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NEC Express5800/R120g-1E
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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Revision 7.0
NEC Corporation

Contents

Technical Specification

Key Features

- High performance with the latest Intel® Xeon® processor E5-2600 v4 Product Family
- Up to 1 TB of high speed DDR4 memory
- High energy efficiency with power capping feature and 80 PLUS® Platinum power supply
- Full manageability by integrated EXPRESSSCOPE Engine 3

Specification

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Model		R120g-1E			
Processor	**Type**	Intel® Xeon® processor E5-2603 v4	Intel® Xeon® processor E5-2609 v4	Intel® Xeon® processor E5-2620 v4	Intel® Xeon® processor E5-2623 v4
	Clock speed	1.70GHz		2.10GHz	2.60 GHz
	Number of Processors	1 or 2			
	Cache	15 MB	20 MB		10 MB
	Cores and Threads	6C-6T	8C-8T	8C-16T	4C-8T
Chipset		Intel® C612 Chipset			
Memory	**Type**	DDR4-2400 Registered DIMM (4/8/16/32GB) DDR4-2400 TSV Registered DIMM (64GB)			
	Standard Capacity	0 GB			
	Maximum Capacity	1 TB (16 x 64 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	**Standard Capacity**	0 GB			
	Maximum Capacity	SAS HDD : 14.4 TB (8 x 1.8 TB) SATA HDD : 16 TB (8 x 2 TB) SAS SSD : 3.2 TB (8 x 400 GB) SATA SSD : 12.8 TB (8 x 1.6 TB)			
	Disk Controller	SATA : 6Gb/s (Integrated) SAS: 12 Gb/s (Optional)			
	RAID	SATA : RAID 0/1/5/6/10/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)			
	Hot Plug	Supported			
	Optical Disk Drive	Optional			
	Optical Drive Bays	1			
	Disk Drive Bays	8			
Expansion Slots	**Standard**	Total: 3 slots available 1 PCIe 3.0 x8 (x8 connector) 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot			
	Optional Riser Card (N8116-39)	Total: 4 slots available 2 PCIe 3.0 x8 (x8 connector) 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot			
	Optional Riser Card (N8116-33)	Total: 4 slots available 2 PCIe 3.0 x16 (x16 connector) 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot			
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)			
	Resolution / Color	1600 x 1200 / 16.7M [1]			
Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2rear) 4 x USB3.0 (2 x front, 2 x rear), 1 x USB 2.0 (1 x internal) 1 x Flexible Integrated NIC (4x 1000BASE-T, 2x 10GBASE-T, or 2x 1000BASE-T + 2x 10GBASE-SFP+) 1 x Management LAN connector (RJ-45, 1 x rear)			
Server Management		EXPRESSSCOPE Engine 3			
Redundant Fan		Standard, non-hot plug			

Redundant Power Supply		Optional, hot plug			
Power Supply		1 to 2 x 460 Watt or 800 Watt 80 PLUS® Platinum certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz, or 800 Watt 80 PLUS® Titanium certified hot plug PSU 200-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			
Power Consumption	**(Max. Config, Idling)**	157 VA / 156 Watt	159 VA /157 Watt	161 VA /160 Watt	156 VA /155 Watt
	(Max. Config, Operating)	441 VA /438 Watt	452 VA /448 Watt	525 VA /521 Watt	508 VA /504 Watt
Acoustical Noise (Sound Pressure Level) [2]	**Max. Config, Idling**	45.2 dB			
	Max. Config, Operating	53.5 dB			
Dimensions (W x D x H)		439.8 x 722.0 x 43.4 mm / 17.3 x 28.4 x 1.7 in (1U)			
Weight (Minimum / Maximum)		14.6 kg / 21.0 kg, 32.19 lbs. / 46.30 lbs.			
Temperature, Relative Humidity (non-condensing)		Operating: 5° to 40° C / 41° to 104° F (Standard) or 5° to 45° C / 41° to 113° F (Optional), 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%			
Regulatory and Safety		FCC, UL, CB, CE, BSMI, UL(Mexico), RCM, RoHS, WEEE			
Operating Systems		Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard Microsoft® Windows Server® 2012 Datacenter 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 6.7 or later (x86_64) [3] Red Hat Enterprise Linux 7.2 or later [3] VMware ESXi™ 5.5 Update 3 VMware ESXi™ 6.0 Update 1 VMware ESXi™ 6.5			

[1] Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

[2] Noise emission was measured at the bystander positions in accordance with ISO 7779. The actual value may vary by the operating environment.

[3] For Linux support, contact your sales representative or go to the NEC website at: http://www.nec.com/global/prod/express/linux/index.html

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Model		**R120g-1E**			
Processor	**Type**	Intel® Xeon® processor E5-2630 v4	Intel® Xeon® processor E5-2650 v4	Intel® Xeon® processor E5-2650L v4	Intel® Xeon® processor E5-2660 v4
	Clock speed	2.20 GHz	2.20 GHz	1.70 GHz	2.00 GHz
	Number of Processors	1 or 2			
	Cache	25 MB	30 MB	35 MB	
	Cores and Threads	10C-20T	12C-24T	14C-28T	
Chipset		Intel® C612 Chipset			
Memory	**Type**	DDR4-2400 Registered DIMM (4/8/16/32GB) DDR4-2400 TSV Registered DIMM (64GB)			
	Standard Capacity	0 GB			
	Maximum Capacity	1 TB (16 x 64 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	**Standard Capacity**	0 GB			
	Maximum Capacity	SAS HDD : 14.4 TB (8 x 1.8 TB) SATA HDD : 16 TB (8 x 2 TB) SAS SSD : 3.2 TB (8 x 400 GB) SATA SSD : 12.8 TB (8 x 1.6 TB)			
	Disk Controller	SATA : 6Gb/s (Integrated) SAS: 12 Gb/s (Optional)			
	RAID	SATA : RAID 0/1/5/6/10/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)			

Model		R120g-1E			
	Hot Plug	Supported			
	Optical Disk Drive	Optional			
	Optical Drive Bays	1			
	Disk Drive Bays	8			
Expansion Slots	**Standard**	Total: 3 slots available 1 PCIe 3.0 x8 (x8 connector) 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot			
	Optional Riser Card (N8116-39)	Total: 4 slots available 2 PCIe 3.0 x8 (x8 connector) 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot			
	Optional Riser Card (N8116-33)	Total: 4 slots available 2 PCIe 3.0 x16 (x16 connector) 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot 1 PCIe 3.0 x8 (x8 connector) flexible integrated NIC slot			
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)			
	Resolution / Color	1600 x 1200 / 16.7M [1]			
Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2rear) 4 x USB3.0 (2 x front, 2 x rear), 1 x USB 2.0 (1 x internal) 1 x Flexible Integrated NIC (4x 1000BASE-T, 2x 10GBASE-T, or 2x 1000BASE-T + 2x 10GBASE-SFP+) 1 x Management LAN connector (RJ-45, 1 x rear)			
Server Management		EXPRESSSCOPE Engine 3			
Redundant Fan		Standard, non-hot plug			
Redundant Power Supply		Optional, hot plug			
Power Supply		1 to 2 x 460 Watt or 800 Watt 80 PLUS® Platinum certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz, or 800 Watt 80 PLUS® Titanium certified hot plug PSU 200-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			
Power Consumption	**(Max. Config, Idling)**	156 VA / 155 Watt	160 VA /159 Watt	155 VA /154 Watt	162 VA /160 Watt
	(Max. Config, Operating)	535 VA /532 Watt	599 VA /595 Watt	506 VA /503 Watt	620 VA /616 Watt
Acoustical Noise (Sound Pressure Level) [3]	**Max. Config, Idling**	45.2 dB			
	Max. Config, Operating	53.5 dB	55.1 dB	55.4 dB	55.1 dB
Dimensions (W x D x H)		439.8 x 722.0 x 43.4 mm / 17.3 x 28.4 x 1.7 in (1U)			
Weight (Minimum / Maximum)		14.6 kg / 21.0 kg, 32.19 lbs. / 46.30 lbs.			
Temperature, Relative Humidity (non-condensing)		Operating: 5° to 40° C / 41° to 104° F (Standard) or 5° to 45° C / 41° to 113° F (Optional), 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%			
Regulatory and Safety		FCC, UL, CB, CE, BSMI, UL(Mexico), RCM, RoHS, WEEE			
Operating Systems		Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard Microsoft® Windows Server® 2012 Datacenter 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 6.7 or later (x86_64) [3] Red Hat Enterprise Linux 7.2 or later [3] VMware ESXi™ 5.5 Update 3 VMware ESXi™ 6.0 Update 1 VMware ESXi™ 6.5			

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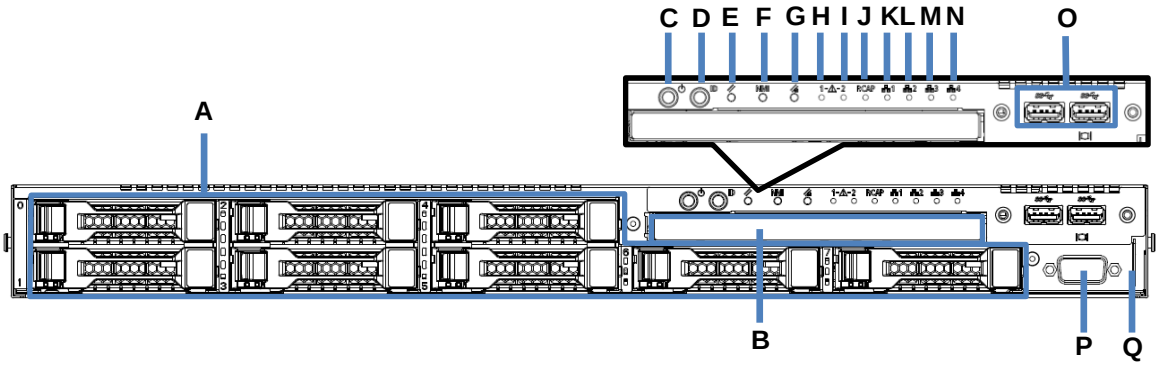
[3] For Linux support, contact your sales representative or go to the NEC website at: http://www.nec.com/global/prod/express/linux/index.html

External Views

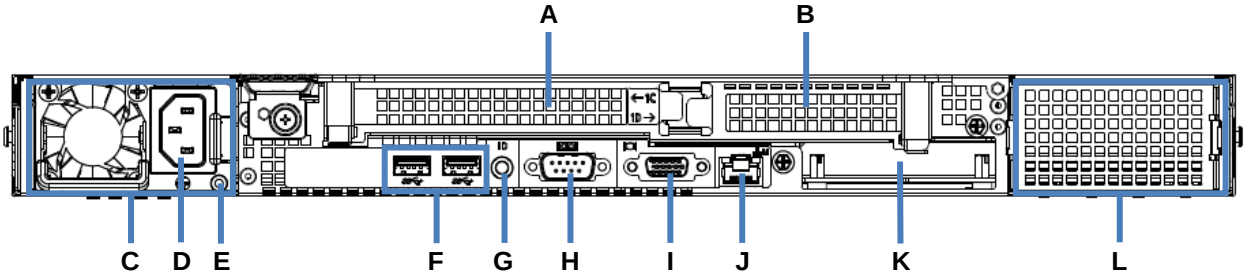
Front and Rear Views

Front View



Legend			
A.	2.5-inch Drive Bays	**J.**	Power Capping LED
B.	Optical Drive Bay	**K.**	Data LAN 1 Activity LED
C.	Power Button / Power LED	**L.**	Data LAN 2 Activity LED
D.	UID LED Button	**M.**	Data LAN 3 Activity LED
E.	System Reset Button	**N.**	Data LAN 4 Activity LED
F.	Dump (NMI) Button	**O.**	USB Connectors
G.	BMC Reset Button	**P.**	Display Connector
H.	System Status LED 1	**Q.**	Pull-out Tab
I.	System Status LED 2		

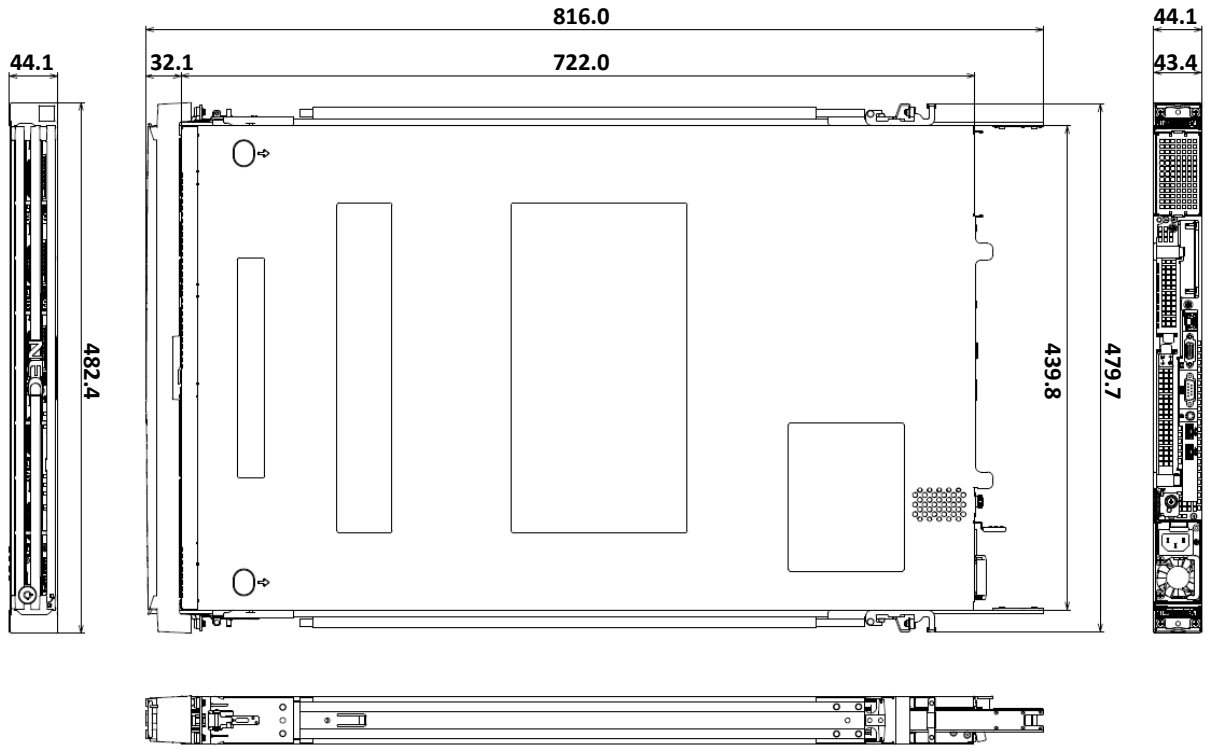
Rear View



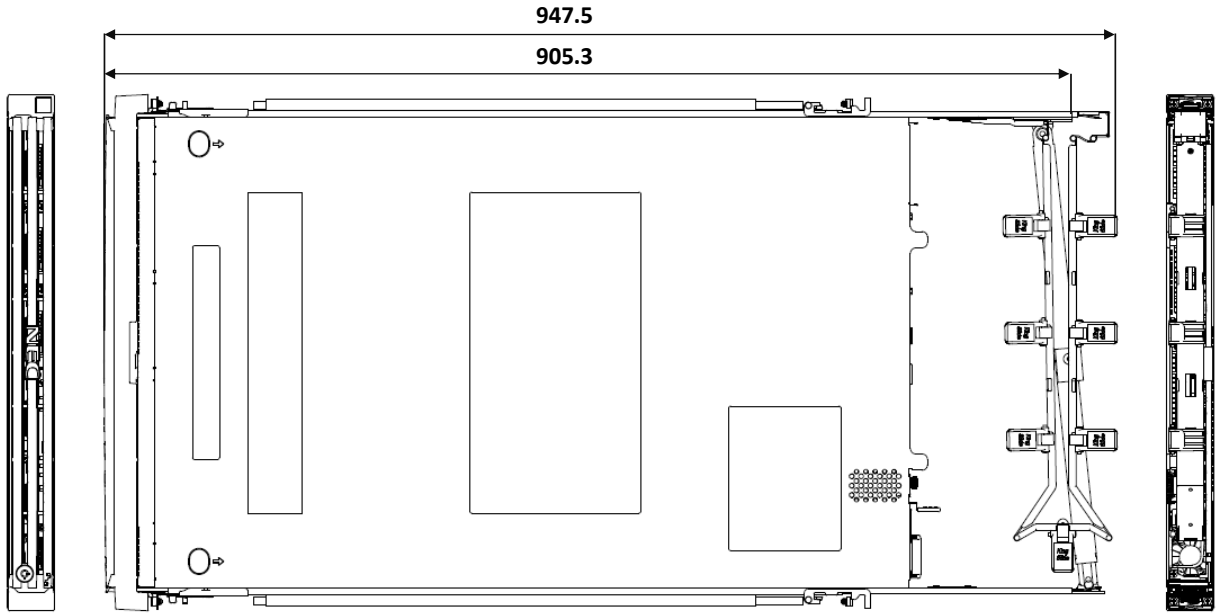
Legend			
A.	PCI Slot (Full-Height)	**G.**	UID Button/LED
B.	PCI Slot (Low-Profile)	**H.**	Serial Port Connector
C.	Power Supply	**I.**	VGA Connector
D.	AC Inlet	**J.**	Management LAN Connector
E.	AC Power LED	**K.**	LOM Card Slot
F.	USB Connectors	**L.**	Additional Power Supply Slot

Dimensions (mm)

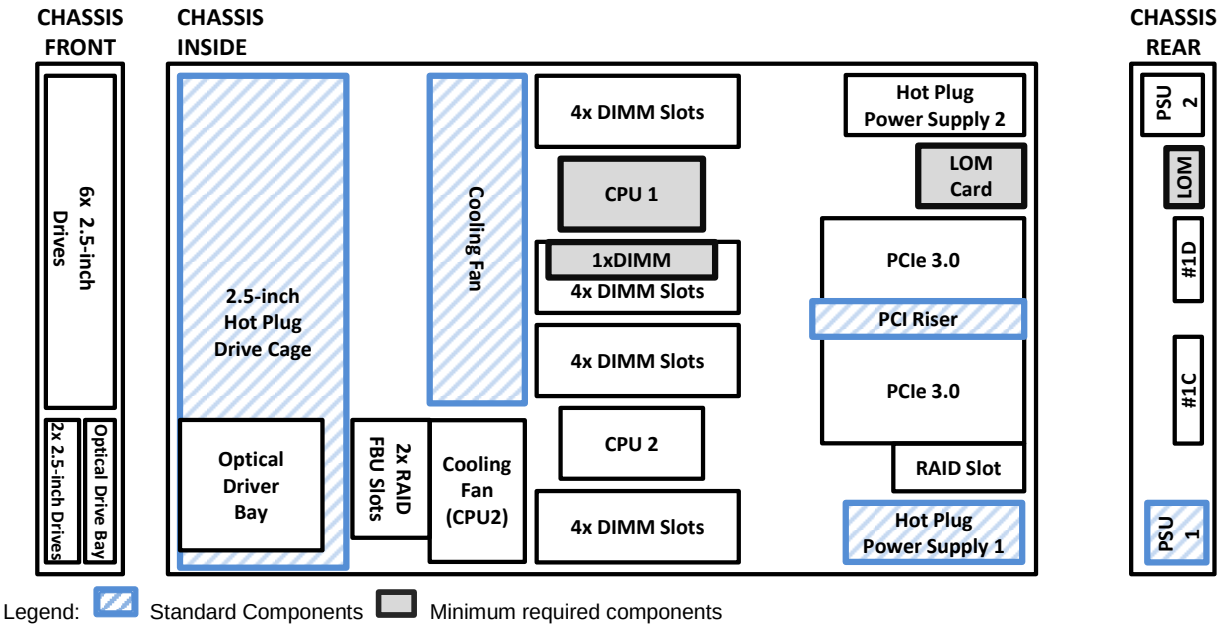
Without Cable Management Arm



With Cable Management Arm

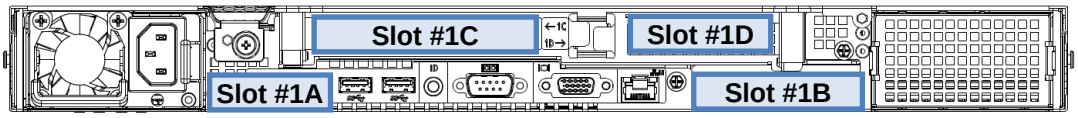


Configuration Diagram



Legend: Standard Components Minimum required components

Expansion Slots



Legend			Remarks
Common	#1A	PCIe 3.0 x8, x8 connector, for a dedicated RAID controller	
	#1B	PCIe 3.0 x8, x8 connector, for a dedicated LOM Card	
	#1D	PCIe 3.0 x8, x8 connector, Low-profile, up to 220 mm length	
PCIe x8 Riser Card Kit	#1C	PCIe 3.0 x8, x8 connector, Full-height, up to 220 mm length	Optional Riser
PCIe x16 Riser Card Kit	#1C	PCIe 3.0 x16, x16 connector, Full-height, up to 220 mm length	Required 2 CPU, Optional Riser
	#1D	PCIe 3.0 x16, x16 connector, Low-profile, up to 220/312 mm length	

Server Configuration

1 Base Models

Product Name / Description	Part Number
NEC Express5800/R120g-1E Server no processor, no RAM, no HDD, no ODD, no LOM Card, no EXPRESSBUILDER DVD Including : 1 x 460 Watt 80 PLUS® Platinum Power Supply Unit, Front Bezel, 2.5-inch Drive Cage	N8100-2434F
NEC Express5800/R120g-1E Server no processor, no RAM, no HDD, no ODD, no LOM Card, no EXPRESSBUILDER DVD Including : 1 x 800 Watt 80 PLUS® Platinum Power Supply Unit, Front Bezel, 2.5-inch Drive Cage	N8100-2435F
NEC Express5800/R120g-1E Server no processor, no RAM, no HDD, no ODD, no LOM Card, no EXPRESSBUILDER DVD Including : 1 x 800 Watt 80 PLUS® Titanium Power Supply Unit, Front Bezel, 2.5-inch Drive Cage	N8100-2436F

NOTE:

- The base model must be ordered with a processor kit, a memory kit, and a LOM card.
- Use the NEC Power Supply Selector to select appropriate size for power units. For details, please visit the NEC website at: http://www.nec.com/en/global/prod/express/collateral/tools/PowerSelector_G01.xls

2 Processors and Heat Sink

Available sockets: 2

Product Name / Description			Part Number
Processors 1 Processor Required		**Xeon E5-2603 v4 Processor Kit** Intel® Xeon ® Processor E5-2603 v4 (1.70 GHz, 6C/6T, 15 MB)	N8101-1029F
		Xeon E5-2609 v4 Processor Kit Intel® Xeon ® Processor E5-2609 v4 (1.70 GHz, 8C/8T, 20 MB)	N8101-1045F
		Xeon E5-2620 v4 Processor Kit Intel® Xeon ® Processor E5-2620 v4 (2.10 GHz, 8C/16T, 20 MB)	N8101-1030F
		Xeon E5-2623 v4 Processor Kit Intel® Xeon ® Processor E5-2623 v4 (2.60 GHz, 4C/8T, 10 MB)	N8101-1031F
		Xeon E5-2630 v4 Processor Kit Intel® Xeon ® Processor E5-2630 v4 (2.20 GHz, 10C/20T, 25 MB)	N8101-1032F
		Xeon E5-2650 v4 Processor Kit Intel® Xeon ® Processor E5-2650 v4 (2.20 GHz, 12C/24T, 30 MB)	N8101-1036F
		Xeon E5-2650L v4 Processor Kit Intel® Xeon ® Processor E5-2650L v4 (1.70 GHz, 14C/28T, 35 MB)	N8101-1037F
		Xeon E5-2660 v4 Processor Kit Intel® Xeon ® Processor E5-2660 v4 (2 GHz, 14C/28T, 35 MB)	N8101-1046F
Heat Sink	**1st**	**Processor Heat Sink** For 1st Processor	(Standard)
	2nd	**Processor Heat Sink** For 2nd Processor, including cooling fan kit	N8101-901F

NOTE:

- Minimum one processor kit from above must be installed.
- The processors must be the same to configure dual processor system.

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.

Number of Logical Processors Supported by Operating Systems		Maximum Available Number of logical Processors
Microsoft Windows Server 2008 R2 Standard (x64) Microsoft Windows Server 2008 R2 Enterprise (x64)	**256** [1]	**88**
Microsoft Windows Server 2012 Standard Microsoft Windows Server 2012 Datacenter Microsoft Windows Server 2012 R2 Standard Microsoft Windows Server 2012 R2 Datacenter Microsoft Windows Server 2016 Standard Microsoft Windows Server 2016 Datacenter	**640** [1]	**88**
Red Hat Enterprise Linux 6 (x86_64) Red Hat Enterprise Linux 7	**240**	**88**
VMware ESXi 5.5	**320**	**88**
VMware ESXi 6.0	**480**	**88**
VMware ESXi 6.5	**576**	**72**

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

- Windows Server 2008 R2 : 64
- Windows Server 2012, Windows Server 2012 R2 : 320
- Windows Server 2016 : 512

3 Memory

3.1 Memory Configuration

Refer to the section in accordance with your operating system and memory configuration:

- Independent Channel Configuration: Refer to **3.1.1**
- Memory Sparing Configuration: Refer to **3.1.2**
- Memory Mirroring / Memory Lockstep Configuration: Refer to **3.1.3**

Memory Configuration Feature Comparison

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

	Independent Channel	Memory Sparing	Memory Lockstep	Memory Mirroring
Performance	Best	Better	Better	Good
Data Protection	No	Multiple single bit error protection	No	Multiple single bit and multi bit error protection
Redundancy	No	Partly	No	Fully
Data Correction	ECC, x4 SDDC	ECC, x4 SDDC	ECC, x8 SDDC	ECC, x4 SDDC
Available Memory	Full physical memory	3/4 physical memory	Full physical memory	Half physical memory
Available Memory Channels	4	4	4	4
Notes	-	All DIMMs in the system must be identical.	Paired DIMMs must be identical.	Paired DIMMs must be identical.

3.1.1 Independent Channel Configuration

Available slots: 8 per processor

Category	Product Name / Description	Part Number
Registered DIMM (RDIMM)	**4GB DDR4-2400 REG Memory Kit (1x4GB)** 1 x 4GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-675F
	8GB DDR4-2400 REG Memory Kit (1x8GB) 1 x 8GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-676F
	16GB DDR4-2400 REG Memory Kit (1x16GB) 1 x 16GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-677F
	32GB DDR4-2400 REG Memory Kit (1x32GB) 1 x 32GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-678F
TSV Registered DIMM (TSV RDIMM)	**64GB DDR4-2400 TSV REG Memory Kit (1x64GB)** 1 x 64GB TSV Registered ECC DIMM, DDR4-2400 (PC4-2400)	N8102-679F

NOTE:

- Minimum one memory kit per processor must be installed.
- It is recommended to install memory kits in multiples of four (identical DIMMs) per processor for quad-channel symmetric memory configurations to increase memory transfer speed.
- When two processors are installed, balance the DIMMs across the two processors.
- Mix configurations of RDIMM and TSV RDIMM are not supported.
- At least 5 GB of memory is required for VMware ESXi.

3.1.2 Memory Sparing Configuration

Available slots: 8 per processor

Product Name / Description	Part Number
16GB DDR4-2400 REG Memory Kit (2x8GB) 2 x 8GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-683
32GB DDR4-2400 REG Memory Kit (2x16GB) 2 x 16GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-684

NOTE:

- Minimum one memory kit per processor must be installed.
- The configured memories must be identical.
- When two processors are installed, balance the DIMMs across the two processors.
- The logical memory capacity at the time of memory sparing becomes three-quarters of physical capacity.

3.1.3 Memory Mirroring / Memory Lockstep Configuration

Available slots: 8 per processor

Product Name / Description	Part Number
16GB DDR4-2400 REG Memory Kit (2x8GB) 2 x 8GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-680
32GB DDR4-2400 REG Memory Kit (2x16GB) 2 x 16GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-681

NOTE:

- Minimum one memory kit per processor must be installed.
- The logical memory capacity at the time of memory mirroring becomes a half of physical capacity.

Maximum Memory Speed

See the table below for the actual maximum memory transfer speed in Independent Channel / Memory Sparing Configuration.

DDR4 memory speed depends on the type of DIMMs, the native memory bus speed of the memory controller and memory configuration. All memory buses operate at the clock frequency of the DIMM with the lowest frequency.

Processor Type	Populated DIMMs	# of DIMMs per processor	DIMM Speed
E5-2603 v4 E5-2609 v4	RDIMM: 4, 8, 16, 32, 64GB	-	1866 MHz
E5-2620 v4 E5-2623 v4 E5-2630 v4	RDIMM: 4, 8, 16, 32, 64GB	-	2133 MHz
E5-2650 v4 E5-2650L v4 E5-2660 v4	RDIMM: 4, 8, 16, 32, 64GB	-	2400 MHz

Maximum Available Memory

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

Maximum Memory Size Supported by Operating Systems		Maximum Available Memory
Microsoft Windows Server 2008 R2 Standard [1]	**32 GB**	**32 GB**
Microsoft Windows Server 2008 R2 Enterprise [1]	**2 TB**	**1 TB**
Microsoft Windows Server 2012 Standard [1] Microsoft Windows Server 2012 Datacenter [1] Microsoft Windows Server 2012 R2 Standard [1] Microsoft Windows Server 2012 R2 Datacenter [1] Microsoft Windows Server 2016 Standard [1] Microsoft Windows Server 2016 Datacenter [1]	**4 TB**	**1 TB**
Red Hat Enterprise Linux 6 (x86_64) Red Hat Enterprise Linux 7	**6 TB**	**1 TB**
VMware ESXi 5.5 [2]	**4 TB**	**1 TB**
VMware ESXi 6.0 [3]	**6 TB**	**1 TB**
VMware ESXi 6.5 [4]	**12 TB**	**1TB**

[1] The maximum available memory size of Hyper-V systems are below:

- Windows Server 2008 R2 Standard : 32 GB
- Windows Server 2008 R2 Enterprise : 1 TB
- Windows Server 2012, Windows Server 2012 R2 : 4 TB
- Windows Server 2016 : 24TB

[2] Up to 1TB of main memory is available to each virtual machine.

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

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

4 Internal Hard Disk Drives

4.1 RAID Configuration

Refer to the section in accordance with your OS and RAID configuration. For example, when you would like to configure RAID 0/1/10 1GB cache with Windows Server 2012 R2, refer to the section 4.2.3 for the required components and then refer to the section 4.3.4 for the hard drives.

Operating System	Supported RAID configuration		Supported HDD/SSD
	RAID and Cache	Section	
Windows Server 2008 R2	Non-RAID (Embedded SATA)	4.2.1	4.3.1
	RAID 0/1 (Embedded SATA RAID)	4.2.2	4.3.2
	RAID 0/1/10 1GB Cache	4.2.3	4.3.3
	RAID 5/6/50/60 1GB Cache	4.2.4	
	RAID 5/6/50/60 2GB Cache	4.2.5	
Windows Server 2012 Windows Server 2012 R2	Non-RAID (Embedde SATA)	4.2.1	4.3.1
	RAID 0/1 (Embedded SATA RAID)	4.2.2	4.3.2
	RAID 0/1/10 1GB Cache	4.2.3	4.3.4
	RAID 5/6/50/60 1GB Cache	4.2.4	
	RAID 5/6/50/60 2GB Cache	4.2.5	
VMware ESXi 5.5 VMware ESXi 6.0	Non-RAID (Embedded SATA)	4.2.1	4.3.1
	RAID 0/1/10 1GB Cache	4.2.3	4.3.3
	RAID 5/6/50/60 1GB Cache	4.2.4	
	RAID 5/6/50/60 2GB Cache	4.2.5	
Windows Server 2016 Red Hat Enterprise Linux 6 Red Hat Enterprise Linux 7 VMware ESXi 6.5	Non-RAID (Embedded SATA)	4.2.1	4.3.1
	RAID 0/1/10 1GB Cache	4.2.3	4.3.4
	RAID 5/6/50/60 1GB Cache	4.2.4	
	RAID 5/6/50/60 2GB Cache	4.2.5	

NOTE:

- Up to four hard drives can be installed in the Embedded SATA configuration.
- 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 (512n), SAS 10K HDDs (512e), SAS 15K HDDs, SATA HDDs, SAS SSDs, SATA SSDs (ME) and SATA SSDs (VE) can be mixed.
- It is recommended to set RAID array configuration drives less than eight per disk group in order to minimize the risk of becoming multiple hard drives failure.
- 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.
- For VMware ESXi, there are some limitations concerning the number of installable PCI cards. Refer to **Supported PCI Cards and Installable Slots** for details.

4.2 Required Components for RAID Configuration

4.2.1 Up to four Drives with embedded SATA Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 4 x 6Gb/s SATA	(Standard)
Cable	**Internal SATA Cable** 1 x mini-SAS HD to 1 x mini-SAS HD, 1 set	(Standard)
Drive Cage	**2.5-inch Drive Cage** 8 x 2.5-inch Hot-plug hard drive bays	(Standard)

NOTE:

- Up to 4 SATA drives are supported.
- For supported HDD, refer to 4.3.1
- Hot plug insertion/removal are not supported in the configuration.

4.2.2 Up to four Drives with embedded SATA RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 4 x 6Gb/s SATA	(Standard)
Cable	**Internal SATA Cable** 1 x mini-SAS HD to 1 x mini-SAS HD, 1 set	(Standard)
Drive Cage	**2.5-inch Drive Cage** 8 x 2.5-inch Hot-plug hard drive bays	(Standard)

NOTE:

- Up to 4 SATA drives are supported.
- For supported HDD, refer to 4.3.2

4.2.3 RAID 0/1 Controller with 1 GB Cache

Category	Product Name / Description	Part Number
Storage Controller **Required**	**RAID Controller (1GB, RAID 0/1)** LSI MegaRAID SAS 9362-8i RAID 0/1/10, 1GB, Int. 8, PCIe 3.0 x8, 12Gb/s	N8103-176
Flash Backup **Recommended**	**Flash Backup Unit** for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
Cable	**Internal SAS/SATA Cable** 1 x Mini SAS HD to 1 x Mini SAS HD, 1 set	(Standard)
Optional Cable	**Internal SAS/SATA Cable** 1 x Mini SAS HD to 1 x Mini SAS HD, 1 set **NOTE:** - To install five drives or more, optional cable is required.	K410-324(00)
Drive Cage	**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)

NOTE:

- For Supported HDD/SSD, refer to **4.3.3** for Windows Server 2008R2 or VMware. Refer to **4.3.4** for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6, or Red Hat Enterprise Linux 7.
- 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, SAS SSDs, SATA SSDs (ME) and SATA SSDs (VE) can be mixed.

4.2.4 RAID 5/6 Controller with 1 GB Cache

Category	Product Name / Description	Part Number
Storage Controller **Required**	**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9362-8i RAID0/1/5/6/10/50/60, 1GB, Int. 8, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s	N8103-177
Flash Backup **Recommended**	**Flash Backup Unit** for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
Cable	**Internal SAS/SATA Cable** 1 x Mini SAS HD to 1 x Mini SAS HD, 1 set	(Standard)
Optional Cable	**Internal SAS/SATA Cable** 1 x Mini SAS HD to 1 x Mini SAS HD, 1 set **NOTE:** - To install five drives or more, optional cable is required.	K410-324(00)
Drive Cage	**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)

NOTE:

- For Supported HDD/SSD, refer to **4.3.3** for Windows Server 2008R2 or VMware. Refer to **4.3.4** for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6, or Red Hat Enterprise Linux 7.
- 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, SAS SSDs, SATA SSDs (ME) and SATA SSDs (VE) 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.

4.2.5 RAID 5/6 Controller with 2 GB Cache

Category	Product Name / Description	Part Number
Storage Controller **Required**	**RAID Controller (2GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9362-8i RAID0/1/5/6/10/50/60, 2GB, Int. 8, PCIe 3.0 x8, 12Gb/s	N8103-178
Flash Backup **Recommended**	**Flash Backup Unit** for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
Cable	**Internal SAS/SATA Cable** 1 x Mini SAS HD to 1 x Mini SAS HD, 1 set	(Standard)
Optional Cable	**Internal SAS/SATA Cable** 1 x Mini SAS HD to 1 x Mini SAS HD, 1 set **NOTE:** - To install five drives or more, optional cable is required.	K410-324(00)
Drive Cage	**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)

NOTE:

- For Supported HDD/SSD, refer to **4.3.3** for Windows Server 2008R2 or VMware. Refer to **4.3.4** for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6, or Red Hat Enterprise Linux 7.
- 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, SAS SSDs, SATA SSDs (ME) and SATA SSDs (VE) 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.

4.3 Supported Drives

4.3.1 For Embedded SATA Controller

Category		Product Name / Description	Part Number
Drive **4 slots available**	**SATA HDD**	**500GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-488
		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	N8150-489
		2TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 2 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-527

NOTE:

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

4.3.2 For Embedded SATA RAID Controller

Category		Product Name / Description	Part Number
Drive **4 slots available**	**SATA HDD**	**500GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-488
		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	N8150-489
		2TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 2 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-527

NOTE:

- For RAID 10 on Windows Server 2008 R2, choose 1TB or less capacity HDDs.

4.3.3 For RAID Controller Configuration (1)

For Windows Server 2008R2, or VMware.

Category		Product Name / Description	Part Number
Drive 8 slots available	**SAS HDD (512n)**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-479
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-480
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-481
		900GB 10K Hot Plug 2.5-inch SAS HDD 1 x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-482
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-483
		300GB 15K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-485
		450GB 15K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-486
		600GB 15K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-518
	SATA HDD (512n)	**500GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-488
		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	N8150-489
		2TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 2 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-527
	SAS SSD (ME)	**200GB Hot Plug 2.5-inch SAS SSD** 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512n sector	N8150-721
		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512n sector	N8150-722
	SATA SSD (ME)	**200GB Hot Plug 2.5-inch SATA SSD** 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-779
		400GB Hot Plug 2.5-inch SATA SSD 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-780
		800GB Hot Plug 2.5-inch SATA SSD 1 x 800 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-781
	SATA SSD (VE)	**200GB Hot Plug 2.5-inch SATA SSD** 1 x 200 GB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-782
		400GB Hot Plug 2.5-inch SATA SSD 1 x 400 GB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-783
		800GB Hot Plug 2.5-inch SATA SSD 1 x 800 GB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-784
		1.6TB Hot Plug 2.5-inch SATA SSD 1 x 1.6 TB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-785

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, SAS SSDs, SATA SSDs (ME) and SATA SSDs (VE) 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.
- For monitoring SATA SSD life on VMware, NEC ESMPRO Manager Ver.6.05 or later is required. Please download the latest version on the NEC web site.

4.3.4 For RAID Controller Configuration (2)

For Windows Server 2012/2012R2, Red Hat Enterprise Linux 6, or Red Hat Enterprise Linux 7

Category		Product Name / Description	Part Number
Drive 8 slots available	SAS HDD (512n)	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-479
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-480
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-481
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-482
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-483
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-485
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-486
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-518
	SAS HDD (512e)	**1.8TB 10K Hot Plug 2.5-inch SAS HDD** 1x 1.8TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512e sector	N8150-541
	SATA HDD (512n)	**500GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-488
		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	N8150-489
		2TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 2 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-527
	SAS SSD (ME)	**200GB Hot Plug 2.5-inch SAS SSD** 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512n sector	N8150-721
		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512n sector	N8150-722
	SATA SSD (ME)	**200GB Hot Plug 2.5-inch SATA SSD** 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-779
		400GB Hot Plug 2.5-inch SATA SSD 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-780
		800GB Hot Plug 2.5-inch SATA SSD 1 x 800 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-781
	SATA SSD (VE)	**200GB Hot Plug 2.5-inch SATA SSD** 1 x 200 GB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-782
		400GB Hot Plug 2.5-inch SATA SSD 1 x 400 GB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-783
		800GB Hot Plug 2.5-inch SATA SSD 1 x 800 GB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-784
		1.6TB Hot Plug 2.5-inch SATA SSD 1 x 1.6 TB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-785

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 (512n), SAS 10K HDDs (512e), SAS 15K HDDs, SATA HDDs, SAS SSDs, SATA SSDs (ME) and SATA SSDs (VE) can be mixed.

- For 512e sector HDD, the supported operating systems of virtual machines on Hyper-V are:
  - Windows Server 2008 R2 SP1 or later
  - Windows 7 SP1 or later
- 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.

5 Optical Drive

Category	Product Name / Description	Part Number
Internal **1 slot available**	**Internal Slim DVD-ROM drive** Slim DVD-ROM drive DVD read speed: 8x (DVD-ROM / DVD-R / DVD-RW) CD read speed: 24x (CD-ROM / CD-R/RW)	N8151-134
	Internal DVD Super Multi Drive Slim DVD Super Multi drive, not including writing software DVD Read speed: 8x (DVD-R / DVD-RW / DVD-R DL / DVD+R / DVD+RW / DVD+R DL / DVD-ROM) DVD-RAM read speed: 5x CD read speed: 24x (CD-ROM / CD-R/RW) **NOTE:** - Not supported for Linux or VMware.	N8151-135F
External	**External DVD Dual drive** DVD Dual drive, Bus powered, 1.5A required, not including writing software	N8160-101F

NOTE:

- Up to 1 optical drive can be connected.

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

Product Name / Description	Part Number
PCIe Riser Card Kit 3 x PCIe 3.0 x8	(Standard)
PCIe x8 Riser Card Kit 4 x PCIe 3.0 x8	N8116-39
PCIe x16 Riser Card Kit 2 x PCIe 3.0 x16, 2 x PCIe 3.0 x8	N8116-33

NOTE:

- N8116-33 PCIe x16 Riser Card Kit is supported in dual-processor configuration.

6.2 Network Interface Controller

Category		Product Name / Description	Part Number
LOM Card	**1GbE**	**Quad Port 1000BASE-T LOM Card** Broadcom® BCM5719 PCIe 2.0 x4	N8104-154F
	10GbE	**Dual Port 10GBASE-T LOM Card** Intel Ethernet Controller X540 PCIe 2.0(x8)	N8104-155F
		Dual Port 10GBASE-T LOM Card Intel Ethernet Controller X550 PCIe 3.0(x8)	N8104-160F
		Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card Qlogic NetXtreme II BCM57800S PCIe 2.0 x8 **NOTE:** - N8104-129 SFP+ Module is required to connect with an optical cable. - Up to two SFP+ Modules can be installed.	N8104-156F
Adapter	**1GbE**	**1000BASE-T Adapter** Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-150
		Dual Port 1000BASE-T Adapter Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-151
		Dual Port 1000BASE-T Adapter Intel® 82580 Gigabit Ethernet Controller PCIe 2.0 x4 **NOTE:** - PXE boot is not supported on UEFI environment.	N8104-145
		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.	N8104-152
	10GbE	**Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)** Intel 82599ES 10 Gigabit Ethernet Controller PCIe 2.0 x8, Low Profile / Full Height **NOTE:** - N8104-129 SFP+ Module is required to connect with an optical cable. - Up to 2 SFP+ Modules can be installed.	N8104-148
		10GBASE SFP+ Adapter (SFP+/2ch) Qlogic NetXtreme II BCM57810S PCIe 2.0 x8, Low Profile / Full Height **NOTE:** - N8104-129 SFP+ Module is required to connect with an optical cable. - Up to 2 SFP+ Modules can be installed.	N8104-149
		10GBASE Adapter (SFP+/2ch) Intel Ethernet Converged Network Adapters X710 PCIe 3.0 x8 **NOTE:** - N8104-129 SFP+ Module is required to connect with an optical cable.	N8104-158
		10GBASE Adapter (QSFP+/4ch) Intel Ethernet Converged Network Adapters XL710 PCIe 3.0 x8 **NOTE:** - N8104-161 QSFP+ Module is required to connect with an optical cable. - Only 40Gb connection is supported for higher level network.	N8104-159
		Dual Port 10GBASE-T Adapter Intel X540-BT2 PCIe 2.1 x8, Low Profile / Full Height	N8104-153
		Dual Port 10GBASE-T Adapter Intel X550-BT2 PCIe 3.0 x4	N8104-157

SFP+ Module	**SFP+ Module (10G-SR)** 1 x SFP+ Module	N8104-129
	QSFP+ Module 1 x QSFP+ Module	N8104-161

NOTE:

- For VMware ESXi, there are some limitations concerning the number of installable PCI cards. Refer to **Supported PCI Cards and Installable Slots** for details.

NIC Teaming feature – NIC Teaming and bonding features

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

Windows Server 2008 R2 supports BASP (Broadcom Advanced Server Program) or Intel PROSet teaming while Windows Server 2012 (and later) and Linux support teaming with bonding function supported by OS.

Network Interface	Team	Operating Systems
1GbE NIC N8104-150/-151/-152/-154F/-156F	Up to four ports per one team	Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux
1GbE NIC N8104-145	Up to four ports per one team	Windows Server 2008 R2
10GbE NIC N8104-149/-156F	Up to four ports per one team	Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux
10GbE NIC N8104-148	Up to four ports per one team	Red Hat Enterprise Linux 7.2 or later
10GbE NIC N8104-158/-159	Up to four ports per one team	Red Hat Enterprise Linux 7.2 or later
10GbE NIC N8104-153/-155F/-157/-160F	Up to four ports per one team	Windows Server 2012 Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux

NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.
- The network interfaces for each teaming must be the same.
- When 10GbE and 1GbE NIC teaming are mixed, the maximum number of team must be as follows:
  - Windows Server 2008 R2 : up to four per one system
  - Windows Server 2012, Windows Server 2012 R2 : up to five per one system
  - Red Hat Enterprise Linux : up to five per one system

Using iSCSI

See the table below for supported network interfaces and operating system combinations.

Category	Network Interface	Operating Systems
1GbE	**N8104-150/-151/-152/-154F/-156F**	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Windows Server 2016, Red Hat Enterprise Linux, VMware
	N8104-145	Windows Server 2008 R2, VMware
10GbE	**N8104-149/-156F**	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Windows Server 2016, Red Hat Enterprise Linux, VMware
	N8104-148	Red Hat Enterprise Linux 7.2 or later
	N8104-153/-155F	Windows Server 2012, Windows Server 2012 R2, Windows Server 2016, Red Hat Enterprise Linux, VMware
	N8104-157	Windows Server 2012, Windows Server 2012 R2, Windows Server 2016, Red Hat Enterprise Linux
	N8104-158	Red Hat Enterprise Linux 7.2 or later

NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.

6.3 InfiniBand

Category		Product Name / Description	Part Number
Controller		**Single Port InfiniBand Adapter** Mellanox ConnectX-3 VPI, MCX353A-FCBT, FDR, PCIe 3.0(x8)	N8104-146
		Dual Port InfiniBand Adapter Mellanox ConnectX-3 VPI, MCX354A-FCBT, FDR, PCIe 3.0(x8)	N8104-147
Cable		**InfiniBand Cable 2m/FRD** Copper	K410-304(02)
		InfiniBand Cable 3m/FDR Copper	K410-304(03)
Switch	**Unit**	**InfiniBand Switch 36 ports/FDR** Mellanox MSX6036F-1SFR 36 ports, FDR, One power supply module included, no power cord	NE3707-061
	Power Supply	**Redundant Power Supply Unit** Power supply module for 36 ports InfiniBand switch, no power cord	NE3707-063

NOTE:

- Up to two InfiniBand adapters can be installed into the system and two adapters should be of the same type.
- The InfiniBand adapters and other options are make-to-order products. Please consult our sales representative in regards to production lead time.

6.4 External Storage Controller

6.4.1 RAID Controller

Category	Product Name / Description	Part Number
Controller	**RAID Controller (2GB, RAID0/1/5/6)** LSI MegaRAID SAS 9380-8e RAID0/1/5/6/10/50/60, 2GB, Ext. 8, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s, Flash cache protection modules included	N8103-179

NOTE:

- 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 less than eight in order to minimize the risk of becoming multiple hard drives failure.

6.4.2 Fibre Channel / SAS Controller

Category	Product Name / Description	Part Number
Fibre Channel	**Fibre Channel Controller (1ch)** Emulex LightPulse LPe1250-F8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8	N8190-159
	Fibre Channel Controller (2ch) Emulex LightPulse LPe12002-M8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8	N8190-160
	Fibre Channel Controller (1ch) Emulex LightPulse LPe16000B-M6 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0 x8	N8190-157A
	Fibre Channel Controller (2ch) Emulex LightPulse LPe16002B-M6 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0 x8	N8190-158A
	Fibre Channel Controller (1ch) QLogic, QLE2690 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0(x8)	N8190-161
	Fibre Channel Controller (2ch) QLogic, QLE2692 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0(x8)	N8190-162

SAS	**SAS Controller** LSI SAS9212-4i4e Host Bus Adapter 6Gb/s SAS, Int. 4 / Ext. 4, 7-pin SATA / SFF-8088, PCIe 2.0 x8	N8103-142
	SAS Controller LSI SAS9300-8e Host Bus Adapter 12Gb/s SAS, ext. 8(SFF-8644 x2), PCIe 3.0 x8	N8103-184

NOTE:

- With regard to 16Gb/s Fiber Channel Controllers, up to two ports in a single processor configuration with Xeon E5-2603 v4 are allowed in the system.
- For VMware ESXi, there are some limitations concerning the number of installable PCI cards. Refer to **Supported PCI Cards and Installable Slots** for details.

6.5 Serial Port Adapter

Product Name / Description	Part Number
Serial Port Adapter Serial port fixed to PCI bracket	N8117-01A

NOTE:

- Up to one Serial Port Adapter can be installed.

7 Other Add-in Components

7.1 Power Supply

Product Name / Description	Part Number
460W Hot Plug Power Supply 1 x 460 Watt 80 PLUS® Platinum	N8181-121F
800W Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Platinum	N8181-122F
800W Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Titanium **NOTE:** - 200 VAC input only supported	N8181-118F

NOTE:

- The power units must be the same to configure redundancy.

7.2 Trusted Platform Module Kit

Product Name / Description	Part Number
Trusted Platform Module Kit TPM 2.0 module **NOTE:** - Supported for Windows Server 2012 or later only.	N8115-26

NOTE:

- The kit is not available in China.
- The kit is not removable after attachment.
- "TPM Support" 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.

7.3 Internal Flash Memory

Product Name / Description	Part Number
VMware ESXi support kit Internal USB flash memory to install VMware ESXi system	N8106-009

NOTE:

- The kit does not include VMware ESXi installation media and license.

7.4 High Temperature Support Option

Product Name / Description	Part Number
High temperature resistant Kit Required for high temperature operation over 40°C (up to 45°C)	N8181-143F

NOTE:
- This option is not applicable to N8100-2434F (460 Watt power supply model).

7.5 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.
- Not supported when VMware is running on the server.

8 Add-on Components

8.1 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
	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 R120g-1E, 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.

8.2 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)

NOTE:

- There are two VGA connectors on R120g-1E, 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.

8.3 Cable Management Arm

Product Name / Description	Part Number
Cable Management Arm 1U Kit for R120g-1E	N8143-96

NOTE:

- The extension bracket of inner rail must be attached when installing the Cable Management Arm.

8.4 Server Management License

The server integrates the EXPRESSSCOPE Engine 3 as standard. Refer to **Server Management** for the standard management features. For more extensive remote KVM and remote media features, choose the following kit.

Product Name / Description	Part Number
Remote KVM and Media License Kit License for one server. Remote KVM and remote media are enabled regardless of OS status. Remote KVM: - Displays a graphics console on the web browser of the remote terminal (PC/server). - Controls keyboard and mouse via the remote terminals' web browser Remote media: Enables the user to use the CD / DVD / FD / Flash memory of the remote terminals (PC/server) as if accessing the local drives. **NOTE:** - Remote KVM and remote media features are not available for virtual machines.	N8115-04

References

Boot Mode Setting

The server supports Legacy mode and UEFI mode (default) as an OS Boot Mode. See the table below for the Boot Mode and X2APIC setting for each Operating System. As the default settings at the factory, UEFI mode is set as OS Boot mode and X2APIC is enabled. Refer to the User's Guide and change the settings before installing an Operating System requiring Legacy Mode.

Operating System	Supported Boot Mode	Supported X2APIC Setting
Windows Server 2008 R2 (x64)	Legacy	Disabled
Windows Server 2012	UEFI	Enabled
Windows Server 2012 R2	UEFI	Enabled
Windows Server 2016	UEFI	Enabled
Red Hat Enterprise Linux 6(x86_64)	UEFI	Enabled
Red Hat Enterprise Linux 7	UEFI	Enabled
VMware ESXi 5.5 Update3	Legacy	Disabled
VMware ESXi 6.0 Update1	Legacy	Disabled
VMware ESXi 6.5	UEFI / Legacy	Enabled (UEFI) / Disabled (Legacy)

Server Management

The EXPRESSSCOPE Engine 3, integrated into the server, provides superior remote control and system management features listed in the table below.

		Standard	With Remote KVM and Media License kit
Hardware monitoring	Temperature/voltage/power/RAID/ standard LAN/fan /degeneration (memory/hard drive)	✓	✓
	Hardware configuration information collection	✓	✓
	Hardware event log collection	✓	✓
Boot monitoring	BIOS/POST stall, Booting, OS stall, shutdown	✓[1]	✓[1]
Alerting	HW error, Boot error , and OS panic (by SNMP, E-Mail)	✓	✓
Remote KVM (via LAN)	POST/BIOS setup, ROM utility	✓[2]	✓
	Panic screen, Boot screen	✓[2, 3, 4]	✓
	CUI-based screen (OS console)	✓[2, 4]	✓
	GUI-based screen (OS console)	-	✓
	Remote console recording function	-	✓
	Video recording	-	✓
Remote control (via LAN)	Remote reset/power on-off/ dump	✓	✓
	Remote power capping	✓	✓
	BIOS/BMC FW update	✓	✓
	Remote BIOS setup(partial configuration only)	✓	✓
	OS shutdown	✓[1]	✓[1]
	Remote media (CD/DVD/FD/USB)	-	✓
	CLP (Command Line Protocol) (DMTF compliant)	✓	✓
	Remote control via Web browser (multi user login at the same time)	✓	✓
	Scheduling (without UPS)	✓[1]	✓[1]
	BIOS setting by using XML file	✓	✓
Maintenance	EXPRESSSCOPE® Profile key (Backup/restore BIOS/BMC setup information)	✓	✓
Others	Set automatic IP address via DNS/DHCP	✓	✓
	LDAP/Active Directory verification/user control	✓	✓
	Clock synchronization of main unit and the RTC	✓	✓
	Access log collection	✓	✓
	IPMI	2.0	2.0
	IPv6(Web console/CLP only)	✓	✓

1 The feature is not supported on VMware ESXi systems.

2 The optional serial port is not available for the feature.

3 Monitoring boot screens is not supported on VMware systems.

4 In VMware systems, only the direct console user interface is supported.

OS Support Matrix for PCI Cards and Embedded Controllers

Part number	Product Name	WS2016	WS 2012 R2	WS 2012	WS 2008 R2	RHEL 7	RHEL 6 x64	ESXi 6.5	ESXi 6.0	ESXi 5.5
-	Embedded SATA non-RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓
-	Embedded SATA RAID Controller	-	✓	✓	✓	-	-	-	-	-
N8104-155F	Dual Port 10GBASE-T LOM Card	✓	✓	✓	-	✓	✓	✓	✓	✓
N8104-160F	Dual Port 10GBASE-T LOM Card	✓	✓	✓	-	✓	✓	-	-	-
N8104-156F	Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-154F	Quad Port 1000BASE-T LOM Card	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-176	RAID Controller (1 GB, RAID 0/1)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-177	RAID Controller (1 GB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-178	RAID Controller (2 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-179	RAID Controller (2 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-162	Fibre Channel Controller (2ch)	✓	-	-	-	-	-	-	-	-
N8190-161	Fibre Channel Controller (1ch)	✓	-	-	-	-	-	-	-	-
N8190-158A	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-157A	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-147	Dual Port InfiniBand Adapter	-	✓	✓	-	✓	✓	-	-	-
N8104-146	Single Port InfiniBand Adapter	-	✓	✓	-	✓	✓	-	-	-
N8103-184	SAS Controller	-	✓	✓	-	✓	✓	✓	✓	✓
N8104-159	10GBASE Adapter (QSFP+/4ch)	-	-	-	-	✓	-	-	-	-
N8104-158	10GBASE Adapter (SFP+/2ch)	-	-	-	-	✓	-	-	-	-
N8104-157	Dual Port 10GBASE-T Adapter	✓	✓	✓	-	✓	✓	-	-	-
N8104-153	Dual Port 10GBASE-T Adapter	✓	✓	✓	-	✓	✓	✓	✓	✓
N8104-149	10GBASE SFP+ Adapter (SFP+/2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-148	Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)	-	-	-	-	✓	✓	-	-	-
N8190-160	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-159	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-142	SAS Controller	✓	✓	✓	✓	✓	✓	-	✓	✓
N8104-152	Quad Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-145	Dual Port 1000BASE-T Adapter	-	-	-	✓	✓	✓	-	-	-
N8104-151	Dual Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-150	1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓

Supported PCI Cards and Installable Slots

Standard Riser Card

Part Number	Product Name	Slots		
		#1A	#1B	#1D
N8104-155F	Dual Port 10GBASE-T LOM Card	-	✓	-
N8104-160F	Dual Port 10GBASE-T LOM Card	-	✓	-
N8104-156F	Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card	-	✓	-
N8104-154F	Quad Port 1000BASE-T LOM Card	-	✓	-
N8103-176	RAID Controller (1 GB, RAID 0/1)	✓	-	-
N8103-177	RAID Controller (1 GB, RAID 0/1/5/6)	✓	-	-
N8103-178	RAID Controller (2 GB,RAID 0/1/5/6)	✓	-	-
N8103-179	RAID Controller (2 GB,RAID 0/1/5/6)	-	-	✓
N8190-162	Fibre Channel Controller (2ch)	-	-	✓
N8190-161	Fibre Channel Controller (1ch)	-	-	✓
N8190-158A	Fibre Channel Controller (2ch)	-	-	✓
N8190-157A	Fibre Channel Controller	-	-	✓
N8104-147	Dual Port InfiniBand Adapter	-	-	✓
N8104-146	Single Port InfiniBand Adapter	-	-	✓
N8103-184	SAS Controller	-	-	✓
N8104-159	10GBASE Adapter (QSFP+/4ch)	-	-	✓
N8104-158	10GBASE Adapter (SFP+/2ch)	-	-	✓
N8104-157	Dual Port 10GBASE-T Adapter	-	-	✓
N8104-153	Dual Port 10GBASE-T Adapter	-	-	✓
N8104-149	10GBASE SFP+ Adapter (SFP+/2ch)	-	-	✓
N8104-148	Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)	-	-	✓
N8190-160	Fibre Channel Controller (2ch)	-	-	✓
N8190-159	Fibre Channel Controller	-	-	✓
N8103-142	SAS Controller	-	-	✓
N8104-152	Quad Port 1000BASE-T Adapter	-	-	✓
N8104-145	Dual Port 1000BASE-T Adapter	-	-	✓
N8104-151	Dual Port 1000BASE-T Adapter	-	-	✓
N8104-150	1000BASE-T Adapter	-	-	✓
N8117-01A	Serial Port Adapter	-	-	✓

NOTE:

- For VMware ESXi 5.5, there are some limitations as follows:
  - With N8104-156F Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card:
    N8104-152 cannot be installed.
- For VMware ESXi 6.0, there are some limitations as follows:
  - With N8104-156F Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card:
    N8104-152 cannot be installed.
- For the configuration limitation for VMware ESXi, refer to the following documents.

VMware ESXi5.5

https://www.vmware.com/pdf/vsphere5/r55/vsphere-55-configuration-maximums.pdf

VMware ESXi6.0

https://www.vmware.com/pdf/vsphere6/r60/vsphere-60-configuration-maximums.pdf

N8116-39 PCIe x8 Riser Card Kit

Part Number	Product Name	Slots			
		#1A	#1B	#1C	#1D [1]
N8104-155F	Dual Port 10GBASE-T LOM Card	-	1	-	-
N8104-160F	Dual Port 10GBASE-T LOM Card	-	1	-	-
N8104-156F	Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card	-	1	-	-
N8104-154F	Quad Port 1000BASE-T LOM Card	-	1	-	-
N8103-176	RAID Controller (1 GB, RAID 0/1)	1	-	-	-
N8103-177	RAID Controller (1 GB, RAID 0/1/5/6)	1	-	-	-
N8103-178	RAID Controller (2 GB,RAID 0/1/5/6)	1	-	-	-
N8103-179	RAID Controller (2 GB,RAID 0/1/5/6)	-	-	1	2
N8190-162	Fibre Channel Controller (2ch)	-	-	1	2
N8190-161	Fibre Channel Controller (1ch)	-	-	1	2
N8190-158A	Fibre Channel Controller (2ch)	-	-	1	2
N8190-157A	Fibre Channel Controller	-	-	1	2
N8104-147	Dual Port InfiniBand Adapter	-	-	1	2
N8104-146	Single Port InfiniBand Adapter	-	-	1	2
N8103-184	SAS Controller	-	-	1	2
N8104-159	10GBASE Adapter (QSFP+/4ch)	-	-	1	2
N8104-158	10GBASE Adapter (SFP+/2ch)	-	-	1	2
N8104-157	Dual Port 10GBASE-T Adapter	-	-	1	2
N8104-153	Dual Port 10GBASE-T Adapter	-	-	1	2
N8104-149	10GBASE SFP+ Adapter (SFP+/2ch)	-	-	1	2
N8104-148	Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)	-	-	1	2
N8190-160	Fibre Channel Controller (2ch)	-	-	1	2
N8190-159	Fibre Channel Controller	-	-	1	2
N8103-142	SAS Controller	-	-	1	2
N8104-152	Quad Port 1000BASE-T Adapter	-	-	1	2
N8104-145	Dual Port 1000BASE-T Adapter	-	-	1	2
N8104-151	Dual Port 1000BASE-T Adapter	-	-	1	2
N8104-150	1000BASE-T Adapter	-	-	1	2
N8117-01A	Serial Port Adapter	-	-	1	2

NOTE:

- The number in the table shows the population priority (recommendation).
- For VMware ESXi 5.5, there are some limitations as follows:
  <With N8104-154F Quad Port 1000BASE-T LOM Card>
  - N8104-149/-153/ and N8104-150/-151/-152 cannot be mixed.
  - Up to two cards among N8103-176/-177/-178/-179 can be installed.
  <With N8104-155F Dual Port 10GBASE-T LOM Card >
  - N8104-150/-151 and N8104-152 cannot be mixed.
  - Up to two cards of N8104-150/-151 can be installed.
  - Up to one card of N8104-152 can be installed.
  - Up to two cards among N8103-176/-177/-178/-179 can be installed.
  <With N8104-156F Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card >
  - Up to one card of N8104-150/-151 can be installed.
  - N8104-152 cannot be installed.
  - Up to two cards among N8103-176/-177/-178/-179 can be installed.
- For VMware ESXi 6.0, there are some limitations as follows:
  <With N8104-154F Quad Port 1000BASE-T LOM Card>
  - N8104-149/-153 and N8104-150/-151/-152 cannot be mixed
  <With N8104-155F Dual Port 10GBASE-T LOM Card>
  - N8104-150/-151 and N8104-152 cannot be mixed.
  - Up to one N8104-152 can be installed
  <With N8104-156F Dual Port 10GBASE-T LOM Card>
  Up to one card of N8104-150/-151 can be installed.
  N8104-152 cannot be installed.
- For the configuration limitation for VMware ESXi, refer to the following documents.

VMware ESXi5.5

https://www.vmware.com/pdf/vsphere5/r55/vsphere-55-configuration-maximums.pdf

VMware ESXi6.0

https://www.vmware.com/pdf/vsphere6/r60/vsphere-60-configuration-maximums.pdf

N8116-33 PCIe x16 Riser Card Kit

Part Number	Product Name	Slots			
		#1A	#1B	#1C [1]	#1D [1]
N8104-155F	Dual Port 10GBASE-T LOM Card	-	1	-	-
N8104-160F	Dual Port 10GBASE-T LOM Card	-	1	-	-
N8104-156F	Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card	-	1	-	-
N8104-154F	Quad Port 1000BASE-T LOM Card	-	1	-	-
N8103-176	RAID Controller (1 GB, RAID 0/1)	1	-	-	-
N8103-177	RAID Controller (1 GB, RAID 0/1/5/6)	1	-	-	-
N8103-178	RAID Controller (2 GB,RAID 0/1/5/6)	1	-	-	-
N8103-179	RAID Controller (2 GB,RAID 0/1/5/6)	-	-	1	2
N8190-162	Fibre Channel Controller (2ch)	-	-	1	2
N8190-161	Fibre Channel Controller (1ch)	-	-	1	2
N8190-158A	Fibre Channel Controller (2ch)	-	-	1	2
N8190-157A	Fibre Channel Controller	-	-	1	2
N8104-147	Dual Port InfiniBand Adapter	-	-	1	2
N8104-146	Single Port InfiniBand Adapter	-	-	1	2
N8103-184	SAS Controller	-	-	1	2
N8104-159	10GBASE Adapter (QSFP+/4ch)	-	-	1	2
N8104-158	10GBASE Adapter (SFP+/2ch)	-	-	1	2
N8104-157	Dual Port 10GBASE-T Adapter	-	-	1	2
N8104-153	Dual Port 10GBASE-T Adapter	-	-	1	2
N8104-149	10GBASE SFP+ Adapter (SFP+/2ch)	-	-	1	2
N8104-148	Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)	-	-	1	2
N8190-160	Fibre Channel Controller (2ch)	-	-	1	2
N8190-159	Fibre Channel Controller	-	-	1	2
N8103-142	SAS Controller	-	-	1	2
N8104-152	Quad Port 1000BASE-T Adapter	-	-	1	2
N8104-145	Dual Port 1000BASE-T Adapter	-	-	1	2
N8104-151	Dual Port 1000BASE-T Adapter	-	-	1	2
N8104-150	1000BASE-T Adapter	-	-	1	2
N8117-01A	Serial Port Adapter	-	-	1	2

[1] Available in dual-processor configuration

NOTE:

- The number in the table shows the population priority (recommendation).
- For VMware ESXi 5.5, there are some limitations as follows:
  <With N8104-154F Quad Port 1000BASE-T LOM Card>
  - N8104-149/-153/ and N8104-150/-151/-152 cannot be mixed.
  - Up to two cards among N8103-176/-177/-178/-179 can be installed.
  <With N8104-155F Dual Port 10GBASE-T LOM Card >
  - N8104-150/-151 and N8104-152 cannot be mixed.
  - Up to two cards of N8104-150/-151 can be installed.
  - Up to one card of N8104-152 can be installed.
  - Up to two cards among N8103-176/-177/-178/-179 can be installed.
  <With N8104-156F Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card >
  - Up to one card of N8104-150/-151 can be installed.
  - N8104-152 cannot be installed.
  - Up to two cards among N8103-176/-177/-178/-179 can be installed.
- For VMware ESXi 6.0, there are some limitations as follows:
  <With N8104-154F Quad Port 1000BASE-T LOM Card>
  - N8104-149/-153 and N8104-150/-151/-152 cannot be mixed
  <With N8104-155F Dual Port 10GBASE-T LOM Card>
  - N8104-150/-151 and N8104-152 cannot be mixed.
  - Up to one N8104-152 can be installed
  <With N8104-156F Dual Port 10GBASE-T LOM Card>
  Up to one card of N8104-150/-151 can be installed.
  N8104-152 cannot be installed.
- For the configuration limitation for VMware ESXi, refer to the following documents.

VMware ESXi5.5

https://www.vmware.com/pdf/vsphere5/r55/vsphere-55-configuration-maximums.pdf

VMware ESXi6.0

https://www.vmware.com/pdf/vsphere6/r60/vsphere-60-configuration-maximums.pdf

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Revision History

Revision	Date	Description
7.0	August 24,2017	**New products added:** 200GB Hot Plug 2.5-inch SATA SSD / N8150-779 400GB Hot Plug 2.5-inch SATA SSD/ N8150-780 800GB Hot Plug 2.5-inch SATA SSD/ N8150-781 200GB Hot Plug 2.5-inch SATA SSD / N8150-782 400GB Hot Plug 2.5-inch SATA SSD / N8150-783 800GB Hot Plug 2.5-inch SATA SSD / N8150-784 1.6TB Hot Plug 2.5-inch SATA SSD / N8150-785 **Discontinued product deleted:** 200GB Hot Plug 2.5-inch SATA SSD / N8150-725 400GB Hot Plug 2.5-inch SATA SSD/ N8150-726 800GB Hot Plug 2.5-inch SATA SSD/ N8150-727 200GB Hot Plug 2.5-inch SATA SSD / N8150-732 400GB Hot Plug 2.5-inch SATA SSD / N8150-733 800GB Hot Plug 2.5-inch SATA SSD / N8150-734 1.6TB Hot Plug 2.5-inch SATA SSD / N8150-735 **Others:** Removed the description of the Endurance of SSD
6.0	April 26, 2017	**New products added:** External DVD Dual drive / N8160-101F **Discontinued product deleted:** External DVD Super Multi Drive / N8160-98F
5.0	February 24, 2017	**New products added:** Fibre Channel Controller(1ch) / N8190-161 Fibre Channel Controller(2ch) / N8190-162 **Others:** Added VMware ESXi 6.5 to the list of operating system supported Updated OS support matrix
4.0	January 31, 2017	**Others:** Added Windows Server 2016 to the list of operating system supported Updated OS support matrix
3.0	October 12, 2016	**New products added:** 1.8TB 10K Hot Plug 2.5-inch SAS HDD / N8150-541 10GBASE Adapter (SFP+/2ch) / N8104-158 10GBASE Adapter (QSFP+/4ch) / N8104-159 QSFP+ Module / N8104-161 **Discontinued product deleted:** 1.8TB 10K Hot Plug 2.5-inch SAS HDD / N8150-490 **Others:** Removed 4Kn sector HDD descriptions
2.0	July 20, 2016	**New products added:** External DVD Super Multi Drive / N8160-98F **Discontinued product deleted:** External DVD Super MULTI Drive / N8160-97F
1.0	June 3, 2016	Initial release