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NEC Express5800/R120h-2E
System Configuration Guide

Introduction

This document contains product and configuration information that will enable you to configure your system. The guide will ensure fast and proper configuration of your NEC Express5800 server.

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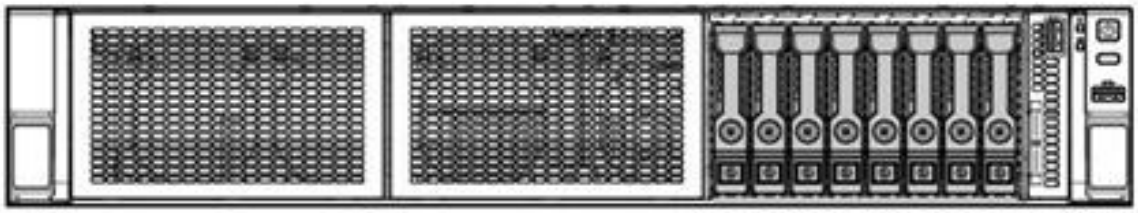
NEC Corporation

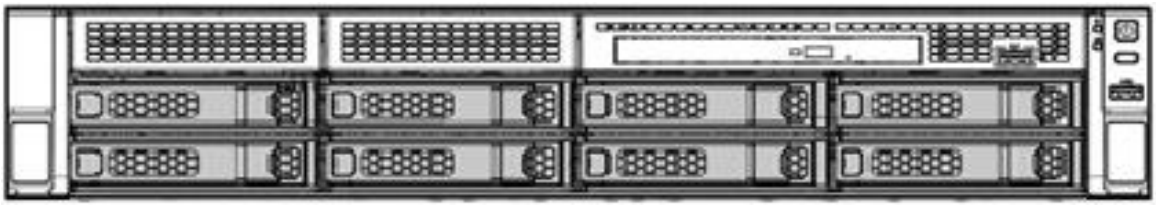
Contents

Model Lineup

8x2.5-inch Drive



8x3.5-inch Drive Model



Technical Specification

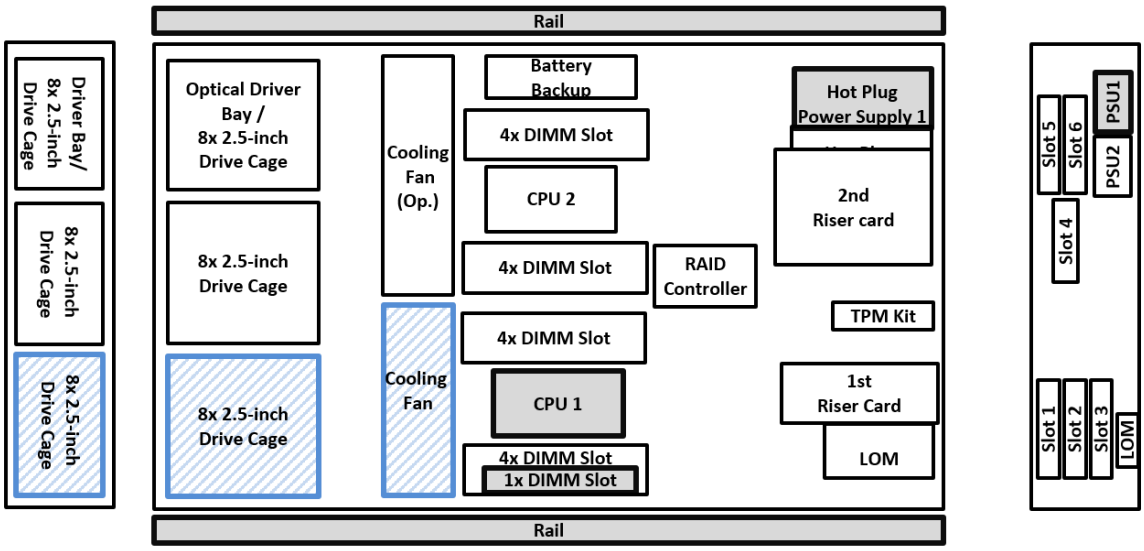
Specification

Model		R120h-2E	
		8x 2.5-inch Drive Model	8x 3.5-inch Drive Model
Part Number		N8100-2604F	N8100-2606F
Processor	Type	Intel® Xeon® Processor Bronze 3104(6C/6T, 1.70 GHz, 8.25MB, TDP 85W) Bronze 3106(8C/8T, 1.70 GHz, 11MB, TDP 85W) Silver 4108(8C/16T, 1.80 GHz, 11MB, TDP 85W) Silver 4110(8C/16T, 2.10 GHz, 11MB, TDP 85W) Silver 4112(4C/8T, 2.60 GHz, 8.25MB, TDP 85W) Silver 4114(10C/20T, 2.20 GHz, 13.75MB, TDP 85W) Silver 4116(12C/24T, 2.10 GHz, 16.50MB, TDP 85W) Gold 5115(10C/20T, 2.40 GHz, 13.75MB, TDP 85W) Gold 5118(12C/24T, 2.30 GHz, 16.50MB, TDP 105W) Gold 5120(14C/28T, 2.20 GHz, 19.25MB, TDP 105W) Gold 5122(4C/8T, 3.60 GHz, 16.50MB, TDP 105W) Gold 6126(12C/24T, 2.60 GHz, 19.25MB, TDP 125W) Gold 6128(6C/12T, 3.40 GHz, 19.25MB, TDP 115W) Gold 6130(16C/32T, 2.10 GHz, 22MB, TDP 125W) Gold 6132(14C/28T, 2.60 GHz, 19.25MB, TDP 140W) Gold 6134(8C/16T, 3.20 GHz, 24.75MB, TDP 130W) Gold 6136(12C/24T, 3 GHz, 24.75MB, TDP 150W) Gold 6138(20C/40T, 2GHz, 27.50MB, TDP 125W) Gold 6140(18C/36T, 2.30 GHz, 24.75MB, TDP 140W) Gold 6142(16C/32T, 2.60 GHz, 22MB, TDP 150W) Gold 6148(20C/40T, 2.40 GHz, 27.50MB, TDP 150W) Gold 6152(22C/44T, 2.10 GHz, 30.25MB, TDP 140W)	
	Number of Processors	1 or 2	
Chipset		Intel® C622 Chipset	
Memory	Type	DDR4-2666 Registered DIMM (8/16/32GB) DDR4-2666 Load Reduced DIMM (64GB)	
	Standard Capacity	0 GB	
	Maximum Capacity	1 TB (16 x 64 GB)	
	Memory protection	ECC, x4 SDDC, x4 DDDC, Memory Mirroring, Memory Sparing	

Model		R120h-2E	
		8x 2.5-inch Drive Model	8x 3.5-inch Drive Model
Internal Storage	Standard Capacity	0 GB	
	Disk Controller	SATA : 6Gb/s, RAID 0/1/5/6/10/50/60 (Optional) SAS: 12 Gb/s, RAID 0/1/5/6/10/50/60 (Optional)	
	Hot Plug	Supported	
	Optical Disk Drive	Optional	Optional
	Optical Drive Bays	1	1
	Standard Disk Drive Bays	8	8
Expansion Slots	Standard	Total: 2 slots available 1 PCIe 3.0 x8 (x8 connector) for a dedicated RAID card 1 Slot for a dedicated LOM controller * The slot configuration is changed by installing an optional riser card.	
Video	Controller (VRAM)	Integrated in Server Management Controller (16MB)	
	Resolution	640x480, 800x600, 1,024x768, 1,280x1,024, 1,600x1,200, 1,920x1,200	
Interfaces	Front	1x USB3.0, 1x USB2.0 (BMC)	
	Rear	2x USB3.0, 1x VGA (15-pin mini D-sub), 1x Management LAN connector (RJ-45), 2x Data LAN connector (RJ-45), 1x Serial (9-pin mini D-sub, Optional)	
	Internal	1x USB3.0, 2x SATA 2.0	
Redundant Fan		Optional, non-hot plug	
Redundant Power Supply		Optional, hot plug	
Power Supply		1x 500 Watt 80 PLUS® Platinum certified non-hot plug PSU 500 Watt : 100-120/200-240VAC ± 10% 50 / 60 Hz ± 3 Hz 1-2 x 500 Watt, 800 Watt, 1600 Watt 80 PLUS® Platinum certified hot plug PSU 500 Watt, 800 Watt, 1600 Watt : 100-120/200-240VAC± 10% 50 / 60 Hz ± 3 Hz 1-2 x 800 Watt, 80 PLUS® Titanium certified hot plug PSU 800Watt : 200-240 VAC± 10% 50 / 60 Hz ± 3 Hz	
Dimensions (W x D x H)		445.4 x 634.7 x 87.3mm 17.5 x 25.0 x 3.4 in (2U)	
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 35° C / 50° to 95° F, 8 to 90% Non-Operating: -30° to 60° C / -22° to 140° F, 5 to 95%	
Regulatory and Safety		FCC, UL/cUL, CB, CE, Mexico (CoC), RCM, RoHS, WEEE	
Operating Systems		Microsoft® Windows Server® 2012 R2 Standard Microsoft® Windows Server® 2012 R2 Datacenter Microsoft® Windows Server® 2016 Standard Microsoft® Windows Server® 2016 Datacenter Red Hat Enterprise Linux 6.9 or later Red Hat Enterprise Linux 7.3 or later VMware ESXi™ 6.0 Update 3 VMware ESXi™ 6.5 Update 1 or later VMware ESXi™ 6.7 or later	

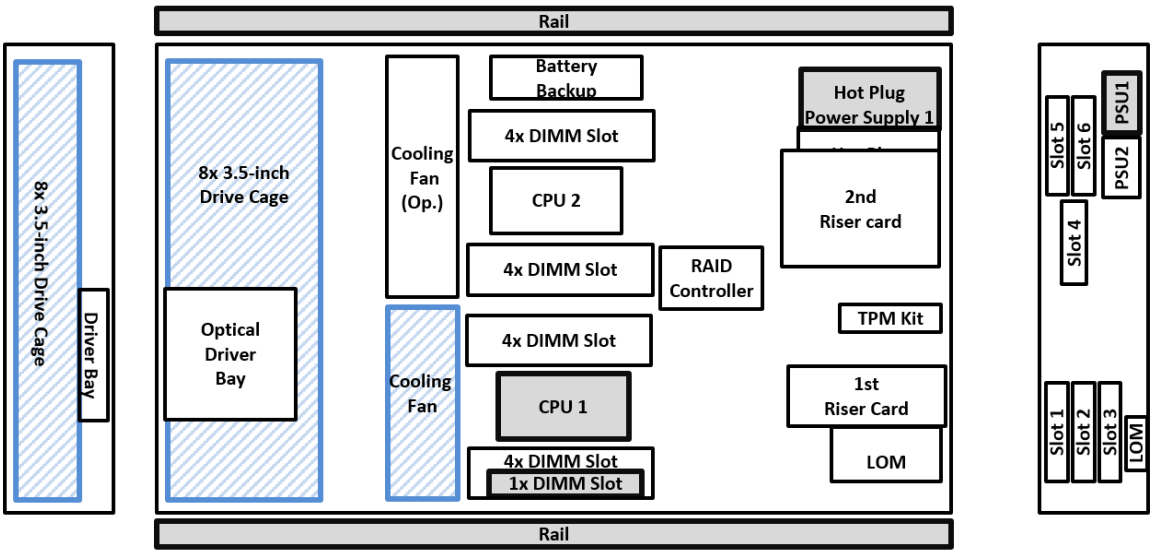
Configuration Diagram

8x 2.5-inch Drive Model



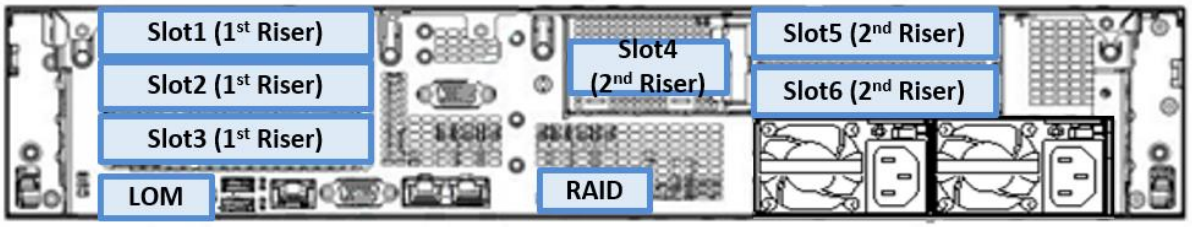
Legend: Standard Components Mandatory Components

8x 3.5-inch Drive Model



Legend: Standard Components Mandatory Components

Expansion slot map



Legend			Remarks
Standard Riser	LOM	Intel C622 Chipset embedded LAN, for a dedicated LOM controller	
	RAID	PCIe 3.0 x8, x8 connector, for a dedicated internal RAID card	
Add N8116-77 1st Riser Card	Slot 1	PCIe 3.0 x8, x8 connector, Full-height, 312mm length	
	Slot 2	PCIe 3.0 x8, x8 connector, Full-height, 168mm length	
	Slot 3	PCIe 3.0 x8, x8 connector, Full-height, 168mm length	
Add N8116-76 2nd Riser Card	Slot 4	PCIe 3.0 x8, x8 connector, Low Profile, 168mm length	2CPU required
	Slot 5	PCIe 3.0 x8, x8 connector, Full-height, 312mm length	2CPU required
	Slot 6	PCIe 3.0 x8, x8 connector, Full-height, 168mm length	2CPU required

NOTE:

- Riser Card is not mounted as standard. It is necessary to select 1st Riser Card.

Server Configuration

1 Base Models

Product Name / Description	Part Number
NEC Express5800/R120h-2E 8x 2.5-inch Drive Model No processor, no RAM, no HDD, no ODD, no Rail, no Power Supply Unit, no Riser Card Kit. Including : Front Bezel, 1x 2.5-inch Drive Cage, Standard Fan Kit	N8100-2604F
NEC Express5800/R120h-2E 8x 3.5-inch Drive Model No processor, no RAM, no HDD, no ODD, no Rail, no Power Supply Unit, no Riser Card Kit. Including : Front Bezel, 3.5-inch Drive Cage, Standard Fan Kit	N8100-2606F

NOTE:

- The base model must be ordered with a processor kit, a memory kit, Riser kit, SAS/SATA cable, a power supply kit and Rail.

2 Processors

Available sockets: 2

Category	Product Name / Description	Part Number
Xeon® Bronze 3100 Series	**Xeon Bronze 3104 Processor Kit** Intel® Xeon ® Bronze 3104 (1.70 GHz, 6C/6T, 8.25MB, TDP 85W)	N8101-1319 (1st) N8101-1320 (2nd)
	Xeon Bronze 3106 Processor Kit Intel® Xeon ® Bronze 3106 (1.70 GHz, 8C/8T, 11MB, TDP 85W)	N8101-1321 (1st) N8101-1322 (2nd)
Xeon® Silver 4100 Series	**Xeon Silver 4108 Processor Kit** Intel® Xeon ® Silver 4108 (1.80 GHz, 8C/16T, 11MB, TDP 85W)	N8101-1323 (1st) N8101-1324 (2nd)
	Xeon Silver 4110 Processor Kit Intel® Xeon ® Silver 4110 (2.10 GHz, 8C/16T, 11MB, TDP 85W)	N8101-1325 (1st) N8101-1326 (2nd)
	Xeon Silver 4112 Processor Kit Intel® Xeon ® Silver 4112 (2.60 GHz, 4C/8T, 8.25MB, TDP 85W)	N8101-1327 (1st) N8101-1328 (2nd)
	Xeon Silver 4114 Processor Kit Intel® Xeon ® Silver 4114 (2.20 GHz, 10C/20T, 13.75MB, TDP 85W)	N8101-1329 (1st) N8101-1330 (2nd)
	Xeon Silver 4116 Processor Kit Intel® Xeon ® Silver 4116 (2.10 GHz, 12C/24T, 16.50MB, TDP 85W)	N8101-1331 (1st) N8101-1332 (2nd)
Xeon® Gold 5100 Series	**Xeon Gold 5115 Processor Kit** Intel® Xeon ® Gold 5115 (2.40 GHz, 10C/20T, 13.75MB, TDP 85W)	N8101-1333 (1st) N8101-1334 (2nd)
	Xeon Gold 5118 Processor Kit Intel® Xeon ® Gold 5118 (2.30 GHz, 12C/24T, 16.50MB, TDP 105W)	N8101-1335 (1st) N8101-1336 (2nd)
	Xeon Gold 5120 Processor Kit Intel® Xeon ® Gold 5120 (2.20 GHz, 14C/28T, 19.25MB, TDP 105W)	N8101-1337 (1st) N8101-1338 (2nd)
	Xeon Gold 5122 Processor Kit Intel® Xeon ® Gold 5122 (3.60 GHz, 4C/8T, 16.50MB, TDP 105W)	N8101-1339 (1st) N8101-1340 (2nd)
Xeon® Gold 6100 Series	**Xeon Gold 6126 Processor Kit** Intel® Xeon ® Gold 6126 (2.60 GHz, 12C/24T, 19.25MB, TDP 125W) NOTE: - The processor kit is make-to-order product.	N8101-1341 (1st) N8101-1342 (2nd)
	Xeon Gold 6128 Processor Kit Intel® Xeon ® Gold 6128 (3.40 GHz, 6C/12T, 19.25MB, TDP 115W) NOTE: - The processor kit is make-to-order product.	N8101-1343 (1st) N8101-1344 (2nd)
	Xeon Gold 6130 Processor Kit Intel® Xeon ® Gold 6130 (2.10 GHz, 16C/32T, 22MB, TDP 125W) NOTE: - The processor kit is make-to-order product.	N8101-1345 (1st) N8101-1346 (2nd)
	Xeon Gold 6132 Processor Kit Intel® Xeon ® Gold 6132 (2.60 GHz, 14C/28T, 19.25MB, TDP 140W) NOTE: - The processor kit is make-to-order product.	N8101-1347 (1st) N8101-1348 (2nd)
	Xeon Gold 6134 Processor Kit Intel® Xeon ® Gold 6134 (3.20 GHz, 8C/16T, 24.75MB, TDP 130W) NOTE: - The processor kit is make-to-order product.	N8101-1349 (1st) N8101-1350 (2nd)

Category	Product Name / Description	Part Number
	Xeon Gold 6136 Processor Kit Intel® Xeon ® Gold 6136 (3 GHz, 12C/24T, 24.75MB, TDP 150W) NOTE: - The processor kit is make-to-order product.	N8101-1486 (1st) N8101-1487 (2nd)
	Xeon Gold 6138 Processor Kit Intel® Xeon ® Gold 6138 (2 GHz, 20C/40T, 27.50MB, TDP 125W) NOTE: - The processor kit is make-to-order product.	N8101-1351 (1st) N8101-1352 (2nd)
	Xeon Gold 6140 Processor Kit Intel® Xeon ® Gold 6140 (2.30 GHz, 18C/36T, 24.75MB, TDP 140W) NOTE: - The processor kit is make-to-order product.	N8101-1353 (1st) N8101-1354 (2nd)
	Xeon Gold 6142 Processor Kit Intel® Xeon ® Gold 6142 (2.60 GHz, 16C/32T, 22MB, TDP 150W) NOTE: - The processor kit is make-to-order product.	N8101-1488 (1st) N8101-1489 (2nd)
	Xeon Gold 6148 Processor Kit Intel® Xeon ® Gold 6148 (2.40 GHz, 20C/40T, 27.50MB, TDP 150W) NOTE: - The processor kit is make-to-order product.	N8101-1490 (1st) N8101-1491 (2nd)
	Xeon Gold 6152 Processor Kit Intel® Xeon ® Gold 6152 (2.10 GHz, 22C/44T, 30.25MB, TDP 140W) NOTE: - The processor kit is make-to-order product.	N8101-1355 (1st) N8101-1356 (2nd)

NOTE:

- The processor kit for the 1st CPU must be ordered with a base model.
- The processors must be the same to configure dual processor system.
- The processor kit for 1st CPU contains CPU Heatsink, the processor kit for 2nd CPU contains CPU Heatsink and CPU fan.
- When using 4 PCIe slots (except LOM slot and RAID slot), it is necessary to purchase the riser card option after setting it to 2 CPU configuration

The maximum number of logical processors supported by OS

See the table below for the maximum number of logical processors that you can actually use on your system.

Operating Systems	Number of Logical Processors Supported by Operating Systems	Maximum Available Number of Logical Processors
Microsoft Windows Server 2012 R2 Standard Microsoft Windows Server 2012 R2 Datacenter	**640** [1]	**104**
Microsoft Windows Server 2016 Standard Microsoft Windows Server 2016 Datacenter	**640** [1]	**104**
Red Hat Enterprise Linux 7	**384**	**104**
VMware ESXi 6.0	**480**	**104**
VMware ESXi 6.5	**576**	**104**
VMware ESXi 6.7	**768**	**104**

[1] The maximum numbers of logical processors when using Hyper-V are below:

- Windows Server 2012 R2: 320
- Windows Server 2016: 512

3 Memory

Available slots: 8 per processor

Category	Product Name / Description	Part Number
Registered DIMM (RDIMM)	**8GB DDR4-2666 REG Memory Kit (1x8GB/SR)** 1 x 8GB Registered ECC DIMM, DDR4-2666(PC4-2666), Single Rank	N8102-708
	16GB DDR4-2666 REG Memory Kit (1x16GB/SR) 1 x 16GB Registered ECC DIMM, DDR4-2666(PC4-2666), Single Rank	N8102-709
	16GB DDR4-2666 REG Memory Kit (1x16GB/DR) 1 x 16GB Registered ECC DIMM, DDR4-2666(PC4-2666), Dual Rank	N8102-710
	32GB DDR4-2666 REG Memory Kit (1x32GB/DR) 1 x 32GB Registered ECC DIMM, DDR4-2666(PC4-2666), Dual Rank	N8102-711
Load Reduced DIMM (LRDIMM)	**64GB DDR4-2666 LR Memory Kit (1x64GB/QR)** 1 x 64GB Load Reduced ECC DIMM, DDR4-2666(PC4-2666), Quad Rank	N8102-712

NOTE:

- Minimum one memory kit per processor must be installed.
- It is recommended to install memory kits in multiples of 6 identical DIMMs for 6-channel symmetric memory configurations to increase memory transfer speed.
- Mix configurations of RDIMM and LRDIMM are not supported.
- See page for additional memory configuration information.

Memory Configuration Feature Comparison

See the table below for feature comparisons of memory configurations supported.

	Independent Channel	Memory Sparing	Memory Mirroring
Performance	Best	Better	Good
Data Protection	No	Multiple single bit error protection	Multiple single bit and multi bit error protection
Redundancy	No	Partly	Fully
Data Correction	ECC, x4 SDDC	ECC, x4 SDDC	ECC, x4 SDDC
Available Memory	Full physical memory	Two ranks of memory per channel : Half physical memory Four ranks of memory per channel : 3/4 physical memory Eight ranks of memory per channel : 7/8 physical memory	Half physical memory
Available Memory Channels	6	6	6
Notes	-	All DIMMs in the system must be identical. Six DIMMs per processor are supported, one DIMM is populated per channel	All DIMMs in the system must be identical. Two or four DIMMs per processor are supported, **It is necessary to re-populate DIMMs after shipment, please contact your sales representative for Memory Mirroring.**

- Single Rank Memory (N8102-708/-709) does not support Memory Mirroring Mode Configuration Service.
- Refer to ”Memory RAS Settings”

Maximum Memory Speed

See the table below for the actual maximum memory transfer speed. DDR4 memory speed depends on CPU series.

Processor Type	DIMM Speed
Xeon ® Gold 6100 Series Xeon ® Gold 5122 Processor	2666 MHz
Xeon ® Gold 5100 Series (Except Xeon ® Gold 5122 Processor) Xeon ® Silver 4100 Series	2400 MHz
Xeon ® Bronze 3100 Series	2133 MHz

Maximum Available Memory

See the table below for the maximum memory size that you can actually use on your system.

Operating Systems	Maximum Memory Size Supported by Operating Systems	Maximum Available Memory
Microsoft Windows Server 2012 R2 Standard Microsoft Windows Server 2012 R2 Datacenter	4 TB	1 TB [1]
Microsoft Windows Server 2016 Standard Microsoft Windows Server 2016 Datacenter	24 TB	1 TB [1]
Red Hat Enterprise Linux 7	12TB	1 TB
VMware ESXi 6.0	6 TB	1 TB [2]
VMware ESXi 6.5	12TB	1 TB [3]
VMware ESXi 6.7	16TB	1 TB [3]

[1] The maximum available memory size of Hyper-V systems is below:
- Windows Server 2012 R2 : 4 TB
- Windows Server 2016 : 24 TB

[2] Up to 4 TB of the main memory is available to each virtual machine.

[3] Up to 6 TB of the main memory is available to each virtual machine.

4 Internal Storage

4.1 Drive Bay Configuration

Choose appropriate drive model and optional drive cages in accordance with the type and number of the drive you want to install.

List of the number that Internal Drives can be mounted

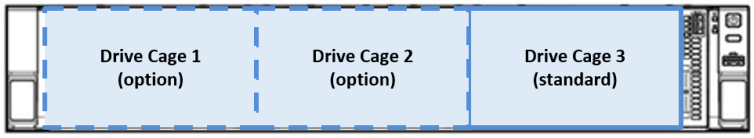
Category	Front Cage	Rear Cage[3]
8x 2.5-inch Drive Cage[1]	**Standard :** **8x 2.5-inch SAS/SATA Drive** **Expansion:** **▪8x2.5-inch SAS/SATA Drive (Up to 2)** **▪Internal DVD Drive Kit (Up to 1)**	**Standard: -** **Expansion:** **2x2.5-inch SAS/SATA Drive (Up to 1)**
8x 3.5-inch Drive Cage[2]	**Standard :** **8x3.5-inch SAS/SATA Drive**	

- [1] Up to 26 SAS/SATA Drives can be mounted.
- [2] Up to 8 SAS/SATA Drives can be mounted. In addition, if 2x 2.5-inch Drive Cage selected, up to 2 SAS/SATA Drives can be mounted.
- [3] If 2x2.5-inch SAS/SATA Drive Cage is selected, 2nd Riser kit cannot be mounted.

Front Drive Bay

Front Drive Bay for 8x 2.5-inch Drive Model

Eight 2.5-inch drive bays are standard. With optional 2.5-inch drive cages, up to 24 2.5-inch drive bays can be equipped.

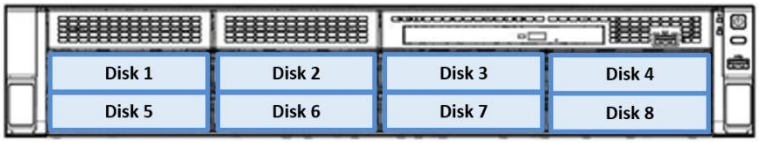


NOTE:

- The order of mounting the optional Drive Cage is 2 → 1.

Front Drive Bay for 8x 3.5-inch Drive Model

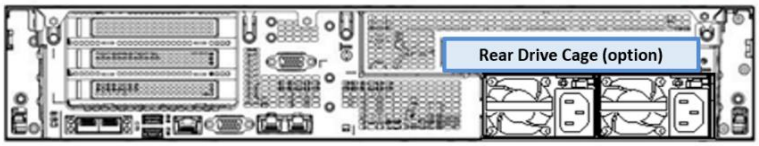
Eight 3.5-inch drive bays are standard.



Optional Rear Drive Bay

Drive Bay for 2.5-inch Drive Model and 3.5-inch Drive Model

With optional 2.5-inch drive cages instead of PCI Riser Card Kit, up to two 2.5-inch drive bays can be added.



4.2 Optional Drive Cages

Factory Integration

Category		Product Name / Description	Part Number
Front	**Drive Cage 3**	**2.5-inch Hot Plug Drive Cage Kit** 8x 2.5-inch SAS/SATA HDD For 8x 2.5-inch Drive Model	(Standard)
	Drive Cage 2	**2.5-inch Hot Plug Drive Cage Kit** 8x 2.5-inch SAS/SATA HDD For 8x 2.5-inch Drive Model	N8154-123
	Drive Cage 1	**2.5-inch Hot Plug Drive Cage Kit** 8x 2.5-inch SAS/SATA HDD For 8x 2.5-inch Drive Model **NOTE:** - If the Drive Cage kit is installed in the Drive cage 1, the Internal DVD Drive Installation Kit cannot be installed.	N8154-124
		Internal DVD Drive Installation Kit Equipping with one optical drive bay, For 8x 2.5-inch Drive Model, SATA	N8154-112
Rear	**Rear Drive Cage**	**2.5-inch Hot Plug Drive Cage Kit** 2x 2.5-inch SAS/SATA HDD **NOTE:** - The Drive Cage Kit can be installed instead of 2nd PCI Riser Kit. If the Drive Cage Kit is installed, 2nd Riser Card Kit cannot be installed. - When the Rear Drive Cage is installed in 3.5-inch Drive Model, select only SATA drives connected to Embedded SATA controller, however N8151-137/138 Internal DVD drive or N8118-312 M.2 SATA SSD Installation kit cannot be installed. SAS drives can be installed after shipment as a field upgrade, select SAS drives, N8154-120 2x2.5 Rear Drive Cage and N8103-195/-201 Internal RAID controller for a field upgrade. - When the Rear Drive Cage is installed in 2.5-inch Drive Model, if Internal RAID controller and SAS Expander card are selected, SAS and/or SATA drives can be installed as factory integration, otherwise field upgrade installation is required.	N8154-107

NOTE:

- For default factory configuration. If it is necessary to install optional cages in the field, select drive cages for Field Upgrade.
- The drive cage kits do NOT include Internal SAS/SATA Cable, select an appropriate cable in accordance with a controller you chose.
- In default factory configuration, there are some conditions of drive types and RAID levels can be installed. Refer to “Condition of internal drives in default factory configuration” in References.
- Up to eight drives can be installed in Non-RAID (Embedded SATA) configuration. Refer to “Conditions for mixing of Internal Drives” in References

Field Upgrade

Category		Product Name / Description	Part Number
Front	**Drive Cage 2**	**2.5-inch Hot Plug Drive Cage Kit** 8x 2.5-inch SAS/SATA HDD, including interface cables For 8x 2.5-inch Drive Model	N8154-104
	Drive Cage 1	**2.5-inch Hot Plug Drive Cage Kit** 8x 2.5-inch SAS/SATA HDD, including interface cables For 8x 2.5-inch Drive Model	N8154-105
Rear	**Rear Drive Cage**	**2.5-inch Hot Plug Drive Cage Kit** 2x 2.5-inch SAS/SATA HDD, including interface cables For 8x 2.5/3.5-inch Drive Model **NOTE:** - The Drive Cage Kit can be installed instead of 2nd PCI Riser Kit. If the Drive Cage Kit is installed, 2nd Riser Card Kit cannot be installed.	N8154-120

NOTE:

- The drive cage kits include Internal SAS/SATA Cable, it not necessary to select the cables.
- Refer to “Conditions for mixing of Internal Drives” in References

4.3 Storage Controllers and Options

Selection of RAID configuration

Select the configuration according to function and performance. The following is an example of the configuration

Configuration	Maximum Drive number	RAID function	Support OS
Embedded SATA Controller (Single connection)	**8**	**Non**	**Windows Server 2012 R2 Windows Server 2016 VMware ESXi 6.0 Update3 VMware ESXi 6.5 Update1 VMware ESXi 6.7**
Embedded SATA RAID Controller (On-board RAID)	**8**	**RAID 0/1/10**	**Windows Server 2012 R2 Windows Server 2016**
Internal RAID Controller (8 port)	**8**	**RAID 0/1/5/6/10/50/60**	**Windows Server 2012 R2 Windows Server 2016 VMware ESXi 6.0 Update3 VMware ESXi 6.5 Update1 VMware ESXi 6.7**
Internal RAID Controller (8 port) + SAS Expander Card *1	**26**		

NOTE:

- ***1 :** SAS Expander Card is only available for 8x2.5-inch Drive Model
- If SAS Expander is installed, VMware vSAN is unavailable.

4.3.1 Embedded SATA Controller

Category		Product Name / Description	Part Number
Storage Controller		**Embedded SATA Controller** 8x 6Gb/s SATA	(Standard)
Cable	**2.5-inch Drive Model**	**Internal SAS/SATA Cable** For Drive Cage 3	K410-421(00)
		Internal SAS/SATA Cable For Drive Cage 2	K410-410(00)
		Internal SAS/SATA Cable For Drive Cage 1	K410-412(00)
		Internal SAS/SATA Cable For Rear Drive Cage, Cable for RAID Controller	K410-418(00)
	3.5-inch Drive Model	**Internal SAS/SATA Cable** 4 port SAS/SATA Cable **NOTE:** - Two cables are required.	K410-414(00)

NOTE:

- Hot plug insertion/removal are not supported in the configuration.
- Up to eight SATA drives are available.

4.3.2 Embedded SATA RAID Controller (RAID 0/1/10)

Category		Product Name / Description	Part Number
Storage Controller		**Embedded SATA Controller** 8x 6Gb/s SATA	(Standard)
Cable	**2.5-inch Drive Model**	**Internal SAS/SATA Cable** For Drive Cage 3	K410-421(00)
		Internal SAS/SATA Cable For Drive Cage 2	K410-410(00)
		Internal SAS/SATA Cable For Drive Cage 1	K410-412(00)
		Internal SAS/SATA Cable For Rear Drive Cage, Cable for RAID Controller	K410-418(00)

	3.5-inch Drive Model	**Internal SAS/SATA Cable** 4 port SAS/SATA Cable **NOTE:** - Two cables are required.	K410-414(00)

NOTE:

- The Embedded SATA RAID Controller is available for Windows operating system only.
- When you use the Embedded SATA RAID controller, choose an external DVD drive. An internal DVD drive requires the embedded SATA controller configuration.

4.3.3 RAID Controller for Dedicated PCI Slot

Choose the appropriate RAID controller in accordance with RAID feature required, the number of drives to install.

Factory Integration

Category		Product Name / Description	Part Number
Storage Controller		**RAID Controller (RAID 0/1)** RAID 0/1/5/10 and SAS HBA mode, 0MB, Int. 8 port, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s	N8103-189
		RAID Controller (2GB, RAID 0/1/5/6) RAID 0/1/5/6/10/50/60, 2GB, Int. 8 port, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s	N8103-190
Battery Backup		**Battery Backup Unit** Lithium-ion Battery for RAID controller with cache memory	N8103-198
Expander Card		**SAS Expander Card** PCI card form factor, Int. 36, SAS 12Gb/s, SATA 6Gb/s **NOTE:** - Only for 8x 2.5-inch Drive Model - The card is required when you install the number of internal drives that exceeds the number of the internal ports of a RAID controller.	N8116-84
Cable	**2.5-inch Drive Model**	**Internal SAS/SATA Cable** For Drive Cage 3	K410-422(00)
		Internal SAS/SATA Cable For Drive Cage 2	K410-411(00)
		Internal SAS/SATA Cable For Drive Cage 1	K410-413(00)
		Internal SAS/SATA Cable For Rear Drive Cage, Cable for RAID Controller	K410-417(00)
		Internal SAS/SATA Cable For Rear Drive Cage, Cable for SAS Expander Card	K410-416(00)
	3.5-inch Drive Model	**Internal SAS/SATA Cable** 4 port SAS/SATA Cable **NOTE:** - Two cables are required.	K410-415(00)

NOTE:

- One battery backup unit must be installed per system.
- N8103-189 supports RAID5 in addition to RAID 0/1 although the product name does not contain “5”. If higher performance is needed, choose RAID controller with cache memory.
- Mix configuration of N8103-189 RAID Controller (RAID 0/1) and N8103-201 RAID Controller (2GB, RAID 0/1/5/6) is not supported.
- Mix configuration of N8103-190 RAID Controller (2GB, RAID 0/1/5/6) and N8103-195 RAID Controller (RAID 0/1) is not supported.

Field Upgrade

Category		Product Name / Description	Part Number
Storage Controller		**RAID Controller (RAID 0/1)** RAID 0/1/5/10 and SAS HBA mode, 0MB, Int. 8 port, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s	N8103-189
		RAID Controller (2GB, RAID 0/1) RAID 0/1/5/6/10/50/60, 2GB, Int. 8 port, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s	N8103-190
Battery Backup		**Battery Backup Unit** Lithium-ion Battery for RAID controller with cache memory	N8103-198
Cable	**2.5-inch Drive Model**	**Internal SAS/SATA Cable** For Drive Cage 3	K410-423(00)

3.5-inch Drive Model	**Internal SAS/SATA Cable** 4 port SAS/SATA Cable **NOTE:** - Two cables are required.	K410-424(00)

NOTE:

- One battery backup unit must be installed per system.
- N8103-189 supports RAID5 in addition to RAID 0/1 although the product name does not contain “5”. If higher performance is needed, choose RAID controller with cache memory.

4.3.4 RAID Controller for Standard PCI Slot

Category	Product Name / Description	Part Number
Storage Controller	**RAID Controller (RAID 0/1)** RAID 0/1/5/10 and SAS HBA mode, 0MB, Int. 8, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s	N8103-195
	RAID Controller (2GB, RAID 0/1/5/6) RAID 0/1/5/6/10/50/60, 2GB, Int. 8, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s	N8103-201
Battery Backup	**Battery Backup Unit** Lithium-ion Battery for RAID controller with cache memory. 1 battery provides power to all RAID controller.	N8103-198
Expander Card	**SAS Expander Card** PCI card form factor, Int. 36, SAS 12Gb/s, SATA 6Gb/s **NOTE:** - Only for 8x 2.5-inch Drive Model - The card is required when you install the number of internal drives that exceeds the number of the internal ports of a RAID controller.	N8116-84

NOTE:

- The RAID controllers are available for 2.5-inch Drive Model only.
- The RAID controllers must be installed after shipment.
- One battery backup unit must be installed per system.
- N8103-195 supports RAID5 in addition to RAID 0/1 although the product name does not contain “5”. If higher performance is needed, choose RAID controller with cache memory.

4.3.5 M.2 SATA SSD Installation kit

Category	Product Name / Description	Part Number
Kit for Standard PCI Slot	**M.2 SATA SSD Installation kit** 2x M.2 SATA SSD Up to 1 for OS boot.	N8118-312
Cable	**Internal SAS/SATA Cable** For motherboard connection	K410-426(00)

NOTE:

- If N8118-312 M.2 SATA SSD Installation kit is installed, K410-426(00) Internal SAS/ SATA cable and M.2 SSD Drive are required.
- M.2 SATA SSD is connected to Embedded SATA controller in Single connection or On-board RAID configuration regardless of whether optional RAID controllers are installed or not.
- If N8118-312 M.2 SATA SSD Installation kit is installed, Internal DVD Drive or Rear Drive Cage cannot be installed

4.4 Internal Drives

4.4.1 2.5-inch SATA Hard Disk Drives

Category	Product Name / Description	Part Number
512n Sector	**1TB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-596
512e Sector	**2TB 7.2K Hot Plug 2.5-inch SATA HDD** **1 x 2 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512e sector**	N8150-545

NOTE:

- 512e sector drives are not available for VMware ESXi system.

- All drives within a RAID array should be of the same capacity, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SATA SSDs can be mixed.

4.4.2 2.5-inch SATA Solid State Drives

Category	Product Name / Description	Part Number
Read Intensive DWPD ≈ 1	**240GB Hot Plug 2.5-inch SATA SSD** 1 x 240GB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Read Intensive	N8150-1740
	480GB Hot Plug 2.5-inch SATA SSD 1 x 480GB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Read Intensive	N8150-1741
	960GB Hot Plug 2.5-inch SATA SSD 1 x 960GB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Read Intensive	N8150-1742
	1.92TB Hot Plug 2.5-inch SATA SSD 1 x 1.92TB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Read Intensive	N8150-1743
	3.84TB Hot Plug 2.5-inch SATA SSD 1 x 3.84TB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Read Intensive	N8150-1744
Value Endurance DWPD ≈ 3	**480GB Hot Plug 2.5-inch SATA SSD** 1 x 480GB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Value Endurance	N8150-1737
	960GB Hot Plug 2.5-inch SATA SSD 1 x 960GB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Value Endurance	N8150-1738
	1.92TB Hot Plug 2.5-inch SATA SSD 1 x 1.92TB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Value Endurance	N8150-1739

NOTE:

- 512e sector drives are not available for VMware ESXi 6.0 system.
- All drives within a RAID array should be of the same capacity and endurance.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SATA SSDs and SAS SSDs can be mixed.

4.4.3 2.5-inch SAS Hard Disk Drives

Category	Product Name / Description	Part Number
512n Sector / 10,000 rpm	**300GB Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-546
	600GB Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-547
	1.2TB Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-549
512e Sector / 10,000 rpm	**1.8TB Hot Plug 2.5-inch SAS HDD** 1 x 1.8TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512e sector	N8150-550
	2.4TB Hot Plug 2.5-inch SAS HDD **1 x 2.4 TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512e sector**	N8150-591
512n Sector / 15,000 rpm	**300GB 15K Hot Plug 2.5-inch SAS HDD** 1x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-551
	600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-552
	900GB 15K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-602

NOTE:

- 512e sector drives are not available for VMware ESXi 6.0 system.
- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, and SATA SSDs can be mixed.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

4.4.4 2.5-inch SAS Solid State Drives

Category	Product Name / Description	Part Number
Middle Endurance DWPD ≈ 10	**400GB Hot Plug 2.5-inch SAS SSD** 1 x 400GB SAS SSD, 2.5-inch, 12Gb/s, 512n sector, Middle Endurance	N8150-1750
	800GB Hot Plug 2.5-inch SAS SSD 1 x 800GB SAS SSD, 2.5-inch, 12Gb/s, 512n sector, Middle Endurance	N8150-1751

Value Endurance **DWPD ≈ 3**	**400GB Hot Plug 2.5-inch SAS SSD** 1 x 400GB SAS SSD, 2.5-inch, 12Gb/s, 512n sector, Value Endurance	N8150-1752
	800GB Hot Plug 2.5-inch SAS SSD 1 x 800GB SAS SSD, 2.5-inch, 12Gb/s, 512n sector, Value Endurance	N8150-1753
Read Intensive **DWPD ≈ 1**	**960GB Hot Plug 2.5-inch SAS SSD** 1 x 960GB SAS SSD, 2.5-inch, 12Gb/s, 512n sector, Read Intensive	N8150-1754
	1.92TB Hot Plug 2.5-inch SAS SSD **1 x 1.92TB SAS SSD, 2.5-inch, 12Gb/s, 512n sector, Read Intensive**	N8150-1755

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SATA SSDs and SAS SSDs can be mixed.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

4.4.5 3.5-inch SATA Hard Disk Drives

Category	Product Name / Description	Part Number
512n Sector **7,200 rpm**	**1TB 7.2K Hot Plug 3.5-inch SATA HDD** 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-565
	2TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-566
	4TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-568
512e Sector **7,200 rpm**	**6TB 7.2K Hot Plug 3.5-inch SATA HDD** 1 x 6 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512e sector	N8150-569
	8TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 8 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512e sector	N8150-570
	12TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 12 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512e sector	N8150-588

NOTE:

- 512e sector drives are not available for VMware ESXi 6.0 system.
- All drives within a RAID array should be of the same type, capacity and rotation speed.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

4.4.6 3.5-inch Near Line SAS Hard Disk Drives

Category	Product Name / Description	Part Number
512e Sector **7,200 rpm**	**8TB 7.2K Hot Plug 3.5-inch SAS HDD** 1 x 8 TB Near Line SAS HDD, 3.5-inch, 12Gb/s, 7,200 rpm, 512e sector **NOTE:** - This HDD is make-to-order product.	N8150-573
	12TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 12 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512e sector	N8150-590

NOTE:

- 512e sector drives are not available for VMware ESXi 6.0 system.
- All drives within a RAID array should be of the same capacity and rotation speed.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- Near Line SAS HDD (7200 rpm) and SAS-HDD (10,000rpm / 15,000rpm) are equipped with SAS interface, they have the same maximum transfer speed and error recovery capabilities from the perspective of the interface specification, however Near Line SAS HDDs have the same I/O performance and endurance life as SATA HDDs(7200rpm) have.

4.4.7 M.2 SATA Solid State Drives

Category	Product Name / Description	Part Number
Value Endurance DWPD ≈ 1.5	**240GB Non-hot-plug M.2 SATA SSD** 1 x 240 GB M.2 SATA SSD, Value Endurance	N8150-1709
Read Intensive DWPD ≈ 0.5	**480GB Non-hot-plug M.2 SATA SSD** 1 x 480 GB M.2 SATA SSD, Read Intensive	N8150-1710

NOTE:

- N8118-312 M.2 SATA SSD Installation kit and K410-426(00) Internal SAS/ SATA cable are required.
- M.2 SATA SSD is connected to Embedded SATA controller in Single connection or On-board RAID configuration regardless of whether optional RAID controllers are installed or not.

5 Optical Drive

Category		Product Name / Description	Part Number
Internal	**Installation Kit**	**Internal DVD Drive Installation Kit** Equipping with one optical drive bay, For 8x 2.5-inch Drive Model, SATA **NOTE:** - The kit must be installed in the Drive Cage 1. If the optional drive cage N8154-105/124 are installed in the Drive Cage 1, the Internal DVD Drive Installation Kit cannot be installed.	N8154-112
	Drive	**Internal DVD-ROM drive** Slim DVD-ROM drive	N8151-137
		Internal DVD-Super Multi Drive Slim DVD Super Multi drive, SATA, including writing software **NOTE:** - Not supported for Linux or VMware	N8151-138
External		**External DVD-ROM Drive** Slim DVD-ROM drive, USB bus powered, 1.6A require, USB	N8160-102

NOTE:

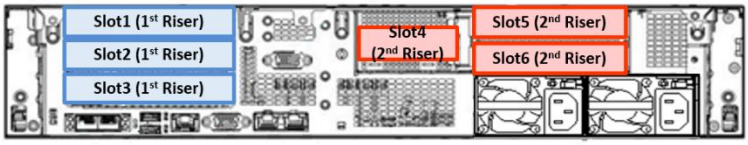
- N8151-137/ -138 can be installed in 8x 2.5-inch Drive Model with N8154-112 or 8x 3.5-inch Drive Model
- If N8154-112 Internal DVD Drive Installation Kit is selected, an Internal DVD drive must be selected.

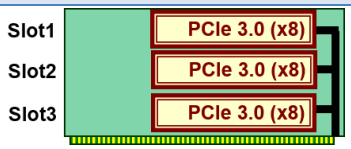
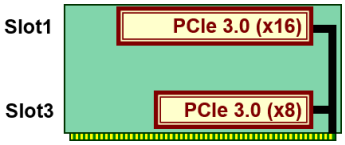
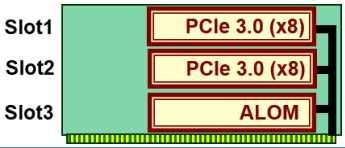
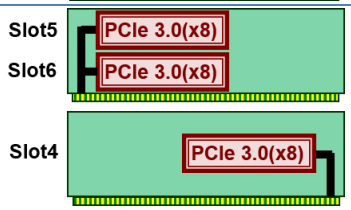
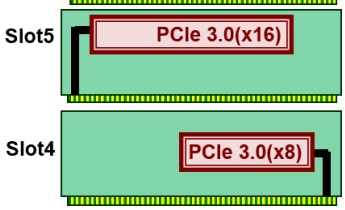
6 PCI Card

Please refer to **Supported PCI Cards and Installable Slots** with regard to the position of PCI slot which can mount PCI card supported.

6.1 PCI Riser Card

The system supports many kind of the PCI slot configuration. Choose the appropriate configuration in accordance with the type and number of PCI cards you want to install.



Category	Product Name / Description	Figure	Part Number
1st Riser	**Riser Card Kit(3xPCI)** Riser card for slot 1 to 3 with three PCIe 3.0 x8 slot		N8116-77
	Riser Card Kit(2xPCI) Riser card for slot 1 and 2 with one PCIe 3.0 x16 slot and one PCIe 3.0 x8 slot		N8116-73
	Riser Card Kit(2xPCI, 1xFLOM) Riser card for slot 1 to 3 with two PCIe 3.0 x8 slot. and one dedicated LOM controller		N8116-74
2nd Riser	**Riser Card Kit(3xPCI)** Riser card for slot 4 to 6 with three PCIe 3.0 x8 slot **NOTE:** - If the Rear Drive Cage Kit is installed, 2nd Riser Card Kit cannot be installed.		N8116-76
	Riser Card Kit(2xPCI + 1xGPU Installation Kit) Riser card for slot 4 and 5 with one PCIe 3.0 x16 slot and PCIe 3.0 x8 slot, including power cable for video card (CPU 8 Pin, PCIe 8 Pin, PCIe 6 Pin) **NOTE:** - If the Rear Drive Cage Kit is installed, 2nd Riser Card Kit cannot be installed.		N8116-75

NOTE:

- The 1st Riser Card Kit must be ordered with a base model.
- To use PCI slot 4 to 6, dual-processor configuration is required.

6.2 Network Interface Controller

Category		Product Name / Description	Part Number
LOM Card (LOM)	**1GbE**	**Dual Port 1000BASE-T LOM Card** Integrated into Intel C622 chipset	N8104-193
	10GbE	**Dual Port 10GBASE-T LOM Card** Integrated into Intel C622 chipset	N8104-195
		Dual Port 10GBASE-SR LOM Card Integrated into Intel C622 chipset	N8104-194
LOM Card (ALOM)	**1GbE**	**Quad Port 1000BASE-T LOM Card** Broadcom BCM5719 PCIe 2.0(x4)	N8104-171
		Quad Port 1000BASE-T LOM Card Intel Ethernet Controller I350 PCIe 2.0(x4)	N8104-172
	10GbE	**Dual Port 10GBASE-T LOM Card** QLogic 57810S PCIe 2.0(x8)	N8104-173
		Dual Port 10GBASE-T LOM Card Intel X550 PCIe 3.0(x4)	N8104-175
		Dual Port 10GBASE SFP+ LOM Card Intel Ethernet Controller X710 PCIe 3.0(x8) **NOTE:** - N8104-189 SFP+ Module is required to connect with an optical cable. - Up to two SFP+ Modules can be installed.	N8104-176
	25GbE	**Dual Port 25GBASE SFP+ LOM Card** Cavium 45604 PCIe 3.0(x16) **NOTE:** - N8104-190 SFP28 Module is required to connect with an optical cable. - Up to 2 SFP28 Modules can be installed. - Twinax cable can be installed - 6 or more memories per processor are needed for maximum performance.	N8104-177
Adapter	**1GbE**	**Dual Port 1000BASE-T Adapter** Broadcom BCM5720 Gigabit Ethernet Controller PCIe 2.0(x1)	N8104-178
		Dual Port 1000BASE-T Adapter Intel Ethernet Controller I350 PCIe 2.0(x4) **NOTE:** - Network cables with RJ-45 plug covers cannot be used.	N8104-180
		Quad Port 1000BASE-T Adapter Broadcom BCM5719 Gigabit Ethernet Controller PCIe 2.0(x4) **NOTE:** - Network cables with RJ-45 plug covers cannot be used.	N8104-179
		Quad Port 1000BASE-T Adapter Intel Ethernet Controller I350 PCIe 2.0(x4) **NOTE:** - Network cables with RJ-45 plug covers cannot be used.	N8104-181
	10GbE	**Dual Port 10GBASE-T Adapter** QLogic 57810S PCIe 2.0(x8)	N8104-182
		Dual Port 10GBASE-T Adapter Cavium QL41401, PCIe3.0(x8)	N8104-183
		Dual Port 10GBASE-T Adapter Intel X550-AT2, PCIe3.0(x4)	N8104-184
		Dual 10GBASE SFP+ Adapter QLogic 57810S	N8104-185

Category		Product Name / Description	Part Number
		PCIe 2.0(x8) **NOTE:** - N8104-189 SFP+ Module is required to connect with an optical cable. - Up to 2 SFP+ Modules can be installed. - Twinax cable can be installed	
		Dual Port 10GBASE SFP+ Adapter Intel Ethernet Controller X710 PCIe 3.0(x8) **NOTE:** - N8104-189 SFP+ Module is required to connect with an optical cable. - Up to 2 SFP+ Modules can be installed. - Twinax cable can be installed	N8104-186
	25GbE	**Dual Port 25GBASE SFP28 Adapter** Cavium QL41401, PCIe3.0(x8) **NOTE:** - N8104-190 SFP28 Module is required to connect with an optical cable. - Up to 2 SFP28 Modules can be installed. - Twinax cable can be installed - 6 or more memories per processor are needed for maximum performance.	N8104-187
SFP Module	**10GbE**	**SFP+ Module (10G-SR)** 1 x SFP+ Module	N8104-189
	25GbE	**SFP28 Module(25G-SR)** 1 x SFP28 Module SFP28 can be connected to 25G BASE adapter **NOTE:** It is not factory integration option.	N8104-190

NOTE:

- The NIC cards must be installed under the maximum configuration limits for networking when running with VMware systems. For more detail, see the Networking Maximum in the Configuration Maximums document for VMware.
  https://configmax.vmware.com/

NIC Teaming feature – NIC Teaming and bonding features

The Express 5800 server supports NIC teaming, which enables you to configure multiple NICs as a virtual single network interface for dual path, load balancing, for fault tolerance and network load balancing respectively.

See the table below for supported network interfaces and OS combinations.

Network Interface	Team	Operating Systems
1GbE NIC On-board LAN Interface N8104-172/-180/-181/-193	Up to four ports per one team **NOTE:** - N8104-172/-180/-181 do NOT support Windows Server 2012 R2 - N8104-193 does NOT support VMware ESXi 6.0 Update3	Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux 6.9 or later Red Hat Enterprise Linux 7.3 or later VMware ESXi 6.0 Update3 VMware ESXi 6.5 Update1 or later VMware ESXi 6.7 or later
1GbE NIC N8104-171/-178/-179	Up to four ports per one team	Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux 6.9 or later Red Hat Enterprise Linux 7.3 or later VMware ESXi 6.0 Update3 VMware ESXi 6.5 Update1 or later VMware ESXi 6.7 or later
10GbE NIC N8104-173/-182	Up to four ports per one team	Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux 6.9 or later Red Hat Enterprise Linux 7.3 or later VMware ESXi 6.0 Update3 VMware ESXi 6.5 Update1 or later VMware ESXi 6.7 or later
10GbE NIC N8104-175/-184/-195	Up to four ports per one team	Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux 6.9 or later

		Red Hat Enterprise Linux 7.3 or later VMware ESXi 6.0 Update3 VMware ESXi 6.5 Update1 or later VMware ESXi 6.7 or later
10GbE NIC N8104-183	Up to four ports per one team	Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux 7.3 or later VMware ESXi 6.0 Update3 VMware ESXi 6.5 Update1 or later VMware ESXi 6.7 or later
10GbE NIC N8104-185	Up to four ports per one team	Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux 6.9 or later Red Hat Enterprise Linux 7.3 or later VMware ESXi 6.0 Update3 VMware ESXi 6.5 Update1 or later VMware ESXi 6.7 or later
10GbE NIC N8104-176/-186/-194	Up to four ports per one team	Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux 6.9 or later Red Hat Enterprise Linux 7.3 or later VMware ESXi 6.5 Update1 or later VMware ESXi 6.7 or later
25GbE NIC N8104-177/-187	Up to four ports per one team	Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux 7.3 or later

NOTE:

- When 1GbE, 10GbE and 25GbE NIC teams are mixed, the maximum number of teams must be five per one system.

6.3 External Storage Controller

6.3.1 RAID Controller

Category	Product Name / Description	Part Number
Controller	**RAID Controller (4GB, RAID0/1/5/6)** RAID0/1/5/6/10/50/60, 4GB, 8 External port PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s	N8103-196
Battery Backup	**Battery Backup Unit** Lithium-ion Battery for RAID controller.	N8103-198

NOTE:

- Only one SAS JBOD Enclosure can be connected to one RAID controller.
- 4Kn sector drives are not supported with the RAID controller.
- One battery backup unit must be installed per system.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives up to eight in order to minimize the risk of becoming multiple hard drives failure.

6.3.2 Fibre Channel / SAS Controller

Category	Product Name / Description	Part Number
Fibre Channel	**Fibre Channel Controller (1ch)** Cavium QLogic, QLE2690 16Gb/s, Optical, PCIe 3.0 x8 **NOTE:** - The controller is qualified with NEC Storage M series, OS support WS2012R2 and WS2016 - The controller is qualified with NEC Storage T series, OS support WS2012R2, WS2016 and RHEL7.3	N8190-165
	Fibre Channel Controller (2ch) Cavium QLogic, QLE2692 16Gb/s, Optical, PCIe 3.0 x8 **NOTE:**	N8190-166

	- The controller is qualified with NEC Storage M series, OS support WS2012R2 and WS2016 - The controller is qualified with NEC Storage T series, OS support WS2012R2, WS2016 and RHEL7.3	
	Fibre Channel Controller (1ch) Broadcom, LPe31000 16Gb/s, Optical, PCIe 3.0 x8 **NOTE:** - The controller is qualified with NEC Storage M series. - The controller is not qualified with NEC Storage T series.	N8190-163
	Fibre Channel Controller (2ch) Broadcom, LPe31002 16Gb/s, Optical, PCIe 3.0 x8 **NOTE:** - The controller is qualified with NEC Storage M series. - The controller is not qualified with NEC Storage T series.	N8190-164
	Fibre Channel Controller (1ch) Broadcom, LPe32000 32Gb/s, Optical, PCIe 3.0 x8 **NOTE:** - The controller is qualified with NEC Storage M series. - The controller is not qualified with NEC Storage T series.	N8190-171
	Fibre Channel Controller (2ch) Broadcom, LPe32002 32Gb/s, Optical, PCIe 3.0 x8 **NOTE:** - The controller is qualified with NEC Storage M series. - The controller is not qualified with NEC Storage T series.	N8190-172
SAS	**SAS Controller** LSI SAS9300-8e Host Bus Adapter 12Gb/s SAS, ext. 8(SFF-8644 x2), PCIe 3.0(x8) **NOTE:** - Support for connection to NEC Storage T series and M series and LTO. - The controller is not qualified with tape drive connection via Device Expansion Unit. - Please download the driver kit from Express5800 web site - This controller is an factory installation option. Select N8103-184 for the field upgrade use after shipment.	N8103-E184
	SAS Controller 12Gb/s SAS, ext. 8(SFF-8644 x2), PCIe 3.0 x8 **NOTE:** - Support tape drive connection via Device Expansion Unit	N8103-197

NOTE:

- Please refer to the NEC Storage website for supported OS and device
- For FC-SAN boot, please refer to “FC SAN Boot Configuration Guide”
- For the cluster configuration, please refer to the Express Cluster website
- Fibre Channel (FC) link speed varies by types and length of cables

6.4 Serial Port Adapter

Product Name / Description	Part Number
Additional Serial Port Kit Serial port Connector	N8117-11

NOTE:

- Up to one serial port adapter can be installed.

7 Other Add-in Components

7.1 Power Supply

Category		Product Name / Description	Part Number
Non Redundant		**500W Non-hot Plug Power Supply**	N8181-168
Redundant	**Power Cage**	**Redundant PSU Cage**	N8181-174
	Power Unit	**500W Platinum Hot Plug Power Supply** 1 x 500 Watt 80 PLUS® Platinum, including one 2m IEC320 C14 power cord	N8181-159
		800W Platinum Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Platinum, including one 2m IEC320 C14 power cord	N8181-160
		800W Titanium Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Titanium, including one 2m IEC320 C14 power cord **NOTE:** - 200 VAC input only supported	N8181-161
		1600W Hot Plug Power Supply 1 x 1600 Watt 80 PLUS® Platinum, including one 2m IEC320 C14 power cord **NOTE:** - 200 VAC input only supported	N8181-162

NOTE:

- Minimum one power supply kit must be installed.
- Up to two redundant power supply units are available per system, they must be the same unit to configure redundancy.

Available Power Supplies

See the table below for the power supplies available based on the number of drives, the number and type of processors, the type and number of DIMMs, the number of drives, and the number of PCI cards.

8x 2.5-inch Drive Model

Number of Processors	Type of Processor	Type of DIMMs	Number of DIMMs	Number of Drives	Number of PCI Cards	Available Power Supply
1CPU	Processor with 115 Watt or less	RDIMM	-	Up to eight	-	500W, 800W, 1600W
				Nine or more	-	800W, 1600W
		LRDIMM	Up to six	Up to eight	-	500W, 800W, 1600W
				Nine or more	-	800W, 1600W
			Seven or more	-	-	800W, 1600W
	Processor with 125 Watt and 130 Watt	RDIMM	Up to six	Up to eight	-	500W, 800W, 1600W
				Nine or more	-	800W, 1600W
			Seven or more	-	-	800W, 1600W
		LRDIMM	Up to six	Up to six	-	500W, 800W, 1600W
				Seven or more	-	800W, 1600W
			Seven or more	-	-	800W, 1600W
	Processor with 140 Watt or more	RDIMM	Up to six	Up to eight	-	500W, 800W, 1600W
			Seven or more	-	-	800W, 1600W
		LRDIMM	-	-	-	800W, 1600W

2CPU	Processor with 85 Watt	RDIMM	Up to 12	-	-	800W, 1600W
			13 or more		-	1600W
		LRDIMM	Up to 12	Up to 16	-	800W, 1600W
				17 or more	-	1600W
			13 or more	-	-	1600W
	Processor with 105 Watt and 115 Watt	RDIMM	Up to 12	Up to 18	-	800W, 1600W
				19 or more	-	1600W
			13 or more	-	-	1600W
		LRDIMM	Up to six	Up to 16	-	800W, 1600W
				17 or more	-	1600W
			Seven or more	-	-	1600W
	Processor with 125 Watt and 130 Watt	RDIMM	Up to 12	Up to 14	-	800W, 1600W
				15 or more	-	1600W
			13 or more	-	-	1600W
		LRDIMM	Up to six	Up to 14	-	800W, 1600W
				15 or more	-	1600W
			Seven or more	-	-	1600W
	Processor with 140 Watt or more	RDIMM	Up to 12	Up to eight	Up to four	800W, 1600W
					Five or more	1600W
				Nine or more		1600W
			13 or more	-		1600W
		LRDIMM	Up to six	Up to eight	Up to four	800W, 1600W
					Five or more	1600W
				Nine or more	-	1600W
			Seven or more	-	-	1600W

NOTE:

- Number of PCI Cards do NOT include a dedicated RAID card or a dedicated LOM controller.

8x 3.5-inch Drive Model

Number of Processors	Type of Processor	Type of DIMMs	Number of DIMMs	Number of Drives	Number of PCI Cards	Available Power Supply
1CPU	Processor with 85 Watt	RDIMM	-	-	-	500W, 800W, 1600W
		LRDIMM	Up to six	Up to six	-	500W, 800W, 1600W
			-	Seven or more	-	800W, 1600W
			Seven or more	-	-	800W, 1600W
	Processor with 105 Watt and 115 Watt	RDIMM	-	-	-	500W, 800W, 1600W
		LRDIMM	Up to six	Up to four	-	500W, 800W, 1600W
				Five or more	-	800W, 1600W
			Seven or more	-	-	800W, 1600W
	Processor with 125 Watt and 130 Watt	RDIMM	Up to six		-	500W, 800W, 1600W
			Seven or more	-	-	800W, 1600W
		LRDIMM	-	-	-	800W, 1600W
	Processor with 140 Watt or more	RDIMM	Up to six	Up to five	-	500W, 800W, 1600W
				Six or more	-	800W, 1600W
			Seven or more		-	800W, 1600W
		LRDIMM	-	-	-	800W, 1600W
2CPU	Processor with 115 Watt or less	RDIMM	-	-	-	800W, 1600W
		LRDIMM	Up to six	-	-	800W, 1600W

		Seven or more	-	-	1600W
Processor with 125 Watt and 130 Watt	RDIMM	Up to 12	-	-	800W, 1600W
		13 or more	-	-	1600W
	LRDIMM	Up to six	-	-	800W, 1600W
		Seven or more	-	-	1600W
Processor with 140 Watt or more	RDIMM	Up to 12	Up to six	Up to four	800W, 1600W
				Five or more	1600W
			Seven or more	-	1600W
		13 or more	-	-	1600W
	LRDIMM	Up to six	Up to six	Up to four	800W, 1600W
				Five or more	1600W
			Seven or more	-	1600W
		Seven or more	-	-	1600W

NOTE:

- Number of PCI Cards do NOT include a dedicated RAID card or a dedicated LOM controller.

Guideline of Maximum Power Consumption

See the following table for the guideline of the maximum power consumption based on the TDP and Input voltage. The actual maximum power consumption differs depend on the type of processor while the TDP of processor is the same.

200VAC Input

CPU TDP	8x 2.5-inch	8x 3.5-inch
85 Watt	939W / 942VA	826W / 829VA
105 Watt	990W / 993VA	877W / 880VA
115 Watt	1003W / 1006VA	889W / 892VA
125 Watt	1051W / 1053VA	936W / 939VA
130 Watt	1051W / 1053VA	936W / 939VA
140 Watt	1110W / 1112VA	994W / 997VA
150 Watt	1119W / 1121VA	1003W / 1005VA

7.2 Cooling Fan Kit

Product Name / Description	Part Number
Non Redundant Fan Kit Non redundant cooling fans	(Standard)
Redundant Fan Kit Redundant cooling fans	N8181-167

7.3 Trusted Platform Module Kit

Product Name / Description	Part Number
Trusted Platform Module Kit TPM 2.0 module	N8115-35

NOTE:

- The kit is not available in China.
- The kit is not removable after attachment.
- The kit supports only with Windows operating system configured with UEFI boot mode.
- "Chipset-TPM" in BIOS setup menu must be activated prior to use of this product.
- To use Windows BitLocker drive encryption, be sure to keep the "recovery password" of BitLocker function. The recovery password is required to restore data for hardware replacement during a system error.

7.4 USB Memory Kit

Product Name / Description	Part Number
8GB USB Memory	N8106-017
Dual 8GB microSD Kit(USB) Including 2x 8GB microSD, USB dual microSD memory card reader, RAID1 Support	N8106-016

NOTE:

- The USB memory kit is installed in the system when you order it with the base model.
- The kit does not include VMware ESXi installation media and license.

8 Factory Server Setting Service

8.1 Memory RAS Settings

If you need to change the BIOS settings for the memory RAS feature at the factory, select the appropriate configuration service.

Product Name / Description	Part Number
Memory Mirroring Mode Configuration Service Setup option to change the Memory RAS of BIOS menu to Memory Mirroring Mode	NESV16-013
Memory Sparing Mode Configuration Service Setup option to change the Memory RAS of BIOS menu to Memory Sparing Mode	NESV16-014

8.2 RAID Configuration Service

If RAID configuration setup is NOT needed when a RAID controller is installed at the factory, select this option service.

Product Name / Description	Part Number
RAID Config Option(None) Server setting option service without RAID configuration setup when a RAID controller is installed.	NESV16-039

9 Add-on Components

9.1 17-inch LCD Console Drawer

Category		Product Name / Description	Part Number
Drawer w/ KVM	**Drawer**	**17-inch LCD Console Drawer (8port)** 17-inch LCD, US 83-keys Keyboard, Optical mouse, 8 port KVM switch, 1U height	N8143-106F
	Cable	**Switch Unit Connection Cable Set (USB, 1.8m)** 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
		Switch Unit Connection Cable Set (USB, 3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
		Switch Unit Connection Cable Set (USB, 5m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)
Drawer w/o KVM	**Drawer**	**17inch LCD Console Unit 1U** 17-inch LCD, US 83-keys Keyboard, Optical mouse, 1U height, 4-pin USB B to 4-pin USB A cable 2 m, PS/2 Y-splitter cable 2m, 15-pin mini D-sub VGA cable 2 m	N8143-105F
		17inch LCD Console Drawer (1port) 17-inch LCD, US 103-keys Keyboard with 10-key, Touch pad with 3-button, 1U height, 4-pin USB B to 4-pin USB A cable 1.8 m, Two PS/2 cable 1.8 m, 15-pin mini D-sub VGA cable 1.8 m	N8143-108F
		17.3inch LCD Console Drawer (1port) 17.3-inch wide Full HD LCD, US 103-keys Keyboard with 10-key, Touch pad with 2-button, 1U height, 4-pin USB B to 4-pin USB A cable 1.8 m, 15-pin mini D-sub VGA cable 1.8 m, DVI-D cable 1.8m	N8143-122F
	Keypad	**Keyboard Unit (JP)** JP 108-keys Keyboard with 10-key for N8143-108F 17inch LCD Console Drawer (1port)	N8143-109
		Keyboard Unit (UK) UK 104-keys Keyboard with 10-key, for N8143-108F 17inch LCD Console Drawer (1port)	N8143-111

9.2 KVM Switch

Category		Product Name / Description	Part Number
KVM Switch		**Server Switch Unit (8 server)** 1U USB 8 port KVM switch	N8191-14F
Cable	**KVM**	**Switch Unit Connection Cable Set (USB,1.8m)** 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
		Switch Unit Connection Cable Set (USB,3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
		Switch Unit Connection Cable Set (USB,3m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)
	Cascading	**Switch Unit Connection Cable 1.8 m** 1.8 m, 1 x 15-pin mini D-sub - 1x 15-pin mini D-Sub / 2x PS/2	K410-119(1A)

9.3 Server Management License

Choose the following license kit to use additional remote management features. See “Server Management” in References.

Product Name / Description	Part Number
License for Remote Management (Advanced) License per server Remote console: - Integrated Remote Console (IRC) with full functionality Remote media: - Virtual media access via Integrated Remote Console (IRC) - Scripted virtual media access System management: - Global team collaboration for up to six consoles	N8115-33

- Integrated Remote Console (IRC) recording and playback	
License for Remote Management (Scale-Out) License per server Remote console: - Text-based remote console via SSH - Integrated Remote Console (IRC) under Pre-OS System management: - Email alert - Remote Syslog feature - Virtual Serial Port recording and playback	N8115-34
License for Remote Management (Essentials) License per server Remote console: - Integrated Remote Console (IRC) Remote media: - Virtual media access via Integrated Remote Console (IRC) System management: - Email alert	N8115-36

NOTE:

- Remote management features are not available for virtual machines.

9.4 Dust Proof Filter Kit

Product Name / Description	Part Number
Dust proof Filter Kit Including the filter attachment kit and 10 sets of dust proof filters Suggested replacement: Every three months (depending on environment).	N8147-33

NOTE:

- The Dust Proof filter kit is make-to-order products. Estimated production lead time for the kit will be approximately one month.

9.5 Slide Rail Kit

Product Name / Description	Part Number
Tool-free Slide Rail Kit for 2U-2.5inch Server	N8143-133

NOTE:

- The slide rail kit must be ordered with a base model.

9.6 Cable Management Arm

Product Name / Description	Part Number
Cable Management Arm for 2U Server Cable Arm for Slide Rail Kit	N8143-126

9.7 Starter Pack DVD

The starter pack DVD includes the software and driver qualified by NEC. In order to obtain technical support from NEC, please be sure to install the software and drivers provided with the starter pack. The latest DVD image can be downloaded for free from NEC website during the warranty period.

Product Name / Description	Part Number
Express5800/R120h-1E, 2E Starter Pack	UL9020-B111

9.8 Flash FDD

Choose the Flash FDD if you need to prepare an alternative device for a floppy drive.

Category	Product Name / Description	Part Number
External	**Flash FDD** USB flash emulating USB floppy disk, Native capacity 1.44 MB	N8160-96

NOTE:

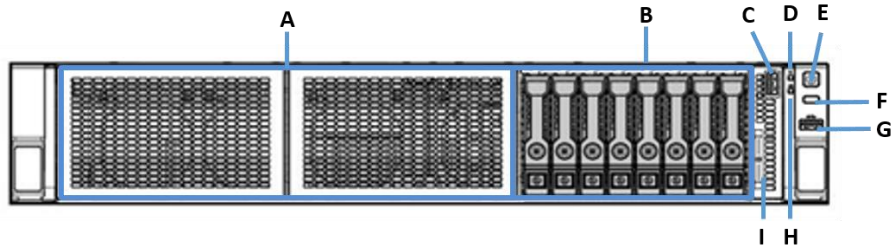
- Up to one drive can be connected.

References

External Views

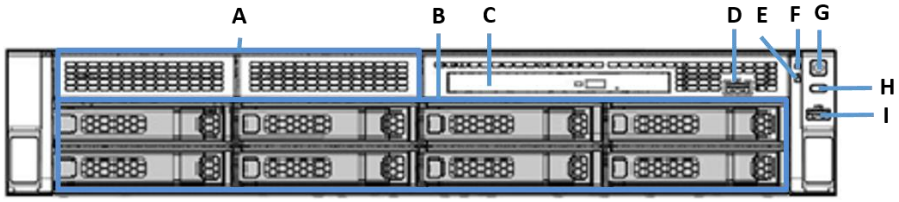
Front and Rear Views

Front View for 8x 2.5-inch Drive Model



Legend			
A.	Optional Drive Cage	**F.**	UID Button/LED
B.	2.5-inch Drive Bays	**G.**	USB 3.0 Connector
C.	iLO Service Connector	**H.**	Network Link/Activity LED
D.	Health LED	**I.**	Pull-out tab
E.	Power On/standby button/LED		

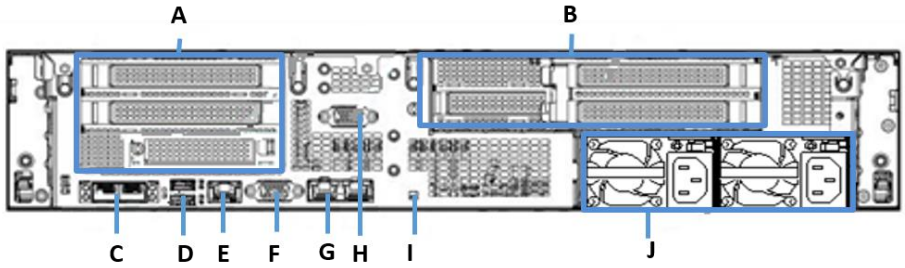
Front View for 8x 3.5-inch Drive Model



Legend			
A.	Optional 2.5-inch Drive Bays	F.	Health LED
B.	3.5-inch Drive Bays	G.	Power On/standby button/LED
C.	ODD Bay	H.	UID button/LED
D.	Service port	I.	USB 3.0 port
E.	LINK/ACT LED	.	

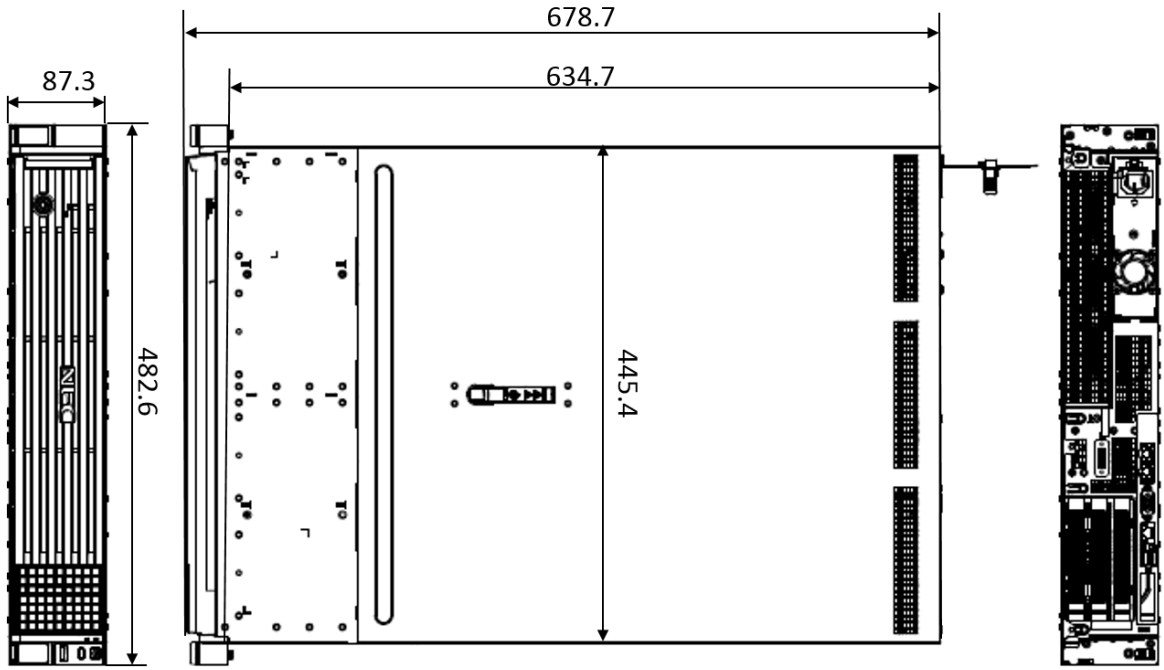
Legend			
A.	3.5-inch Drive Bays	**D.**	Health LED
B.	Power On/standby button/LED	**E.**	UID LED Button
C.	Network Link/Activity LED		

Rear View



Legend			
A.	PCIe slots (Option)	**F.**	VGA connector
B.	PCIe slots (Option)	**G.**	NIC Connectors 1-2 (1Gb)
C.	Flexible LOM (optional)	**H.**	Serial Port(Option)
D.	USB 3.0 Connectors	**I.**	Rear UID LED
E.	Management Port	**J.**	Power supply

Dimensions (mm)



General Supplementary Matters

HDD

- The Capacity of Hard disk drive is indicated in decimal not binary. 1GB＝1000^3B、1TB=1000^4B.

PCI expansion slot

- Transfer speed of PCI Express
  - PCI Express (PCIe): 2.5Gb/s (simplex) per lane
  - PCI Express 2.0 (PCIe 2.0): 5Gb/s (simplex) per lane
  - PCI Express 3.0 (PCIe 3.0): 8Gb/s (simplex) per lane

Time display

- A system clock is affected by temperature conditions in storage. If high accuracy of the system clock is required, use of NPT servers is recommended.

Memory Supplementary Matters

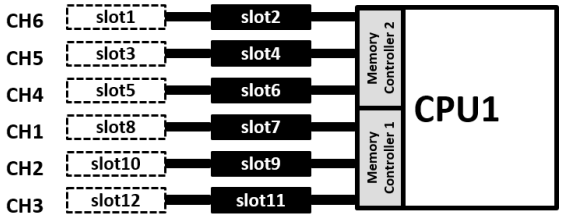
Installation rule

- The number of memory which can be installed varies depending on number of installed CPUs.
- This installation rule is defined to maximize performance efficiently in multiple cores and tasks operation.
- Registered DIMM (RDIMM), Load Reduced DIMM (LRDIMM) can be installed up to 8 per 1CPU.
- Mixing of RDIMM and LRDIMM is not allowed to be installed.

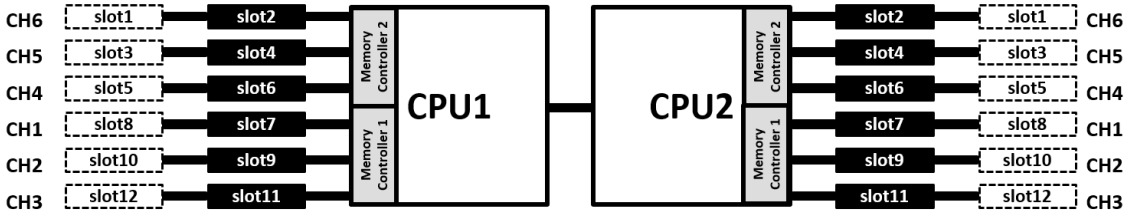
When install DIMMs, higher capacity memory must be installed preferentially, if this rule is ignored, it may cause failures of DIMMs. This rule applies to the factory installation.

For dual CPU system, install DIMM to CPU1 firstly and then to CPU2 alternately.
Memory population varies with number of installed DIMMs. In installation of 5, 7, 8 DIMMs per CPU, optimal performance might NOT be obtained. Other memory populations are recommended.

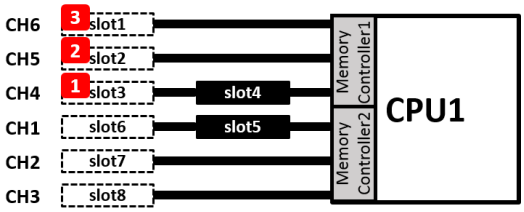
Single CPU system



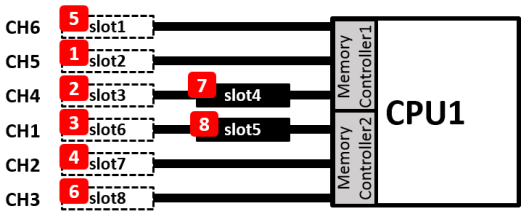
Dual CPU system



1-3x DIMM(s)



4-8x DIMMs



Internal Drive Supplementary Matters

Conditions of Internal Drives in the default factory configuration

In the default factory configuration, there are some conditions of drive types and RAID levels that can be installed as below.

Common

- For the shipment with a RAID array, select the drives in the same capacity as many as needed.
- In the default factory configuration, up to two types of Internal Drives can be installed in accordance with the following conditions and restrictions.

Conditions for mixing Internal Drives in the default factory configuration

- Up to two types of Internal Drives can be installed in the default factory configuration.
- M.2 SATA SSD can be installed at the factory regardless of mixing Internal Drives.
- The type of Internal Drives is classified according to form factors (2.5”/3.5”), interfaces (SAS/SATA), devices (HDD/SSD), Data transfer speeds, and rotational speeds. The current categories are below.
  - 3.5 inch SAS HDD, 12Gb/s, 7,200rpm
  - 3.5 inch SATA HDD, 6Gb/s, 7,200rpm
  - 2.5 inch SAS HDD, 12Gb/s, 10,000rpm
  - 2.5 inch SAS HDD, 12Gb/s, 15,000rpm
  - 2.5 inch SAS SSD, 12Gb/s
  - 2.5 inch SATA HDD, 6Gb/s, 7,200rpm
  - 2.5 inch SATA SSD, 6Gb/s

  For example, 2.5 inch SATA HDD, 1TB, 7,200rpm 512n sector and 2.5 inch SATA HDD, 2TB, 7,200rpm 512n sector are regarded as the same type of Internal Drives.

Common restrictions of mixing Internal Drives in the default factory configuration

- Internal Drives with a different sector size cannot be mixed, even if they are the same type.
  For example, a mixing of 2.5 inch SATA HDD, 1TB, 7,200rpm 512n sector and 2.5 inch SATA HDD, 2TB, 7,200rpm 512e sector is NOT supported in the default factory configuration.
- SSDs of different Endurance (ME, VE, RI) cannot be mixed, even if they are the same type.
  For example, a mixing of 2.5 inch SATA SSD, 400GB, 6Gb/s VE (Value Endurance) and 2.5 inch SATA HDD, 800GB, 6Gb/s RI (Read Intensive) is NOT supported in the default factory configuration.

Mounting order of mixing Internal Drives in the default factory configuration

- In the default factory configuration, the drive mounting order is defined as below.
- The Internal drives is installed in the order of Front Cage, Middle Cage, Rear Cage.

Order	2.5 inch Drives
1	2.5 inch SAS HDD
2	2.5 inch SAS SSD
3	2.5 inch SATA HDD
4	2.5 inch SATA SSD

Order	3.5 inch Drives
1	3.5 inch SAS HDD
2	3.5 inch SATA HDD
-	-
-	-

- The Internal drives are installed in the ascending order of a slot number, when the same type of the drives are selected, the drives are installed according to the order below.

Order	Factors	Priority; high	Priority; middle	Priority; low
1	Drive capacity	Smaller	Bigger	-
2	Data transfer speed	6Gb/s	12Gb/s	-
3	Rotational speed	7,200rpm	10,000rpm	15,000rpm

RAID controller configuration

- Capacity of Logical drive can be within 2TB with legacy boot mode, capacity of logical drive can be within the total capacity of logical disks with UEFI boot mode.
- As the factory shipment, initial cache policy of RAID controllers is Write Through for N8103-189, Write back for N8103-190.

RAID configuration for the default factory shipment

Available RAID level is determined by the RAID configurations and the number of drives as below.

RAID configuration for shipment	Number of Drives	Number of Drives in RAID levels
Non RAID	1～8	Non
Embedded RAID(On-board RAID) configuration (RAID 0/1/10)	1	RAID0 (Single drive)
	2	RAID1
	3	2 in RAID1、1 for hot spare
	4/6/8	4/6/8 in RAID10
	5/7	4/6 in RAID10, 1 for a hot spare
RAID controller configuration(RAID 0/1/10)	1	RAID0(Single drive)
	2	RAID1
	3	2 in RAID1, 1 for a hot spare
	4/6/8	4/6/8 in RAID10
	5/7/9	4/6/8 in RAID10, 1 for a hot spare
	10	8 in RAID10, 2 in RAID1
	11	8 in RAID10, 2 in RAID1, 1 for a hot spare
	12/14/16	8 in RAID10, 4/6/8 in RAID10
	13/15/17	8 in RAID10, 4/6/8 in RAID10, 1 for a hot spare
	18	2x 8 in RAID10, 2 in RAID1
	19	2x 8 in RAID10, 2 in RAID1, 1 for a hot spare
	20/22/24	2x 8 in RAID10, 4/6/8 in RAID10
	21/23/25	2x 8 in RAID10, 4/6/8 in RAID10, 1 for a hot spare
	26	3x 8 in RAID10, 2 in RAID1
RAID controller configuration (RAID 0/1/5/6/10)	1	RAID0(Single drive)
	2	RAID1
	3-8	RAID5
	9	8 in RAID 5, 1 in RAID0 (Single drive)
	10	8 in RAID 5, 2 in RAID 1
	11-16	8 in RAID 5, 3-8 in RAID5
	17	2x 8 in RAID 5, 1 in RAID0 (Single drive)
	18	2x 8 in RAID 5, 2 in RAID 1
	19-24	2x 8 in RAID 5, 3-8 in RAID5
	25	3x 8 in RAID 5, 1 in RAID0 (Single drive)
	26	3x 8 in RAID 5, 2 in RAID 1

Conditions for mixing of Internal Drives after shipment

- RAID controller is required for mixing of Internal Drives
- Mixed Internal Drives cannot be installed in the same RAID array.
- When using hot spare disk for different RAID arrays which consist of various type of drives, assign “Dedicated Hot Spare” to each RAID arrays with the same type of drive, to prevent from mixing different type of drives in a RAID array. “Global Hot Spare” cannot be used.

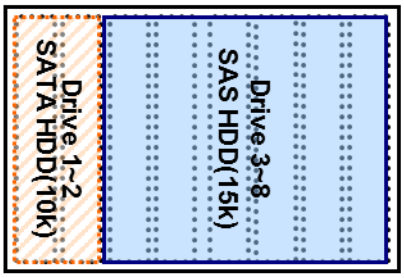
Mixing of different type of drives

Two types of drive can be installed in standard drive cage (8slots) and optional drive cage (8slots), in total, up to four types of drive using both cages. There is nine “type”, such as SAS HDD 10,000rpm(512n), SAS HDD 10,000rpm(512e), SAS HDD 15,000rpm(512n), SAS HDD 7,200rpm(512e), SATA HDD 7,200rpm(512n), SATA HDD 7,200rpm(512e), SATA SSD(ME/VE/RI).

See some examples as below.

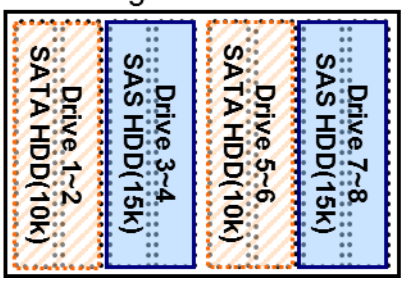
OK

Up to two types of drives can be installed in the drive cage. Any combination of drives is ok.
(Ex. 2 SATA HDD and 6 SAS HDDs)



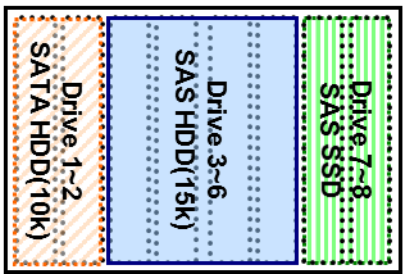
N/A

Same type drives cannot be put in 2 places or more separately in the drive cage



N/A

More than two types of drives cannot be installed in the drive cage



Server Management

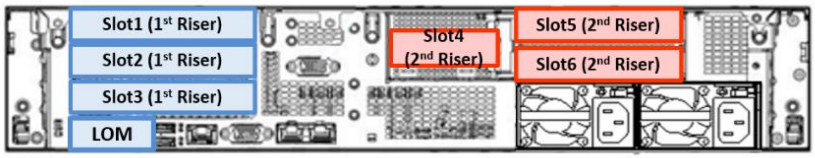
The integrated server management controller provides superior remote control and system management features listed in the table below.

	Standard	Remote Management License (Essentials)	Remote Management License (Scale-out)	Remote Management License (Advanced)
Authentication with Active Directory and LDAP	-		-	✓
Two-factor and Kerberos authentication	-		-	✓
Virtual media access via Integrated Remote Console (IRC)	-	✓	-	✓
Scripted virtual media access	-	-	-	✓
Integrated Remote Console (IRC)	Pre-OS Only	✓	Pre-OS Only	✓
Global team collaboration for up to six consoles	-	-	-	✓
Integrated Remote Console (IRC) recording and playback	-	-	-	✓
Virtual Serial Port recording and playback	-	-	✓	✓
Text-based remote console via SSH	-	-	✓	✓
Email alert	-	✓	✓	✓
Remote Syslog feature	-	-	✓	✓
Advanced power management (power history graph, power capping)	-	-	✓	✓
BMC federation management	-	-	✓	✓
BMC detection for BMC federation	✓	✓	✓	✓
Remote serial console (Virtual Serial Port)	✓	✓	✓	✓
Server Health Summary	✓	✓	✓	✓
Restart BMC form web-based management console	✓	✓	✓	✓
Redfish™API	✓	✓	✓	✓
Agentless Management	✓	✓	✓	✓
Server Health monitoring	✓	✓	✓	✓
Web-based GUI	✓	✓	✓	✓
Virtual power buttons	✓	✓	✓	✓
SSH / SMASH Command-Line Protocol (including serial console redirection)	✓	✓	✓	✓
IPMI / DCMI (including serial console redirection)	✓	✓	✓	✓

OS Support Matrix for PCI Cards and Embedded Controllers

Part number	Product Name	WS 2016	WS 2012 R2	RHEL 7	ESXi 6.0	ESXi 6.5	ESXi 6.7
-	Embedded SATA non-RAID Controller	✓	✓	✓	✓	✓	✓
-	Embedded SATA RAID Controller	✓	✓	-	-	-	-
-	Embedded 1Gb NIC	✓	✓	✓	✓	✓	✓
N8103-189	RAID Controller (RAID 0/1)	✓	✓	✓	✓	✓	✓
N8103-190	RAID Controller (2GB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓
N8103-195	RAID Controller (4GB, RAID 0/1)	✓	✓	✓	✓	✓	✓
N8103-201	RAID Controller (2GB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓
N8103-196	RAID Controller (4GB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓
N8103-197	SAS Controller	✓	✓	✓	-	-	-
N8103-E184	SAS Controller	✓	✓	✓	✓	✓	✓
N8104-171	Quad Port 1000BASE-T LOM Card	✓	✓	✓	✓	✓	✓
N8104-172	Quad Port 1000BASE-T LOM Card	✓	-	✓	✓	✓	✓
N8104-173	Quad Port 10GBASE-T LOM Card	✓	✓	✓	✓	✓	✓
N8104-176	Quad Port 10BASE SFP+ LOM Card	✓	✓	✓	-	✓	✓
N8104-177	Dual Port 25GBASE SFP28 LOM Card	✓	✓	✓	-	✓	-
N8104-178	Dual Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓
N8104-179	Quad Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓
N8104-180	Dual Port 1000BASE-T Adapter	✓	-	✓	✓	✓	✓
N8104-181	Quad Port 1000BASE-T Adapter	✓	-	✓	✓	✓	✓
N8104-182	Dual Port 10GBASE-T Adapter	✓	✓	✓	✓	✓	✓
N8104-185	Dual Port 10GBASE SFP+ Adapter	✓	✓	✓	✓	✓	✓
N8104-186	Dual Port 10GBASE SFP+ Adapter	✓	✓	✓	-	✓	✓
N8104-187	Dual Port 25GBASE SFP28 Adapter	✓	✓	✓	-	✓	✓
N8190-165	Fibre Channel Controller (1ch)	✓	✓	-	-	-	-
N8190-166	Fibre Channel Controller (2ch)	✓	✓	-	-	-	-
N8190-171	Fibre Channel Controller (1ch)	✓	✓	✓	-	✓	✓
N8190-172	Fibre Channel Controller (2ch)	✓	✓	✓	-	✓	✓
N8190-163	Fibre Channel Controller (1ch)	✓	✓	✓	✓	✓	✓
N8190-164	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓

Supported PCI Cards and Installable Slots

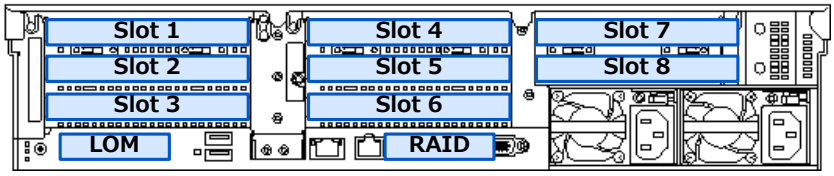


Part Number	Product Name	RAID	LOM	SLOT1	SLOT2	SLOT3 (PCI)	SLOT3 (ALOM)	SLOT4	SLOT5	SLOT6
N8103-189	RAID Controller (RAID 0/1)	1	-	-	-	-	-	-	-	-
N8103-190	RAID Controller (2GB, RAID 0/1/5/6)	1	-	-	-	-	-	-	-	-
N8116-84	SAS Expander Card	-	-	1	-	-	-	-	-	-
N8103-195	RAID Controller (4GB, RAID 0/1/5/6)	-	-	2 (1)	1 (2)	3	-	4	5	6
N8103-201	RAID Controller (2GB, RAID 0/1/5/6)	-	-	2 (1)	1 (2)	3	-	4	5	6
N8103-196	RAID Controller (4GB, RAID 0/1/5/6)	-	-	2 (1)	1 (2)	3	-	4	5	6
N8103-197	SAS Controller	-	-	2 (1)	1 (2)	3	-	4	5	6
N8104-193	Dual Port 1000BASE-T LOM Card	-	1	-	-	-	-	-	-	-
N8104-194	Dual Port 10GBASE SFP+ LOM Card	-	1	-	-	-	-	-	-	-
N8104-195	Dual Port 10GBASE-T LOM Card	-	1	-	-	-	-	-	-	-
N8104-171	Quad Port 1000BASE-T LOM Card	-	-	-	-	-	1	-	-	-
N8104-172	Quad Port 1000BASE-T LOM Card	-	-	-	-	-	1	-	-	-
N8104-173	Quad Port 10GBASE-T LOM Card	-	-	-	-	-	1	-	-	-
N8104-175	Dual Port 10GBASE-T LOM Card	-	-	-	-	-	1	-	-	-
N8104-176	Quad Port 10BASE-SFP+ LOM Card	-	-	-	-	-	1	-	-	-
N8104-177	Dual Port 25GBASE SFP+ LOM Card	-	-	-	-	-	1	-	-	-
N8104-178	Dual Port 1000BASE-T Adapter	-	-	2 (1)	1 (2)	3	-	4	5	6
N8104-179	Quad Port 1000BASE-T Adapter	-	-	2 (1)	1 (2)	3	-	4	5	6
N8104-180	Dual Port 1000BASE-T Adapter	-	-	2 (1)	1 (2)	3	-	4	5	6
N8104-181	Quad Port 1000BASE-T Adapter	-	-	2 (1)	1 (2)	3	-	4	5	6
N8104-182	Dual Port 10GBASE-T Adapter	-	-	2 (1)	1 (2)	3	-	4	5	6
N8104-183	Dual Port 10GBASE-T Adapter	-	-	2 (1)	1 (2)	3	-	4	5	6
N8104-184	Dual Port 10GBASE-T Adapter	-	-	2 (1)	1 (2)	3	-	4	5	6
N8104-185	Dual 10GBASE-SFP+ Adapter	-	-	2 (1)	1 (2)	3	-	4	5	6
N8104-186	Dual 10GBASE-SFP+ Adapter	-	-	2 (1)	1 (2)	3	-	4	5	6
N8104-187	Dual Port 25GBASE SFP28 Adapter	-	-	2 (1)	1 (2)	3	-	4	5	6
N8190-165	Fibre Channel Controller (1ch)	-	-	2 (1)	1 (2)	3	-	4	5	6
N8190-166	Fibre Channel Controller (2ch)	-	-	2 (1)	1 (2)	3	-	4	5	6
N8190-171	Fibre Channel Controller (1ch)	-	-	2 (1)	1 (2)	3	-	4	5	6
N8190-172	Fibre Channel Controller (2ch)	-	-	2 (1)	1 (2)	3	-	4	5	6
N8190-163	Fibre Channel Controller (1ch)	-	-	2 (1)	1 (2)	3	-	4	5	6
N8190-164	Fibre Channel Controller (2ch)	-	-	2 (1)	1 (2)	3	-	4	5	6
N8103-184	SAS Controller	-	-	2 (1)	1 (2)	3	-	4	5	6

NOTE:

- Be sure to install a PCI card in the order of slot 1 and slot 2, if the bus width of the PCI slot 1 is x8.

Expansion Slots



	Slot Name	Standard	Bus Width	Connector Width	Height	Length	Processor
Dedicated Slots	LOM	-	-	-	-	-	-
	RAID	PCIe 3.0	x8	x8	-	-	CPU1
1st Riser Card (Standard)	Slot 1	PCIe 3.0	x8	x8			CPU1
	Slot 2	PCIe 3.0	x8	x8			CPU1
	Slot 3 (PCI)	PCIe 3.0	x8	x8			CPU1
1st Riser Card (Optional)	Slot 1	PCIe 3.0	x16	x16			CPU1
	Slot 2	-	-	-	-	-	CPU1
	Slot 3 (PCI)	PCIe 3.0	x16	x16			CPU1
1st Riser Card (Optional)	Slot 1	PCIe 3.0	x8	x8			CPU1
	Slot 2	PCIe 3.0	x8	x8			CPU1
	Slot 3 (ALOM)	PCIe 3.0	x8	-	-	-	CPU1
2nd Riser Card (Optional)	Slot 4	PCIe 3.0	x8	x8			CPU2
	Slot 5	PCIe 3.0	x8	x8			CPU2
	Slot 6	PCIe 3.0	x8	x8			CPU2
2nd Riser Card (Optional)	Slot 4	PCIe 3.0	x8	x8			CPU2
	Slot 5	PCIe 3.0	x16	x16			CPU2
	Slot 6	-	-	-	-	-	-

Supported Tape and Removal Disk Backup Drive List

See the following table for supported tape and removal disk backup drives. An optional tape drive enclosure is needed to connect the backup drives to the server.

Category	Product Name / Description	Part Number
LTO	**Internal LTO (SAS)** LTO5, Half height, Native capacity 1.5 TB	N8151-141
	Internal LTO (SAS) LTO6, Half height, Native capacity 2.5 TB	N8151-142
	Internal LTO (SAS) LTO7, Half height, Native capacity 6 TB	N8151-143
RDX	**Internal RDX (USB)**	N8151-139

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Revision History

Revision	Date	Description
6.0	January 25, 2019	**New products added:** ● 480GB Hot Plug 2.5-inch SATA SSD / N8150-1737 ● 960GB Hot Plug 2.5-inch SATA SSD / N8150-1738 ● 1.92TB Hot Plug 2.5-inch SATA SSD / N8150-1739 ● 240GB Hot Plug 2.5-inch SATA SSD / N8150-1740 ● 480GB Hot Plug 2.5-inch SATA SSD / N8150-1741 ● 960GB Hot Plug 2.5-inch SATA SSD / N8150-1742 ● 1.92TB Hot Plug 2.5-inch SATA SSD / N8150-1743 ● 3.84TB Hot Plug 2.5-inch SATA SSD / N8150-1744 ● 12TB 7.2K Hot Plug 3.5-inch SATA HDD / N8150-588 ● 12TB 7.2K Hot Plug 3.5-inch SAS HDD / N8150-590 ● 400GB Hot Plug 2.5-inch SAS SSD / N8150-1750 ● 800GB Hot Plug 2.5-inch SAS SSD / N8150-1751 ● 400GB Hot Plug 2.5-inch SAS SSD / N8150-1752 ● 800GB Hot Plug 2.5-inch SAS SSD / N8150-1753 ● 960GB Hot Plug 2.5-inch SAS SSD / N8150-1754 ● 1.92TB Hot Plug 2.5-inch SAS SSD / N8150-1755 ● 900GB 15K Hot Plug 2.5-inch SAS HDD / N8150-602 **Discontinued products deleted:** ● Platinum 8160(24C/48T, 2.10 GHz, 33MB, TDP 150W) ● Platinum 8164(26C/52T, 2GHz, 35.75MB, TDP 150W) ● 240GB Hot Plug 2.5-inch SATA SSD / N8150-1700 ● 480GB Hot Plug 2.5-inch SATA SSD / N8150-1701 ● 960GB Hot Plug 2.5-inch SATA SSD / N8150-1702 ● 1.92TB Hot Plug 2.5-inch SATA SSD / N8150-1703 ● 240GB Hot Plug 2.5-inch SATA SSD / N8150-1704 ● 480GB Hot Plug 2.5-inch SATA SSD / N8150-1705 ● 960GB Hot Plug 2.5-inch SATA SSD / N8150-1706 ● 1.92TB Hot Plug 2.5-inch SATA SSD / N8150-1707 ● 3.84TB Hot Plug 2.5-inch SATA SSD / N8150-1708 ● 900GB 15K Hot Plug 2.5-inch SAS HDD / N8150-553 ● 10TB 7.2K Hot Plug 3.5-inch SATA HDD / N8150-571 ● 10TB 7.2K Hot Plug 3.5-inch SAS HDD / N8150-574 ● 4TB 7.2K Hot Plug 3.5-inch SAS HDD / N8150-572 ● 400GB Hot Plug 2.5-inch SAS SSD / N8150-748 ● 800GB Hot Plug 2.5-inch SAS SSD / N8150-749 ● 400GB Hot Plug 2.5-inch SAS SSD / N8150-750 ● 800GB Hot Plug 2.5-inch SAS SSD / N8150-751 **Correction of errors**
5.0	July 12, 2018	**New products added:** ● 240GB Hot Plug 2.5-inch SATA SSD / N8150-1700 ● 480GB Hot Plug 2.5-inch SATA SSD / N8150-1701 ● 960GB Hot Plug 2.5-inch SATA SSD / N8150-1702 ● 1.92TB Hot Plug 2.5-inch SATA SSD / N8150-1703 ● 240GB Hot Plug 2.5-inch SATA SSD / N8150-1704 ● 480GB Hot Plug 2.5-inch SATA SSD / N8150-1705 ● 960GB Hot Plug 2.5-inch SATA SSD / N8150-1706 ● 1.92TB Hot Plug 2.5-inch SATA SSD / N8150-1707 ● 3.84TB Hot Plug 2.5-inch SATA SSD / N8150-1708 ● 2.4TB Hot Plug 2.5-inch SAS HDD / N8150-591 ● 240GB Non-Hot Plug M.2 SATA SSD / N8150-1709 ● 480GB Non-Hot Plug M.2 SATA SSD / N8150-1710 **Discontinued products deleted:** ● 240GB Hot Plug 2.5-inch SATA SSD / N8150-739 ● 480GB Hot Plug 2.5-inch SATA SSD / N8150-740 ● 960GB Hot Plug 2.5-inch SATA SSD / N8150-741 ● 1.92TB Hot Plug 2.5-inch SATA SSD / N8150-742 ● 240GB Hot Plug 2.5-inch SATA SSD / N8150-743 ● 480GB Hot Plug 2.5-inch SATA SSD / N8150-744 ● 960GB Hot Plug 2.5-inch SATA SSD / N8150-745 ● 1.92TB Hot Plug 2.5-inch SATA SSD / N8150-746 ● 3.84TB Hot Plug 2.5-inch SATA SSD / N8150-747 **Correction of errors**

4.0	April 27, 2018	**New products / service added:** ● 1TB 7.2K Hot Plug 2.5-inch SATA HDD / N8150-596 ● SAS Controller / N8103-E184 (Factory Installation only) ● RAID Config Option(None) / NESV16-039 **Others:** ● Enable to mix Internal devices in the default factory configuration ● Enable to use Internal DVD-ROM drive when the Embedded SATA Controller is used **Correction of errors**
3.0	January 25, 2018	**Discontinued products deleted:** ● 3TB 7.2K Hot Plug 3.5-inch SATA HDD / N8150-567 ● 1TB 7.2K Hot Plug 2.5-inch SATA HDD / N8150-544 ● 480GB Hot Plug 2.5-inch SAS SSD / N8150-752 ● 960GB Hot Plug 2.5-inch SAS SSD / N8150-753 ● Quad Port 25GBASE QSFP28 Adapter / N8104-188 **Others:** ● Updated the table of the Available Power Supplies ● License for Remote Management (Essentials) added **Correction of errors**
2.0	December 22, 2017	**New products added:** ● 400GB Hot Plug 2.5-inch SAS SSD / N8150-748 ● 800GB Hot Plug 2.5-inch SAS SSD / N8150-749 ● 400GB Hot Plug 2.5-inch SAS SSD / N8150-750 ● 800GB Hot Plug 2.5-inch SAS SSD / N8150-751 ● 480GB Hot Plug 2.5-inch SAS SSD / N8150-752 ● 960GB Hot Plug 2.5-inch SAS SSD / N8150-753 ● Dual Port 25GBASE SFP28 Adapter / N8104-187 ● Dual Port 25GBASE SFP+ LOM Card / N8104-177 ● SFP+ Module (10G-SR) / N8104-189 ● SFP28 Module(25G-SR) / N8104-190 ● QSFP28 Module(100G-SR4) / N8104-191 ● SAS Controller / N8103-184 ● 500W Non-hot Plug Power Supply / N8181-168 ● 500W Hot Plug Power Supply / N8181-159 **Others:** ● Added Red Hat Enterprise Linux 7 to the list of operating system supported ● Updated OS support matrix ● Supported SATA drives with SAS Expander Card ● Updated the table of the Available Power Supplies
1.0	November 17, 2017	Initial release