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NEC Express5800/R120h-1M
System Configuration Guide

Introduction

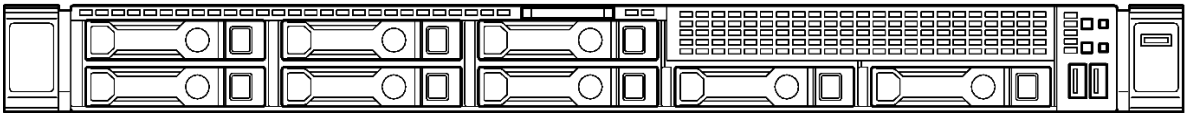
This document contains product and configuration information that will enable you to configure your system. The guide will ensure fast and proper configuration of your NEC Express5800 server.

July 12, 2018
Revision 7.0
NEC Corporation

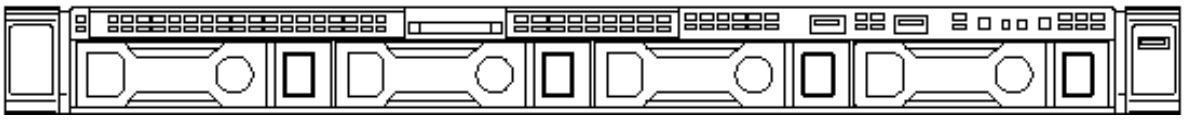
Contents

Model Lineup

8x 2.5-inch Drive Model



4x 3.5-inch Drive Model



Technical Specification

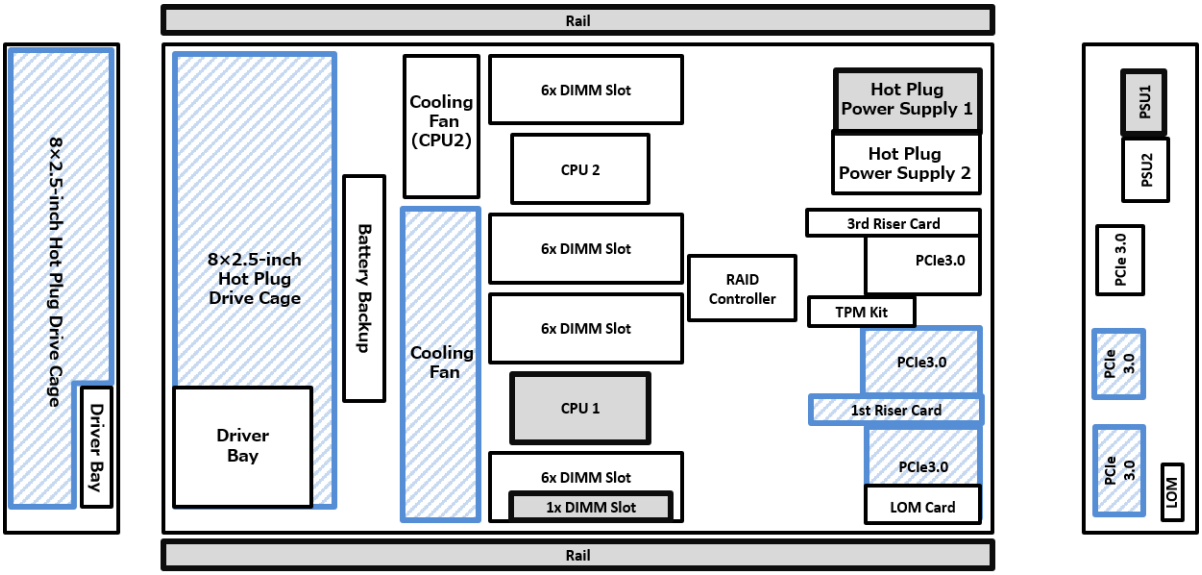
Specification

Model		R120h-1M	
		8x 2.5-inch Drive Model	4x 3.5-inch Drive Model
Part Number		N8100-2557F	N8100-2561F
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, 2 GHz, 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 6144 (3.50 GHz, 8C/16T, 24.75MB, TDP 150W) Gold 6146 (3.20 GHz, 12C/24T, 24.75MB, TDP 165W) Gold 6148(20C/40T, 2.40 GHz, 27.50MB, TDP 150W) Gold 6150(18C/36T, 2.70 GHz, 24.75MB, TDP 165W) Gold 6152(22C/44T, 2.10 GHz, 30.25MB, TDP 140W) Gold 6154(18C/36T, 3 GHz, 24.75MB, TDP 200W) Platinum 8153(16C/32T, 2 GHz, 22MB, TDP 125W) Platinum 8156(4C/8T, 3.60 GHz, 16.50MB, TDP 105W) Platinum 8158(12C/24T, 3 GHz, 24.75MB, TDP 150W) Platinum 8160(24C/48T, 2.10 GHz, 33MB, TDP 150W) Platinum 8164(26C/52T, 2GHz, 35.75MB, TDP 150W) Platinum 8168(24C/48T, 2.70 GHz, 33MB, TDP 205W) Platinum 8170(26C/52T, 2.10 GHz, 35.75MB, TDP 165W) Platinum 8176(28C/56T, 2.10 GHz, 38.50MB, TDP 165W) Platinum 8180(28C/56T, 2.50 GHz, 38.50MB, TDP 205W) Gold 6134M(8C/16T, 3.20 GHz, 24.75MB, TDP 130W) Gold 6140M(18C/36T, 2.30 GHz, 24.75MB, TDP 140W) Gold 6142M(16C/32T, 2.60 GHz, 22MB, TDP 150W) Platinum 8160M(24C/48T, 2.10 GHz, 33MB, TDP 150W) Platinum 8170M(26C/52T, 2.10 GHz, 35.75MB, TDP 165W) Platinum 8176M(28C/56T, 2.10 GHz, 38.50MB, TDP 165W) Platinum 8180M(28C/56T, 2.50 GHz, 38.50MB, TDP 205W)	
	Number of Processors	1 or 2	
Chipset		Intel® C621 Chipset	
Memory	**Type**	DDR4-2666 Registered DIMM (8/16/32GB) DDR4-2666 Load Reduced DIMM (64/128GB)	
	Standard Capacity	0 GB	
	Maximum Capacity	3 TB (24 x 128 GB)	
	Memory protection	ECC, x4 SDDC, x4 DDDC, Memory Mirroring, Memory Sparing	
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	
	Optical Drive Bays	1	
	Standard Disk Drive Bays	8	4

Model		R120h-1M	
		8x 2.5-inch Drive Model	4x 3.5-inch Drive Model
Expansion Slots	Standard	Total: 4 slots available 1 PCIe 3.0 x16 (x16 connector) 1 PCIe 3.0 x8 (x8 connector) 1 PCIe 3.0 x8 (x8 connector) for a dedicated RAID card 1 PCIe 3.0 x8 (x8 connector) for a dedicated LOM controller * The slot mix changes 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), 4x Data LAN connector (RJ-45), 1x Serial (9-pin mini D-sub, Optional) Internal: 2x USB3.0, 2x SATA 2.0	
Redundant Fan		Standard, hot plug	
Redundant Power Supply		Optional, hot plug	
Power Supply		1-2 x 500 Watt, 800 Watt, 1600 Watt 80 PLUS® Platinum certified hot plug PSU 500Watt, 800 Watt : 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz 800Watt, 1600 Watt : 200-240 VAC ± 10% 50 / 60 Hz ± 3 Hz	
Dimensions (W x D x H)		434.6 x 707.0 x 42.9 mm 17.1 x 27.8 x 1.7 in (1U)	434.6 x 749.8 x 42.9 mm 17.1 x 29.5 x 1.7 in (1U)
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 7.3 or later VMware ESXi™ 6.0 Update 3 VMware ESXi™ 6.5 Update 1	

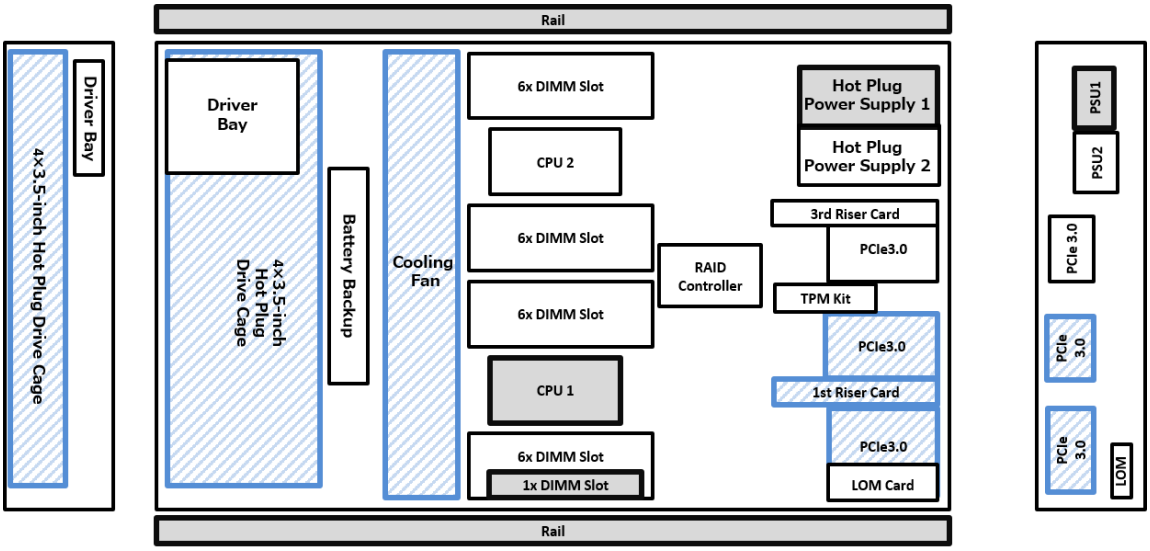
Configuration Diagram

8x 2.5-inch Drive Model



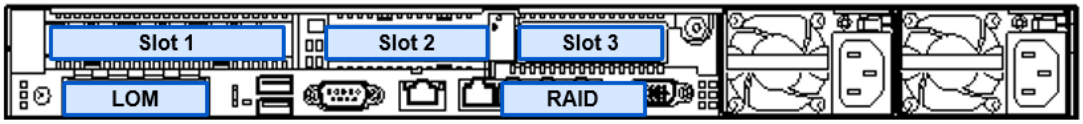
Legend: Standard Components Mandatory Components

4x 3.5-inch Drive Model



Legend: Standard Components Mandatory Components

Expansion slot Map



Legend			Remarks
Standard	LOM	PCIe 3.0 x8, x8 connector, for a dedicated LOM controller	
	RAID	PCIe 3.0 x8, x8 connector, for a dedicated RAID Card	
1st Riser (Standard)	Slot 1	PCIe 3.0 x16, x16 connector, Full-height, up to 3/4 length	
	Slot 2	PCIe 3.0 x8, x8 connector, Low Profile, 168mm length	
N8116-53 1st Riser (Option)	Slot 1	PCIe 3.0 x16, x16 connector, Full-height, up to 3/4 length	
	Slot 2	PCIe 3.0 x16, x16 connector, Low Profile, 168mm length	
	Internal	2x M.2 SATA SSD Slot for OS Boot	
N8116-55 3rd Riser (Option)	Slot 3	PCIe 3.0 x16, x16 connector, Low Profile, 168 mm length	2CPU required
N8116-54 3rd Riser (Option)	Slot 3	PCIe 3.0 x16, x16 connector, Full-height, up to 3/4 Length	2CPU required

NOTE:

- By selecting PCI Riser Card, standard Riser can be exchanged and 3rd Riser can be expanded. Refer to “PCI Riser Card” for available Riser Card and detailed specifications

Server Configuration

1 Base Models

Product Name / Description	Part Number
NEC Express5800/R120h-1M 8x 2.5-inch Drive Model No processor, no RAM, no HDD, no ODD, no Rail, no Power Supply Unit. Including : Front Bezel, 2.5-inch Drive Cage	N8100-2557F
NEC Express5800/R120h-1M 4x 3.5-inch Drive Model No processor, no RAM, no HDD, no ODD, no Rail, no Power Supply Unit. Including : Front Bezel, 3.5-inch Drive Cage	N8100-2561F

NOTE:

- The base model must be ordered with a Processor kit, a Memory kit, a Power Supply kit and a Slide Rail kit

2 Processors

Available sockets: 2

Category	Product Name / Description	Part Number
Bronze 3100	**Xeon Bronze 3104 Processor Kit** Intel® Xeon ® Bronze 3104 (1.70 GHz, 6C/6T, 8.25MB, TDP 85W)	N8101-1107 (1st) N8101-1108 (2nd)
	Xeon Bronze 3106 Processor Kit Intel® Xeon ® Bronze 3106 (1.70 GHz, 8C/8T, 11MB, TDP 85W)	N8101-1109 (1st) N8101-1110 (2nd)
Silver 4100	**Xeon Silver 4108 Processor Kit** Intel® Xeon ® Silver 4108 (1.80 GHz, 8C/16T, 11MB, TDP 85W)	N8101-1111 (1st) N8101-1112 (2nd)
	Xeon Silver 4110 Processor Kit Intel® Xeon ® Silver 4110 (2.10 GHz, 8C/16T, 11MB, TDP 85W)	N8101-1113 (1st) N8101-1114 (2nd)
	Xeon Silver 4112 Processor Kit Intel® Xeon ® Silver 4112 (2.60 GHz, 4C/8T, 8.25MB, TDP 85W)	N8101-1115 (1st) N8101-1116 (2nd
	Xeon Silver 4114 Processor Kit Intel® Xeon ® Silver 4114 (2.20 GHz, 10C/20T, 13.75MB, TDP 85W)	N8101-1117 (1st) N8101-1118 (2nd)
	Xeon Silver 4116 Processor Kit Intel® Xeon ® Silver 4116 (2.10 GHz, 12C/24T, 16.50MB, TDP 85W)	N8101-1119 (1st) N8101-1120 (2nd)
Gold 5100	**Xeon Gold 5115 Processor Kit** Intel® Xeon ® Gold 5115 (2.40 GHz, 10C/20T, 13.75MB, TDP 85W)	N8101-1121 (1st) N8101-1122 (2nd)
	Xeon Gold 5118 Processor Kit Intel® Xeon ® Gold 5118 (2.30 GHz, 12C/24T, 16.50MB, TDP 105W)	N8101-1123 (1st) N8101-1124 (2nd)
	Xeon Gold 5120 Processor Kit Intel® Xeon ® Gold 5120 (2.20 GHz, 14C/28T, 19.25MB, TDP 105W)	N8101-1125 (1st) N8101-1126 (2nd)
	Xeon Gold 5122 Processor Kit Intel® Xeon ® Gold 5122 (3.60 GHz, 4C/8T, 16.50MB, TDP 105W)	N8101-1127 (1st) N8101-1128 (2nd)
Gold 6100	**Xeon Gold 6126 Processor Kit** Intel® Xeon ® Gold 6126 (2.60 GHz, 12C/24T, 19.25MB, TDP 125W)	N8101-1129 (1st) N8101-1130 (2nd)
	Xeon Gold 6128 Processor Kit Intel® Xeon ® Gold 6128 (3.40 GHz, 6C/12T, 19.25MB, TDP 115W)	N8101-1131 (1st) N8101-1132 (2nd)
	Xeon Gold 6130 Processor Kit Intel® Xeon ® Gold 6130 (2.10 GHz, 16C/32T, 22MB, TDP 125W)	N8101-1133 (1st) N8101-1134 (2nd)
	Xeon Gold 6132 Processor Kit Intel® Xeon ® Gold 6132 (2.60 GHz, 14C/28T, 19.25MB, TDP 140W)	N8101-1135 (1st) N8101-1136 (2nd)
	Xeon Gold 6134 Processor Kit Intel® Xeon ® Gold 6134 (3.20 GHz, 8C/16T, 24.75MB, TDP 130W)	N8101-1137 (1st) N8101-1138 (2nd)
	Xeon Gold 6136 Processor Kit Intel® Xeon ® Gold 6136 (3 GHz, 12C/24T, 24.75MB, TDP 150W)	N8101-1139 (1st) N8101-1140 (2nd)
	Xeon Gold 6138 Processor Kit Intel® Xeon ® Gold 6138 (2 GHz, 20C/40T, 27.50MB, TDP 125W)	N8101-1141 (1st) N8101-1142 (2nd)
	Xeon Gold 6140 Processor Kit Intel® Xeon ® Gold 6140 (2.30 GHz, 18C/36T, 24.75MB, TDP 140W)	N8101-1143 (1st) N8101-1144 (2nd)
	Xeon Gold 6142 Processor Kit Intel® Xeon ® Gold 6142 (2.60 GHz, 16C/32T, 22MB, TDP 150W)	N8101-1145 (1st) N8101-1146 (2nd)
	Xeon Gold 6144 Processor Kit Intel® Xeon ® Gold 6144 (3.50 GHz, 8C/16T, 24.75MB, TDP 150W)	N8101-1147 (1st) N8101-1148 (2nd)

	Xeon Gold 6146 Processor Kit Intel® Xeon ® Gold 6146 (3.20 GHz, 12C/24T, 24.75MB, TDP 165W)	N8101-1149 (1st) N8101-1150 (2nd)
	Xeon Gold 6148 Processor Kit Intel® Xeon ® Gold 6148 (2.40 GHz, 20C/40T, 27.50MB, TDP 150W)	N8101-1151 (1st) N8101-1152 (2nd)
	Xeon Gold 6150 Processor Kit Intel® Xeon ® Gold 6150 (2.70 GHz, 18C/36T, 24.75MB, TDP 165W)	N8101-1153 (1st) N8101-1154 (2nd)
	Xeon Gold 6152 Processor Kit Intel® Xeon ® Gold 6152 (2.10 GHz, 22C/44T, 30.25MB, TDP 140W)	N8101-1155 (1st) N8101-1156 (2nd)
	Xeon Gold 6154 Processor Kit Intel® Xeon ® Gold 6154 (3 GHz, 18C/36T, 24.75MB, TDP 200W)	N8101-1157 (1st) N8101-1158 (2nd)
Platinum 8100	**Xeon Platinum 8153 Processor Kit** Intel® Xeon ® Platinum 8153 (2 GHz, 16C/32T, 22MB, TDP 125W)	N8101-1159 (1st) N8101-1160 (2nd)
	Xeon Platinum 8156 Processor Kit Intel® Xeon ® Platinum 8156 (3.60 GHz, 4C/8T, 16.50MB, TDP 105W) **NOTE:** - The processor kit is make-to-order product.	N8101-1161 (1st) N8101-1162 (2nd)
	Xeon Platinum 8158 Processor Kit Intel® Xeon ® Platinum 8158 (3 GHz, 12C/24T, 24.75MB, TDP 150W) **NOTE:** - The processor kit is make-to-order product.	N8101-1163 (1st) N8101-1164 (2nd)
	Xeon Platinum 8160 Processor Kit Intel® Xeon ® Platinum 8160 (2.10 GHz, 24C/48T, 33MB, TDP 150W)	N8101-1165 (1st) N8101-1166 (2nd)
	Xeon Platinum 8164 Processor Kit Intel® Xeon ® Platinum 8164 (2 GHz, 26C/52T, 35.75MB, TDP 150W)	N8101-1167 (1st) N8101-1168 (2nd)
	Xeon Platinum 8168 Processor Kit Intel® Xeon ® Platinum 8168 (2.70 GHz, 24C/48T, 33MB, TDP 205W) **NOTE:** - The processor kit is make-to-order product.	N8101-1169 (1st) N8101-1170 (2nd)
	Xeon Platinum 8170 Processor Kit Intel® Xeon ® Platinum 8170 (2.10 GHz, 26C/52T, 35.75MB, TDP 165W) **NOTE:** - The processor kit is make-to-order product.	N8101-1171 (1st) N8101-1172 (2nd)
	Xeon Platinum 8176 Processor Kit Intel® Xeon ® Platinum 8176 (2.10 GHz, 28C/56T, 38.50MB, TDP 165W) **NOTE:** - The processor kit is make-to-order product.	N8101-1173 (1st) N8101-1174 (2nd)
	Xeon Platinum 8180 Processor Kit Intel® Xeon ® Platinum 8180 (2.50 GHz, 28C/56T, 38.50MB, TDP 205W)	N8101-1175 (1st) N8101-1176 (2nd)
Gold 6100	**Xeon Gold 6134M Processor Kit** Intel® Xeon ® Gold 6134M (3.20 GHz, 8C/16T, 24.75MB, TDP 130W) **NOTE:** - The processor kit is make-to-order product.	N8101-1177 (1st) N8101-1178 (2nd)
	Xeon Gold 6140M Processor Kit Intel® Xeon ® Gold 6140M (2.30 GHz, 18C/36T, 24.75MB, TDP 140W) **NOTE:** - The processor kit is make-to-order product.	N8101-1179 (1st) N8101-1180 (2nd)
	Xeon Gold 6142M Processor Kit Intel® Xeon ® Gold 6142M (2.60 GHz, 16C/32T, 22MB, TDP 150W) **NOTE:** - The processor kit is make-to-order product.	N8101-1181 (1st) N8101-1182 (2nd)
Platinum 8100	**Xeon Platinum 8160M Processor Kit** Intel® Xeon ® Platinum 8160M (2.10 GHz, 24C/48T, 33MB, TDP 150W) **NOTE:** - The processor kit is make-to-order product.	N8101-1183 (1st) N8101-1184 (2nd)
	Xeon Platinum 8170M Processor Kit Intel® Xeon ® Platinum 8170M (2.10 GHz, 26C/52T, 35.75MB, TDP 165W) **NOTE:** - The processor kit is make-to-order product.	N8101-1185 (1st) N8101-1186 (2nd)
	Xeon Platinum 8176M Processor Kit Intel® Xeon ® Platinum 8176M (2.10 GHz, 28C/56T, 38.50MB, TDP 165W) **NOTE:** - The processor kit is make-to-order product.	N8101-1187 (1st) N8101-1188 (2nd)

	Xeon Platinum 8180M Processor Kit Intel® Xeon ® Platinum 8180M (2.50 GHz, 28C/56T, 38.50MB, TDP 205W)	N8101-1189 (1st) N8101-1190 (2nd)

NOTE:

- The processor kit is make-to-order product.

NOTE:

- The processor kit for the 1st CPU must be ordered with a base model.
- The processor models must be the same to configure dual processor system.
- High performance CPU heat sink is shipped with the processor with 130 Watt or higher and Platinum 8156, Gold 6128, 5122. The standard CPU heat sink is shipped with all other processors.
- Estimated production lead time for the make-to-order processor kits will be approximately 3 months.
- When using 3 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]	**112**
Microsoft Windows Server 2016 Standard Microsoft Windows Server 2016 Datacenter	**640** [1]	**112**
Red Hat Enterprise Linux 7	**384**	**112**
VMware ESXi 6.0	**480**	**112**
VMware ESXi 6.5	**576**	**112**

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

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

Maximum memory capacity

Maximum available memory capacity depends on the type of processor, see below.

CPU	Maximum memory capacity per CPU
Processor containing an “M” in the model Xeon ® Platinum 8160M, 8170M, 8176M, 8180M Xeon ® Gold 6134M, 6140M, 6142M	**1.5TB**
others	**768GB**

3 Memory

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 16 ranks of memory per channel : 3/4 physical memory	Half physical memory
Available Memory Channels	6	6	6
Notes	-	All DIMMs in the system must be identical. Eight or twelve DIMMs per a processor are supported, two DIMMs are populated per channel	All DIMMs in the system must be identical. Twelve DIMMs per processor are supported,

NOTE:

- Single Rank Memory (N8102-708/-709) does not support Memory Mirroring Mode Configuration Service.
- Refer to “9.1 Memory RAS Settings”

Memory

Available slots: 12 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
	8GB DDR4-2666 REG Memory Kit (1x8B/DR) **1 x 8GB Registered ECC DIMM, DDR4-2666(PC4-2666), Dual Rank** **NOTE:** - This is make-to-order product.	N8102-714
	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
	128GB DDR4-2666 LR Memory Kit (1x128GB/OR) 1 x 128GB Load Reduced ECC DIMM, DDR4-2666(PC4-2666), Octal Rank	N8102-713

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. Do NOT mix LRDIMM 64GB with LRDIMM 128GB.
- If you install more than six times N8102-713 128GB DDR4-2666 LR Memory Kit, you require one of the following CPU Processor codes containing an “M” (N8101-1177/-1178/-1179/-1180/-1181/-1182/-1183/-1184/-1185/-1186/-1187/-1188/-1189/-1190)
- See page 37 for additional memory configuration information.

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 ® Platinum 8100 Series 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 [1] Microsoft Windows Server 2012 R2 Datacenter [1]	**4 TB**	**3 TB**
Microsoft Windows Server 2016 Standard [1] Microsoft Windows Server 2016 Datacenter [1]	**24 TB**	**3 TB**
Red Hat Enterprise Linux 7	**12TB**	**3 TB**
VMware ESXi 6.0 [2]	**6 TB**	**3 TB**
VMware ESXi 6.5 [3]	**12TB**	**3 TB**

[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 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

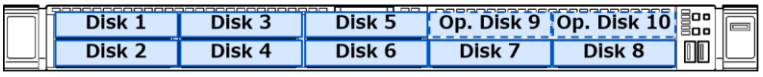
Base Model	Front cage	Rear Cage [2]	Inside the server (Mounted on Option Riser Card[1,2])
2.5-inch Drive Model	Standard : 8x 2.5-inch SAS/SATA Drive Expansion : 2x 2.5-inch SAS/SATA Drive	Standard : - Expansion : 1x 2.5-inch SAS/SATA Drive	Standard : - Expansion : 2x M.2 SATA SSD (available soon)
3.5-inch Drive Model	Standard : 4x 3.5-inch SAS/SATA Drive		

1 By selecting Option 1st Riser Card, up to two M.2 SATA SSD can be mounted. It is impossible to connect RAID controller to M.2 SATA SSD.

2 Mix configurations of Rear Cage and M.2 SATA SSD for installing PCI Riser Card are not supported.

Drive Bay for 2.5-inch Drive Model

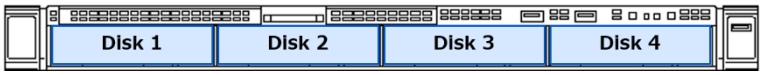
Eight 2.5-inch drive bays are standard. With an optional 2.5-inch drive cage, up to ten 2.5-inch drive bays can be equipped.



- Standard eight drives are available, if add more drive, Expansion Drive cage is needed.
- Standard internal cable is attached.
- Standard internal cable can be connected up to eight SAS/SATA Drives.

Drive Bay for 3.5-inch Drive Model

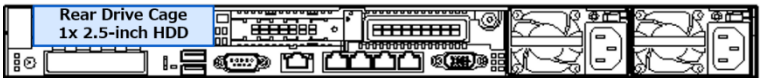
Four 3.5-inch drive bays are equipped as standard



- Standard four drives are available.
- Standard internal cable is attached.
- Standard internal cable can be connected up to four SAS/SATA Drives.

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

With an optional drive cage installed into the PCI Slot 1, one 2.5-inch drive bay can be added.



NOTE:

- 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 10 drives can be installed in Non-RAID (Embedded SATA) configuration.

Refer to “Conditions for mixing of Internal Drives” in References.

4.2 Drive Models

4.2.1 8x 2.5-inch Drive model

Category	Product Name / Description	Part Number
Front	**2.5-inch Hot Plug Drive Cage Kit (SAS/SATA)** Including internal cable, for 8x 2.5-inch Drive Model	(standard)
	2x2.5-inch Hot Plug Drive Cage Kit(SAS/SATA) Including internal cable, for 8x 2.5-inch Drive Model **NOTE:** - The Drive Cage Kit cannot be installed if N8117-03 Internal DVD Drive Installation Kit is installed.	N8154-89

4.2.2 4x 3.5-inch Drive model

Category	Product Name / Description	Part Number
Front	**3.5-inch Hot Plug Drive Cage Kit (SAS/SATA)** Including internal cable, for 4x 3.5-inch Drive Model	(standard)

4.3 Optional Rear Drive Cages

Category	Product Name / Description	Part Number
Rear	**1x2.5-inch Hot Plug Drive Cage Kit(SAS/SATA, Rear)** Including internal cable	N8154-92

NOTE:

- Up to one N8154-92 1x2.5-inch Hot Plug Drive Cage Kit (SAS/SATA, Rear) can be installed
- If equipped with N8154-92 1x2.5-inch Hot Plug Drive Cage Kit (SAS/SATA, Rear), 1st Riser card cannot be mounted
- After the drives are fully mounted on the Front Drive Cage, the drive should be mounted on the Rear Drive Cage

4.4 Storage Controllers and Options

4.4.1 Embedded SATA Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 10 x 6Gb/s SATA drive, 2x M.2 drive(available soon)	(Standard)
Cable	**Internal SATA Cable**	(Standard)

NOTE:

- Hot plug insertion/removal are not supported in the configuration.

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

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 10 x 6Gb/s SATA, 2x M.2 drive(available soon)	(Standard)
Cable	**Internal SATA Cable**	(Standard)

NOTE:

- For factory installation, up to ten drives can be installed in the system.
- The Embedded SATA RAID Controller is available for Windows operating system only.

4.4.3 RAID Controller for Dedicated PCI Slot

Choose the appropriate RAID controller in accordance with RAID feature required, the number of drives to install and whether a full-length PCI card is installed.

Category		Product Name / Description	Part Number
Storage Controller	**8 Ports / Standard Heat Sink**	**RAID Controller (RAID 0/1)** RAID 0/1/5/10 and SAS HBA mode, 0MB, Int. 8 ports, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s, Standard Heat Sink	N8103-189
		RAID Controller (2GB, RAID 0/1/5/6) RAID 0/1/5/6/10/50/60, 2GB, Int. 8 ports, PCIe 3.0 x8, SAS 12Gb/s, SATA, 6Gb/s, Standard Heat Sink	N8103-190
	16 Ports / Standard Heat Sink	**RAID Controller (4GB, RAID 0/1/5/6)** RAID 0/1/5/6/10/50/60, 4GB, Int. 16 ports, PCIe 3.0 x8, SAS 12Gb/s, SATA, 6Gb/s, Standard Heat Sink **NOTE:** The RAID Controller is supported on 8x 2.5 Drive Model Only.	N8103-191
	8 Ports / Low Profile Heat Sink	**RAID Controller (RAID 0/1)** RAID 0/1/5/10 and SAS HBA mode, 0MB, Int. 8 ports, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s, Low Profile Heat Sink	N8103-192
		RAID Controller (2GB, RAID 0/1/5/6) RAID 0/1/5/6/10/50/60, 2GB, Int. 8 ports, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s, Low Profile Heat Sink	N8103-193
	16 Ports / Low Profile Heat Sink	**RAID Controller (4GB, RAID 0/1/5/6)** RAID 0/1/5/6/10/50/60, 4GB, Int. 16 ports, PCIe 3.0 x8, SAS 12Gb/s, SATA, 6Gb/s, Low Profile Heat Sink **NOTE:** The RAID Controller is supported on 8x 2.5 Drive Model Only.	N8103-194
Battery Backup		**Battery Backup Unit** Lithium-ion Battery for N8103-190/-191/-193/-194/-196/-201 RAID controller.	N8103-198

NOTE:

- The RAID controller with low profile heat sink is required when a full-length PCI card is installed.
- One battery backup unit must be installed per one system.
- If you select long PCI Cards or GPU Computing Card, Low Profile Heat Sink is needed.
- N8103-189/-192 support 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.

4.4.4 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 (Necessary for N8103-201)	**Battery Backup Unit** Lithium-ion Battery for N8103-190/-191/-193/-194/-196/-201 RAID controller. 1 battery provides power to all RAID controller.	N8103-198
Cable (Necessary for N8103-195 / -201)	**Internal SAS/SATA Cable** For 2.5-inch Drive Model	K410-376(00)
	Internal SAS/SATA Cable For 3.5-inch Drive Model	K410-377(00)

NOTE:

- The RAID controller must be installed after shipment.
- One battery backup unit must be installed per one 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.

4.5 Internal Drives

4.5.1 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 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.

4.5.2 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	N8150-1704
	480GB Hot Plug 2.5-inch SATA SSD 1 x 480GB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Read Intensive	N8150-1705
	960GB Hot Plug 2.5-inch SATA SSD 1 x 960GB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Read Intensive	N8150-1706
	1.92TB Hot Plug 2.5-inch SATA SSD 1 x 1.92TB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Read Intensive	N8150-1707
	3.84TB Hot Plug 2.5-inch SATA SSD 1 x 3.84TB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Read Intensive	N8150-1708
Value Endurance **DWPD ≈ 3**	**240GB Hot Plug 2.5-inch SATA SSD** 1 x 240GB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Value Endurance	N8150-1700
	480GB Hot Plug 2.5-inch SATA SSD 1 x 480GB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Value Endurance	N8150-1701
	960GB Hot Plug 2.5-inch SATA SSD 1 x 960GB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Value Endurance	N8150-1702
	1.92TB Hot Plug 2.5-inch SATA SSD 1 x 1.92TB SATA SSD, 2.5-inch, 6Gb/s, 512n sector, Value Endurance	N8150-1703

NOTE:

- All drives within a RAID array should be of the same type, capacity.
- 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.

4.5.3 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
512e Sector / 15,000 rpm	**900GB 15K Hot Plug 2.5-inch SAS HDD** 1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512e sector	N8150-553

- 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, 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.

4.5.4 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	N8150-748
	800GB Hot Plug 2.5-inch SAS SSD 1 x 800GB SAS SSD, 2.5-inch, 12Gb/s, 512n sector, Middle Endurance	N8150-749
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	N8150-750
	800GB Hot Plug 2.5-inch SAS SSD 1 x 800GB SAS SSD, 2.5-inch, 12Gb/s, 512n sector, Value Endurance	N8150-751
Read Intensive DWPD ≈ 1	**480GB Hot Plug 2.5-inch SAS SSD** 1 x 480GB SAS SSD, 2.5-inch, 12Gb/s, 512n sector, Read Intensive	N8150-752
	960GB Hot Plug 2.5-inch SAS SSD 1 x 960GB SAS SSD, 2.5-inch, 12Gb/s, 512n sector, Read Intensive	N8150-753

NOTE:

- All drives within a RAID array should be of the same capacity.
- 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.

4.5.5 3.5-inch SATA Hard Disk Drives

Category	Product Name / Description	Part Number
512n Sector	**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	N8150-554
	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	N8150-555
	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	N8150-557
512e Sector	**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	N8150-558
	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	N8150-559
	10TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 10 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512e sector	N8150-560
	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**	N8150-587

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 and capacity.
- 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.

4.5.6 3.5-inch Near Line SAS Hard Disk Drives

Category	Product Name / Description	Part Number
512e Sector	**4TB 7.2K Hot Plug 3.5-inch SAS HDD** 1 x 4 TB Near Line SAS HDD, 3.5-inch, 12Gb/s, 7,200 rpm, 512e sector	N8150-597
	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**	N8150-562
	10TB 7.2K Hot Plug 3.5-inch SAS HDD 1 x 10 TB Near Line SAS HDD, 3.5-inch, 12Gb/s, 7,200 rpm, 512e sector	N8150-563
	12TB 7.2K Hot Plug 3.5-inch SAS HDD **1 x 12 TB Near Line SAS HDD, 3.5-inch, 12Gb/s, 7,200 rpm, 512e sector**	N8150-589

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.
- 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 HDDs (7200 rpm) and SAS-HDDs (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.

4.5.7 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:

- Optional riser card kit with M.2 connector is 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

Up to one drive can be installed

Category		Product Name / Description	Part Number
Internal	**Installation Kit**	**Internal DVD Drive Installation Kit** Installation kit for 8x2.5-inch Drive Model **NOTE:** - The Installation Kit cannot be installed if N8154-89 2x2.5-inch Hot Plug Drive Cage Kit (SAS/SATA) is installed. - Displayport on this kit is not supported.	N8117-03
	Cable	**Internal SATA Cable for DVD Drive** For 4x3.5-inch Drive Model	K410-375(00)
	Drive	**Internal Slim DVD-ROM drive** Slim DVD-ROM drive, SATA	N8151-137
		Internal DVD-Super Multi Drive Slim DVD Super Multi drive, including writing software, SATA **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:

- If N8151-137/-138 Internal Slim DVD-ROM drive/ Internal DVD-Super Multi Drive selected, N8117-03 Internal DVD Drive Installation Kit is needed for 8x2.5-inch Drive Model.
- If N8117-03 Internal DVD Drive Installation Kit is selected, an Internal DVD drive must be selected.
- If N8151-137/-138 Internal Slim DVD-ROM drive/ Internal DVD-Super Multi Drive selected, K410-375(00) is needed for 4x 3.5-inch Drive Model.

6 Flash FDD

Up to one drive can be installed.

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

NOTE:

- Up to one drive can be connected.
- Choose the Flash FDD if you need to prepare an alternative device for a floppy drive.

7 PCI Riser Card / PCI Card

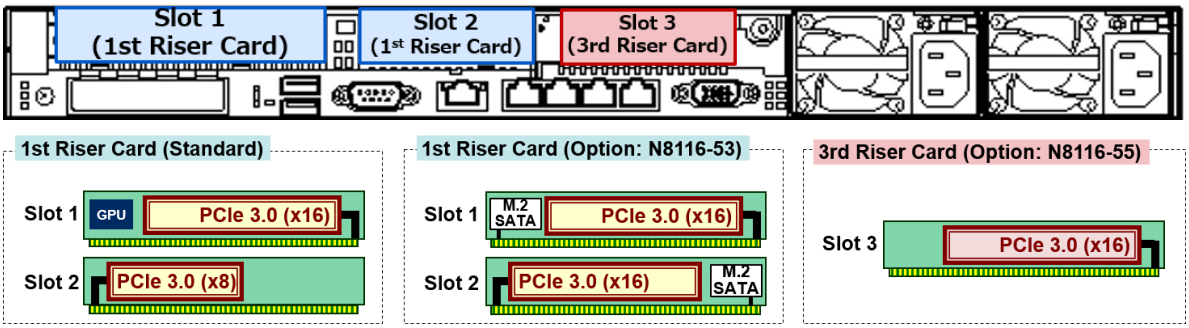
Up to three PCI riser cards can be installed in the system and 1st riser card is installed as standard. Up to two PCI cards can be mounted on the 1st riser card. To install three or more PCI cards, 3rd PCI riser card is required. HDD cage is required for HDD installation

7.1 PCI Riser Card

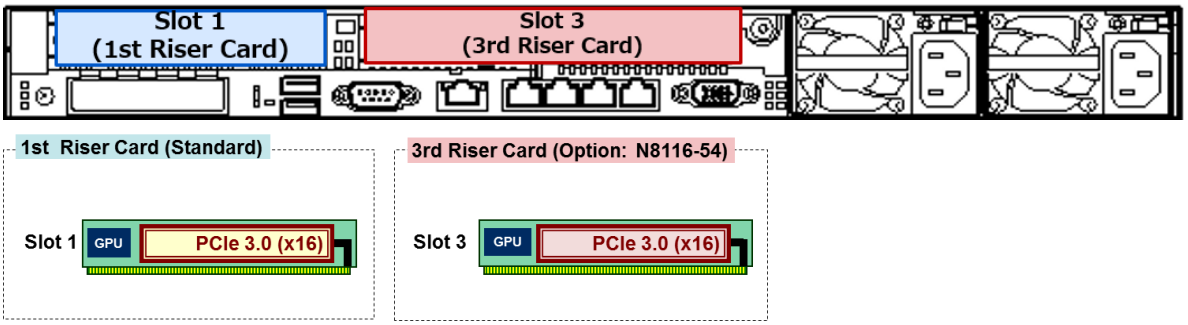
7.1.1 PCI Slot Configuration

The system supports three types of the PCI slot configuration. Choose an appropriate configuration in accordance with the type of PCI cards you want to install and whether you need M.2 .slots.

Using 3xPCI slot (Slot1: FullHeight, Slot2: LowProfile, Slot3: LowProfile)



Using 2xPCI slot (Slot1: FullHeight, Slot3: FullHeight)



7.2 List of PCI Riser Card

Category	Product Name / Description	Part Number
1st Riser	**1st Riser Card(2xPCI)** Riser card for slot 1 with one PCIe 3.0 x16 slot and one GPU power connector, and riser card for slot 2 with one PCIe 3.0 x8 slot **NOTE:** - No power cable for GPU is included.	(Standard)
	1st Riser Card Kit(2xPCI + 2xM.2 SATA SSD) Riser card for slot 1 and 2 with one PCIe 3.0 x16 slot and two M.2 SATA connector **NOTE:** - The Riser Card Kit cannot be installed if the Rear Drive Cage Kit is installed.	N8116-53
3rd Riser	**3rd Riser Card Kit(1xPCI)** Riser card for slot 3 with one PCIe 3.0 x16 slot **NOTE:** - The Riser Card Kit is supported in dual-processor configuration.	N8116-55

		3rd Riser Card Kit(1xPCI + 1xGPU Installation Kit) Riser card for slot 3 (physically occupied from slot 2 to slot 3) with one PCIe 3.0 x16 slot and one GPU power connector, Including two power cables for GPU **NOTE:** - The Riser Card Kit is supported in dual-processor configuration. - N8154-92 1x2.5-inch drive cage (SAS/SATA, rear) can't be installed when N8116-53 1st riser card (2x PCI + 2xM.2 SATA SSD) is selected	N8116-54

NOTE:

- If N8116-53 1st Riser Card (2xPCI + 2xM.2 SATA SSD) is selected, 1x2.5-inch Drive Cage (SAS/SATA, rear) can't be installed.

7.3 Network Interface Controller

Category		Product Name / Description	Part Number
LOM Card	**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. - Twinax cable can be installed.	N8104-176
	25GbE	**Dual Port 25GBASE SFP28 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	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 Port 10GBASE SFP+ Adapter QLogic 57810S 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	N8104-185
		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.	N8104-187
SFP Module	**10GbE**	**SFP+ Module (10G-SR)** 1 x SFP+ Module	N8104-189
	25GbE	**SFP28 Module (25G-SR)** 1x SFP28 Module SFP28 can be connected to 25G BASE adapter **NOTE:** It is not factory installation 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.
  - For VMware ESXi 6.0: https://www.vmware.com/pdf/vsphere6/r60/vsphere-60-configuration-maximums.pdf
  - For VMware ESXi 6.5: https://www.vmware.com/pdf/vsphere6/r65/vsphere-65-configuration-maximums.pdf

NIC Teaming feature - NIC Teaming and bonding features

The Express5800 server supports NIC teaming which is the ability to configure multiple NICs to a virtual single network interface for dual path and load balancing to fault tolerance and Network Loading Balancing.

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

Network Interface	Team	Operating Systems
1GbE NIC On-board LAN Interface N8104-171/-178/-179	Up to four ports per one team	Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux 7.3 VMware ESXi 6.0 Update3 VMware ESXi 6.5 Update1
1GbE NIC N8104-172/-180/-181	Up to four ports per one team	Windows Server 2016 Red Hat Enterprise Linux 7.3 VMware ESXi 6.0 Update3 VMware ESXi 6.5 Update1
10GbE NIC N8104-173/-182	Up to four ports per one team	Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux 7.3 VMware ESXi 6.0 Update3 VMware ESXi 6.5 Update1
10GbE NIC N8104-175/-184	Up to four ports per one team	Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux 7.3 VMware ESXi 6.0 Update3 VMware ESXi 6.5 Update1

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

NOTE:

- The Bonding function of 10GBASE is available for mode 1 (active-backup) and mode 4 (802.3 ad).
- Mixing 1000 BASE teaming, 10 GBASE teaming, and 25 GBASE teaming in one system is supported. For Windows Server 2012 R2, Windows Server 2016, Red Hat Enterprise Linux, up to 5 teams per system can be installed.

7.4 External Storage Controller

7.4.1 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 one 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.

7.4.2 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:** - 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	N8190-166
	Fibre Channel Controller (1ch)	N8190-163

	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	
	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** 12Gb/s SAS, ext. 8(SFF-8644 x2), PCIe 3.0 x8 **NOTE:** - Support tape connection via Device Expansion Unit only	N8103-197
	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

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

7.5 GPU Computing Card

Product Name / Description	Part Number
GPU Computing Card NVIDIA Tesla P4	N8105-51

NOTE:

- When installing N8105-51 GPU Computing Card, please select the following items.
  - N8101-1285 High Performance CPU Heat sink Kit (In some CPU Processor kits, a high-performance CPU heat sink is attached as standard)
  - N8181-157 High Performance Fan Kit (In some Base Models, High Performance Fans are attached as standard)
- When installing N8105-51 GPU Computing Card, please meet below items
  - System memory under 1TB in total
  - If you select RAID Controller, Low Profile Heat Sink type (N8103-192/-193/-194) is needed.
  - Up to one N8105-51 GPU can be installed
  - Operating under 35 degrees Celsius
  - Optional drive cage is not supported

7.6 Serial Port Adapter

Product Name / Description	Part Number
Additional Serial Port Kit Serial port Connector	N8117-09

NOTE:

- Up to one Serial Port Adapter can be installed.

7.7 ExpEther Board

It is connected to ExpEther I/O Expasion Unit(40G)

Product Name / Description	Part Number
ExpEther Board PCIe 3.0(x8), 2x40G QSFP+ port	N8104-165

NOTE:

- Up to two ExpEther Board can be installed.
- QSFP+ module is required.
- It is supported to directly connect to ExpEther I/O Expansion Unit.
- It is not factory installation option. Please contact your sales representative for further information.

8 Other Add-in Components

8.1 Power Supply

Category	Product Name / Description	Part Number
1 PSU Required Up to 2 PSU	**500W Hot Plug Power Supply** 1 x 500 Watt 80 PLUS® Platinum	N8181-159
	800W Platinum Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Platinum	N8181-160
	800W Titanium Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Titanium NOTE: - Support 200 VAC inlet only	N8181-161
	1600W Hot Plug Power Supply 1 x 1600 Watt 80 PLUS® Platinum NOTE: - Support 200 VAC inlet only	N8181-162
	800W -48VDC Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Platinum NOTE: - Support -48 VDC inlet only - This is make-to-order product.	N8181-163

NOTE:

- Minimum one power supply kit must be installed.
- The power units must be the same to configure redundancy.

Available Power Supplies

See the table below for available power supplies based on the number and type of processor, and the number and type of DIMMs.

Number of Processors	Type of Processor	Type of DIMMs	Number of DIMMs	GPU	Available Power Supply
1CPU	Processor with 150 Watt or less	RDIMM	Up to 6	No	500W, 800W, 1600W
				Yes	800W, 1600W
			7 or more	-	800W, 1600W
		64GB LRDIMM	-	-	800W, 1600W
		128GB LRDIMM	-	-	1600W
	Processor with 160 Watt or more	RDIMM	-	-	800W, 1600W
		64GB LRDIMM	-	-	800W, 1600W
		128GB LRDIMM	-	-	1600W
2CPU	Processor with between 85 Watt and 150 Watt	RDIMM	Up to16	Yes	800W, 1600W
			17 or more	No	800W, 1600W
				Yes	1600W
		64GB LRDIMM	Up to 10	Yes	800W, 1600W
			11 to 17or more	Yes	1600W
			Up to 18	No	800W, 1600W
			19 or more	No	1600W
		128GB LRDIMM	-	-	1600W
	Processor with 165 Watt or more	-	-	-	1600W

- 128GB LRDIMM requires 1600W power supply.

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 varies depend on the type of processor while the TDP of processor is the same.

100VAC Input

CPU TDP	8x 2.5-inch	4x 3.5-inch
85 Watt	766W / 767VA	679W / 679VA
105 Watt	816W / 816VA	727W / 728VA
115 Watt	832W / 833VA	744W / 745VA
125 Watt	870W / 871VA	781W / 782VA
130 Watt	878W / 878VA	789W / 789VA
140 Watt	885W / 887VA	822W / 822VA

200VAC Input

CPU TDP	8x 2.5-inch	4x 3.5-inch
85 Watt	736W / 737VA	657W / 658VA
105 Watt	780W / 781VA	701W / 702VA
115 Watt	795W / 796VA	716W / 717VA
125 Watt	829W / 830VA	750W / 751VA
130 Watt	836W / 837VA	756W / 757VA
140 Watt	866W / 867VA	786W / 787VA
150 Watt	884W / 887VA	814W / 815VA
165 Watt	926W / 927VA	846W / 846VA
200 Watt	1012W / 1015VA	942W / 943VA
205 Watt	1012W / 1015VA	942W / 943VA

NOTE:

- This table shows maximum power consumption with 64GB LRDIMM.

8.2 High Performance CPU Heat Sink

Product Name / Description	Part Number
High Performance CPU Heat Sink Kit Including two high performance CPU heat sink	N8101-1285

NOTE:

- The kit is required if you need to replace the standard CPU heat sink.

Type of CPU Heat Sink

The heat sink attached varies depending on the processor type.

CPU	Type of CPU Heat Sink
All CPU's with a TPD of 130W or higher and the following specific models, Platinum 8156, Gold 6128 and Gold 5122	High Performance CPU Heatsink
Others	Standard CPU Heatsink

8.3 Fan Kit

Product Name / Description	Part Number
Redundant Fan Kit 5x Hot-plug redundant cooling fans	(Standard)
High Performance Fan Kit 7x Hot-plug redundant cooling fans	N8181-157

NOTE:

- High-performance fans are products that require arrangements for specific configurations.
- The cable management arm is required if you want to replace a fan unit while the system is running

8.4 Front Panel Kit

Product Name / Description	Part Number
Status LED LED indicator for power, system status and aggregate NIC activity	(Standard)
Status LED Panel Kit Standard LED indicator plus LED indicator for CPU, Memory, Fan, Power supply, PCI Riser, individual NIC activity For 4x 3.5-inch drive model	N8117-07
Status LED Panel Kit Standard LED indicator and LED indicator for CPU, Memory, Fan, Power supply, PCI Riser, and individual NIC activity For 8x 2.5-inch drive model	N8117-08
Front DisplayPort Kit One DisplayPort connector and one USB connector For 4x3.5-inch model	N8117-05

NOTE:

- You can monitor the status of each part from BMC management console or NEC ESMPRO. Ordering the Status LED Panel Kit, you can check the detailed status of devices directly.

8.5 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.

8.6 USB Memory Kit

Product Name / Description	Part Number
8GB USB Memory Support boot VMware ESXi from 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.
- The USB Memory Kit cannot be installed, if M.2 SATA Solid State Drives are installed.
- To use VMware vSAN, combination of vSAN certified hardware is required.
- The USB Memory Kit cannot be installed if M.2 SATA Solid State Drives are installed.

9 Factory Server Setting Service

9.1 Memory RAS Settings

If you need to change the BIOS settings for the memory RAS feature in 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

NOTE:

- It is an option only for factory setup
- Single Rank Memory (N8102-708/-709) does not support Memory Mirroring Mode Configuration Service (NESV16-013)

9.2 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

10 Add-on Components

10.1 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

NOTE:

- There are two VGA connectors on R120h-1M, one on the front side and one on the rear side. However, the front side only works when both are connected at the same time.

10.2 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, 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)
	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)

10.3 Server Management License

Choose the following license kit to use additional remote management features

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 - Integrated Remote Console (IRC) recording and playback	N8115-33
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

NOTE:

- Remote management features are not available for virtual machines.

10.4 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	N8147-32

NOTE:

- The Dust Proof Filter Kit is make-to-order products. Please consult your sales representative in regard to the production lead time.

10.5 Slide Rail Kit

Product Name / Description	Part Number
Tool-free Slide Rail Kit for 1U-2.5inch Server For 8x 2.5-inch Drive Model	N8143-131
Tool-free Slide Rail Kit for 1U-3.5inch Server For 4x 3.5-inch Drive Model	N8143-132
Slide Rail Kit for 1U-2.5" Server For 8x 2.5-inch Drive Model	N8143-127
Slide Rail Kit for 1U-3.5" Server For 4x 3.5-inch Drive Model	N8143-128

10.6 Cable Management Arm

Product Name / Description	Part Number
Cable Management Arm for 1U Server **NOTE:** The cable management arm is required if you want to replace a fan unit while the system is running.	N8143-125

10.7 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 or maintenance contract period.

Product Name / Description	Part Number
Express5800/R120h-1M, R120h-2M Starter Pack	UL9020-B108

NOTE:

- By applying Starter Pack, Driver software qualified by NEC can be installed. To use servers, UL9020-B108 Starter Pack or Starter Pack downloaded from Web site must be installed.
- Starter Pack may be updated without notice. The latest version of Start Pack is available in Web site. Starter Pack can be downloaded within Warranty term.
- User Guide of this product is supplied as PDF file in NEC Web site.

10.8 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:

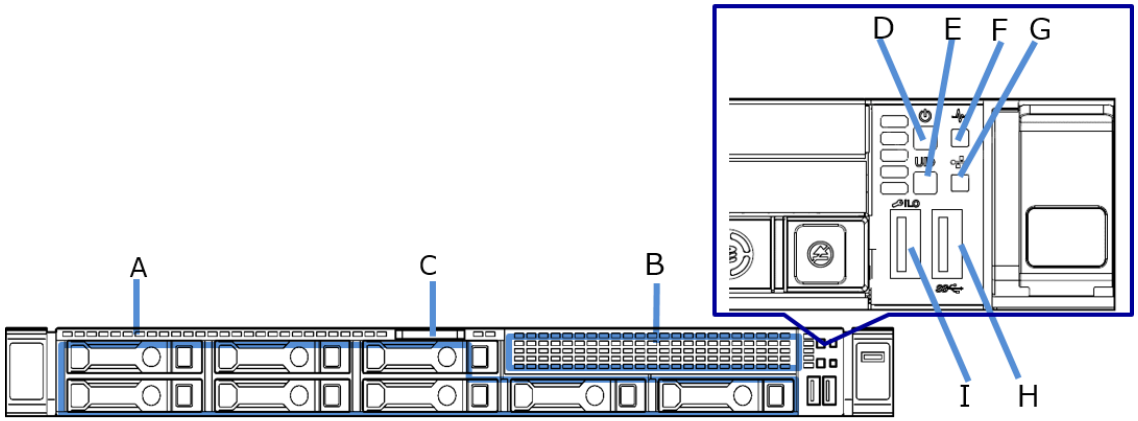
- Up to one drive can be connected.

References

External Views

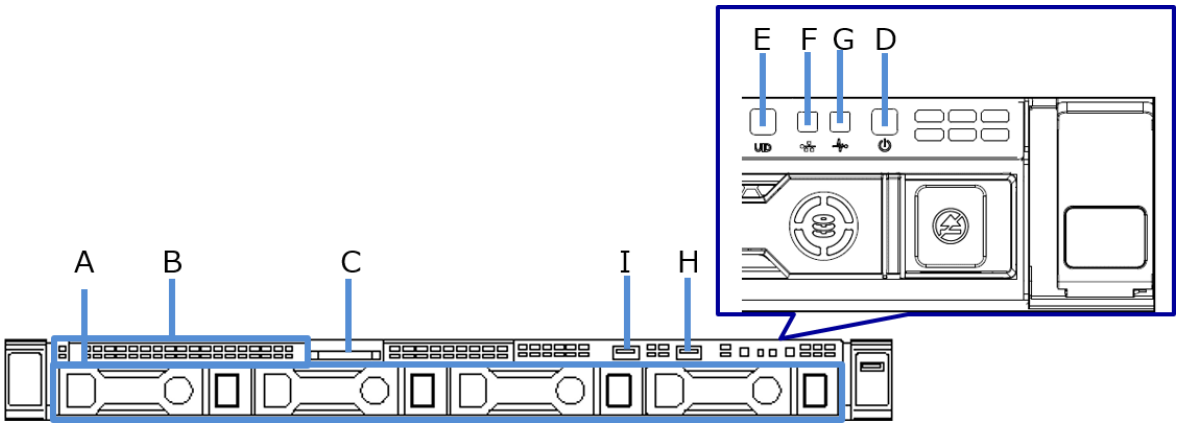
Front and Rear Views

Front View for 8x 2.5-inch Drive Model



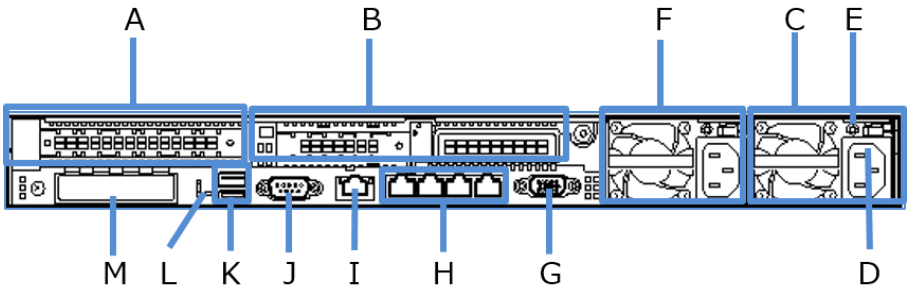
Legend			
A.	2.5-inch Drive Bays	**F.**	Health LED
B.	Optional Drive Bay	**G.**	LINK/ACT LED
C.	Pull-out Tab	**H.**	USB 3.0 Connector
D.	Power On/standby button/LED	**I.**	iLO Service Connector
E.	UID button LED		

Front View for 4x 3.5-inch Drive Model



Legend			
A.	3.5-inch Drive Bays	**F.**	Health LED
B.	Optional Drive Bay	**G.**	LINK/ACT LED
C.	Pull-out Tab	**H.**	USB 3.0 Connector
D.	Power On/standby button/LED	**I.**	iLO Service Connector
E.	UID button LED		

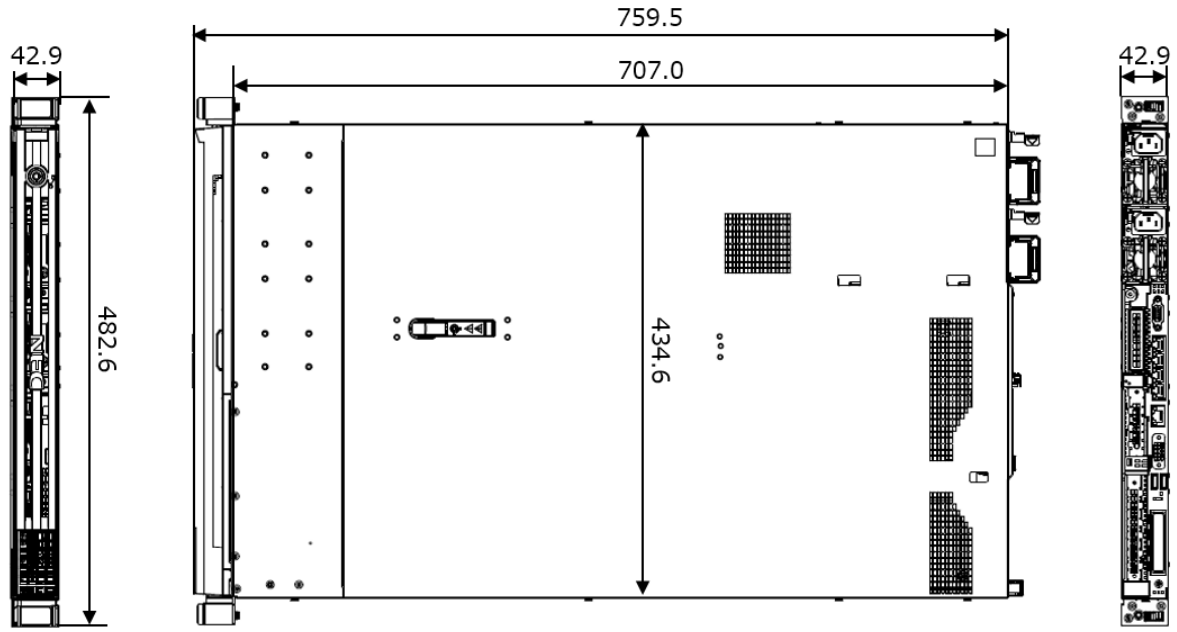
Rear View



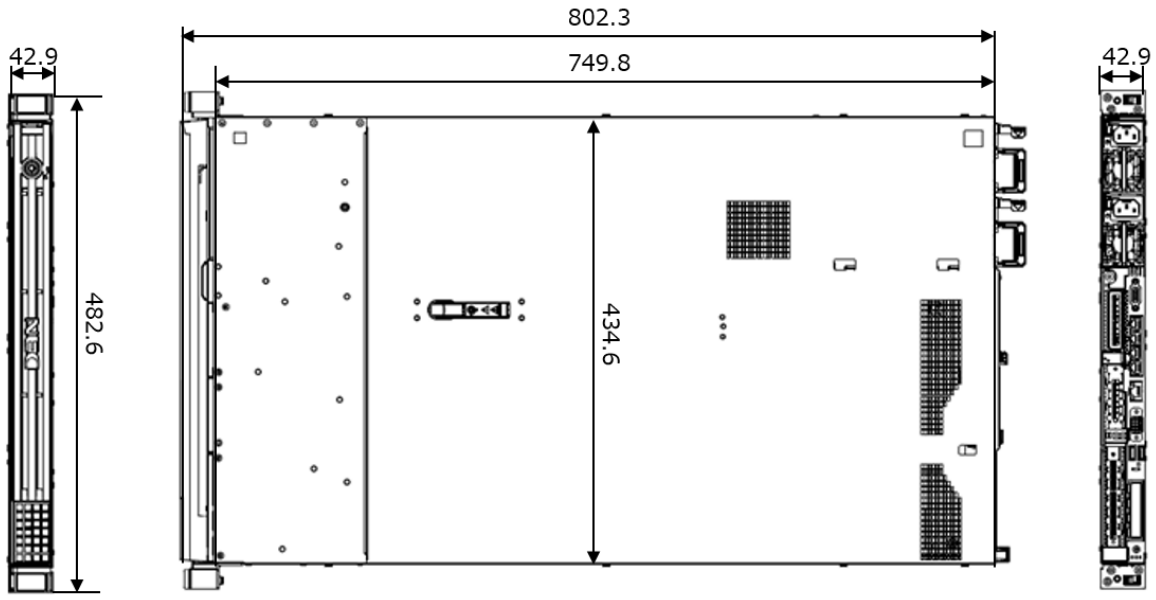
Legend			
A.	PCI Slots (Full-Height)	**H.**	NIC ports 1-4(1Gb)
B.	PCI Slots (Low-Profile)	**I.**	Management Port
C.	Power Supply	**J.**	Serial Port Connector (optional)
D.	AC Inlet	**K.**	USB 3.0 Connectors
E.	AC Power LED	**L.**	UID LED
F.	Power Supply (optional)	**M.**	Flexible LOM (optional)
G.	VGA Connector (optional)		

Dimensions (mm)

8x 2.5-inch Drive Model



4x 3.5-inch Drive Model



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

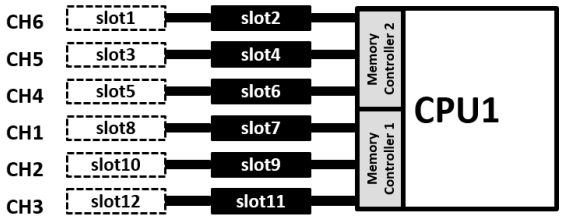
Installation rule

- 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 12 per 1CPU.
- Mixing of RDIMM and LRDIMM is not allowed to be installed.

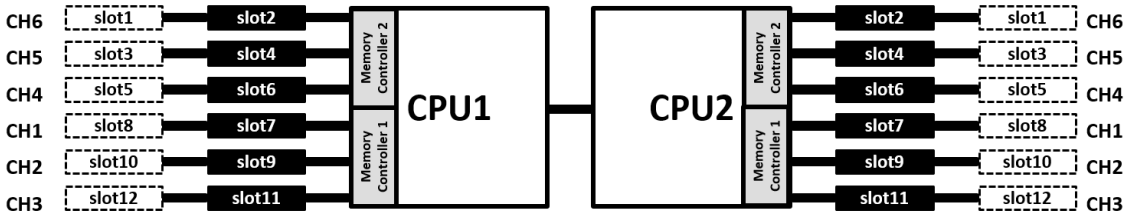
When installing DIMMs, higher capacity memory must be installed preferentially, if this rule is ignored, it may cause failures of DIMMs. This rule applies to the factory installation.

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, 9 or 11 DIMMs per CPU, optimal performance might NOT be obtained. Other memory populations are recommended.

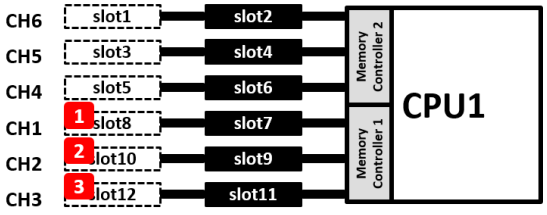
Single CPU system



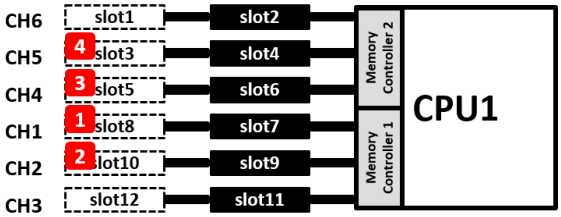
Dual CPU system



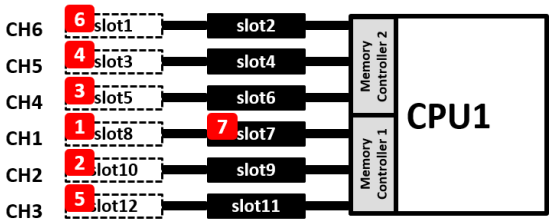
1-3x DIMM(s)



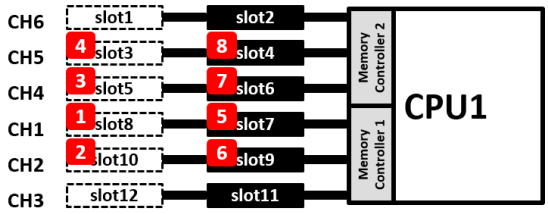
4x DIMMs



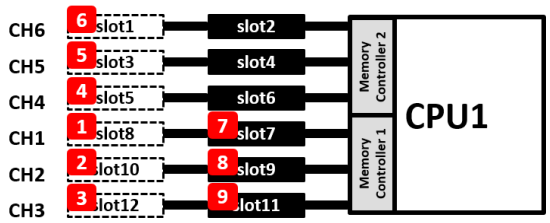
5-7x DIMMs



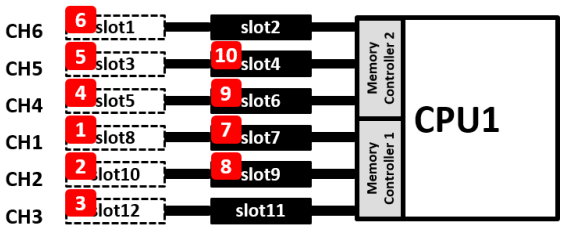
8x DIMMs



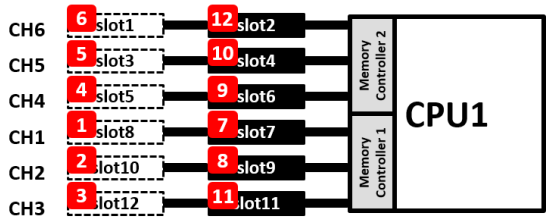
9x DIMMs



10x DIMMs



11-12x 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

- RAID level 0, 1, 5, 6, 10 can be installed for the default factory configuration. Selectable RAID levels are depending on the RAID controller.
- 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 N8103-190/191/193/194.

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	1～10	Non
Embedded 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 9 (3.5inch model only)	4/6/8 in RAID10, 1 for a hot spare
	10 (3.5inch model only)	8 in RAID10, 2 in RAID1
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	4/6 in RAID10, 1 for a hot spare
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

Conditions for mixing of Internal Drives after shipment

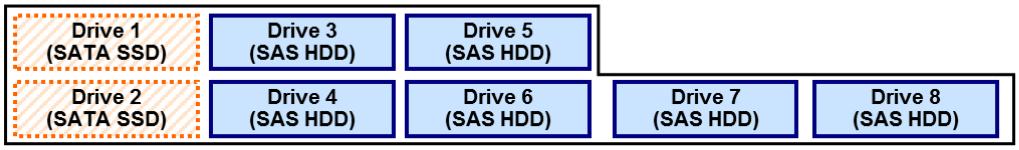
- RAID controller is required for mixing of Internal Drives
- Mixed Internal Drives cannot be installed in the same RAID array.
- When using hot spare disk for different RAID arrays which consist of various type of drives, assign “Dedicated Hot Spare” to each RAID arrays with the same type of drive,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

Mixing of different type of drives

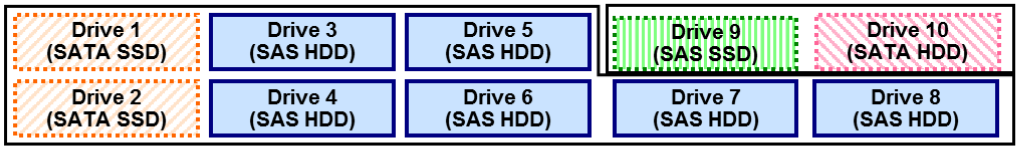
Two types of drive can be installed in standard drive cage (8slots) and optional drive cage (8slots), in total, up to four types of drive using both cages. There is nine “type”, such as SAS HDD 10,000rpm(512n), SAS HDD 10,000rpm(512e), SAS HDD 15,000rpm(512n), SAS HDD 7,200rpm(512e), SATA HDD 7,200rpm(512n),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

See some examples as below.

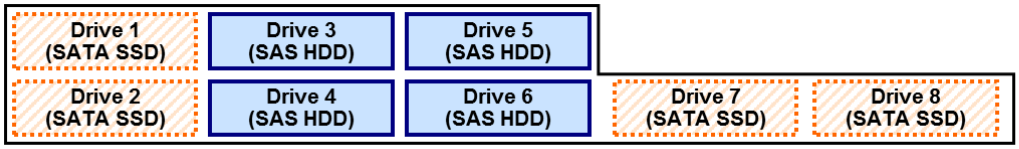
OK
Up to two types of drives can be installed in the drive cage. Any combination of drives is ok.
(Ex. 2 SATA HDD and 6 SAS HDDs)



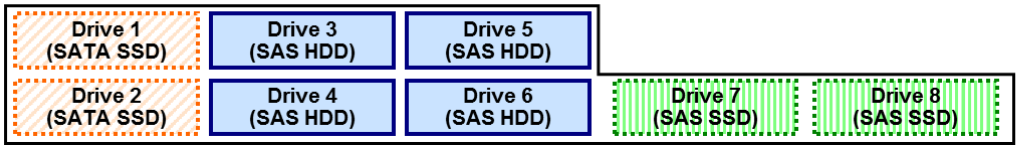
OK
Up to two types of drives can be installed in each drive cage (drive 1~8 as standard cage, drive 9~10 as optional cage).



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



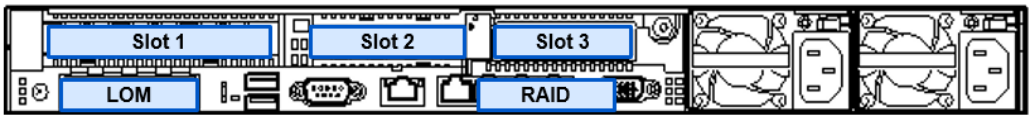
Server Management

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

	Standard	Remote Management License (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)	✓	✓	✓

Supported PCI Cards and Installable Slots

Three PCI Slot Configuration



Part Number	Product Name	RAID	FLOM	SLOT1	SLOT2	SLOT3	NOTE
N8103-189	RAID Controller (RAID 0/1)	1	-	-	-	-	
N8103-190	RAID Controller (2GB, RAID 0/1/5/6)	1	-	-	-	-	Up to 1
N8103-191	RAID Controller (4GB, RAID 0/1/5/6)	1	-	-	-	-	Up to 1
N8103-192	RAID Controller (RAID 0/1)	1	-	-	-	-	
N8103-193	RAID Controller (2GB, RAID 0/1/5/6)	1	-	-	-	-	Up to 1
N8103-194	RAID Controller (4GB, RAID 0/1/5/6)	1	-	-	-	-	Up to 1
N8103-195	RAID Controller (4GB, RAID 0/1)	-	-	3	1	2	
N8103-201	RAID Controller (2GB, RAID 0/1/5/6)	-	-	3	1	2	Up to 1
N8103-196	RAID Controller (4GB, RAID 0/1/5/6)	-	-	3	1	2	For external devices. Up to 1
N8103-197	SAS Controller	-	-	3	1	2	For external devices
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	-	-	-	
N8104-178	Dual Port 1000BASE-T Adapter	-	-	3	1	2	

N8104-179	Quad Port 1000BASE-T Adapter	-	-	3	1	2	Network cables with RJ-45 plug covers cannot be used.
N8104-180	Dual Port 1000BASE-T Adapter	-	-	3	1	2	Network cables with RJ-45 plug covers cannot be used.
N8104-181	Quad Port 1000BASE-T Adapter	-	-	3	1	2	Network cables with RJ-45 plug covers cannot be used.
N8104-182	Dual Port 10GBASE-T Adapter	-	-	3	1	2	
N8104-183	Dual Port 10GBASE-T Adapter	-	-	3	1	2	
N8104-184	Dual Port 10GBASE-T Adapter	-	-	3	1	2	
N8104-185	Dual Port 10GBASE SFP+ Adapter	-	-	3	1	2	
N8104-186	Dual Port 10GBASE SFP+ Adapter	-	-	3	1	2	
N8104-187	Dual Port 10GBASE SFP28 Adapter	-	-	3	1	2	
N8105-51	GPU Computing Card	-	-	1	3	2	Up to 1
N8190-165	Fibre Channel Controller (1ch)	-	-	3	1	2	Can't mix with N8190-163/-164/-171/-172
N8190-166	Fibre Channel Controller (2ch)	-	-	3	1	2	Can't mix with N8190-163/-164/-171/-172
N8190-171	Fibre Channel Controller (1ch)	-	-	3	1	2	Can't mix with N8190-165/-166
N8190-172	Fibre Channel Controller (2ch)	-	-	3	1	2	Can't mix with N8190-165/-166
N8190-163	Fibre Channel Controller (1ch)	-	-	3	1	2	Can't mix with N8190-165/-166
N8190-164	Fibre Channel Controller (2ch)	-	-	3	1	2	Can't mix with N8190-165/-166
N8103-184	SAS Controller	-	-	3	1	2	Up to 3. Up to 2 for NEC Storage M series

Two PCI Slot Configuration

Part Number	Product Name	RAID	FLOM	SLOT1	SLOT3
N8103-189	RAID Controller (RAID 0/1)	1	-	-	-
N8103-190	RAID Controller (2GB, RAID 0/1/5/6)	1	-	-	-
N8103-191	RAID Controller (4GB, RAID 0/1/5/6)	1	-	-	-
N8103-192	RAID Controller (RAID 0/1)	1	-	-	-
N8103-193	RAID Controller (2GB, RAID 0/1/5/6)	1	-	-	-
N8103-194	RAID Controller (4GB, RAID 0/1/5/6)	1	-	-	-
N8103-195	RAID Controller (4GB, RAID 0/1)	-	-	1	2
N8103-201	RAID Controller (2GB, RAID 0/1/5/6)	-	-	1	2
N8103-196	RAID Controller (4GB, RAID 0/1/5/6)	-	-	1	2
N8103-197	SAS Controller	-	-	1	2
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	-	-
N8104-178	Dual Port 1000BASE-T Adapter	-	-	1	2
N8104-179	Quad Port 1000BASE-T Adapter	-	-	1	2
N8104-180	Dual Port 1000BASE-T Adapter	-	-	1	2
N8104-181	Quad Port 1000BASE-T Adapter	-	-	1	2
N8104-182	Dual Port 10GBASE-T Adapter	-	-	1	2
N8104-184	Dual Port 10GBASE-T Adapter	-	-	1	2
N8104-185	Dual 10GBASE SFP+ Adapter	-	-	1	2
N8104-186	Dual 10GBASE SFP+ Adapter	-	-	1	2
N8104-187	Dual Port 10GBASE SFP28 Adapter	-	-	1	2
N8105-51	GPU Computing Card	-	-	1	2
N8190-165	Fibre Channel Controller (1ch)	-	-	1	2
N8190-166	Fibre Channel Controller (2ch)	-	-	1	2
N8190-171	Fibre Channel Controller (1ch)	-	-	1	2
N8190-172	Fibre Channel Controller (2ch)	-	-	1	2
N8190-163	Fibre Channel Controller (1ch)	-	-	1	2
N8190-164	Fibre Channel Controller (2ch)	-	-	1	2
N8103-184	SAS Controller	-	-	1	2

OS Support Matrix for PCI Cards and Embedded Controllers

Part number	Product Name	WS 2016	WS 2012 R2	RHEL 7	ESXi 6.5	ESXi 6.0
-	Embedded SATA non-RAID Controller	✓	✓	✓	✓	✓
-	Embedded SATA RAID Controller	✓	✓	-	-	-
N8103-189	RAID Controller (RAID 0/1)	✓	✓	✓	✓	✓
N8103-190	RAID Controller (2GB, RAID 0/1/5/6)	✓	✓	✓	✓	✓
N8103-191	RAID Controller (4GB, RAID 0/1/5/6)	✓	✓	✓	✓	-
N8103-192	RAID Controller (RAID 0/1)	✓	✓	✓	✓	✓
N8103-193	RAID Controller (2GB, RAID 0/1/5/6)	✓	✓	✓	✓	✓
N8103-194	RAID Controller (4GB, 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	✓	✓	✓	-	-
N8103-184	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	✓	✓	✓	✓	✓
N8104-175	Dual 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	✓	✓	✓	✓	✓
N8104-183	Dual Port 10GBASE-T Adapter	✓	✓	✓	✓	✓
N8104-184	Dual Port 10GBASE-T Adapter	✓	✓	✓	✓	✓
N8104-185	Dual Port 10GBASE SFP+ Adapter	✓	✓	✓	✓	✓
N8104-186	Dual Port 10GBASE SFP+ Adapter	✓	✓	✓	✓	✓
N8104-187	Dual Port 10GBASE 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 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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For hard drive capacity measurements, 1 GB = 1 billion bytes. Actual formatted capacity is less.

Revision History

Revision	Date	Description
7.0	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 ● 12TB 7.2K Hot Plug 3.5-inch SATA HDD / N8150-587 ● 12TB 7.2K Hot Plug 3.5-inch NLSAS HDD / N8150-589 ● 240GB Non-Hot Plug M.2 SATA SSD / N8150-1709 ● 480GB Non-Hot Plug M.2 SATA SSD / N8150-1710 ● 8GB DDR4-2666 REG Memory Kit (1x8B/DR) / N8102-714 **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**
6.0	April 27, 2018	**New products / service added:** ● 1TB 7.2K Hot Plug 2.5-inch SATA HDD / N8150-596 ● 4TB 7.2K Hot Plug 3.5-inch SAS HDD / N8150-597 ● SAS Controller / N8103-E184 (Factory Installation only) ● RAID Config Option(None) / NESV16-039 **Discontinued products deleted:** ● 150GB Non-hot-plug M.2 SATA SSD / N8150-778 (Replacement part number to be released soon.) **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**
5.1	March 26, 2018	**Others:** ● N8103-184 connects to NEC Storage M series ● Some improvements in description Correction of errors
5.0	January 25, 2018	**Discontinued products deleted:** ● 1TB 7.2K Hot Plug 2.5-inch SATA HDD / N8150-544 (Replacement part number to be released soon.) ● 4TB 7.2K Hot Plug 3.5-inch SAS HDD / N8150-561 (Replacement part number to be released soon.) ● 3TB 7.2K Hot Plug 3.5-inch SATA HDD / N8150-556 (No replacement planed) ● Quad Port 25GBASE QSPF28 Adapter / N8104-188 **Others:** Correction of errors
4.0	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 ● SFP28 Module(25G-SR) / N8104-190 ● SAS Controller / N8103-184 **Others:**

		● Updated the table of the Available Power Supplies ● SAS Expander supported SATA drives ● Information in References is updated
3.0	November 22, 2017	**New products added:** ● Xeon Gold 6144 Processor Kit / N8101-1147, N8101-1148 ● Xeon Gold 6146 Processor Kit / N8181-1149, N8101-1150 ● 3.84TB Hot Plug 2.5-inch SATA SSD / N8150-747 ● 240GB Hot Plug 2.5-inch SATA SSD / N8150-739 ● Dual Port 10GBASE-T Adapter / N8104-183 ● Dual Port 10GBASE-T Adapter / N8104-184 ● Slide Rail Kit for 1U-2.5" Server / N8143-127 ● Slide Rail Kit for 1U-3.5" Server / N8143-128 **Others:** ● Added the table of guideline of the maximum power consumption ● Added VMware ESXi 6.5 to the list of operating system supported ● Updated OS support matrix
.2.0	October 19, 2017	**New products added:** ● 4TB 7.2K Hot Plug 3.5-inchSAS HDD / N8150-561 ● 8TB 7.2K Hot Plug 3.5-inchSAS HDD / N8150-562 ● 10TB 7.2K Hot Plug 3.5-inchSAS HDD / N8150-563 ● 150GB Non-hot-plug M.2 SATA SSD / N8150-778 ● Fibre Channel Controller (1ch) / N8190-171 ● Fibre Channel Controller (2ch) / N8190-172 **Discontinued product deleted:** ● 120GB Non-hot plug M.2 SATA SSD / N8150-754 **Others:** ● Updated the OS support matrix ● Updated Supported PCI Cards and Installable Slots matrix ● Added the table of maximum power consumption
1.1	September 15, 2017	**Others:** ● Added note when ordering M.2 SATA SSD ● Updated the table of available power supplies ● Corrected the type of processors with high performance heatsink as standard
1.0	August 29, 2017	Initial release