as a pair of controllers, one #EL59 can be located in that #5802/5803/EL36 low profile slot.
- Tape/DVD cannot be mixed with disk/SSD on the same adapter.
- Attributes provided: Low profile PCIe3 four port x8 SAS RAID adapter with no write cache and optional pairing
- Attributes required: One low profile PCIe slot per adapter and Mini-SAS HD narrow connector SAS cables such as #EECC4 or 12Gb cables such as #ECDJ, ECDT or #ECDU.
- Minimum required: 0
- Maximum allowed: 7 (Initial order maximum: 7)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Supports PowerKVM and VIOS. Refer to Software Requirements for specific code levels supported.**

### (#EL3C) - PCIe3 LP 4-port(10Gb FCoE & 1GbE) SFP+Copper&RJ45

(No longer available as of April 24, 2020)

This PCIe Gen3 Converged Network Adapter (CNA) supports both Ethernet NIC (Network Interface Card) traffic and Fibre Channel (FCoE) traffic. The adapter provides two 10 Gb ports for active copper twinax cables and two 1 Gb RJ45 ports in a PCIe 8x short form adapter. The adapter was initially announced as PCIe Gen2, but the introduction of POWER8/POWER9 servers have enabled PCIe Gen3. NPIV capability is provided through VIOS SR-IOV supported on specific servers with the appropriate firmware for any of the four ports. The 10Gb ports are SFP+ and do not support twinax cables up to 5 meter in length are supported such as provided by feature #EN01, #EN02 or #EN03. A transceiver is required for SFP+ twinax copper is NOT AS/400 5250 twinax or CX4 or 10 GBase-T. Active cables differ from passive cables. Note that FCoE traffic. For the 1Gb RJ45 ports, 4-pair CAT-5 Unshielded Twisted Pair (UTP) cable or higher is supported for distance.

1Gb (1000 Mb) networks, 100 Mb networks are also supported, but 10Mb networks are not supported. #EN0K and #EN0/E are physically identical except #EN0K has a tail stock for full high PCIe slots and #EN0/EL3CL has a tail stock for 2CC1 for these features. #EN0K/EN0L are very similar to the #EN0H/#EN0J/#EL38 adapters except the #EN0H/EN0K/EL38 have different CCIN. Details for the ports include:

- AIX NIM support
- IEEE 802.3ae (10 GbE), 802.3ab (1 GbE), 802.1p priority, 802.1Q VLAN tagging, 802.3x flow control, 802.3ad load-balancing
- Link aggregation, IEEE 802.3ad 802.3
- Multiple MAC addresses per interface
- MSI-X, MSI and support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6
- TCP segmentation Offload (TSO) for IPv4 and IPv6
- UDP checksum offload for IPv4 and IPv6
- AIX, IBM i and Linux provide software iSCSI support through the adapter. Linux can also leverage adapter hardware scatter/gather (SG) data digest (CRC) generation and checking

**Note: VNIC supported with SUSE Linux Enterprise Server 12, Service Pack 3, with all available maintenance updates.**  
Important: There is no FCoE support on POWER9 systems.

- Attributes provided: Four ports - two 10Gb CNA and two 1Gb E
- Attributes required: PCIe Gen2 or Gen3 slot
- Minimum required: 0
- Maximum allowed: 9 (Initial order maximum: 9)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No  
VIOS 2.2.3.3 with interim fix IV56366, or later

## (#EL3X) - PCIe3 LP 2-port 10GbE NIC&RoCE SFP+ Copper Adapter

This PCIe Gen3 adapter provides two 10 Gb SFP+ ports for copper twinax cabling/transceivers. The adapter supports both Remote Direct Memory Access (RDMA) over Converged Ethernet. Using RoCE, the adapter can support significantly greater throughput and minimize CPU overhead by more efficiently using memory access. This offloads the CPU from I/O networking tasks, improving performance.

Active Copper twinax cables up to 5 meter in length are supported such as provided by feature #EN01, #EN02 or #EN03. Passive transceivers. Active cables differ from passive cables.

Feature code #EL3X and #EL53 have identical electronics and function and CCIN (57BC), but have different tail stocks. #EL3X/EL53 Compared to EL40/EL54, the EC3X/EL53 have identical application capability, but different cabling (optical fiber vs copper) and the Mellanox ConnectX-3 Pro ASIC and is newer technology than previous features EC27/EC28

**LIMITATION:** This adapter supports RoCE and NIC functions but not concurrently on same adapter.

Details for the ports include:

- Linux Network Install is supported.
- IBTA RoCE v2 support.
- IEEE 802.3ae (10Gb Ethernet), IEEE 802.3ad (Link Aggregation & Failover), IEEE 802.3az (Energy Efficient Ethernet), IEEE 802.10au (Congestion Notification), IEEE 802.1Qbg, IEEE 802.3Qaz D0.2 (ETS), IEEE 802.1Qbb D1.0 (PFC), IEEE 1588-2008 (PTP)



- Jumbo frame support up to 9.6KB
  - VXLAN and NVGRE Overlay Network offload support
  - TCP/UDP/IP stateless offload
  - TCP checksum offload
  - TCP segmentation offload
  - UDP checksum offload
  - MSI-X, MSI and support of legacy pin interrupt
  - Attributes provided: 2-port 10Gb Ethernet Adapter with NIC and/or RoCE capability
  - Attributes required: PCIe Gen3 or Gen2 slot
  - Minimum required: 0
  - Maximum allowed: 9 (Initial order maximum: 0)
  - OS level required:
    - SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.4, or later
    - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.4, or later
    - Red Hat Enterprise Linux, with MLNX\_OFED 4.4, or later
    - Ubuntu Server, with MLNX\_OFED 4.4, or later
  - Initial Order/MES/Both/Supported: Supported
  - CSU: Yes
  - Return parts MES: No
- Note: NIC capability support only.**

## (#EL3Z) - PCIe2 LP 2-port 10/1GbE BaseT RJ45 Adapter

PCIe Gen2 short x8 adapter which provides two 10G-BaseT ports. The ports are RJ45. The ports default to auto negotiate (10GBaseT), 1Gb (1000BaseT) or 100Mb (100BaseT) full duplex. Each RJ45 port's configuration is independent of the other (Network Interface Card) traffic. CCIN is 2CC4.

The RJ45 ports use 4-pair CAT-6A cabling for distances of up to 100 meters or CAT-6 cabling for distances up to 37 meters supported.

#EN0W and #EN0X are electronically identical with the same CCIN of 2CC4. #EN0W has a full high tail stock and #EN0X

Details for the ports include:

- VIOS NIM and LINUX NETWORK INSTALL is supported.
- IEEE 802.3an (10GBASE-T), IEEE 802.3ab (1000BASE-T GbE), IEEEu (100BASE-T), 802.1p priority, 802.1Q VLAN tagging, load-balancing and failover
- Link aggregation, IEEE 802.3ad 802.3
- Multiple MAC addresses / promiscuous mode (for PowerVM/VIOS) per interface
- Message Signalling Interrupt (MSI-X, MSI) support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6
- TCP segmentation Offload (TSO)
- RSS (Receive Side Scaling) support for IPv4, IPv6 and UDP.
- UDP checksum offload for IPv4 and IPv6
- Linux provides software iSCSI support through the adapter.
- Attributes provided: Two 10G-BaseT ports
- Attributes required: PCIe Gen2 or Gen3 slot - low profile
- Minimum required: 0
- Maximum allowed: 9 (Initial order maximum: 9)

- OS level required:
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Supports PowerKVM and VIOS. Refer to Software Requirements for specific code levels supported.**

## (#EL43) - PCIe3 LP 2-port 16Gb Fibre Channel Adapter

(No Longer Available as of June 08, 2021)

PCIe Gen3 16 Gigabit dual-port Fibre Channel (FC) Adapter is a high-performance 8x short form adapter based on the Emulex LOM Adapter (HBA). The adapter provides two ports of 16Gb Fibre Channel capability using SR optics. Each port can provide up to 16Gb/s simultaneously.

Each port provides single initiator capability over a fibre link or with NPIV, multiple initiator capability is provided. The ports support 10Gb/s and 4Gb/s transceiver. The ports have LC type connectors and utilize shortwave laser optics. The adapter operates at link speeds of up to 16Gb/s negotiate to the highest speed possible. LEDs on each port provide information on the status and link speed of the port.

The adapter connects to a Fibre Channel switch at 4Gb, 8Gb or 16Gb. It can directly attach to a device without a switch at 16Gb. Direct attach without a switch is not supported at 4Gb or 8Gb.

N\_Port ID Virtualization (NPIV) capability is supported through VIOS.

Feature #EL43 and #EL5B are electronically identical. They differ physically only that EL5B has a tail stock for full high profile PCIe slots. CCIN is 577F for both features.

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following standards:

- OM4 - multimode 50/125 micron fibre, 4700 MHz\*km bandwidth
- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth

The maximum cable lengths at the three different link speeds are:

Cable	4 Gbps	8 Gbps	16 Gbps
OM4	400m	190m	125m
OM3	380m	150m	100m
OM2	150m	50m	35m
OM1	70m	21m	15m

- Attributes provided: Two 16Gb FC ports (with LC connectors)
- Attributes required: PCIe Gen3 or Gen2 slot in supported server
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Bare Metal Systems (#EC16): Ubuntu Server 14.04.03 or later.
  - PowerKVM 3.1 Systems (#EC40): Virtualized resources served to guest partitions.
  - PowerKVM 2.1 Systems: (#EC20): Virtualized resources served to guest partitions.
  - Passthrough (directly assigned) to guest partitions: Red Hat Enterprise Linux; SUSE Linux Enterprise Server; Ubuntu Server; All other systems:
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server

- Ubuntu
- VIOS supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EL4L) - PCIe2 4-port 1GbE Adapter**

This short PCIe Gen2 adapter provides four 1Gb Ethernet ports that can be configured to run at 1000, 100 or 10 Mbps. 4-p (UTP) cables up to 100 meters in length are attached to the copper RJ45 connectors. Each port is independent of one and duplex. 1000 Mbps speed is not supported in Half Duplex (HDX) mode. Feature #EL4M and #EL4L are electronically identical. #EL4M indicates a low profile tail stock while #EL4L indicates a full high tail stock. (See also equivalent features #5260 and

Details for the ports include:

- Linux install support
- IEEE 802.3ab (1 GbE), 802.1p priority, 802.1Q VLAN tagging, 802.3x flow control, 802.3ad load-balancing and failover
- Link aggregation, IEEE 802.3ad 802.3
- Multiple MAC addresses per interface
- MSI-X, MSI and support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6
- TCP segmentation Offload (TSO) for IPv4 and IPv6
- UDP checksum offload for IPv4 and IPv6
- Linux provide software iSCSI support through the adapter. Linux can also leverage adapter hardware support including (CRC) generation and checking
- Attributes provided: Four-port 1 Gb Ethernet
- Attributes required: 1 Full High Profile PCIe slot
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:
  - Bare Metal Systems (#EC16): Not Supported.
  - PowerKVM 3.1 Systems (#EC40): Not Supported.
  - PowerKVM 2.1 Systems: (#EC20): Not Supported.

All other systems:

- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EL4M) - PCIe2 LP 4-port 1GbE Adapter**

This short PCIe Gen2 adapter provides four 1Gb Ethernet ports that can be configured to run at 1000, 100 or 10 Mbps. 4-p (UTP) cables up to 100 meters in length are attached to the copper RJ45 connectors. Each port is independent of one and duplex. 1000 Mbps speed is not supported in Half Duplex (HDX) mode. Feature #EL4M and #EL4L are electronically identical. #EL4M indicates a low profile tail stock while #EL4L indicates a full high tail stock. (See also equivalent features #5260 and

Details for the ports include:

- Linux install support

- IEEE 802.3ab (1 GbE), 802.1p priority, 802.1Q VLAN tagging, 802.3x flow control, 802.3ad load-balancing and failover
- Link aggregation, IEEE 802.3ad 802.3
- Multiple MAC addresses per interface
- MSI-X, MSI and support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6
- TCP segmentation Offload (TSO) for IPv4 and IPv6
- UDP checksum offload for IPv4 and IPv6
- Linux provide software iSCSI support through the adapter. Linux can also leverage adapter hardware support including (CRC) generation and checking
- Attributes provided: Four-port 1 Gb Ethernet
- Attributes required: 1 Low Profile (LP) PCIe slot
- Minimum required: 0
- Maximum allowed: 9 (Initial order maximum: 9)
- OS level required:
  - Bare Metal Systems (#EC16): Red Hat Enterprise Linux Ubuntu
  - PowerKVM 3.1 Systems (#EC40): Virtualized resources served to guest partitions.
  - PowerKVM 2.1 Systems: (#EC20): Virtualized resources served to guest partitions.
  - Passthrough (directly assigned) to PowerKVM guest partitions: Red Hat Enterprise Linux SUSE Linux Enterprise
- All other systems:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EL4Q) - 387GB SFF-2 4K SSD for Linux**

This SFF (2.5") SAS Solid State Drive (SSD) is shipped from IBM with 3875GB capacity formatted with 4K byte sectors (4K Gen2 SAS bays (SFF-2) provided in an EXP24S drawer (such as #EL1S).

Limitations: This drive can not be placed in the same array with a drive formatted with 528 byte sectors. Also JBOD mode (

- Attributes provided: 4K byte formatted 387GB SFF Gen2 SSD eMLC
- Attributes required: Available SAS Gen2 bay in EXP24S drawer
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 0)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

### **(#EL4S) - 775GB SFF-2 4K SSD for Linux**

This SFF (2.5") SAS Solid State Drive (SSD) is shipped from IBM with 775GB capacity formatted with 4K byte sectors (422 Gen2 SAS bays (SFF-2) provided in an EXP24S drawer (such as #EL1S).

Limitations: This drive can not be placed in the same array with a drive formatted with 528 byte sectors. Also JBOD mode (

- Attributes provided: 4K byte formatted 775GB SFF Gen2 SSD eMLC
- Attributes required: Available SAS Gen2 bay in EXP24S drawer
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 0)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

### **(#EL53) - PCIe3 2-port 10GbE NIC&RoCE SFP+ Copper Adapter**

This PCIe Gen3 adapter provides two 10 Gb SFP+ ports for copper twinax cabling/transceivers. The adapter is a converge and IBTA RoCE standard. RoCE is Remote Direct Memory Access (RDMA) over Converged Ethernet. Using RoCE, the adapter provides high bandwidth with low latency and minimize CPU overhead by more efficiently using memory access. This offloads the CPU from network performance and scalability.

Active Copper twinax cables up to 5 meters in length are supported such as provided by feature #EN01, #EN02 or #EN03. transceivers. Active cables differ from passive cables.

Feature code #EL3X and #EL53 have identical electronics and function and CCIN (57BC), but have different tail stocks. #EL53 Compared to EL40/EL54, the EC3X/ EL53 have identical application capability, but different cabling (optical fiber vs copper) and the Mellanox ConnectX-3 Pro ASIC and is newer technology than previous features EC27/EC28

LIMITATION: This adapter supports RoCE and NIC functions but not concurrently on the same adapter.

Details for the ports include:

- Linux Network Install are supported.
- IBTA RoCE v2 support.
- IEEE 802.3ae (10Gb Ethernet), IEEE 802.3ad (Link Aggregation & Failover), IEEE 802.3az (Energy Efficient Ethernet), IEEE 802.10au (Congestion Notification), IEEE 802.1Qbg, IEEE 802.3Qaz D0.2 (ETS), IEEE 802.1Qbb D1.0 (PFC), IEEE 1588 (PTP)
- Jumbo frame support up to 9.6KB
- VXLAN and NVGRE Overlay Network offload support
- TCP/UDP/IP stateless offload
- TCP checksum offload
- TCP segmentation offload
- UDP checksum offload
- MSI-X, MSI and support of legacy pin interrupt
- Attributes provided: 2-port 10Gb Ethernet Adapter with NIC and/or RoCE capability
- Attributes required: PCIe Gen3 or Gen2 slot
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 0)
- OS level required:
  - SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.4, or later
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12 Service Pack 3, or later, with MLNX\_OFED 4.4, or later
  - Red Hat Enterprise Linux, with MLNX\_OFED 4.4, or later
  - Ubuntu Server, with MLNX\_OFED 4.4, or later

- Initial Order/MES/Both/Supported: Supported
  - CSU: Yes
  - Return parts MES: No
- Note: NIC capability support only.**

## (#EL55) - PCIe2 2-port 10/1GbE BaseT RJ45 Adapter

(No longer available as of April 24, 2020)

PCIe Gen2 short x8 adapter which provides two 10G-BaseT ports. The ports are RJ45. The ports default to auto negotiate (10GBaseT), 1Gb (1000BaseT) or 100Mb (100BaseT) full duplex. Each RJ45 port's configuration is independent of the other (Network Interface Card) traffic.

The RJ45 ports use 4-pair CAT-6A cabling for distances of up to 100 meters or CAT-6 cabling for distances up to 37 meters.

#EL55 and #EL3Z are electronically identical with the same CCIN of 2CC4. #EL55 has a full high tail stock and #EL3Z has

Details for the ports include:

- Linux Network Install is supported.
  - IEEE 802.3an (10GBASE-T), IEEE 802.3ab (1000BASE-T GbE), IEEEu (100BASE-T), 802.1p priority, 802.1Q VLAN tagging, load-balancing and failover,
  - Link aggregation, IEEE 802.3ad 802.3
  - Multiple MAC addresses / promiscuous mode (for PowerVM/VIOS) per interface
  - Message Signalling Interrupt (MSI-X, MSI) support of legacy pin interrupts
  - Ether II and IEEE 802.3 encapsulated frames
  - Jumbo frames up to 9.6 Kbytes
  - TCP checksum offload for IPv4 and IPv6
  - TCP segmentation Offload (TSO)
  - RSS (Receive Side Scaling) support for IPv4, IPv6 and UDP.
  - UDP checksum offload for IPv4 and IPv6
  - Linux provides software iSCSI support through the adapter.
  - Attributes provided: Two 10G-BaseT ports
  - Attributes required: PCIe Gen2 or Gen3 slot - full high
  - Minimum required: 0
  - Maximum allowed: 18 (Initial order maximum: 18)
  - OS level required:
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Supports VIOS. Refer to Software Requirements for specific code levels supported.**

## (#EL56) - PCIe3 4-port (10Gb FCoE & 1GbE) SR&RJ45

(No longer available as of April 24, 2020)

This PCIe Gen3 Converged Network Adapter (CNA) supports both Ethernet NIC (Network Interface Card) traffic and Fibre Channel traffic. The adapter provides two 10 Gb SR optical ports and two 1 Gb RJ45 ports in a PCIe 8x short form adapter. The 10Gb ports have Ethernet capability. The adapter was initially announced as PCIe Gen2, but upgrades to the adapter firmware and initialization have enabled PCIe Gen3.

NPIV capability is provided through VIOS

SR-IOV capability for the NIC function is supported on specific servers with the appropriate firmware and OS level for any c

The 10Gb ports are SFP+ and include an optical SR transceiver. The ports have LC Duplex type connectors and utilize short fiber cabling. With 62.5 micron OM1, up to 33 meter length fiber cables are supported. With 50 micron OM2, up to 82 meter 50 micron OM3 or OM4, up to 300 meter fiber cable lengths are supported. Note that an FCoE switch is required for any F

For the 1Gb RJ45 ports, 4-pair CAT-5 Unshielded Twisted Pair (UTP) cable or higher is supported for distances of up to 10 networks, 100 Mb networks are also supported, but 10Mb networks are not supported.

#EL56 and #EL38 adapters are electronically identical. They are physically identical except #EL56 has a tail stock for full h stock for low profile slots. The CCIN is 2B93 for both features.

**Note: VNIC supported with SUSE Linux Enterprise Server 12, Service Pack 3, with all available maintenance updat**

Details for the ports include:

- Linux Network Install support
- IEEE 802.3ae (10 GbE), 802.3ab (1 GbE), 802.1p priority, 802.1Q VLAN tagging, 802.3x flow control, 802.3ad load-ba
- Link aggregation, IEEE 802.3ad 802.3
- Multiple MAC addresses per interface
- MSI-X, MSI and support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6
- TCP segmentation Offload (TSO) for IPv4 and IPv6
- UDP checksum offload for IPv4 and IPv6
- AIX, IBM i and Linux provide software iSCSI support through the adapter. Linux can also leverage adapter hardware s data digest (CRC) generation and checking

Important: There is no FCoE support on POWER9 systems.

- Attributes provided: Four ports - two 10Gb CNA and two 1Gb E
- Attributes required: PCIe Gen2 or Gen3 slot
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Supports VIOS. Refer to Software Requirements for specific code levels supported.**

## (#EL57) - PCIe3 4-port (10Gb FCoE & 1GbE) SFP+Copper&RJ45

(No longer available as of April 24, 2020)

This PCIe Gen3 Converged Network Adapter (CNA) supports both Ethernet NIC (Network Interface Card) traffic and Fibre The adapter provides two 10 Gb ports for active copper twinax cables and two 1 Gb RJ45 ports in a PCIe 8x short form ad NIC and FCoE) functionality. The 1Gb ports have Ethernet capability. The adapter was initially announced as PCIe Gen2, b and introduction of POWER8/POWER9 servers have enabled PCIe Gen3.

NPIV capability is provided through VIOS

SR-IOV capability for the NIC function is supported on specific servers with the appropriate firmware and OS level for any c

The 10Gb ports are SFP+ and do not include a transceiver. Active Copper twinax cables up to 5 meter in length are support #EN02 or #EN03. A transceiver is included with these cables. Note that SFP+ twinax copper is NOT AS/400 5250 twinax c

differ from passive cables. Note that an FCoE switch is required for any FCoE traffic.

For the 1Gb RJ45 ports, 4-pair CAT-5 Unshielded Twisted Pair (UTP) cable or higher is supported for distances of up to 10 networks, 100 Mb networks are also supported, but 10Mb networks are not supported.

#EL57 and #EL3C adapters are electronically identical. They are physically identical except #EL57 has a tail stock for full height stock for low profile slots. The CCIN is 2CC1 for both features.

#EL57/EL3C are very similar to the #EL56/EL38 adapters except the #EL57/EL3C use SR optical cabling and has a different connector. **Note: VNIC supported with SUSE Linux Enterprise Server 12, Service Pack 3, with all available maintenance updates.**

Details for the ports include:

- Linux network install support
- IEEE 802.3ae (10 GbE), 802.3ab (1 GbE), 802.1p priority, 802.1Q VLAN tagging, 802.3x flow control, 802.3ad load-balancing
- Link aggregation, IEEE 802.3ad 802.3
- Multiple MAC addresses per interface
- MSI-X, MSI and support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6
- TCP segmentation Offload (TSO) for IPv4 and IPv6
- UDP checksum offload for IPv4 and IPv6
- AIX and Linux provide software iSCSI support through the adapter. Linux can also leverage adapter hardware support for digest (CRC) generation and checking

Important: There is no FCoE support on POWER9 systems.

- Attributes provided: Four ports - two 10Gb CNA and two 1Gb E
  - Attributes required: PCIe Gen2 or Gen3 slot
  - Minimum required: 0
  - Maximum allowed: 18 (Initial order maximum: 18)
  - OS level required:
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: VIOS supported**

## (#EL58) - PCIe 8Gb 2-port Fibre Channel Adapter

(No longer available as of December 13, 2019)

The 8 Gigabit PCI Express Dual Port Fibre Channel Adapter is a high-performance 8x short form adapter based on the Emulex (HBA). Each port provides single initiator capability over a fibre link. The ports have LC type connectors and utilize shortwave link speeds of 2, 4, and 8 Gbps and will automatically negotiate to the highest speed possible. LEDs on each port provide status of the port.

The adapter connects to a Fibre Channel switch (Linux, VIOS).

N\_Port ID Virtualization (NPIV) capability is supported through VIOS.

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following:

- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth



- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth

Because core sizes are different, OM1 cables can only be connected to other OM1 cables. For best results, OM2 cables should be connected to OM2 cables. However, if an OM2 cable is connected to an OM3 cable, the characteristics of the OM2 cable apply to the entire length of the connection.

The following table shows the supported distances for the three different cable types at the three different link speeds.

Cable	2.125 Gbps	4.25 Gbps	8.5 Gbps
OM3	.5m - 500m	.5m - 380m	.5m - 150m
OM2	.5m - 300m	.5m - 150m	.5m - 50m
OM1	.5m - 150m	.5m - 70m	.5m - 21m

#EL58 feature indicates a full high adapter. #EL2N feature indicates a low profile adapter which is electronically identical. Contact your IBM representative or Business Partner for additional information relative to any third party attachment.

- Attributes provided: Dual Port 8Gb Fibre Channel adapter
  - Attributes required: 1 Empty PCIe slot
  - Minimum required: 0
  - Maximum allowed: 18 (Initial order maximum: 18)
  - OS level required:
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: VIOS supported**

## (#EL59) - PCIe3 RAID SAS Adapter Quad-port 6Gb x8

(No longer available as of April 24, 2020)

The PCIe3 RAID SAS Adapter is a high performance SSD/HDD controller using PCIe Gen3 x8 technology. The adapter does not require pairing with another PCIe3 RAID SAS Adapter (#EL59 or #EL3B) is optional. Pairing can provide controller redundancy and backup batteries in the adapter to maintain.

The adapter provides four Mini-SAS HD (high density) narrow connectors for the attachment of SAS drives located in the E storage enclosures or #5802/5803/EL36 12X PCIe I/O drawers. X, YO or AT SAS cables with HD narrow connectors are used. A maximum of 4 EXP24S/EXP12SX/EXP24SX can be attached. A maximum of 48 SSD can be attached and a maximum of 96 HDD can be attached. If controlling drives in a #5802/5803/EL36 as a single controller, the #EL59 must be located in that #5802/5803/EL36 as a pair of controllers, at least one of the SAS adapter pair must be located in that #5802/5803/EL36.

The adapter provides RAID 0, RAID 5, RAID 6 and RAID 10 for Linux and VIOS. Linux/VIOS provide OS mirroring (LVM).

Features #EL59 and #EL3B are electronically identical with the same CCIN of 57B4. #EL59 has a full-high tailstock bracket. #EL3B has a low-profile tailstock bracket.

#EL65 and #EL59 are the same adapter with the same 57B4 CCIN, but have different feature code numbers to indicate different capabilities. #EL65 runs SAS LTO-5/LTO-6 tape drives and DVD whereas #EL59 runs HDD or SSD. Support of both tape/DVD and HDD/SSD is supported.

Both 5xx and 4k byte sector HDD/SSD are supported for POWER8/POWER9 servers. 5xx byte sector HDD/SSD are supported and 4k drives cannot be mixed in the same array.

Limitations:

- HDD/SSD workloads which are performance sensitive to WRITES should consider using SAS adapters with write cache.
- HDD and SSD cannot be mixed on the same SAS port, but can be mixed on the same adapter.
- 177GB SSD are not supported.

- Running SAS bays for both an EXP24S I/O drawer and a 12X-attached #5802/5803 I/O drawer on the same adapter combining EXP24S or EXP12SX or EXP24SX is supported.
  - Tape/DVD cannot be mixed with disk/SSD on the same adapter.
  - Attributes provided: Full high PCIe3 four port x8 SAS RAID adapter with no write cache and optional pairing
  - Attributes required: One PCIe slot per adapter and Mini-SAS HD narrow connector SAS cables such as #ECBJ-ECBL cables such as #ECDJ, ECDT or #ECDU.
  - Minimum required: 0
  - Maximum allowed: 12 (Initial order maximum: 12)
  - OS level required:
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: VIOS supported**

## (#EL5B) - PCIe3 16Gb 2-port Fibre Channel Adapter

(No Longer Available as of June 08, 2021)

PCIe Gen3 16 Gigabit dual-port Fibre Channel (FC) Adapter is a high-performance 8x short form adapter based on the Emulex L2 adapter (HBA). The adapter provides two ports of 16Gb Fibre Channel capability using SR optics. Each port can provide up to 16Gb/s simultaneously.

Each port provides single initiator capability over a fibre link or with NPIV, multiple initiator capability is provided. The ports support a 16Gb/s transceiver. The ports have LC type connectors and utilize shortwave laser optics. The adapter operates at link speeds of up to 16Gb/s negotiate to the highest speed possible. LEDs on each port provide information on the status and link speed of the port.

The adapter connects to a Fibre Channel switch at 4Gb, 8Gb or 16Gb. It can directly attach to a device without a switch at 16Gb. Direct attach without a switch is not supported at 4Gb or 8Gb.

N\_Port ID Virtualization (NPIV) capability is supported through VIOS.

Feature #EL43 and #EL5B are electronically identical. They differ physically only that EL5B has a tail stock for full high PC low profile PCIe slots. CCIN is 577F for both features.

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following standards:

- OM4 - multimode 50/125 micron fibre, 4700 MHz\*km bandwidth
- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth

The maximum cable lengths at the three different link speeds are:

Cable	4 Gbps	8 Gbps	16 Gbps
OM4	400m	190m	125m
OM3	380m	150m	100m
OM2	150m	50m	35m
OM1	70m	21m	15m

- Attributes provided: Two 16Gb FC ports (with LC connectors)
- Attributes required: PCIe Gen2 or Gen3 slot in supported server
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:

- Bare Metal Systems (#EC16): Not supported.
- PowerKVM 3.1 Systems (#EC40): Not supported.
- PowerKVM 2.1 Systems: (#EC20): Not supported.

All other systems:

- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Supports VIOS. Refer to Software Requirements for specific code levels supported.**

## (#EL5U) - PCIe3 32Gb 2-port Fibre Channel Adapter

PCIe Gen3 32 Gigabit dual-port Optical Fibre Channel (FC) Adapter is a high-performance 8x short form adapter based on Host Bus Adapter (HBA). The adapter provides two ports of 32Gb Fibre Channel capability using SR optics. Each port can functions simultaneously.

Each port provides single initiator capability over a fibre link or with NPIV, multiple initiator capability is provided. The ports transceiver. The ports have LC type connectors and utilize shortwave laser optics. The adapter operates at link speeds of { negotiate to the highest speed possible.

Feature #EL5U and #EL5V are electronically identical. They differ physically only that EL5U has a tail stock for full high PC for low profile PCIe slots.

CCIN is 578F for both features.

Each port has two LED indicators located on the bracket next to each connector. These LEDs communicate boot status and operating state. The LEDs have five defined states; solid on, solid off, slow blink, fast blink, and flashing. The slow blink rate flashing refers to an irregular on/off transition that reflects test progress. The operator should observe the LED sequence for operating state is correctly identified.

See also optional wrap plug feature #ECW0 which is: a) Required to run some diagnostic procedures and b) In some cases in empty ports as well as avoid useless messages pointing to a planned empty port.

Cables:

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following:

- OM4 - multimode 50/125 micron fibre, 4700 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 400m o 8GFC: 0.5m - 100m
- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 380m o 8GFC: 0.5m - 70m
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 150m o 8GFC: 0.5m - 20m
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 70m o 8GFC: 0.5m - 32GFC: N/A

**Note: The H/W cannot detect what length and type of cable is installed. The link will auto-negotiate to the speed reported during installation. The user must manually set the maximum negotiation speed. If too high of speed is selected, bit errors may occur.**

- Attributes provided: 2-port 32Gb Optical FC
- Attributes required: Full high profile PCIe Gen3 slot
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:
  - 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

- Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EL5V) - PCIe3 LP 32Gb 2-port Fibre Channel Adapter

PCIe Gen3 32 Gigabit dual-port Optical Fibre Channel (FC) Adapter is a high-performance 8x short form adapter based on Host Bus Adapter (HBA). The adapter provides two ports of 32Gb Fibre Channel capability using SR optics. Each port can functions simultaneously.

Each port provides single initiator capability over a fibre link or with NPIV, multiple initiator capability is provided. The ports transceiver. The ports have LC type connectors and utilize shortwave laser optics. The adapter operates at link speeds of 4 automatically negotiate to the highest speed possible.

Feature #EL5U and #EL5V are electronically identical. They differ physically only that EL5U has a tail stock for full high PC for low profile PCIe slots.

CCIN is 578F for both features.

Each port has two LED indicators located on the bracket next to each connector. These LEDs communicate boot status and operating state. The LEDs have five defined states; solid on, solid off, slow blink, fast blink, and flashing. The slow blink rate flashing refers to an irregular on/off transition that reflects test progress. The operator should observe the LED sequence for operating state is correctly identified.

See also optional wrap plug feature #ECW0 which is: a) Required to run some diagnostic procedures and b) In some cases in empty ports as well as avoid useless messages pointing to a planned empty port.

Cables:

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following:

- OM4 - multimode 50/125 micron fibre, 4700 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 400m o 8GFC: 0.5m - 100m
- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 380m o 8GFC: 0.5m - 70m
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 150m o 8GFC: 0.5m - 20m
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 70m o 8GFC: 0.5m - 20m

**Note: The H/W cannot detect what length and type of cable is installed. The link will auto-negotiate to the speed reported during boot. The user must manually set the maximum negotiation speed. If too high of speed is selected, bit errors may occur.**

- Attributes provided: 2-port 32Gb Optical FC
- Attributes required: Low profile PCIe Gen3 slot
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - 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
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EL5W) - PCIe3 16Gb 4-port Fibre Channel Adapter

(No longer available as of January 29, 2021)

PCIe Gen3 16 Gigabit quad-port Optical Fibre Channel (FC) Adapter is a high-performance x8 short form PCIe adapter base Bus Adapter (HBA). The adapter provides four ports of 16Gb Fibre Channel capability using SR optics. Each port can provide simultaneously.

Each port provides single initiator capability over a fibre link or with NPIV, multiple initiator capability is provided. The ports transceiver. The ports have LC type connectors and utilize shortwave laser optics. The adapter operates at link speeds of 4 negotiate to the highest speed possible.

Feature #EL5W and #EL5X are electronically identical. They differ physically only that EL5W has a tail stock for full high profile PCIe slots.

CCIN is 578E for both features.

Each port has two LED indicators located on the bracket next to each connector. These LEDs communicate boot status and operating state. The LEDs have five defined states; solid on, solid off, slow blink, fast blink, and flashing. The slow blink rate flashing refers to an irregular on/off transition that reflects test progress. The operator should observe the LED sequence for operating state is correctly identified.

See also optional wrap plug feature #ECW0 which is: a) Required to run some diagnostic procedures and b) In some cases in empty ports as well as avoid useless messages pointing to a planned empty port.

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following:

- OM4 - multimode 50/125 micron fibre, 4700 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 400m o 8GFC: 0.5m - 100m
- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 380m o 8GFC: 0.5m - 70m
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 150m o 8GFC: 0.5m - 20m
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 70m o 8GFC: 0.5m - 20m

**Note: The H/W cannot detect what length and type of cable is installed. The link will auto-negotiate to the speed reported during installation. The user must manually set the maximum negotiation speed. If too high of speed is selected, bit errors may occur.**

- Attributes provided: 4-port 16Gb Optical FC
- Attributes required: Full high profile PCIe Gen3 slot
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:
  - 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
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EL5X) - PCIe3 LP 16Gb 4-port Fibre Channel Adapter

(No longer available as of January 29, 2021)

PCIe Gen3 16 Gigabit quad-port Optical Fibre Channel (FC) Adapter is a high-performance x8 short form PCIe adapter base Bus Adapter (HBA). The adapter provides four ports of 16Gb Fibre Channel capability using SR optics. Each port can provide simultaneously.

Each port provides single initiator capability over a fibre link or with NPIV, multiple initiator capability is provided. The ports transceiver. The ports have LC type connectors and utilize shortwave laser optics. The adapter operates at link speeds of 4 negotiate to the highest speed possible.

Feature #EL5W and #EL5X are electronically identical. They differ physically only that EL5W has a tail stock for full high profile PCIe slots.

CCIN is 578E for both features.

Each port has two LED indicators located on the bracket next to each connector. These LEDs communicate boot status and operating state. The LEDs have five defined states; solid on, solid off, slow blink, fast blink, and flashing. The slow blink rate refers to an irregular on/off transition that reflects test progress. The operator should observe the LED sequence for operating state is correctly identified.

See also optional wrap plug feature #ECW0 which is: a) Required to run some diagnostic procedures and b) In some cases in empty ports as well as avoid useless messages pointing to a planned empty port.

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following:

- OM4 - multimode 50/125 micron fibre, 4700 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 400m o 8GFC: 0.5m - 100m
- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 380m o 8GFC: 0.5m - 70m
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 150m o 8GFC: 0.5m - 20m
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth with LC connectors o 4GFC: 0.5m - 70m o 8GFC: 0.5m - 10m

**Note: The H/W cannot detect what length and type of cable is installed. The link will auto-negotiate to the speed reported during installation. The user must manually set the maximum negotiation speed. If too high of speed is selected, bit errors may occur.**

- Attributes provided: 4-port 16Gb Optical FC
- Attributes required: Low profile PCIe Gen3 slot
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - 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
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EL5Y) - PCIe2 LP 8Gb 2-Port Fibre Channel Adapter

(No longer available as of May 12, 2020)

This feature ships a two-port, 8 Gb PCIe Gen2 Fibre Channel Adapter based on the QLogic QLE2562 Host Bus Adapter (HBA) capability over a fibre link. The ports have LC type connectors and utilize shortwave laser optics. The adapter operates at 10 Gb/s and automatically negotiates to the highest speed possible. LEDs on each port provide information on the status and link speed.

The adapter connects to a Fibre Channel switch or can directly attach to a Fibre Channel port on a supported storage unit.

N\_Port ID Virtualization (NPIV) capability is supported through VIOS.

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following:

- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth

Because core sizes are different, OM1 cables can only be connected to other OM1 cables. For best results, OM2 cables should only be connected to other OM2 cables. However, if an OM2 cable is connected to an OM3 cable, the characteristics of the OM2 cable apply to the entire length of the cable.

the supported distances for the three different cable types at the three different link speeds.

Cable	2.125 Gbps	4.25 Gbps	8.5 Gbps
OM3	.5m - 500m	.5m - 380m	.5m - 150m
OM2	.5m - 300m	.5m - 150m	.5m - 50m
OM1	.5m - 150m	.5m - 70m	.5m - 21m

#EL5Y and #EL5Z are electronically identical with the same CCIN of 578D. #EL5Y has a low profile tailstock bracket. #EL5

See also feature #EL2N or #EL58 for a 2-port 8Gb Fibre Channel adapter based on an Emulex adapter.

See also optional wrap plug feature #ECW0 which is a) required to run some diagnostic procedures and b) in some cases empty ports.

- Attributes provided: Dual port Fibre Channel adapter
- Attributes required: Low Profile PCIe slot
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 11, Service Pack 4, or later
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12, Service Pack 3, or later
  - SUSE Linux Enterprise Server 12, Service Pack 3, or later
  - SUSE Linux Enterprise Server 15, or later
  - Red Hat Enterprise Linux 8 for Power, or later
  - Red Hat Enterprise Linux 7 for Power LE, version 7.5, or later
  - Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.5, or later
  - Red Hat Enterprise Linux 7 for Power LE, version 7.5, for POWER9, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EL5Z) - PCIe2 8Gb 2-Port Fibre Channel Adapter

(No longer available as of May 12, 2020)

This feature ships a two-port, 8 Gb PCIe Gen2 Fibre Channel Adapter based on the QLogic QLE2562 Host Bus Adapter (HBA) capability over a fibre link. The ports have LC type connectors and utilize shortwave laser optics. The adapter operates at 10 Gbps and automatically negotiates to the highest speed possible. LEDs on each port provide information on the status and link speed.

The adapter connects to a Fibre Channel switch or can directly attach to a Fibre Channel port on a supported storage unit.

N\_Port ID Virtualization (NPIV) capability is supported through VIOS.

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following standards:

- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth

Because core sizes are different, OM1 cables can only be connected to other OM1 cables. For best results, OM2 cables should be connected to OM2 cables. However, if an OM2 cable is connected to an OM3 cable, the characteristics of the OM2 cable apply to the entire length of the cable. See the supported distances for the three different cable types at the three different link speeds.

Cable	2.125 Gbps	4.25 Gbps	8.5 Gbps
OM3	.5m - 500m	.5m - 380m	.5m - 150m
OM2	.5m - 300m	.5m - 150m	.5m - 50m
OM1	.5m - 150m	.5m - 70m	.5m - 21m

#EL5Y and #EL5Z are electronically identical with the same CCIN of 578D. #EL5Y has a low profile tailstock bracket. #EL5

See also feature #EL2N or #EL58 for a 2-port 8Gb Fibre Channel adapter based on an Emulex adapter.

See also optional wrap plug feature #ECW0 which is a) required to run some diagnostic procedures and b) in some cases empty ports.

- Attributes provided: Dual port Fibre Channel adapter
- Attributes required: Full High PCIe slot
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 11, Service Pack 4, or later
  - SUSE Linux Enterprise Server for SAP with SUSE Linux Enterprise Server 12, Service Pack 3, or later
  - SUSE Linux Enterprise Server 12, Service Pack 3, or later
  - SUSE Linux Enterprise Server 15, or later
  - Red Hat Enterprise Linux 7 for Power LE, version 7.5, or later
  - Red Hat Enterprise Linux for SAP with Red Hat Enterprise Linux 7 for Power LE version 7.5, or later
  - Red Hat Enterprise Linux 7 for Power LE, version 7.5, for POWER9, or later
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EL60) - PCIe3 LP SAS Tape/DVD Adapter Quad-port 6Gb x8

(No longer available as of April 24, 2020)

The PCIe3 Low Profile SAS Adapter is a high performance SAS tape controller using PCIe Gen3 x8 technology. It supports The adapter provides four Mini-SAS HD (high density) connectors to which AE1 SAS cables such as #ECBY and/or YE1 S narrow connectors can be attached. A max of 4 tape drives per adapter can be attached using four AE1 cables. A max of 8 YE1 cables.

#EJ10 (full high) and #EL60/#EJ11 (low profile) are electronically the same adapter with the same 57B4 CCIN, but differ in slots.

#EL3B and #EL60 are the same adapter with the same 57B4 CCIN, but have different feature code numbers to indicate dif #EL60 runs SAS LTO-5 or later tape drives and DVD. Support of both tape/DVD and HDD/SSD on the same adapter is not

**Note: Adapter uses a Mini-SAS HD narrow connector and AE1 #ECBZ or YE1 #ECBY SAS cable.**

Limitation: LTO-4 or earlier drives are not supported.

- Attributes provided: Low profile PCIe3 four port x8 SAS adapter
  - Attributes required: One low profile PCIe slot per adapter
  - Minimum required: 0
  - Maximum allowed: 7 (Initial order maximum: 7)
  - OS level required:
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Supports PowerKVM and VIOS. Refer to Software Requirements for specific code levels supported.**

## (#EL62) - 3.82-4.0 TB 7200 RPM 4K SAS LFF-1 Nearline Disk Drive (Linux)



(No longer available as of January 29, 2021)

3.86 TB 3.5-inch (Large Form Factor (LFF)) 7200 rpm SAS disk drive on Gen-1 carrier/tray. Supported in LFF-1 SAS bays Enclosure. CCIN is 5B1D.

IBM Manufacturing ships the drive formatted with 4224 byte sectors for additional data integrity protection which results in : reformatted to 4096 byte sectors by the client which which results in 4 TB capacity, but with less protection.

**Note: Reformatting large, 7200 rpm drives takes very significant time.**

Limitation: Cannot be in the same array as a 10k or 15k rpm drive

- Attributes provided: One enterprise nearline drive.
- Attributes required: One LFF (3.5-inch) bay in EXP12SX Storage Enclosure.
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EL64) - 7.72-8.0 TB 7200 RPM 4K SAS LFF-1 Nearline Disk Drive (Linux)**

(No longer available as of January 29, 2021)

7.72 TB 3.5-inch (Large Form Factor (LFF)) 7200 rpm SAS disk drive on Gen-1 carrier/tray. Supported in LFF-1 SAS bays Enclosure. CCIN is 5B1F.

IBM Manufacturing ships the drive formatted with 4224 byte sectors for additional data integrity protection which results in : reformatted to 4096 byte sectors by the client which which results in 8 TB capacity, but with less protection. NOTE: Reform significant time.

Limitation: Cannot be in the same array as a 10k or 15k rpm drive

- Attributes provided: One enterprise nearline drive.
- Attributes required: One LFF (3.5-inch) bay in EXP12SX Storage Enclosure.
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EL66) - Base Storage Backplane 8 SFF-3 Bays**

(No longer available as of January 29, 2021)

Storage backplane with integrated SAS controller for SAS bays in the system unit. SAS bays are 2.5-inch or Small Form Factor (SFF-3) carrier/tray specific to the system unit (SFF-3).

The high performance SAS controller provides RAID-0, RAID-5, RAID-6 and RAID-10 support for either HDD or SSD. JBO Controller has no write cache.

For split backplane capability add #EL68H feature.

Both 5xx and 4k byte sector HDD/SSD are supported. 5xx and 4k drives cannot be mixed in the same array.

- Attributes provided: Storage backplane with one integrated SAS adapter with no cache running 8 SFF-3 SAS bays in 1
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: No
- Return parts MES: No

## **(#EL67) Expanded Function Storage Backplane 8 SFF-3 Bays/Single IOA**

(No longer available as of January 29, 2021) **with Write Cache**

Storage backplane with an integrated SAS controller with effectively up to 7.2GB write cache. High performance controller Write cache power protection hardware covers one PCIe x8 slot. Write cache augments controller's high performance for v HDD. 1.8GB physical write cache is leveraged with compression to provide up to 7.2GB cache capacity. The write cache c with flash memory and super capacitors removing the need for battery maintenance. This adapter utilizes non-mirrored wri configuration.

The high performance SAS controller provide RAID-0, RAID-5, RAID-6, RAID-10, RAID-5T2, RAID-6T2, and RAID-10T2 : configurations with at least two arrays is supported.

Easy Tier function is supported so the controller can automatically move hot data to attached SSD and cold data to attache environments.

Small Form Factor (SFF) or 2.5-inch drives are mounted on a carrier/ tray specific to the system unit (SFF-3). The backplai

This backplane also provides for an optional SAS port on the rear of the system unit which supports the attachment of one Enclosure. One SAS Y0 cable ordered separately with mini-SAS HD narrow connector is used for the optional EXP12SX o must be 3m or shorter. If shorter, remember cable management arm needs about 1 meter.

Note this backplane doesn't support split backplane. For split backplane use #EL66 + #EL68 backplane features

Both 5xx and 4k byte sector HDD/SSD are supported. 5xx and 4k drives cannot be mixed in the same array.

Limitation: this backplane option reduces the number of available x8 PCIe slots in the system unit by one.

- Attributes provided: Storage backplane with an integrated SAS adapter with write cache controlling: a) a set of 8 SFF- port on the rear of the system unit
- Attributes required: Server without #EL68 backplane
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: No
- Return parts MES: No

## **(#EL68) - Split #EL66 to 4+4 SFF-3 Bays**

(No longer available as of January 29, 2021)

#### Add 2nd SAS Controller

This feature modifies the base Storage backplane cabling and adds a second, high performance SAS controller. The existing backplane is split into two sets of four bays, each with one SAS controller. Both SAS controllers are located in integrated slots and do not require additional power.

The high performance SAS controllers each provides RAID-0, RAID-5, RAID-6 and RAID-10 support. JBOD support for HCL cache on either controller.

Both 5xx and 4k byte sector HDD/SSD are supported. 5xx and 4k drives cannot be mixed in the same array.

- Attributes provided: A second integrated SAS adapter with no cache and internal cables to provide two sets of four SFF-2 bays
- Attributes required: Feature EL66 backplane feature
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: No
- Return parts MES: No

#### (#EL78) - 387GB SFF-2 SSD 5xx eMLC4 for Linux

(No longer available as of January 18, 2019)

This SFF (2.5") SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 5xx (528) byte sectors. CCIN is 5B16

- Limitation: Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in the #EL1S (SFF-2). It does not fit in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1) or POWER8/POWER9 system units. The drive was not tested with 512 byte sectors and thus JBOD mode for AIX/Linux is not supported. Note 4k and 5xx drives cannot be mixed in the same array. 4k drives cannot be reformatted to 5xx drives (or vice versa).
- Attributes provided: one 387GB SFF-2 5xx SSD
- Attributes required: one SFF-2 SAS bay
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Bare Metal Systems (indicated by #EC16): Red Hat Enterprise Linux; Ubuntu Server
  - PowerKVM 3.1 Systems (indicated by #EC40) or PowerKVM 2.1 (#EC20): Virtualizing for Red Hat Linux; SUSE Linux Enterprise Server; Other environments (not PowerKVM, not Bare Metal):
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server

**Note: Please install the latest iprutils software available in the IBM Power Tool Repository:**

<http://www14.software.ibm.com/support/customer/saas/f/lopdiags/home.html>

- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

#### (#EL7E) - 775GB SFF-2 SSD 5xx eMLC4 for Linux

(No longer available as of January 18, 2019)

This SFF (2.5") SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 5xx (528) byte sectors. SAS bays. CCIN is 5B17.

- Limitation: Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in #EL1S EX (SFF-2). It does not fit in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1) or POWER8/POWER9 system units (SFF-1). The drive was not tested with 512 byte sectors and thus JBOD mode for Linux is not supported. Note 4k and 5xx byte sectors: 4k drives cannot be reformatted to 5xx drives (or vice versa).
- Attributes provided: one 775GB SFF-2 5xx SSD
- Attributes required: one SFF-2 SAS bay
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Bare Metal Systems (indicated by #EC16): Red Hat Enterprise Linux; Ubuntu Server
  - PowerKVM 3.1 Systems (indicated by #EC40) or PowerKVM 2.1 (#EC20): Virtualizing for Red Hat Linux; SUSE Linux Enterprise Server; Other environments (not PowerKVM, not Bare Metal):
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server

**Note: Please install the latest iprutils software available in the IBM Power Tool Repository:**

<http://www14.software.ibm.com/support/customer/sa/sff/lopdiags/home.html>

- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EL7K) - 387GB SFF-3 SSD 5xx eMLC4 for Linux

(No longer available as of January 18, 2019)

This SFF (2.5") SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 5xx (528) byte sectors. SAS bays. CCIN is 5B19

- Limitation: Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 system units (SFF-3). It does not fit in EXP24S drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1). The drive was tested with 512 byte sectors and thus JBOD mode is not supported. Note 4k and 5xx byte sector drives cannot be mixed: 4k drives cannot be reformatted to 5xx drives (or vice versa).
- Attributes provided: one 387GB SFF-3 5xx SSD
- Attributes required: one SFF-3 SAS bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Bare Metal Systems (#EC16): Red Hat Enterprise Linux; Ubuntu Server
  - PowerKVM 3.1 Systems (#EC40): Supported
  - PowerKVM 2.1 Systems (#EC20): Supported
 All other systems:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server

**Note: Please install the latest iprutils software available in the IBM Power Tool Repository:**

<http://www14.software.ibm.com/support/customer/sa/sff/lopdiags/home.html>

- Initial Order/MES/Both/Supported: Both
- CSU: Yes

- Return parts MES: No

## (#EL7P) - 775GB SFF-3 SSD 5xx eMLC4 for Linux

(No longer available as of January 18, 2019)

This SFF (2.5") SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 5xx (528) byte sectors in SAS bays. CCIN is 5B1A

- Limitation: Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 (SFF-3). It does not fit in EXP24S drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1). It is tested with 512 byte sectors and thus JBOD mode is not supported. Note 4k and 5xx byte sector drives cannot be mixed and must be reformatted to 5xx drives (or vice versa).
- Attributes provided: one 775GB SFF-3 5xx SSD
- Attributes required: one SFF-3 SAS bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Bare Metal Systems (indicated by #EC16): Red Hat Enterprise Linux; Ubuntu Server
  - PowerKVM 3.1 Systems (indicated by #EC40) or PowerKVM 2.1 (#EC20): Virtualizing for Red Hat Linux; SUSE Linux Enterprise Server; Other environments (not PowerKVM, not Bare Metal):
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server

**Note: Please install the latest iprutils software available in the IBM Power Tool Repository:**

<http://www14.software.ibm.com/support/customer/sa/sff/lopdiags/home.html>

- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EL80) - 1.9TB Read Intensive SAS 4k SFF-2 SSD for Linux

1.9 TB SAS 2.5-inch (SFF) read intensive solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24S. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors. 1.86 TB but is rounded up for convenience.

Drive is designed for read intensive workloads with light write activity. Approximately 3,394 TB of data can be written over the lifetime of the workload may be somewhat larger. After the warranty period, if the maximum write capability is achieved, the drive is no longer under IBM maintenance.

Limitations: The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit. 512 byte sectors is not tested or supported. Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same drawer. Earlier PCIe2 or earlier do not support 4k drives.

- Attributes provided: 1.9 TB Read Intensive SSD
- Attributes required: Open SFF-2 SAS bay in an EXP24S controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 0)
- OS level required:
  - Bare Metal Systems (indicated by #EC16): Red Hat Enterprise Linux 7.2, little endian, or later; Ubuntu 16.04, or later
  - PowerKVM 3.1 Systems (indicated by #EC40) or PowerKVM 2.1 Systems (indicated by #EC20): Not supported
  - Other environments, such as PowerVM (not PowerKVM, not Bare Metal):
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server

**Note: Please install the latest iprutils software available in the IBM Power Tool Repository:**

<http://www14.software.ibm.com/support/customer/sa/sff/lopdiags/home.html>

- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

## (#EL83) - 931GB Mainstream SAS 4k SFF-3 SSD for Linux

(No longer available as of January 18, 2019)

931 GB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in SAS bays. Rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

CCIN is 5B28.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system during this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for 4k byte sector drives.**

Limitations:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD formatting is supported. Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Older systems do not support 4k drives.
- Attributes provided: 931 GB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EL85) - 387GB SFF-2 SSD 4k eMLC4 for Linux

(No longer available as of January 18, 2019)

This SFF (2.5") SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 4k (4224) byte sectors in SAS bays. CCIN is 5B10

- Limitation: Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in #5887/#EL85 not fit in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1) or POWER8/POWER9 system units (not tested with 4096 byte sectors and thus JBOD mode for AIX/Linux is not supported. Note 4k and 5xx byte sector drives cannot be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of the common cases, a Linux application may access the disk drive directly through the raw device interface and may still require or usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387GB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Bare Metal Systems (indicated by #EC16): Red Hat Enterprise Linux 7.2, little endian, or later; Ubuntu 14.04.3, or
  - PowerKVM 3.1 Systems (indicated by #EC40) or PowerKVM 2.1 (#EC20): Virtualizing for Red Hat Linux; SUSE Linux
  - Other environments (not PowerKVM, not Bare Metal):
    - Red Hat Enterprise Linux
    - SUSE Linux
    - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EL8C) - 775GB SFF-2 SSD 4k eMLC4 for Linux**

(No longer available as of January 18, 2019)

This SFF (2.5") SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 4k (4224) byte sectors in SAS bays. CCIN is 5B11

- Limitation: Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in #5887/#EL8C not fit in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1) or POWER8/POWER9 system units (not tested with 4096 byte sectors and thus JBOD mode for AIX/Linux is not supported. Note 4k and 5xx byte sector drives cannot be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of the common cases, a Linux application may access the disk drive directly through the raw device interface and may still require or usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775GB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EL8F) - 1.55TB SFF-2 SSD 4k eMLC4 for Linux**

(No longer available as of January 18, 2019)

This SFF (2.5") SAS Solid State Drive (SSD) is shipped from IBM with 1.55TB capacity formatted with 4k (4224) byte sectors in the EXP24S (#EL1F/#5887) I/O drawer. CCIN is 5B12

- Limitation: Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in the EXP24 POWER8/POWER9 system unit SAS bays (SFF-3) or in #5802/#5803 I/O drawers (SFF-1) or in system units with SF tested with 4096 byte sectors and thus JBOD mode is not supported. 4k drives cannot be reformatted to 5xx drives (o

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of thi common cases, a Linux application may access the disk drive directly through the raw device interface and may still require or usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 1.55TB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#EL8J) - 1.9TB Read Intensive SAS 4k SFF-3 SSD for Linux

1.9 TB SAS 2.5-inch (SFF) read intensive solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mountec a POWER8/POWER9 system unit. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors. ( but is rounded up for convenience.

Drive is designed for read intensive workloads with light write activity. Approximately 3,394 TB of data can be written over t nature of the workload may be somewhat larger. After the warranty period, if the maximum write capability is achieved, the under IBM maintenance.

Limitations: The drive is mounted on a SFF-3 carrier/tray and does not physically fit into an expansion unit such as the EXF 4096 byte sectors is not tested or supported. Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be

- Attributes provided: 1.9 TB Read Intensive SSD
- Attributes required: Open SFF-3 SAS bay in a POWER8/POWER9 system unit and controlled by the internal SAS cor
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 0)
- OS level required:
  - Bare Metal Systems (indicated by #EC16): Red Hat Enterprise Linux 7.2, little endian, or later; Ubuntu 16.04, or l
  - PowerKVM 3.1 Systems (indicated by #EC40) or PowerKVM 2.1 Systems (indicated by #EC20): Not supported
- Other environments, such as PowerVM (not PowerKVM, not Bare Metal):
  - Red Hat Enterprise Linux
  - SUSE Enterprise Linux
  - Ubuntu Server

**Note: Please install the latest iprutils software available in the IBM Power Tool Repository:**

[http://www14.software.ibm.com/support/customer/sa\\_s/f/lopdiags/home.html](http://www14.software.ibm.com/support/customer/sa_s/f/lopdiags/home.html)

- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

### (#EL8N) - 387GB SFF-3 SSD 4k eMLC4 for Linux

(No longer available as of January 18, 2019)



This SFF (2.5") SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 4k (4224) byte sectors. CCIN is 5B13

- Limitation: Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/3). It does not fit in EXP24S drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1) tested with 4096 byte sectors and thus JBOD mode is not supported. 4k drives cannot be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of this transition. In common cases, a Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387GB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#EL8Q) - 775GB SFF-3 SSD 4k eMLC4 for Linux

(No longer available as of January 18, 2019)

This SFF (2.5") SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 4k (4224) byte sectors. CCIN is 5B14

- Limitation: Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/3). It does not fit in EXP24S drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1) tested with 512 byte sectors and thus JBOD mode is not supported. Note 4k and 5xx byte sector drives cannot be mixed. 4k drives cannot be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of this transition. In common cases, a Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775GB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#EL8V) - 1.55TB SFF-3 SSD 4k eMLC4 for Linux

(No longer available as of January 18, 2019)

This SFF (2.5") SAS Solid State Drive (SSD) is shipped from IBM with 1.55 TB capacity formatted with 4k (4224) byte sector SAS bays. CCIN is 5B15

- Limitation: Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/3). It does not fit in EXP24S drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1) tested with 4096 byte sectors and thus JBOD mode is not supported. Note 4k and 5xx byte sector drives cannot be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of this common cases, a Linux application may access the disk drive directly through the raw device interface and may still require or usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 1.55TB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EL8Y) - 931GB Mainstream SAS 4k SFF-2 SSD for Linux

(No longer available as of January 18, 2019)

931 GB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime write by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance information for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

CCIN is 5B29.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect of this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

Limitations:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-2 carrier. SFF-2 sectors is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same drawer. Adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 931 GB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux

- SUSE Linux Enterprise Server
- Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EL92) - 1.86TB Mainstream SAS 4k SFF-3 SSD for Linux

(No longer available as of January 18, 2019)

1.86 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

CCIN is 5B20.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

Limitations:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD formatting supported. Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Older models do not support 4k drives.
- Attributes provided: 1.86 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EL96) - 1.86TB Mainstream SAS 4k SFF-2 SSD for Linux

(No longer available as of January 18, 2019)

1.86 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

CCIN is 5B21.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system. This sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

Limitations:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-bay. SFF-bay is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed. Adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 1.86 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELAV) - One Processor Core Activation for #ELPV

Entitlement for one processor core activation.

- Attributes provided: Processor core activation for #ELPV.
- Attributes required: Feature #ELPV.
- Minimum required: 0
- Maximum allowed: 16 (Initial order maximum: 16)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELAW) - One Processor Core Activation for #ELPW

Entitlement for one processor core activation.

- Attributes provided: Processor core activation for #ELPW.

- Attributes required: Feature #ELPW.
- Minimum required: 0
- Maximum allowed: 20 (Initial order maximum: 20)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELAX) - One Processor Core Activation for #ELPX

Entitlement for one processor core activation.

- Attributes provided: Processor core activation for #ELPX.
- Attributes required: Feature #ELPX.
- Minimum required: 0
- Maximum allowed: 24 (Initial order maximum: 24)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ELC0) - PDU Access Cord 0.38m**

This 0.38 meter (14 inch) cord is used with a vertically mounted PDU (Power Distribution Unit) such as a #EPTJ, #EPTN, # in a 7965-S42, 7965-94Y, or #ER05 Slim Rack. One end of this power cord connects to the PDU. The other end of this cord connects to the wall outlet or electrical power source.

One PDU Access Cord is required per vertically mounted PDU. Without a PDU Access Cord, inserting and removing the w be very difficult in the narrow side pockets of the Slim Rack. A PDU Access Cord is not required for PDUs in wider racks st

- Attributes provided: Power cord
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

**(#ELC5) - Power Cable - Drawer to IBM PDU (250V/10A)**

This feature permits manufacturing to select the optimum PDU power jumper cord length (2.8M or 4.3M) for rack integration that use power supplies with C14 inlets that are going to be factory integrated with IBM racks (such as with 7014-T00 or T4

Feature is not valid on initial order with non-factory integrated feature 4650. Power jumper cord has C13 on one end (for C unit or I/O drawer) and C20 on the other end (for IBM PDU C19 receptacle). MES orders of FC #ELC5 will ship 4.3m length

should order #6665.

- Attributes provided: Power jumper cord (2.8m or 4.3m)
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELD3) - 1.2TB 10K RPM SAS SFF-2 Disk Drive (Linux)**

1.20TB SFF 10K RPM SAS disk drive in Gen2 carrier. Supported in SFF-2 SAS bays such as provided in #EL1S EXP24S byte sectors.

Limitation: can not be used in #EL36 I/O drawers or in CEC SFF-1 bays due to physical difference in Gen1 and Gen2 carrier.

- Attributes provided: 1.20TB 10K RPM 2.5-inch SAS disk drive mounted on Gen-2 carrier (SFF-2)
- Attributes required: one SFF-2 SAS bay in EXP24S drawer
- Minimum required: 0
- Maximum allowed: 672 (Initial order maximum: 0)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

### **(#ELD5) - 600GB 10K RPM SAS SFF-3 Disk Drive (Linux)**

(No longer available as of January 29, 2021)

600 GB 2.5-inch (Small Form Factor (SFF)) 10k rpm SAS disk drive on Gen-3 carrier/tray. Supported in SFF-3 SAS bays. If reformatted to 528 byte sectors, capacity would be 571 GB.

CCIN is 59D0

Limitation: cannot be used in EXP24S SFF Gen2-bay Drawer because of physical difference of carrier/tray.

Limitation: Cannot be combined in the same array as a drive of the same capacity, but using different sector size

- Attributes provided: 600 GB Disk Drive - SFF-3
- Attributes required: one SFF-3 SAS bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ELDB) - 300GB 15K RPM SAS SFF-3 Disk Drive (Linux)**

(No longer available as of January 29, 2021)

300 GB 2.5-inch (Small Form Factor (SFF)) 15k rpm SAS disk drive on Gen-3 carrier/tray. Supported in SFF-3 SAS bays. If reformatted to 528 byte sectors, capacity would be 283 GB.

CCIN is 59E0

Limitation: cannot be used in EXP24S SFF Gen2-bay Drawer because of physical difference of carrier/tray.

Limitation: Cannot be combined in the same array as a drive of the same capacity, but using different sector size

- Attributes provided: 300 GB Disk Drive - SFF-3
- Attributes required: one SFF-3 SAS bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ELDP) - 600GB 15K RPM SAS SFF-2 Disk Drive - 5xx Block**

2.5-inch (Small Form Factor (SFF)) 15k RPM SAS disk drive mounted in a Gen-2 carrier and supported in SAS SFF-2 bay; capacity is 600GB. With 528 byte sectors (RAID) drive capacity is 571GB and the drive has additional data integrity protection. If ordered, IBM Manufacturing will ship #ELDP with either 512 or 528 byte formatting. Reformatting a disk drive can take significant time on capacity disk drives.

- Attributes provided: One 600GB (571GB with 528 byte sectors) SFF SAS disk drive in Gen-2 carrier / tray (SFF-2)
- Attributes required: Available Gen-2 drive bay (SFF-2) in EXP24S drawer (such as #EL1S)
- Minimum required: 0
- Maximum allowed: 672 (Initial order maximum: 0)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

## **(#ELE1) - 3.72TB Mainstream SAS 4k SFF-3 SSD for Linux**

(No longer available as of January 18, 2019)

3.72 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted and rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700

1.86 TB	3399
3.72 TB	6799

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

CCIN is 5B2C.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

Limitations:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD formatting is supported. Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Older drives do not support 4k drives.
- Attributes provided: 3.72 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ELE7) - 3.72TB Mainstream SAS 4k SFF-2 SSD for Linux

(No longer available as of January 18, 2019)

3.72 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime TBW by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

CCIN is 5B2D.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

Limitations:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD formatting is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Older adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 3.72 TB Mainstream SSD



- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ELEV) - 600GB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096**

(No longer available as of January 29, 2021)

600 GB 2.5-inch (Small Form Factor (SFF)) 10k rpm SAS disk drive on Gen-2 carrier/tray. Supported in SFF-2 SAS bays s drawer. IBM Manufacturing may ship formatted with 4224 byte sectors or with 4096 sectors. With 4096 byte sectors the dri byte sectors the capacity is 571 GB. Using 4224 byte sectors provides additional data integrity protection. Reformatting larg Limitations: - Can not be combined in the same array as a drive using different sector size - Physically does not fit in a SFF differences

- Attributes provided: 571GB 10K RPM SFF-2 Disk 4K
- Attributes required: one SFF-2 SAS bay
- Minimum required: 0
- Maximum allowed: 672 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ELEZ) - 300GB 15K RPM SAS SFF-2 4K Block - 4096 Disk Drive**

(No longer available as of November 9, 2018)

300 GB 2.5-inch (Small Form Factor (SFF)) 15k rpm SAS disk drive on Gen-2 carrier/tray. Supported in SFF-2 SAS bays o 4096 byte sectors. If reformatted to 4224 byte sectors, capacity would be 283 GB.

CCIN is 59C9

Limitations:

- Cannot be used in POWER8/POWER9 System unit SFF Gen3-bay Drawer because of physical difference of carrier/tr
- Cannot be combined in the same array as a drive of the same capacity, but using different sector size.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of thi common cases, an Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: 300 GB Disk Drive - SFF-2 4K block
- Attributes required: one SFF-2 SAS bay
- Minimum required: 0
- Maximum allowed: 672 (Initial order maximum: 250)

- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELF3) - 1.2TB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096**

(No longer available as of January 29, 2021)

1.2 TB 2.5-inch (Small Form Factor (SFF)) 10k rpm SAS disk drive on Gen-2 carrier/tray. Supported in SFF-2 SAS bays su IBM Manufacturing may ship formatted with 4224 byte sectors or with 4096 sectors. With 4096 byte sectors the drive's cap the capacity is 1.14TB. Using 4224 byte sectors provides additional data integrity protection. Reformatting large drives take

Limitations:

- Cannot be combined in the same array as a drive using different sector size
- Physically does not fit in a SFF-1 or SFF-3 bay due to carrier/ tray differences

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of thi common cases, an Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: 1.2TB 10K RPM SFF-2 Disk 4K
- Attributes required: one SFF-2 SAS bay
- Minimum required: 0
- Maximum allowed: 672 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELF5) - 600GB 10K RPM SAS SFF-3 Disk Drive 4K Block - 4096**

(No longer available as of January 29, 2021)

600 GB 2.5-inch (Small Form Factor (SFF)) 10k rpm SAS disk drive on Gen-3 carrier/tray. Supported in SFF-3 SAS bays s servers. IBM Manufacturing may ship formatted with 4224 byte sectors or with 4096 sectors. With 4096 byte sectors the dr byte sectors the capacity is 571 GB. Using 4224 byte sectors provides additional data integrity protection. Reformatting larg

Limitations:

- Cannot be combined in the same array as a drive using different sector size
- Physically does not fit in a SFF-1 or SFF-2 bay due to carrier/ tray differences

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of thi common cases, an Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: 600GB 10K RPM SFF-3 Disk 4K
- Attributes required: one SFF-3 SAS bay

- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELF9) - 1.2TB 10K RPM SAS SFF-3 Disk Drive 4K Block - 4096

(No longer available as of January 29, 2021)

1.2 TB 2.5-inch (Small Form Factor (SFF)) 10k rpm SAS disk drive on Gen-3 carrier/tray. Supported in SFF-3 SAS bays su IBM Manufacturing may ship formatted with 4224 byte sectors or with 4096 sectors. With 4096 byte sectors the drive's cap the capacity is 1.14TB. Using 4224 byte sectors provides additional data integrity protection. Reformatting large drives take

Limitations:

- Cannot be combined in the same array as a drive using different sector size
- Physically does not fit in a SFF-1 or SFF-2 bay due to carrier/ tray differences

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of thi common cases, an Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: 1.2TB 10K RPM SFF-3 Disk 4K
- Attributes required: one SFF-3 SAS bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELFB) - 300GB 15K RPM SAS SFF-3 4K Block - 4096 Disk Drive

(No longer available as of November 9, 2018)

300 GB 2.5-inch (Small Form Factor (SFF)) 15k rpm SAS disk drive on Gen-3 carrier/tray. Supported in SFF-3 SAS bays. I reformatted to 4224 byte sectors, capacity would be 283 GB.

CCIN is 59E1

Limitations:

- Cannot be used in EXP24S SFF Gen2-bay Drawer because of physical difference of carrier/tray.
- Cannot be combined in the same array as a drive of the same capacity, but using different sector size.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of thi**

**common cases, an Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: 300 GB Disk Drive - SFF-3 4K block
- Attributes required: one SFF-3 SAS bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Requires VIOS 2.2.3.3 or later when assigned to the VIOS.**

## **(#ELFF) - 600GB 15K RPM SAS SFF-3 4K Block - 4096 Disk Drive**

(No longer available as of November 9, 2018)

600 GB 2.5-inch (Small Form Factor (SFF)) 15k rpm SAS disk drive on Gen-3 carrier/tray. Supported in SFF-3 SAS bays. If reformatted to 4224 byte sectors, capacity would be 571 GB.

CCIN is 59E5

Limitations:

- Cannot be used in EXP24S SFF Gen2-bay Drawer because of physical difference of carrier/tray.
- Cannot be combined in the same array as a drive of the same capacity, but using different sector size.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of this common cases, an Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: 600 GB Disk Drive - SFF-3 4K block
- Attributes required: one SFF-3 SAS bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Requires VIOS 2.2.3.3 or later when assigned to the VIOS.**

## **(#ELFP) - 600GB 15K RPM SAS SFF-2 4K Block - 4096 Disk Drive**

(No longer available as of November 9, 2018)

600 GB 2.5-inch (Small Form Factor (SFF)) 15k rpm SAS disk drive on Gen-2 carrier/tray. Supported in SFF-2 SAS bays or 4096 byte sectors. If reformatted to 4224 byte sectors, capacity would be 571 GB.

CCIN is 59CC

Limitations:

- Cannot be used in POWER8/POWER9 System unit SFF Gen3-bay Drawer because of physical difference of carrier/tray
- Cannot be combined in the same array as a drive of the same capacity, but using different sector size.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of this common cases, an Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: 600 GB Disk Drive - SFF-2 4K block
- Attributes required: one SFF-2 SAS bay
- Minimum required: 0
- Maximum allowed: 672 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**Note: Requires VIOS 2.2.3.3 or later when assigned to the VIOS.**

### (#ELFT) - 1.8TB 10K RPM SAS SFF-2 Disk Drive 4K Block - 4096

(No longer available as of January 29, 2021)

1.8 TB 2.5-inch (Small Form Factor (SFF)) 10k rpm SAS disk drive on Gen-2 carrier/tray. Supported in SFF-2 SAS bays such as IBM Manufacturing may ship formatted with 4224 byte sectors or with 4096 sectors. With 4096 byte sectors the drive's capacity is 1.71TB. Using 4224 byte sectors provides additional data integrity protection. Reformatting large drives takes

Limitations:

- Cannot be combined in the same array as a drive using different sector size
- Physically does not fit in a SFF-1 or SFF-3 bay due to carrier/ tray differences

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of this common cases, an Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: 1.8TB 10K RPM SFF-2 Disk 4K
- Attributes required: one SFF-2 SAS bay
- Minimum required: 0
- Maximum allowed: 672 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ELFV) - 1.8TB 10K RPM SAS SFF-3 Disk Drive 4K Block - 4096

(No longer available as of January 29, 2021)

1.8 TB 2.5-inch (Small Form Factor (SFF)) 10k rpm SAS disk drive on Gen-3 carrier/tray. Supported in SFF-3 SAS bays such as IBM Manufacturing may ship formatted with 4224 byte sectors or with 4096 sectors. With 4096 byte sectors the drive's capacity is 1.71TB. Using 4224 byte sectors provides additional data integrity protection. Reformatting large drives takes

sectors the capacity is 1.71TB. Using 4224 byte sectors provides additional data integrity protection. Reformatting large dri

Limitations:

- Cannot be combined in the same array as a drive using different sector size
- Physically does not fit in a SFF-1 or SFF-2 bay due to carrier/ tray differences

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system and experience no effect of thi common cases, an Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: 1.8TB 10K RPM SFF-3 Disk 4K
- Attributes required: one SFF-3 SAS bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELG5) - 387GB Enterprise SAS 5xx SFF-2 SSD for Linux

(No longer available as of August 30, 2019)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 5xx (528 SFF-2 SAS bays in the EXP24S (#5887 or #EL1S) or EXP24SX (#ELLS) I/O drawer. This drive is rated at 10 DWPD (Drive year period.

CCIN is 5B16.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as f and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not t JBOD mode for AIX/Linux is not supported. 5xx drives cannot be reformatted to 4k drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-2 5xx SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELG9) - 387GB Enterprise SAS 5xx SFF-3 SSD for Linux

(No longer available as of August 30, 2019)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 5xx (528 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

CCIN is 5B19.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 ; not fit in EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units ( tested with 512 byte sectors and thus JBOD mode for AIX/Linux is not supported. 5xx drives cannot be reformatted to

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-3 5xx SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELGB) - 387GB Enterprise SAS 4k SFF-2 SSD for Linux

(No longer available as of August 30, 2019)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 4k (4224 SFF-2 SAS bays in the EXP24S (#5887 or #EL1S) or EXP24SX (#ELLS) I/O drawer. This drive is rated at 10 DWPD (Drive year period.

CCIN is 5B10.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as f and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not t JBOD mode for AIX/Linux is not supported. 4k drives cannot be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server

- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELGD) - 387GB Enterprise SAS 4k SFF-3 SSD for Linux

(No longer available as of August 30, 2019)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 4k (4224 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

CCIN is 5B13.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 ; not fit in EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units ( ; tested with 4096 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives cannot be reformatted to

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELGF) - 775GB Enterprise SAS 5xx SFF-2 SSD for Linux

(No longer available as of August 30, 2019)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 5xx (528 SFF-2 SAS bays in the EXP24S (#5887 or #EL1S) or EXP24SX (#ELLS) I/O drawer. This drive is rated at 10 DWPD (Drive year period.

CCIN is 5B17.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as f and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not t JBOD mode for AIX/Linux is not supported. 5xx drives cannot be reformatted to 4k drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-2 5xx SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0



- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELGH) - 775GB Enterprise SAS 5xx SFF-3 SSD for Linux

(No longer available as of August 30, 2019)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 5xx (528 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

CCIN is 5B1A.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 ; not fit in EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1). The drive is tested with 512 byte sectors and thus JBOD mode for AIX/Linux is not supported. 5xx drives cannot be reformatted to 4k.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (528 SFF-3) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-3 5xx SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELGK) - 775GB Enterprise SAS 4k SFF-2 SSD for Linux

(No longer available as of August 30, 2019)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 4k (4224 SFF-2 SAS bays in the EXP24S (#5887 or #EL1S) or EXP24SX (#ELLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

CCIN is 5B11.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as EXP24S and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not tested with 512 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives cannot be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (528 SFF-3) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

**SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c**  
**common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ**  
**are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775GB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELGM) - 775GB Enterprise SAS 4k SFF-3 SSD for Linux**

(No longer available as of August 30, 2019)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 4k (4224 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

CCIN is 5B14.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 ; not fit in EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (S not tested with 4096 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives cannot be reformatted to

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c**  
**common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ**  
**are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775GB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELGP) - 1.55TB Enterprise SAS 4k SFF-2 SSD for Linux**

(No longer available as of August 30, 2019)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 1.55 TB capacity formatted with 4k (4224 SFF-2 SAS bays in the EXP24S (#5887 or #EL1S) or EXP24SX (#ELLS) I/O drawer. This drive is rated at 10 DWPD (Drive year period.

CCIN is 5B12.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as f and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not t JBOD mode for AIX/Linux is not supported. 4k drives cannot be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 1.55 TB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELGR) - 1.55TB Enterprise SAS 4k SFF-3 SSD for Linux**

(No longer available as of August 30, 2019)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 1.55 TB capacity formatted with 4k (4224 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

CCIN is 5B15.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 ; not fit in EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (i tested with 4096 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives cannot be reformatted to

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 1.55 TB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELHJ) - 931 GB Mainstream SAS 4k SFF-2 SSD for Linux**

(No longer available as of August 30, 2019)

931 GB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

CCIN is 5B29.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for 4k byte sector drives.**

#### Limitations:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-2 carrier. SFF-2 carrier is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the same bay. Adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 931 GB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ELHL) - 1.86 TB Mainstream SAS 4k SFF-2 SSD for Linux

(No longer available as of August 30, 2019)

1.86 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

CCIN is 5B21.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for 4k byte sector drives.**

**and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider to ensure 4k byte sector drives.**

#### Limitations:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-2 carrier. SFF-2 sectors is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed. Adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 1.86 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELHN) - 7.45 TB Mainstream SAS 4k SFF-2 SSD for Linux**

(No longer available as of August 30, 2019)

7.45 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

#### Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance information for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

#ELHN has 5B2F CCIN. Different feature codes help the IBM configuration tools understand how the SSD is used. #ELHN **Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system. As part of this transition, Linux applications may access the disk drive directly through raw devices. In much less common cases, an Linux application may access the disk drive directly through raw devices. Still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider to ensure 4k byte sector drives.**

#### Limitations:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-2 carrier. SFF-2 sectors is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed. Adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 7.45 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu

- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELHS) - 931 GB Mainstream SAS 4k SFF-3 SSD for Linux

(No longer available as of August 30, 2019)

931 GB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted and rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

CCIN is 5B2B.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for 4k byte sector drives.**

Limitations:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD formatting is supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the same array. Older servers do not support 4k drives.
- Attributes provided: 931 GB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELHU) - 1.86 TB Mainstream SAS 4k SFF-3 SSD for Linux

(No longer available as of August 30, 2019)

1.86 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted and rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399

3.72 TB 6799  
7.45 TB 13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

CCIN is 5B20.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

Limitations:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD format is supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the same array. Older models do not support 4k drives.
- Attributes provided: 1.86 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELHW) - 7.45 TB Mainstream SAS 4k SFF-3 SSD for Linux

(No longer available as of August 30, 2019)

7.45 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted and rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB 1700  
1.86 TB 3399  
3.72 TB 6799  
7.45 TB 13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ELHW has 5B2E CCIN. Different feature codes help the IBM configuration tools understand how the SSD is used. **Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most Linux applications access SAS drives through a file system sector size transition. In much less common cases, a Linux application may access the disk drive directly through a file system and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider to ensure 4k usage.**

Limitations:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD format is supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the same array. Older models do not support 4k drives.
- Attributes provided: 7.45 TB Mainstream SSD

- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELLL) - EXP12SX SAS Storage Enclosure

(No longer available as of January 29, 2021)

The EXP12SX is a storage expansion enclosure with twelve 3.5-inch large form factor (LFF) SAS bays. It supports up to 12 bays in only 2 EIA of space in a 19-inch rack. The EXP12SX SFF bays use LFF gen1 (LFF-1) carriers/trays. 4k byte sector drives (4Kb) are supported.

The EXP12SX 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 can be changed in the field using software commands along with a specifically documented procedure. IMPORTANT NOTE: when changing mode, follow the documented procedures and that there is no data on the drives before the change. Improperly changing modes can potentially prevent access to existing data, or allow other partitions to access another partition's existing data. Hire an expert to assist with re-configuration work.

The EXP12SX has redundant SAS paths to all drives via two redundant Enclosure Services Modules (ESMs). Four mini-SAS PCIe Gen3 SAS adapters such as the #EL3B/EL59 or #EJ0L or #EJ14, or attached to an imbedded SAS controller in a PC as the Power S812L, S822L, S824L, or L922. Attachment between the SAS controller and the storage enclosure SAS port: X12 cables. The PCIe Gen3 SAS adapters support 6Gb throughput. The EXP12SX has been designed to support up to 12 bays and support that capability.

The EXP12SX uses redundant power supplies and two power cords. Order two feature #ESLA for AC power supplies. The depth rails and can accommodate rack depths from 59.5 - 75 cm (23.4 - 29.5 inches). Slot filler panels are provided for empty bays.

See also the 24-bay Small Form Factor (SFF) EXP24SX SAS Storage Enclosure (feature #ELLS) for higher performance configurations.

Limitation: Does not support SSDs.

- Attributes provided: 12 LFF-1 SAS bays in a 2U enclosure
- Attributes required: PCIe Gen3 SAS adapter/controller; Power System (at least POWER8/ POWER9 generation); 2U enclosure; SAS cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELLS) - EXP24SX SAS Storage Enclosure

(No longer available as of January 29, 2021)

The EXP24SX is a storage expansion enclosure with 24 2.5-inch small form factor (SFF) SAS bays. It supports up to 24 hot-pluggable Solid State Drives (SSD) in only 2 EIA of space in a 19-inch rack. The EXP24SX SFF bays use SFF gen2 (SFF-2) carriers/ trays. The EXP24SX is a replacement for the previous EXP24S Drawer.



The EXP24SX can be ordered with four sets of 6 bays (mode 4), two sets of 12 bays (mode 2) or one set of 24 bays (mode 1) in the field using software commands along with a specifically documented procedure. **IMPORTANT NOTE:** when changing modes, follow the documented procedures and that there is no data on the drives before the change. Improperly changing modes can potentially prevent access to existing data, or allow other partitions to access another partition's existing data. Hire an expert to assist with re-configuration work.

The EXP24SX has redundant SAS paths to all drives via two redundant Enclosure Services Modules (ESMs). Four mini-SAS PCIe Gen3 SAS adapters such as the #EL3B/EL59 or #EJ0L or #EJ14, or attached to an embedded SAS controller in a PC as the Power S812L, S822L, S824L, or L922. Attachment between the SAS controller and the storage enclosure SAS ports uses X12 cables. The PCIe Gen3 SAS adapters support 6Gb throughput. The EXP24SX has been designed to support up to 12 bays of that capability.

The EXP24SX uses redundant power supplies and two power cords. Order two feature #ESLA for AC power supplies. The enclosure depth and can accommodate rack depths from 59.5 - 75 cm (23.4 - 29.5 inches). Slot filler panels are provided for empty bays.

See also the 12-bay Large Form Factor (LFF) EXP12SX SAS Storage Enclosure (feature #ELLL) for higher capacity drives.

- Attributes provided: 24 SFF-2 SAS bays in a 2U enclosure
- Attributes required: PCIe Gen3 SAS adapter/controller; Power System (at least POWER8/ POWER9 generation); 2U enclosure; SAS cables
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ELM8) - 3.72 TB Mainstream SAS 4k SFF-2 SSD for Linux**

(No longer available as of August 30, 2019)

3.72 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime data rate by each drive capacity:

Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance information for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

CCIN is 5B2D.

**Note:** As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for 4k byte sector drives.

Limitations:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-2 carrier. The drive's 4k sectors is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed. Older SAS adapters such as PCIe2 or earlier do not support 4k drives.

- Attributes provided: 3.72 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ELMF) - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer**

PCIe3 fanout module for PCIe Gen3 I/O Expansion Drawer. Provides six PCIe Gen3 full high, full length slots (two x16 and

The module has two CXP ports which are connected two CXP ports on a PCIe Optical Cable Adapter (#EJ05/#EJ08). A pair of CXP copper cables are used for this connection. The top CXP port of the fanout module is cabled to the top CXP port of the PCIe3 Optical Cable Adapter. The bottom CXP port of the fanout module is cabled to the bottom CXP port of the same PCIe3 Optical Cable Adapter.

- Attributes provided: PCIe3 6-slot fanout module for PCIe Gen3 I/O Expansion Drawer
- Attributes required: Available bay in PCIe Gen3 I/O Expansion Drawer. Firmware 8.40 or later for copper CXP cables.
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 0)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## **(#ELMG) - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer**

PCIe3 fanout module for PCIe Gen3 I/O Expansion Drawer. Provides six PCIe Gen3 full high, full length slots (two x16 and two x8). With firmware 8.4 or later, the fanout module supports concurrent maintenance, though obviously while off-line all its PCIe cassettes (BSC) are used for the PCIe slots. The BSC are interchangeable with the #5802/5877/5803/5873 12X PCIe I/O

The module has two CXP ports which are connected two CXP ports on a PCIe Optical Cable Adapter #EJ05 or #EJ07 or #EJ08. A pair of active optical CXP cables (AOC) or a pair of CXP copper cables are used for this connection. The top CXP port of the fanout module is cabled to the top CXP port of the PCIe3 Optical Cable Adapter. The bottom CXP port of the fanout module is cabled to the bottom CXP port of the same PCIe3 Optical Cable Adapter.

ELMG is a follow-on to the original ELMF fanout module. ELMG and ELMF are functionally identical but ELMG implements a larger set of potential PCIe adapters to be housed. ELMG and ELMF can be intermixed in the same drawer. There is no difference in prerequisites for the ELMF and ELMG. ELMG and for ELMF use the same BSC.

- Attributes provided: PCIe3 6-slot fanout module for PCIe Gen3 I/O Expansion Drawer.
- Attributes required: Available bay in PCIe Gen3 I/O Expansion Drawer. Firmware 8.40 or later for copper CXP cables.
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 0)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server

- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## (#ELMQ) - 3.72 TB Mainstream SAS 4k SFF-3 SSD for Linux

(No longer available as of August 30, 2019)

3.72 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

CCIN is 5B2C.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system, so this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for 4k byte sector drives.**

Limitations:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD formatting is supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the same array. Older POWER8 servers do not support 4k drives.
- Attributes provided: 3.72 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ELMX) - PCIe Gen3 I/O Expansion Drawer

(No longer available as of January 29, 2021)

This 19-inch, 4U (4 EIA) enclosure provides PCIe Gen3 slots outside of the system unit. It has two module bays. One 6-Slot module bay. Two 6-slot modules provide a total of 12 PCIe Gen3 slots. Each fanout module is connected to a PCIe3 Optical module unit over an active optical CXP cable (AOC) pair or CXP copper cable pair.

The PCIe Gen3 I/O Expansion Drawer has two redundant, hotplug power supplies. Each power supply has its own separate power cord that plug into a Power supply conduit which connects to the power supply. The single-phase AC power supply is rated at 200-240V. If using 100-120V, then the maximum is 950 Watt. It's recommended the power supply connect to a PDU in the rack designed for 200-240V electrical source.

The drawer has fixed rails which can accommodate racks with depths from 27.5 inches to 30.5 inches.

- Attributes provided: 19-inch 4U (4 EIA) PCIe Gen3 I/O Expansion Drawer
- Attributes required: One or two PCIe Optical Cable Adapters (#EJ07/#EJ05/#EJ08), one or two PCIe3 fanout modules cable pairs (such as #ECC7 or #ECC8 or #ECCS), one power supply conduit (such as #EMXA).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELPV) - 8-core Typical 3.4 to 3.9 Ghz (max) POWER9 Processor**

8-core Typical 3.4 to 3.9 Ghz (max) POWER9 Processor card.

- Attributes provided: Processor card.
- Attributes required: One processor card slot.
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: No
- Return parts MES: No

### **(#ELPW) - 10-core Typical 2.9 to 3.8 Ghz (max) POWER9 Processor**

10-core Typical 2.9 to 3.8 Ghz (max) POWER9 Processor card.

- Attributes provided: Processor card
- Attributes required: One processor card slot.
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: No
- Return parts MES: No

### **(#ELPX) - 12-core Typical 2.7 to 3.8 Ghz (max) POWER9 Processor**

12-core Typical 2.7 to 3.8 Ghz (max) POWER9 Processor card.

- Attributes provided: Processor card

- Attributes required: One processor card slot
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: No
- Return parts MES: No

### **(#ELQ0) - Quantity 150 of #ELDP 600GB 15k RPM SFF-2 Disk**

This feature ships a quantity 150 of #ELDP drive. The configurator may either generate this feature or allow users to select single disk drive feature. This feature remains on the inventory records

- Attributes provided: Quantity of 150 #ELDP
- Attributes required: See #ELDP
- Minimum required: 0
- Maximum allowed: 4 (Initial order maximum: 0)
- OS level required: see feature ELDP
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

### **(#ELQ1) - Quantity 150 of #ELFP (600GB SSD SFF-2)**

(No longer available as of November 9, 2018)

This feature ships a quantity 150 of #ELFP disk units. The configurator may either generate this feature or allow users to select other single disk unit feature. This feature remains on the inventory records

- Attributes provided: Quantity of 150 #ELFP
- Attributes required: See #ELFP
- Minimum required: 0
- Maximum allowed: 4 (Initial order maximum: 4)
- OS level required: see feature ELFP
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELQ2) - Quantity 150 of #ELF3 (1.2TB 10k SFF-2)**

(No longer available as of January 29, 2021)

This feature ships a quantity of 150 #ELF3, 1.2TB 10K RPM 4K SAS SFF-2 Disk, units. The configurator may either generate this feature as they would any other single disk unit feature. This feature remains on the inventory records.

- Attributes provided: See feature#ELF3
- Attributes required: 150 SFF-2 SAS bays in EXP24S drawers
- Minimum required: 0
- Maximum allowed: 4 (Initial order maximum: 4)
- OS level required: see feature ELF3

- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELQ3) - Quantity 150 of #ELD3 (1.2TB 10k SFF-2)**

This feature ships a quantity of 150 #ELD3 disk units. The configurator may either generate this feature or allow users to select other single disk unit feature. This feature remains on the inventory records.

- Attributes provided: See feature #ELD3
- Attributes required: 150 SFF-1 SAS bays
- Minimum required: 0
- Maximum allowed: 4 (Initial order maximum: 0)
- OS level required: see feature ELD3
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

### **(#ELQ5) - Quantity 150 of #EL85 387GB SFF-2 SSD 4k**

(No longer available as of January 18, 2019)

This feature ships a quantity of 150 #EL85 solid state drives (SSDs). The configurator may either generate this feature or allow users to select any other single SSD feature. This feature remains on the inventory records.

- Attributes provided: Ships 150 SSDs
- Attributes required: See feature #EL85
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature EL85
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELQ6) - Quantity 150 of #EL96 (1.86TB SFF-2)**

(No longer available as of January 18, 2019)

This feature ships a quantity of 150 #EL96 SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #EL96
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature EL96
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELQ7) - Quantity 150 of #ELE7 (3.72TB SFF-2)**

(No longer available as of January 18, 2019)

This feature ships a quantity of 150 #ELE7 SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ELE7
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature ELE7
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELQ8) - Quantity 150 of #EL78 387GB SFF-2 SSD 5xx**

(No longer available as of January 18, 2019)

This feature ships a quantity of 150 #EL78 solid state drives (SSDs). The configurator may either generate this feature or would any other single SSD feature. This feature remains on the inventory records.

- Attributes provided: Ships 150 SSDs
- Attributes required: See feat #EL78
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature EL78
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELQC) - Quantity 150 of #EL8C 775GB SFF-2 SSD 4k**

(No longer available as of January 18, 2019)

This feature ships a quantity of 150 #EL8C solid state drives (SSDs). The configurator may either generate this feature or would any other single SSD feature. This feature remains on the inventory records.

- Attributes provided: Ships 150 SSDs
- Attributes required: See feat #EL8C
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature EL8C
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELQE) - Quantity 150 of #EL7E 775GB SFF-2 SSD 5xx**

(No longer available as of January 18, 2019)

This feature ships a quantity of 150 #EL7E solid state drives (SSDs). The configurator may either generate this feature or would any other single SSD feature. This feature remains on the inventory records.

- Attributes provided: Ships 150 SSDs
- Attributes required: See feat #EL7E
- Minimum required: 0

- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature EL7E
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELQF) - Quantity 150 of #EL8F 1.55TB SFF-2 SSD 4k**

(No longer available as of January 18, 2019)

This feature ships a quantity of 150 #EL8F solid state drives (SSDs). The configurator may either generate this feature or a would any other single SSD feature. This feature remains on the inventory records.

- Attributes provided: Ships 150 SSDs
- Attributes required: See feat #EL8F
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature EL8F
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELQP) - Quantity 150 of #EL1P**

(No longer available as of January 29, 2021)

This feature ships a quantity of 150 #EL1P disk units. The configurator may either generate this feature or allow users to select other single disk unit feature. This feature remains on the inventory records.

- Attributes provided: See feature #EL1P
- Attributes required: See feature #EL1P
- Minimum required: 0
- Maximum allowed: 4 (Initial order maximum: 4)
- OS level required: See feature EL1P
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELQQ) - Quantity 150 of #EL1Q**

(No longer available as of January 29, 2021)

This feature ships a quantity of 150 #EL1Q disk units. The configurator may either generate this feature or allow users to select other single disk unit feature. This feature remains on the inventory records.

- Attributes provided: See feature #EL1Q
- Attributes required: See feature #EL1Q
- Minimum required: 0
- Maximum allowed: 4 (Initial order maximum: 4)
- OS level required: See feature EL1Q
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No



**(#ELQS) - Quantity 150 of #EL4S 775GB SFF-2 4k SSD (Linux)**

This feature ships a quantity 150 of #EL4S SSD. The configurator may either generate this feature or allow users to select single disk unit feature. This feature remains on the inventory records

- Attributes provided: Quantity of 150 #EL4S
- Attributes required: 150 available SFF-2/GEN2 bays
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 0)
- OS level required: see feature EL4S
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

**(#ELQT) - Quantity 150 of #ELFT (1.8TB 10k SFF-2)**

(No longer available as of January 29, 2021)

This feature ships a quantity of 150 #ELFT 1.8TB 10K RPM 4K SAS SFF-2, units. The configurator may either generate the feature as they would any other single disk unit feature. This feature remains on the inventory records.

- Attributes provided: See feature#ELFT
- Attributes required: 150 SFF-2 SAS bays in EXP24S drawers
- Minimum required: 0
- Maximum allowed: 4 (Initial order maximum: 4)
- OS level required: see feature ELFT
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ELQV) - Quantity 150 of #ELEV (600GB 10k SFF-2)**

(No longer available as of January 29, 2021)

This feature ships a quantity of 150 #ELEV 600GB 10K RPM 4K SAS SFF-2, units. The configurator may either generate the feature as they would any other single disk unit feature. This feature remains on the inventory records.

- Attributes provided: See feature#ELEV
- Attributes required: 150 SFF-2 SAS bays in EXP24S drawers
- Minimum required: 0
- Maximum allowed: 4 (Initial order maximum: 4)
- OS level required: see feature ELEV
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ELQY) - Quantity 150 of #EL8Y (931GB SFF-2)**

(No longer available as of January 18, 2019)

This feature ships a quantity of 150 #EL8Y SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #EL8Y

- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature EL8Y
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELQZ) - Quantity 150 of #ELEZ (300GB SSD SFF-2)**

(No longer available as of November 9, 2018)

This feature ships a quantity 150 of #ELEZ disk units. The configurator may either generate this feature or allow users to select other single disk unit feature. This feature remains on the inventory records

- Attributes provided: Quantity 150 of #ELEZ
- Attributes required: See #ELEZ
- Minimum required: 0
- Maximum allowed: 4 (Initial order maximum: 4)
- OS level required: see feature ELEZ
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELR0) - Quantity 150 of EL80 1.9TB SSD**

This feature ships a quantity of 150 #EL80 SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #EL80
- Attributes required: see feature #EL80
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 0)
- OS level required: see feature EL80
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

### **(#ELR2) - Quantity 150 of #EL62 3.86-4.0 TB 7200 rpm 4k LFF-1 Disk**

(No longer available as of January 29, 2021)

This feature ships a quantity of 150 #EL62 drives. The configurator may either generate this feature or allow users to select single drive feature. This feature remains on the inventory records.

- Attributes provided: 150 enterprise nearline drives.
- Attributes required: 150 open LFF (3.5-inch) bays in EXP12SX Storage Enclosure.
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature EL62
- Initial Order/MES/Both/Supported: Both
- CSU: Yes

- Return parts MES: No

#### **(#ELR4) - Quantity 150 of #EL64 7.72-8.0 TB 7200 rpm 4k LFF-1 Disk**

(No longer available as of January 29, 2021)

This feature ships a quantity of 150 #EL64 drives. The configurator may either generate this feature or allow users to select single drive feature. This feature remains on the inventory records.

- Attributes provided: 150 enterprise nearline drives
- Attributes required: 150 open LFF (3.5-inch) bays in EXP12SX Storage Enclosure
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature EL64
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

#### **(#ELR5) - Quantity 150 of #ELG5 (387GB SAS 5xx)**

(No longer available as of August 30, 2019)

This feature ships a quantity of 150 #ELG5 387GB, units. The configurator may either generate this feature or allow users to select other single disk unit feature. This feature remains on the inventory records.

- Attributes provided: See feature #ELG5
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature ELG5
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

#### **(#ELR8) - Quantity 150 of #ELM8 3.72 TB SSD 4k SFF-2**

(No longer available as of August 30, 2019)

This feature ships a quantity of 150 #ELM8 SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ELM8
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature ELM8
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

#### **(#ELRB) - Quantity 150 of #ELGB (387GB SAS 4k)**

(No longer available as of August 30, 2019)

This feature ships a quantity of 150 #ELGB 387GB, units. The configurator may either generate this feature or allow users other single disk unit feature. This feature remains on the inventory records.

- Attributes provided: See feature #ELGB
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature ELGB
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELRF) - Quantity 150 of #ELGF (775GB SAS 5xx)**

(No longer available as of August 30, 2019)

This feature ships a quantity of 150 #ELGF 775 GB, units. The configurator may either generate this feature or allow users other single disk unit feature. This feature remains on the inventory records.

- Attributes provided: See feature #ELGF
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature ELGF
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELRJ) - Quantity 150 of #ELHJ 931 GB SSD 4k SFF-2**

(No longer available as of August 30, 2019)

This feature ships a quantity of 150 #ELHJ SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ELHJ
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature ELHJ
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELRK) - Quantity 150 of #ELGK (775GB SAS 4k)**

(No longer available as of August 30, 2019)

This feature ships a quantity of 150 #ELGK 775 GB, units. The configurator may either generate this feature or allow users other single disk unit feature. This feature remains on the inventory records.

- Attributes provided: See feature #ELGK
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0

- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature ELGK
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELRL) - Quantity 150 of #ELHL 1.86 TB SSD 4k SFF-2**

(No longer available as of August 30, 2019)

This feature ships a quantity of 150 #ELHL SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ELHL
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature ELHL
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELRN) - Quantity 150 of #ELHN 7.45 TB SSD 4k SFF-2**

(No longer available as of August 30, 2019)

This feature ships a quantity of 150 #ELHN SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ELHN
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature ELHN
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ELRP) - Quantity 150 of #ELGP (1.55TB SAS 4k)**

(No longer available as of August 30, 2019)

This feature ships a quantity of 150 #ELGP 1.55 TB, units. The configurator may either generate this feature or allow users other single disk unit feature. This feature remains on the inventory records.

- Attributes provided: See feature #ELGP
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: see feature ELGP
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ELRQ) - Quantity 150 of #EL4Q 387GB SFF-2 4k SSD (Linux)**

This feature ships a quantity 150 of #EL4Q SSD. The configurator may either generate this feature or allow users to select single disk unit feature. This feature remains on the inventory records

- Attributes provided: Quantity of 150 #EL4Q
- Attributes required: 150 available GEN2 drive bays
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 0)
- OS level required: see feature EL4Q
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

## **(#EM60) - 8 GB DDR4 Memory**

(No longer available as of August 7, 2020)

Provides 8 GB 2666 Mhz DDR4 of system memory.

- Attributes provided: 8 GB RDIMM memory
- Attributes required: Available memory slot
- Minimum required: 0
- Maximum allowed: 32 (Initial order maximum: 32)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EM62) - 16 GB DDR4 Memory**

Provides 16 GB of DDR4 system memory.

- Attributes provided: 16 GB DDR4 memory dimm
- Attributes required: Available memory slot
- Minimum required: 0
- Maximum allowed: 32 (Initial order maximum: 32)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EM63) - 32 GB DDR4 Memory**

Provides 32 GB of DDR4 system memory.

- Attributes provided: 32 GB DDR4 memory dimm
- Attributes required: Available memory slot
- Minimum required: 0
- Maximum allowed: 32 (Initial order maximum: 32)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EM64) - 64 GB DDR4 Memory**

(No longer available as of March 5, 2021)

Provides 64 GB of DDR4 system memory.

- Attributes provided: 64 GB DDR4 memory dimm
- Attributes required: Available memory slot
- Minimum required: 0
- Maximum allowed: 32 (Initial order maximum: 32)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EM65) - 128 GB DDR4 Memory**

(No longer available as of March 5, 2021)

Provides 128 GB of DDR4 system memory.

- Attributes provided: 128 GB DDR4 memory dimm
- Attributes required: Available memory slot
- Minimum required: 0
- Maximum allowed: 32 (Initial order maximum: 32)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#EM7B) - 64 GB DDR4 Memory Dimm**

Provides 64 GB running at 2666Mhz 16Gbit DDR4 system memory.

- Attributes provided: 64GB Memory Dimm

- Attributes required: Available memory slot
- Minimum required: 0
- Maximum allowed: 32 (Initial order maximum: 32)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No  
Editor Note: FW 950, or later is required

## **(#EM7C) - 128 GB DDR4 Memory Dimm**

Provides 128 GB running at 2666Mhz 16Gbit DDR4 system memory.

- Attributes provided: 128 GB Memory Dimm
- Attributes required: Available memory slot
- Minimum required: 0
- Maximum allowed: 32 (Initial order maximum: 32)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No  
Editor Note: FW 950, or later is required

## **(#EMXA) - AC Power Supply Conduit for PCIe3 Expansion Drawer**

Provides two 320-C14 inlet electrical connections for two separately ordered AC power cords with C13 connector plugs. C13 connection between two power supplies located in the front of a PCIe Gen3 I/O Expansion Drawer (#EMX0) and two power supplies located in the front of a PCIe Gen3 I/O Expansion Drawer.

- Attributes provided: Two AC Power Supply connections
- Attributes required: PCIe Gen3 I/O Expansion Drawer and two AC power cords
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EMXH) - PCIe3 6-Slot Fanout Module for PCIe3 Expansion Drawer**

PCIe3 fanout module for PCIe Gen3 I/O Expansion Drawer. Provides six PCIe Gen3 full high, full length slots (two x16 and four x8).

The module has two CXP ports which are connected to two CXP ports on a PCIe Optical Cable Adapter (only allowed to connect to a PCIe3 Optical Cable Adapter). A pair of active optical CXP cables (AOC) or a pair of CXP copper cables are used for this connection. The fanout module is cabled to the top CXP port of the PCIe3 Optical Cable Adapter. The bottom CXP port of the fanout module is cabled to the same PCIe3 Optical Cable Adapter.

Limitations:



- Mixing of prior PCIe3 fanout modules (#EMXF, #EMXG, #ELMF, #ELMG) with PCIe3 fanout module (feature #EMXH) not allowed
- Mixing of I/O Expansion Drawer with prior PCIe3 fanout modules (#EMXF, #EMXG, #ELMF, #ELMG) and I/O Expansion Drawer (feature #EMXH) in same configuration is allowed
- Prior PCIe3 fanout modules (#EMXF, #EMXG, #ELMF, #ELMG) are only allowed to connect with prior PCIe3 Optical Cable Adapters (#EJ19, #EJ20, or #EJ1R) requires to use Optical Cables (#ECCR, #ECCX, ECCY, or #ECCZ)
- Attributes provided: PCIe3 6-slot fanout module for PCIe Gen3 I/O Expansion Drawer
- Attributes required: Available bay in PCIe Gen3 I/O Expansion Drawer.
- Minimum required: 0
- Maximum allowed: 3 (Initial order maximum: 3)
- OS level required:
  - Linux supported
  - AIX not supported
  - IBM i not supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No
  - Firmware 9.30, or later for copper CXP cables

### **(#EN01) - 1m (3.3-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper**

1m (3.3-ft) copper active twinax Ethernet cable which supports Ethernet data transfer rates up to 10 Gb/s. The cable has a SFP+ port which is placed in an SFP+ port of an adapter and/or a switch. This cabling option can be a cost effective alternative to optical connection.

- Attributes provided: 10Gb/s copper active twinax Ethernet cable
- Attributes required: One available SFP+ 10Gb/s Ethernet Port
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EN02) - 3m (9.8-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper**

3m (9.8-ft) copper active twinax Ethernet cable which supports Ethernet data transfer rates up to 10 Gb/s. The cable has a SFP+ port which is placed in an SFP+ port of an adapter and/or a switch. This cabling option can be a cost effective alternative to optical connection.

- Attributes provided: 10Gb/s copper active twinax Ethernet cable
- Attributes required: One available SFP+ 10Gb/s Ethernet Port
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#EN03) - 5m (16.4-ft), 10Gb E'Net Cable SFP+ Act Twinax Copper**

5m (16.4-ft) copper active twinax Ethernet cable which supports Ethernet data transfer rates up to 10 Gb/s. The cable has a SFP+ port which is placed in an SFP+ port of an adapter and/or a switch. This cabling option can be a cost effective alternative to optical connection.

connection.

- Attributes provided: 10Gb/s copper active twinax Ethernet cable
- Attributes required: One available SFP+ 10Gb/s Ethernet Port
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EN0N) - PCIe3 LP 4-port(10Gb FCoE & 1GbE) LR&RJ45 Adapter**

This PCIe Gen3 Converged Network Adapter (CNA) supports both Ethernet NIC (Network Interface Card) traffic and Fibre Channel traffic. The adapter provides two 10 Gb LR optical ports and two 1 Gb RJ45 ports in a PCIe 8x short form adapter. The 10Gb ports have Ethernet capability. NPIV capability is provided through VIOS. The adapter was initially announced as PCIe Gen2, but the introduction of POWER8/POWER9 servers have enabled PCIe Gen3.

The 10Gb ports are SFP+ and include an optical LR transceiver. The ports have LC Duplex type connectors and utilize OM3 OM4 cabling. With 9 micron OS1, up to 10 kilometer length fiber cables are supported. Priority Flow Control (PFC) and Fibre Channel are supported for distances of 300 meters or less. Note that an FCoE switch is required for any FCoE traffic.

For the 1Gb RJ45 ports, 4-pair CAT-5 Unshielded Twisted Pair (UTP) cable or higher is supported for distances of up to 100 meters, 100 Mb networks are also supported, but 10Mb networks are not supported.

#EN0M and #EN0N adapters are electronically identical. They are physically identical except #EN0M has a tail stock for full height stock for low profile slots. The CCIN is 2CC0 for both features.

Details for the ports include:

- AIX NIM support
- IEEE 802.3ae (10 GbE), 802.3ab (1 GbE), 802.1p priority, 802.1Q VLAN tagging, 802.3x flow control, 802.3ad load-balancing
- Link aggregation, IEEE 802.3ad 802.3
- Multiple MAC addresses per interface
- MSI-X, MSI and support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6
- TCP segmentation Offload (TSO) for IPv4 and IPv6
- UDP checksum offload for IPv4 and IPv6
- AIX, IBM i and Linux provide software iSCSI support through the adapter. Linux can also leverage adapter hardware scatter/gather (CRC) generation and checking

Important: There is no FCoE support on POWER9 systems.

- Attributes provided: Four ports - two 10Gb CNA and two 1Gb Ethernet
- Attributes required: PCIe Gen2 or Gen3 slot - low profile
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 0)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Must remove
- CSU: Yes

- Return parts MES: No  
**Note: VIOS 2.2.3.3 with interim fix IV56366, or later**

## (#EN0S) - PCIe2 4-Port (10Gb+1GbE) SR+RJ45 Adapter

PCIe Gen2 x8 short Ethernet adapter supports Ethernet NIC (Network Interface Card) traffic. The adapter provides two 10 ports in a PCIe 8x short form adapter.

The 10Gb ports are SFP+ and include optical SR transceivers. The ports have LC Duplex type connectors and utilize short cabling. With 62.5 micron OM1, up to 33 meter length fiber cables are supported. With 50 micron OM2, up to 82 meter fiber cable lengths are supported. With 50 micron OM3 or OM4, up to 300 meter fiber cable lengths are supported.

For the 1Gb RJ45 ports, 4-pair CAT-5 Unshielded Twisted Pair (UTP) cable or higher is supported for distances of up to 10 networks, 100 Mb networks are also supported, but 10Mb networks are not supported.

#EN0S and #EN0T adapters are electronically identical. They are physically identical except #EN0S has a tail stock for full stock for low profile slots. The CCIN is 2CC3 for both features.

Details for the ports include:

- VIOS NIM and LINUX NETWORK INSTALL are supported.
- IEEE 802.3ae (10GBASE-SR), IEEE 802.3ab (1000BASE-T GbE), IEEEu 802.3u (100BASE-T), 802.1p priority, 802.1Q, 802.3ad load-balancing and failover,
- Link aggregation, IEEE 802.3ad 802.3
- Multiple MAC addresses/promiscuous mode (for PowerVM/VIOS) per interface
- Message Signalling Interrupt MSI-X, MSI and support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6
- TCP segmentation Offload (TSO) RSS (Receive Side Scaling) support for IPv4, IPv6 and UDP for IPv4 and IPv6
- UDP checksum offload for IPv4 and IPv6
- AIX, IBM i, and Linux provide software iSCSI support through the adapter.
- Attributes provided: Four ports - two 10Gb and two 1Gb E
- Attributes required: PCIe Gen2 or Gen3 slot - full high
- Minimum required: 0
- Maximum allowed: 18 (Initial order maximum: 18)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No  
**Note: VIOS supported**

## (#EN0T) - PCIe2 LP 4-Port (10Gb+1GbE) SR+RJ45 Adapter

PCIe Gen2 x8 short Ethernet adapter supports Ethernet NIC (Network Interface Card) traffic. The adapter provides two 10 ports in a PCIe 8x short form adapter.

The 10Gb ports are SFP+ and include optical SR transceivers. The ports have LC Duplex type connectors and utilize short cabling. With 62.5 micron OM1, up to 33 meter length fiber cables are supported. With 50 micron OM2, up to 82 meter fiber cable lengths are supported. With 50 micron OM3 or OM4, up to 300 meter fiber cable lengths are supported.

For the 1Gb RJ45 ports, 4-pair CAT-5 Unshielded Twisted Pair (UTP) cable or higher is supported for distances of up to 10 networks, 100 Mb networks are also supported, but 10Mb networks are not supported.

#EN0S and #EN0T adapters are electronically identical. They are physically identical except #EN0S has a tail stock for full stock for low profile slots. The CCIN is 2CC3 for both features.

Details for the ports include:

- VIOS NIM and LINUX NETWORK INSTALL are supported.
- IEEE 802.3ae (10GBASE-SR), IEEE 802.3ab (1000BASE-T GbE), IEEEu 802.3u (100BASE-T), 802.1p priority, 802.1Q VLAN tagging, 802.3ad load-balancing and failover,
- Link aggregation, IEEE 802.3ad 802.3
- Message Signalling Interrupt MSI-X, MSI and support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6
- TCP segmentation Offload (TSO) RSS (Receive Side Scaling) support for IPv4, IPv6 and UDP for IPv4 and IPv6
- UDP checksum offload for IPv4 and IPv6
- AIX, IBM i and Linux provide software iSCSI support through the adapter.
- Attributes provided: Four ports - two 10Gb and two 1Gb E
- Attributes required: PCIe Gen2 or Gen3 slot - low profile
- Minimum required: 0
- Maximum allowed: 9 (Initial order maximum: 9)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EN0U) - PCIe2 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter**

PCIe Gen2 x8 short Ethernet adapter supports Ethernet NIC (Network Interface Card) traffic. The adapter provides two 10 RJ45 ports in a PCIe 8x short form adapter.

The 10Gb ports are SFP+ and do not include a transceiver. Active Copper twinax cables up to 5 meter in length are supported for #EN02 or #EN03. A transceiver is included with these cables. Note that SFP+ twinax copper is NOT AS/400 5250 twinax c differ from passive cables.

For the 1Gb RJ45 ports, 4-pair CAT-5 Unshielded Twisted Pair (UTP) cable or higher is supported for distances of up to 100 meters, 100 Mb networks are also supported, but 10Mb networks are not supported.

#EN0U and #EN0V adapters are electronically identical. They are physically identical except #EN0U has a tail stock for full stock for low profile slots. The CCIN is 2CC3 for both features.

Details for the ports include:

- AIX NIM and Linux Network Install are supported.
- IEEE 802.3ae (10 GbE), IEEE 802.3ab (1000BASE-T GbE), 100BASE-T IEEEu, 802.1p priority, 802.1Q VLAN tagging, 802.3ad load-balancing and failover,
- Link aggregation, IEEE 802.3ad 802.3
- Multiple MAC addresses/promiscuous mode (for PowerVM/VIOS) per interface
- Message Signalling Interrupt MSI-X, MSI and support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6

- TCP segmentation Offload (TSO) for IPv4 and IPv6
  - UDP checksum offload for IPv4 and IPv6
  - AIX, IBM i and Linux provide software iSCSI support through the adapter.
  - Attributes provided: Four ports - two 10Gb and two 1Gb E
  - Attributes required: PCIe Gen2 or Gen3 slot - full high
  - Minimum required: 0
  - Maximum allowed: 18 (Initial order maximum: 18)
  - OS level required:
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Supports PowerKVM and VIOS. Refer to Software Requirements for specific code levels supported.**

### (#EN0V) - PCIe2 LP 4-port (10Gb+1GbE) Copper SFP+RJ45 Adapter

PCIe Gen2 x8 short Ethernet adapter supports Ethernet NIC (Network Interface Card) traffic. The adapter provides two 10 RJ45 ports in a PCIe 8x short form adapter.

The 10Gb ports are SFP+ and do not include a transceiver. Active Copper twinax cables up to 5 meter in length are supported by #EN02 or #EN03. A transceiver is included with these cables. Note that SFP+ twinax copper is NOT AS/400 5250 twinax c differ from passive cables.

For the 1Gb RJ45 ports, 4-pair CAT-5 Unshielded Twisted Pair (UTP) cable or higher is supported for distances of up to 10 networks, 100 Mb networks are also supported, but 10Mb networks are not supported.

#EN0U and #EN0V adapters are electronically identical. They are physically identical except #EN0U has a tail stock for full stock for low profile slots. The CCIN is 2CC3 for both features.

Details for the ports include:

- VIOS NIM and LINUX NETWORK INSTALL are supported.
- IEEE 802.3ae (10 GbE), IEEE 802.3ab (1000BASE-T GbE), 100BASE-T IEEEu, 802.1p priority, 802.1Q VLAN tagging balancing and failover,
- Link aggregation, IEEE 802.3ad 802.3
- Message Signalling Interrupt MSI-X, MSI and support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- Jumbo frames up to 9.6 Kbytes
- TCP checksum offload for IPv4 and IPv6
- TCP segmentation Offload (TSO) for IPv4 and IPv6
- UDP checksum offload for IPv4 and IPv6
- AIX, IBM i and Linux provide software iSCSI support through the adapter.
- Attributes provided: Four ports - two 10Gb and two 1Gb E
- Attributes required: PCIe Gen2 or Gen3 slot - low profile
- Minimum required: 0
- Maximum allowed: 9 (Initial order maximum: 9)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both

- CSU: Yes
- Return parts MES: No

## (#EN0Y) - PCIe2 LP 8Gb 4-port Fibre Channel Adapter

(No longer available as of May 12, 2020)

PCIe Gen2 8 Gigabit quad port Fibre Channel Adapter is a low profile, high-performance 8x short form Host Bus Adapter (HBA) with capability over a fiber link or with NPIV, multiple initiator capability is provided. The ports have LC type connectors and utilize shortwave optics; operates at link speeds of 2, 4, and 8 Gbps and will automatically negotiate to the highest speed possible. LEDs on each port indicate link speed of the port. CCIN is EN0Y. This adapter based on the QLogic QLE2564 PCIe Host Bus Adapter (HBA).

The adapter connects to a Fibre Channel switch. Direct device attachment has not been tested and is not supported.

N\_Port ID Virtualization (NPIV) capability is supported through VIOS.

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the following standards:

- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth

Because core sizes are different, OM1 cables can only be connected to other OM1 cables. For best results, OM2 cables should be connected to OM2 cables. However, if an OM2 cable is connected to an OM3 cable, the characteristics of the OM2 cable apply to the entire length of the cable.

The following table shows the supported distances for the three different cable types at the three different link speeds.

Cable	2.125 Gbps	4.25 Gbps	8.5 Gbps
OM3	.5m - 500m	.5m - 380m	.5m - 150m
OM2	.5m - 300m	.5m - 150m	.5m - 50m
OM1	.5m - 150m	.5m - 70m	.5m - 21m

A Gen2 or later PCIe slot is required to provide the bandwidth for all four ports to operate at full speed. Use in Gen1 slots if supported.

The EN12 and EN0Y adapters are electronically and functionally identical. Feature EN12 indicates a full high tailstock bracket profile tailstock bracket.

Consult with your IBM representative or Business Partner for additional information relative to any third party attachment.

- Attributes provided: 4-port 8Gb Fibre Channel Adapter
  - Attributes required: 1 Empty PCIe Gen2 or later slot
  - Minimum required: 0
  - Maximum allowed: 8 (Initial order maximum: 8)
  - OS level required:
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: VIOS supported. Refer to Software Requirements for specific code levels supported.**

## (#EN12) - PCIe2 8Gb 4-port Fibre Channel Adapter

(No longer available as of May 12, 2020)

PCIe Gen2 8 Gigabit quad port Fibre Channel Adapter is a high-performance 8x short form Host Bus Adapter (HBA). Each port has capability over a fiber link or with NPIV, multiple initiator capability is provided. The ports have LC type connectors and use shortwave optics.

link speeds of 2, 4, and 8 Gbps and will automatically negotiate to the highest speed possible. LEDs on each port provide i of the port. This adapter based on the QLogic QLE2564 PCIe Host Bus Adapter (HBA).

- The adapter connects to a Fibre Channel switch. Direct device attachment has not been tested and is not supported.
- N\_Port ID Virtualization (NPIV) capability is supported through VIOS.
- Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to t
  - OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth
  - OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth
  - OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth
- Because core sizes are different, OM1 cables can only be connected to other OM1 cables. For best results, OM2 cabl cables. However, if an OM2 cable is connected to an OM3 cable, the characteristics of the OM2 cable apply to the ent
- The following table shows the supported distances for the three different cable types at the three different link speeds.

Cable	2.125 Gbps	4.25 Gbps	8.5 Gbps
OM3	.5m - 500m	.5m - 380m	.5m - 150m
OM2	.5m - 300m	.5m - 150m	.5m - 50m
OM1	.5m - 150m	.5m - 70m	.5m - 21m

- The EN12 and EN0Y adapters are electronically and functionally identical with the same CCIN of EN0Y. # EN12 indic indicates a low profile tailstock bracket.
- Consult with your IBM representative or Business Partner for additional information relative to any third party attachme
- Attributes provided: 4-port 8Gb Fibre Channel Adapter
- Attributes required: Available PCIe Gen3 slot in #EMX0 Expansion Drawer
  - Minimum required: 0
  - Maximum allowed: 18 (Initial order maximum: 18)
  - OS level required:
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No

## (#EN15) - PCIe3 4-port 10GbE SR Adapter

This PCIe Gen3 supports Ethernet NIC (Network Interface Card) traffic and also supports SR-IOV capability. The adapter p PCIe 8x short form adapter. SR-IOV capability for the NIC function is supported with the appropriate firmware and OS leve IOV function requires an HMC.

The four 10Gb ports are SFP+ and include four optical SR transceivers. The ports have LC Duplex type connectors and uti 850nm fiber cabling. With 62.5 micron OM1, up to 33 meter length fiber cables are supported. With 50 micron OM2, up to 8 supported. With 50 micron OM3 or OM4, up to 300 meter fiber cable lengths are supported.

#EN15 and #EN16 adapters are electronically identical. They are physically identical except #EN15 has a tail stock for full stock allowing it to fit in a Power E870/E880 or Power E870C/E880C system node PCIe slot. The CCIN is 2CE3 for both fe  
**Note: VNIC supported with SUSE Linux Enterprise Server 12, Service Pack 3, with all available maintenance updat**

Details for the ports include:

- AIX NIM support
- IEEE 802.3ae (10 GbE), 802.1p priority, 802.1Q VLAN tagging, 802.3x flow control, 802.3ad load-balancing and failov
- Link aggregation, IEEE 802.3ad 802.3
- Multiple MAC addresses per interface
- MSI-X, MSI and support of legacy pin interrupts
- Ether II and IEEE 802.3 encapsulated frames
- TCP checksum offload for IPv4 and IPv6

- TCP segmentation Offload (TSO) for IPv4 and IPv6
  - UDP checksum offload for IPv4 and IPv6
  - AIX, IBM i and Linux provide software iSCSI support through the adapter. Linux can also leverage adapter hardware s data digest (CRC) generation and checking
  - Attributes provided: Four 10GbE ports
  - Attributes required: full high PCIe Gen3 slot
  - Minimum required: 0
  - Maximum allowed: 18 (Initial order maximum: 18)
  - OS level required:
    - Bare Metal Systems (#EC16): Not Supported.
    - PowerKVM 3.1 Systems (#EC40): Not Supported.
    - PowerKVM 2.1 Systems: (#EC20): Not Supported.
- All other systems:
- Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
    - VIOS 2.2.3.51 or later
    - PowerKVM - No support currently provided with PowerKVM

## (#EN2A) - PCIe3 16Gb 2-port Fibre Channel Adapter

PCIe Gen3 16 Gigabit dual-port Optical Fibre Channel (FC) Adapter is a high-performance 8x short form adapter PCIe Host Bus Adapter (HBA) that provides two ports of 16Gb Fibre Channel capability using SR optics. Each port can provide up to 16Gb Fibre Channel functionality.

Each port provides single initiator capability over a fibre link. If you are using N\_Port ID Virtualization (NPIV), multiple initial SFP+ and include an optical SR transceiver. The ports have little connector-type (LC) and utilize shortwave laser optics. They support 1, 2, 4, 8, and 16 Gbps and it will automatically negotiate to the highest speed possible.

The adapter connects to a Fibre Channel switch at 4 Gb, 8 Gb, or 16 Gb. It can directly attach to a device without a switch. Channel switch attached is not supported at 4 Gb or 8 Gb.

NPIV capability is supported through Virtual I/O Server (VIOS).

Feature EN2A and EN2B are electronically identical. They differ physically only that EN2A has a tail stock for full high PCIe slots for low profile PCIe slots.

CCIN is 579D for both features.

Each port has two LED indicators located on the bracket next to each connector. These LEDs communicate boot status and operating state. The LEDs have five defined states; solid on, solid off, slow blink, fast blink, and flashing. The slow blink rate and flashing refers to an irregular on/off transition that reflects test progress. The operator should observe the LED sequence for operating state is correctly identified.

The adapter has the following features:

- The adapter is compliant with the PCIe base and Card Electromechanical (CEM) 2.0 specifications with the following capabilities:
  - Provides an x8 lane link interface at 14.025 Gbps, 8.5 Gbps, or 4.25 Gbps (automatic negotiation with system)
  - Provides support for one Virtual Channel (VC0) and one Traffic Class (TC0)
  - Provides configuration and I/O memory read and write, completion, and messaging capabilities
  - Provides support for 64-bit addressing
  - Provides error correction code (ECC) and error protection functions
  - Provides link cyclic redundancy check (CRC) on all PCIe packets and message information
  - Provides a large payload size of 2048 bytes for read and write functions



- Provides a large read request size of 4096 bytes
- The adapter is compatible with 4, 8, and 16 Gb Fibre Channel interface with the following characteristics:
  - Provides for automatic negotiation between 4 Gb, 8 Gb, or 16 Gb link attachments
  - Provides support for the following Fibre Channel topologies: point-to-point (16 Gb only) and fabric
  - Provides support for Fibre Channel class 3
  - Provides a maximum Fibre Channel throughput that is achieved by using full duplex hardware support
- The adapter provides an end-to-end data path parity and CRC protection, including internal data path random-access
- Provides architectural support for multiple upper layer protocols
- Provides comprehensive virtualization capabilities with support for N\_Port ID Virtualization (NPIV) and virtual fabric (V)
- Provides support for message signaled interrupts extended (MSI-X)
- Provides support for 255 VFs and 1024 MSI-X
- Provides an internal, high-speed static random-access memory (SRAM) memory
- Provides ECC protection of local memory that includes single-bit correction and double-bit protection
- Provides an embedded shortwave optical connection with diagnostics capability
- Provides support for an on-board context management by firmware:
  - Up to 8192 FC port logins
  - I/O multiplexing down to the Fibre Channel frame level
- Provides data buffers capable of supporting 64+ buffer-to-buffer (BB) credits per port for shortwave applications
- Provides link management and recovery that is handled by firmware
- Provides on-board diagnostic capability accessible by an optional connection
- Provides a performance up to 16 Gbps full duplex

#### Cables:

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the fo

- OM4 - multimode 50/125 micron fibre, 4700 MHz\*km bandwidth with LC connectors
  - 4GFC: 0.5m - 400m
  - 8GFC: 0.5m - 190m
  - 16GFC: 0.5m - 125m
  - 32GFC: 0.5m - 100m
- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth with LC connectors
  - 4GFC: 0.5m - 380m
  - 8GFC: 0.5m - 150m
  - 16GFC: 0.5m - 100m
  - 32GFC: 0.5m - 70m
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth with LC connectors
  - 4GFC: 0.5m - 150m
  - 8GFC: 0.5m - 50m
  - 16GFC: 0.5m - 35m
  - 32GFC: 0.5m - 20m
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth with LC connectors
  - 4GFC: 0.5m - 70m
  - 8GFC: 0.5m - 21m
  - 16GFC: 0.5m - 15m
  - 32GFC: N/A

;note.The H/W cannot detect what length and type of cable is installed. The link will auto-negotiate to the speed reported d must manually set the maximum negotiation speed. If too high of speed is selected, bit errors may occur.

See also optional wrap plug feature ECW0 which is: a) Required to run some diagnostic procedures and b) In some cases empty ports as well as avoid useless messages pointing to a planned empty port.

- Attributes provided: 2-port 16Gb Optical FC
  - Attributes required: Full high profile PCIe Gen3 slot
  - Minimum required: 0
  - Maximum allowed: 18 (Initial order maximum: 18)
  - OS level required:
    - Red Hat Enterprise Linux 8, for POWER LE, version 8.2, or later
    - SUSE Linux Enterprise Server 15, Service Pack 2, or later
    - SUSE Linux Enterprise Server 12, Service Pack 5, or later
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Assignment to the VIOS requires VIOS 3.1.2.10, or later**

## (#EN2B) - PCIe3 LP 16Gb 2-port Fibre Channel Adapter

PCIe Gen3 16 Gigabit dual-port Optical Fibre Channel (FC) Adapter is a high-performance 8x short form adapter PCIe Host Bus Adapter (HBA) that provides two ports of 16Gb Fibre Channel capability using SR optics. Each port can provide up to 16Gb Fibre Channel functionality.

Each port provides single initiator capability over a fibre link. If you are using N\_Port ID Virtualization (NPIV), multiple initial SFP+ and include an optical SR transceiver. The ports have little connector-type (LC) and utilize shortwave laser optics. They support 1, 2, 4, 8, and 16 Gbps and it will automatically negotiate to the highest speed possible.

The adapter connects to a Fibre Channel switch at 4 Gb, 8 Gb, or 16 Gb. It can directly attach to a device without a switch. Direct attach without a switch is not supported at 4 Gb or 8 Gb.

NPIV capability is supported through Virtual I/O Server (VIOS).

Feature EN2A and EN2B are electronically identical. They differ physically only that EN2A has a tail stock for full high PCIe slots for low profile PCIe slots.

CCIN is 579D for both features.

Each port has two LED indicators located on the bracket next to each connector. These LEDs communicate boot status and operating state. The LEDs have five defined states; solid on, solid off, slow blink, fast blink, and flashing. The slow blink rate and flashing refers to an irregular on/off transition that reflects test progress. The operator should observe the LED sequence for the operating state is correctly identified.

The adapter has the following features:

- The adapter is compliant with the PCIe base and Card Electromechanical (CEM) 2.0 specifications with the following characteristics:
  - Provides an x8 lane link interface at 14.025 Gbps, 8.5 Gbps, or 4.25 Gbps (automatic negotiation with system)
  - Provides support for one Virtual Channel (VC0) and one Traffic Class (TC0)
  - Provides configuration and I/O memory read and write, completion, and messaging capabilities
  - Provides support for 64-bit addressing
  - Provides error correction code (ECC) and error protection functions
  - Provides link cyclic redundancy check (CRC) on all PCIe packets and message information
  - Provides a large payload size of 2048 bytes for read and write functions
  - Provides a large read request size of 4096 bytes
- The adapter is compatible with 4, 8, and 16 Gb Fibre Channel interface with the following characteristics:
  - Provides for automatic negotiation between 4 Gb, 8 Gb, or 16 Gb link attachments
  - Provides support for the following Fibre Channel topologies: point-to-point (16 Gb only) and fabric
  - Provides support for Fibre Channel class 3
  - Provides a maximum Fibre Channel throughput that is achieved by using full duplex hardware support
- The adapter provides an end-to-end data path parity and CRC protection, including internal data path random-access
- Provides architectural support for multiple upper layer protocols
- Provides comprehensive virtualization capabilities with support for N\_Port ID Virtualization (NPIV) and virtual fabric (VF)

- Provides support for message signaled interrupts extended (MSI-X)
- Provides support for 255 VFs and 1024 MSI-X
- Provides an internal, high-speed static random-access memory (SRAM) memory
- Provides ECC protection of local memory that includes single-bit correction and double-bit protection
- Provides an embedded shortwave optical connection with diagnostics capability
- Provides support for an on-board context management by firmware:
  - Up to 8192 FC port logins
  - I/O multiplexing down to the Fibre Channel frame level
- Provides data buffers capable of supporting 64+ buffer-to-buffer (BB) credits per port for shortwave applications
- Provides link management and recovery that is handled by firmware
- Provides on-board diagnostic capability accessible by an optional connection
- Provides a performance up to 16 Gbps full duplex

#### Cables:

Cables are the responsibility of the customer. Use multimode fibre optic cables with short-wave lasers that adhere to the fo

- OM4 - multimode 50/125 micron fibre, 4700 MHz\*km bandwidth with LC connectors
  - 4GFC: 0.5m - 400m
  - 8GFC: 0.5m - 190m
  - 16GFC: 0.5m - 125m
  - 32GFC: 0.5m - 100m
- OM3 - multimode 50/125 micron fibre, 2000 MHz\*km bandwidth with LC connectors
  - 4GFC: 0.5m - 380m
  - 8GFC: 0.5m - 150m
  - 16GFC: 0.5m - 100m
  - 32GFC: 0.5m - 70m
- OM2 - multimode 50/125 micron fibre, 500 MHz\*km bandwidth with LC connectors
  - 4GFC: 0.5m - 150m
  - 8GFC: 0.5m - 50m
  - 16GFC: 0.5m - 35m
  - 32GFC: 0.5m - 20m
- OM1 - multimode 62.5/125 micron fibre, 200 MHz\*km bandwidth with LC connectors
  - 4GFC: 0.5m - 70m
  - 8GFC: 0.5m - 21m
  - 16GFC: 0.5m - 15m
  - 32GFC: N/A

**Note: The H/W cannot detect what length and type of cable is installed. The link will auto-negotiate to the speed reported during must manually set the maximum negotiation speed. If too high of speed is selected, bit errors may occur.**

See also optional wrap plug feature ECW0 which is: a) Required to run some diagnostic procedures and b) In some cases empty ports as well as avoid useless messages pointing to a planned empty port.

- Attributes provided: 2-port 16Gb Optical FC
- Attributes required: Low profile PCIe Gen3 slot
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux 8, for POWER LE, version 8.2, or later
  - SUSE Linux Enterprise Server 15, Service Pack 2, or later
  - SUSE Linux Enterprise Server 12, Service Pack 5, or later
- Initial Order/MES/Both/Supported: Both

- CSU: Yes
  - Return parts MES: No
- Note: Assignment to the VIOS requires VIOS 3.1.2.10, or later**

## (#EPTH) - Horizontal PDU Mounting Hardware

This feature ships the hardware required to properly horizontally mount one #EPTG/EPTJ, #EPTK/EPTL, #EPTM/EPTN or rack. A 1U blank panel for the front of the rack for air-flow control is included.

Without this hardware, the PDU can be mounted vertically in the rack's side pockets, but can only be poorly mounted horizontally attached to the rear of the rack. But the front of the PDU will be unsupported toward the middle of the rack. Without the PDU will rest on the hardware mounted immediately below it. If that underlying hardware is removed from the rack then

**Important Note:** This feature code is typically used for an MES order and not for an original order of a new rack with #EPT IBM Manufacturing automatically adds this hardware without a feature code and at no additional charge when its #EPTn PDU mounted PDUs. Use this feature code when (1) converting an existing vertically mounted #EPTn PDU to horizontal mounting PDU for horizontal field installation.

- Attributes provided: mounting hardware
- Attributes required: High Function PDU (#EPT\*) and space in 19-inch rack
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#EPTJ) - High Function 9xC19 PDU

(No longer available as of April 24, 2020)

Switched, Monitoring

This is an intelligent, switched 200-240 volt AC Power Distribution Unit (PDU) with nine C19 receptacles on the front of the of the rack making the nine C19 receptacles easily accessible. Each receptacle has a 20 amp circuit breaker. Depending on single-phase or three-phase wye. See three-phase #EPTK/EPTL for countries which do not use wye wiring.

The PDU can be mounted vertically in rack side pockets or it can be mounted horizontally. If mounted horizontally, it uses 1 #EPTH for horizontal mounting hardware.

Device power cords with a C20 plug connect to C19 PDU receptacles and are ordered separately. One country-specific wall and attaches to a UTG524-7 connector on the front of the PDU. Supported line cords include features #6489, #6491, #6492, #6658, and #6667.

Two RJ45 ports on the front of the PDU enable the client to monitor each receptacle's electrical power usage and to remotely manage the PDU. The PDU is shipped with a generic PDU password and IBM strongly urges clients to change it upon installation.

There are also three C13 receptacles on the rear of the PDU positioned toward the middle of the rack. These are generally not recommended for use.

#EPTG and #EPTJ are identical PDUs. Up to one lower price #EPTG can be ordered with a new 7014-T42/T00 rack in place of the PDU.

For comparison, this is most similar to the earlier generation #7189 PDU

**Limitation:** Some configurations of the Elastic Storage Server (ESS) are delivered with a Intelligent PDU. At this time, the PDU is not configured or used by the ESS system. If the ESS Customer would like to use this capability, it is the Customer's responsibility to configure the PDU. In any case the ethernet port on the Intelligent PDU must not be connected to the ESS Management switch.

- Attributes provided: Nine C19 PDU - switched, power monitoring
- Attributes required: PDU wall line cord & space in 19-inch rack
- Minimum required: 0

- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EPTL) - High Function 9xC19 PDU 3-Phase**

(No longer available as of April 24, 2020)

Switched, Monitoring

This is an intelligent, switched 208 volt 3-phase AC Power Distribution Unit (PDU) with nine C19 receptacles on the front or rear of the rack making the nine C19 receptacles easily accessible. Each receptacle has a 20 amp circuit breaker.

The PDU can be mounted vertically in rack side pockets or it can be mounted horizontally. If mounted horizontally, it uses 1 #EPTH for horizontal mounting hardware.

Device power cords with a C20 plug connect to C19 PDU receptacles and are ordered separately. One wall line cord is provided (code) and has a IEC60309 60A plug (3P+G). The PDU supports up to 48 amps.

Two RJ45 ports on the front of the PDU enable the client to monitor each receptacle's electrical power usage and to remotely manage the PDU. The PDU is shipped with a generic PDU password and IBM strongly urges clients to change it upon installation.

There are also three C13 receptacles on the rear of the PDU positioned toward the middle of the rack. These are generally not recommended for use.

#EPTK and #EPTL are identical PDUs. Up to one lower price #EPTK can be ordered with a new 7014-T42/T00 rack in place of the PDU.

For comparison, this is most similar to the earlier generation #7196 PDU.

Not orderable in China and Hong Kong.

Limitation: Some configurations of the Elastic Storage Server (ESS) are delivered with a Intelligent PDU. At this time, the Intelligent PDU is not configured or used by the ESS system. If the ESS Customer would like to use this capability, it is the Customer's responsibility to order the Intelligent PDU. In any case the ethernet port on the Intelligent PDU must not be connected to the ESS Management switch.

- Attributes provided: Nine C19 PDU - switched, power monitoring
- Attributes required: space in rack, 3-phase 208V AC delta electrical service
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EPTN) - High Function 12xC13 PDU**

(No longer available as of April 24, 2020)

Switched, Monitoring

This is an intelligent, switched 200-240 volt AC Power Distribution Unit (PDU) with twelve C13 receptacles on the front of the rack making the twelve C13 receptacles easily accessible. Each receptacle has a 20 amp circuit breaker. Depending on the configuration, the PDU is single-phase or three-phase wye. See three-phase #EPTK/EPTL for countries which do not use wye wiring.

The PDU can be mounted vertically in rack side pockets or it can be mounted horizontally. If mounted horizontally, it uses 1 #EPTH for horizontal mounting hardware.

Device power cords with a C14 plug connect to C13 PDU receptacles and are ordered separately. One country-specific wall line cord is provided and attaches to a UTG524-7 connector on the front of the PDU. Supported line cords include features #6489, #6491, #6492, #6658, and #6667.

Two RJ45 ports on the front of the PDU enable the client to monitor each receptacle's electrical power usage and to remotely manage the PDU. The PDU is shipped with a generic PDU password and IBM strongly urges clients to change it upon installation.

#EPTM and #EPTN are identical PDUs. Up to one lower price #EPTM can be ordered with a new 7014-T42/T00 rack in place of the 7014-T42/T00 rack.

For comparison, this is most similar to the earlier generation #7109 PDU.

Limitation: Some configurations of the Elastic Storage Server (ESS) are delivered with a Intelligent PDU. At this time, the Intelligent PDU is not configured or used by the ESS system. If the ESS Customer would like to use this capability, it is the Customer's responsibility to configure the PDU. In any case the ethernet port on the Intelligent PDU must not be connected to the ESS Management switch.

- Attributes provided: Twelve C13 PDU - switched, power monitoring
- Attributes required: PDU wall line cord & space in 19-inch rack
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EPTQ) - High Function 12xC13 PDU 3-Phase**

(No longer available as of April 24, 2020)

Switched, Monitoring

This is an intelligent, switched 208 volt 3-phase AC Power Distribution Unit (PDU) with twelve C13 receptacles on the front of the PDU and twelve C13 receptacles on the rear of the rack making the twelve C13 receptacles easily accessible. Each receptacle has a 20 amp circuit breaker.

The PDU can be mounted vertically in rack side pockets or it can be mounted horizontally. If mounted horizontally, it uses 1U of rack space and requires #EPTH for horizontal mounting hardware.

Device power cords with a C14 plug connect to C13 PDU receptacles and are ordered separately. One wall line cord is provided (country-specific code) and has a IEC60309 60A plug (3P+G). The PDU supports up to 48 amps.

Two RJ45 ports on the front of the PDU enable the client to monitor each receptacle's electrical power usage and to remotely manage the PDU. The PDU is shipped with a generic PDU password and IBM strongly urges clients to change it upon installation.

#EPTP and #EPTQ are identical PDUs. Up to one lower price #EPTP can be ordered with a new 7014-T42/T00 rack in place of the 7014-T42/T00 rack.

For comparison, this is most similar to the earlier generation #7196 PDU, but offers C13 receptacles.

Not orderable in China and Hong Kong.

Limitation: Some configurations of the Elastic Storage Server (ESS) are delivered with a Intelligent PDU. At this time, the Intelligent PDU is not configured or used by the ESS system. If the ESS Customer would like to use this capability, it is the Customer's responsibility to configure the PDU. In any case the ethernet port on the Intelligent PDU must not be connected to the ESS Management switch.

- Attributes provided: Twelve C13 PDU - switched, power monitoring
- Attributes required: space in rack, 3-phase 208V AC delta electrical service
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ER05) - 42U Slim Rack

(No longer available as of January 17, 2020)

Provides a 19-inch, 2.0 meter high rack with 42 EIA units of total space for installing rack mounted CECs and/or expansion a data center's 24" floor tiles and provides better thermal and cable management capabilities. The ER05 rack does not contain rear door or side covers.

The following features are required on the #ER05:

- #EC01 front door
- #EC02 rear door or #EC15 Rear Door Heat Exchanger (RDHX) indicator

The following optional features are offered on the ER05 rack:

- EC03 - Rack Side Cover Kit  
**Note: If EC15 (rear door heat exchanger) is ordered with ER05 then EC03 is required.**
- EC04 - Rack Suite attachment Kit

Power Distribution Units (PDU) on the rack are optional. Each PDU consumes one of six vertical mounting bays and every #ELC0. Each PDU beyond six will consume 1U of rack space.

- Attributes provided: 19 inch, 2.0M, 42 EIA Rack
- Attributes required: #EC01 front door, #EC02 rear door or #EC15 RDHX indicator
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## (#ER94) - Quantity 150 of ES94 387GB SAS 4k

(No longer available as of December 31, 2020)

This feature ships a quantity of 150 #ES94 SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ES94
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ES94
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ERB0) - Bulk Packaging Request ID

(No longer available as of January 29, 2021)

This indicator is used to optimize package density of 2U server shipments through the use of bulk packaging.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs within the bulk packaging.

- Attributes provided: Bulk packaging from the IBM factory to the customer.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#ERB1) - Bulk Packaging ID #1

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #1.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#ERB2) - Bulk Packaging ID #2

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #2.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#ERB3) - Bulk Packaging ID #3

(No longer available as of January 29, 2021)



This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #3.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk pack order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#ERB4) - Bulk Packaging ID #4

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #4.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk pack order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#ERB5) - Bulk Packaging ID #5

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #5.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk pack order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A

- Return parts MES: Does not apply

## (#ERB6) - Bulk Packaging ID #6

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #6.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#ERB7) - Bulk Packaging ID #7

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #7.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#ERB8) - Bulk Packaging ID #8

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #8.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).

- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#ERB9) - Bulk Packaging ID #9

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #9.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#ERBA) - Bulk Packaging ID #10

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #10.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#ERBB) - Bulk Packaging ID #11

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #11.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

**8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for I for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk pack order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## **(#ERBC) - Bulk Packaging ID #12**

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #12.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for I for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk pack order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## **(#ERBD) - Bulk Packaging ID #13**

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #13.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for I for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk pack order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#ERBE) - Bulk Packaging ID #14

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #14.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#ERBF) - Bulk Packaging ID #15

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #15.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#ERBG) - Bulk Packaging ID #16

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #16.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0

- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#ERBH) - Bulk Packaging ID #17

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #17.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#ERBJ) - Bulk Packaging ID #18

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #18.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#ERBK) - Bulk Packaging ID #19

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #19.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or more servers for MTM 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk pack order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#ERBL) - Bulk Packaging ID #20

(No longer available as of January 29, 2021)

This indicator is used to specify that servers will be bulk packaged for shipment in package identifier #20.

**Note: Bulk packaging would be defaulted via a specify code on the order for any customer order that contains 2 or 8001-12C and 8001-22C, bulk packaging can be supported for customer order that contains 5 or more servers for 1 for MTM 8001-22C).**

Limitations: There will be no mixing of MTMs with in the bulk packaging.

- Attributes provided: Multiple servers in 1 package.
- Attributes required: Order that contains 2 or more servers (except for MTM's 8001-12C and MTM 8001-22C, bulk pack order that contains 5 or more servers for MTM 8001-12C and 4 or more servers for MTM 8001-22C).
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#ERBZ) - No Bulk Packaging Specify

(No longer available as of January 29, 2021)

This indicator is used to indicate single packaging will be used and not allow for bulk packaging.

- Attributes provided: Single packages
- Attributes required: Single customer orders.
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

## (#ERF1) - RFID Tags for Servers, Compute Nodes, Chassis, Racks,

(No longer available as of January 29, 2021) and HMCs

The specify feature attaches one Radio Frequency Identification Device (RFID) tag to a Server CEC, rack, HMC, compute used with MTM (machine type model) rack such as a 7953-94X or 7014-T42, not a feature code rack such as a #0553. It a racks, HMCs, compute nodes, and chassis enclosures, not MES orders with one exception. POWER5 CECs being upgrad

CECs being upgraded to a POWER 7 CEC can order this feature. The RFID tag meets the Financial Services Technology Data Center Asset Tracking.

- Attributes provided: RFIDs
- Attributes required: Server CEC, Compute Node, Chassis, MTM Rack, or HMC
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#ERG0) - Rear rack extension**

Extends the rear of a 2.0M enterprise rack (#0553) eight inches or 20.3 cm. The extra depth provides extra space for cable center of the rack more open for airflow and access to the rear of the equipment mounted in the rack. This rear extension c 42 EIA (42U) vertical size. The extension does increase the floor footprint.

- Attributes provided: Adds eight inches or 20.3 cm to the rear of a 2.0M rack.
- Attributes required: 42U 2m enterprise rack such as #0553
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#ERGV) - Quantity 150 of ESGV 387GB SSD 4k**

(No longer available as of December 31, 2020)

This feature ships a quantity of 150 #ESGV SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESGV
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ESGV
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ERGZ) - Quantity 150 of ESGZ 775GB SSD 4k**

(No longer available as of December 31, 2020)

This feature ships a quantity of 150 #ESGZ SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESGZ
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)



- OS level required: See feature #ESGZ
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ERJ0) - Quantity 150 of ESJ0 931GB SAS 4k**

(No longer available as of March 5, 2021)

This feature ships a quantity of 150 #ESJ0 SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESJ0
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ESJ0
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ERJ2) - Quantity 150 of ESJ2 1.86TB SAS 4k**

(No longer available as of March 5, 2021)

This feature ships a quantity of 150 #ESJ2 SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESJ2
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ESJ2
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ERJ4) - Quantity 150 of ESJ4 3.72TB SAS 4k**

This feature ships a quantity of 150 #ESJ4 SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESJ4
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ESJ4
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ERJ6) - Quantity 150 of ESJ6 7.45TB SAS 4k**

(No longer available as of March 5, 2021)

This feature ships a quantity of 150 #ESJ6 SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESJ6
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ESJ6
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ERNA) - Quantity 150 of ESNA 775GB SSD 4k**

(No longer available as of December 31, 2020)

This feature ships a quantity of 150 #ESNA SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESNA
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ESNA
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ERNE) - Quantity 150 of ESNE 1.55TB SSD 4k**

(No longer available as of December 31, 2020)

This feature ships a quantity of 150 #ESNE SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESNE
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ESNE
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ES14) - Mainstream 400GB SSD NVMe M.2 module**

(No longer available as of March 24, 2020)

400 GB Mainstream solid state drive (SSD) formatted in 4096 byte sectors (4k). The drive is mounted on the PCIE NVMe (feature EC59). DDPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. Approximately 1,095 TB of data capacity but depending on the nature of the workload may be somewhat larger. Recommend to be used for boot support and non-in **Note: Must order, at a minimum, quantity of one feature #ES14 module with each feature #EC59 ordered. Maximum feature #EC59.**

- Attributes provided: Mainstream SSD module
  - Attributes required: Feature #EC59; Usage beyond boot support and non-intensive workload could result in throttled p that lead to time-outs and critical thermal warnings
  - Minimum required: 0
  - Maximum allowed: 4 (Initial order maximum: 4)
  - OS level required:
    - 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
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: Assignment to the VIOS supported.**

### (#ES90) - 387GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux

(No longer available as of December 31, 2020)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 4k (4224 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

Features #ES90 and #ES91 are physically identical drives with the same CCIN of 5B13. Different feature codes to help the how the SSD is used. Feature ES90 indicates usage by AIX, Linux or VIOS. Feature ES91 indicates usage by IBM i.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 ; not fit in EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (i tested with 4096 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux Supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ES94) - 387GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux

(No longer available as of December 31, 2020)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 4k (4224 SFF-2 SAS bays in the EXP24S (#5887) or EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes P

Features #ES94 and #ES95 are physically identical drives with the same CCIN of 5B10. Different feature codes to help the how the SSD is used. Feature ES94 indicates usage by AIX, Linux or VIOS. Feature ES95 indicates usage by IBM i.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as f and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not t JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ESB0) - 387GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux**

(No Longer Available as of June 30, 2021)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 5xx (528 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

IBM solid state device failures will be replaced during the standard warranty and maintenance period for devices that have write cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's

Features #ESB0 CCIN is 5B19. Different feature codes to help the IBM configuration tools understand how the SSD is use or VIOS.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 ; not fit in EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units ( ; tested with 512 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-3 5xx SSD
- Attributes required: SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ESB2) - 387GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux**

(No Longer Available as of June 30, 2021)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 5xx (528 SFF-2 SAS bays in the EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated o

Features #ESB2 CCIN is 5B16. Different feature codes to help the IBM configuration tools understand how the SSD is used or VIOS.

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as 1 and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not in JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

- Attributes provided: one 387 GB SFF-2 5xx SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

(No Longer Available as of June 30, 2021)

IBM solid state device failures will be replaced during the standard warranty and maintenance period for devices that have write cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense.

Feature #ESB4 CCIN is 5B1A. Different feature codes to help the IBM configuration tools understand how the SSD is used Linux or VIOS.

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9; not fit in EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1). The drive is tested with 512 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 512 byte sectors.

- Attributes provided: one 775 GB SFF-3 5xx SSD
- Attributes required: SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ESB6) - 775GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux

(No Longer Available as of June 30, 2021)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 5xx (528 SFF-2 SAS bays in the EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

IBM solid state device failures will be replaced during the standard warranty and maintenance period for devices that have write cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense.

Features #ESGZ CCIN is 5B17. Different feature codes to help the IBM configuration tools understand how the SSD is used for AIX, Linux or VIOS.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as EXP24SX and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not tested for JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (528 SFF-2 SAS bays) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-2 5xx SSD
- Attributes required: SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ESB8) - 387GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux

(No Longer Available as of June 30, 2021)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 4k (4224 SFF-3 SAS bays). This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

IBM solid state device failures will be replaced during the standard warranty and maintenance period for devices that have write cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense.

Features #ESB8 and #ESB9 are physically identical drives with the same CCIN of 5B13. Different feature codes to help the IBM configuration tools understand how the SSD is used. Feature ESB8 indicates usage by AIX, Linux or VIOS. Feature ESB9 indicates usage by IBM i.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 system units (SFF-3) and not fit in EXP24SX drawers (SFF-2) or in #5802/ #5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1) SAS bays with 4096 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (528 SFF-2 SAS bays) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)

- OS level required:
  - Linux Supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ESBA) - 387GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux

(No Longer Available as of June 30, 2021)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 4k (4224 SFF-2 SAS bays in the EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPDP (Drive Writes Per Day) calculated over a 5-year period.

IBM solid state device failures will be replaced during the standard warranty and maintenance period for devices that have write cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense.

Features #ESBA and #ESBB are physically identical drives with the same CCIN of 5B10. Different feature codes to help the client know how the SSD is used. Feature ESBA indicates usage by AIX, Linux or VIOS. Feature ESBB indicates usage by IBM i.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as EXP24SX and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not tested in JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (512 byte sector) drives to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect from this transition. In some common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 512 byte sectors. In these cases, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ESBE) - 775GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux

(No Longer Available as of June 30, 2021)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 4k (4224 SFF-3 SAS bays. This drive is rated at 10 DWPDP (Drive Writes Per Day) calculated over a 5-year period.

IBM solid state device failures will be replaced during the standard warranty and maintenance period for devices that have write cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense.

Features #ESBE and #ESBF are physically identical drives with the same CCIN of 5B14. Different feature codes to help the client know how the SSD is used. Feature ESBE indicates usage by AIX, Linux or VIOS. Feature ESBF indicates usage by IBM i.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 system units (SFF-3) and not in EXP24SX drawers (SFF-2) or in #5802/ #5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1) SAS bays with 4096 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (512 byte sector) drives to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect from this transition. In some common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 512 byte sectors. In these cases, check with the application provider to ensure compatibility with 4K byte sector drives.**

**SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ESBG) - 775GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux**

(No Longer Available as of June 30, 2021)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 4k (4224 SFF-2 SAS bays in the EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated o

IBM solid state device failures will be replaced during the standard warranty and maintenance period for devices that have write cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's

Features #ESBG and #ESBH are physically identical drives with the same CCIN of 5B11. Different feature codes to help th how the SSD is used. Feature ESBG indicates usage by AIX, Linux or VIOS. Feature ESBH indicates usage by IBM i.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as f and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not t JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ESBJ) - 1.55TB Enterprise SAS 4k SFF-3 SSD for AIX/Linux**

(No Longer Available as of June 30, 2021)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 1.55 TB capacity formatted with 4k (4224 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

IBM solid state device failures will be replaced during the standard warranty and maintenance period for devices that have write cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's

Features #ESBJ and #ESBK are physically identical drives with the same CCIN of 5B15. Different feature codes to help th how the SSD is used. Feature ESBJ indicates usage by AIX, Linux or VIOS. Feature ESBK indicates usage by IBM i.



**Limitations:**

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 ; not fit in EXP24SX drawers (SFF-2) or in #5802/ #5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1) SAS with 4096 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx d

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 1.55 TB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ESBL) - 1.55TB Enterprise SAS 4k SFF-2 SSD for AIX/Linux**

(No Longer Available as of June 30, 2021)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 1.55 TB capacity formatted with 4k (4224 SFF-2 SAS bays in the EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated o

IBM solid state device failures will be replaced during the standard warranty and maintenance period for devices that have write cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's

Features #ESBL and #ESBM are physically identical drives with the same CCIN of 5B12. Different feature codes to help th how the SSD is used. Feature ESBL indicates usage by AIX, Linux or VIOS. Feature ESBM indicates usage by IBM i.

**Limitations:**

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as f and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not t JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 1.55 TB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ESC0) - S&H - No Charge**

No charge shipping and handling

- Attributes provided: None

- Attributes required: Sales Preapproval Required
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: N/A
- Return parts MES: Does not apply

### (#ESC5) - S&H-a

#### Shipping and handling

- Attributes provided: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### (#ESGT) - 387GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux

(No longer available as of December 31, 2020)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 5xx (528 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

Features #ESGT CCIN is 5B19. Different feature codes to help the IBM configuration tools understand how the SSD is use or VIOS.

#### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 ; not fit in EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units ( ; tested with 512 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-3 5xx SSD
- Attributes required: SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ESGV) - 387GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux

(No longer available as of December 31, 2020)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 5xx (528 SFF-2 SAS bays in the EXP24S (#5887) or EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes P

Features #ESGV CCIN is 5B16. Different feature codes to help the IBM configuration tools understand how the SSD is use or VIOS.

#### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as f and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not t JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-2 5xx SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ESGX) - 775GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux

(No longer available as of December 31, 2020)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 5xx (528 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

Features #ESGX CCIN is 5B1A. Different feature codes to help the IBM configuration tools understand how the SSD is use AIX, Linux or VIOS.

#### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 ; not fit in EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (I tested with 512 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-3 5xx SSD
- Attributes required: SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ESGZ) - 775GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux

(No longer available as of December 31, 2020)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 5xx (528 SFF-2 SAS bays in the EXP24S (#5887) or EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes Per Day).

Features #ESGZ CCIN is 5B17. Different feature codes to help the IBM configuration tools understand how the SSD is used for AIX, Linux or VIOS.

#### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as EXP24S and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not tested in JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (528 byte sector) SSDs to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect. In common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-2 5xx SSD
- Attributes required: SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ESJ0) - 931GB Mainstream SAS 4k SFF-2 SSD for AIX/Linux

(No Longer Available as of May 25, 2021)

931 GB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

#### Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance information for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJ0 and #ESJ1 are physically identical drives with the same 5B29 CCIN. Different feature codes help the IBM configuration tools understand how the SSD is used. #ESJ0 indicates usage by AIX, Linux or VIOS. #ESJ1 indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect. In common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

#### Limitation:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-3 bay. 4k sectors is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the same bay. Adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 931 GB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.

- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ESJ2) - 1.86TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux

(No Longer Available as of May 25, 2021)

1.86 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple fa

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJ2 and #ESJ3 are physically identical drives with the same 5B21 CCIN. Different feature codes help the IBM SSD is used. #ESJ2 indicates usage by AIX, Linux or VIOS. #ESJ3 indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

Limitation:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-2 carrier. SFF-2 sectors is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed on adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 1.86 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ESJ4) - 3.72TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux

(No Longer Available as of May 25, 2021)

3.72 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple fa

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

**Drive Capacity Total Bytes Written (TBW) in (TB)**

931 GB 1700  
 1.86 TB 3399  
 3.72 TB 6799  
 7.45 TB 13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJ4 and #ESJ5 are physically identical drives with the same 5B2D CCIN. Different feature codes help the IBM SSD is used. #ESJ4 indicates usage by AIX, Linux or VIOS. #ESJ5 indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

**Limitation:**

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-2 carrier. The drive is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed on adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 3.72 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ESJ6) - 7.45TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux**

(No Longer Available as of May 25, 2021)

7.45 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime TBW by each drive capacity:

**Drive Capacity Total Bytes Written (TBW) in (TB)**

931 GB 1700  
 1.86 TB 3399  
 3.72 TB 6799  
 7.45 TB 13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJ6 and #ESJ7 are physically identical drives with the same 5B2F CCIN. Different feature codes help the IBM SSD is used. #ESJ6 indicates usage by AIX, Linux or VIOS. #ESJ7 indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

**Limitations:**

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-2 carrier. The drive is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed on adapters such as PCIe2 or earlier do not support 4k drives.

adapters such as PCIe2 or earlier do not support 4k drives.

- Attributes provided: 7.45 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ESJ8) - 931GB Mainstream SAS 4k SFF-3 SSD for AIX/Linux

(No Longer Available as of May 25, 2021)

931 GB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted and rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJ8 and #ESJ9 are physically identical drives with the same 5B2B CCIN. Different feature codes help the IBM SSD is used. #ESJ8 indicates usage by AIX, Linux or VIOS. #ESJ9 indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system. This sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for 4k byte sector drives.**

Limitation:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD format is supported. Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Older adapters do not support 4k drives.
- Attributes provided: 931 GB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ESJA) - 1.86TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux

(No Longer Available as of May 25, 2021)

1.86 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted and rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

#### Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB 1700  
 1.86 TB 3399  
 3.72 TB 6799  
 7.45 TB 13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJA and #ESJB are physically identical drives with the same 5B20 CCIN. Different feature codes help the IBM SSD is used. #ESJA indicates usage by AIX, Linux or VIOS. #ESJB indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

#### Limitation:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD formatting supported. Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Older earlier do not support 4k drives.
- Attributes provided: 1.86 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ESJC) - 3.72TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux

(No Longer Available as of May 25, 2021)

3.72 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

#### Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB 1700  
 1.86 TB 3399  
 3.72 TB 6799  
 7.45 TB 13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJC and #ESJD are physically identical drives with the same 5B2C CCIN. Different feature codes help the IBM SSD is used. #ESJC indicates usage by AIX, Linux or VIOS. #ESJD indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**



## Limitation:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD format supported. Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Old earlier do not support 4k drives.
- Attributes provided: 3.72 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ESJE) - 7.45TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux**

(No Longer Available as of May 25, 2021)

7.45 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

**Drive Capacity Total Bytes Written (TBW) in (TB)**

931 GB 1700  
 1.86 TB 3399  
 3.72 TB 6799  
 7.45 TB 13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJE and #ESJF are physically identical drives with the same 5B2E CCIN. Different feature codes help the IBM SSD is used. #ESJE indicates usage by AIX, Linux or VIOS. #ESJF indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

## Limitations:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD format supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the same array. Old earlier do not support 4k drives.
- Attributes provided: 7.45 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ESJJ) - 931GB Mainstream SAS 4k SFF-2 SSD for AIX/Linux**

931 GB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

#### Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance information for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJJ and #ESJK are physically identical drives with the same 5B29 CCIN. Different feature codes help the IBM SSD is used. #ESJJ indicates usage by AIX, Linux or VIOS. #ESJK indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system during this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

#### Limitation:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-2 carrier. SFF-2 sectors is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed. Older adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 931 GB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter or later.
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ESJL) - 1.86TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux

1.86 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

#### Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance information for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJL and #ESJM are physically identical drives with the same 5B21 CCIN. Different feature codes help the IBM SSD is used. #ESJL indicates usage by AIX, Linux or VIOS. #ESJM indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system during this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

## Limitation:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-2 carrier. SFF-2 sectors is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed. Adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 1.86 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ESJN) - 3.72TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux**

3.72 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime write by each drive capacity:

**Drive Capacity Total Bytes Written (TBW) in (TB)**

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance information for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJN and #ESJP are physically identical drives with the same 5B2D CCIN. Different feature codes help the IBM SSD is used. #ESJN indicates usage by AIX, Linux or VIOS. #ESJP indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system. During this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for 4k byte sector drives.**

## Limitation:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-2 carrier. SFF-2 sectors is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed. Adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 3.72 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ESJQ) - 7.44TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux**

7.44 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

#### Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.44 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJQ and #ESJR are physically identical drives with the same 5B2F CCIN. Different feature codes help the IBM SSD is used. #ESJQ indicates usage by AIX, Linux or VIOS. #ESJR indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system during this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

#### Limitations:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER8/POWER9 system unit's SFF-2 carrier. SFF-2 sectors is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed on adapters such as PCIe2 or earlier do not support 4k drives.
- Attributes provided: 7.44 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ESJS) - 931GB Mainstream SAS 4k SFF-3 SSD for AIX/Linux

931 GB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in a SFF-3 carrier. Rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

#### Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance for POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJS and #ESJT are physically identical drives with the same 5B2B CCIN. Different feature codes help the IBM SSD is used. #ESJS indicates usage by AIX, Linux or VIOS. #ESJT indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system during this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

#### Limitation:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD format supported. Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Old earlier do not support 4k drives.
- Attributes provided: 931 GB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ESJU) - 1.86TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux**

1.86 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJU and #ESJV are physically identical drives with the same 5B20 CCIN. Different feature codes help the IBM SSD is used. #ESJU indicates usage by AIX, Linux or VIOS. #ESJV indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

### Limitation:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD format supported. Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Old earlier do not support 4k drives.
- Attributes provided: 1.86 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#ESJW) - 3.72TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux**

3.72 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJW and #ESJX are physically identical drives with the same 5B2C CCIN. Different feature codes help the IBM SSD is used. #ESJW indicates usage by AIX, Linux or VIOS. #ESJX indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider byte sector drives.**

Limitation:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD formatting supported. Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Older earlier do not support 4k drives.
- Attributes provided: 3.72 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ESJY) - 7.44TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux

7.44 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.44 TB	13601

Depending on the nature of the workload, the lifetime TBW may be somewhat larger. To read the warranty and maintenance POWER8 and POWER9 servers, see the Terms and Conditions section or IBM Knowledge Center for additional detail.

Features #ESJY and #ESJZ are physically identical drives with the same 5B2E CCIN. Different feature codes help the IBM SSD is used. #ESJY indicates usage by AIX, Linux or VIOS. #ESJZ indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider byte sector drives.**

Limitations:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER8/POWER9 system unit's SFF-3 bays. JBOD format supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the same array. Older earlier do not support 4k drives.
- Attributes provided: 7.44 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ESK0) - 387GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 5xx (528 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

IBM SDD device failures will be replaced during standard warranty and maintenance period for devices that have not reach cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense and can be monitored using an operating system command.

Features #ESK0 CCIN is 5B19. Different feature codes to help the IBM configuration tools understand how the SSD is used or VIOS.

### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER9 system units EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in older system units (SFF-1) SAS to 512 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect. In common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-3 5xx SSD
- Attributes required: SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ESK1) - 387GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 5xx (528 SFF-2 SAS bays in the EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

IBM SDD device failures will be replaced during standard warranty and maintenance period for devices that have not reach cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense and can be monitored using an operating system command.

Features #ESK1 CCIN is 5B16. Different feature codes to help the IBM configuration tools understand how the SSD is used or VIOS.

### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as f and cannot be used in POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not tested with for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-2 5xx SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#ESK2) - 775GB Enterprise SAS 5xx SFF-3 SSD for AIX/Linux**

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 5xx (528 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

IBM SDD device failures will be replaced during standard warranty and maintenance period for devices that have not reach cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expi and can be monitored using an operating system command.

Feature #ESK2 CCIN is 5B1A. Different feature codes to help the IBM configuration tools understand how the SSD is used Linux or VIOS.

Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER9 system uni EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in older system units (SFF-1) SAS b 512 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-3 5xx SSD
- Attributes required: SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#ESK3) - 775GB Enterprise SAS 5xx SFF-2 SSD for AIX/Linux**

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 5xx (528 SFF-2 SAS bays in the EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated o

IBM SDD device failures will be replaced during standard warranty and maintenance period for devices that have not reach cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expi and can be monitored using an operating system command.



Features #ESK3 CCIN is 5B17. Different feature codes to help the IBM configuration tools understand how the SSD is use AIX, Linux or VIOS.

#### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as f and cannot be used in POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not tested with for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-2 5xx SSD
- Attributes required: SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### (#ESK6) - 387GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 4k (4224 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

IBM SDD device failures will be replaced during standard warranty and maintenance period for devices that have not reach cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expi and can be monitored using an operating system command.

Features #ESK6 and #ESK7 are physically identical drives with the same CCIN of 5B13. Different feature codes to help the how the SSD is used. Feature ESK6 indicates usage by AIX, Linux or VIOS. Feature ESK7 indicates usage by IBM i.

#### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER9 system uni EXP24SX drawers (SFF-2) or in #5802/ #5803 I/O drawers (SFF-1) or in older system units (SFF-1) SAS bays. Also th sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice ve

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### (#ESK8) - 387GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 387 GB capacity formatted with 4k (4224 SFF-2 SAS bays in the EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

IBM SSD device failures will be replaced during standard warranty and maintenance period for devices that have not reached their rated life cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense and can be monitored using an operating system command.

Features #ESK8 and #ESK9 are physically identical drives with the same CCIN of 5B10. Different feature codes to help the client know how the SSD is used. Feature ESK8 indicates usage by AIX, Linux or VIOS. Feature ESK9 indicates usage by IBM i.

#### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as EXP24SX and cannot be used in POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not tested with VIOS for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (SFF-2) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect in common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 387 GB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### (#ESKA) - 775GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 4k (4224 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

IBM SSD device failures will be replaced during standard warranty and maintenance period for devices that have not reached their rated life cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense and can be monitored using an operating system command.

Features #ESKA and #ESKB are physically identical drives with the same CCIN of 5B14. Different feature codes to help the client know how the SSD is used. Feature ESKA indicates usage by AIX, Linux or VIOS. Feature ESKB indicates usage by IBM i.

#### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER9 system units EXP24SX drawers (SFF-2) or in #5802/ #5803 I/O drawers (SFF-1) or in older system units (SFF-1) SAS bays. Also the drive was not tested with VIOS for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (SFF-2) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect in common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES

- CSU: Yes
- Return parts MES: No

## (#ESKC) - 775GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 4k (4224 SFF-2 SAS bays in the EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

IBM SSD device failures will be replaced during standard warranty and maintenance period for devices that have not reached their life cycle limits. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense and can be monitored using an operating system command.

Features #ESKC and #ESKD are physically identical drives with the same CCIN of 5B11. Different feature codes to help the user know how the SSD is used. Feature ESKC indicates usage by AIX, Linux or VIOS. Feature ESKD indicates usage by IBM i.

### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as EXP24SX and cannot be used in POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not tested with VIOS for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect. In common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## (#ESKE) - 1.55TB Enterprise SAS 4k SFF-3 SSD for AIX/Linux

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 1.55 TB capacity formatted with 4k (4224 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

IBM SSD device failures will be replaced during standard warranty and maintenance period for devices that have not reached their life cycle limits. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's expense and can be monitored using an operating system command.

Features #ESKE and #ESKF are physically identical drives with the same CCIN of 5B15. Different feature codes to help the user know how the SSD is used. Feature ESKE indicates usage by AIX, Linux or VIOS. Feature ESKF indicates usage by IBM i.

### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER9 system units EXP24SX drawers (SFF-2) or in #5802/ #5803 I/O drawers (SFF-1) or in older system units (SFF-1) SAS bays. Also the drive was not tested with VIOS for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect. In common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 1.55 TB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller

- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## (#ESKG) - 1.55TB Enterprise SAS 4k SFF-2 SSD for AIX/Linux

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 1.55 TB capacity formatted with 4k (4224 SFF-2 SAS bays in the EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated o

IBM SDD device failures will be replaced during standard warranty and maintenance period for devices that have not reach cycles. Devices that reach this limit may fail to operate according to specifications and must be replaced at the client's exp and can be monitored using an operating system command.

Features #ESKG and #ESKH are physically identical drives with the same CCIN of 5B12. Different feature codes to help th how the SSD is used. Feature ESKG indicates usage by AIX, Linux or VIOS. Feature ESKH indicates usage by IBM i.

### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as f and cannot be used in POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not tested with for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 1.55 TB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## (#ESKJ) - 931GB Mainstream SAS 4k SFF-3 SSD for AIX/Linux

931 GB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted i rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

### Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.44 TB	13601

Features #ESKJ and #ESKL are physically identical drives with the same 5B2B CCIN. Different feature codes help the IBM SSD is used. #ESKJ indicates usage by AIX, Linux or VIOS. #ESKL indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file s this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive direct**

**and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for 4k byte sector drives.**

Limitation:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER9 system unit's SFF-3 bays. JBOD formatting of 4096 byte sectors is not supported. Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Older SAS adapters do not support 4k drives.
- Attributes provided: 931 GB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#ESKK) - 931GB Mainstream SAS 4k SFF-2 SSD for AIX/Linux**

931 GB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.44 TB	13601

Features #ESKK and #ESKM are physically identical drives with the same 5B29 CCIN. Different feature codes help the IBM determine how the SSD is used. #ESKK indicates usage by AIX, Linux or VIOS. #ESKM indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system. During this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provider for 4k byte sector drives.**

Limitation:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER9 system unit's SFF-3 bays. JBOD formatting of 4096 byte sectors is not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the same array. PCIe2 or earlier do not support 4k drives.
- Attributes provided: 931 GB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### **(#ESKN) - 1.86TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux**

1.86 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

#### Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.45 TB	13601

Features #ESKN and #ESKQ are physically identical drives with the same 5B20 CCIN. Different feature codes help the IBM the SSD is used. #ESKN indicates usage by AIX, Linux or VIOS. #ESKQ indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

#### Limitation:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER9 system unit's SFF-3 bays. JBOD formatting of 4096 Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Older SAS adapters support 4k drives.
- Attributes provided: 1.86 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### (#ESKP) - 1.86TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux

1.86 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted in an expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

#### Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.44 TB	13601

Features #ESKP and #ESKR are physically identical drives with the same 5B21 CCIN. Different feature codes help the IBM the SSD is used. #ESKP indicates usage by AIX, Linux or VIOS. #ESKR indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

#### Limitation:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER9 system unit's SFF-3 bays. JBOD not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the same array. PCIe2 or earlier do not support 4k drives.
- Attributes provided: 1.86 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later

- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### (#ESKS) - 3.72TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux

3.72 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.44 TB	13601

Features #ESKS and #ESKU are physically identical drives with the same 5B2C CCIN. Different feature codes help the IBM the SSD is used. #ESKS indicates usage by AIX, Linux or VIOS. #ESKU indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

Limitation:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER9 system unit's SFF-3 bays. JBOD formatting of 4096 Drive cannot be reformatted to 5xx byte sectors. 5xx and 4k drives cannot be mixed in the same array. Older SAS adapters support 4k drives.
- Attributes provided: 3.72 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### (#ESKT) - 3.72TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux

3.72 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity	Total Bytes Written (TBW) in (TB)
931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.44 TB	13601

Features #ESKT and #ESKV are physically identical drives with the same 5B2D CCIN. Different feature codes help the IBM SSD is used. #ESKT indicates usage by AIX, Linux or VIOS. #ESKV indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

Limitation:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER9 system unit's SFF-3 bays. JBOD not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the same array. PCIe2 or earlier do not support 4k drives.
- Attributes provided: 3.72 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

### (#ESKW) - 7.44TB Mainstream SAS 4k SFF-3 SSD for AIX/Linux

7.44 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted on a SFF-3 carrier/tray. The drive is rated at 6Gb/s though actual performance is dependent upon multiple factors.

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.44 TB	13601

Features #ESKW and #ESKY are physically identical drives with the same 5B2E CCIN. Different feature codes help the IBM SSD is used. #ESKW indicates usage by AIX, Linux or VIOS. #ESKY indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive directly and may still require only 5xx byte sector drives. If there are 4k usage concerns, check with the application provider for byte sector drives.**

Limitations:

- The drive is mounted on a SFF-3 carrier/tray to fit into a POWER9 system unit's SFF-3 bays. JBOD formatting of 4096 byte sectors is not supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the same array. Older SAS adapters do not support 4k drives.
- Attributes provided: 7.44 TB Mainstream SSD
- Attributes required: Open SFF-3 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No



## (#ESKX) - 7.44TB Mainstream SAS 4k SFF-2 SSD for AIX/Linux

7.44 TB SAS 2.5-inch (SFF) Mainstream solid state drive (SSD) formatted in 4224 byte sectors (4k). The drive is mounted expansion drawer such as the EXP24SX. Drive is rated at 6Gb/s though actual performance is dependent upon multiple fa

DWPD (Drive Write Per Day) rating is 1 calculated over a 5 year period. See the following table for the approximate lifetime by each drive capacity:

Drive Capacity Total Bytes Written (TBW) in (TB)

931 GB	1700
1.86 TB	3399
3.72 TB	6799
7.44 TB	13601

Features #ESKX and #ESKZ are physically identical drives with the same 5B2F CCIN. Different feature codes help the IBM SSD is used. #ESKX indicates usage by AIX, Linux or VIOS. #ESKZ indicates usage by IBM i.

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from SAS drives (HDD or SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file s this sector size transition. In much less common cases, an AIX/Linux application may access the disk drive direct and may still require only 5xx byte sectors drives. If there are 4k usage concerns, check with the application provi byte sector drives.**

Limitations:

- The drive is mounted on a SFF-2 carrier/tray and does not physically fit into a POWER9 system unit's SFF-3 bays. JB not tested or supported. Drive can not be reformatted to 5xx byte sectors. 5xx and 4k drives can not be mixed in the s PCIe2 or earlier do not support 4k drives.
- Attributes provided: 7.44 TB Mainstream SSD
- Attributes required: Open SFF-2 SAS bay controlled by PCIe Gen3 PCIe SAS adapter, or later
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## (#ESLA) - Specify AC Power Supply for EXP12SX/EXP24SX Storage Enclosure

No-charge specify for AC power supply for an EXP12SX or EXP24SX SAS Storage Enclosure.

The power supply has a 320-C14 inlet electrical connection for a separately ordered power cord. It is rated 800 Watts Output voltage.

- Attributes provided: communicates to IBM Manufacturing an AC Power Supply is to be used
- Attributes required: EXP12SX or EXP24SX Storage Enclosure and AC power cord
- Minimum required: 0
- Maximum allowed: 28 (Initial order maximum: 28)
- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## (#ESNA) - 775GB Enterprise SAS 4k SFF-2 SSD for AIX/Linux

(No longer available as of December 31, 2020)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 4k (4224 SFF-2 SAS bays in the EXP24S (#5887) or EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes P

Features #ESNA and #ESNB are physically identical drives with the same CCIN of 5B11. Different feature codes to help th how the SSD is used. Feature ESNA indicates usage by AIX, Linux or VIOS. Feature ESNB indicates usage by IBM i.

#### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as f and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not t JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ESNC) - 775GB Enterprise SAS 4k SFF-3 SSD for AIX/Linux

(No longer available as of December 31, 2020)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 775 GB capacity formatted with 4k (4224 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

Features #ESNC and #ESND are physically identical drives with the same CCIN of 5B14. Different feature codes to help th how the SSD is used. Feature ESNC indicates usage by AIX, Linux or VIOS. Feature ESND indicates usage by IBM i.

#### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 ; not fit in EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (i tested with 4096 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx SSD) to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect c common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still requ are 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 775 GB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ESNE) - 1.55TB Enterprise SAS 4k SFF-2 SSD for AIX/Linux

(No longer available as of December 31, 2020)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 1.55 TB capacity formatted with 4k (4224 SFF-2 SAS bays in the EXP24S (#5887) or EXP24SX (#ESLS) I/O drawer. This drive is rated at 10 DWPD (Drive Writes Per Day).

Features #ESNE and #ESNF are physically identical drives with the same CCIN of 5B12. Different feature codes to help the user know how the SSD is used. Feature ESNE indicates usage by AIX, Linux or VIOS. Feature ESNF indicates usage by IBM i.

#### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in SFF-2 bays such as EXP24S or EXP24SX and cannot be used in POWER8/POWER9 system units (SFF-3) or in older SFF-1 SAS bays. Also the drive was not tested in JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (512 byte sector) SSDs to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect. In common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 1.55 TB SFF-2 4k SSD
- Attributes required: one SFF-2 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 336 (Initial order maximum: 250)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#ESNG) - 1.55TB Enterprise SAS 4k SFF-3 SSD for AIX/Linux

(No longer available as of December 31, 2020)

This SFF (2.5") Enterprise SAS Solid State Drive (SSD) is shipped from IBM with 1.55 TB capacity formatted with 4k (4224 SFF-3 SAS bays. This drive is rated at 10 DWPD (Drive Writes Per Day) calculated over a 5-year period.

Features #ESNG and #ESNH are physically identical drives with the same CCIN of 5B15. Different feature codes to help the user know how the SSD is used. Feature ESNG indicates usage by AIX, Linux or VIOS. Feature ESNH indicates usage by IBM i.

#### Limitations:

- Due to physical differences in the carrier/tray on which the drive is mounted, the SSD only fits in POWER8/POWER9 system units (SFF-3) and not fit in EXP24S or EXP24SX drawers (SFF-2) or in #5802/#5803 I/O drawers (SFF-1) or in POWER7 system units (SFF-1). This drive was not tested with 4096 byte sectors and thus JBOD mode for AIX/Linux is not supported. 4k drives can not be reformatted to 5xx drives (or vice versa).

**Note: As part of a larger industry transition, IBM Power Systems is in the process of gradually shifting away from offering 5xx (512 byte sector) SSDs to 4K byte sector drives. Most AIX/Linux applications access SAS drives through a file system and experience no effect. In common cases, an AIX/Linux application may access the disk drive directly through the raw device interface and may still require 4k usage concerns, check with the application provider to ensure compatibility with 4K byte sector drives.**

- Attributes provided: one 1.55 TB SFF-3 4k SSD
- Attributes required: one SFF-3 SAS bay, PCIe3 SAS controller
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Linux supported
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ESQ2) - Quantity 150 of ESB2 387GB SAS 4k**

(No longer available as of March 5, 2021)

This feature ships a quantity of 150 #ESB2 SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESB2
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ESB2
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ESQ6) - Quantity 150 of ESB6 775GB SAS 4k**

(No longer available as of March 5, 2021)

This feature ships a quantity of 150 #ESB6 SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESB6
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ESB6
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ESQA) - Quantity 150 of ESBA 387GB SAS 4k**

(No longer available as of March 5, 2021)

This feature ships a quantity of 150 #ESBA SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESBA
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ESBA
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

**(#ESQG) - Quantity 150 of ESG 775GB SAS 4k**

(No longer available as of March 5, 2021)

This feature ships a quantity of 150 #ESG SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESBG
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ESBG
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ESQL) - Quantity 150 of ESBL 1.55TB SAS 4k**

(No longer available as of March 5, 2021)

This feature ships a quantity of 150 #ESBL SSD. The configurator may either generate this feature or allow users to select single SSD feature. This feature remains on the inventory records.

- Attributes provided: see feature #ESBL
- Attributes required: 150 SFF-2 SAS bays in expansion drawers
- Minimum required: 0
- Maximum allowed: 2 (Initial order maximum: 2)
- OS level required: See feature #ESBL
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ESRL) - 300GB 15K RPM SAS SFF-3 4k Block Cached Disk Drive (Linux)**

(No longer available as of January 29, 2021)

300 GB 2.5-inch (Small Form Factor (SFF)) 15k rpm SAS disk drive on Gen-3 carrier/tray. Supported in SFF-3 SAS bays. If reformatted to 4224 byte sectors, capacity would be 283 GB. Drive includes enhanced caching capability with 256MB DRA somewhat compared to previous disk drives without the cache.

CCIN is 5B41.

Limitations:

- Cannot be used in EXP24S or EXP24SX SFF Gen2-bay Drawer because of physical difference of carrier/tray.
- Cannot be combined in the same array as a drive of the same capacity, but using different sector size. However, can be same capacity in the same array.
- Attributes provided: 300 GB Disk Drive - SFF-3
- Attributes required: one SFF-3 drive bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ESRM) - 300GB 15K RPM SAS SFF-2 4k Block Cached Disk Drive (Linux)**

(No longer available as of January 29, 2021)

300 GB 2.5-inch (Small Form Factor (SFF)) 15k rpm SAS disk drive on Gen-2 carrier/tray. Supported in SFF-2 SAS bays. If reformatted to 4224 byte sectors, capacity would be 283 GB. Drive includes enhanced caching capability with 256MB DRA somewhat compared to previous disk drives without the cache.

CCIN is 5B43.

Limitations:

- Cannot be combined in the same array as a drive of the same capacity, but using different sector size. However, can be same capacity in the same array.
- This HDD feature is not supported in the EXP24S drawer (#5887 or #EL1S).
- Attributes provided: 300 GB Disk Drive - SFF-2
- Attributes required: one SFF-2 drive bay
- Minimum required: 0
- Maximum allowed: 672 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ESRP) - 600GB 15K RPM SAS SFF-3 4k Block Cached Disk Drive (Linux)**

(No longer available as of January 29, 2021)

600 GB 2.5-inch (Small Form Factor (SFF)) 15k rpm SAS disk drive on Gen-3 carrier/tray. Supported in SFF-3 SAS bays. If reformatted to 4224 byte sectors, capacity would be 571 GB. Drive includes enhanced caching capability with 256MB DRA somewhat compared to previous disk drives without the cache.

CCIN is 5B45.

Limitations:

- Cannot be used in EXP24S or EXP24SX SFF Gen2-bay Drawer because of physical difference of carrier/tray.
- Cannot be combined in the same array as a drive of the same capacity, but using different sector size. However, can be same capacity in the same array.
- Attributes provided: 600 GB Disk Drive - SFF-3
- Attributes required: one SFF-3 drive bay
- Minimum required: 0
- Maximum allowed: 8 (Initial order maximum: 8)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ESRR) - 600GB 15K RPM SAS SFF-2 4k Block Cached Disk Drive (Linux)**

(No longer available as of January 29, 2021)

600 GB 2.5-inch (Small Form Factor (SFF)) 15k rpm SAS disk drive on Gen-2 carrier/tray. Supported in SFF-2 SAS bays. If reformatted to 4224 byte sectors, capacity would be 571 GB. Drive includes enhanced caching capability with 256MB DRA somewhat compared to previous disk drives without the cache.

CCIN is 5B47.

#### Limitations:

- Cannot be combined in the same array as a drive of the same capacity, but using different sector size. However, can be same capacity in the same array.
- This HDD feature is not supported in the EXP24S drawer (#5887 or #EL1S).
- Attributes provided: 600 GB Disk Drive - SFF-2
- Attributes required: one SFF-2 drive bay
- Minimum required: 0
- Maximum allowed: 672 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ESVM) - Quantity 150 of #ESRM (300GB 15k SFF-2)**

(No longer available as of January 29, 2021)

This feature ships a quantity of 150 #ESRM 300GB 15K RPM 4K SAS SFF-2, units. The configurator may either generate feature as they would any other single disk unit feature. This feature remains on the inventory records.

This HDD feature is not supported in the EXP24S drawer (#5887 or #EL1S).

- Attributes provided: See feature #ESRM
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 4 (Initial order maximum: 4)
- OS level required: see feature ESRM
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### **(#ESVR) - Quantity 150 of #ESRR (600GB 15k SFF-2)**

(No longer available as of January 29, 2021)

This feature ships a quantity of 150 #ESRR 600GB 15K RPM 4K SAS SFF-2, units. The configurator may either generate feature as they would any other single disk unit feature. This feature remains on the inventory records.

Limitation: This HDD feature is not supported in the EXP24S drawer (#5887 or #EL1S).

- Attributes provided: See feature #ESRR
- Attributes required: 150 SFF-2 SAS bays in EXP24S or EXP24SX drawers
- Minimum required: 0
- Maximum allowed: 4 (Initial order maximum: 4)
- OS level required: see feature ESRR

- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EU01) - 1TB Removable Disk Drive Cartridge**

1TB Removable Disk Drive Cartridge (#EU01) provides a RDX disk drive in a rugged cartridge to be used in an RDX Interr the (#1103, #1104 or #1123, #EU03, #EU04, #EU23, or #EU07 1TB is uncompressed. docking station. 1TB is uncompress provided by the operating system, not the drive itself. Feature EU01 is not entitled under the IBM Maintenance Agreement,

- Attributes provided: 1TB RDX rugged disk cartridge
- Attributes required: None.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EU04) - RDX USB External Docking Station for Removable Disk Cartridge**

(No longer available as of June 12, 2018)

USB Eternal Docking Station accommodates RDX removable disk cartridge of any capacity. The disk are in a protective ru the docking station. The docking station holds one removable rugged disk drive/cartridge at a time. The rugged removable up similar to tape drive. This can be an excellent alternative to DAT72, DAT160, 8mm, and VXA-2 and VXA-320 tapes. CC

#EU04 is a follow on product to the #1104 RDX docking station. #EU04 has identical function and performance to the interi

- Attributes provided: USB RDX External Docking Station, 3M USB cable, 1M power cord with universal adapter 100-24 DC to the docking station.
- Attributes required: One USB port and at least one #1106, #1107, #EU01, #EU08, #EU15, or follow-on Removable Dis
- Minimum required: 0
- Maximum allowed: 5 (Initial order maximum: 5)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Limitations:
  - Feature #EU04 is not available in US, EMEA, and Japan.
  - This feature is only available through Offering Management approval, contact [douglasg@ca.ibm.com](mailto:douglasg@ca.ibm.com) for approva
- Initial Order/MES/Both/Supported: BOTH
- CSU: Yes
- Return parts MES: No

## **(#EU08) - RDX 320 GB Removable Disk Drive**

Provides a RDX disk drive in a rugged cartridge to be used in an RDX docking station such as #EU03, #EU04, #EU23, #11 320 GB is uncompressed. Compression/ decompression is provided by the operating system, not the drive itself. Feature E Maintenance Agreement, if one is purchased.

- Attributes provided: 320 GB RDX rugged disk/cartridge



- Attributes required: One docking station
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

## **(#EU0B) - Operator Panel LCD Display**

This feature provides a cable that connects the system's Operator Panel to the DASD backplane. Used on a Rack-mount c

- Attributes provided: LCD Display
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EU15) - 1.5TB Removable Disk Drive Cartridge**

The 1.5 TB Removable Disk Drive Cartridge provides a RDX disk drive in a rugged cartridge to be used in an RDX Internal (#1103, #1104 or #1123, #EU03, #EU04, #EU23, or #EU07. 1.5TB is uncompressed. Compression/ decompression is provided by the drive itself. Feature EU015 is not entitled under the IBM Maintenance Agreement, if one is purchased.

- Attributes provided: 1.5TB RDX rugged disk cartridge
- Attributes required: RDX docking station
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 0)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Supported
- CSU: Yes
- Return parts MES: No

## **(#EU19) - Cable Ties & Labels**

Set of 10 hook and loop fabric, often called VELCRO(R) ties 35.5 cm (14-inch) in length to conveniently attach cables or cable labels 2x4 inches (5x10 cm) in size to identify cables when installing or moving or servicing equipment.

- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)

- OS level required: None
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EU2T) - 2TB Removable Disk Drive Cartridge (RDX)**

The 2.0TB Removable Disk Drive Cartridge provides a RDX disk drive in a rugged cartridge to be used in an RDX Internal (#1103, #1104 or #1123, #EU03, #EU04, #EU23, or #EU07. 2.0TB is uncompressed. Compression/ decompression is provided by the drive itself. Feature EU2T is not entitled under the IBM Maintenance Agreement, if one is purchased.

- Attributes provided: 2.0TB RDX rugged disk cartridge
- Attributes required: None.
- Minimum required: 0
- Maximum allowed: 9999 (Initial order maximum: 250)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

## **(#EUA4) - RDX USB External Docking Station**

USB External Docking Station which accommodates RDX removable disk cartridge of any capacity. The disk is inserted into the docking station. The docking station holds one removable rugged disk drive/cartridge at a time. The rugged removable disk drive can be used similar to a tape drive. This can be an excellent entry system save/ restore option and a good alternative to DLT or VXA-320 tapes. CCIN: 63B8-005.

#EUA4 attaches to a Power server via a USB cable which carries data and control information. It is not powered by the USB System USB adapter, but has a separate electrical line cord. Physically the #EUA4 docking station is a standalone enclosure which can sit on a shelf or on top of equipment in a rack.

#EUA4 is a follow on product to the #EU04 RDX docking station. #EUA4 has identical performance and identical applications.

- Previously announced #EU04 and #1104 USB external docking stations
- Top mount #EUA3 USB docking station used in the Power S814 tower configuration
- #EU03 USB internal docking stations used in Power 720 system units
- #EU03 USB docking station available in the rack mounted IBM 7226-1U3 Multimedia Drawer

The RDX USB External Docking Station (Feature EUA4) is only orderable in the following countries/regions:

United States.

- Attributes provided:
  - USB 3.0 RDX External Docking Station
  - USB 3.0 Cable (2.7 meter or 8.8 foot)
  - Four line cords (1.85 meter or 6 foot) with type A, G, F or I plug (see <http://www.iec.ch/worldplugs> for type definitions)
  - One power jumper cord as an alternative to using one of the four power line cords above. This would draw power from a separate power source
  - Power Adapter using single phase 110-250V 50-60Hz power source
- Attributes required:
  - One USB port on server or server's USB adapter
  - At least one Removable Disk Drive Cartridge such as #EU01 or #1107
  - Firmware version 860.20, or higher

- Minimum required: 0
- Maximum allowed: 5 (Initial order maximum: 5)
- OS level required:
  - Red Hat Enterprise Linux
  - SUSE Linux Enterprise Server
  - Ubuntu Server
- Initial Order/MES/Both/Supported: Both
- CSU: Yes
- Return parts MES: No

### (#EUA5) - Standalone USB DVD drive w/cable

The Standalone USB DVD drive (FC EUA5) is an optional, standalone external USB-DVD device. It requires high current a port on the 9008-22L, 9009-22A, 9009-41A, 9009-42A, 9223-22H, and 9223-42H systems.

- Custom card identification number (CCIN): 6331 model 005
  - Media: Reads CD-ROM, CD-R, CD-RW, DVD-R, DVD+R, DVD-RW, DVD+RW, DVD-ROM, and DVD-RAM discs; Write speed at 24X; DVD-ROM read speed at 8X; DVD-RAM at 5X; DVD-RAM has a write speed of 5X; The buffer size is 0
  - Interface: USB
  - Connector: USB 2.0
  - Loading tray: supports 12 cm and 8 cm discs floor) Note: A USB extension cable is included (P/N 32N1311). The USB there are no safe, flat spots available in the rack. This cable allows the drive to reach the floor. Alternate or additional the total USB cable length can be no longer than 3 meters.
  - Form factor: standalone USB DVD drive
  - DVD video: not supported
  - Attributes provided: USB DVD drive
  - Attributes required: None
  - Minimum required: 0
  - Maximum allowed: 1 (Initial order maximum: 1)
  - OS level required:
    - Red Hat Enterprise Linux
    - SUSE Linux Enterprise Server
    - Ubuntu Server
  - Initial Order/MES/Both/Supported: Both
  - CSU: Yes
  - Return parts MES: No
- Note: If using #EUA5 on this system's integrated USB 3.0 ports, it must be connected to the front USB 3.0 port or USB 3.0 ports.**

### (#EUC0) - Software preload define

(No longer available as of April 24, 2018)

Communicates to the Customer Solution Center that no components of a given software product are to be preloaded.

- Attributes provided: Within a hardware and software solution, a define for software components.
- Attributes required: Hardware specify feature for the software product within a hardware and software solution.
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A

- Return parts MES: Does not apply

### **(#EUC1) - Software preload define**

(No longer available as of April 24, 2018)

Communicates to the Customer Solution Center that a given component of a software product is to be preloaded. The name is defined by the configurator.

- Attributes provided: Within a hardware and software solution, a define for a software component.
- Attributes required: Hardware specify feature for the software product within a hardware and software solution.
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#EUC2) - Software preload define**

(No longer available as of April 24, 2018)

Communicates to the Customer Solution Center that a given component of a software product is to be preloaded. The name is defined by the configurator.

- Attributes provided: Within a hardware and software solution, a define for a software component.
- Attributes required: Hardware specify feature for the software product within a hardware and software solution.
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#EUC3) - Software preload define**

(No longer available as of April 24, 2018)

Communicates to the Customer Solution Center that a given component of a software product is to be preloaded. The name is defined by the configurator.

- Attributes provided: Within a hardware and software solution, a define for a software component.
- Attributes required: Hardware specify feature for the software product within a hardware and software solution.
- Minimum required: 0
- Maximum allowed: 1 (Initial order maximum: 1)
- OS level required: None
- Initial Order/MES/Both/Supported: Initial
- CSU: N/A
- Return parts MES: Does not apply

### **(#EUC6) - Core Use HW Feature**

A Service Provider (SP) under a "revenue payment" contract with IBM pays IBM a percentage of revenue generated on the services. The contract stipulates that each quarter the service provider calculates the amount due IBM and then purchases

required payment. Each occurrence of this feature represents one billing unit.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 250 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## (#EUC7) - Core Use HW Feature 10X

A Service Provider (SP) under a "revenue payment" contract with IBM pays IBM a percentage of revenue generated on the services. The contract stipulates that each quarter the service provider calculates the amount due IBM and then purchases required payment. Each occurrence of this feature represents ten billing units.

- Attributes provided: None
- Attributes required: None
- Minimum required: 0
- Maximum allowed: 250 (Initial order maximum: 0)
- OS level required: None
- Initial Order/MES/Both/Supported: MES
- CSU: Yes
- Return parts MES: No

## Feature exchanges

Not applicable.

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## Accessories

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Not applicable.

## Customer replacement parts

Not applicable.

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## Supplies

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Not applicable.

## Supplemental media

Not applicable.

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