

# **NEC Express5800/R120f-2E Configuration Guide**

## **Standard model**



### **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.

## Contents

<b>TECHNICAL SPECIFICATION</b>	<b>3</b>
Key Features	3
Specification	3
<b>EXTERNAL VIEWS</b>	<b>7</b>
Front and Rear Views	7
Dimensions (mm)	9
<b>CONFIGURATION DIAGRAM</b>	<b>10</b>
<b>EXPANSION SLOT</b>	<b>10</b>
<b>SERVER CONFIGURATION</b>	<b>11</b>
<b>1 Base Models</b>	<b>11</b>
<b>2 Processors and Heat Sink</b>	<b>11</b>
<b>3 Memory</b>	<b>12</b>
3.1 Memory Configuration	12
3.2 Other OS than Windows Server 2008 Standard	13
3.3 Windows Server 2008 Standard	14
<b>4 Internal Hard Disk Drives</b>	<b>16</b>
4.1 RAID Configuration	16
4.2 Required Components for RAID Configuration	17
4.3 Supported HDD/SDD	19
<b>5 2.5-inch PCIe SSD</b>	<b>22</b>
5.1 2.5-inch PCIeSSD Installation Kit	22
5.2 PCIe SSD	22
<b>6 Optical Drive</b>	<b>22</b>
<b>7 Internal RDX Drives</b>	<b>23</b>
7.1 RDX Configuration	23
<b>8 PCI Card</b>	<b>23</b>
8.1 Network Interface Controller	23
8.2 InfiniBand	25
8.3 External Storage Controller	25
8.4 Serial Port Adapter	27
<b>9 Other Add-in Components</b>	<b>27</b>
9.1 Redundant Power Supply Module	27
9.2 Redundant Fan Kit	27
9.3 Trusted Platform Module Kit	27
9.4 Internal Flash Memory	28
9.5 Flash FDD	28
<b>10 Add-on Components</b>	<b>28</b>
10.1 17-inch LCD Console Drawer	28
10.2 KVM Switch	29
10.3 Cable Management Arm	29
10.4 Server Management License	29
10.5 Medium and Cartridge	29
<b>REFERENCES</b>	<b>30</b>
Boot Mode Setting	30
Server Management	31
OS Support Matrix for PCI Cards and Embedded Controller	32

Supported PCI Cards and Installable Slots .....33  
 Copyright Notice and Liability Disclaimer .....34  
 REVISION HISTORY ..... 35

# Technical Specification

## Key Features

- High performance with the latest Intel® Xeon® processor E5-2600 v3 product family
- Up to 512 GB of memory capacity, supporting high speed and energy efficient DDR4-2133 memory
- Up to sixteen 2.5-inch hard drives
- High energy efficiency with power capping feature and 80 PLUS® Titanium power supply
- Full manageability by integrated EXPRESSSCOPE Engine 3

## Specification

(1/2)

Model		R120f-2E			
Part Number		N8100-2271F, N8100-2272F, N8100-2273F			
Processor	Type	Intel® Xeon® processor E5-2603 v3	Intel® Xeon® processor E5-2620 v3	Intel® Xeon® processor E5-2630 v3	Intel® Xeon® processor E5-2650 v3
	Clock speed	1.60 GHz	2.40 GHz	2.40 GHz	2.30 GHz
	Number of Processors	1 to 2			
	Cache	15 MB	15 MB	20 MB	25 MB
	Cores and Threads	6C-6T	6C-12T	8C-16T	10C-20T
Chipset		Intel® C612 Chipset			
Memory	Type	DDR4-2133 Registered DIMM (4/8/16GB), DDR4-2133 Load Reduced DIMM (32GB)			
	Standard Capacity	0 GB			
	Maximum Capacity	512 GB (16 x 32 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	Standard Capacity	0 GB			
	Maximum Capacity	SAS HDD: 28.8 TB (16 x 1.8 TB) SATA HDD : 32 TB (16 x 2 TB) SAS SSD: 6.4 TB ( 16 x 400 GB) SATA SSD: 12.8 TB ( 16 x 800 GB)			
	Disk Controller	SATA: 6Gb/s (Integrated) SAS: 12Gb/s (Optional)			
	RAID	SATA : RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)			
	Hot Plug	Supported			
	Optical Disk Drive	Optional			
	Optical Drive Bays	1			
	3.5-inch Media Bays	1			
	Disk Drive Bays	16			

Model		R120f-2E			
<b>Expansion Slots</b>	<b>Standard</b>	Total: 5 slots available 2 PCIe 3.0 x16 (x16 connector) 1 PCIe 3.0 x8 (x8 connector) 1 PCIe 3.0 x8 (x8 connector) (Dual processor configuration only) 1 PCIe 2.0 x4 (x8 connector)			
<b>Video</b>	<b>Controller (VRAM)</b>	Integrated in Server Management Controller (32MB)			
	<b>Resolution / Color</b>	1600 x 1200 / 16.7M <sup>1</sup>			
<b>Interfaces</b>		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 5 x USB3.0 (2 x front, 2 x rear, 1 x internal) 2 x USB2.0 (2 x rear) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 2 x 1000BASE-T LAN connector (RJ-45, 2 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)			
<b>Server Management</b>		EXPRESSSCOPE Engine 3			
<b>Redundant Fan</b>		Optional, hot plug			
<b>Redundant Power Supply</b>		Optional, hot plug			
<b>Power Supply</b>		1 to 2 x 460 Watt or 800 Watt 80 PLUS® Platinum certified, or 800 Watt 80 PLUS® Titanium certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			
<b>Power Consumption</b>	<b>(Max. Config, Idling)</b>	258 VA / 256 Watt	259 VA / 257 Watt	256VA / 254 Watt	258VA / 256 Watt
	<b>(Max. Config, Operating)</b>	566 VA / 562 Watt	625 VA / 621 Watt	667 VA / 663 Watt	711 VA / 706 Watt
<b>Acoustical Noise (Sound Pressure Level)<sup>2</sup></b>	<b>Max. Config, Idling</b>	52.3dB	52.3dB	52.3dB	52.3dB
	<b>Max. Config, Operating</b>	57.1dB	57.1dB	57.1dB	60.0dB
<b>Dimensions (W x D x H)</b>		448.0 x 683.8 x 87.2 mm / 17.6 x 26.9 x 3.4 in (2U)			
<b>Weight (Minimum / Maximum)</b>		18 kg / 27 kg, 39.68 lbs. / 59.52 lbs.			
<b>Temperature, Relative Humidity (non-condensing)</b>		Operating: 10° to 40° C / 50° to 104° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%			
<b>Regulatory and Safety</b>		FCC, UL, CB, CE, BSMI, UL(Mexico), KC, RoHS			
<b>Operating Systems</b>		Microsoft® Windows Server® 2008 Standard (x86) <sup>3</sup> Microsoft® Windows Server® 2008 Enterprise (x86) <sup>3</sup> 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 Red Hat Enterprise Linux 6.5 or later (x86) <sup>4</sup> Red Hat Enterprise Linux 6.5 or later (x86_64) <sup>4</sup> Red Hat Enterprise Linux 7.1 or later <sup>4</sup> VMware ESXi™ 5.1 Update 2 VMware ESXi™ 5.5 Update 2 <sup>5</sup> VMware ESXi™ 6.0 <sup>5</sup>			

<sup>1</sup> Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

<sup>2</sup> Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

<sup>3</sup> Not supported with E5-2650v3, E5-2660v3, E5-2680v3 and E5-2690v3.

<sup>4</sup> For Linux support, contact your sales representative or go to the NEC website at: <http://www.nec.com/global/prod/express/linux/index.html>

<sup>5</sup> 5GB or more memory is required.

(2/2)

Model		R120f-2E		
Part Number		N8100-2271F, N8100-2272F, N8100-2273F		
Processor	Type	Intel® Xeon® processor E5-2660 v3	Intel® Xeon® processor E5-2680 v3	Intel® Xeon® processor E5-2690 v3
	Clock speed	2.60 GHz	2.50 GHz	2.60 GHz
	Number of Processors	1 to 2		
	Cache	25 MB	30 MB	30 MB
	Cores and Threads	10C-20T	12C-24T	12C-24T
	Chipset	Intel® C612 Chipset		
Memory	Type	DDR4-2133 Registered DIMM (4/8/16GB), DDR4-2133 Load Reduced DIMM (32GB)		
	Standard Capacity	0 GB		
	Maximum Capacity	512 GB (16 x 32 GB)		
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing		
Internal Storage	Standard Capacity	0 GB		
	Maximum Capacity	SAS HDD: 28.8 TB (16 x 1.8 TB) SATA HDD : 32 TB (16 x 2 TB) SAS SSD: 12.8 TB ( 16 x 800 GB)		
	Disk Controller	SATA: 6Gb/s (Integrated) SAS: 12Gb/s (Optional)		
	RAID	SATA : RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)		
	Hot Plug	Supported		
	Optical Disk Drive	Optional		
	Optical Drive Bays	1		
	3.5-inch Media Bays	1		
	Disk Drive Bays	16		
Expansion Slots	Standard	Total: 5 slots available 2 PCIe 3.0 x16 (x16 connector) 1 PCIe 3.0 x8 (x8 connector) 1 PCIe 3.0 x8 (x8 connector) (Dual processor configuration only) 1 PCIe 2.0 x4 (x8 connector)		
Video	Controller (VRAM)	Integrated in Server Management Controller (32MB)		
	Resolution / Color	1600 x 1200 / 16.7M <sup>1</sup>		
Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 5 x USB3.0 (2 x front, 2 x rear, 1 x internal) 2 x USB2.0 (2 x rear) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 2 x 1000BASE-T LAN connector (RJ-45, 2 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)		
Server Management		EXPRESSSCOPE Engine 3		
Redundant Fan		Optional, hot plug		
Redundant Power Supply		Optional, hot plug		
Power Supply		1 to 2 x 460 Watt or 800 Watt 80 PLUS® Platinum certified, or 800 Watt 80 PLUS® Titanium certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz		

Model		R120f-2E		
Power Consumption	Max. Config, Idling	259 VA / 257 Watt	257 VA / 256 Watt	260 VA / 258 Watt
	Max. Config, Operating	757 VA / 752 Watt	817 VA / 811 Watt	844 VA / 838 Watt
Acoustical Noise (Sound Pressure Level) <sup>2</sup>	Max. Config, Idling	52.3dB	52.3dB	52.3dB
	Max. Config, Operating	60.0 dB	56.4 dB	58.1 dB
Dimensions (W x D x H )		448.0 x 683.8 x 87.2 mm / 17.6 x 26.9 x 3.4 in (2U)		
Weight (Minimum / Maximum)		18 kg / 27 kg, 39.68 lbs. / 59.52 lbs.		
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C / 50° to 104° F, 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), KC, RoHS		
Operating Systems		Microsoft® Windows Server® 2008 Standard (x86) <sup>3</sup> Microsoft® Windows Server® 2008 Enterprise (x86) <sup>3</sup> 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 Red Hat Enterprise Linux 6.5 or later (x86) <sup>4</sup> Red Hat Enterprise Linux 6.5 or later (x86_64) <sup>4</sup> Red Hat Enterprise Linux 7.1 or later <sup>4</sup> VMware ESXi™ 5.1 Update 2 VMware ESXi™ 5.5 Update 2 <sup>5</sup> VMware ESXi™ 6.0 <sup>5</sup>		

<sup>1</sup> Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

<sup>2</sup> Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

<sup>3</sup> Not supported with E5-2650v3, E5-2660v3, E5-2680v3 and E5-2690v3.

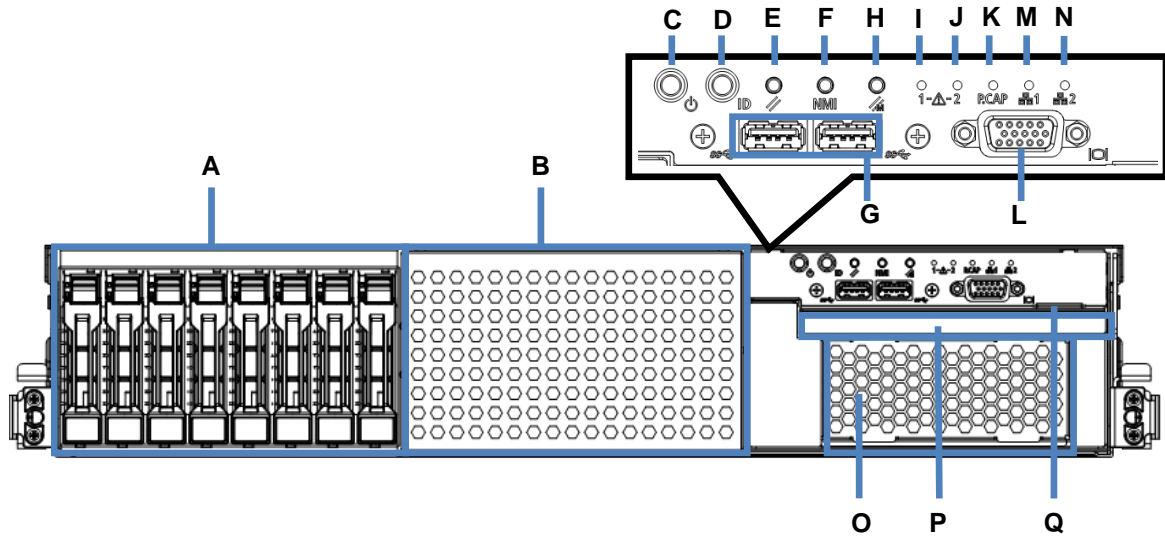
<sup>4</sup> For Linux support, contact your sales representative or go to the NEC website at: <http://www.nec.com/global/prod/express/linux/index.html>

<sup>5</sup> 5GB or more memory is required.

# External Views

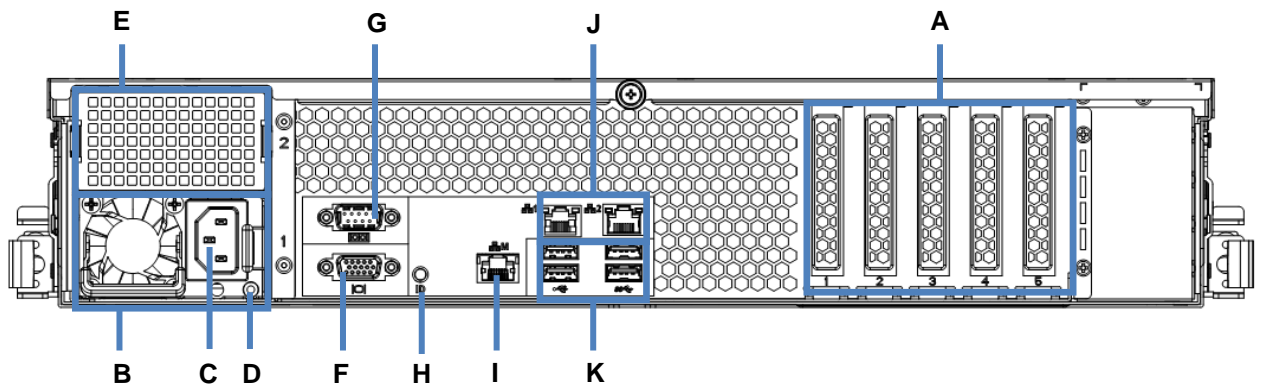
## Front and Rear Views

### Front View



Legend			
A.	2.5-inch Drive Bays	J.	STATUS LED 2
B.	2.5-inch Additional HDD Cage Bay	K.	Power Capping LED
C.	POWER Switch/ LED	L.	Display Connector
D.	UID Switch/LED	M.	LINK/ACT LED(LAN1)
E.	RESET Switch	N.	LINK/ACT LED(LAN2)
F.	DUMP (NMI) Switch	O.	Expansion Bay
G.	USB Connectors	P.	Optical Drive Bay
H.	BMC RESET Switch	Q.	Pull-out Tab
I.	STATUS LED 1		

Rear View



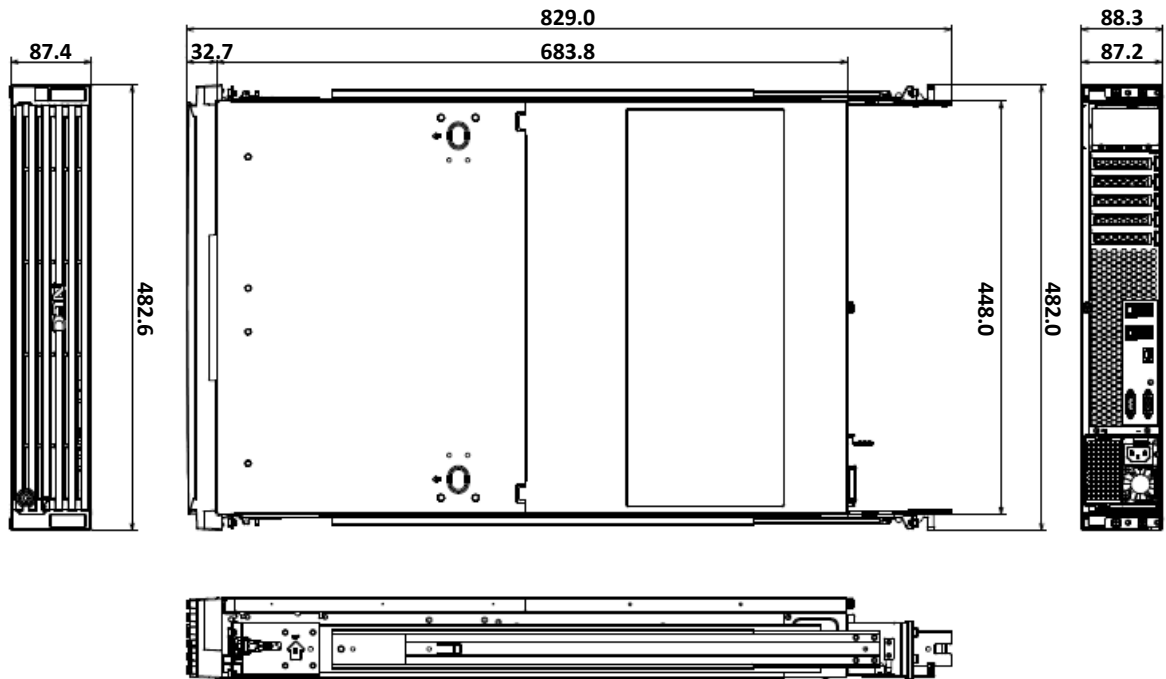
Legend

<b>A.</b> PCI Slots (Low-Profile)	<b>G.</b> Serial Port Connector
<b>B.</b> Power Supply	<b>H.</b> UID Switch/LED
<b>C.</b> AC Inlet	<b>I.</b> Management LAN Connector
<b>D.</b> AC POWER LED	<b>J.</b> LAN Connector
<b>E.</b> Additional Power Supply Slot	<b>K.</b> USB Connectors
<b>F.</b> Display Connector	

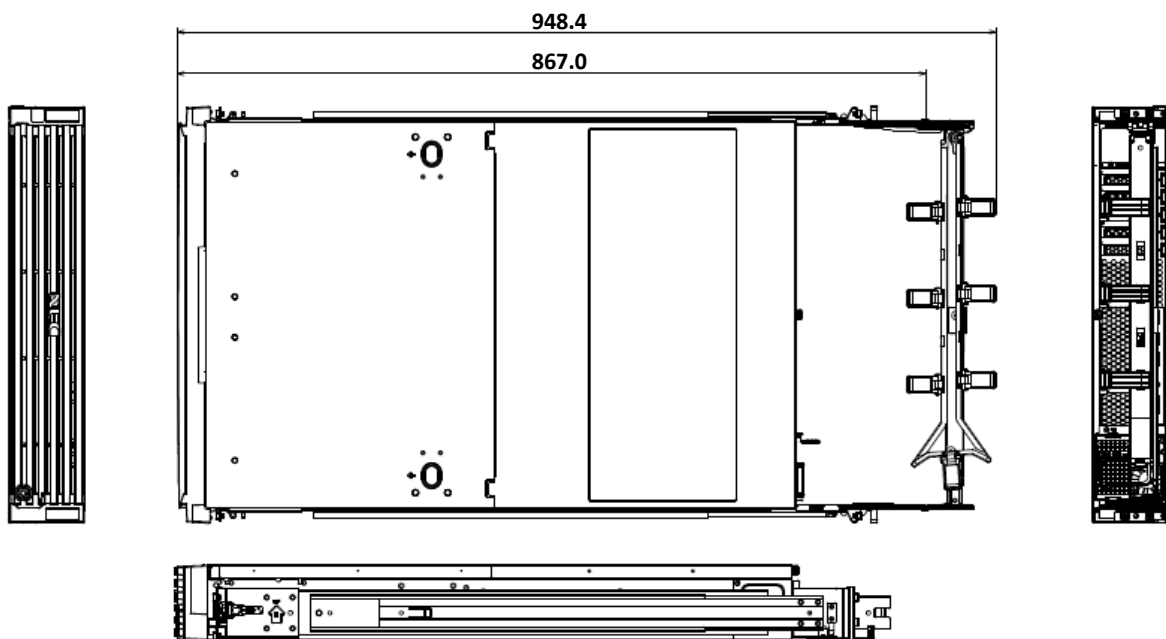


## Dimensions (mm)

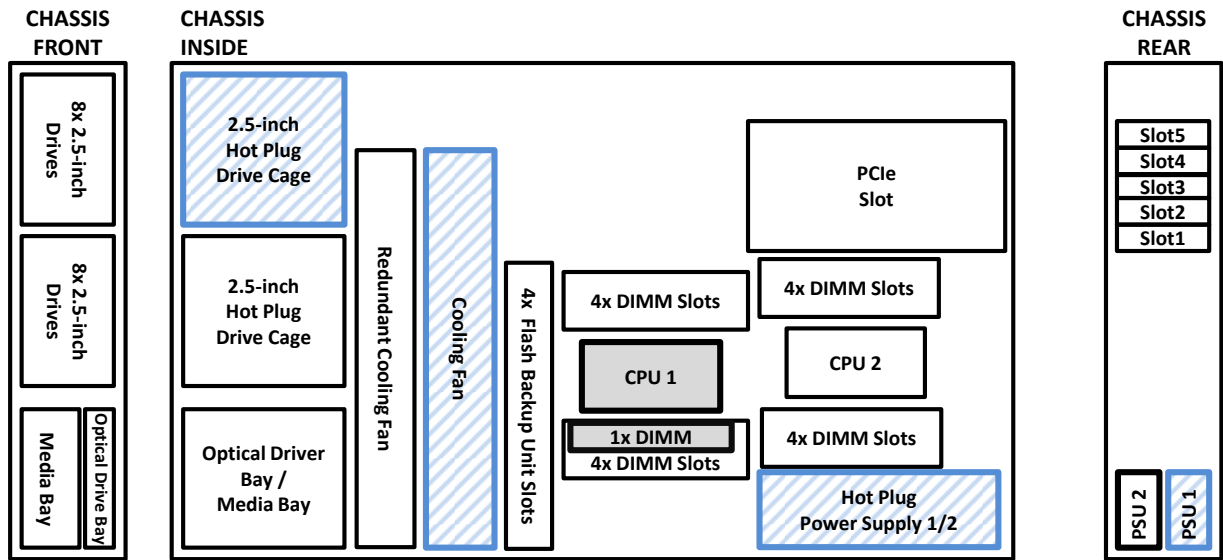
### Without Cable Arm



### With Cable Arm

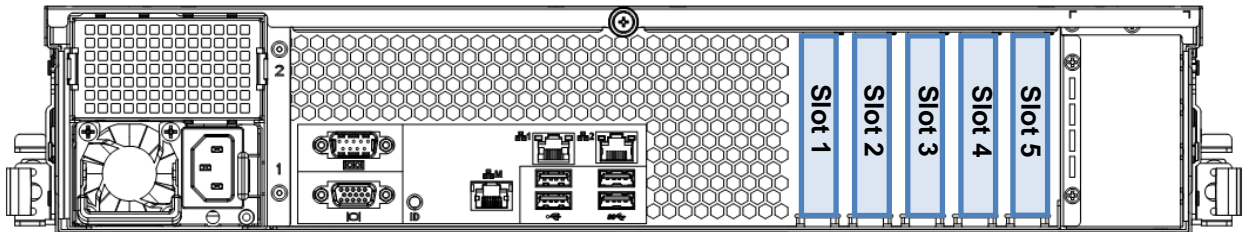


# Configuration Diagram



Legend: Standard Components Minimum required components

## Expansion Slot



Legend	Remarks
#1	PCIe 3.0 x8, x8 connector, Low-profile, up to 168 mm length 2 CPUs required
#2	PCIe 3.0 x16, x16 connector, Low-profile, up to 200 mm length
#3	PCIe 3.0 x8, x8 connector, Low-profile, up to 200 mm length
#4	PCIe 3.0 x16, x16 connector, Low-profile, up to 200 mm length
#5	PCIe 2.0 x4, x8 connector, Low-profile, up to 168 mm length

**NOTE:**

- Slot #1 is only available in a dual processor configuration.

# Server Configuration

## 1 Base Models

Product Name / Description	Part Number
<b>NEC Express5800/R120f-2E</b> no processor, no RAM, no HDD, no ODD Including : 1 x 460 Watt 80 PLUS® Platinum Power Supply Unit, Front Bezel, 8 x 2.5-inch Drive Cage, 2 sets of Mini-SAS HD cable, EXPRESSBUILDER DVD	N8100-2271F
<b>NEC Express5800/R120f-2E</b> no processor, no RAM, no HDD, no ODD, no LOM Card Including : 1 x 800 Watt 80 PLUS® Platinum Power Supply Unit, Front Bezel, 8 x 2.5-inch Drive Cage, 2 sets of Mini-SAS HD cable, EXPRESSBUILDER DVD	N8100-2272F
<b>NEC Express5800/R120f-2E</b> no processor, no RAM, no HDD, no ODD, no LOM Card Including : 1 x 800 Watt 80 PLUS® Titanium Power Supply Unit, Front Bezel, 8 x 2.5-inch Drive Cage, 2 sets of Mini-SAS HD cable, EXPRESSBUILDER DVD	N8100-2273F

**NOTE:**

- The base model must be ordered with a processor kit and a memory kit.
- 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](http://www.nec.com/en/global/prod/express/collateral/tools/PowerSelector_G01.xls)

## 2 Processors and Heat Sink

Available sockets: 2

Category	Product Name / Description	Part Number
<b>Processors</b> 1 Processor Required	<b>Xeon E5-2603 v3 Processor Kit</b> Intel® Xeon® Processor E5-2603 v3 (1.60 GHz, 6C/6T, 15 MB)	N8101-919F
	<b>Xeon E5-2620 v3 Processor Kit</b> Intel® Xeon® Processor E5-2620 v3 (2.40 GHz, 6C/12T, 15 MB)	N8101-921F
	<b>Xeon E5-2630 v3 Processor Kit</b> Intel® Xeon® Processor E5-2630 v3 (2.40 GHz, 8C/16T, 20 MB)	N8101-922F
	<b>Xeon E5-2650 v3 Processor Kit</b> Intel® Xeon® Processor E5-2650 v3 (2.30 GHz, 10C/20T, 25 MB)	N8101-924F
	<b>Xeon E5-2660 v3 Processor Kit</b> Intel® Xeon® Processor E5-2660 v3 (2.60 GHz, 10C/20T, 25 MB)	N8101-925F
	<b>Xeon E5-2680 v3 Processor Kit</b> Intel® Xeon® Processor E5-2680 v3 (2.50 GHz, 12C/24T, 30 MB)	N8101-926F
	<b>Xeon E5-2690 v3 Processor Kit</b> Intel® Xeon® Processor E5-2690 v3 (2.60 GHz, 12C/24T, 30 MB)	N8101-937F
	<b>Heat Sink 1st</b>	<b>Processor Heat Sink</b> For 1 <sup>st</sup> Processor
<b>Heat Sink 2nd</b>	<b>Processor Heat Sink</b> For 2 <sup>nd</sup> Processor	N8101-927F

**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	32 <sup>1</sup>	Maximum Available Number of Logical Processors
Microsoft Windows Server 2008 Standard (x86)	32 <sup>1</sup>	32
Microsoft Windows Server 2008 Enterprise (x86)		
Microsoft Windows Server 2008 R2 Standard (x64)	256 <sup>1</sup>	48
Microsoft Windows Server 2008 R2 Enterprise (x64)		
Microsoft Windows Server 2012 Standard	640 <sup>1</sup>	48
Microsoft Windows Server 2012 Datacenter		
Microsoft Windows Server 2012 R2 Standard		
Microsoft Windows Server 2012 R2 Datacenter		
Red Hat Enterprise Linux 6	32	32
Red Hat Enterprise Linux 6 (x86_64)	240	48
Red Hat Enterprise Linux 7		
VMware ESXi 5.1	160	48
VMware ESXi 5.5	320	48
VMware ESXi 6.0	480	48

<sup>1</sup> The maximum numbers of logical processors when using Hyper-V are below:

- Windows Server 2008 : 24 logical processors
- Windows Server 2008 R2 : 64 logical processors
- Windows Server 2012 : 320 logical processors
- Windows Server 2012 R2 : 320 logical processors

## 3 Memory

### 3.1 Memory Configuration

Refer to the section in accordance with your memory configuration:

#### Other OS than Windows Server 2008 Standard

- Independent Channel: Refer to [3.2.1](#)
- Memory Sparing Configuration: Refer to [3.2.2](#)
- Memory Mirroring / Memory Lockstep Configuration: Refer to [3.2.3](#)

#### Windows Server 2008 Standard

- Independent Channel: Refer to [3.3.1](#)

## Memory Configuration Feature Comparison

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

	Independent Channel	Memory Sparring	Memory Lockstep	Memory Mirroring
<b>Performance</b>	Best	Better	Better	Good
<b>Data Protection</b>	No	Multiple single bit error protection	No	Multiple single bit and multi bit error protection
<b>Redundancy</b>	No	Partly	No	Fully
<b>Data Correction</b>	ECC, x4 SDDC	ECC, x4 SDDC	ECC, x8 SDDC	ECC, x4 SDDC
<b>Available Memory</b>	Full physical memory	3/4 physical memory (16GB DIMM)	Full physical memory	Half physical memory
<b>Available Memory Channels</b>	4	4	4	4
<b>Notes</b>	-	All DIMMs in the system must be identical.	Paired DIMMs must be identical.	Paired DIMMs must be identical.

## 3.2 Other OS than Windows Server 2008 Standard

### 3.2.1 Independent Channel Configuration

Available slots: 8 per processor

Category	Product Name / Description	Part Number
<b>Registered DIMM (RDIMM)</b>	<b>4GB DDR4-2133 REG Memory Kit (1x4GB)</b> 1 x 4GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-644F
	<b>8GB DDR4-2133 REG Memory Kit (1x8GB)</b> 1 x 8GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-645F
	<b>16GB DDR4-2133 REG Memory Kit (1x16GB)</b> 1 x 16GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-646F
<b>Load Reduced DIMM (LRDIMM)</b>	<b>32GB DDR4-2133 LR Memory Kit (1x32GB)</b> 1 x 32GB Load Reduced ECC DIMM, DDR4-2133(PC4-2133)	N8102-647F

**NOTE:**

- Minimum one memory kit per processor must be installed.
- It is recommended to install memory kits in multiples of four (four identical DIMMs) 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 UDIMM/RDIMM are not supported.
- At least 5 GB of memory is required for VMware ESXi 5.5 and VMware ESXi 6.0.

### 3.2.2 Memory Sparring Configuration

Available slots: 8 per processor

Product Name / Description	Part Number
<b>32GB DDR4-2133 REG Memory Kit (2x16GB)</b> 2 x 16GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-655

**NOTE:**

- Minimum one memory kit per processor must be installed.
- The configured memories must be identical.

- The logical memory capacity becomes three-fourths of physical capacity.

### 3.2.3 Memory Mirroring / Memory Lockstep Configuration

Available slots: 8 per processor

Product Name / Description	Part Number
<b>16GB DDR4-2133 REG Memory Kit (2x8GB)</b> 2 x 8GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-650
<b>32GB DDR4-2133 REG Memory Kit (2x16GB)</b> 2 x 16GB Registered ECC DIMM, DDR4-2133 (PC4-2133)	N8102-651

**NOTE:**

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

## 3.3 Windows Server 2008 Standard

### 3.3.1 Independent Channel Configuration

Available slots: 1

Product Name / Description	Part Number
<b>4GB DDR4-2133 REG Memory Kit (1x4GB)</b> 1 x 4GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-644F

**NOTE:**

- Only one Memory Kit can be installed regardless of the number of processors.

### 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 v3	RDIMM: 4, 8, 16 GB LRDIMM: 32GB	-	1600 MHz
E5-2620 v3 E5-2630 v3	RDIMM: 4, 8, 16 GB LRDIMM: 32GB	-	1866 MHz
E5-2650 v3 E5-2660 v3 E5-2680 v3 E5-2690 v3	RDIMM: 4, 8, 16 GB LRDIMM: 32GB	-	2133 MHz

## Maximum Available Memory

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

The maximum available memory is less than the maximum physical memory supported by your system because some chipsets require PCI resource space of about 750MB. PCI resource requirements vary depending on the type and the number of PCI cards you are using.

Maximum Memory Size Supported by OS		Maximum Available Memory
Microsoft Windows Server 2008 Standard (x86) <sup>1</sup>	<b>4 GB</b>	<b>4 GB (HW-DEP enabled) App. 2 GB (HW-DEP disabled)</b>
Microsoft Windows Server 2008 R2 Standard <sup>1</sup>	<b>32 GB</b>	<b>32 GB</b>
Microsoft Windows Server 2008 Enterprise (x86) <sup>1</sup>	<b>64 GB</b>	<b>64 GB</b>
Microsoft Windows Server 2008 R2 Enterprise <sup>1</sup>	<b>2 TB</b>	<b>512 GB</b>
Microsoft Windows Server 2012 Standard <sup>1</sup>	<b>4 TB</b>	<b>512 GB</b>
Microsoft Windows Server 2012 Datacenter <sup>1</sup>		
Microsoft Windows Server 2012 R2 Standard <sup>1</sup>		
Microsoft Windows Server 2012 R2 Datacenter <sup>1</sup>		
Red Hat Enterprise Linux 6	<b>3 TB</b>	<b>16 GB</b>
Red Hat Enterprise Linux 6 (x86_64)	<b>6 TB</b>	<b>512 GB</b>
Red Hat Enterprise Linux 7		
VMware ESXi 5.1 <sup>2</sup>	<b>2 TB</b>	<b>512 GB</b>
VMware ESXi 5.5 <sup>2</sup>	<b>4 TB</b>	<b>512 GB</b>
VMware ESXi 6.0 <sup>3</sup>	<b>6 TB</b>	<b>512 GB</b>

<sup>1</sup> The maximum available memory size of Hyper-V systems are below:

- Windows Server 2008 Standard (x64) and Windows Server 2008 R2 Standard : 32 GB
- Windows Server 2008 Enterprise (x64) and Windows Server 2008 R2 Enterprise : 1TB
- Windows Server 2012, Windows Server 2012 R2 : 4 TB

<sup>2</sup> Up to 1 TB of the main memory is available to each virtual machine.

<sup>3</sup> Up to 4TB 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 Standard	Non-RAID (Embedded SATA)	4.2.1	4.3.1
Windows Server 2008 Enterprise	RAID 0/1 (Embedded SATA RAID)	4.2.2	4.3.2
Windows Server 2008 R2 Standard	(Windows only)		
Windows Server 2008 R2 Enterprise	RAID 0/1/10 1GB Cache	4.2.3	4.3.3
Red Hat Enterprise Linux 6	RAID 5/6/50/60 1GB Cache	4.2.4	
KVM in Red Hat Enterprise Linux 6 (x86_64)	RAID 5/6/50/60 2GB Cache	4.2.5	
Windows Server 2012 Standard	Non-RAID (Embedded SATA)	4.2.1	4.3.1
Windows Server 2012 Datacenter	RAID 0/1 (Embedded SATA RAID)	4.2.2	4.3.2
Windows Server 2012 R2 Standard	(Windows only)		
Windows Server 2012 R2 Datacenter	RAID 0/1/10 1GB Cache	4.2.3	4.3.4
Red Hat Enterprise Linux 6 (x86_64) without KVM feature	RAID 5/6/50/60 1GB Cache	4.2.4	
Red Hat Enterprise Linux 7	RAID 5/6/50/60 2GB Cache	4.2.5	
VMware ESXi 5.1	Non-RAID (Embedded SATA)	4.2.1	4.3.1
VMware ESXi 5.5	RAID 0/1/10 1GB Cache	4.2.3	4.3.3
VMware ESXi 6.0	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, SAS 15K HDDs, SATA HDDs, SAS SSDs and SATA SSDs can be mixed in each drive cage.
- 512B sector HDD and 4KB sector HDD cannot 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.



## 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	<b>Embedded SATA Controller</b> 4 x 6Gb/s SATA	(Standard)
Cable	<b>Internal SATA Cable</b> 2 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable	(Standard)
Drive Cage	<b>2.5-inch Drive Cage</b> 8 x 2.5-inch Hot-plug hard drive bays	(Standard)

**NOTE:**

- Up to 4 SATA drives are supported.
- For supported HDD/SSD, 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 0/1 Controller

Category	Product Name / Description	Part Number
Storage Controller	<b>Embedded SATA Controller</b> 4 x 6Gb/s SATA	(Standard)
Cable	<b>Internal SATA Cable</b> 2 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable	(Standard)
Drive Cage	<b>2.5-inch Drive Cage</b> 8 x 2.5-inch Hot-plug hard drive bays	(Standard)

**NOTE:**

- Up to 4 SATA drives are supported.
- For supported HDD/SSD, refer to [4.3.2](#)

### 4.2.3 Up to sixteen Drives with RAID 0/1 Controller with 1GB Cache

Category	Product Name / Description	Part Number
Storage Controller <b>Required</b>	<b>RAID Controller (1GB, RAID 0/1)</b> LSI MegaRAID SAS 9362-8i RAID 0/1/10, 1GB, Int. 8, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s	N8103-176
Flash Backup <b>Recommended</b>	<b>Flash Backup Unit</b> for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
Cable	<b>Internal SAS/SATA Cable</b> 1 x Mini SAS HD to 1 x Mini SAS HD, 2 sets	(Standard)
Drive Cage	<b>2.5-inch Drive Cage</b> 8 x 2.5-inch hot plug drive bays	(Standard)
<b>Optional Drive Cage</b> <b>(For more than 8 Drives)</b>	<b>2.5-inch Hot Plug Drive Cage Kit</b> 8 x 2.5-inch hot plug drive bays Including 4 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable, SAS expander card	N8154-74

**NOTE:**

- For Supported HDD/SSD, refer to [4.3.3](#) for Windows Server 2008/2008R2, Red Hat Enterprise Linux 6, Red Hat Enterprise Linux 6(x86\_64) with KVM feature, or VMware. Refer to [4.3.4](#) for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6(x86\_64) without KVM feature, 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

and SATA SSDs can be mixed in each drive cage.

#### 4.2.4 Up to sixteen Drives with RAID 5/6 Controller with 1GB Cache

Category	Product Name / Description	Part Number
<b>Storage Controller</b> <b>Required</b>	<b>RAID Controller (1GB, RAID 0/1/5/6)</b> 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
<b>Flash Backup</b> <b>Recommended</b>	<b>Flash Backup Unit</b> for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
<b>Cable</b>	<b>Internal SAS/SATA Cable</b> 1 x Mini SAS HD to 1 x Mini SAS HD, 2 sets	(Standard)
<b>Drive Cage</b>	<b>2.5-inch Drive Cage</b> 8 x 2.5-inch hot plug drive bays	(Standard)
<b>Optional Drive Cage</b> <b>(For more than 8 Drive)</b>	<b>2.5-inch Hot Plug Drive Cage Kit</b> 8 x 2.5-inch hot plug drive bays Including 4 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable, SAS expander card	N8154-74

**NOTE:**

- For Supported HDD/SSD, refer to [4.3.3](#) for Windows Server 2008/2008R2, Red Hat Enterprise Linux 6, Red Hat Enterprise Linux 6(x86\_64) with KVM feature, or VMware. Refet to [4.3.4](#) for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6(x86\_64) without KVM feature, 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 and SATA SSDs can be mixed in each drive cage.

#### 4.2.5 Up to sixteen Drives with RAID 5/6 Controller with 2GB Cache

Category	Product Name / Description	Part Number
<b>Storage Controller</b> <b>Required</b>	<b>RAID Controller (2GB, RAID 0/1/5/6)</b> LSI MegaRAID SAS 9362-8i RAID0/1/5/6/10/50/60, 2GB, Int. 8, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s	N8103-178
<b>Flash Backup</b> <b>Recommended</b>	<b>Flash Backup Unit</b> for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
<b>Cable</b>	<b>Internal SAS/SATA Cable</b> 1 x Mini SAS HD to 1 x Mini SAS HD, 2 sets	(Standard)
<b>Drive Cage</b>	<b>2.5-inch Drive Cage</b> 8 x 2.5-inch hot plug drive bays	(Standard)
<b>Optional Drive Cage</b> <b>(more than 8 Drive)</b>	<b>2.5-inch Hot Plug Drive Cage Kit</b> 8 x 2.5-inch hot plug drive bays Including 4 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable, SAS expander card	N8154-74

**NOTE:**

- For Supported HDD/SSD, refer to [4.3.3](#) for Windows Server 2008/2008R2, Red Hat Enterprise Linux 6, Red Hat Enterprise Linux 6(x86\_64) with KVM feature, or VMware. Refet to [4.3.4](#) for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6(x86\_64) without KVM feature, 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 and SATA SSDs can be mixed in each drive cage.

## 4.3 Supported HDD/SDD

### 4.3.1 For Embedded SATA Controller

Category		Product Name / Description	Part Number
Drive 4 slots available	2.5-inch SATA HDD	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-487
		<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-488
		<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-489

**NOTE:**

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

### 4.3.2 For Embedded SATA RAID 0/1 Controller

Category		Product Name / Description	Part Number
Drive 4 slots available	2.5-inch SATA HDD	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-487
		<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-488
		<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-489

### 4.3.3 For RAID Controller Configuration (1)

For Windows Server 2008/2008R2, Red Hat Enterprise Linux 6, KVM in Red Hat Enterprise Linux 6(x86\_64), or VMware.

Category		Product Name / Description	Part Number
Drive Standard : 8 slots available Max : 16 slots available	SAS HDD	<b>300GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-479
		<b>450GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-480
		<b>600GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-481
		<b>900GB 10K Hot Plug 2.5-inch SAS HDD</b> 1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-482
		<b>1.2TB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-483
		<b>300GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector	N8150-485

	<b>450GB 15K Hot Plug 2.5-inch SAS HDD</b> 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector	N8150-486
	<b>600GB 15K Hot Plug 2.5-inch SAS HDD</b> 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector	N8150-518
<b>SATA HDD</b>	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-487
	<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-488
	<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-489
<b>SAS SSD</b>	<b>200GB Hot Plug 2.5-inch SAS SSD</b> 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512B sector	N8150-721
	<b>400GB Hot Plug 2.5-inch SAS SSD</b> 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512B sector	N8150-722
<b>SATA SSD</b>	<b>200GB Hot Plug 2.5-inch SATA SSD</b> 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector	N8150-725
	<b>400GB Hot Plug 2.5-inch SATA SSD</b> 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector	N8150-726
	<b>800GB Hot Plug 2.5-inch SATA SSD</b> 1 x 800 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector	N8150-727

**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 and SATA SSDs can be mixed in each drive cage

#### 4.3.4 For RAID Controller Configuration (2)

For Windows Server 2012/2012R2, Red Hat Enterprise Linux 6(x86\_64) without KVM, or Red Hat Enterprise Linux 7

Category	Product Name / Description	Part Number
<b>Drive</b> <b>Standard :</b> <b>8 slots</b> <b>available</b> <b>Max :</b> <b>16 slots</b> <b>available</b>	<b>SAS HDD (512B)</b> <b>300GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-479
	<b>450GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-480
	<b>600GB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-481
	<b>900GB 10K Hot Plug 2.5-inch SAS HDD</b> 1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-482
	<b>1.2TB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-483

	<b>300GB 15K Hot Plug 2.5-inch SAS HDD</b> 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector	N8150-485
	<b>450GB 15K Hot Plug 2.5-inch SAS HDD</b> 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector	N8150-486
	<b>600GB 15K Hot Plug 2.5-inch SAS HDD</b> 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector	N8150-518
<b>SAS HDD (4KB)</b>	<b>1.8TB 10K Hot Plug 2.5-inch SAS HDD</b> 1 x 1.8TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 4KB sector	N8150-490
<b>SATA HDD (512B)</b>	<b>250GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-487
	<b>500GB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-488
	<b>1TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-489
<b>SATA HDD (4KB)</b>	<b>2TB 7.2K Hot Plug 2.5-inch SATA HDD</b> 1 x 2 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 4KB sector	N8150-521
<b>SAS SSD</b>	<b>200GB Hot Plug 2.5-inch SAS SSD</b> 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512B sector	N8150-721
	<b>400GB Hot Plug 2.5-inch SAS SSD</b> 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512B sector	N8150-722
<b>SATA SSD</b>	<b>200GB Hot Plug 2.5-inch SATA SSD</b> 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector	N8150-725
	<b>400GB Hot Plug 2.5-inch SATA SSD</b> 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector	N8150-726
	<b>800GB Hot Plug 2.5-inch SATA SSD</b> 1 x 800 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector	N8150-727

**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 and SATA SSDs can be mixed in each drive cage.
- The 4KB sector drives are make-to-order products. Please consult your sales representative in regard to production lead time.
- When you select 4KB sector HDD, confirm whether your applications support hard drives with 4 KB sector size. For more information, visit the NEC website at: [http://www.nec.com/en/global/prod/express/svropt/hdd/collateral/4KHDD\\_Precautions\\_EN.pdf](http://www.nec.com/en/global/prod/express/svropt/hdd/collateral/4KHDD_Precautions_EN.pdf)
- 512B sector HDD and 4KB sector HDD cannot be mixed.

## 5 2.5-inch PCIe SSD

### 5.1 2.5-inch PCIeSSD Installation Kit

Product Name / Description	Part Number
<b>2.5-inch PCIeSSD Installation Kit</b> 2.5-inch Drive Cage for 4 x SSDs, PCIe SSD switch card, and PCIe cable	N8118-303

**NOTE:**

- One PCIe slot is required to install the PCIe SSD switch card.
- 2.5-inch Additional HDD Cage Bay is used to install 2.5-inch PCIeSSDs. Therefore, the 2.5-inch Hot Plug Drive Cage Kit N8154-74 cannot be installed at the same time.



- The PCIe SSD slots do not support hot-plug.
- Operating system cannot be installed on any PCIe SSD.

### 5.2 PCIe SSD

Category	Product Name / Description	Part Number
<b>PCIe SSD</b> 4 slots available	<b>800GB Non-Hot Plug 2.5-inch PCIe SSD</b> - 1x 800 GB PCIe SSD, 2.5-inch	N8118-500

**NOTE:**

- 2.5-inch PCIeSSD Installation Kit is required to install this product.
- Download the drivers and ESM/PRO/ServerAgentService1.2 or later from NEC web site.
- Warranty period is 3 years (36 months) or until the total bytes of written value (TBW) exceeds the limit value, whichever occurs first. It is recommended to check the TBW periodically.
- Operating system cannot be installed on any PCIe SSD.

## 6 Optical Drive

Category	Product Name / Description	Part Number
<b>Internal</b> 1 slot available	<b>Internal Slim DVD-ROM drive</b> Slim DVD-ROM drive DVD read speed: 8x (DVD-ROM / DVD-R / DVD-RW) CD read speed: 24x (CD-ROM / CD-R/RW)	N8151-123
	<b>Internal DVD Super Multi Drive</b> 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)	N8151-124F
<b>External</b>	<b>External DVD Super MULTI Drive</b> USB, Slim DVD Super Multi drive, not including writing software	N8160-97F

**NOTE:**

- Up to 1 optical drive can be connected.

## 7 Internal RDX Drives

### 7.1 RDX Configuration

Category	Product Name / Description	Part Number
<b>Controller</b>	<b>Internal USB Controller</b> 1 x USB port	(Standard)
<b>Cable</b>	<b>Internal USB cable</b> 1 x Internal USB to 1 x USB device, USB 3.0	(Standard)
<b>Drive</b> 1 bay available	<b>Internal RDX (USB)</b>	N8151-125

## 8 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.

### 8.1 Network Interface Controller

Category	Product Name / Description	Part Number
<b>Adapter</b>	<b>1GbE</b>	
	<b>1000BASE-T Adapter</b> Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-150
	<b>Dual Port 1000BASE-T Adapter</b> Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-151
	<b>Dual Port 1000BASE-T Adapter</b> Intel® 82580 Gigabit Ethernet Controller PCIe 2.0 x4 <b>NOTE:</b> - PXE boot is not supported on UEFI environment.	N8104-145
	<b>Quad Port 1000BASE-T Adapter</b> Broadcom ® BCM5719 Gigabit Ethernet Controller PCIe 2.0 x4 <b>NOTE:</b> - Network cables with RJ-45 plug covers cannot be used.	N8104-152
<b>10GbE</b>	<b>10GBASE SFP+ Adapter (SFP+/2ch)</b> Qlogic NetXtreme II BCM57810S PCIe 2.0 x8, Low Profile / Full Height <b>NOTE:</b> - N8104-129 SFP+ Module is required to connect with an optical cable. - The latest driver is required for Window Server 2008 and Windows Server 2008 R2.	N8104-149
	<b>Dual Port 10GBASE-T Adapter</b> Intel® Ethernet Controller X540 PCIe 2.0(x8) , Low Profile / Full Height	N8104-153
	<b>SFP+ Module</b>	
	<b>SFP+ Module (10G-SR)</b> 1 x SFP+ Module for N8104-149	N8104-129

**NOTE:**

- Supports up to three 10GbE network adapters in a single-processor configuration, and up to five in a dual-processor configuration. However, up to two when WS2008(x86) is installed, and up to one when RHEL 6(x86) is installed.
- Network performance may be reduced depending on the applications and memory performance when three or more 10Gb Network Adapters are installed.



## Types and Number of Available NICs and FC HBAs when Running with VMware ESXi

See the table below for the types and number of available NICs and FC HBAs when running with VMware ESXi.

The condition depends on interrupt processes managed by the operating system and insufficient interrupt resources may lead to system failure.

NICs and FC HBAs Type	Number of Available Adapters	Total Number of Available Adapters
N8104-152 Quad Port 1000BASE-T Adapter	Up to two adapters	Up to three adapters
N8104-145 Dual Port 1000BASE-T Adapter	Up to four adapters	
N8104-151 Dual Port 1000BASE-T Adapter		
N8104-150 1000BASE-T Adapter		
N8104-153 Dual Port 10GBASE-T Adapter		
N8104-149 10GBASE SFP+ Adapter (SFP+/2ch)	Up to four adapters	
N8190-158A Fibre Channel Controller (2ch)	Up to four adapters	
N8190-160 Fibre Channel Controller (2ch)		
Other FC HBAs (1ch)	No limitations	No limitations

### NOTE:

- There are following limitations when using ESXi 6.0;
  - (1) N8104-152 cannot be installed when using N8104-149/153.
  - (2) Up to one adapter can be selected from N8104-150/151/145

## NIC Teaming feature – NIC Teaming and bonding features

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

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

Network Interface	Team	Operating Systems
<b>1GbE NIC</b> Embedded/N8104-150/-151/-152	Up to four ports per one team	Windows Server 2008 Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2 Red Hat Enterprise Linux
N8104-145	Up to four ports per one team	Windows Server 2008 R2
<b>10GbE NIC (10GBASE-SR)</b> N8104-149	Up to four ports per one team	Windows Server 2008 Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2 Red Hat Enterprise Linux
<b>10GbE NIC (10GBASE-T)</b> N8104-153	Up to four ports per one team	Windows Server 2012 Windows Server 2012 R2 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 NIC teaming and 1GbE NIC teaming are mixed, the teams must be up to five per one system.
- When using Windows Server 2008 or Windows Server 2008 R2, the teams must be up to four per one system.



## Using iSCSI

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

Category	Network Interface	Operating Systems
1GbE	Embedded 1GbE NIC/ N8104-150/-151/-152	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Enterprise Linux, VMware
	N8104-145	Windows Server 2008 R2, VMware
10GbE (10GBASE-SR)	N8104-149	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Enterprise Linux, VMware
10GbE (10GBASE-T)	N8104-153	Windows Server 2012, Windows Server 2012 R2, Red Hat Enterprise Linux 6.5 (x86_64) or later, Red Hat Enterprise Linux 7.1 or later, VMware

**NOTE:**

- NIC Teaming feature is not supported on iSCSI interfaces.

## 8.2 InfiniBand

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

**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.

## 8.3 External Storage Controller

### 8.3.1 RAID Controller

Category	Product Name / Description	Part Number
Controller	<b>RAID Controller (2GB, RAID0/1/5/6)</b> 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.

### Types and Number of Available RAID Controllers when Running with VMware ESXi

See the table below for the types and number of available RAID Controllers and SAS Controller when running with VMware ESXi.

The condition depends on interrupt processes managed by the operating system and insufficient interrupt resources may lead to system failure.

Processor Type	Controller Type	Number of available controllers	Total Number of available controllers
E5-2603 v3	N8103-176 RAID Controller (1 GB, RAID 0/1)	Up to one controller	Up to three controllers
E5-2620 v3	N8103-177 RAID Controller (1 GB, RAID 0/1/5/6)		
E5-2630 v3	N8103-178 RAID Controller (2 GB,RAID 0/1/5/6)		
E5-2650 v3	N8103-179 RAID Controller (2 GB,RAID 0/1/5/6)	Up to two controllers	
E5-2660 v3			
E5-2680 v3	N8103-176 RAID Controller (1 GB, RAID 0/1)	Up to one controller	Up to two controllers
E5-2690 v3	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)		
	N8103-184 SAS Controller <sup>1</sup>	Up to two controllers <sup>1</sup>	

<sup>1</sup> When ESXi 5.1/5.5 is installed.

### 8.3.2 Fibre Channel / SAS Controller

Category	Product Name / Description	Part Number
Fibre Channel	<b>Fibre Channel Controller (1ch)</b> Emulex LightPulse LPe1250-F8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8	N8190-159
	<b>Fibre Channel Controller (2ch)</b> Emulex LightPulse LPe12002-M8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8	N8190-160
	<b>Fibre Channel Controller (1ch)</b> Emulex LightPulse LPe16000B-M6 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0 x8	N8190-157A
	<b>Fibre Channel Controller (2ch)</b> Emulex LightPulse LPe16002B-M6 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0 x8	N8190-158A
SAS	<b>SAS Controller</b> LSI SAS9212-4i4e Host Bus Adapter 6Gb/s SAS, Int. 4 / Ext. 4, 7-pin SATA / SFF-8088, PCIe 2.0 x8	N8103-142
	<b>SAS Controller</b> LSI SAS9300-8e Host Bus Adapter 12Gb/s SAS, ext. 8(SFF-8644 x2), PCIe 3.0 x8	N8103-184

**NOTE:**

- There is a PCI slot limitation when configured with Xeon E5-2680 v3/-2690 v3 and VMware ESXi 5.1/5.5. Refer to **Types and Number of Available RAID Controllers when Running with VMware ESXi** in the previous section for details.

**NOTE:**

- With regard to 16Gb/s Fiber Channel Controllers, up to two ports in a single processor configuration

with Xeon E5-2603 v3, and up to six ports in a dual processor configuration with Xeon E5-2603 v3 are allowed in the system.

- Refer to [Types and Number of Available NICs and FC HBAs when Running with VMware ESXi](#) with regard to the number of available FC HBAs on VMware ESXi systems.
- Up to three SAS Controllers can be installed.

## 8.4 Serial Port Adapter

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

**NOTE:**

- Up to one Serial Port Adapter can be installed.

## 9 Other Add-in Components

### 9.1 Redundant Power Supply Module

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

**NOTE:**

- The power units must be the same to configure redundancy.
- 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](http://www.nec.com/en/global/prod/express/collateral/tools/PowerSelector_G01.xls)

### 9.2 Redundant Fan Kit

Product Name / Description	Part Number
<b>Redundant Fan Kit</b> hot plug redundant cooling fans for R120f-2E	N8181-126

### 9.3 Trusted Platform Module Kit

Product Name / Description	Part Number
<b>Trusted Platform Module Kit</b> TPM 1.2 module	N8115-21

**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 kit.
- 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.

## 9.4 Internal Flash Memory

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

**NOTE:**

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

## 9.5 Flash FDD

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

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

**NOTE:**

- Up to one drive can be connected.

# 10 Add-on Components

## 10.1 17-inch LCD Console Drawer

Category	Product Name / Description	Part Number
<b>Drawer w/ KVM</b>	<b>Drawer</b> <b>17-inch LCD Console Drawer (8port)</b> 17-inch LCD, US 83-keys Keyboard, Optical mouse, 8 port KVM switch, 1U height	N8143-106F
	<b>Cable</b> <b>Switch Unit Connection Cable Set (USB, 1.8m)</b> 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)
	<b>Switch Unit Connection Cable Set (USB, 3m)</b> 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)
	<b>Switch Unit Connection Cable Set (USB, 5m)</b> 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)
<b>Drawer w/o KVM</b>	<b>Drawer</b> <b>17inch LCD Console Unit 1U</b> 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
	<b>17inch LCD Console Drawer (1port)</b> 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
	<b>Keypad</b> <b>Keyboard Unit (JP)</b> JP 108-keys Keyboard with 10-key for N8143-108F 17inch LCD Console Drawer (1port)	N8143-109
	<b>Keyboard Unit (UK)</b> UK 104-keys Keyboard with 10-key, for N8143-108F 17inch LCD Console Drawer (1port)	N8143-111

**NOTE:**

- There are two VGA connectors on R120f-2E, 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		<b>Server Switch Unit (8 server)</b> 1U USB 8 port KVM switch	N8191-14F
Cable	KVM	<b>Switch Unit Connection Cable Set (USB,1.8m)</b> 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)
		<b>Switch Unit Connection Cable Set (USB,3m)</b> 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)
		<b>Switch Unit Connection Cable Set (USB,3m)</b> 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	<b>Switch Unit Connection Cable 1.8 m</b> 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 R120f-2E, 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.

## 10.3 Cable Management Arm

Product Name / Description	Part Number
<b>Cable Management Arm 2U Kit</b> for R120f-2E	N8143-95

## 10.4 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
<b>Remote KVM and Media License Kit</b> 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.	N8115-04

**NOTE:**

- Remote KVM and remote media features are not available for virtual machines.

## 10.5 Medium and Cartridge

Category	Product Name	Drive supported	Part Number
RDX	HDD	<b>RDX Cartridge (320GB)</b>	N8151-125
		<b>RDX Cartridge (500GB)</b>	N8151-125
		<b>RDX Cartridge (1TB)</b>	N8151-125
		<b>RDX Cartridge (2TB)</b>	N8151-125
			N8153-01
			N8153-02
			N8153-03
			N8153-09

## 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(x86)	Legacy	Disabled
Windows Server 2008 R2 (x64)	Legacy	Disabled
Windows Server 2012	UEFI	Enabled
Windows Server 2012 R2	UEFI	Enabled
Red Hat Enterprise Linux 6	Legacy	Disabled
Red Hat Enterprise Linux 6(x86_64)	UEFI	Enabled
Red Hat Enterprise Linux 7	UEFI	Enabled
VMware ESXi 5.1 Update2	Legacy	Disabled
VMware ESXi 5.5 Update2	Legacy	Disabled
VMware ESXi 6.0	Legacy	Disabled

## 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
<b>Hardware monitoring</b>	Temperature/voltage/power/RAID/standard LANfan /degeneration (memory/hard drive)	✓	✓
	Hardware configuration information collection	✓	✓
	Hardware event log collection	✓	✓
<b>Boot monitoring</b>	BIOS/POST stall, Booting, OS stall, shutdown	✓ <sup>1</sup>	✓ <sup>1</sup>
<b>Alerting</b>	HW error, Boot error , and OS panic (by SNMP, E-Mail)	✓	✓
<b>Remote KVM (via LAN)</b>	POST/BIOS setup, ROM utility	✓ <sup>2</sup>	✓
	Panic screen, Boot screen	✓ <sup>2, 3, 4</sup>	✓
	CUI-based screen (OS console)	✓ <sup>2, 4</sup>	✓
	GUI-based screen (OS console)	-	✓
	Remote console recording function	-	✓
	Video recording	-	✓
<b>Remote control (via LAN)</b>	Remote reset/power on-off/ dump	✓	✓
	Remote power capping	✓	✓
	BIOS/BMC FW update	✓	✓
	Remote BIOS setup(partial configuration only)	✓	✓
	OS shutdown	✓ <sup>1</sup>	✓ <sup>1</sup>
	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)	✓ <sup>1</sup>	✓ <sup>1</sup>
<b>Maintenance</b>	EXPRESSSCOPE® Profile key (Backup/restore BIOS/BMC setup information)	✓	✓
<b>Others</b>	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)	✓	✓

<sup>1</sup> The feature is not supported on VMware ESXi systems.

<sup>2</sup> The optional serial port is not available for the feature.

<sup>3</sup> Monitoring boot screens is not supported on VMware systems.

<sup>4</sup> In VMware systems, only the direct console user interface is supported.

## OS Support Matrix for PCI Cards and Embedded Controller

Part number	Product Name	WS 2012 R2	WS 2008 R2	WS 2008	RHEL 7	RHEL 6	RHEL 6 x64	ESXi 6.0	ESXi 5.5	ESXi 5.1
-	Embedded SATA non-RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓
-	Embedded SATA RAID Controller	✓	✓	✓	✓	-	-	-	-	-
-	Embedded 1GbE NIC	✓	✓	✓	✓	✓	✓	✓	✓	✓
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)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8118-303	2.5-inch PCIeSSD Installation Kit	✓	✓	-	-	-	✓	✓	-	-
N8118-01	PCIe SSD Adapter 365GB	✓	✓	-	-	-	-	-	-	-
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	✓	✓	-	-	✓	-	✓	✓	✓
N8190-160	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-159	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-153	Dual Port 10GBASE-T Adapter	✓	✓	-	-	✓	✓	✓	✓	✓
N8104-149	10GBASE SFP+ Adapter (SFP+/2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓
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

Priority	Part Number	Product Name	Slots				
			#1 <sup>1</sup>	#2	#3	#4	#5
(1)	N8103-176	RAID Controller (1 GB, RAID 0/1)	(4)	(2)	(1)	(3)	-
(2)	N8103-177	RAID Controller (1 GB, RAID 0/1/5/6)	(4)	(2)	(1)	(3)	-
(3)	N8103-178	RAID Controller (2 GB, RAID 0/1/5/6)	(4)	(2)	(1)	(3)	-
(4)	N8103-179	RAID Controller (2 GB, RAID 0/1/5/6)	(4)	(2)	(1)	(3)	-
(5)	N8118-303	2.5-inch PCIeSSD Installation Kit	-	(1)	-	(2)	-
(6)	N8118-01	PCIe SSD Adapter 365GB	(4)	(2)	(1)	(3)	-
(7)	N8190-158A	Fibre Channel Controller (2ch)	(4)	(2)	(1)	(3)	-
(8)	N8190-157A	Fibre Channel Controller	(4)	(2)	(1)	(3)	-
(9)	N8104-147	Dual Port InfiniBand Adapter	(4)	(2)	(1)	(3)	-
(10)	N8104-146	Single Port InfiniBand Adapter	(4)	(2)	(1)	(3)	-
(11)	N8103-184	SAS Controller	(4)	(2)	(1)	(3)	-
(12)	N8190-160	Fibre Channel Controller (2ch)	(4)	(2)	(1)	(3)	-
(13)	N8190-159	Fibre Channel Controller	(4)	(2)	(1)	(3)	-
(14)	N8104-153	Dual Port 10GBASE-T Adapter	(4)	(2)	(1)	(3)	(5)
(15)	N8104-149	10GBASE SFP+ Adapter (SFP+/2ch)	(4)	(2)	(1)	(3)	(5)
(16)	N8103-142	SAS Controller	(4)	(2)	(1)	(3)	(5)
(17)	N8104-152	Quad Port 1000BASE-T Adapter	(4)	(2)	(1)	(3)	(5)
(18)	N8104-145	Dual Port 1000BASE-T Adapter	(4)	(2)	(1)	(3)	(5)
(19)	N8104-151	Dual Port 1000BASE-T Adapter	(4)	(2)	(1)	(3)	(5)
(20)	N8104-150	1000BASE-T Adapter	(4)	(2)	(1)	(3)	(5)
(21)	N8117-01A	Serial Port Adapter	-	-	(1)	(2)	(3)

<sup>1</sup> The slot #1 is not available when a single processor configuration.

### NOTE:

- The number between parentheses shows the population priority (recommendation). For example, install N8103-176 (1) in the slot #3, N8190-160 (12) in the slot #2 and N8104-153 (14) in the slot #4 when you have those cards.
- For the configuration limitation for VMware ESXi, refer to the following documents.

VMware ESXi5.1

<https://www.vmware.com/pdf/vsphere5/r51/vsphere-51-configuration-maximums.pdf>

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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For hard drive capacity measurements, 1 GB = 1 billion bytes. Actual formatted capacity is less.

## Revision History

Revision	Date	Description
7.0	October 23, 2015	<p><b>New products added:</b> External DVD Super MULTI Drive / N8160-97F RDX Cartridge (2TB) / N8153-09</p> <p><b>Discontinued product deleted:</b> External DVD-ROM drive / N8160-91 RDX Cartridge (2TB) / N8153-08 RDX Cartridge (SSD/128GB) / N8153-06 RDX Cartridge (SSD/256GB) /N8153-07</p>
6.0	July 15, 2015	<p><b>New products added:</b> 2.5-inch PCIeSSD Installation Kit N8118-303 800GB Non-Hot Plug 2.5-inch PCIe SSD N8118-500</p> <p><b>Discontinued product deleted:</b> 100GB Hot Plug 2.5-inch SATA SSD N8150-724 PCIe SSD Adapter 365GB N8118-01</p> <p><b>Others:</b> Added RHEL 7 to the list of operating system supported Changed the number of logical processors and maximum memory size supported by Red Hat Enterprise Linux 6 (x86_64) 2.5-inch SATA SSD(MLC) is supported on VMware ESXi Added URL links to VMware documents for the configuration limitation</p>
5.0	June 25, 2015	<p><b>Discontinued product deleted:</b> 4KB sector drives other than N8150-490 and N8150-521</p> <p><b>Others:</b> Added a note for 4KB sector drives</p>
4.0	May 29, 2015	<p><b>Others:</b> SAS Controller N8103-184 supports ESXi 5.5 Added PCI slot limitation for VMware ESXi 5.1/5.5 Corrected description of N8104-149 Added note for N8104-145 Dual Port 1000BASE-T Adapter</p>
3.0	April 17, 2015	<p><b>New products added:</b> 1TB 7.2K Hot Plug 2.5-inch SATA HDD / N8150-520 2TB 7.2K Hot Plug 2.5-inch SATA HDD / N8150-521</p> <p><b>Others:</b> Added ESXi 6 to the list of operating system supported</p>
2.0	February 18, 2015	<p><b>New products added:</b> VMware ESXi support kit / N8106-009</p> <p><b>Others:</b> Added note to configure with VMware Systems</p>
1.0	January 16, 2015	Initial release