Empowered by Innovation

NEC Express5800/R120f-2M
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.

April 17, 2015
Revision 6.0
NEC Corporation

Contents

Technical Specification

Key Features

- High performance with the latest Intel® Xeon® processor E5-2600 v3 product family
- Up to 768 GB 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		R120f-2M			
Part Number		N8100-2225F, N8100-2226F, N8100-2227F, N8100-2228F			
Processor	**Type**	Intel® Xeon® processor E5-2603 V3	Intel® Xeon® processor E5-2609 V3	Intel® Xeon® processor E5-2620 v3	Intel® Xeon® processor E5-2623 v3
	Clock speed	1.60 GHz	1.90 GHz	2.40 GHz	3 GHz
	Number of Processors	1 to 2			
	Cache	15 MB			10 MB
	Cores and Threads	6C-12T			4C-8T
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	768 GB (24 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 : 16 TB (16 x 1 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: 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			
	3.5-inch Media Bays	1			
	Disk Drive Bays	16 [1]			
Expansion Slots	**Standard**	Total: 8 slots available 3 PCIe 3.0 x8 (x8 connector) 3 PCIe 3.0 x8 (x8 connector) [2] 1 PCIe 3.0 x8 (x8 connector) flexible LOM slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			

Model		R120f-2M			
Expansion Slots (Cont.)	Optional Riser Card (N8116-34)	Total: 7 slots available 1 PCIe 3.0 x16 (x16 connector) 1 PCIe 3.0 x8 (x16 connector) [2] 1 PCIe 3.0 x8 (x8 connector) 2 PCIe 3.0 x8 (x8 connector) [2] 1 PCIe 3.0 x8 (x8 connector) flexible LOM slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			
Video	Controller (VRAM)	Integrated in Server Management Controller (32MB)			
	Resolution / Color	1600 x 1200 / 16.7M [3]			
Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2rear) 5 x USB3.0 (2 x front, 2 x rear, 1 x internal) 2 x USB2.0 (2 x rear) 1 x Management LAN connector (1000BASE-T, RJ-45, 1 x rear)			
Server Management		EXPRESSSCOPE Engine 3			
Redundant Fan		Standard (N+1), Optional kit for N+N redundancy, hot plug			
Redundant Power Supply		Optional, hot plug			
Power Supply		1 to 2 x 460 Watt or 800 Watt or 1000 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			
Power Consumption	(Max. Config, Idling)	335 VA / 333 Watt	336 VA / 334 Watt	332 VA / 330 Watt	355 VA / 352 Watt
	(Max. Config, Operating)	710 VA / 705 Watt	738 VA / 733 Watt	790 VA / 785 Watt	831 VA / 825 Watt
Acoustical Noise (Sound Pressure Level) [4]	Max. Config, Idling	49.6dB			49.6dB
	Max. Config, Operating	54.0dB			55.6dB
Dimensions (W x D x H)		448.0 x 735.8 x 87.2 mm / 17.6 x 28.9 x 3.4 in (2U)			
Weight (Minimum / Maximum)		18.4 kg / 32.3 kg, 40.57 lbs. / 71.21 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, CCC, RCM, RoHS, WEEE			
Operating Systems		Microsoft® Windows Server® 2008 Standard (x86) Microsoft® Windows Server® 2008 Enterprise (x86) 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) [5] Red Hat Enterprise Linux 6.5 or later (x86_64) [5] VMware ESXi™ 5.1 Update 2 VMware ESXi™ 5.5 Update 2 VMware ESXi™ 6.0			

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2 Available only when the second processor is configured.

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Model		R120f-2M		
Part Number		N8100-2225F, N8100-2226F, N8100-2227F, N8100-2228F		
Processor	**Type**	Intel® Xeon® processor E5-2637 v3	Intel® Xeon® processor E5-2640 v3	Intel® Xeon® processor E5-2643 v3
	Clock speed	3.50 GHz	2.60 GHz	3.40 GHz
	Number of Processors	1 to 2		
	Cache	15 MB	20 MB	
	Cores and Threads	4C-8T	8C-16T	6C-12T
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	768 GB (24 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 : 16 TB (16 x 1 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: 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		
	3.5-inch Media Bays	1		
	Disk Drive Bays	16 [1]		
Expansion Slots	**Standard**	Total: 8 slots available 3 PCIe 3.0 x8 (x8 connector) 3 PCIe 3.0 x8 (x8 connector) [2] 1 PCIe 3.0 x8 (x8 connector) flexible LOM slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot		
	Optional Riser Card (N8116-34)	Total: 7 slots available 1 PCIe 3.0 x16 (x16 connector) 1 PCIe 3.0 x8 (x16 connector) [2] 1 PCIe 3.0 x8 (x8 connector) 2 PCIe 3.0 x8 (x8 connector) [2] 1 PCIe 3.0 x8 (x8 connector) flexible LOM slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot		
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)		
	Resolution / Color	1600 x 1200 / 16.7M [3]		
Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2rear) 5 x USB3.0 (2 x front, 2 x rear, 1 x internal) 2 x USB2.0 (2 x rear) 1 x Management LAN connector (1000BASE-T, RJ-45, 1 x rear)		
Server Management		EXPRESSSCOPE Engine 3		
Redundant Fan		Standard (N+1), Optional kit for N+N redundancy, hot plug		
Redundant Power Supply		Optional, hot plug		
Power Supply		1 to 2 x 460 Watt or 800 Watt or 1000 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		

Model		R120f-2M		
Power Consumption	(Max. Config, Idling)	365 VA / 362 Watt	333 VA / 330 Watt	364 VA / 361 Watt
	(Max. Config, Operating)	876 VA / 870 Watt	809 VA / 803 Watt	988 VA / 981 Watt
Acoustical Noise (Sound Pressure Level) [4]	Max. Config, Idling	49.6dB	49.6dB	49.6dB
	Max. Config, Operating	57.7dB	54.4dB	57.7dB
Dimensions (W x D x H)		448.0 x 735.8 x 87.2 mm / 17.6 x 28.9 x 3.4 in (2U)		
Weight (Minimum / Maximum)		18.4 kg / 32.3 kg, 40.57 lbs. / 71.21 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, CCC, RCM, RoHS, WEEE		
Operating Systems		Microsoft® Windows Server® 2008 Standard (x86) Microsoft® Windows Server® 2008 Enterprise (x86) 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) [5] Red Hat Enterprise Linux 6.5 or later (x86_64) [5] VMware ESXi™ 5.1 Update 2 VMware ESXi™ 5.5 Update 2 VMware ESXi™ 6.0		

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2 Available only when the second processor is configured.

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Part Number		N8100-2225F, N8100-2226F, N8100-2227F, N8100-2228F		
Processor	Type	Intel® Xeon® processor E5-2660 v3	Intel® Xeon® processor E5-2667 v3	Intel® Xeon® processor E5-2670 v3
	Clock speed	2.60 GHz	3.20 GHz	2.30 GHz
	Number of Processors	1 to 2		
	Cache	25 MB	20 MB	30 MB
	Cores and Threads	10C-20T	8C-16T	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	768 GB (24 x 32 GB)		
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing		
Internal Storage	Standard Capacity	0 GB		

Model		R120f-2M		
Internal Storage (Cont.)	**Maximum Capacity**	SAS HDD : 28.8 TB (16 x 1.8 TB) SATA HDD : 16 TB (16 x 1 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: 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		
	3.5-inch Media Bays	1		
	Disk Drive Bays	16 [1]		
Expansion Slots	**Standard**	Total: 8 slots available 3 PCIe 3.0 x8 (x8 connector) 3 PCIe 3.0 x8 (x8 connector) [2] 1 PCIe 3.0 x8 (x8 connector) flexible LOM slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot		
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Server Management		EXPRESSSCOPE Engine 3		
Redundant Fan		Standard (N+1), Optional kit for N+N redundancy, hot plug		
Redundant Power Supply		Optional, hot plug		
Power Supply		1 to 2 x 460 Watt or 800 Watt or 1000 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		
Power Consumption	**(Max. Config, Idling)**	332 VA / 330 Watt	362 VA / 360 Watt	336 VA / 334 Watt
	(Max. Config, Operating)	876 VA / 870 Watt	984 VA / 977 Watt	963 VA / 957 Watt
Acoustical Noise (Sound Pressure Level) [4]	**Max. Config, Idling**	49.6dB	49.6dB	49.6dB
	Max. Config, Operating	55.6dB	57.7dB	56.6dB
Dimensions (W x D x H)		448.0 x 735.8 x 87.2 mm / 17.6 x 28.9 x 3.4 in (2U)		
Weight (Minimum / Maximum)		18.4 kg / 32.3 kg, 40.57 lbs. / 71.21 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, CCC, RCM, RoHS, WEEE		

Model	R120f-2M
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Model		R120f-2M		
Part Number		N8100-2225F, N8100-2226F, N8100-2227F, N8100-2228F		
Processor	**Type**	Intel® Xeon® processor E5-2690 v3	Intel® Xeon® processor E5-2697 v3	Intel® Xeon® processor E5-2699 v3
	Clock speed	2.60 GHz		2.30 GHz
	Number of Processors	1 to 2		
	Cache	30 MB	35 MB	45 MB
	Cores and Threads	12C-24T	14C-28T	18C-36T
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	768 GB (24 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 : 16 TB (16 x 1 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: 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		
	3.5-inch Media Bays	1		
	Disk Drive Bays	16 [1]		

Model		R120f-2M		
Expansion Slots	**Standard**	Total: 8 slots available 3 PCIe 3.0 x8 (x8 connector) 3 PCIe 3.0 x8 (x8 connector) [2] 1 PCIe 3.0 x8 (x8 connector) flexible LOM slot 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot		
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Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2rear) 5 x USB3.0 (2 x front, 2 x rear, 1 x internal) 2 x USB2.0 (2 x rear) 1 x Management LAN connector (1000BASE-T, RJ-45, 1 x rear)		
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Redundant Power Supply		Optional, hot plug		
Power Supply		1 to 2 x 460 Watt or 800 Watt or 1000 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		
Power Consumption	**(Max. Config, Idling)**	362 VA / 360 Watt	368 VA / 365 Watt	364 VA / 362 Watt
	(Max. Config, Operating)	987 VA / 980 Watt	994 VA / 987 Watt	996 VA / 989 Watt
Acoustical Noise (Sound Pressure Level) [4]	**Max. Config, Idling**	49.6dB	49.6dB	49.6dB
	Max. Config, Operating	57.7dB	58.3dB	58.3dB
Dimensions (W x D x H)		448.0 x 735.8 x 87.2 mm / 17.6 x 28.9 x 3.4 in (2U)		
Weight (Minimum / Maximum)		18.4 kg / 32.3 kg, 40.57 lbs. / 71.21 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, CCC, RCM, RoHS, WEEE		
Operating Systems		Microsoft® Windows Server® 2008 Standard (x86) Microsoft® Windows Server® 2008 Enterprise (x86) 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) [5] Red Hat Enterprise Linux 6.5 or later (x86_64) [5] VMware ESXi™ 5.1 Update 2 VMware ESXi™ 5.5 Update 2 VMware ESXi™ 6.0		

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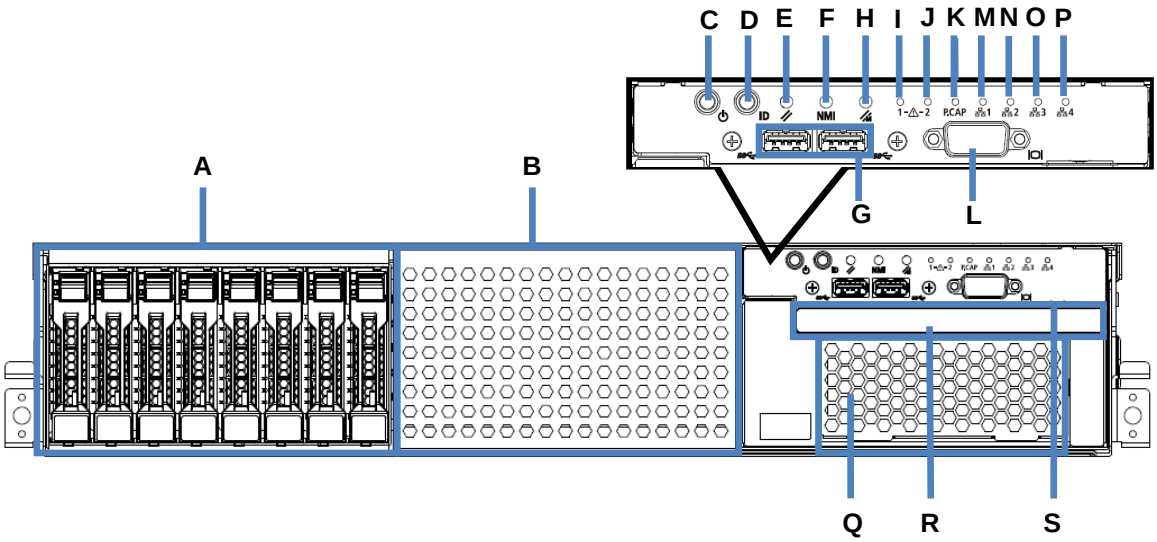
External Views

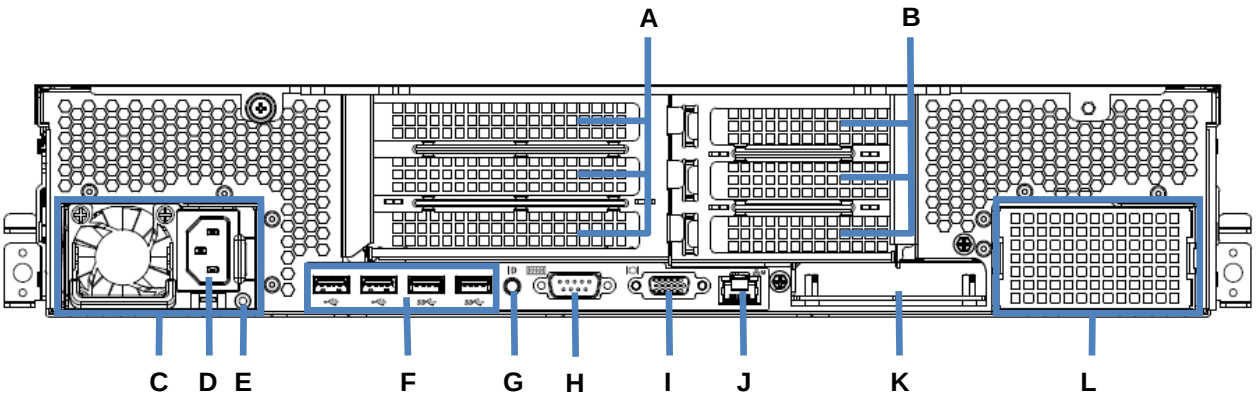
Front and Rear Views

Front View



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

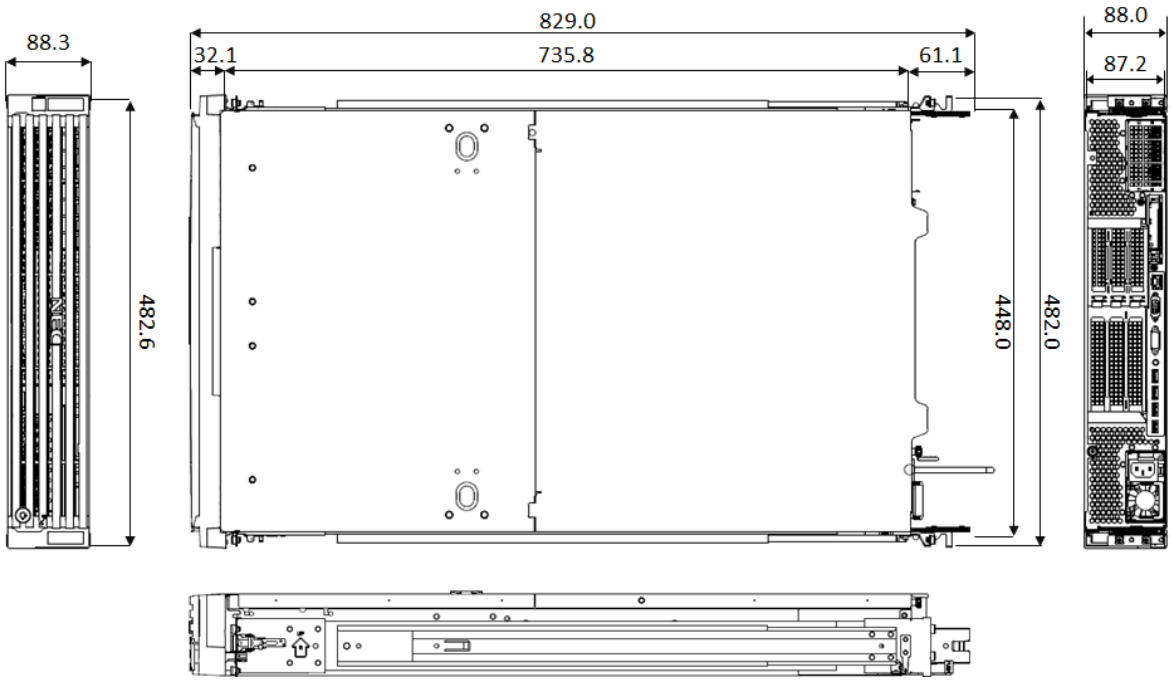
Rear View



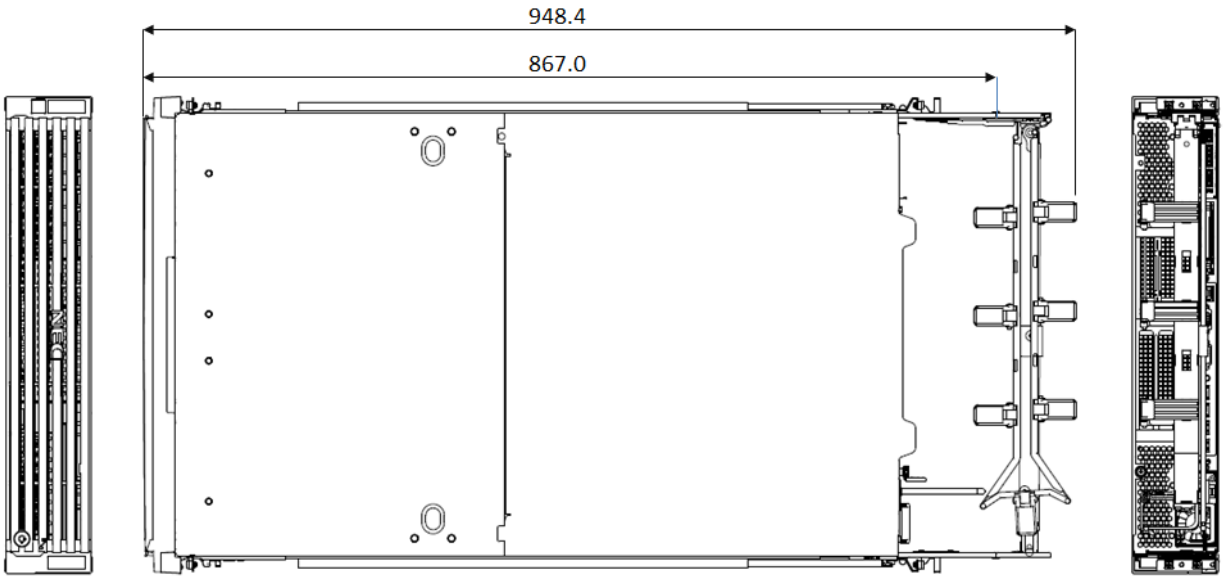
Legend			
A.	PCI Slots (Full-Height)	**G.**	UID Button/LED
B.	PCI Slots (Low-Profile)	**H.**	Serial Port Connector
C.	Power Supply	**I.**	VGA Connector
D.	AC Inlet	**J.**	Management LAN Connector
E.	AC Power LED	**K.**	LOM Card Slot
F.	USB Connectors	**L.**	Additional Power Supply Slot

Dimensions (mm)

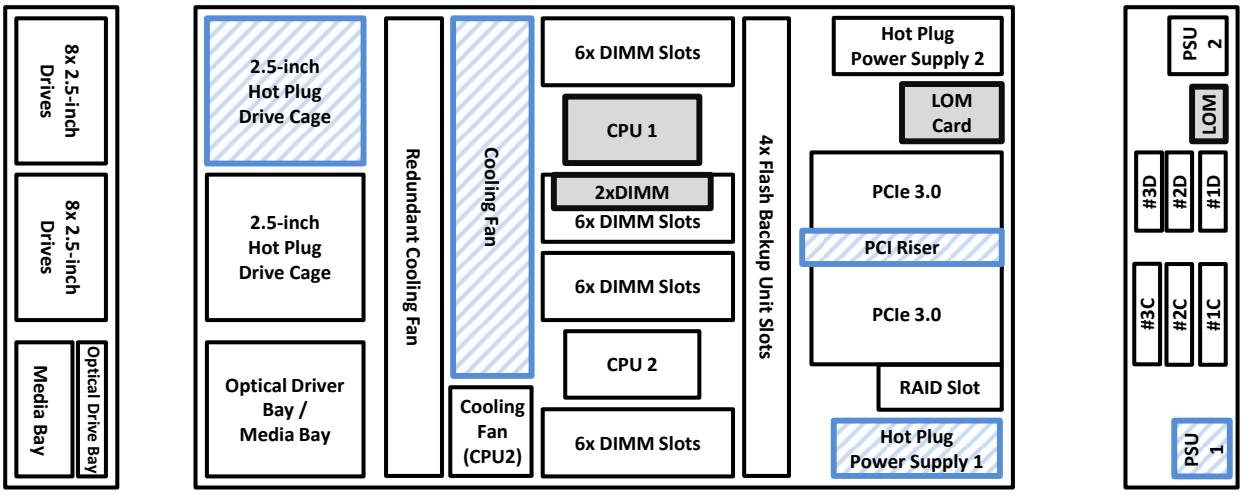
Without Cable Arm



With Cable Arm

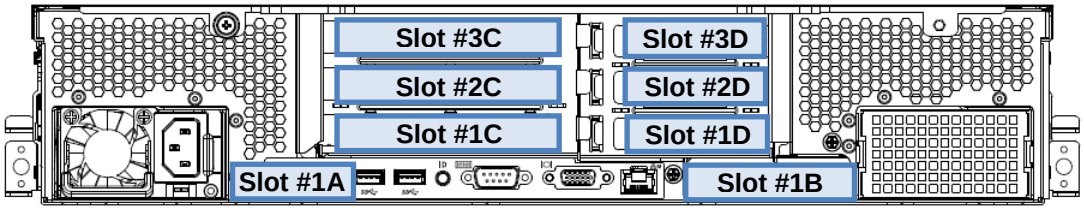


Configuration Diagram



Legend: Standard Components Mandatory components

Expansion Slots



Legend			Remarks
Common	#1A	PCIe 3.0 x8, x8 connector, for a dedicated RAID controller	
	#1B	PCIe 3.0 x8, x8 connector, for a dedicated LOM Card	
	#1C	PCIe 3.0 x8, x8 connector, Full-height, up to 220 mm length	
	#2C	PCIe 3.0 x8, x8 connector, Full-height, up to 220/312 mm length	2CPU required
	#3C	PCIe 3.0 x8, x8 connector, Full-height, up to 312 mm length	2CPU required
	#1D	PCIe 3.0 x8, x8 connector, Low-profile, up to 220 mm length	
	#2D	PCIe 3.0 x8, x8 connector, Low-profile, up to 220 mm length	2CPU required
	#3D	PCIe 3.0 x8, x8 connector, Low-profile, up to 220 mm length	2CPU required
PCIe x16 Riser Card Kit	#1C	PCIe 3.0 x8, x16 connector, Full-height, up to 220 mm length	
	#2C	PCIe 3.0 x16, x16 connector, Full-height, up to 220/312 mm length	2CPU required

NOTE:

- Up to 312 mm length card can be installed into slot #2C when N8116-37 Full Length PCI Card installation Kit is installed.
- The slot #3C is not available when using N8116-34/34A PCIe x16 Riser Card Kit

Server Configuration

1 Base Models

Product Name / Description	Part Number
NEC Express5800/R120f-2M Server 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, EXPRESSBUILDER DVD	N8100-2225F
NEC Express5800/R120f-2M Server 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, EXPRESSBUILDER DVD	N8100-2226F
NEC Express5800/R120f-2M Server 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, EXPRESSBUILDER DVD	N8100-2227F
NEC Express5800/R120f-2M Server no processor, no RAM, no HDD, no ODD, no LOM Card Including : 1 x 1000 Watt 80 PLUS® Platinum Power Supply Unit, Front Bezel, 2.5-inch Drive Cage, EXPRESSBUILDER DVD	N8100-2228F

NOTE:

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

2 Processors and Heat Sink

Available sockets: 2

Product Name / Description		Part Number
Processors 1 Processor Required	**Xeon E5-2603 v3 Processor Kit** Intel® Xeon ® Processor E5-2603 v3 (1.60 GHz, 6C/6T, 15 MB)	N8101-768F
	Xeon E5-2609 v3 Processor Kit Intel® Xeon ® Processor E5-2609 v3 (1.90 GHz, 6C/6T, 15 MB)	N8101-769F
	Xeon E5-2620 v3 Processor Kit Intel® Xeon ® Processor E5-2620 v3 (2.40 GHz, 6C/12T, 15 MB)	N8101-770F
	Xeon E5-2623 v3 Processor Kit Intel® Xeon ® Processor E5-2623 v3 (3 GHz, 4C/8T, 10 MB)	N8101-771F
	Xeon E5-2637 v3 Processor Kit Intel® Xeon ® Processor E5-2637 v3 (3.50 GHz, 4C/8T, 15 MB)	N8101-772F
	Xeon E5-2640 v3 Processor Kit Intel® Xeon ® Processor E5-2640 v3 (2.60 GHz, 8C/16T, 20 MB)	N8101-773F
	Xeon E5-2643 v3 Processor Kit Intel® Xeon ® Processor E5-2643 v3 (3.40 GHz, 6C/12T, 20 MB)	N8101-774F
	Xeon E5-2660 v3 Processor Kit Intel® Xeon ® Processor E5-2660 v3 (2.60 GHz, 10C/20T, 25 MB)	N8101-776F
	Xeon E5-2667 v3 Processor Kit Intel® Xeon ® Processor E5-2667 v3 (3.20 GHz, 8C/16T, 20 MB)	N8101-777F
	Xeon E5-2670 v3 Processor Kit Intel® Xeon ® Processor E5-2670 v3 (2.30 GHz, 12C/24T, 30 MB)	N8101-778F
	Xeon E5-2690 v3 Processor Kit Intel® Xeon ® Processor E5-2690 v3 (2.60 GHz, 12C/24T, 30 MB)	N8101-779F
	Xeon E5-2697 v3 Processor Kit Intel® Xeon ® Processor E5-2697 v3 (2.60 GHz, 14C/28T, 35 MB)	N8101-931F

		Xeon E5-2699 v3 Processor Kit Intel® Xeon ® Processor E5-2699 v3 (2.30 GHz, 18C/36T, 45 MB)	N8101-933F
Heat Sink	**1st**	**Processor Heat Sink** For 1st Processor	(Standard)
	2nd	**Processor Heat Sink** For 2nd Processor, including cooling fan kit	N8101-781F

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 Standard (x86) Microsoft Windows Server 2008 Enterprise (x86)	**32** [1]	**32**
Microsoft Windows Server 2008 R2 Standard (x64) Microsoft Windows Server 2008 R2 Enterprise (x64)	**256** [1]	**72**
Microsoft Windows Server 2012 Standard Microsoft Windows Server 2012 Datacenter Microsoft Windows Server 2012 R2 Standard Microsoft Windows Server 2012 R2 Datacenter	**640** [1]	**72**
Red Hat Enterprise Linux 6	**32**	**32**
Red Hat Enterprise Linux 6 (x86_64)	**160**	**72**
VMware ESXi 5.1	**160**	**72**
VMware ESXi 5.5	**320**	**72**
VMware ESXi 6.0	**480**	**72**

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

- Windows Server 2008 : 24
- Windows Server 2008 R2 : 64
- Windows Server 2012, Windows Server 2012 R2 : 320

3 Memory

3.1 Memory Configuration

Refer to the section in accordance with your operating system and 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**

3.2 Other OS than Windows Server 2008 Standard

3.2.1 Independent Channel Configuration

Available slots: 12 per processor

Category	Product Name / Description	Part Number
Registered DIMM (RDIMM)	**8GB DDR4-2133 REG Memory Kit (2x4GB)** 2 x 4GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-611F
	16GB DDR4-2133 REG Memory Kit (2x8GB) 2 x 8GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-612F
	32GB DDR4-2133 REG Memory Kit (2x16GB) 2 x 16GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-613F
Load Reduced DIMM (LRDIMM)	**64GB DDR4-2133 LR Memory Kit (2x32GB)** 2 x 32GB Load Reduced ECC DIMM, DDR4-2133(PC4-2133)	N8102-614F

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 LRDIMM are not supported.

3.2.2 Memory Sparing Configuration

Available slots: 12 per processor

Product Name / Description	Part Number
24GB DDR4-2133 REG Memory Kit (3x8GB) 3 x 8GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-622
48GB DDR4-2133 REG Memory Kit (3x16GB) 3 x 16GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-623

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 two-thirds of physical capacity with configurations less than 8GB DIMM and five-sixth physical capacity with configurations more than 16GB DIMM.
- The maximum memory speed is 1600 MHz.

3.2.3 Memory Mirroring / Memory Lockstep Configuration

Available slots: 12 per processor

Product Name / Description	Part Number
16GB DDR4-2133 REG Memory Kit (2x8GB) 2 x 8GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-618
32GB DDR4-2133 REG Memory Kit (2x16GB) 2 x 16GB Registered ECC DIMM, DDR4-2133 (PC4-2133)	N8102-619

NOTE:

- Minimum one memory kit per processor must be installed.

3.3 Windows Server 2008 Standard

3.3.1 Independent Channel Configuration

Available slots: 1

Product Name / Description	Part Number
4GB DDR4-2133 REG Memory Kit (1x4GB) 1 x 4GB Registered ECC DIMM, DDR4-2133(PC4-2133)	N8102-610

NOTE:

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

Memory Configuration Feature Comparison

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

	Independent Channel	Memory Sparing	Memory Lockstep	Memory Mirroring
Performance	Best	Better	Better	Good
Data Protection	No	Persistent correctable errors that may result in future uncorrectable memory errors	No	Uncorrectable memory errors
Redundancy	No	Partly	No	Fully
Data Correction	ECC, x4 SDDC	ECC, x4 SDDC	ECC, x8 SDDC	ECC, x4 SDDC
Available Memory	Full physical memory	2/3 physical memory (8GB DIMM) 5/6 physical memory (16GB DIMM)	Full physical memory	Half physical memory
Available Memory Channels	4	4	4	4
Notes	-	All DIMMs in the system must be identical.	Paired DIMMs must be identical.	Paired DIMMs must be identical.

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 speed is 1600 MHz with Memory Sparing Configuration.

Processor Type	Populated DIMMs	# of DIMMs per processor	DIMM Speed
E5-2603 v3	RDIMM: 4, 8, 16 GB	-	1600 MHz
E5-2609 v3	LRDIMM: 32GB	-	1600 MHz
E5-2620 v3	RDIMM: 4, 8, 16 GB	Up to 8 DIMMs -	1866 MHz
E5-2623 v3		10 or more DIMMs	1600 MHz
E5-2640 v3	LRDIMM: 32GB	Up to 8 DIMMs -	1866 MHz
		10 or more DIMMs	1600 MHz
E5-2637 v3	RDIMM: 4, 8, 16 GB	Up to 8 DIMMs -	2133 MHz
E5-2643 v3		10 or more DIMMs	1600 MHz
E5-2660 v3	LRDIMM: 32GB	Up to 8 DIMMs -	2133 MHz
E5-2667 v3		10 or more DIMMs	1600MHz
E5-2670 v3			
E5-2690 v3			
E5-2697 v3			
E5-2699 v3			

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 Operating Systems		Maximum Available Memory
Microsoft Windows Server 2008 Standard (x86) [1]	**4 GB**	**4 GB (HW-DEP enabled)** **App. 2 GB(HW-DEP disabled)**
Microsoft Windows Server 2008 R2 Standard [1]	**32 GB**	**32 GB**
Microsoft Windows Server 2008 Enterprise (x86) [1]	**64 GB**	**64 GB**
Microsoft Windows Server 2008 R2 Enterprise [1]	**4 TB**	**768GB**
Microsoft Windows Server 2012 Standard [1] Microsoft Windows Server 2012 Datacenter [1] Microsoft Windows Server 2012 R2 Standard [1] Microsoft Windows Server 2012 R2 Datacenter [1]	**16 GB**	**768GB**
Red Hat Enterprise Linux 6	**3 TB**	**16 GB**
Red Hat Enterprise Linux 6 (x86_64)	**3 TB**	**768GB**
VMware ESXi 5.1 [2]	**2 TB**	**768GB**
VMware ESXi 5.5 [2]	**4 TB**	**768GB**
VMware ESXi 6.0 [3]	**6 TB**	**768GB**

[1] 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

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

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

4 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 4.3.2 for the hard drives.

Operating System	Supported RAID configuration		Supported HDD/SSD
	RAID and Cache	Section	
Windows Server 2008 Standard Windows Server 2008 Enterprise Windows Server 2008 R2 Standard Windows Server 2008 R2 Enterprise Red Hat Enterprise Linux 6	Non-RAID (Embedded SATA)	4.2.1	4.3.1
	RAID 0/1/10 1GB Cache	4.2.2	4.3.2
	RAID 5/6/50/60 1GB Cache	4.2.3	
	RAID 5/6/50/60 2GB Cache	4.2.4	
Windows Server 2012 Standard Windows Server 2012 Datacenter Windows Server 2012 R2 Standard Windows Server 2012 R2 Datacenter Red Hat Enterprise Linux 6 (x86_64) [1]	Non-RAID (Embedde SATA)	4.2.1	4.3.1
	RAID 0/1/10 1GB Cache	4.2.2	4.3.3 [1]
	RAID 5/6/50/60 1GB Cache	4.2.3	
	RAID 5/6/50/60 2GB Cache	4.2.4	
VMware ESXi 5.1 VMware ESXi 5.5 VMware ESXi 6.0	Non-RAID (Embedded SATA)	4.2.1	4.3.1
	RAID 0/1/10 1GB Cache	4.2.2	4.3.4
	RAID 5/6/50/60 1GB Cache	4.2.3	
	RAID 5/6/50/60 2GB Cache	4.2.4	

[1] If you use Red Hat Enterprise Linux 6 (x86_64) KVM, select HDD/SSD from the section 4.3.2

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.
- 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	**Embedded SATA Controller** 4 x 6Gb/s SATA	(Standard)
Cable	**Internal SATA Cable** 1 x mini-SAS HD to 1 x mini-SAS HD	(Standard)
Drive Cage	**2.5-inch Drive Cage** 8 x 2.5-inch Hot-plug hard drive bays	(Standard)

NOTE:

- Up to 4 SATA drives are supported.
- For supported HDD/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 **Required**	**RAID Controller (1GB, RAID 0/1)** 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 **Recommended**	**Flash Backup Unit** for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
Cable	**Internal SAS/SATA Cable** 1 x Mini SAS HD to 1 x Mini SAS HD, 2 sets	(Standard)
Drive Cage	**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage **(Required when more than 8 drives)**	**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays Including six sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable, SAS expander card	N8154-69

NOTE:

- For Supported HDD/SSD, refer to **4.3.2** for Windows Server 2008/2008R2, Red Hat Enterprise Linux 6 or Red Hat Enterprise Linux 6(x86_64) with KVM feature. Refet to **4.3.3** for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6(x86_64) without KVM feature. Refer to **4.3.4** for VMware.
- 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.

4.2.3 RAID 5/6 Controller with 1 GB Cache

Category	Product Name / Description	Part Number
Storage Controller **Required**	**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9362-8i RAID0/1/5/6/10/50/60, 1GB, Int. 8, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s	N8103-177
Flash Backup **Recommended**	**Flash Backup Unit** for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
Cable	**Internal SAS/SATA Cable** 1 x Mini SAS HD to 1 x Mini SAS HD, 2 sets	(Standard)
Drive Cage	**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage **(Required when more than 8 drives)**	**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays Including six sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable, SAS expander card	N8154-69

NOTE:

- For Supported HDD/SSD, refer to **4.3.2** for Windows Server 2008/2008R2, Red Hat Enterprise Linux 6 or Red Hat Enterprise Linux 6(x86_64) with KVM feature. Refet to **4.3.3** for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6(x86_64) without KVM feature. Refer to **4.3.4** for VMware.
- 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 RAID 5/6 Controller with 2 GB Cache

Category	Product Name / Description	Part Number
Storage Controller **Required**	**RAID Controller (2GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9362-8i RAID0/1/5/6/10/50/60, 2GB, Int. 8, PCIe 3.0 x8, SAS 12Gb/s, SATA 6Gb/s	N8103-178
Flash Backup **Recommended**	**Flash Backup Unit** for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
Cable	**Internal SAS/SATA Cable** 1 x Mini SAS HD to 1 x Mini SAS HD, 2 sets	(Standard)
Drive Cage	**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage **(Required when more than 8 drives)**	**2.5-inch Drive Cage** 8 x 2.5-inch hot plug drive bays Including six sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable, SAS expander card	N8154-69

NOTE:

- For Supported HDD/SSD, refer to **4.3.2** for Windows Server 2008/2008R2, Red Hat Enterprise Linux 6 or Red Hat Enterprise Linux 6(x86_64) with KVM feature. Refet to **4.3.3** for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6(x86_64) without KVM feature. Refer to **4.3.4** for VMware.
- 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 Required Components for RAID Configuration

4.3.1 For Embedded SATA Controller

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

4.3.2 For RAID Controller Configuration (1)

For Windows Server 2008/2008R2, Red Hat Enterprise Linux 6, or KVM in Red Hat Enterprise Linux 6(x86_64)

Category		Product Name / Description	Part Number
Drive **Standard : 8 slots available** **Max : 16 slots available**	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-479
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-480
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-481
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-482
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-483
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector	N8150-485
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector	N8150-486
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector	N8150-518
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-487
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-488
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-489
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512B sector	N8150-721

		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512B sector	N8150-722
	SATA SSD	**100GB Hot Plug 2.5-inch SATA SSD** 1 x 100 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector	N8150-724
		200GB Hot Plug 2.5-inch SATA SSD 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector	N8150-725
		400GB Hot Plug 2.5-inch SATA SSD 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector	N8150-726
		800GB Hot Plug 2.5-inch SATA SSD 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

4.3.3 For RAID Controller Configuration (2)

For Windows Server 2012/2012R2 or Red Hat Enterprise Linux 6(x86_64) without KVM

Category		Product Name / Description	Part Number
Drive **Standard : 8 slots available** **Max : 16 slots available**	**SAS HDD (4KB)**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 4KB sector	N8150-470
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 4KB sector	N8150-471
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 4KB sector	N8150-472
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 4KB sector	N8150-473
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 4KB sector	N8150-474
		1.8TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.8TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 4KB sector	N8150-490
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 4KB sector	N8150-476
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 4KB sector	N8150-477
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 4KB sector	N8150-478
	SAS HDD (512B)	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-479
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-480

	600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-481
	900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-482
	1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512B sector	N8150-483
	300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector	N8150-485
	450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector	N8150-486
	600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512B sector	N8150-518
SATA HDD (4KB)	**1TB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 4KB sector	N8150-520
	2TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 2 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 4KB sector	N8150-521
SATA HDD (512B)	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-487
	500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-488
	1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512B sector	N8150-489
SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512B sector	N8150-721
	400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512B sector	N8150-722
SATA SSD	**100GB Hot Plug 2.5-inch SATA SSD** 1 x 100 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector	N8150-724
	200GB Hot Plug 2.5-inch SATA SSD 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector	N8150-725
	400GB Hot Plug 2.5-inch SATA SSD 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512B sector	N8150-726
	800GB Hot Plug 2.5-inch SATA SSD 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.
- When you select 4KB sector HDD, confirm whether your applications support hard drives with 4 KB sector size.
- 512B sector HDD and 4KB sector HDD cannot be mixed.

4.3.4 For RAID Controller Configuration (3)

For VMware

Category		Product Name / Description	Part Number
Drive **Standard : 8 slots available** **Max : 16 slots available**	**SAS HDD**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm 512B sector	N8150-479
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm 512B sector	N8150-480
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm 512B sector	N8150-481
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm 512B sector	N8150-482
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm 512B sector	N8150-483
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm 512B sector	N8150-485
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm 512B sector	N8150-486
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm 512B sector	N8150-518
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm 512B sector	N8150-487
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm 512B sector	N8150-488
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm 512B sector	N8150-489
	SAS SSD	**200GB Hot Plug 2.5-inch SAS SSD** 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s 512B sector	N8150-721
		400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s 512B sector	N8150-722

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.

5 Optical Drive

Category	Product Name / Description	Part Number
Internal **1 slot available**	**Internal Slim DVD-ROM drive** Slim DVD-ROM drive DVD read speed: 8x (DVD-ROM / DVD-R / DVD-RW) CD read speed: 24x (CD-ROM / CD-R/RW)	N8151-123
	Internal DVD Super Multi Drive Slim DVD Super Multi drive, not including writing software DVD Read speed: 8x (DVD-R / DVD-RW / DVD-R DL / DVD+R / DVD+RW / DVD+R DL / DVD-ROM) DVD-RAM read speed: 5x CD read speed: 24x (CD-ROM / CD-R/RW)	N8151-124F
External	**External DVD-ROM drive** DVD-ROM drive, Bus powered, 1.2 A required DVD Read speed: 4x (DVD-ROM / DVD-R / DVD-RW) CD read speed: 12x (CD-ROM / CD-R/RW)	N8160-91

NOTE:

- Up to 1 optical drive can be connected.

6 Internal RDX Drive

6.1 RDX Configuration

Category	Product Name / Description	Part Number
Controller	**Internal USB Controller** 1 x USB port	(Standard)
Cable	**Internal USB cable** 1 x Internal USB to 1 x USB device, USB 3.0	K410-275(00)
Drive **1 bay available**	**Internal RDX (USB)**	N8151-125

7 PCI Riser Card / 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.

7.1 PCI Riser Card

Product Name / Description	Part Number
PCIe Riser Card Kit 8 x PCIe 3.0 x8	(Standard)
PCIe x16 Riser Card Kit 1 x PCIe 3.0 x16, 6x PCIe 3.0 x8, auxiliary power connector (8pin)	N8116-34
PCIe x16 Riser Card Kit 1 x PCIe 3.0 x16, 6x PCIe 3.0 x8, auxiliary power connector (8+6pin)	N8116-34A

7.2 Full Length PCI Card installation Kit

For a full-length PCI card (D=312mm/12.28 in) installation in PCI Slot #2C

Product Name / Description	Part Number
Full Length PCI Card installation Kit For a full-length installation, contains special heat sinks	N8116-37

NOTE:

- Since this product is make-to-order manufacturing, the support is provided individually. Contact your sales representative for details.

7.3 Graphics Card Installation Kit

For an installation of the video card which is used for Micorosoft RemoteFX

Product Name / Description	Part Number
Graphics Card Installation Kit Power cables for video card (6+2pin) , a retainer to secure the graphics board	N8116-38
Graphics Card Installation Kit Power cables for video card (6+2pin, 6pin) , two retainers to secure the graphics board	N8116-38A

NOTE:

- Since this product is make-to-order manufacturing, the support is provided individually. Contact your sales representative for details.
- This product does not support/guarantee installation of general video cards on R120f-2M
- N8116-34 is required for N8116-38 and N8116-34A is required for N8116-38A.

7.4 Network Interface Controller

Category		Product Name / Description	Part Number
LOM card **Required**	**1GbE**	**Quad Port 1000BASE-T LOM Card** Broadcom® BCM5719 PCIe 2.0 x4	N8104-154F
	10GbE	**Dual Port 10GBASE-T LOM Card** Intel® Ethernet Controller X540 PCIe 2.0 x8	N8104-155F
		Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card Broadcom® NetXtreme II BCM57800S PCIe 2.0 x8 **NOTE**: - Available in October, 2014. - N8104-129 SFP+ Module is required to connect with an optical cable. - Up to two SFP+ Modules can be installed.	N8104-156F

Adapter	**1GbE**	**1000BASE-T Adapter** Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-150
		Dual Port 1000BASE-T Adapter Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-151
		Dual Port 1000BASE-T Adapter Intel® 82580 Gigabit Ethernet Controller PCIe 2.0 x4	N8104-145
		Quad Port 1000BASE-T Adapter Broadcom ® BCM5719 Gigabit Ethernet Controller PCIe 2.0 x4 NOTE: - Network cables with RJ-45 plug covers cannot be used.	N8104-152
	10GbE	**Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)** Intel® 82599ES 10 Gigabit Ethernet Controller PCIe 2.0 x8, Low Profile / Full Height **NOTE**: - N8104-129 SFP+ Module is required to connect with an optical cable. - Up to 2 SFP+ Modules can be installed.	N8104-148
		10GBASE SFP+ Adapter (SFP+/2ch) Broadcom® NetXtreme II BCM57810S PCIe 2.0 x8, Low Profile / Full Height **NOTE**: - 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
		Dual Port 10GBASE-T Adapter Intel® Ethernet Controller X540 PCIe 2.0(x8) , Low Profile / Full Height	N8104-153
SPF+ Module		**SFP+ Module (10G-SR)** 1 x SFP+ Module for N8104-148 and N8104-149, N8104-156	N8104-129

NOTE:

- Supports up to three adapters of 10Gb Converged Network Adapter and 10Gb Network Adapter 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.

LOM Type	NICs and FC HBAs Type	Number of Available Adapters	Total Number of Available Adapters
N8104-154F Quad Port 1000BASE-T LOM Card	N8104-152 Quad Port 1000BASE-T Adapter	Up to one adapter	Up to four adapters
	N8104-145 Dual Port 1000BASE-T Adapter N8104-151 Dual Port 1000BASE-T Adapter N8104-150 1000BASE-T Adapter	Up to four adapters	
	N8104-153 Dual Port 10GBASE-T Adapter N8104-149 10GBASE SFP+ Adapter (SFP+/2ch)	Up to four adapters	

	N8104-158A Fibre Channel Controller (2ch) N8104-160 Fibre Channel Controller	Up to four adapters	
N8104-155F Dual Port 10GBASE-T LOM Card	N8104-152 Quad Port 1000BASE-T Adapter	Up to two adapter	Up to four adapters
	N8104-145 Dual Port 1000BASE-T Adapter N8104-151 Dual Port 1000BASE-T Adapter N8104-150 1000BASE-T Adapter	Up to four adapters	
	N8104-153 Dual Port 10GBASE-T Adapter N8104-149 10GBASE SFP+ Adapter (SFP+/2ch)	Up to three adapters	
	N8104-158A Fibre Channel Controller (2ch) N8104-160 Fibre Channel Controller	Up to four adapters	
N8104-156 Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card	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 N8104-153 Dual Port 10GBASE-T Adapter N8104-149 10GBASE SFP+ Adapter (SFP+/2ch) N8104-158A Fibre Channel Controller (2ch) N8104-160 Fibre Channel Controller	Up to two adapters	Up to two adapters

NOTE:

- There are following limitations when using ESXi 6.0;
  (1) When N8104-154F is selected, mix configuration of N8104-194/153 and N8104-150/151/152/145 is not supported.
  (2) When N8104-155F is selected, mix configuration of N8104-150/151/145 and N8104-152 is not supported, up to two adapters can be selected from N8104-150/151/145, and up to one adapter of N8104-152.
  (3) When N8104-156F is selected, up to one adapter can be selected form N8104-150/-151/-145, and N8104-152 cannot be installed.

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
1GbE NIC N8104-150/-151/-152/-154/-156	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
10GbE NIC N8104-149/156	Up to two ports per one team	Windows Server 2008 Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2 Red Hat Enterprise Linux
10GbE NIC N8104-153/-155F	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 operating system combinations.

Category	Network Interface	Operating Systems
1GbE	N8104-150/-151/-152/-154	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Enterprise Linux, VMware
	N8104-145	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Enterprise Linux, VMware
10GbE	N8104-149	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Enterprise Linux, VMware
10GbE	N8104-153/-155F	Windows Server 2012, Windows Server 2012 R2 / Red Hat Enterprise Linux 6.5 (x86_64) or later / VMware

NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.

7.5 InfiniBand

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

NOTE:

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

7.6 PCIe SSD Adapter

Category	Product Name / Description	Part Number
PCIe SSD	**PCIe SSD Adapter 365GB** Fusion-io ioDrive2 365GB PCIe 2.0(x4), Low Profile / Full Height **NOTE**: - Install the drivers from the attached CD.	N8118-01

NOTE:

- Server Core is not supported
- Warranty period is the shorter of 3 years (37 months) or until the total bytes of written value (PBW) exceeds 4 PB. Check the PBW periodically with the utility for the PCIe SSD adapter.
- At least 8GB of memory per one PCIe SSD Adapter is required for adequate performance with this product. Refer to the user's guide for details.
- Operating system can not be installed in this product.

7.7 External Storage Controller

7.7.1 RAID Controller

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

NOTE:

- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight in order to minimize the risk of becoming multiple hard drives failure.

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 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 E5-2609 v3 E5-2620 v3 E5-2623 v3 E5-2637 v3 E5-2643 v3	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)	Up to one controller	Up to three controllers
	N8103-179 RAID Controller (2 GB,RAID 0/1/5/6)	Up to two controllers	
E5-2640 v3 E5-2660 v3 E5-2667 v3	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)	Up to one controller	Up to two controllers
	N8103-179 RAID Controller (2 GB,RAID 0/1/5/6)	Up to two controller	
E5-2670 v3 E5-2690 v3 E5-2697 v3 E5-2699 v3	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)	Up to one controller	Up to one controller

7.7.2 Fibre Channel / SAS Controller

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

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

NOTE:

- Up to four 16Gb/s Fiber Channel Controllers can be installed. However, up to two ports in a single processor configuration with Xeon E5-2603 v3/-2609 v3, and up to six ports in a dual processor configuration with Xeon E5-2603 v3/-2609 v3.
- 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.

7.8 Serial Port Adapter

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

NOTE:

- Up to one Serial Port Adapter can be installed.

8 Other Add-in Components

8.1 Power Supply Module

Product Name / Description	Part Number
460W Hot Plug Power Supply 1 x 460 Watt 80 PLUS® Platinum	N8181-121F
800W Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Platinum	N8181-122F
1000W Hot Plug Power Supply 1 x 1000 Watt 80 PLUS® Platinum	N8181-123F
800W Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Titanium - **NOTE:** 200 VAC input only supported	N8181-118F

NOTE:

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

8.2 Redundant Fan Kit

Product Name / Description	Part Number
Redundant Fan Kit 4(1CPU), 5(2CPU) hot plug redundant cooling fans for R120f-2M	(Standard)
Redundant Fan Kit 5(1CPU), 10(2CPU) hot plug redundant cooling fans for R120f-2M	N8181-125

NOTE:

- In a 35 degrees C environment, the fans are N+1 redundant as standard, but CPU and/or memory throttling may occur when a fan is broken.
- For 40 degrees C environment or full redundancy, arrange N8181-125 redundant fan kit.

8.3 Trusted Platform Module Kit

Product Name / Description	Part Number
Trusted Platform Module Kit 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.

8.4 Internal Flash Memory

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

NOTE:

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

8.5 Flash FDD

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

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

NOTE:

- Up to one drive can be connected.

9 Add-on Components

9.1 17-inch LCD Console Drawer

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

	Keypad	**Keyboard Unit (JP)** JP 108-keys Keyboard with 10-key for N8143-108F 17inch LCD Console Drawer (1port)	N8143-109
		Keyboard Unit (UK) UK 104-keys Keyboard with 10-key, for N8143-108F 17inch LCD Console Drawer (1port)	N8143-111

NOTE:

- There are two VGA connectors on R120f-2M, 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.

9.2 KVM Switch

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

NOTE:

- There are two VGA connectors on R120f-2M, 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.

9.3 Cable Management Arm

Product Name / Description	Part Number
Cable Management Arm 2U Kit For R120f-2M	N8143-95

9.4 Server Management License

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

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

9.5 Medium and Cartridge

Category		Product Name	Drive supported	Part Number
RDX	**HDD**	RDX Cartridge (320GB)	N8151-125	N8153-01
		RDX Cartridge (500GB)	N8151-125	N8153-02
		RDX Cartridge (1TB)	N8151-125	N8153-03
		RDX Cartridge (2TB)	N8151-125	N8153-08
	SSD	RDX Cartridge (SSD/128GB)	N8151-125	N8153-06
		RDX Cartridge (SSD/256GB)	N8151-125	N8153-07

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

[1] The feature is not supported on VMware ESXi systems.

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

[3] Monitoring boot screens is not supported on VMware systems.

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

OS Support Matrix for PCI Cards and Embedded Controllers

Part number	Product Name	WS 2012 R2	WS 2012	WS 2008 R2	WS 2008	RHEL 6	RHEL 6 x64	ESXi 6.0	ESXi 5.5	ESXi 5.1
-	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	✓	✓	-	-	-	✓	✓	-	-
N8190-159	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	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-150	1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-151	Dual Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-145	Dual Port 1000BASE-T Adapter	-	-	✓	-	✓	✓	-	✓	✓
N8104-152	Quad Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-155F	Dual Port 10GBASE-T LOM Card	✓	✓	-	-	✓	✓	✓	✓	✓
N8104-153	Dual Port 10GBASE-T Adapter	✓	✓	-	-	✓	✓	✓	✓	✓
N8104-156F	Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-149	10GBASE SFP+ Adapter (SFP+/2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-148	Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)	-	-	-	-	✓	✓	-	-	-
N8104-146	Single Port InfiniBand Adapter	✓	✓	-	-	-	✓	-	-	-
N8104-147	Dual Port InfiniBand Adapter	✓	✓	-	-	-	✓	-	-	-
N8118-01	PCIe SSD Adapter 365GB	✓	✓	-	-	-	-	-	-	-

Supported PCI Cards and Installable Slots

Standard Riser Card

Priority	Part Number	Product Name	Slots							
			#1A	#1B	#1C	#2C	#3C	#1D	#2D	#3D
(1)	N8104-155F	Dual Port 10GBASE-T LOM Card	-	(1)	-	-	-	-	-	-
(2)	N8104-156F	Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card	-	(1)	-	-	-	-	-	-
(3)	N8104-154F	Quad Port 1000BASE-T LOM Card	-	(1)	-	-	-	-	-	-
(4)	N8103-176	RAID Controller (1 GB, RAID 0/1)	(1)	-	-	-	-	-	-	-
(5)	N8103-177	RAID Controller (1 GB, RAID 0/1/5/6)	(1)	-	-	-	-	-	-	-
(6)	N8103-178	RAID Controller (2 GB,RAID 0/1/5/6)	(1)	-	-	-	-	-	-	-
(7)	N8103-179	RAID Controller (2 GB,RAID 0/1/5/6)	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(8)	N8118-01	PCIe SSD Adapter 365GB	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(9)	N8190-158A	Fibre Channel Controller (2ch)	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(10)	N8190-157A	Fibre Channel Controller	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(11)	N8104-147	Dual Port InfiniBand Adapter	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(12)	N8104-146	Single Port InfiniBand Adapter	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(13)	N8103-184	SAS Controller	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(14)	N8104-153	Dual Port 10GBASE-T Adapter	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(15)	N8104-149	10GBASE SFP+ Adapter (SFP+/2ch)	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(16)	N8104-148	Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(17)	N8190-160	Fibre Channel Controller (2ch)	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(18)	N8190-159	Fibre Channel Controller	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(19)	N8103-142	SAS Controller	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(20)	N8104-152	Quad Port 1000BASE-T Adapter	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(21)	N8104-145	Dual Port 1000BASE-T Adapter	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(22)	N8104-151	Dual Port 1000BASE-T Adapter	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(23)	N8104-150	1000BASE-T Adapter	-	-	(1)	(3)	(4)	(2)	(5)	(6)
(24)	N8117-01A	Serial Port Adapter	-	-	(1)	(3)	(4)	(2)	(5)	(6)

NOTE:

- The slot #2C, #3C, #2D, and #3D are available in a dual-processor configuration.
- Up to 312 mm / 12.28in length card can be installed into slot #2C when N8116-37 Full Length PCI Card installation Kit is installed.
- The number between parentheses shows the population priority (recommendation). For example, install N8104-155F (1) in the slot #1B, N8103-176 (4) in the slot #1A, N8104-153 (14) in the slot #1C and N8190-160 (17) in the slot #1D when you install those cards.

N8116-34/34A PCIe x16 Riser Card Kit

Priority	Part Number	Product Name	Slots						
			#1A	#1B	#1C	#2C	#1D	#2D	#3D
(1)	N8104-155F	Dual Port 10GBASE-T LOM Card	-	(1)	-	-	-	-	-
(2)	N8104-156F	Dual Port 10G-SFP + Dual Port 1000BASE-T LOM Card	-	(1)	-	-	-	-	-
(3)	N8104-154F	Quad Port 1000BASE-T LOM Card	-	(1)	-	-	-	-	-
(4)	N8103-176	RAID Controller (1 GB, RAID 0/1)	(1)	-	-	-	-	-	-
(5)	N8103-177	RAID Controller (1 GB, RAID 0/1/5/6)	(1)	-	-	-	-	-	-
(6)	N8103-178	RAID Controller (2 GB,RAID 0/1/5/6)	(1)	-	-	-	-	-	-
(7)	N8103-179	RAID Controller (2 GB,RAID 0/1/5/6)	-	-	(1)	(3)	(2)	(4)	(5)
(8)	N8118-01	PCIe SSD Adapter 365GB	-	-	(1)	(3)	(2)	(4)	(5)
(9)	N8190-158A	Fibre Channel Controller (2ch)	-	-	(1)	(3)	(2)	(4)	(5)
(10)	N8190-157A	Fibre Channel Controller	-	-	(1)	(3)	(2)	(4)	(5)
(11)	N8104-147	Dual Port InfiniBand Adapter	-	-	(1)	(3)	(2)	(4)	(5)
(12)	N8104-146	Single Port InfiniBand Adapter	-	-	(1)	(3)	(2)	(4)	(5)
(13)	N8103-184	SAS Controller	-	-	(1)	(3)	(2)	(4)	(5)
(14)	N8104-153	Dual Port 10GBASE-T Adapter	-	-	(1)	(3)	(2)	(4)	(5)
(15)	N8104-149	10GBASE SFP+ Adapter (SFP+/2ch)	-	-	(1)	(3)	(2)	(4)	(5)
(16)	N8104-148	Dual Port 10GBASE SFP+ Adapter (SFP+/2ch)	-	-	(1)	(3)	(2)	(4)	(5)
(17)	N8190-160	Fibre Channel Controller (2ch)	-	-	(1)	(3)	(2)	(4)	(5)
(18)	N8190-159	Fibre Channel Controller	-	-	(1)	(3)	(2)	(4)	(5)
(19)	N8103-142	SAS Controller	-	-	(1)	(3)	(2)	(4)	(5)
(20)	N8104-152	Quad Port 1000BASE-T Adapter	-	-	(1)	(3)	(2)	(4)	(5)
(21)	N8104-145	Dual Port 1000BASE-T Adapter	-	-	(1)	(3)	(2)	(4)	(5)
(22)	N8104-151	Dual Port 1000BASE-T Adapter	-	-	(1)	(3)	(2)	(4)	(5)
(23)	N8104-150	1000BASE-T Adapter	-	-	(1)	(3)	(2)	(4)	(5)
(24)	N8117-01A	Serial Port Adapter	-	-	(1)	(3)	(2)	(4)	(5)

NOTE:

- The slot #2C, #2D, and #3D are available in a dual-processor configuration.
- Up to 312 mm / 12.28in length card can be installed into slot #2C when N8116-37 Full Length PCI Card installation Kit is installed.
- The number between parentheses shows the population priority (recommendation). For example, install N8104-155F (1) in the slot #1B, N8103-176 (4) in the slot #1A, N8104-153 (14) in the slot #1C and N8190-160 (17) in the slot #1D when you install those cards.

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Revision History

Revision	Date	Description
6.0	April 17, 2015	**New products added:** 1TB 7.2K Hot Plug 2.5-inch SATA HDD / N8150-520 2TB 7.2K Hot Plug 2.5-inch SATA HDD / N8150-521 PCIe x16 Riser Card Kit / N8116-34A Graphics Card Installation Kit / N8116-38A **Others:** Added ESXi 6 to the list of operating system supported
5.1	March 25, 2015	**Others:** Added note for RAID Controller Configuration (2)
5.0	February 18, 2015	**New products added:** Graphics Card Installation Kit / N8116-38 VMware ESXi support kit / N8106-009 **Others:** Added note to configure with VMware Systems Updated Supported PCI Cards and Installable Slots matrix to indicate the population priority of PCI card
4.0	January 28, 2015	**New products added:** SAS Controller / N8103-184 **Part number changed:** Flash FDD / N8160-96 17-inch LCD Console Drawer (1port) / N8143-108F Keyboard Unit (JP) / N8143-109 Keyboard Unit (UK) / N8143-111 **Others:** Added CCC and RCM in the Regulatory and Safety list
3.0	November 17, 2014	**Others:** Added KC in the Regulatory and Safety list 512B sector SAS HDDs supported on UEFI Boot OS 250GB SATA HDD supported on UEFI Boot OS N8103-142 SAS controller supported on ESXi 5.5 N8104-153 Dual Port 10GBASE-T Adapter supported on Windows/ESXi N8104-155F Dual Port 10GBASE-T Adapter supported on Windows Notes for NIC Teaming feature changed
2.0	October 16, 2014	**Discontinued product deleted:** RDX Cartridge (1.5TB) / N8153-04 **Others:** Add BSMI and UL(Mexico) in the Regulatory and Safety list. Support for VMware ESXi 5.1 and 5.5
1.0	September 17, 2014	Initial release