

# NEC Express5800/R120g-1M System Configuration Guide



## Introduction

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

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# Technical Specification

## Key Features

- High performance with the latest Intel® Xeon® processor E5-2600 v4 Product Family
- Up to 1.5 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-1M			
Part Number		N8100-2402F, N8100-2403F, N8100-2404F			
Processor	Type	Intel® Xeon® processor E5-2603 v4	Intel® Xeon® processor E5-2620 v4	Intel® Xeon® processor E5-2623 v4	Intel® Xeon® processor E5-2630 v4
	Clock speed	1.70GHz	2.10 GHz	2.60 GHz	2.20 GHz
	Number of Processors	1 or 2			
	Cache	15 MB	20 MB	10 MB	25 MB
	Cores and Threads	6C-6T	8C-16T	4C-8T	10C-20T
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	1.5 TB (24 x 64 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparring			
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: 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 * The slot mix changes by installing an optional riser card.		
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) 1 x Serial (9-pin mini D-sub, RS232-C, Serial A, 1 x rear) 5 x USB3.0 (2 x front, 2 x rear, 1 x internal) 3 x USB2.0 (2 x rear, 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, hot plug			
Redundant Power Supply		Optional, hot plug			
Power Supply		1-2 x 460 Watt or 800 Watt 80 PLUS® Platinum certified hot plug PSU, or 800 Watt 80 PLUS® Titanium certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			

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Model		R120g-1M			
Power Consumption	(Max. Config, Idling)	216 VA / 215 Watt	214 VA / 213 Watt	214 VA / 213 Watt	215 VA / 214 Watt
	(Max. Config, Operating)	521 VA / 517 Watt	583 VA / 578 Watt	580 VA / 576 Watt	607 VA / 602 Watt
Acoustical Noise (Sound Pressure Level) <sup>2</sup>	Max. Config, Idling	45.8 dB			
	Max. Config, Operating	53.2 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)		15.3 kg / 21.2 kg, 33.73 lbs. / 46.74 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), KC, 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) <sup>3</sup> Red Hat Enterprise Linux 7.2 or later <sup>3</sup> VMware ESXi™ 5.5 Update 3 VMware ESXi™ 6.0 Update 1 VMware ESXi™ 6.5			

<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 at the bystander positions in accordance with ISO 7779. The actual value may vary by the operating environment.

<sup>3</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>

### (2 / 4)

Model		R120g-1M			
Part Number		N8100-2402F, N8100-2403F, N8100-2404F			
Processor	Type	Intel® Xeon® processor E5-2637 v4	Intel® Xeon® processor E5-2640 v4	Intel® Xeon® processor E5-2650 v4	Intel® Xeon® processor E5-2650L v4
	Clock speed	3.50GHz	2.40 GHz	2.20 GHz	1.70 GHz
	Number of Processors	1 or 2			
	Cache	15 MB	25 MB	30 MB	35 MB
	Cores and Threads	4C-8T	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	1.5 TB (24 x 64 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	Standard Capacity	0 GB			
Internal Storage (Cont'd)	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			

## SYSTEM CONFIGURATION GUIDE – NEC Express5800R120g-1M

Model		R120g-1M			
	<b>Optical Disk Drive</b>	Optional			
	<b>Optical Drive Bays</b>	1			
	<b>Disk Drive Bays</b>	8			
<b>Expansion Slots</b>	<b>Standard</b>	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 * The slot mix changes by installing an optional riser card.			
<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) 1 x Serial (9-pin mini D-sub, RS232-C, Serial A, 1 x rear) 5 x USB3.0 (2 x front, 2 x rear, 1 x internal) 3 x USB2.0 (2 x rear, 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)			
<b>Server Management</b>		EXPRESSSCOPE Engine 3			
<b>Redundant Fan</b>		Standard, hot plug			
<b>Redundant Power Supply</b>		Optional, hot plug			
<b>Power Supply</b>		1-2 x 460 Watt or 800 Watt 80 PLUS® Platinum certified hot plug PSU, 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>	217 VA / 216 Watt	218 VA / 217 Watt	218 VA / 218 Watt	214 VA / 213 Watt
	<b>(Max. Config, Operating)</b>	658 VA / 654 Watt	623 VA / 619 Watt	656 VA / 652 Watt	558 VA / 554 Watt
<b>Acoustical Noise (Sound Pressure Level)<sup>2</sup></b>	<b>Max. Config, Idling</b>	45.8 dB	45.8 dB	45.8 dB	45.8 dB
	<b>Max. Config, Operating</b>	60.3 dB	54.1 dB	56.3 dB	49.7 dB
<b>Dimensions (W x D x H)</b>		439.8 x 722.0 x 43.4 mm / 17.3 x 28.4 x 1.7 in (1U)			
<b>Weight (Minimum / Maximum)</b>		15.3 kg / 21.2 kg, 33.73 lbs. / 46.74 lbs.			
<b>Temperature, Relative Humidity (non-condensing)</b>		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%			
<b>Regulatory and Safety</b>		FCC, UL, CB, CE, BSMI, UL(Mexico), KC, RoHS, WEEE			
<b>Operating Systems</b>		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) <sup>3</sup> Red Hat Enterprise Linux 7.2 or later <sup>3</sup> VMware ESXi™ 5.5 Update 3 VMware ESXi™ 6.0 Update 1 VMware ESXi™ 6.5			

<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 at the bystander positions in accordance with ISO 7779. The actual value may vary by the operating environment.

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### (3 / 4)

Model		R120g-1M			
<b>Part Number</b>		N8100-2402F, N8100-2403F, N8100-2404F			
<b>Processor</b>	<b>Type</b>	Intel® Xeon® processor E5-2667 v4	Intel® Xeon® processor E5-2680 v4	Intel® Xeon® processor E5-2690 v4	Intel® Xeon® processor E5-2697 v4

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Model		R120g-1M			
	<b>Clock speed</b>	3.20GHz	2.40 GHz	2.60 GHz	2.30 GHz
	<b>Number of Processors</b>	1 or 2			
	<b>Cache</b>	25 MB	35 MB	45 MB	
	<b>Cores and Threads</b>	8C-16T	14C-28T	18C-36T	
<b>Chipset</b>		Intel® C612 Chipset			
<b>Memory</b>	<b>Type</b>	DDR4-2400 Registered DIMM (4/8/16/32GB) DDR4-2400 TSV Registered DIMM (64GB)			
	<b>Standard Capacity</b>	0 GB			
	<b>Maximum Capacity</b>	1.5 TB (24 x 64 GB)			
	<b>Memory protection</b>	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparring			
<b>Internal Storage</b>	<b>Standard Capacity</b>	0 GB			
	<b>Maximum Capacity</b>	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)			
	<b>Disk Controller</b>	SATA : 6Gb/s (Integrated) SAS: 12 Gb/s (Optional)			
	<b>RAID</b>	SATA : RAID 0/1/5/6/10/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)			
	<b>Hot Plug</b>	Supported			
	<b>Optical Disk Drive</b>	Optional			
	<b>Optical Drive Bays</b>	1			
	<b>Disk Drive Bays</b>	8			
<b>Expansion Slots</b>	<b>Standard</b>	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 * The slot mix changes by installing an optional riser card.			
<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) 1 x Serial (9-pin mini D-sub, RS232-C, Serial A, 1 x rear) 5 x USB3.0 (2 x front, 2 x rear, 1 x internal) 3 x USB2.0 (2 x rear, 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)			
<b>Server Management</b>		EXPRESSSCOPE Engine 3			
<b>Redundant Fan</b>		Standard, hot plug			
<b>Redundant Power Supply</b>		Optional, hot plug			
<b>Power Supply</b>		1-2 x 460 Watt or 800 Watt 80 PLUS® Platinum certified hot plug PSU, 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>	219 VA / 218 Watt	213 VA / 212 Watt	214 VA / 213 Watt	229 VA / 228 Watt
	<b>(Max. Config, Operating)</b>	684 VA / 679 Watt	719 VA / 714 Watt	740 VA / 735 Watt	744 VA / 739 Watt
<b>Acoustical Noise (Sound Pressure Level)<sup>2</sup></b>	<b>Max. Config, Idling</b>	45.8 dB	45.8 dB	45.8 dB	45.8 dB
	<b>Max. Config, Operating</b>	60.3 dB	58.4 dB	60.3 dB	61.1 dB
<b>Dimensions (W x D x H)</b>		439.8 x 722.0 x 43.4 mm / 17.3 x 28.4 x 1.7 in (1U)			
<b>Weight (Minimum / Maximum)</b>		15.3 kg / 21.2 kg, 33.73 lbs. / 46.74 lbs.			
<b>Temperature, Relative Humidity (non-condensing)</b>		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%			
<b>Regulatory and Safety</b>		FCC, UL, CB, CE, BSMI, UL(Mexico), KC, RoHS, WEEE			
<b>Operating Systems</b>		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			

## SYSTEM CONFIGURATION GUIDE – NEC Express5800R120g-1M

Model	R120g-1M
	Microsoft® Windows Server® 2016 Standard Microsoft® Windows Server® 2016 Datacenter Red Hat Enterprise Linux 6.7 or later (x86_64) <sup>3</sup> Red Hat Enterprise Linux 7.2 or later <sup>3</sup> VMware ESXi™ 5.5 Update 3 VMware ESXi™ 6.0 Update 1 VMware ESXi™ 6.5

- <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 at the bystander positions in accordance with ISO 7779. The actual value may vary by the operating environment.
- <sup>3</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>

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Model	R120g-1M			
<b>Part Number</b>	N8100-2402F, N8100-2403F, N8100-2404F			
<b>Processor</b>	<b>Type</b>	Intel® Xeon® processor E5-2697A v4	Intel® Xeon® processor E5-2698 v4	Intel® Xeon® processor E5-2699 v4
	<b>Clock speed</b>	2.60GHz	2.20 GHz	2.20 GHz
	<b>Number of Processors</b>	1 or 2		
	<b>Cache</b>	40 MB	50 MB	55 MB
	<b>Cores and Threads</b>	16C-32T	20C-40T	22C-44T
<b>Chipset</b>	Intel® C612 Chipset			
<b>Memory</b>	<b>Type</b>	DDR4-2400 Registered DIMM (4/8/16/32GB) DDR4-2400 TSV Registered DIMM (64GB)		
	<b>Standard Capacity</b>	0 GB		
	<b>Maximum Capacity</b>	1.5 TB (24 x 64 GB)		
	<b>Memory protection</b>	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparring		
<b>Internal Storage</b>	<b>Standard Capacity</b>	0 GB		
	<b>Maximum Capacity</b>	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)		
	<b>Disk Controller</b>	SATA : 6Gb/s (Integrated) SAS: 12 Gb/s (Optional)		
<b>Internal Storage (Cont'd)</b>	<b>RAID</b>	SATA : RAID 0/1/5/6/10/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)		
	<b>Hot Plug</b>	Supported		
	<b>Optical Disk Drive</b>	Optional		
	<b>Optical Drive Bays</b>	1		
	<b>Disk Drive Bays</b>	8		
<b>Expansion Slots</b>	<b>Standard</b>	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 * The slot mix changes by installing an optional riser card.		
<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) 1 x Serial (9-pin mini D-sub, RS232-C, Serial A, 1 x rear) 5 x USB3.0 (2 x front, 2 x rear, 1 x internal) 3 x USB2.0 (2 x rear, 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)			
<b>Server Management</b>	EXPRESSSCOPE Engine 3			
<b>Redundant Fan</b>	Standard, hot plug			
<b>Redundant Power Supply</b>	Optional, hot plug			
<b>Power Supply</b>	1-2 x 460 Watt or 800 Watt 80 PLUS® Platinum certified hot plug PSU, or			

## SYSTEM CONFIGURATION GUIDE – NEC Express5800R120g-1M

Model		R120g-1M		
		800 Watt 80 PLUS® Titanium certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz		
Power Consumption	(Max. Config, Idling)	230 VA / 229 Watt	221 VA / 220 Watt	233 VA / 232 Watt
	(Max. Config, Operating)	743 VA / 738 Watt	734 VA / 729 Watt	751 VA / 745 Watt
Acoustical Noise (Sound Pressure Level) <sup>2</sup>	Max. Config, Idling	45.8 dB	45.8 dB	45.8 dB
	Max. Config, Operating	61.1 dB	60.3 dB	61.1 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)		15.3 kg / 21.2 kg, 33.73 lbs. / 46.74 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), KC, 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) <sup>3</sup> Red Hat Enterprise Linux 7.2 or later <sup>3</sup> VMware ESXi™ 5.5 Update 3 VMware ESXi™ 6.0 Update 1 VMware ESXi™ 6.5		

<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 at the bystander positions in accordance with ISO 7779. The actual value may vary by the operating environment.

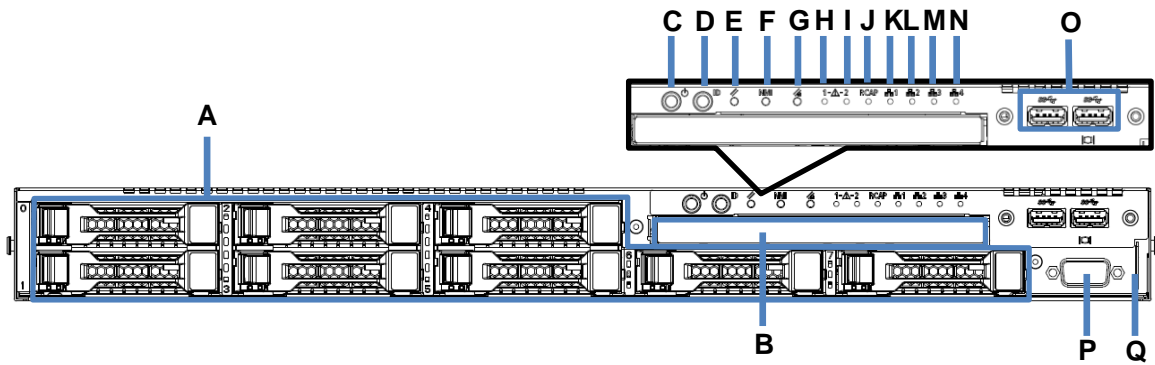
<sup>3</sup> For Linux support, contact your sales representative or go to the NEC website at:  
<http://www.nec.com/global/prod/express/linux/index.html>



# External Views

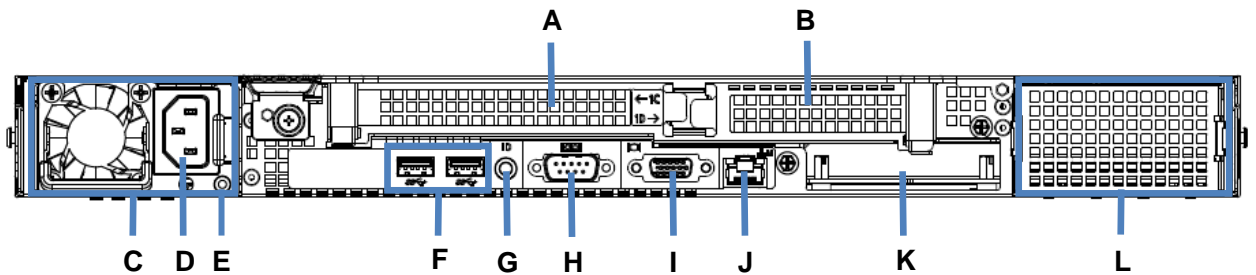
## Front and Rear Views

### Front View



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

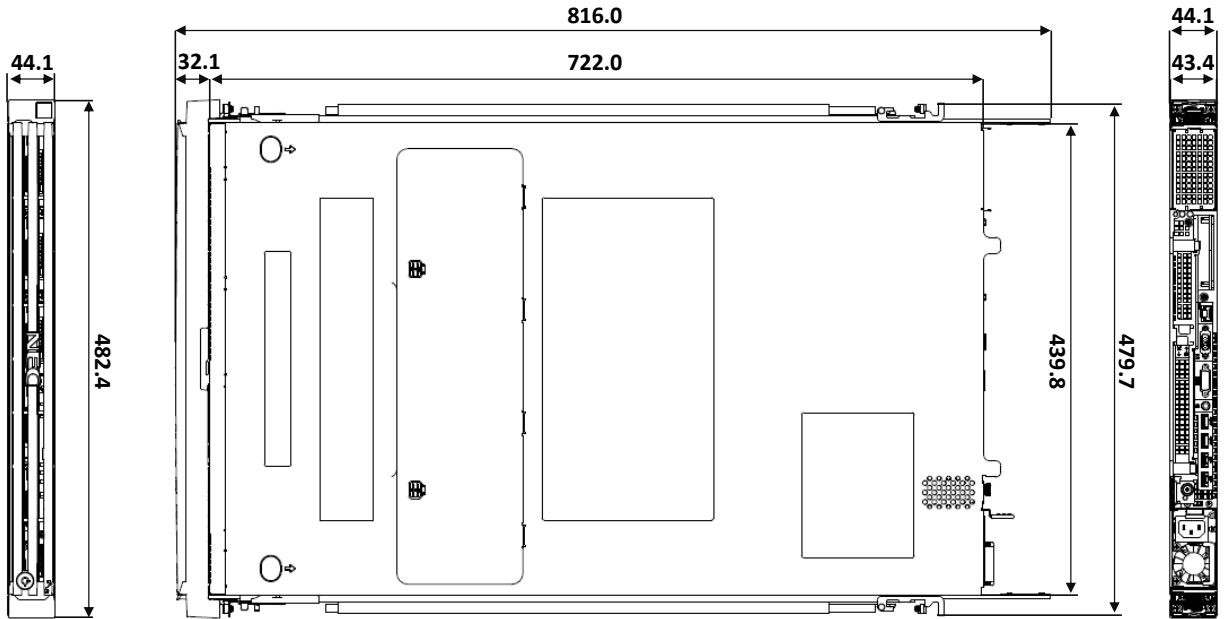
### Rear View



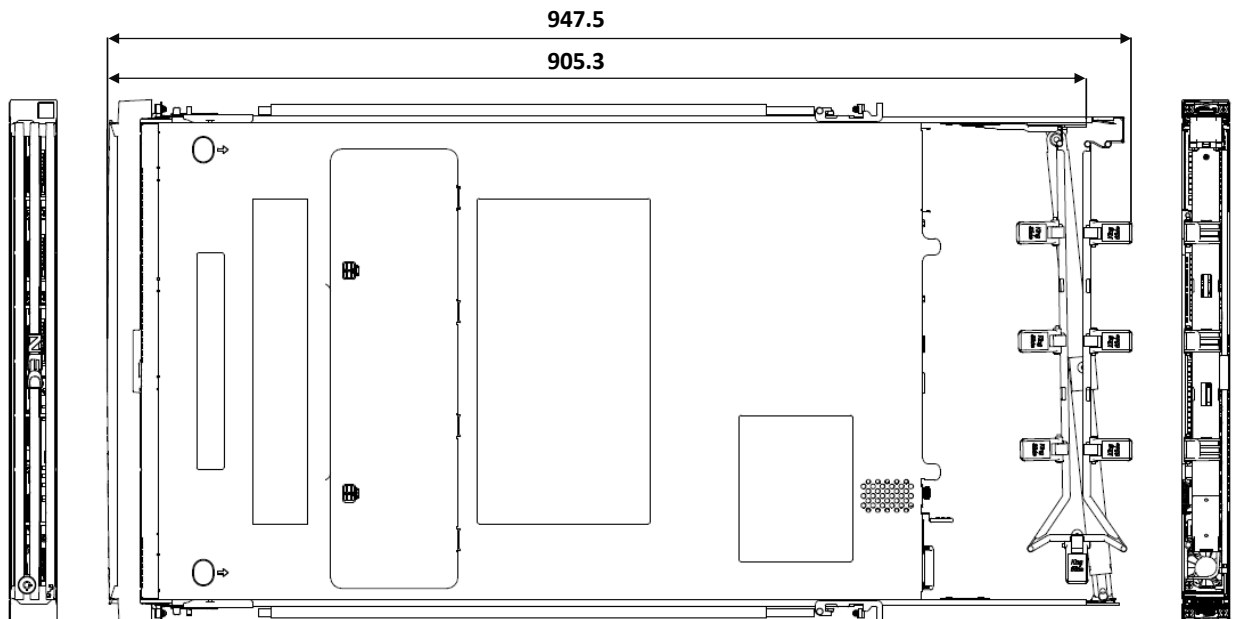
Legend	
A.	PCI Slot (Full-Height)
B.	PCI Slot (Low-Profile)
C.	Power Supply
D.	AC Inlet
E.	AC Power LED
F.	USB Connectors
G.	UID Button/LED
H.	Serial Port Connector
I.	VGA Connector
J.	Management LAN Connector
K.	LOM Card Slot
L.	Additional Power Supply Slot

## Dimensions (mm)

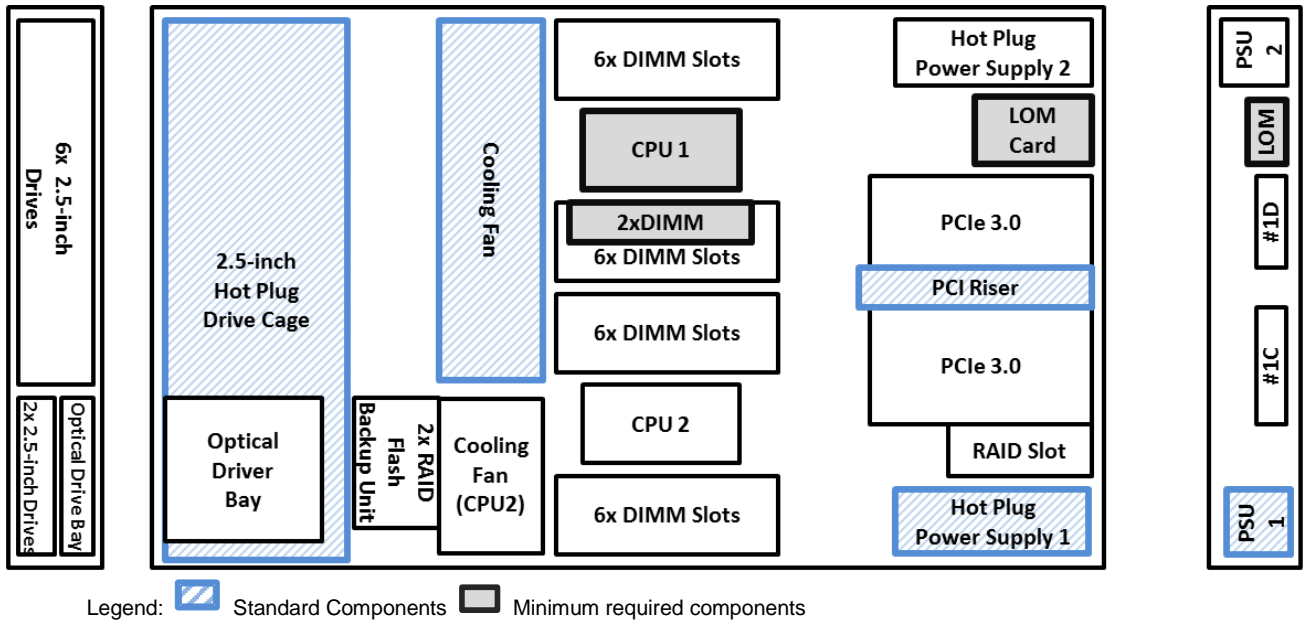
### Without Cable Arm



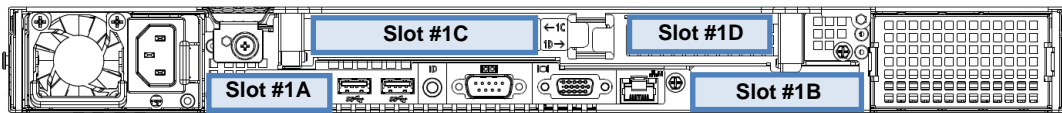
### With Cable Arm



# Configuration Diagram



## Expansion Slots



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

# Server Configuration

## 1 Base Models

Product Name / Description	Part Number
<b>NEC Express5800/R120g-1M Server</b> no processor, no RAM, no HDD, no ODD, no LOM Card Including : 1 x 460 Watt 80 PLUS® Platinum Power Supply Unit, Front Bezel, 2.5-inch Drive Cage	N8100-2402F
<b>NEC Express5800/R120g-1M Server</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, 2.5-inch Drive Cage	N8100-2403F
<b>NEC Express5800/R120g-1M Server</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, 2.5-inch Drive Cage	N8100-2404F

### 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](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 v4 Processor Kit</b> Intel® Xeon® Processor E5-2603 v4 (1.70 GHz, 6C/6T, 15 MB)	N8101-1029F	
	<b>Xeon E5-2620 v4 Processor Kit</b> Intel® Xeon® Processor E5-2620 v4 (2.10 GHz, 8C/16T, 20 MB)	N8101-1030F	
	<b>Xeon E5-2623 v4 Processor Kit</b> Intel® Xeon® Processor E5-2623 v4 (2.60 GHz, 4C/8T, 10 MB)	N8101-1031F	
	<b>Xeon E5-2630 v4 Processor Kit</b> Intel® Xeon® Processor E5-2630 v4 (2.20 GHz, 10C/20T, 25 MB)	N8101-1032F	
	<b>Xeon E5-2637 v4 Processor Kit</b> Intel® Xeon® Processor E5-2637 v4 (3.50 GHz, 4C/8T, 15 MB)	N8101-1033F	
	<b>Xeon E5-2640 v4 Processor Kit</b> Intel® Xeon® Processor E5-2640 v4 (2.40 GHz, 10C/20T, 25 MB)	N8101-1034F	
	<b>Xeon E5-2650 v4 Processor Kit</b> Intel® Xeon® Processor E5-2650 v4 (2.20 GHz, 12C/24T, 30 MB)	N8101-1036F	
	<b>Xeon E5-2650L v4 Processor Kit</b> Intel® Xeon® Processor E5-2650L v4 (1.70 GHz, 14C/28T, 35 MB)	N8101-1037F	
	<b>Xeon E5-2667 v4 Processor Kit</b> Intel® Xeon® Processor E5-2667 v4 (3.20 GHz, 8C/16T, 25 MB)	N8101-1038F	
	<b>Xeon E5-2680 v4 Processor Kit</b> Intel® Xeon® Processor E5-2680 v4 (2.40 GHz, 14C/28T, 35 MB)	N8101-1039F	
	<b>Xeon E5-2690 v4 Processor Kit</b> Intel® Xeon® Processor E5-2690 v4 (2.60 GHz, 14C/28T, 35 MB)	N8101-1040F	
	<b>Xeon E5-2697 v4 Processor Kit</b> Intel® Xeon® Processor E5-2697 v4 (2.30 GHz, 18C/36T, 45 MB)	N8101-1041F	
	<b>Xeon E5-2697A v4 Processor Kit</b> Intel® Xeon® Processor E5-2697A v4 (2.60 GHz, 16C/32T, 40 MB)	N8101-1042F	
	<b>Xeon E5-2698 v4 Processor Kit</b> Intel® Xeon® Processor E5-2698 v4 (2.20 GHz, 20C/40T, 50 MB)	N8101-1043F	
	<b>Xeon E5-2699 v4 Processor Kit</b> Intel® Xeon® Processor E5-2699 v4 (2.20 GHz, 22C/44T, 55 MB)	N8101-1044F	
	<b>Heat Sink</b>		
	<b>1st</b>	<b>Processor Heat Sink</b> For 1 <sup>st</sup> Processor	(Standard)
<b>2nd</b>	<b>Processor Heat Sink</b> For 2 <sup>nd</sup> Processor, including cooling fan kit	N8101-780F	

### 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)	256 <sup>1</sup>
Microsoft Windows Server 2008 R2 Enterprise (x64)	88
Microsoft Windows Server 2012 Standard	640 <sup>1</sup>
Microsoft Windows Server 2012 Datacenter	88
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 (x86_64)	240
Red Hat Enterprise Linux 7	88
VMware ESXi 5.5	320
VMware ESXi 6.0	480
VMware ESXi 6.5	576
VMware ESXi 6.5	72

<sup>1</sup> 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
<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	5/6 physical memory	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.

#### 3.1.1 Independent Channel Configuration

Available slots: 12 per processor

Category	Product Name / Description	Part Number
<b>Registered DIMM (RDIMM)</b>	<b>8GB DDR4-2400 REG Memory Kit (2x4GB)</b> 2 x 4GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-663F
	<b>16GB DDR4-2400 REG Memory Kit (2x8GB)</b> 2 x 8GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-664F
	<b>32GB DDR4-2400 REG Memory Kit (2x16GB)</b> 2 x 16GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-665F
	<b>64GB DDR4-2400 REG Memory Kit (2x32GB)</b> 2 x 32GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-666F
<b>TSV Registered DIMM (TSV RDIMM)</b>	<b>128GB DDR4-2400 TSV REG Memory Kit (2x64GB)</b> 2 x 64GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-667F

**NOTE:**

- Minimum one memory kit per processor must be installed.
- It is recommended to install memory kits in multiples of two (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 RDIMM and TSV RDIMM are not supported.
- When N8102-667F is installed, the operable ambient temperature is up to 35 degrees Celsius.
- When N8102-667F is installed, N8118-300 2.5-inch PCIeSSD Installation Kit is not supported.

### 3.1.2 Memory Sparing Configuration

Available slots: 12 per processor

Product Name / Description	Part Number
<b>24GB DDR4-2400 REG Memory Kit (3x8GB)</b> 3 x 8GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-672
<b>48GB DDR4-2400 REG Memory Kit (3x16GB)</b> 3 x 16GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-673

**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 five-sixth of physical capacity.
- The maximum memory speed is 1866 MHz.

### 3.1.3 Memory Mirroring / Memory Lockstep Configuration

Available slots: 12 per processor

Product Name / Description	Part Number
<b>16GB DDR4-2400 REG Memory Kit (2x8GB)</b> 2 x 8GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-669
<b>32GB DDR4-2400 REG Memory Kit (2x16GB)</b> 2 x 16GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-670

**NOTE:**

- Minimum one memory kit per processor must be installed.

### 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.

The maximum memory transfer rate is 1866 MHz with Memory Sparing Configuration.

Processor Type	Populated DIMMs	# of DIMMs per processor	DIMM Speed
E5-2603 v4	RDIMM: 4, 8, 16, 32, 64GB	-	1866 MHz
	Memory Sparing	-	1866 MHz
E5-2620 v4	RDIMM: 4, 8, 16, 32, 64GB	Up to 8 DIMMs -	2133 MHz
E5-2623 v4		10 or more DIMMs	1866 MHz
E5-2630 v4	Memory Sparing	-	1866 MHz
E5-2640 v4		-	1866 MHz
E5-2637 v4	RDIMM: 4, 8, 16, 32, 64GB	Up to 8 DIMMs -	2400 MHz
E5-2650 v4		10 or more DIMMs	1866 MHz
E5-2650L v4	Memory Sparing	-	1866 MHz
E5-2667 v4		-	1866 MHz
E5-2680 v4		-	1866 MHz
E5-2690 v4		-	1866 MHz
E5-2697 v4		-	1866 MHz
E5-2697A v4		-	1866 MHz
E5-2698 v4		-	1866 MHz
E5-2699 v4		-	1866 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 <sup>1</sup>	32 GB	32 GB
Microsoft Windows Server 2008 R2 Enterprise <sup>1</sup>	2 TB	1.5 TB
Microsoft Windows Server 2012 Standard <sup>1</sup>	4 TB	1.5 TB
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>		
Microsoft Windows Server 2016 Standard <sup>1</sup>		
Microsoft Windows Server 2016 Datacenter <sup>1</sup>		
Red Hat Enterprise Linux 6 (x86_64)	6 TB	1.5 TB
Red Hat Enterprise Linux 7		
VMware ESXi 5.5 <sup>2</sup>	4 TB	1.5 TB
VMware ESXi 6.0 <sup>3</sup>	6 TB	1.5 TB
VMware ESXi 6.5 <sup>4</sup>	12 TB	1.5 TB

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

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

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

<sup>3</sup> Up to 4TB of main memory is available to each virtual machine.

<sup>4</sup> 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 4.2.2 for the required components and then refer to the section 4.3.3 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
VMware ESXi 5.5	RAID 0/1/10 1GB Cache	4.2.2	4.3.2
VMware ESXi 6.0	RAID 5/6/50/60 1GB Cache	4.2.3	
	RAID 5/6/50/60 2GB Cache	4.2.4	
Windows Server 2012	Non-RAID (Embedde SATA)	4.2.1	4.3.1
Windows Server 2012 R2	RAID 0/1/10 1GB Cache	4.2.2	4.3.3
Windows Server 2016			
Red Hat Enterprise Linux 6	RAID 5/6/50/60 1GB Cache	4.2.3	
Red Hat Enterprise Linux 7	RAID 5/6/50/60 2GB Cache	4.2.4	
VMware ESXi 6.5			

**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 in each drive cage.
- 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	<b>Embedded SATA Controller</b> 4 x 6Gb/s SATA	(Standard)
Cable	<b>Internal SATA Cable</b> 1 x mini-SAS HD to 1 x mini-SAS HD	(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 RAID 0/1 Controller with 1 GB 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)

**NOTE:**

- Up to two Flash Backup Units can be installed in the system. Therefore, N8103-181 Flash backup Unit cannot be installed for N8103-176, N8103-177 or N8103-178 when two N8103-179 RAID controllers (including Flash Backup Unit as standard) are installed.
- For Supported HDD/SSD, refer to 4.3.2 for Windows Server 2008R2, or VMware. Refet to 4.3.3 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 in each drive cage.

### 4.2.3 RAID 5/6 Controller with 1 GB Cache

Category	Product Name / Description	Part Number
Storage Controller <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
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)

**NOTE:**

- Up to two Flash Backup Units can be installed in the system. Therefore, N8103-181 Flash backup Unit cannot be installed for N8103-176, N8103-177 or N8103-178 when two N8103-179 RAID controllers (including Flash Backup Unit as standard) are installed.

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- For Supported HDD/SSD, refer to 4.3.2 for Windows Server 2008R2 or VMware. Refet to 4.3.3 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 in each drive cage.

### 4.2.4 RAID 5/6 Controller with 2 GB Cache

Category	Product Name / Description	Part Number
<b>Storage Controller</b> Required	<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, 12Gb/s	N8103-178
<b>Flash Backup</b> Recommended	<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)

#### NOTE:

- Up to two Flash Backup Units can be installed in the system. Therefore, N8103-181 Flash backup Unit cannot be installed for N8103-176, N8103-177 or N8103-178 when two N8103-179 RAID controllers (including Flash Backup Unit as standard) are installed.
- For Supported HDD/SSD, refer to 4.3.2 for Windows Server 2008R2 or VMware. Refet to 4.3.3 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 in each drive cage.

## 4.3 Supported HDD/SDD

### 4.3.1 For Embedded SATA Controller

Category	Product Name / Description	Part Number
<b>Drive</b> 4 slots available	<b>SATA HDD (512n)</b> <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, 512n 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, 512n sector	N8150-489
	<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, 512n sector	N8150-527

### 4.3.2 For RAID Controller Configuration (1)

For Windows Server 2008R2 or VMware.

Category	Product Name / Description	Part Number
<b>Drive</b> 8 slots available	<b>SAS HDD (512n)</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, 512n 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, 512n 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, 512n 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, 512n 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, 512n 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, 512n sector	N8150-485
	<b>450GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-486
	<b>600GB 15K Hot Plug 2.5-inch SAS HDD</b>	N8150-518

	1x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	
<b>SATA HDD (512n)</b>	<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, 512n 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, 512n sector	N8150-489
	<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, 512n sector	N8150-527
<b>SAS SSD (ME)</b>	<b>200GB Hot Plug 2.5-inch SAS SSD</b> 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512n 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, 512n sector	N8150-722
<b>SATA SSD (ME)</b>	<b>200GB Hot Plug 2.5-inch SATA SSD</b> 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-725
	<b>400GB Hot Plug 2.5-inch SATA SSD</b> 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-726
	<b>800GB Hot Plug 2.5-inch SATA SSD</b> 1 x 800 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-727
<b>SATA SSD (VE)</b>	<b>200GB Hot Plug 2.5-inch SATA SSD</b> 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, VE	N8150-732
	<b>400GB Hot Plug 2.5-inch SATA SSD</b> 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, VE	N8150-733
	<b>800GB Hot Plug 2.5-inch SATA SSD</b> 1 x 800 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, VE	N8150-734
	<b>1.6TB Hot Plug 2.5-inch SATA SSD</b> 1 x 1.6 TB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, VE	N8150-735

**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 in each drive cage.
- For monitoring SATA SSD life on VMware, NEC ESM PRO Manager Ver.6.05 or later is required. Please download the latest version on the NEC web site.
- The 2.5-inch SAS/SATA SSDs have limited lifetime. Refer to [Endurance of SSD](#) for details.

### 4.3.3 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
<b>Drive Standard :8 slots available</b>	<b>SAS HDD (512n)</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, 512n 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, 512n 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, 512n 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, 512n 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, 512n 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, 512n sector	N8150-485
	<b>450GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-486
	<b>600GB 15K Hot Plug 2.5-inch SAS HDD</b> 1x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-518
	<b>SAS HDD (512e)</b> <b>1.8TB 10K Hot Plug 2.5-inch SAS HDD</b> 1x 1.8TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512e sector	N8150-541
	<b>SATA HDD (512n)</b> <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, 512n 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, 512n sector	N8150-489
	<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, 512n sector	N8150-527

<b>SAS SSD (ME)</b>	<b>200GB Hot Plug 2.5-inch SAS SSD</b> 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512n 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, 512n sector	N8150-722
<b>SATA SSD (ME)</b>	<b>200GB Hot Plug 2.5-inch SATA SSD</b> 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-725
	<b>400GB Hot Plug 2.5-inch SATA SSD</b> 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-726
	<b>800GB Hot Plug 2.5-inch SATA SSD</b> 1 x 800 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-727
<b>SATA SSD (VE)</b>	<b>200GB Hot Plug 2.5-inch SATA SSD</b> 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, VE	N8150-732
	<b>400GB Hot Plug 2.5-inch SATA SSD</b> 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, VE	N8150-733
	<b>800GB Hot Plug 2.5-inch SATA SSD</b> 1 x 800 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, VE	N8150-734
	<b>1.6TB Hot Plug 2.5-inch SATA SSD</b> 1 x 1.6 TB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, VE	N8150-735

**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 in each drive cage.
- 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
- When you select 4Kn sector HDD, confirm whether your applications support hard drives with 4Kn sector size. For more information, visit the NEC website at: [http://www.nec.com/en/global/prod/express/svopt/hdd/collateral/4KHDD\\_Precautions\\_EN.pdf](http://www.nec.com/en/global/prod/express/svopt/hdd/collateral/4KHDD_Precautions_EN.pdf)
- The 2.5-inch SAS/SATA SSDs have limited lifetime. Refer to [Endurance of SSD](#) for details.

## 5 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)	N8151-134
	<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)	N8151-135F
	<b>NOTE:</b> Not supported for Linux or VMware.	
<b>External</b>	<b>External DVD Dual drive</b> 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
<b>PCIe Riser Card Kit</b> 4 x PCIe 3.0 x8	(Standard)
<b>PCIe x16 Riser Card Kit</b> 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	<b>Quad Port 1000BASE-T LOM Card</b> Broadcom® BCM5719 PCIe 2.0 x4	N8104-154F
		<b>10GbE</b>	
		<b>Dual Port 10GBASE-T LOM Card</b> Intel Ethernet Controller X540 PCIe 2.0(x8)	N8104-155F
		<b>Dual Port 10GBASE-T LOM Card</b> Intel Ethernet Controller X550 PCIe 3.0(x8)	N8104-160F
		<b>Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card</b> Qlogic NetXtreme II BCM57800S PCIe 2.0 x8	N8104-156F
		<b>NOTE:</b> N8104-129 SFP+ Module is required to connect with an optical cable. Up to two SFP+ Modules can be installed.	
Adapter	1GbE	<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	N8104-145
		<b>NOTE:</b> PXE boot is not supported on UEFI environment.	
		<b>Quad Port 1000BASE-T Adapter</b> Broadcom® BCM5719 Gigabit Ethernet Controller PCIe 2.0 x4	N8104-152
		<b>NOTE:</b> Network cables with RJ-45 plug covers cannot be used.	
	10GbE	<b>Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)</b> Intel 82599ES 10 Gigabit Ethernet Controller PCIe 2.0 x8, Low Profile / Full Height	N8104-148
		<b>NOTE:</b> N8104-129 SFP+ Module is required to connect with an optical cable. Up to 2 SFP+ Modules can be installed.	
		<b>10GBASE SFP+ Adapter (SFP+/2ch)</b> Qlogic NetXtreme II BCM57810S PCIe 2.0 x8, Low Profile / Full Height	N8104-149

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**NOTE:**

N8104-129 SFP+ Module is required to connect with an optical cable.

<b>10GBASE Adapter (SFP+/2ch)</b>	N8104-158
Intel Ethernet Converged Network Adapters X710 PCIe 3.0 x8	

**NOTE:**

- N8104-129 SFP+ Module is required to connect with an optical cable.

<b>10GBASE Adapter (QSFP+/4ch)</b>	N8104-159
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.

<b>Dual Port 10GBASE-T Adapter</b>	N8104-153
Intel® Ethernet Controller X540 PCIe 2.0(x8) , Low Profile / Full Height	

<b>Dual Port 10GBASE-T Adapter</b>	N8104-157
Intel® Ethernet Controller X550 PCIe 3.0 x4, Low Profile / Full Height	

<b>SFP+ Module</b>	<b>SFP+ Module (10G-SR)</b>	N8104-129
	1 x SFP+ Module	
	<b>QSFP+ Module</b>	N8104-161
	1 x QSFP+ Module	

**NOTE:**

- Up to three adapters of 10GbE can be installed.
- Network performance may be reduced depending on the applications and memory performance when three 10Gb Network Adapters are installed.
- 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
<b>1GbE NIC</b> 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
<b>1GbE NIC</b> N8104-145	Up to four ports per one team	Windows Server 2008 R2
<b>10GbE NIC</b> 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
<b>10GbE NIC</b> N8104-148/-158/-159	Up to four ports per one team	Red Hat Enterprise Linux 6.7 or later [Supporting N8104-148 only] Red Hat Enterprise Linux 7.2 or later
<b>10GbE NIC</b> 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 teams are mixed, the maximum number of teams 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/-158/-159	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

**NOTE:**

- NIC Teaming feature is not supported on iSCSI interfaces.

## 6.3 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	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 your sales representative in regard to production lead time.

## 6.4 External Storage Controller

### 6.4.1 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:**

- Up to two Flash Backup Units can be installed in the system. Therefore, N8103-181 Flash backup Unit cannot be installed for N8103-176, N8103-177 or N8103-178 when two N8103-179 RAID controllers (including Flash Backup Unit as standard) are installed.
- 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.

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

### 6.4.2 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
	<b>Fibre Channel Controller (1ch)</b> QLogic, QLE2690 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0(x8)	N8190-161
	<b>Fibre Channel Controller (2ch)</b> QLogic, QLE2692 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0(x8)	N8190-162
	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
<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:

- Up to two ports of 16Gb/s Fibre Channel Controller are supported in a single processor configuration with Xeon E5-2603v4. (i.e. one N8190-158A or up to two N8190-157A)

### 6.5 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.

## 7 Other Add-in Components

### 7.1 Power Supply

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	N8181-118F

#### NOTE:

- 200 VAC input only supported

#### NOTE:

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



## 7.2 Trusted Platform Module Kit

Product Name / Description	Part Number
<b>Trusted Platform Module Kit</b> TPM 2.0 module	N8115-26

**NOTE:**

- Supported for Windows Server 2012 and Windows Server 2012 R2 only.

**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
<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.

## 7.4 High Temperature Support Option

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

**NOTE:**

- This option is not applicable to N8100-2402F (460 Watt power supply model).

**NOTE:**

- To apply this option, there are some configuration limitations below.

**Required System Configuration:**

- Installed memory must be 6 DIMMs per processor or less.
- Do not install N8102-667F 128GB DDR4-2400 REG Memory Kit (2x64GB)

## 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
<b>External</b>	<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.
- 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
<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 R120g-1M, one on the front side and one on the rear side. However, the front side only works when both are connected at the same time.

### 8.2 KVM Switch

Category		Product Name / Description	Part Number
<b>KVM Switch</b>		<b>Server Switch Unit (8 server)</b> 1U USB 8 port KVM switch	N8191-14F
<b>Cable</b>	<b>KVM</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,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)
	<b>Cascading</b>		<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

**NOTE:**

- There are two VGA connectors on R120g-1M, one on the front side and one on the rear side. However, the front side only works when both are connected at the same time.

### 8.3 Cable Management Arm

Product Name / Description	Part Number
<b>Cable Management Arm 1U Kit</b> for R120g-1M	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
<p><b>Remote KVM and Media License Kit</b></p> <p>License for one server. Remote KVM and remote media are enabled regardless of OS status.</p> <p>Remote KVM:</p> <ul style="list-style-type: none"><li>- Displays a graphics console on the web browser of the remote terminal (PC/server).</li><li>- Controls keyboard and mouse via the remote terminals' web browser</li></ul> <p>Remote media:</p> <p>Enables the user to use the CD / DVD / FD / Flash memory of the remote terminals (PC/server) as if accessing the local drives.</p> <p><b>NOTE:</b> Remote KVM and remote media features are not available for virtual machines.</p>	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	Legacy	Disabled
VMware ESXi 6.0	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
<b>Hardware monitoring</b>	Temperature/voltage/power/RAID/standard LAN/fan /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>
	BIOS setting by using XML file	✓	✓
<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.

## Endurance of SSD

The 2.5-inch SAS/SATA SSDs have limited lifetime, which can only be written a limited number of times before it fails.

The warranty period of SSD is the stated period of warranty or until the total bytes of written value (PBW) exceeds the limit value, whichever occurs first. It is recommended to check the total bytes of written value periodically.

Refer to the table below for the write endurance (PBW and DWPD), warranty period and monitoring tool.

### SSD Lifetime

Part Number	Product Name	PBW	DWPD	Period	Monitoring Tool
<b>SAS SSD</b>					
N8150-721	200GB Hot Plug 2.5-inch SAS SSD	3.6PBW	10 Times	3 Years	Universal RAID Utility, EXPRESSBUILDER (System Test and Diagnostics)
N8150-722	400GB Hot Plug 2.5-inch SAS SSD	7.3PBW	10 Times	3 Years	
<b>SATA SSD (Middle Endurance)</b>					
N8150-725	200GB Hot Plug 2.5-inch SATA SSD	3.6PBW	10 Times	3 Years	
N8150-726	400GB Hot Plug 2.5-inch SATA SSD	7.3PBW	10 Times	3 Years	
N8150-727	800GB Hot Plug 2.5-inch SATA SSD	14.6PBW	10 Times	3 Years	
<b>SATA SSD (Value Endurance)</b>					
N8150-732	200GB Hot Plug 2.5-inch SATA SSD	1.1PBW	3 Times	3 Years	
N8150-733	400GB Hot Plug 2.5-inch SATA SSD	3.0PBW	3 Times	3 Years	
N8150-734	800GB Hot Plug 2.5-inch SATA SSD	5.3PBW	3 Times	3 Years	
N8150-735	1.6TB Hot Plug 2.5-inch SATA SSD	10.7PBW	3 Times	3 Years	

- PBW(Peta-Bytes Write): Total amount of data that can be written into the SSD. 1PB=1,000TB.
- DWPD(Drive Writes per Day): Rewrite capacity of the SSD per day.
- Check the lifetime of SSD by monitoring tool regularly.
- It is recommended to replace the SSD before it reaches its end of life. For repurchase, please contact your sales representative.
- For detailed operating methods of monitoring tool, refer to the User's Guide.

## OS Support Matrix for PCI Cards and Embedded Controllers

Part number	Product Name	WS 2016	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	✓	✓	✓	✓	✓	✓	✓	✓	✓
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)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-142	SAS Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-184	SAS Controller	-	✓	✓	-	✓	✓	✓	✓	✓
N8190-162	Fibre Channel Controller (2ch)	✓	-	-	-	-	-	-	-	-
N8190-161	Fibre Channel Controller (1ch)	✓	-	-	-	-	-	-	-	-
N8190-159	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-160	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-157A	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-158A	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-154F	Quad Port 1000BASE-T LOM Card	✓	✓	✓	✓	✓	✓	✓	✓	✓
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	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-150	1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-151	Dual Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-145	Dual Port 1000BASE-T Adapter	-	-	-	✓	✓	✓	-	-	-
N8104-152	Quad Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-148	Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)	-	-	-	-	✓	✓	-	-	-
N8104-149	10GBASE SFP+ Adapter (SFP+/2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-153	Dual Port 10GBASE-T Adapter	✓	✓	✓	-	✓	✓	✓	✓	✓
N8104-159	10GBASE Adapter (QSFP+/4ch)	-	-	-	-	✓	-	-	-	-
N8104-158	10GBASE Adapter (SFP+/2ch)	-	-	-	-	✓	-	-	-	-
N8104-157	Dual Port 10GBASE-T Adapter	✓	✓	✓	-	✓	✓	-	-	-
N8104-146	Single Port InfiniBand Adapter	-	✓	✓	-	✓	✓	-	-	-
N8104-147	Dual Port InfiniBand Adapter	-	✓	✓	-	✓	✓	-	-	-
N8118-300	2.5-inch PCIeSSD Installation Kit	✓	✓	✓	-	-	✓	-	-	-

## Supported PCI Cards and Installable Slots

### Standard Riser Card

Priority	Part Number	Product Name	Slots			
			#1A	#1B	#1C	#1D
(1)	N8104-155F	Dual Port 10GBASE-T LOM Card	-	(1)	-	-
(2)	N8104-160F	Dual Port 10GBASE-T LOM Card	-	(1)	-	-
(3)	N8104-156F	Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card	-	(1)	-	-
(4)	N8104-154F	Quad Port 1000BASE-T LOM Card	-	(1)	-	-
(5)	N8103-176	RAID Controller (1 GB, RAID 0/1)	(1)	-	-	-
(6)	N8103-177	RAID Controller (1 GB, RAID 0/1/5/6)	(1)	-	-	-
(7)	N8103-178	RAID Controller (2 GB,RAID 0/1/5/6)	(1)	-	-	-
(8)	N8103-179	RAID Controller (2 GB,RAID 0/1/5/6)	-	-	(1)	(2)
(9)	N8118-300	2.5-inch PCIeSSD Installation Kit	-	-	-	(1)
(10)	N8190-162	Fibre Channel Controller (2ch)	-	-	(1)	(2)
(11)	N8190-161	Fibre Channel Controller (1ch)	-	-	(1)	(2)
(12)	N8190-158A	Fibre Channel Controller (2ch)	-	-	(1)	(2)
(13)	N8190-157A	Fibre Channel Controller	-	-	(1)	(2)
(14)	N8104-147	Dual Port InfiniBand Adapter	-	-	(1)	(2)
(15)	N8104-146	Single Port InfiniBand Adapter	-	-	(1)	(2)
(16)	N8103-184	SAS Controller	-	-	(1)	(2)
(17)	N8104-159	10GBASE Adapter (QSFP+/4ch)	-	-	(1)	(2)
(18)	N8104-158	10GBASE Adapter (SFP+/2ch)	-	-	(1)	(2)
(19)	N8104-157	Dual Port 10GBASE-T Adapter	-	-	(1)	(2)
(20)	N8104-153	Dual Port 10GBASE-T Adapter	-	-	(1)	(2)
(21)	N8104-149	10GBASE SFP+ Adapter (SFP+/2ch)	-	-	(1)	(2)
(22)	N8104-148	Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)	-	-	(1)	(2)
(23)	N8190-160	Fibre Channel Controller (2ch)	-	-	(1)	(2)
(24)	N8190-159	Fibre Channel Controller	-	-	(1)	(2)
(25)	N8103-142	SAS Controller	-	-	(1)	(2)
(26)	N8104-152	Quad Port 1000BASE-T Adapter	-	-	(1)	(2)
(27)	N8104-145	Dual Port 1000BASE-T Adapter	-	-	(1)	(2)
(28)	N8104-151	Dual Port 1000BASE-T Adapter	-	-	(1)	(2)
(29)	N8104-150	1000BASE-T Adapter	-	-	(1)	(2)
(30)	N8117-01A	Serial Port Adapter	-	-	(1)	(2)

**NOTE:**

- The number between parentheses shows the population priority (recommendation). For example, install N8104-155F (1) in the slot #1B, N8103-176 (5) in the slot #1A, N8104-153 (18) in the slot #1C and N8190-160 (21) in the slot #1D when you install those cards.
- For VMware ESXi 5.5, there are some limitations as follows:
  - <With N8104-154F Quad Port 1000BASE-T LOM Card>
    - N8104-149/-153/-157 and N8104-150/-151/-152 cannot be mixed.
    - When configured with Xeon E5-2697 v4/E5-2697A v4/E5-2698 v4/E5-2699 v4, up to one card among N8103-176/-177/-178/-179 can be installed.
    - When configured with Xeon E5-2603 v4/E5-2620A v4/E5-2623 v4/E5-2630 v4/E5-2637 v4/E5-2640 v4/E5-2650 v4/E5-2650L v4/E5-2667 v4/E5-2680 v4/E5-2690 v4, 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.
    - When configured with Xeon E5-2697 v4/E5-2697A v4/E5-2698 v4/E5-2699 v4, up to one card among N8103-176/-177/-178/-179 can be installed.
    - When configured with Xeon E5-2603 v4/E5-2620A v4/E5-2623 v4/E5-2630 v4/E5-2637 v4/E5-2640 v4/E5-2650 v4/E5-2650L v4/E5-2667 v4/E5-2680 v4/E5-2690 v4, 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.
    - When configured with Xeon E5-2697 v4/E5-2697A v4/E5-2698 v4/E5-2699 v4, up to one card among N8103-176/-177/-178/-179 can be installed.



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- When configured with Xeon E5-2603 v4/E5-2620A v4/E5-2623 v4/E5-2630 v4/E5-2637 v4/E5-2640 v4/E5-2650 v4/E5-2650L v4/E5-2667 v4/E5-2680 v4/E5-2690 v4, 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/-145 cannot be mixed
  - With N8104-155F Dual Port 10GBASE-T LOM Card:  
N8104-150/-151/-145 and N8104-152 cannot be mixed.  
Up to one N8104-152 can be installed
  - With N8104-156F Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card:  
Up to one card of N8104-150/-151/-145 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**

Priority	Part Number	Product Name	Slots			
			#1A	#1B	#1C	#1D
(1)	N8104-155F	Dual Port 10GBASE-T LOM Card	-	(1)	-	-
(2)	N8104-160F	Dual Port 10GBASE-T LOM Card	-	(1)	-	-
(3)	N8104-156F	Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card	-	(1)	-	-
(4)	N8104-154F	Quad Port 1000BASE-T LOM Card	-	(1)	-	-
(5)	N8103-176	RAID Controller (1 GB, RAID 0/1)	(1)	-	-	-
(6)	N8103-177	RAID Controller (1 GB, RAID 0/1/5/6)	(1)	-	-	-
(7)	N8103-178	RAID Controller (2 GB,RAID 0/1/5/6)	(1)	-	-	-
(8)	N8103-179	RAID Controller (2 GB,RAID 0/1/5/6)	-	-	(1)	(2)
(9)	N8118-300	2.5-inch PCIeSSD Installation Kit	-	-	-	(1)
(10)	N8190-162	Fibre Channel Controller (2ch)	-	-	(1)	(2)
(11)	N8190-161	Fibre Channel Controller (1ch)	-	-	(1)	(2)
(12)	N8190-158A	Fibre Channel Controller (2ch)	-	-	(1)	(2)
(13)	N8190-157A	Fibre Channel Controller	-	-	(1)	(2)
(14)	N8104-147	Dual Port InfiniBand Adapter	-	-	(1)	(2)
(15)	N8104-146	Single Port InfiniBand Adapter	-	-	(1)	(2)
(16)	N8103-184	SAS Controller	-	-	(1)	(2)
(17)	N8104-159	10GBASE Adapter (QSFP+/4ch)	-	-	(1)	(2)
(18)	N8104-158	10GBASE Adapter (SFP+/2ch)	-	-	(1)	(2)
(19)	N8104-157	Dual Port 10GBASE-T Adapter	-	-	(1)	(2)
(20)	N8104-153	Dual Port 10GBASE-T Adapter	-	-	(1)	(2)
(21)	N8104-149	10GBASE SFP+ Adapter (SFP+/2ch)	-	-	(1)	(2)
(22)	N8104-148	Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)	-	-	(1)	(2)
(23)	N8190-160	Fibre Channel Controller (2ch)	-	-	(1)	(2)
(24)	N8190-159	Fibre Channel Controller	-	-	(1)	(2)
(25)	N8103-142	SAS Controller	-	-	(1)	(2)
(26)	N8104-152	Quad Port 1000BASE-T Adapter	-	-	(1)	(2)
(27)	N8104-145	Dual Port 1000BASE-T Adapter	-	-	(1)	(2)
(28)	N8104-151	Dual Port 1000BASE-T Adapter	-	-	(1)	(2)
(29)	N8104-150	1000BASE-T Adapter	-	-	(1)	(2)
(30)	N8117-01A	Serial Port Adapter	-	-	(1)	(2)

**NOTE:**

- The slot #1C and #1D are available in a dual-processor configuration.
- The number between parentheses shows the population priority (recommendation). For example, install N8104-155F (1) in the slot #1B, N8103-176 (5) in the slot #1A, N8104-153 (16) in the slot #1C and N8190-160 (19) in the slot #1D when you install those cards.
- For VMware ESXi 5.5, there are some limitations as follows:
  - <With N8104-154F Quad Port 1000BASE-T LOM Card>
    - N8104-149/-153/-157 and N8104-150/-151/-152 cannot be mixed.
    - When configured with Xeon E5-2697 v4/E5-2697A v4/E5-2698 v4/E5-2699 v4, up to one card among N8103-176/-177/-178/-179 can be installed.
    - When configured with Xeon E5-2603 v4/E5-2620A v4/E5-2623 v4/E5-2630 v4/E5-2637 v4/E5-2640 v4/E5-2650 v4/E5-2650L v4/E5-2667 v4/E5-2680 v4/E5-2690 v4, 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.
    - When configured with Xeon E5-2697 v4/E5-2697A v4/E5-2698 v4/E5-2699 v4, up to one card among N8103-176/-177/-178/-179 can be installed.
    - When configured with Xeon E5-2603 v4/E5-2620A v4/E5-2623 v4/E5-2630 v4/E5-2637 v4/E5-2640 v4/E5-2650 v4/E5-2650L v4/E5-2667 v4/E5-2680 v4/E5-2690 v4, 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.
    - When configured with Xeon E5-2697 v4/E5-2697A v4/E5-2698 v4/E5-2699 v4, up to one card among N8103-176/-177/-178/-179 can be installed.
    - When configured with Xeon E5-2603 v4/E5-2620A v4/E5-2623 v4/E5-2630 v4/E5-2637 v4/

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E5-2640 v4/E5-2650 v4/E5-2650L v4/E5-2667 v4/E5-2680 v4/E5-2690 v4, 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/-145 cannot be mixed
  - With N8104-155F Dual Port 10GBASE-T LOM Card:  
N8104-150/-151/-145 and N8104-152 cannot be mixed.  
Up to one N8104-152 can be installed
  - With N8104-156F Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card:  
Up to one card of N8104-150/-151/-145 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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For hard drive capacity measurements, 1 GB = 1 billion bytes. Actual formatted capacity is less.

## Revision History

Revision	Date	Description
6.0	April 26, 2017	<p><b>New products added:</b> External DVD Dual drive / N8160-101F</p> <p><b>Discontinued product deleted:</b> External DVD Super Multi Drive / N8160-98F</p>
5.0	February 24, 2017	<p><b>New products added:</b> Fibre Channel Controller(1ch) / N8190-161 Fibre Channel Controller(2ch) / N8190-162</p> <p><b>Others:</b> Added VMware ESXi 6.5 to the list of operating system supported Updated OS support matrix</p>
4.0	January 31, 2017	<p><b>Others:</b> Added Windows Server 2016 to the list of operating system supported Updated OS support matrix</p>
3.0	October 12, 2016	<p><b>New products added:</b> 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</p> <p><b>Discontinued product deleted:</b> 1.8TB 10K Hot Plug 2.5-inch SAS HDD / N8150-490</p> <p><b>Others:</b> Removed 4Kn sector HDD descriptions</p>
2.0	July 20, 2016	<p><b>New products added:</b> External DVD Super Multi Drive / N8160-98F</p> <p><b>Discontinued product deleted:</b> External DVD Super MULTI Drive / N8160-97F</p> <p><b>Others:</b> Removed the note 5 of Server Management Corrected OS Support Matrix for N8104-160F</p>
1.1	May 17, 2016	<p><b>Others:</b> Added DVD read speed information</p>
1.0	April 25, 2016	Initial release