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NEC Express5800/R120d-1E 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.

December 21, 2012
Revision 4.0
NEC Corporation

Contents

Technical Specification

Key Features

- High performance with the latest Intel® Xeon® processor E5-2400 product family
- Up to 384 GB of memory capacity, supporting high speed and energy efficient DDR3-1600 memory
- High energy efficiency with power capping feature and 80 PLUS® Platinum power supply
- Up to eight 2.5-inch drives in 1U dense form factor

Specification

2.5-inch Drive Model (1 / 2)

Model		R120d-1E			
Processor	**Type**	Intel® Xeon® processor E5-2403	Intel® Xeon® processor E5-2407	Intel® Xeon® processor E5-2420	Intel® Xeon® processor E5-2430
	Clock speed	1.80 GHz	2.20 GHz	1.90 GHz	2.20 GHz
	Number of Processors	1 or 2			
	Cache	10 MB		15 MB	
	Cores and Threads	4C-4T		6C-12T	
Chipset		Intel® C602 Chipset			
Memory	**Type**	DDR3-1333 ECC Unbuffered Low Power DIMM, DDR3-1600 and DDR3-1066 ECC Registered Low Power DIMM			
	Standard Capacity	0 GB			
	Maximum Capacity	384 GB (12 x 32 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	**Standard Capacity**	0 GB			
	Maximum Capacity	SAS HDD: 7.2 TB (8 x 900 GB) SATA HDD: 8 TB (8 x 1 TB) SAS SSD: 3.2 TB (8 x 400 GB)			
	Storage Controller	SATA : 3Gb/s and 6Gb/s (Integrated) SAS: 6Gb/s (Optional)			
	RAID	SATA : RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)			
	Hot Plug	Supported			
	Optical Disk Drive	Optional			
	Optical Drive Bays	1			
	Disk Drive Bays	8 with optional drive cage			
Expansion Slots	**Standard**	Total: 3 slots available 1 x PCIe 3.0 x16 (x16 connector) 1 x PCIe 2.0 x4 (x8 connector) 1 x PCIe 3.0 x8 (x8 connector) dedicated RAID slot			
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)			
	Resolution / Color	1280 x 1024 / 16.7M [1]			
Interfaces		9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 4 x 1000BASE-T LAN connector (RJ-45, 4 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)			
Server Management		EXPRESSSCOPE Engine 3			
Redundant Fan		Standard, non-hot plug			
Redundant Power Supply		Optional, hot plug			

Model		R120d-1E			
Power Supply		1 to 2 x 450 Watt or 800 Watt 80 PLUS® Platinum certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			
Power Consumption	**Max. Config, Idling**	175 VA / 175 Watt	175 VA / 175 Watt	183 VA / 182 Watt	183 VA / 182 Watt
	Max. Config, Operating	411 VA / 403 Watt	438 VA / 430 Watt	497 VA / 487 Watt	499 VA / 489 Watt
Acoustical Noise (Sound Pressure Level) [2]	**Max. Config, Idling**	43.5 dB			
	Max. Config, Operating	57.1 dB			
Dimensions (W x D x H)		439.8 x 682.1 x 43.4 mm / 17.3 x 26.9 x 1.7 in (1U)			
Weight (Minimum / Maximum)		13 kg / 18.0 kg, 28.66 lbs. / 39.68 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, C-TICK, CE, UL, CB, KC, BSMI, CCC, RoHS, WEEE			
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2003 R2, Standard Edition Microsoft® Windows Server® 2003 R2, Enterprise Edition Microsoft® Windows Server® 2003 R2, Standard x64 Edition Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard [3] Microsoft® Windows Server® 2012 Datacenter [3] Red Hat Enterprise Linux 5.7 or later (x86) [4] Red Hat Enterprise Linux 5.7 or later (EM64T) [4] Red Hat Enterprise Linux 6.1 or later (x86) [4] Red Hat Enterprise Linux 6.1 or later (x86_64) [4] VMware ESX 4.1Update 2 VMware ESXi 5.0 Update 1 VMware ESXi 5.1			

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

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

3 For Windows Server 2012 installation, download the driver kit from the following website and install it after OS installation
http://www.nec.com/en/global/prod/express/download/

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

2.5-inch Drive Model (2 / 2)

Model		R120d-1E		
Processor	**Type**	Intel® Xeon® processor E5-2430L	Intel® Xeon® processor E5-2450	Intel® Xeon® processor E5-2470
	Clock speed	2 GHz	2.10 GHz	2.30 GHz
	Number of Processors	1 or 2		
	Cache	15 MB	20 MB	
	Cores and Threads	6C-12T	8C-16T	
Chipset		Intel® C602 Chipset		

Model		R120d-1E		
Memory	**Type**	DDR3-1333 ECC Unbuffered Low Power DIMM, DDR3-1600 and DDR3-1066 ECC Registered Low Power DIMM		
	Standard Capacity	0 GB		
	Maximum Capacity	384 GB (12 x 32 GB)		
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing		
Internal Storage	**Standard Capacity**	0 GB		
	Maximum Capacity	SAS HDD: 7.2 TB (8 x 900 GB) SATA HDD: 8 TB (8 x 1 TB) SAS SSD: 3.2 TB (8 x 400 GB)		
	Storage Controller	SATA : 3Gb/s and 6Gb/s (Integrated) SAS: 6Gb/s (Optional)		
	RAID	SATA : RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)		
	Hot Plug	Supported		
	Optical Disk Drive	Optional		
	Optical Drive Bays	1		
	Disk Drive Bays	8 with optional drive cage		
Expansion Slots	**Standard**	Total: 3 slots available 1 x PCIe 3.0 x16 (x16 connector) 1 x PCIe 2.0 x4 (x8 connector) 1 x PCIe 3.0 x8 (x8 connector) dedicated RAID slot		
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)		
	Resolution / Color	1280 x 1024 / 16.7M [1]		
Interfaces		9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 4 x 1000BASE-T LAN connector (RJ-45, 4 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)		
Server Management		EXPRESSSCOPE Engine 3		
Redundant Fan		Standard, non-hot plug		
Redundant Power Supply		Optional, hot plug		
Power Supply		1 to 2 x 450 Watt or 800 Watt 80 PLUS® Platinum certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz		
Power Consumption	**Max. Config, Idling**	183 VA / 180 Watt	183 VA / 183 Watt	183 VA / 183 Watt
	Max. Config, Operating	474 VA / 465 Watt	520 VA / 511 Watt	522 VA / 512 Watt
Acoustic Noise (Sound Pressure Level) [2]	**Max. Config, Idling**	43.5 dB		
	Max. Config, Operating	53.1 dB	57.1 dB	
Dimensions (W x D x H)		439.8 x 682.1 x 43.4 mm / 17.3 x 26.9 x 1.7 in (1U)		
Weight (Minimum / Maximum)		13 kg / 18.0 kg, 28.66 lbs. / 39.68 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, C-TICK, CE, UL, CB, KC, BSMI, CCC, RoHS, WEEE		
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2003 R2, Standard Edition Microsoft® Windows Server® 2003 R2, Enterprise Edition Microsoft® Windows Server® 2003 R2, Standard x64 Edition Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64)		

Model	R120d-1E
Operating Systems and Virtualization Software	Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard [3] Microsoft® Windows Server® 2012 Datacenter [3] Red Hat Enterprise Linux 5.7 or later (x86) [4] Red Hat Enterprise Linux 5.7 or later (EM64T) [4] Red Hat Enterprise Linux 6.2 or later (x86) [4] Red Hat Enterprise Linux 6.2 or later (x86_64) [4] VMware ESX 4.1 Update 2 VMware ESXi 5.0 Update 1 VMware ESXi 5.1

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

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

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3.5-inch Drive Model (1 / 2)

Model		R120d-1E		
Processor	**Type**	Intel® Xeon® processor E5-2403	Intel® Xeon® processor E5-2407	Intel® Xeon® processor E5-2430
	Clock speed	1.80 GHz	2.20 GHz	2.20 GHz
	Number of Processors	1 or 2		
	Cache	10 MB		15 MB
	Cores and Threads	4C-4T		6C-12T
Chipset		Intel® C602 Chipset		
Memory	**Type**	DDR3-1333 ECC Unbuffered Low Power DIMM, DDR3-1600 and DDR3-1066 ECC Registered Low Power DIMM		
	Standard Capacity	0 GB		
	Maximum Capacity	384 GB (12 x 32 GB)		
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing		
Internal Storage	**Standard Capacity**	0 GB		
	Maximum Capacity	12 TB (4 x 3 TB)		
	Storage Controller	3Gb/s and 6Gb/s (Integrated)		
	RAID	RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional)		
	Hot Plug	Supported		
	Optical Disk Drive	Optional		
	Optical Drive Bays	1		
	Disk Drive Bays [free]	4		
Expansion Slots	**Standard**	Total: 3 slots available 1 x PCIe 3.0 x16 (x16 connector) 1 x PCIe 2.0 x4 (x8 connector) 1 x PCIe 3.0 x8 (x8 connector) dedicated RAID slot		
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)		
	Resolution / Color	1280 x 1024 / 16.7M [1]		

Model		R120d-1E		
Interfaces		9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 4 x 1000BASE-T LAN connector (RJ-45, 4 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)		
Server Management		EXPRESSSCOPE Engine 3		
Redundant Fan		Standard, non-hot plug		
Redundant Power Supply		Optional, hot plug		
Power Supply		1 to 2 x 450 Watt 80 PLUS® Platinum certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz		
Power Consumption	**Max. Config, Idling**	150 VA / 150 Watt	150 VA / 150 Watt	158 VA / 157 Watt
	Max. Config, Operating	289 VA / 284 Watt	312 VA / 306 Watt	394 VA / 387 Watt
Acoustic Noise (Sound Pressure Level) [2]	**Max. Config, Idling**	43.5 dB		
	Max. Config, Operating	57.1 dB		
Dimensions (W x D x H)		439.8 x 682.1 x 43.4 mm / 17.3 x 26.9 x 1.7 in (1U)		
Weight (Minimum / Maximum)		13 kg / 18.0 kg, 28.66 lbs. / 39.68 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, C-TICK, CE, UL, CB, KC, BSMI, CCC, RoHS, WEEE		
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2003 R2, Standard Edition Microsoft® Windows Server® 2003 R2, Enterprise Edition Microsoft® Windows Server® 2003 R2, Standard x64 Edition Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard [3] Microsoft® Windows Server® 2012 Datacenter [3] Red Hat Enterprise Linux 5.7 or later (x86) [4] Red Hat Enterprise Linux 5.7 or later (EM64T) [4] Red Hat Enterprise Linux 6.2 or later (x86) [4] Red Hat Enterprise Linux 6.2 or later (x86_64) [4] VMware ESX 4.1 Update 2 VMware ESXi 5.0 Update 1 VMware ESXi 5.1		

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3.5-inch Drive Model (2 / 2)

Model		R120d-1E	
Processor	**Type**	Intel® Xeon® processor E5-2430L	Intel® Xeon® processor E5-2450
	Clock speed	2 GHz	2.10 GHz
	Number of Processors	1 or 2	
	Cache	15 MB	20 MB
	Cores and Threads	6C-12T	8C-16T
Chipset		Intel® C602 Chipset	
Memory	**Type**	DDR3-1333 ECC Unbuffered Low Power DIMM, DDR3-1600 and DDR3-1066 ECC Registered Low Power DIMM	
	Standard Capacity	0 GB	
	Maximum Capacity	384 GB (12 x 32 GB)	
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing	
Internal Storage	**Standard Capacity**	0 GB	
	Maximum Capacity	12 TB (4 x 3 TB)	
	Storage Controller	3Gb/s and 6Gb/s (Integrated)	
	RAID	RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional)	
	Hot Plug	Supported	
	Optical Disk Drive	Optional	
	Optical Drive Bays	1	
	Disk Drive Bays	4	
Expansion Slots	**Standard**	Total: 3 slots available 1 x PCIe 3.0 x16 (x16 connector) 1 x PCIe 2.0 x4 (x8 connector) 1 x PCIe 3.0 x8 (x8 connector) dedicated RAID slot	
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)	
	Resolution / Color	1280 x 1024 / 16.7M [1]	
Interfaces		9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 4 x 1000BASE-T LAN connector (RJ-45, 4 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)	
Server Management		EXPRESSSCOPE Engine 3	
Redundant Fan		Standard, non-hot plug	
Redundant Power Supply		Optional, hot plug	
Power Supply		1-2 x 450 Watt 80 PLUS® Platinum certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz	
Power Consumption	**Max. Config, Idling**	158 VA / 155 Watt	158 VA / 157 Watt
	Max. Config, Operating	375 VA / 368 Watt	478 VA / 472 Watt
Acoustic Noise (Sound Pressure Level) [2]	**Max. Config, Idling**	43.5 dB	
	Max. Config, Operating	53.1dB	57.1 dB
Dimensions (W x D x H)		439.8 x 682.1 x 43.4 mm / 17.3 x 26.9 x 1.7 in (1U)	
Weight (Minimum / Maximum)		13 kg / 18.0 kg, 28.66 lbs. / 39.68 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, C-TICK, CE, UL, CB, KC, RoHS, WEEE	
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2003 R2, Standard Edition Microsoft® Windows Server® 2003 R2, Enterprise Edition Microsoft® Windows Server® 2003 R2, Standard x64 Edition	

Model	R120d-1E
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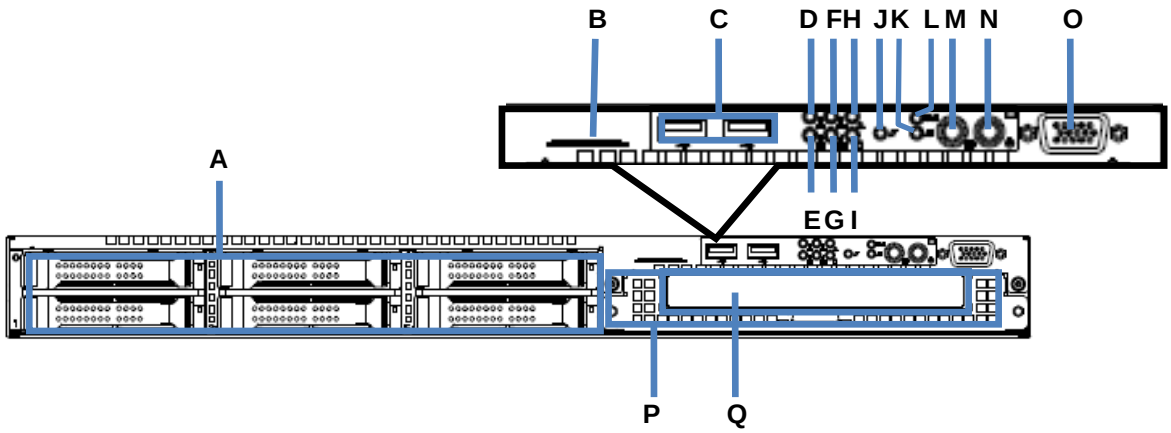
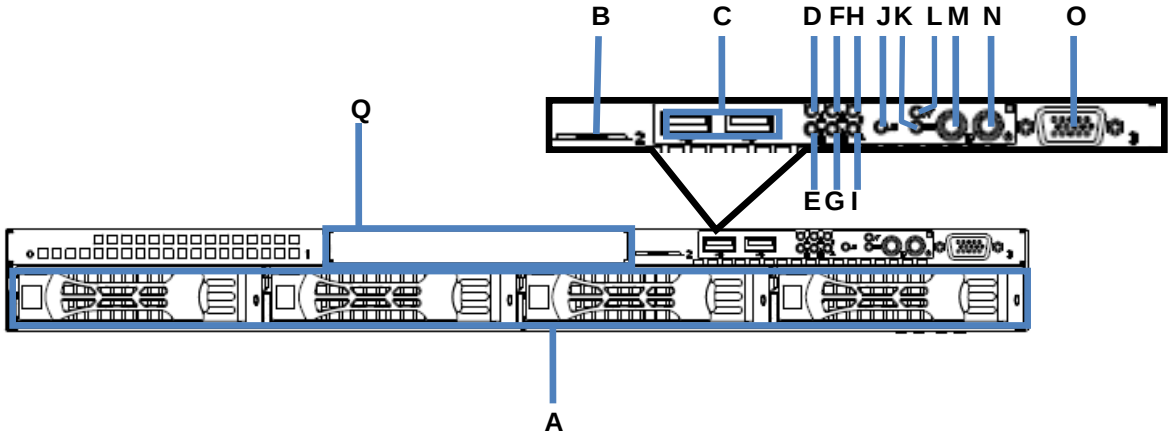
External Views

Front and Rear Views

Front View for 2.5-inch Drive Model

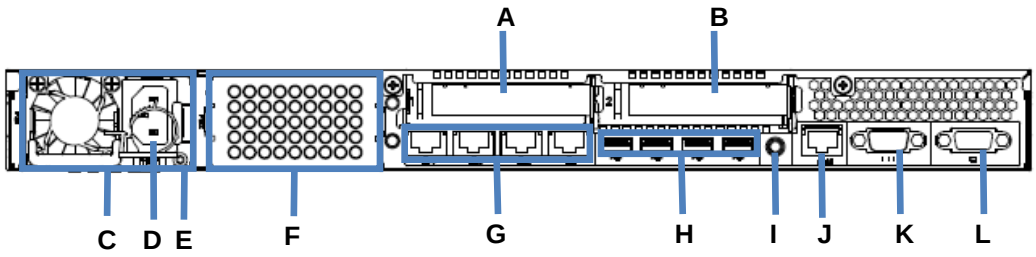


Front View for 3.5-inch Drive Model



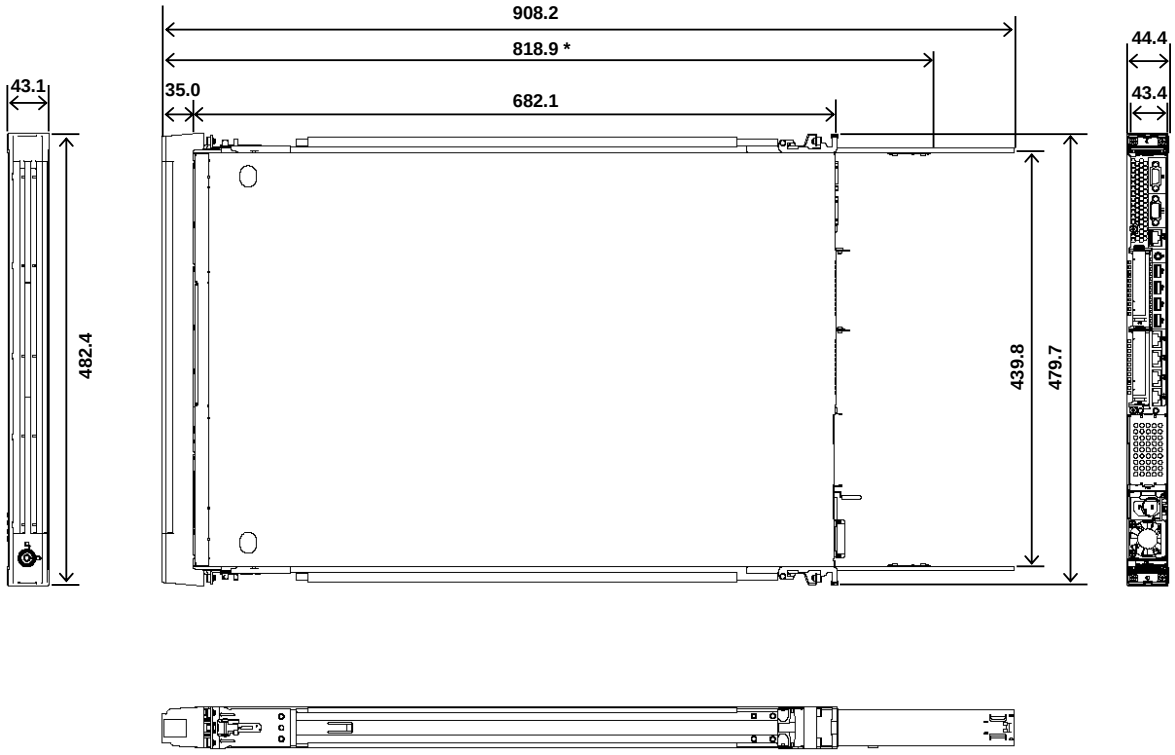
Legend			
A.	Drive Bays	**J.**	BMC RESET Switch
B.	Pull-out tab	**K.**	DUMP Switch
C.	USB Connectors	**L.**	RESET Switch
D.	Data LAN 1 Activity LED	**M.**	UID LED Button/LED
E.	Data LAN 2 Activity LED	**N.**	POWER Button/LED
F.	Data LAN 3 Activity LED	**O.**	VGA Connector
G.	Data LAN 4 Activity LED	**P.**	Optional 2.5-inch Drive Bay
H.	Hard Drive Activity LED	**Q.**	Optical Drive Bay
I.	System Status LED		

Rear View



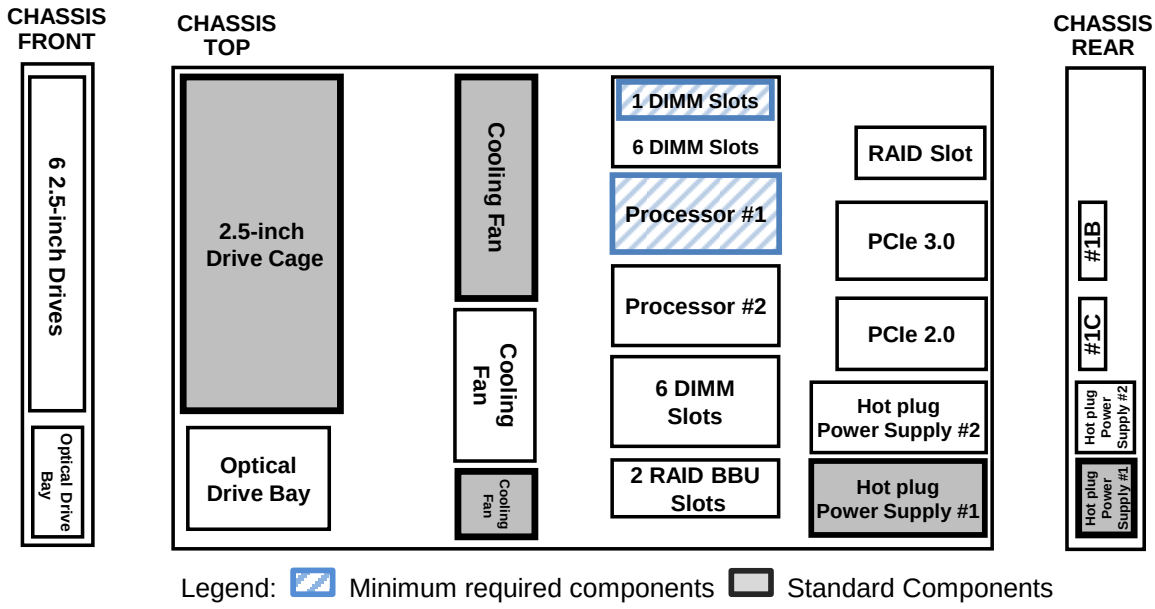
Legend			
A.	PCI Slot (Low Profile)	**G.**	LAN Connector
B.	PCI Slot (Low Profile)	**H.**	USB Connector
C.	Power Supply	**I.**	UID LED Button/LED
D.	AC Inlet	**J.**	Management LAN Connector
E.	AC Power LED	**K.**	Serial Port Connector
F.	Additional PS Slot	**L.**	VGA Connector

Dimensions (mm)



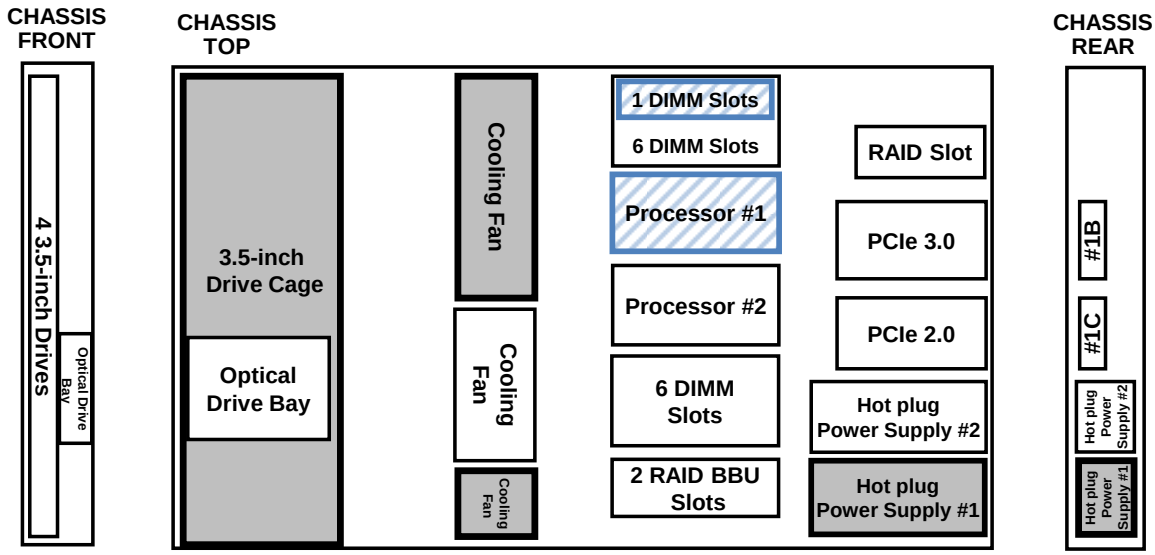
Configuration Diagram

2.5-inch Drive Model



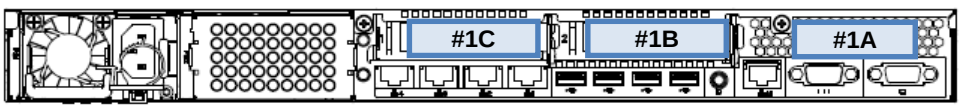
Legend: Minimum required components Standard Components

3.5-inch Drive Model



Legend: Minimum required components Standard Components

Expansion Slot



Legend	
#1A	PCIe 3.0 x8, x8 connector, for a dedicated RAID controller
#1B	PCIe 3.0 x16, x16 connector, Low-profile, up to 170 mm length
#1C	PCIe 2.0 x4, x8 connector, Low-profile, up to 170 mm length

Server Configuration

1 Base Models

2.5-inch Drive Model

Product Name / Description	Part Number
NEC Express5800/R120d-1E Server no processor, no RAM, no HDD, no ODD Including: 6 x 2.5-inch hot plug drive cage, 1 x 450 Watt 80 PLUS® Platinum hot plug power supply, EXPRESSBUILDER DVD	N8100-1954F
NEC Express5800/R120d-1E Server no processor, no RAM, no HDD, no ODD Including: 6 x 2.5-inch drive cage, 1 x 800 Watt 80 PLUS® Platinum hot plug power supply, EXPRESSBUILDER DVD	N8100-1955F

NOTE:

- The base model must be ordered with a processor kit.

3.5-inch Drive Model

Product Name / Description	Part Number
NEC Express5800/R120d-1E Server no processor, no RAM, no HDD, no ODD Including: 4 x 3.5-inch hot plug drive cage, 1 x 450 Watt 80 PLUS® Platinum hot plug power supply, EXPRESSBUILDER DVD	N8100-1956F

NOTE:

- The base model must be ordered with a processor kit.

2 Processors and Heat Sink

Available sockets: 2

Category		Product Name / Description	Part Number
CPU **1 Processor Required**		**Xeon E5-2403 Processor Kit** Intel® Xeon ® Processor E5-2403 (1.80 GHz, 4C/4T, 10 MB)	N8101-560F
		Xeon E5-2407 Processor Kit Intel® Xeon ® Processor E5-2407 (2.20 GHz, 4C/4T, 10 MB)	N8101-561F
		Xeon E5-2420 Processor Kit Intel® Xeon ® Processor E5-2420 (1.90 GHz, 6C/12T, 15 MB) **NOTE:** The kit is supported on 2.5-inch drive model only.	N8101-562F
		Xeon E5-2430 Processor Kit Intel® Xeon ® Processor E5-2430 (2.20 GHz, 6C/12T, 15 MB)	N8101-563F
		Xeon E5-2430L Processor Kit Intel® Xeon ® Processor E5-2430L (2 GHz, 6C/12T, 15 MB)	N8101-564F
		Xeon E5-2450 Processor Kit Intel® Xeon ® Processor E5-2450 (2.10 GHz, 8C/16T, 20 MB)	N8101-565F
		Xeon E5-2470 Processor Kit Intel® Xeon ® Processor E5-2470 (2.30 GHz, 8C/16T, 20 MB) **NOTE:** The kit is supported on 2.5-inch drive model only.	N8101-567F
Heat Sink	**1st**	**Processor Heat Sink** For 1st Processor	(Standard)
	2nd	**Processor Heat Sink** For 2nd Processor, including cooling fan kit	N8101-576F

NOTE:

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

3 Memory

3.1 Memory Configuration

Refer to the section in accordance with your memory configuration:

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

Memory Configuration Feature Comparison

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

	Independent Channel	Memory Sparing	Memory Lockstep	Memory Mirroring
Performance	Best	Better	Better	Good
Data Protection	No	Multiple single bit error protection	No	Multiple single bit and multi bit error protection
Redundancy	No	Partly	No	Fully
Data Correction	ECC, x4 SDDC [1]	ECC, x4 SDDC	ECC, x8 SDDC	ECC, x4 SDDC
Available Memory	Full physical memory	2/3 physical memory	Full physical memory	Half physical memory
Available Memory Channels	3	3	2	2
Notes	-	All DIMMs in the system must be identical.	Paired DIMMs must be identical.	Paired DIMMs must be identical.

- N8102-455F 4GB DDR3-1333 UNB Memory Kit and N8102-488F 2GB DDR3-1600 REG Memory Kit do not support x4 SDDC.

3.1.1 Independent Channel Configuration

Available slots: 6 per processor

Category	Product Name / Description	Part Number
Unbuffered DIMM (UDIMM)	**4GB DDR3-1333 UNB Memory Kit** 1x 4GB Unbuffered ECC DIMM, DDR3L-1333(PC3L-10600) **NOTE:** The x4 SDDC is not supported.	N8102-455F
Registered DIMM (RDIMM)	**2GB DDR3-1600 REG Memory Kit** 1x 2GB Registered ECC DIMM, DDR3L-1600(PC3L-12800) **NOTE:** The x4 SDDC is not supported.	N8102-488F
	4GB DDR3-1600 REG Memory Kit 1x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-489F
	8GB DDR3-1600 REG Memory Kit 1x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-490F
	16GB DDR3-1600 REG Memory Kit 1x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-491F
	32GB DDR3-1066 REG Memory Kit 1x 32GB Registered ECC DIMM, DDR3L-1066(PC3L-8500)	N8102-492F

NOTE:

- Minimum one memory kit per processor must be installed.
- It is recommended to install three identical memory kits for triple-channel symmetric memory configurations to increase memory transfer speed.
- Mix configurations of UDIMM/RDIMM are not supported.

3.1.2 Memory Sparing Configuration

Available slots: 6 per processor

Product Name / Description	Part Number
16GB DDR3-1600 REG Memory Kit 2x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-497
32GB DDR3-1600 REG Memory Kit 2x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-498

NOTE:

- Minimum one memory kit per processor must be installed.
- The memory kits must be identical.
- The logical memory capacity becomes three-fourths of physical capacity.

3.1.3 Memory Mirroring / Memory Lockstep Configuration

Available slots: 6 per processor

Product Name / Description	Part Number
4GB DDR3-1600 REG Memory Kit 2x 2GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-493
8GB DDR3-1600 REG Memory Kit 2x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-494
16GB DDR3-1600 REG Memory Kit 2x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-495
32GB DDR3-1600 REG Memory Kit 2x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-496

NOTE:

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

Maximum Memory Speed

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

DDR3 memory speed depends on the type of DIMMs, the native memory bus speed of the memory controller and memory configuration. All memory buses operate at the clock frequency of the DIMM with the lowest frequency.

Processor Type	Populated DIMMs	# of DIMMs per processor	Memory Power Setting	DIMM Speed
E5-2403	UDIMM: 4GB RDIMM: 2 GB, 4 GB, 8 GB,16 GB	-	-	1066 MHz
E5-2407	RDIMM: 32 GB	-	-	800 MHz
E5-2420	UDIMM: 4GB	Up to 3 DIMMs	-	1333 MHz
E5-2430		4 or more DIMMs	-	1066 MHz
E5-2430L	RDIMM: 2 GB, 4 GB, 8 GB,16 GB	-	-	1333 MHz
	RDIMM: 32 GB	-	-	800 MHz
E5-2450	UDIMM: 4GB	Up to 3 DIMMs	-	1333 MHz
E5-2470		4 or more DIMMs	-	1066 MHz
	RDIMM: 2 GB, 4 GB, 8 GB,16 GB	-	Low (1.35V)	1333 MHz
		-	Normal (1.5V)	1600 MHz
	RDIMM: 32 GB	-	-	800 MHz

Maximum Available Memory

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

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

Maximum Memory Size Supported by Operating Systems		Maximum Available Memory
Microsoft Windows Server 2003 R2, Standard Edition Microsoft Windows Server 2008 Standard	**4 GB**	**4 GB (HW-DEP enabled)** **App. 2 GB (HW-DEP disabled)**
Microsoft Windows Server 2003 R2, Standard x64 Edition Microsoft Windows Server 2008 Standard (x64) Microsoft Windows Server 2008 R2 Standard	**32 GB**	**32 GB**
Microsoft Windows Server 2003 R2, Enterprise Edition Microsoft Windows Server 2008 Enterprise	**64 GB**	**64 GB**
Microsoft Windows Server 2003 R2, Enterprise x64 Edition	**1 TB**	**384 GB**
Microsoft Windows Server 2008 Enterprise (x64) Microsoft Windows Server 2008 R2 Enterprise	**2 TB**	**384 GB**
Microsoft Windows Server 2012 Standard Microsoft Windows Server 2012 Datacenter	**4 TB**	**384 GB**
Red Hat Enterprise Linux 5 Red Hat Enterprise Linux 6	**16 GB**	**16 GB**
Red Hat Enterprise Linux 5 (EM64T)	**1 TB**	**384 GB**
Red Hat Enterprise Linux 6 (x86_64)	**2 TB**	**384 GB**
VMware ESX 4.1[1]	**256 GB or 1 TB**	**256 GB or 384 GB**
VMware ESXi 5.0 / 5.1[2]	**2 TB**	**384 GB**

[1] Up to 255 GB of the main memory is available to each virtual machine

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

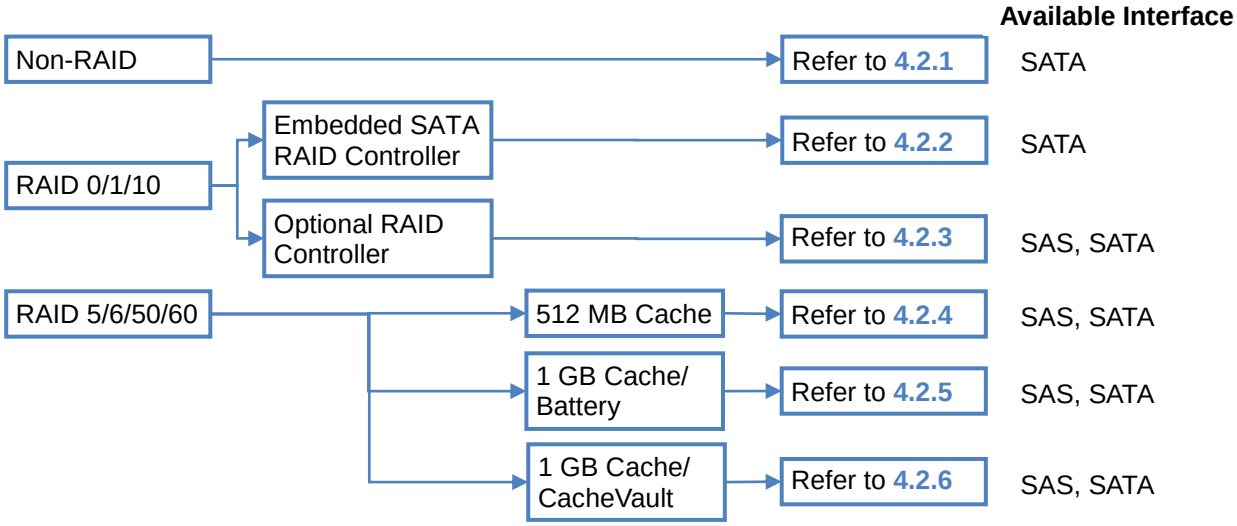
4 Internal Hard Disk Drives

4.1 RAID Configuration

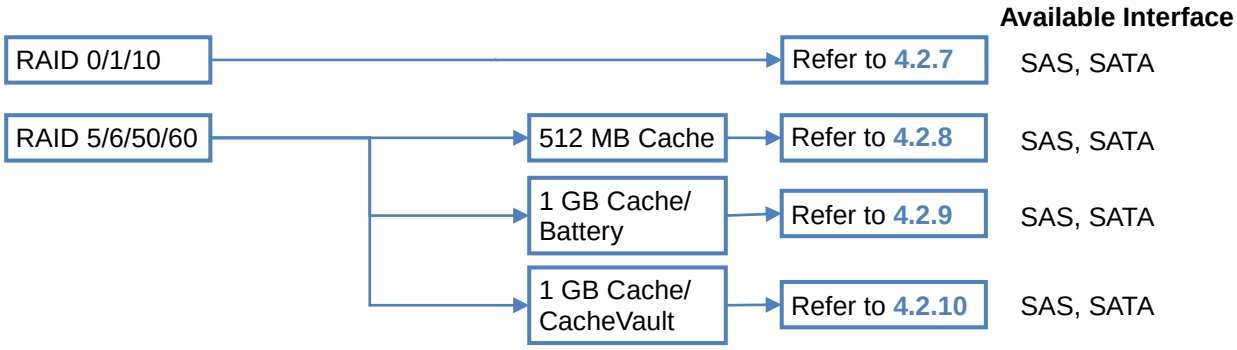
Refer to the section in accordance with your disk form factor and RAID configuration.

4.1.1 2.5-inch Drive Model

Up to six 2.5-inch Drives



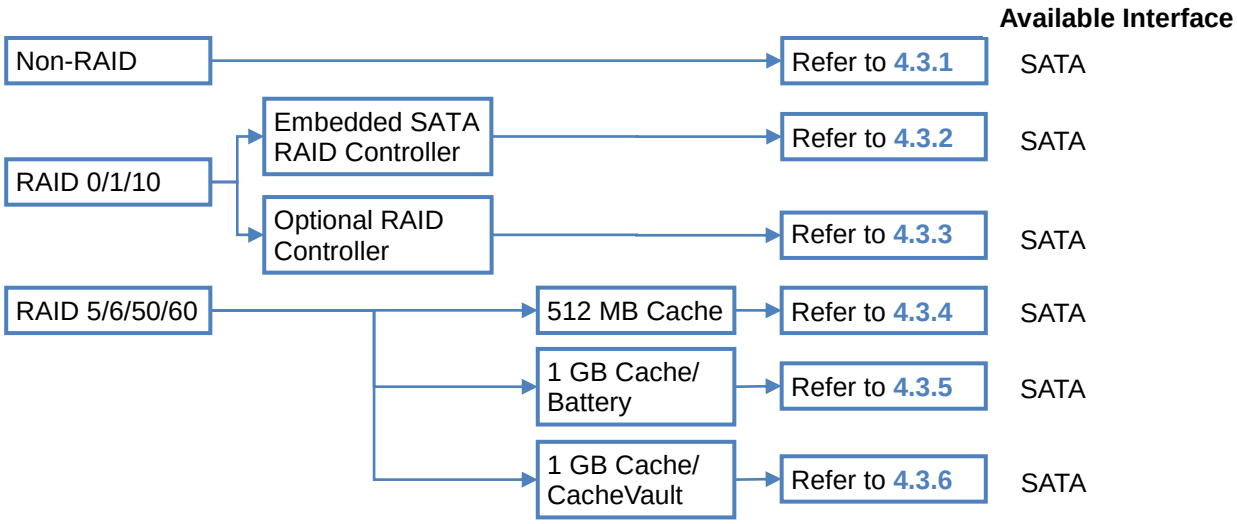
Up to eight 2.5-inch Drives



NOTE:

- Up to four hard drives can be installed in the Embedded SATA configuration.
- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- Hot plug insertion/removal are not supported in the Embedded SATA non-RAID controller.
- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Use the same rotational speed of the SAS hard drives.
- 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.
- Up to two different kinds of drives can be mixed in one system
- For optional RAID controller driver to install Windows Server 2003 R2, download from the NEC website at:
  http://www.nec.com/en/global/prod/express/download/index.html

4.1.2 3.5-inch Drive Model



NOTE:

- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- Embedded SATA RAID Controller does not support RAID 10 configured with 2TB and 3TB HDDs.
- Hot plug insertion/removal is not supported with the Embedded SATA non-RAID controller.
- All hard drives within a RAID array should be of the same capacity.
- For optional RAID controller driver to install Windows Server 2003 R2, download from the NEC website at:
  http://www.nec.com/en/global/prod/express/download/index.html

4.2 Hot Plug 2.5-inch Drive Configuration

4.2.1 Up to four Drives with Embedded SATA non-RAID Controller

Category		Product Name / Description	Part Number
Storage Controller		**Embedded SATA Controller** 2x 6Gb/s SATA, 2x 3Gb/s SATA	(Standard)
Cable **Required**		**Internal SATA Cable** 4 x Single SATA to 1 x mini-SAS	(Standard)
Drive Cage **Required**		**2.5-inch Hot Plug Drive Cage Kit** 6 x 2.5-inch hot plug hard drive bays	(Standard)
Drive **4 slots available**	**SATA HDD**	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

NOTE:

- Hot plug insertion/removal is not supported with the Embedded SATA non-RAID controller.

4.2.2 Up to four Drives with Embedded SATA RAID Controller

Category		Product Name / Description	Part Number
Storage Controller		**Embedded SATA Controller** 2x 6Gb/s SATA, 2x 3Gb/s SATA, RAID 0/1/10 capable	(Standard)
Cable		**Internal SATA Cable** 4 x Single SATA to 1 x mini-SAS	(Standard)
Drive Cage		**2.5-inch Hot Plug Drive Cage Kit** 6 x 2.5-inch hot plug hard drive bays	(Standard)
Drive **4 slots available**	**SATA HDD**	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

NOTE:

- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- All hard drives within a RAID array should be of the same capacity.

4.2.3 Up to six Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID 0/1, 512 MB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable		**Internal SAS/SATA Cable** two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		**2.5-inch Hot Plug Drive Cage Kit** 6 x 2.5-inch hot plug hard drive bays	(Standard)
Drive 6 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, SLC, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, SCL, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives can be mixed in one system

4.2.4 Up to six Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID0/1/5/6/10/50/60, 512MB cache, Int.8, PCIe 2.0 x8 , SAS 6Gb/s, SATA 6Gb/s	N8103-150
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable		**Internal SAS/SATA Cable** two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		**2.5-inch Hot Plug Drive Cage Kit** 6 x 2.5-inch hot plug hard drive bays	(Standard)
Drive 6 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, SLC, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, SCL, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives can be mixed in one system
- A large-capacity RAID array configuration requires long-time rebuilding when to recover from the failure. In order to improve the reliability, RAID 6 or RAID 60 configuration, which supports two hard drives failures, is recommended as the redundancy becomes invalid during the system recovery.

4.2.5 Up to six Drives with RAID 5/6 Controller with 1 GB Cache/Battery

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-151
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SAS/SATA Cable** two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		**2.5-inch Hot Plug Drive Cage Kit** 6 x 2.5-inch hot plug hard drive bays	(Standard)
Drive 6 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, SLC, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, SCL, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives can be mixed in one system
- A large-capacity RAID array configuration requires long-time rebuilding when to recover from the failure. In order to improve the reliability, RAID 6 or RAID 60 configuration, which supports two hard drives failures, is recommended as the redundancy becomes invalid during the system recovery.

4.2.6 Up to six Drives with RAID 5/6 Controller with 1 GB Cache/CacheVault

Category		Product Name / Description	Part Number
Storage Controller **Required**		**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9265CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included	N8103-152
SSD Caching **Recommended**		**MegaRAID CacheCade** for LSI MegaRAID SAS **NOTE:** - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SAS/SATA Cable** two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		**2.5-inch Hot Plug Drive Cage Kit** 6 x 2.5-inch hot plug hard drive bays	(Standard)
Drive **6 slots available**	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, SLC, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, SCL, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives can be mixed in one system
- A large-capacity RAID array configuration requires long-time rebuilding when to recover from the failure. In order to improve the reliability, RAID 6 or RAID 60 configuration, which supports two hard drives failures, is recommended as the redundancy becomes invalid during the system recovery.
- For VMware ESXi 5.x installation, to download the CIM provider is required.
- For VMware ESXi 5.x systems, monitoring the status of a RAID array with NEC ESMPRO is not supported.

4.2.7 Up to eight Drives with RAID 0/1 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID 0/1, 512 MB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable		**Internal SAS/SATA Cable** two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		**2.5-inch Hot Plug Drive Cage Kit** 6 x 2.5-inch hot plug hard drive bays	(Standard)
Optional Drive Cage Required		**2.5-inch Hot Plug Drive Cage Kit** 2 x 2.5-inch hot plug drive bays	N8154-45
Drive 8 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, SLC, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, SCL, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives can be mixed in one system
- A large-capacity RAID array configuration requires long-time rebuilding when to recover from the failure. Since redundancy becomes invalid during the system recovery, it is recommended to obtain a RAID controller for RAID 6 (N8103-150/-151) to configure with RAID 6 or RAID 60, which supports two hard drives failures, in order to improve the reliability.

4.2.8 Up to eight Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID 0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID0/1/5/6/10/50/60, 512MB cache, Int.8, PCIe 2.0 x8 , SAS 6Gb/s, SATA 6Gb/s	N8103-150
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable		**Internal SAS/SATA Cable** two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		**2.5-inch Hot Plug Drive Cage Kit** 6 x 2.5-inch hot plug hard drive bays	(Standard)
Optional Drive Cage Required		**2.5-inch Hot Plug Drive Cage Kit** 2 x 2.5-inch hot plug drive bays	N8154-45
Drive 8 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, SLC, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, SCL, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives can be mixed in one system
- A large-capacity RAID array configuration requires long-time rebuilding when to recover from the failure. In order to improve the reliability, RAID 6 or RAID 60 configuration, which supports two hard drives failures, is recommended as the redundancy becomes invalid during the system recovery.

4.2.9 Up to eight Drives with RAID 5/6 Controller with 1 GB Cache/Battery

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-151
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS 9267-8i NOTE: - SSD used for cache is required. - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SAS/SATA Cable** two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		**2.5-inch Hot Plug Drive Cage Kit** 6 x 2.5-inch hot plug hard drive bays	(Standard)
Optional Drive Cage Required		**2.5-inch Hot Plug Drive Cage Kit** 2 x 2.5-inch hot plug drive bays	N8154-45
Drive 8 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, SLC, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, SCL, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives can be mixed in one system
- A large-capacity RAID array configuration requires long-time rebuilding when to recover from the failure. In order to improve the reliability, RAID 6 or RAID 60 configuration, which supports two hard drives failures, is recommended as the redundancy becomes invalid during the system recovery.

4.2.10 Up to eight Drives with RAID 5/6 Controller with 1 GB Cache/CacheVault

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9265CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included	N8103-152
SSD Caching Recommended		**MegaRAID CacheCade** for LSI MegaRAID SAS NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable		**Internal SAS/SATA Cable** two set of 1 x mini-SAS to 4 x Single SATA	(Standard)
Drive Cage		**2.5-inch Hot Plug Drive Cage Kit** 6 x 2.5-inch hot plug hard drive bays	(Standard)
Optional Drive Cage Required		**2.5-inch Hot Plug Drive Cage Kit** 2 x 2.5-inch hot plug drive bays	N8154-45
Drive 8 slots available	**SAS HDD**	**300GB HDD** 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1x 73.2 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331
	SATA HDD	**250GB 7.2K Hot Plug 2.5-inch SATA HDD** 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD	**100GB Hot Plug 2.5-inch SAS SSD** 1x 100 GB SAS SSD, SLC, 2.5-inch, 6Gb/s	N8150-709
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, SCL, 2.5-inch, 6Gb/s	N8150-710
		200GB Hot Plug 2.5-inch SAS SSD 1x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
		400GB Hot Plug 2.5-inch SAS SSD 1x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two different kinds of drives can be mixed in one system
- A large-capacity RAID array configuration requires long-time rebuilding when to recover from the failure. In order to improve the reliability, RAID 6 or RAID 60 configuration, which supports two hard drives failures, is recommended as the redundancy becomes invalid during the system recovery.
- For VMware ESXi 5.x installation, to download the CIM provider is required.
- For VMware ESXi 5.x systems, monitoring the status of a RAID array with NEC ESMPRO is not supported.

4.3 Hot Plug 3.5-inch Drive Configuration

4.3.1 Up to four Drives with Embedded SATA non-RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 2x 6Gb/s SATA, 2x 3Gb/s SATA	(Standard)
Cable	**Internal SATA Cable** 4 x Single SATA to 1 x mini-SAS	(Standard)
Drive Cage	**3.5-inch Hot Plug Drive Cage Kit** 4 x 3.5-inch hot plug hard drive bays	(Standard)
Drive **4 slots available**	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	1TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
	2TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354

NOTE:

- Hot plug insertion/removal is not supported with the configuration.

4.3.2 Up to four Drives with Embedded SATA RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 2x 6Gb/s SATA, 2x 3Gb/s SATA, RAID 0/1/10 capable	(Standard)
Cable	**Internal SATA Cable** 4 x Single SATA to 1 x mini-SAS	(Standard)
Drive Cage	**3.5-inch Hot Plug Drive Cage Kit** 4 x 3.5-inch hot plug hard drive bays	(Standard)
Drive **4 slots available**	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	1TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
	2TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
	3TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355

NOTE:

- Embedded SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- Embedded SATA RAID Controller does not support RAID 10 configured with 2 TB and 3 TB HDDs.
- All hard drives within a RAID array should be of the same capacity.

4.3.3 Up to four Drives with RAID 0/1 Controller with 512 MB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (512MB, RAID 0/1)** LSI MegaRAID SAS 9267-8i RAID 0/1/10, 512MB cache, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-149
RAID BBU Recommended	**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable	**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS	(Standard)
Drive Cage	**3.5-inch Hot Plug Drive Cage Kit** 4 x 3.5-inch hot plug hard drive bays	(Standard)
Drive 4 slots available	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	1TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-364
	2TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-354
	3TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-355

NOTE:

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

4.3.4 Up to four Drives with RAID 5/6 Controller with 512 MB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (512MB, RAID 0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID0/1/5/6/10/50/60, 512MB cache, Int.8, PCIe 2.0 x8 , SAS 6Gb/s, SATA 6Gb/s	N8103-150
RAID BBU Recommended	**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable	**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS	(Standard)
Drive Cage	**3.5-inch Hot Plug Drive Cage Kit** 4 x 3.5-inch hot plug hard drive bays	(Standard)
Drive 4 slots available	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	1TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 1 TB SATA HDD, 3. 5-inch, 6Gb/s, 7,200 rpm	N8150-364
	2TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 2 TB SATA HDD, 3. 5-inch, 6Gb/s, 7,200 rpm	N8150-354
	3TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 3 TB SATA HDD, 3. 5-inch, 6Gb/s, 7,200 rpm	N8150-355

NOTE:

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

4.3.5 Up to four Drives with RAID 5/6 Controller with 1 GB Cache/Battery

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (1GB, RAID0/1/5/6)** LSI MegaRAID SAS 9267-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-151
RAID BBU Recommended	**RAID Battery Backup Unit** for LSI MegaRAID SAS 9267-8i	N8103-153
Cable	**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS	(Standard)
Drive Cage	**3.5-inch Hot Plug Drive Cage Kit** 4 x 3.5-inch hot plug hard drive bays	(Standard)
Drive 4 slots available	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	1TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 1 TB SATA HDD, 3. 5-inch, 6Gb/s, 7,200 rpm	N8150-364
	2TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 2 TB SATA HDD, 3. 5-inch, 6Gb/s, 7,200 rpm	N8150-354
	3TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 3 TB SATA HDD, 3. 5-inch, 6Gb/s, 7,200 rpm	N8150-355

NOTE:

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

4.3.6 Up to four Drives with RAID 5/6 Controller with 1 GB Cache/CacheVault

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (1GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9265CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included	N8103-152
Cable	**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS	(Standard)
Drive Cage	**3.5-inch Hot Plug Drive Cage Kit** 4 x 3.5-inch hot plug hard drive bays	(Standard)
Drive 4 slots available	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-363
	1TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 1 TB SATA HDD, 3. 5-inch, 6Gb/s, 7,200 rpm	N8150-364
	2TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 2 TB SATA HDD, 3. 5-inch, 6Gb/s, 7,200 rpm	N8150-354
	3TB 7.2K Hot Plug 3.5-inch SATA HDD 1x 3 TB SATA HDD, 3. 5-inch, 6Gb/s, 7,200 rpm	N8150-355

NOTE:

- All hard drives within a RAID array should be of the same capacity.
- For VMware ESXi 5.x installation, to download the CIM provider is required.
- For VMware ESXi 5.x systems, monitoring the status of a RAID array with NEC ESMPRO is not supported.

5 Optical Drive

Category	Product Name / Description	Part Number
Internal **1 slot available**	**Internal Slim DVD-ROM drive** Slim DVD-ROM drive	N8151-100
	Internal DVD Super Multi Drive Slim DVD Super Multi drive, not including writing software	N8151-104F
External	**External DVD-ROM drive** Slim DVD-ROM drive, Bus powered, 0.8 A required	N8160-85

NOTE:

- Up to 1 optical drive can be connected.

6 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.

6.1 Network Interface Controller

Category		Product Name / Description	Part Number
GbE		**1000BASE-T Adapter** Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-138
		Dual Port 1000BASE-T Adapter Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-132
		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. - Jumbo frames are supported.on Windows Server 2008 R2 and Redhat Enterprise Linux operating systems.	N8104-133
10GbE	**Ctrlr**	**10GBASE Adapter (SFP+/2ch)** Broadcom NetXtreme II BCM957711 10G SFP+ Dual Port Network Interface Card PCIe 2.0 x8 **NOTE**: - N8104-129 SFP+ Module is required to connect with an optical cable. - Up to 2 SFP+ Modules can be installed. - Supports up to 2 adapters covering 10Gb Converged Network Adapter and 10Gb Network Adapter.	N8104-128
		Dual Port 10Gb Converged Network Adapter BROCADE 1020 Dual Port 10Gbps Converged Network Adapter PCIe 2.0 x8, 2 x SFP modules **NOTE**: - Supports up to two adapters of10Gb Converged Network Adapter and 10Gb Network Adapter.	N8104-131
	Module	**SFP+ Module (10G-SR)** 1 x SFP+ Module for N8104-128	N8104-129

NIC Teaming feature – NIC Teaming and bonding features

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

Windows supports BASP (Broadcom Advanced Server Program) teaming while Linux supports teaming with bonding function supported by OS.

Network Interface	Team	Operating Systems
1GbE NIC Embedded 1GbE NIC and N8104-138/-132/-133	Up to four teams per one system Up to four ports per one team	Windows Server 2003 R2 Windows Server 2008 Windows Server 2008 R2 Red Hat Enterprise Linux
10GbE NIC N8104-128	Up to two teams per one system Up to two ports per one team	Windows Server 2008 Windows Server 2008 R2 Red Hat Enterprise Linux

NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.
- The network interfaces for NIC teaming must be the same.
- When 10GbE and 1GbE NIC teaming are mixed, the teams must be up to four per one system.

Using iSCSI

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

Categor	Network Interface	Operating Systems
1GbE	Embedded 1GbE NIC	Windows Server 2008 R2, Windows Server 2012, Red Hat Linux, VMware
	N8104-138	Windows Server 2008 R2, Windows Server 2012, Red Hat Linux, VMware
	N8104-132	Windows Server 2008 R2, Windows Server 2012, Red Hat Linux, VMware
	N8104-133	Windows Server 2008 R2, Windows Server 2012, Red Hat Linux, VMware
10GbE	N8104-128	Windows Server 2008, Windows Server 2008 R2, Red Hat Linux, VMware

NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.

6.2 External Storage Controller

6.2.1 RAID Controller

Category	Product Name / Description	Part Number
Controller	**RAID Controller (1GB, RAID0/1/5/6)** LSI MegaRAID SAS 9285-8e RAID0/1/5/6/10/50/60, 1GB, Ext. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 6Gb/s	N8103-160
RAID BBU	**RAID Battery Backup Unit** for LSI MegaRAID SAS 9285-8e	N8103-162

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 to minimize the risk of becoming multiple hard drives failure.

6.2.2 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)	N8190-153
	Fibre Channel Controller (2ch) Emulex LightPulse LPe12002-M8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0(x8)	N8190-154
SAS	**SAS Controller** LSI SAS9212-4i4 Host Bus Adapter 6Gb/s SAS, Int. 4(7-pin SATA) / ext. 4(SFF-8088), PCIe 2.0(x8)	N8103-142

6.3 Serial Port Adapter

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

NOTE:

- Up to one Serial Port Adapter can be installed.

7 Other Add-in Components

7.1 Power Supply

Product Name / Description	Part Number
450W Hot Plug Power Supply 1 x 450 Watt 80 PLUS® Platinum Power Supply	N8181-86F
800W Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Platinum Power Supply	N8181-87F

NOTE:

- The power units must be the same to configure redundancy.
- Use the NEC Power Supply Selector to select appropriate size for power units. For details, please visit the NEC website at:
  http://www.nec.com/en/global/prod/express/collateral/tools/PowerSelector_G01.xls

7.2 Trusted Platform Module Kit

Product Name / Description	Part Number
Trusted Platform Module Kit TPM 1.2 module	N8115-11

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
Internal Flash Memory Internal flash memory to enable software and tools in the EXPRESSBUILDER DVD without DVD media **NOTE:** Before use, software and tools must be copied from the EXPRESSBUILDER DVD to the flash memory. The following operations can be performed with the flash memory: - Installation of Windows server with express setup - Installation of Starter Pack—the package of NEC qualified drivers and system setting tools - Installation of NEC ESMPRO Agent and Universal RAID Utility - Performance of the Test and Diagnosis Tool	N8115-10

7.4 Flash FDD

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

Category	Product Name / Description	Part Number
External	**Flash FDD** USB flash emulating USB floppy disk, Native capacity 1.44 MB	N8160-86

NOTE:

- Up to one drive can be connected.

7.5 Front Bezel

Product Name / Description	Part Number
Front Bezel Front bezel for R120d-1E	N8146-32F

8 Add-on Components

8.1 17-inch LCD Console Drawer

Category		Product Name / Description	Part Number
Drawer w/ KVM	**Drawer**	**17-inch LCD Console Drawer (8port)** 17-inch LCD, US 83-keys Keyboard, Optical mouse, 8 port KVM switch, 1U height	N8143-77F
	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	N8143-76F
		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	N8143-84F
	Keypad	**Keyboard Unit (JP)** JP 108-keys Keyboard with 10-key for N8143-84F 17inch LCD Console Drawer (1port)	N8143-85
		Keyboard Unit (UK) UK 104-keys Keyboard with 10-key, for N8143-84F 17inch LCD Console Drawer (1port)	N8143-87

8.2 KVM Switch

Category		Product Name / Description	Part Number
KVM Switch		**Server Switch Unit (8 server)** 1U USB 8 port KVM switch	N8191-12F
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)

8.3 Cable Management Arm

Product Name / Description	Part Number
Cable Management Arm 1U Kit For R120d-1E	N8143-79

NOTE:

- The Cable Management Arm cannot be attached when the back parts of the slide-rail are removed.

8.4 Server Management License

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

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

References

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/ 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 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	✓	✓
Industry standard	IPMI	2.0	2.0

[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

Part number	Product Name	WS 2012	WS 2008R2	WS 2008	WS 2008 x64	WS 2003R2	WS 2003R2 x64	RHEL 6	RHEL 6 x64	RHEL 5	RHEL 5 x64	ESXi 5.1	ESXi 5.0	ESX 4.1
-	Embedded SATA non-RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
-	Embedded SATA RAID Controller	-	✓	✓	✓	✓	✓	-	-	-	-	-	-	-
-	Embedded 1GbE NIC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-149	RAID Controller (512 MB, RAID 0/1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-150	RAID Controller (512 MB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-151	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-152	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓
N8103-160	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-142	SAS Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
N8190-153	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-154	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-138	1000BASE-T adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-132	Dual Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-133	Quad Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-128	10GBASE adapter (SFP+/2ch)	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓
N8104-131	Dual Port 10Gb Converged Network Adapter	✓	✓	✓	✓	-	-	✓	✓	✓	✓	-	-	-

Supported PCI Cards and Installable Slots

		Slots		
Part Number	Product Name	#1A	#1B	#1C
N8103-149	RAID Controller (512 MB, RAID 0/1)	✓	-	-
N8103-150	RAID Controller (512 MB, RAID 0/1/5/6)	✓	-	-
N8103-151	RAID Controller (1 GB,RAID 0/1/5/6)	✓	-	-
N8103-152	RAID Controller (1 GB,RAID 0/1/5/6)	✓	-	-
N8103-160	RAID Controller (1 GB,RAID 0/1/5/6)	-	✓	✓
N8103-142	SAS Controller	-	✓	✓
N8190-153	Fibre Channel Controller	-	✓	✓
N8190-154	Fibre Channel Controller (2ch)	-	✓	✓
N8104-138	1000BASE-T adapter	-	✓	✓
N8104-132	Dual Port 1000BASE-T Adapter	-	✓	✓
N8104-133	Quad Port 1000BASE-T Adapter	-	✓	✓
N8104-128	10GBASE adapter (SFP+/2ch)	-	✓	✓
N8104-131	Dual Port 10Gb Converged Network Adapter	-	✓	✓
N8117-01A	Serial Port Adapter	-	✓	✓

Maximum power consumption

See the table below for the maximum power consumption based on type of power supplies installed. The power consumption was measured in 40 degree Celsius (104 degree Fahrenheit) environment.

2.5-inch Drive Model

Processors		E5-2403	E5-2407	E5-2420	E5-2430	E5-2430L	E5-2450	E5-2470
200 VAC input	800 Watt PSU	407 VA / 399 Watt	434 VA / 426 Watt	493 VA / 483 Watt	495 VA / 485 Watt	470 VA / 461 Watt	515 VA / 506 Watt	517 VA / 507 Watt
	450 Watt PSU	307 VA / 301 Watt	316 VA / 311 Watt	400 VA /393 Watt	402 VA / 396 Watt	362 VA / 356 Watt	469 VA / 461 Watt	470 VA / 462 Watt
100 VAC input	800 Watt PSU	411 VA / 403 Watt	438 VA / 430 Watt	497 VA / 487 Watt	499 VA / 489 Watt	474 VA / 465 Watt	520 VA / 511 Watt	522 VA / 512 Watt
	450 Watt PSU	310 VA /304 Watt	319 VA / 314 Watt	404 VA / 396 Watt	406 VA / 399 Watt	365 VA / 359 Watt	473 VA / 465 Watt	474 VA / 466 Watt

3.5-inch drive model

Processors		E5-2403	E5-2407	E5-2430	E5-2430L	E5-2450
200 VAC input	450 Watt PSU	287 VA / 282 Watt	309 VA / 303 Watt	391 VA / 384 Watt	372 VA / 365 Watt	474 VA / 468 Watt
100 VAC input	450 Watt PSU	289 VA / 284 Watt	312 VA / 306 Watt	394 VA / 387 Watt	375 VA / 368 Watt	478 VA / 472 Watt

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

Revision History

Revision	Date	Description
4.0	December 21, 2012	**Other:** Add Windows Server 2012 to the list of operating system supported Support N8103-152 RAID Controller on VMware ESXi 5.x systems Support 10GbE NIC teaming with two or more 10GbE NIC cards. Update OS support matrix
3.0	October 31, 2012	**New products added:** RAID Controller (1GB, RAID 0/1/5/6) / N8103-152 200GB SSD / N8150-711 400GB SSD / N8150-712 **Discontinued products removed:** 100GB SSD / N8150-707 SAS Controller / N8103-104A **Other:** Add VMware ESXi 5.1 to the list of operating system supported Support bonding feature on Linux operating system using 10GbE NIC Update Regulatory list Update OS support matrix
2.0	August 3, 2012	**New products added:** 17-inch LCD Console Drawer (1port) / N8143-84F Keyboard Unit (JP) / N8143-85 Keyboard Unit (UK) / N8143-87 Switch Unit Connection Cable 1.8 m / K410-119(1A) **Other:** Add description for expansion slots Update maximum memory speed table Support jumbo frames in quad-channel 1GbE NIC Add description for using iSCSI Add OS support information for embedded controllers into support matrix table Add maximum power consumption table Remove 2.5-inch 10Krpm SATA drives
1.0	May 14, 2012	Initial release