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NEC Express5800/T120g
System Configuration Guide

Introduction

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

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Revision 6.0
NEC Corporation

Contents

Technical Specification

Key Features

- High performance with the latest Intel® Xeon® processor E5-2600 v4 product family
- Up to 512 GB of high speed DDR4 memory
- High energy efficiency with power capping feature and 80 PLUS® Platinum or Gold power supply
- Full manageability by integrated EXPRESSSCOPE Engine 3

Specification

(1/2)

Model		T120g			
Part Number		N8100-2476F, N8100-2477F, N8100-2478F, N8100-2479F			
Processor	**Type**	Intel® Xeon® Processor E5-2603 v4	Intel® Xeon® Processor E5-2620 v4	Intel® Xeon® Processor E5-2623 v4	Intel® Xeon® Processor E5-2630 v4
	Clock speed	1.70 GHz	2.10 GHz	2.60 GHz	2.20 GHz
	Number of Processors	1 or 2			
	Cache	15 MB	20 MB	10 MB	25 MB
	Cores and Threads	6C - 6T	8C - 16T	4C - 8T	10C - 20T
Chipset		Intel® C612 Chipset			
Memory	**Type**	DDR4-2400 Registered DIMM (4/8/16/32GB)			
	Standard Capacity	0 GB			
	Maximum Capacity	1 TB (16 x 64 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	**Standard Capacity**	0 GB			
	Maximum Capacity	**Hot plug 2.5-inch drive configuration:** SAS HDD: 43.2 TB (24 x 1.8 TB) SATA HDD: 48 TB (24 x 2 TB) SAS SSD : 9.6 TB (24 x 400 GB) SATA SSD : 38.4 TB (24 x 1.6 TB) **Hot plug 3.5-inch drive configuration:** SATA HDD: 80 TB (8 x 10 TB)			
	Storage Controller	SATA : 6 Gb/s (Integrated) SAS: 12 Gb/s (Optional)			
	RAID	SATA : RAID 0/1/10 1 (Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)			
	Hot Plug	Supported			
	Optical Disk Drive	Optional			
	5-inch Media Bays	2			
	Disk Drive Bays	**Hot plug 2.5-inch drive configuration:** 24 **Hot plug 3.5-inch drive configuration:** 8			
Expansion Slots		Total: 5 slots available 2 PCIe 3.0 x16 (x16 connector) 1 PCIe 3.0 x8 (x8 connector) 1 PCIe 3.0 x8 (x8 connector) (Dual processor configuration only) 1 PCIe 2.0 x4 (x8 connector)			
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)			
	Resolution / Color	1600 x 1200 / 16.7M [2]			
Interfaces		5 USB3.0 (2 x front, 4 x rear, 1 x internal) 3 USB2.0 (2 x front, 1 x internal) 1 VGA (15-pin mini D-sub, 1 x rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 2 1000BASE-T LAN connector (RJ-45, 2 x rear)			

Model		T120g			
		1 Management LAN connector (RJ-45, 1 x rear)			
Server Management		EXPRESSSCOPE Engine 3			
Redundant Fan		Optional, hot plug with redundant fan kit			
Redundant Power Supply		Standard, hot plug (except non-redundant power supply model)			
Power Supply		2 x 460 / 800 / 1000 Watt 80 PLUS® Platinum certified hot plug PSU 1 x 700 Watt 80 PLUS® Gold certified non-hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			
Power Consumption	**(Max. Config, Idling)**	320 VA / 317 Watt	321 VA / 318 Watt	318 VA / 316 Watt	321 VA / 319 Watt
	(Max. Config, Operating)	613 VA / 609 Watt	622 VA / 617 Watt	671 VA / 667 Watt	720 VA / 715 Watt
Acoustical Noise (Sound Pressure Level) [3]	**Max. Config, Idling**	40.0 dB			
	Max. Config, Operating	44.0 dB			
Dimensions (W x D x H)		200.0 x 599.0 x 438.0 mm / 7.8 x 23.5 x 17.2 in (5U)			
Weight (Minimum / Maximum)		17 kg / 31.0 kg, 37.47 lbs. / 68.34 lbs.			
Temperature, Relative Humidity (non-condensing)		Operating: 5° to 40° C / 41° to 104° F (Standard) or 5° to 45° C / 41° to 113° F (Optional), 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%			
Regulatory and Safety		FCC, UL, CB, CE, BSMI, CCC, RoHS, WEEE			
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard Microsoft® Windows Server® 2012 Datacenter Microsoft® Windows Server® 2012 R2 Standard Microsoft® Windows Server® 2012 R2 Datacenter Microsoft® Windows Server® 2016 Standard Microsoft® Windows Server® 2016 Datacenter Red Hat Enterprise Linux 6.7 or later (x86_64) [4] Red Hat Enterprise Linux 7.2 or later [4] VMware ESXi™ 5.5 Update 3 VMware ESXi™ 6.0 Update 1 VMware ESXi™ 6.5			

1 Embedded SATA RAID controller is supported only on limited operating systems.

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

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

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

(2/2)

Model		T120g			
Part Number		N8100-2476F, N8100-2477F, N8100-2478F, N8100-2479F			
Processor	**Type**	Intel® Xeon® Processor E5-2650 v4	Intel® Xeon® Processor E5-2660 v4	Intel® Xeon® Processor E5-2690 v4	Intel® Xeon® Processor E5-2697 v4
	Clock speed	2.20 GHz	2.00 GHz	2.60 GHz	2.30 GHz
	Number of Processors	1 or 2			
	Cache	30 MB	35 MB		45 MB
	Cores and Threads	12C - 24T	14C - 28T		18C - 36T
Chipset		Intel® C612 Chipset			
Memory	**Type**	DDR4-2400 Registered DIMM (4/8/16/32GB)			
	Standard Capacity	0 GB			
	Maximum Capacity	1 TB (16 x 64 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	**Standard Capacity**	0 GB			
	Maximum Capacity	**Hot plug 2.5-inch drive configuration:** SAS HDD: 43.2 TB (24 x 1.8 TB) SATA HDD: 48 TB (24 x 2 TB) SAS SSD : 9.6 TB (24 x 400 GB) SATA SSD : 38.4 TB (24 x 1.6 TB) **Hot plug 3.5-inch drive configuration:** SATA HDD: 64 TB (8 x 8 TB)			
	Storage Controller	SATA : 6 Gb/s (Integrated) SAS: 12 Gb/s (Optional)			
	RAID	SATA : RAID 0/1/10 1 (Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)			
	Hot Plug	Supported			
	Optical Disk Drive	Optional			
	5-inch Media Bays	2			
	Disk Drive Bays	**Hot plug 2.5-inch drive configuration:** 24 **Hot plug 3.5-inch drive configuration:** 8			
Expansion Slots		Total: 5 slots available 2 PCIe 3.0 x16 (x16 connector) 1 PCIe 3.0 x8 (x8 connector) 1 PCIe 3.0 x8 (x8 connector) (Dual processor configuration only) 1 PCIe 2.0 x4 (x8 connector)			
Video	**Controller (VRAM)**	Integrated in Server Management Controller (32MB)			
	Resolution / Color	1280 x 1024 / 16.7M [2]			
Interfaces		5 USB3.0 (2 x front, 4 x rear, 1 x internal) 3 USB2.0 (2 x front, 1 x internal) 1 VGA (15-pin mini D-sub, 1 x rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 2 1000BASE-T LAN connector (RJ-45, 2 x rear) 1 Management LAN connector (RJ-45, 1 x rear)			
Server Management		EXPRESSSCOPE Engine 3			
Redundant Fan		Optional, hot plug with redundant fan kit			
Redundant Power Supply		Standard, hot plug (except non-redundant power supply model)			
Power Supply		2 x 460 / 800 / 1000 Watt 80 PLUS® Platinum certified hot plug PSU 1 x 700 Watt 80 PLUS® Gold certified non-hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			
Power Consumption	**(Max. Config, Idling)**	322 VA / 320 Watt			322 VA / 320 Watt
	(Max. Config, Operating)	766 VA /			846 VA /

Model		T120g	
		761 Watt	840 Watt
Acoustical Noise (Sound Pressure Level) [3]	**Max. Config, Idling**	40.0 dB	40.0 dB
	Max. Config, Operating	45.0 dB	44.0 dB
Dimensions (W x D x H)		200.0 x 599.0 x 438.0 mm / 7.8 x 23.5 x 17.2 in (5U)	
Weight (Minimum / Maximum)		17 kg / 31.0 kg, 37.47 lbs. / 68.34 lbs.	
Temperature, Relative Humidity (non-condensing)		Operating: 5° to 40° C / 41° to 104° F (Standard) or 5° to 45° C / 41° to 113° F (Optional), 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%	
Regulatory and Safety		FCC, UL, CB, CE, BSMI, CCC, RoHS, WEEE	
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard Microsoft® Windows Server® 2012 Datacenter Microsoft® Windows Server® 2012 R2 Standard Microsoft® Windows Server® 2012 R2 Datacenter Microsoft® Windows Server® 2016 Standard Microsoft® Windows Server® 2016 Datacenter Red Hat Enterprise Linux 6.7 or later (x86_64) [4] Red Hat Enterprise Linux 7.2 or later [4] VMware ESXi™ 5.5 Update 3 VMware ESXi™ 6.0 Update 1 VMware ESXi™ 6.5	

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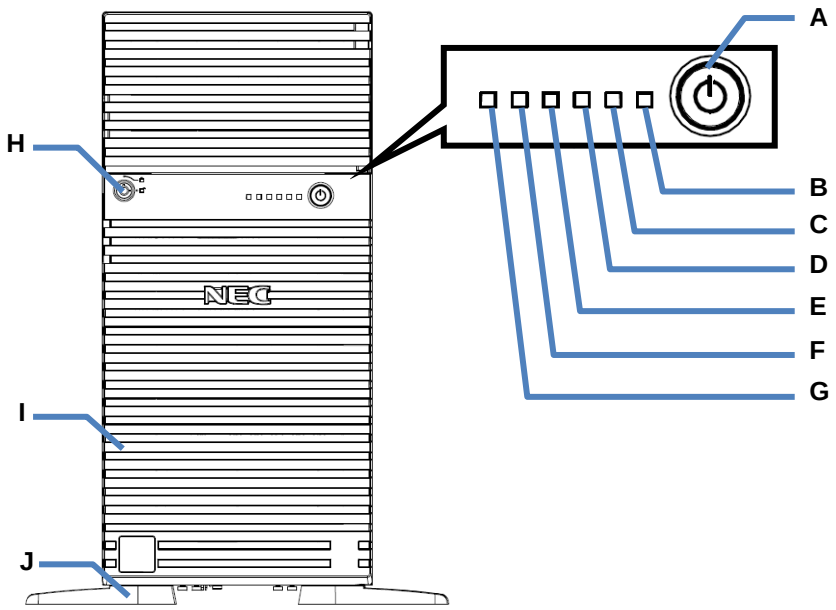
External Views

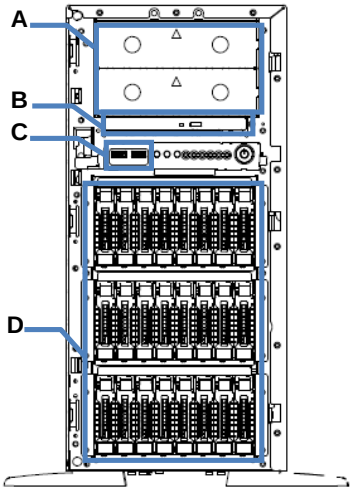
Front and Rear Views

Front View (with front bezel)

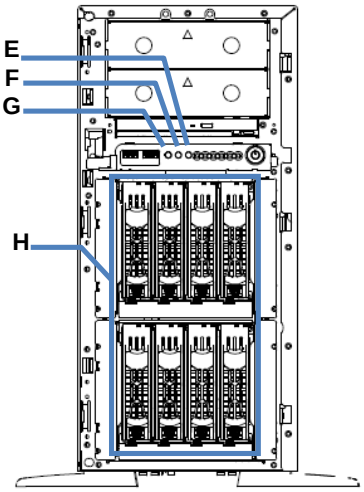


Legend			
A.	Power Button	**F.**	Data LAN 1 Activity LED
B.	Power LED	**G.**	Data LAN 2 Activity LED
C.	System Status LED 1	**H.**	Front Bezel Key
D.	System Status LED 2	**I.**	Front Bezel
E.	Power Capping LED	**J.**	Stabilizer

Front View (without front bezel)



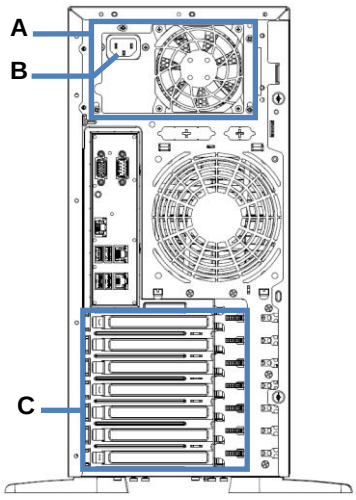
Hot Plug 2.5-inch Drive Configuration



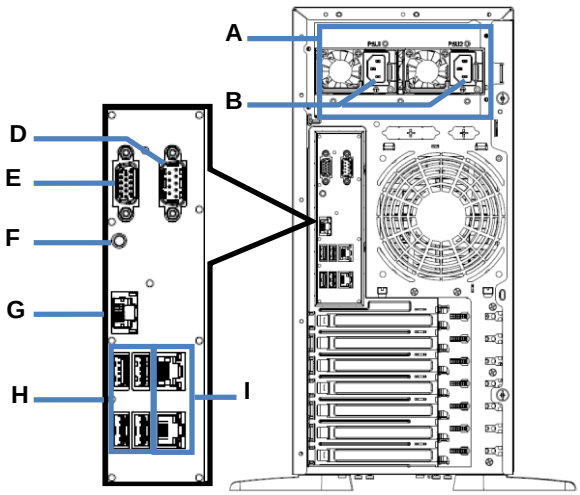
Hot Plug 3.5-inch Drive Configuration

Legend			
A.	5.25-inch Media Bay	**E.**	System Reset Button
B.	Optical Drive Bay	**F.**	Dump (NMI) Button
C.	USB Connectors	**G.**	BMC Reset Button
D.	2.5-inch Drive Bay	**H.**	3.5-inch Drive Bay

Rear View



Non-hot Plug Power Supply Configuration

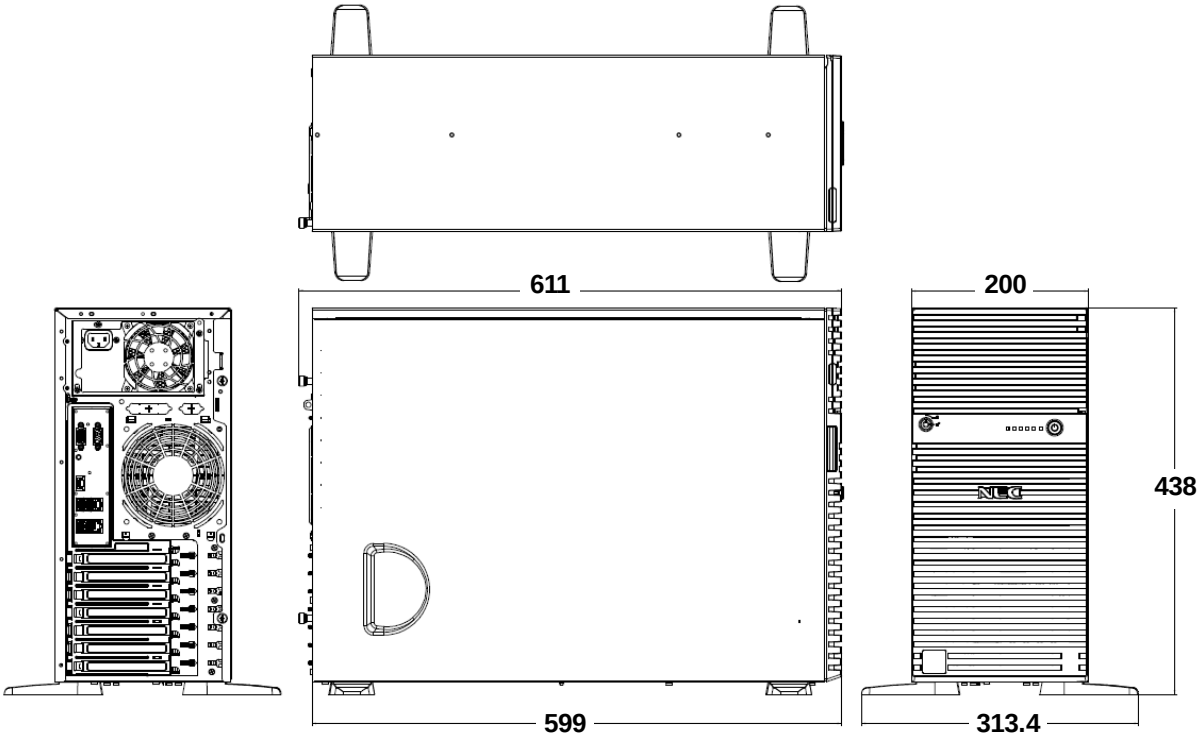


Hot Plug Power Supply Configuration

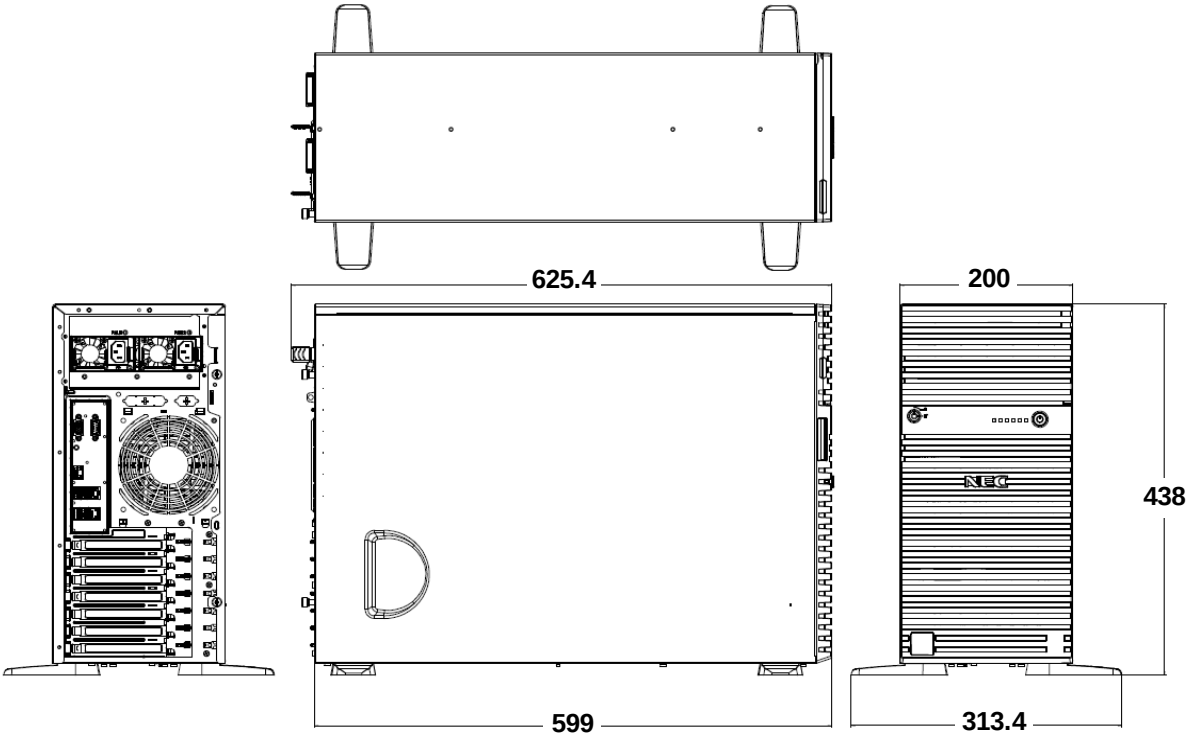
Legend			
A.	Power Supply Unit	**F.**	UID Button/LED
B.	AC Inlet	**G.**	Management LAN Connector
C.	PCI Slots	**H.**	USB Connectors
D.	Serial Port Connector	**I.**	Data LAN Connectors
E.	VGA Connector		

Dimensions (mm)

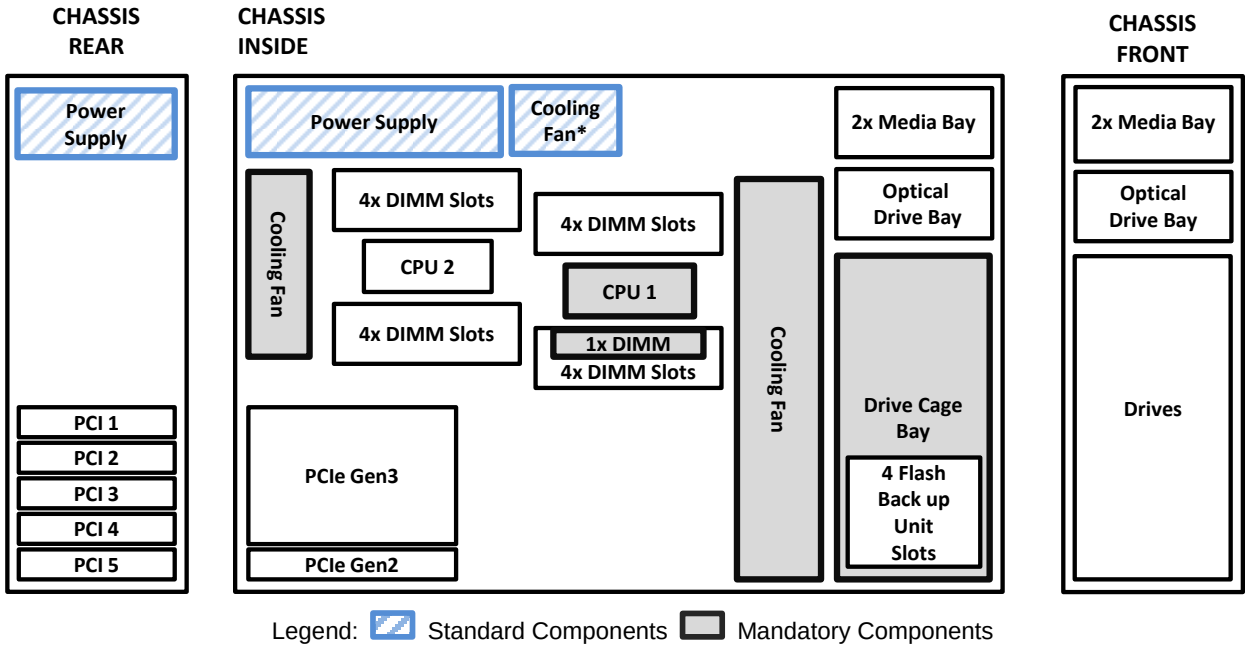
Non-hot Plug Power Supply Configuration



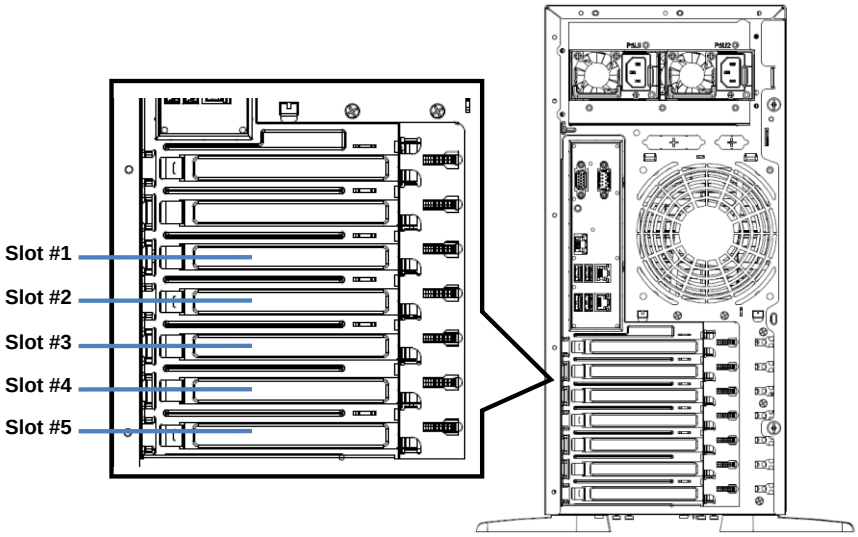
Hot Plug Power Supply Configuration



Configuration Diagram



Expansion Slots



Legend	
#1	PCIe 3.0 x8, x8 connector, Full height, up to 168 mm length
#2	PCIe 3.0 x16, x16 connector, Full height, up to 290 mm length
#3	PCIe 3.0 x8, x8 connector, Full height, up to 290 mm length
#4	PCIe 3.0 x16, x16 connector, Full height, up to 290 mm length
#5	PCIe 2.0 x4, x8 connector, Full height, up to 168 mm length

NOTE:

- The slot #1 is available in dual processor configuration.

Server Configuration

1 Base Models

Product Name / Description	Part Number
EXPRESS5800/T120g Server no processor, no RAM, no Drive Cage, no HDD, no DVD, no FAN, no keyboard, no mouse Including: 700W 80 PLUS® Gold non-hot plug PSU	N8100-2476F
EXPRESS5800/T120g Server no processor, no RAM, no Drive Cage, no HDD, no DVD, no FAN, no keyboard, no mouse Including: 2 x 460W 80 PLUS® Platinum hot plug PSU	N8100-2477F
EXPRESS5800/T120g Server no processor, no RAM, no Drive Cage, no HDD, no DVD, no FAN, no keyboard, no mouse Including: 2 x 800W 80 PLUS® Platinum hot plug PSU	N8100-2478F
EXPRESS5800/T120g Server no processor, no RAM, no Drive Cage, no HDD, no DVD, no FAN, no keyboard, no mouse Including: 2 x 1000W 80 PLUS® Platinum hot plug PSU	N8100-2479F

NOTE:

- The base model must be ordered with a processor kit and memory, a drive cage.
- Keyboard and mouse are not included in the base models. Please order separately if necessary.
- 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

Category		Product Name / Description	Part Number
Processors **1 Processor Required**		**Xeon E5-2603 v4 Processor Kit** Intel® Xeon ® Processor E5-2603 v4 (1.70 GHz, 6C/6T, 15 MB)	N8101-1068F
		Xeon E5-2620 v4 Processor Kit Intel® Xeon ® Processor E5-2620 v4 (2.10 GHz, 8C/16T, 20 MB)	N8101-1070F
		Xeon E5-2623 v4 Processor Kit Intel® Xeon ® Processor E5-2623 v4 (2.60 GHz, 4C/8T, 10 MB)	N8101-1071F
		Xeon E5-2630 v4 Processor Kit Intel® Xeon ® Processor E5-2630 v4 (2.20 GHz, 10C/20T, 25 MB)	N8101-1072F
		Xeon E5-2650 v4 Processor Kit Intel® Xeon ® Processor E5-2650 v4 (2.20 GHz, 12C/24T, 30 MB)	N8101-1073F
		Xeon E5-2660 v4 Processor Kit Intel® Xeon ® Processor E5-2660 v4 (2.00 GHz, 14C/28T, 35 MB)	N8101-1074F
		Xeon E5-2690 v4 Processor Kit Intel® Xeon ® Processor E5-2690 v4 (2.60 GHz, 14C/28T, 35 MB)	N8101-1075F
		Xeon E5-2697 v4 Processor Kit Intel® Xeon ® Processor E5-2697 v4 (2.30 GHz, 18C/36T, 45 MB)	N8101-1076F
Heat Sink	**1st**	**Processor Heat Sink** For 1st Processor	(Standard)
	2nd	**Processor Heat Sink** For 2nd Processor	N8101-928F

NOTE:

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

The maximum number of logical processors supported by OS

See the table below for the maximum number of logical processors that you can actually use on your system.

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

[1] The maximum numbers of logical processors when using Hyper-V are below :
- Windows Server 2008 R2 : 64
- Windows Server 2012 and Windows Server 2012 R2 : 320
- Windows Server 2016: 512

3 Memory

3.1 Memory Configuration

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

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

Memory Configuration Feature Comparison

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

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

3.1.1 Independent Channel Configuration

Available slots: 8 per processor

Category	Product Name / Description	Part Number
Registered DIMM (RDIMM)	**4GB DDR4-2400 REG Memory Kit (1x4GB)** 1x 4GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-686F
	8GB DDR4-2400 REG Memory Kit (1x8GB) 1x 8GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-687F
	16GB DDR4-2400 REG Memory Kit (1x16GB) 1x 16GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-688F
	32GB DDR4-2400 REG Memory Kit (1x32GB) 1x 32GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-689F
TSV Registered DIMM (TSV RDIMM)	**64GB DDR4-2400 REG Memory Kit (1x64GB)** 1 x64GB TSV Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-690F

NOTE:

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

3.1.2 Memory Sparing Configuration

Available slots: 8 per processor

Product Name / Description	Part Number
16GB DDR4-2400 REG Memory Kit (2x8GB) 2x 8GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-693
32GB DDR4-2400 REG Memory Kit (2x16GB) 2x 16GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-694

NOTE:

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

3.1.3 Memory Mirroring / Memory Lockstep Configuration

Available slots: 8 per processor

Product Name / Description	Part Number
16GB DDR4-2400 REG Memory Kit (2x 8GB) 2x 8GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-691
32GB DDR4-2400 REG Memory Kit (2x 16GB) 2x 16GB Registered ECC DIMM, DDR4-2400(PC4-2400)	N8102-692

NOTE:

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

Maximum Memory Speed

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

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

Processor Type	Populated DIMMs	Memory Power Setting	DIMM Speed
E5-2603 v4	4 GB, 8 GB,16 GB, 32GB	-	1866 MHz
E5-2620 v4 E5-2623 v4 E5-2630 v4	4 GB, 8 GB,16 GB, 32GB	-	2133 MHz
E5-2650 v4 E5-2660 v4 E5-2690 v4 E5-2697 v4	4 GB, 8 GB,16 GB, 32GB	-	2400 MHz

Maximum Available Memory

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

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

[1] The maximum available memory size of Hyper-V systems are below:
- Windows Server 2008 R2 Standard : 32 GB
- Windows Server 2008 R2 Enterprise : 1TB
- Windows Server 2012 and Windows Server 2012 R2 : 4 TB
- Windows Server 2016 : 24TB

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

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

[4] Up to 6 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.

4.1.1 Hot Plug 2.5-inch Drive Configuration

Refer to the section in accordance with your OS and RAID configuration. For example, when you would like to configure RAID 0/1/10 1GB cache with Windows Server 2012 R2, refer to the section 4.2.3 for the required components and then refer to the section 4.3.2 for the hard drives.

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

NOTE:

- Up to four hard drives can be installed in the Embedded SATA configuration.
- Hot plug insertion/removal is not supported with the Embedded SATA non-RAID controller.
- Embedded SATA RAID controller is supported only on limited OS. For more details, please see OS Support Matrix for PCI Cards and Embedded Controllers.
- 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.

4.1.2 Hot Plug 3.5-inch Drive Configuration

Refer to the section in accordance with your OS and RAID configuration.

Operating System	Supported RAID configuration		Supported Drives
	RAID and Cache	Section	
Windows Server 2008 R2	Non-RAID (Embedded SATA)	4.2.6	4.3.5
	RAID 0/1 (Embedded SATA RAID)	4.2.7	4.3.7
	RAID 0/1/10 1GB Cache	4.2.8	4.3.8
	RAID 5/6/50/60 1GB Cache	4.2.9	
	RAID 5/6/50/60 2GB Cache	4.2.10	
VMware ESXi 5.5 VMware ESXi 6.0	Non-RAID (Embedded SATA)	4.2.6	4.3.6
	RAID 0/1/10 1GB Cache	4.2.8	4.3.8
	RAID 5/6/50/60 1GB Cache	4.2.9	
	RAID 5/6/50/60 2GB Cache	4.2.10	
Windows Server 2012 Windows Server 2012 R2 Windows Server 2016 Red Hat Enterprise Linux 6 Red Hat Enterprise Linux 7 VMware ESXi 6.5	Non-RAID (Embedded SATA)	4.2.6	4.3.6
	RAID 0/1 (Embedded SATA RAID) (Windows only)	4.2.7	4.3.7
	RAID 0/1/10 1GB Cache	4.2.8	4.3.9
	RAID 5/6/50/60 1GB Cache	4.2.9	
	RAID 5/6/50/60 2GB Cache	4.2.10	

NOTE:

- Up to four hard drives can be installed in the Embedded SATA configuration.
- Hot plug insertion/removal is not supported with the Embedded SATA non-RAID controller.
- Embedded SATA RAID controller is supported only on limited OS. For more details, please see OS Support Matrix for PCI Cards and Embedded Controllers.
- All drives within a RAID array should be of the same capacity.
- 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 2.5-inch Drive Cage with Embedded SATA non-RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 4 x 6Gb/s SATA	(Standard)
Drive Cage/ Cable **Required**	**2.5-inch Hot Plug Drive Cage Kit** 8 x 2.5-inch hot plug hard drive bays Including 2 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable	N8154-77F

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 2.5-inch Drive Cage with Embedded SATA RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 4 x 6Gb/s SATA	(Standard)
Drive Cage/ Cable **Required**	**2.5-inch Hot Plug Drive Cage Kit** 8 x 2.5-inch hot plug hard drive bays Including 2 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable	N8154-77F

NOTE:

- Embedded SATA RAID controller is supported only on limited OS. For more details, please see OS Support Matrix for PCI Cards and Embedded Controllers.
- For supported HDD/SSD, refer to 4.3.2

4.2.3 2.5-inch Drive Cage with RAID 0/1 Controller with 1 GB Cache

Category	Product Name / Description	Part Number
Storage Controller **Required**	**RAID Controller (1GB, RAID 0/1)** LSI MegaRAID SAS 9362-8i RAID 0/1/10, 1GB, Int. 8, PCIe 3.0 x8, 12Gb/s	N8103-176
SAS Expander Card	**SAS Expander Card** SAS Expander Card Including 2 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable **NOTE:** - Required when more than 1 drive cage	N8103-186
Flash Backup **Recommended**	**Flash Backup Unit** for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
Drive Cage/ Cable **1 to 3 Required**	**2.5-inch Hot Plug Drive Cage Kit** 8 x 2.5-inch hot plug hard drive bays Including 2 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable	N8154-77F

NOTE:

- For supported HDD/SSD, refer to **4.3.3** for Windows Server 2008R2 or VMware. Refer to **4.3.4** for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6 or Red Hat Enterprise Linux 7.
- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SAS SSDs, SATA SSDs (ME) and SATA SSDs (VE) can be mixed.

4.2.4 2.5-inch Drive Cage with 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
SAS Expander Card	**SAS Expander Card** SAS Expander Card Including 2 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable **NOTE:** - Required when more than 1 drive cage	N8103-186
Flash Backup **Recommended**	**Flash Backup Unit** for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
Drive Cage/ Cable **1 to 3 Required**	**2.5-inch Hot Plug Drive Cage Kit** 8 x 2.5-inch hot plug hard drive bays Including 2 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable	N8154-77F

NOTE:

- For supported HDD/SSD, refer to **4.3.3** for Windows Server 2008R2 or VMware. Refer to **4.3.4** for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6 or Red Hat Enterprise Linux 7.
- All drives within a RAID array should be of the same type, capacity and rotation speed.

- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SAS SSDs, SATA SSDs (ME) and SATA SSDs (VE) can be mixed.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

4.2.5 2.5-inch Drive Cage with RAID 5/6 Controller with 2 GB Cache

Category	Product Name / Description	Part Number
Storage Controller **Required**	**RAID Controller (2GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9362-8i RAID0/1/5/6/10/50/60, 2GB, Int. 8, PCIe 3.0 x8, 12Gb/s	N8103-178
SAS Expander Card	**SAS Expander Card** SAS Expander Card Including 2 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable **NOTE:** - Required when more than 1 drive cage	N8103-186
Flash Backup **Recommended**	**Flash Backup Unit** for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
Drive Cage/ Cable **1 to 3 Required**	**2.5-inch Hot Plug Drive Cage Kit** 8 x 2.5-inch hot plug hard drive bays Including 2 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable	N8154-77F

NOTE:

- For supported HDD/SSD, refer to **4.3.3** for Windows Server 2008R2 or VMware. Refer to **4.3.4** for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6 or Red Hat Enterprise Linux 7.
- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SAS SSDs, SATA SSDs (ME) and SATA SSDs (VE) can be mixed.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process

4.2.6 3.5-inch Drive Cage with Embedded SATA non-RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 4 x 6Gb/s SATA	(Standard)
Drive Cage/ Cable Required	**3.5-inch Hot Plug Drive Cage Kit** 4 x 3.5-inch hot plug hard drive bays Including 1 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable	N8154-78F

NOTE:

- Up to 4 SATA drives are supported
- For supported HDD/SSD, refer to **4.3.5** for Windows Server 2008R2. Refer to **4.3.6** for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6, Red Hat Enterprise Linux 7 or VMware.
- Hot plug insertion/removal is not supported with the Embedded SATA non-RAID controller.

4.2.7 3.5-inch Drive Cage with Embedded SATA RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	**Embedded SATA Controller** 4 x 6Gb/s SATA	(Standard)
Drive Cage/ Cable Required	**3.5-inch Hot Plug Drive Cage Kit** 4 x 3.5-inch hot plug hard drive bays Including 1 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable	N8154-78F

NOTE:

- Up to 4 SATA drives are supported
- For supported HDD/SSD, refer to 4.3.7

4.2.8 3.5-inch Drive Cage with RAID 0/1 Controller with 1 GB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (1GB, RAID 0/1)** LSI MegaRAID SAS 9362-8i RAID 0/1/10, 1GB, Int. 8, PCIe 3.0 x8, 12Gb/s	N8103-176
Flash Backup Recommended	**Flash Backup Unit** for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
Drive Cage/ Cable 1 to 2 Required	**3.5-inch Drive Cage** 4 x 3.5-inch hot plug hard drive bays Including 1 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable	N8154-78F

NOTE:

- For supported HDD/SSD, refer to 4.3.8 for Windows Server 2008R2 or VMware. Refer to 4.3.9 for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6 or Red Hat Enterprise Linux 7.
- All drives within a RAID array should be of the same capacity.

4.2.9 3.5-inch Drive Cage with 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
Drive Cage/ Cable 1 to 2 Required	**3.5-inch Drive Cage** 4 x 3.5-inch hot plug hard drive bays Including 1 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable	N8154-78F

NOTE:

- For supported HDD/SSD, refer to 4.3.8 for Windows Server 2008R2 or VMware. Refer to 4.3.9 for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6 or Red Hat Enterprise Linux 7.
- All drives within a RAID array should be of the same capacity.
- 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.

4.2.10 3.5-inch Drive Cages with RAID 5/6 Controller with 2 GB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (2GB, RAID 0/1/5/6)** LSI MegaRAID SAS 9362-8i RAID0/1/5/6/10/50/60, 2GB, Int. 8, PCIe 3.0 x8, 12Gb/s	N8103-178
Flash Backup Recommended	**Flash Backup Unit** for LSI MegaRAID SAS 9362-8i 650mm Cable for Flash Backup Unit included	N8103-181
Drive Cage/ Cable 1 to 2 Required	**3.5-inch Drive Cage** 4 x 3.5-inch hot plug hard drive bays Including 1 sets of 1 x Mini SAS HD to 1 x Mini SAS HD cable	N8154-78F

NOTE:

- For supported HDD/SSD, refer to 4.3.8 for Windows Server 2008R2 or VMware. Refer to 4.3.9 for Windows Server 2012/2012R2, Red Hat Enterprise Linux 6 or Red Hat Enterprise Linux 7.
- All drives within a RAID array should be of the same capacity.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

4.3 Supported Drives

4.3.1 2.5-inch Drives for Embedded SATA Controller

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

NOTE:

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

4.3.2 2.5-inch Drives for Embedded SATA RAID Controller

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

NOTE:

- All hard drives within a RAID array should be of the same capacity.
- For RAID 10 on Windows Server 2008 R2, choose 1TB or less capacity HDDs.

4.3.3 2.5-inch Drives for RAID Controller Configuration (1)

For Windows Server 2008R2, or VMware

Category		Product Name / Description	Part Number
Drive Standard:8 slots available Max : 24 slots available	**SAS HDD (512n)**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-479
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-480
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-481
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-482
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-483
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-485
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-486
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-518
	SATA HDD (512n)	**500GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-488

	1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-489
	2TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 2 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-527
SAS SSD (ME)	**200GB Hot Plug 2.5-inch SAS SSD** 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512n sector	N8150-721
	400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512n sector	N8150-722
SATA SSD (ME)	**200GB Hot Plug 2.5-inch SATA SSD** 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-779
	400GB Hot Plug 2.5-inch SATA SSD 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-780
	800GB Hot Plug 2.5-inch SATA SSD 1 x 800 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-781
SATA SSD (VE)	**200GB Hot Plug 2.5-inch SATA SSD** 1 x 200 GB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-782
	400GB Hot Plug 2.5-inch SATA SSD 1 x 400 GB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-783
	800GB Hot Plug 2.5-inch SATA SSD 1 x 800 GB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-784
	1.6TB Hot Plug 2.5-inch SATA SSD 1 x 1.6 TB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-785

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs, SAS 15K HDDs, SATA HDDs, SAS SSDs, SATA SSDs (ME) and SATA SSDs (VE) can be mixed in each drive cage.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

4.3.4 2.5-inch Drives for RAID Controller Configuration (2)

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

Category		Product Name / Description	Part Number
Drive **Standard :8 slots available** **Max : 24 slots available**	**SAS HDD (512n)**	**300GB 10K Hot Plug 2.5-inch SAS HDD** 1 x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-479
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-480
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-481
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-482
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512n sector	N8150-483
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-485
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-486
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 12Gb/s, 15,000 rpm, 512n sector	N8150-518
	SAS HDD (512e)	**1.8TB 10K Hot Plug 2.5-inch SAS HDD** 1x 1.8TB SAS HDD, 2.5-inch, 12Gb/s, 10,000 rpm, 512e sector	N8150-541

SATA HDD (512n)	**500GB 7.2K Hot Plug 2.5-inch SATA HDD** 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-488
	1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-489
	2TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 2 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm, 512n sector	N8150-527
SAS SSD (ME)	**200GB Hot Plug 2.5-inch SAS SSD** 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512n sector	N8150-721
	400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 12Gb/s, 512n sector	N8150-722
SATA SSD (ME)	**200GB Hot Plug 2.5-inch SATA SSD** 1 x 200 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-779
	400GB Hot Plug 2.5-inch SATA SSD 1 x 400 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-780
	800GB Hot Plug 2.5-inch SATA SSD 1 x 800 GB SATA SSD, MLC, 2.5-inch, 6b/s, 512n sector, ME	N8150-781
SATA SSD (VE)	**200GB Hot Plug 2.5-inch SATA SSD** 1 x 200 GB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-782
	400GB Hot Plug 2.5-inch SATA SSD 1 x 400 GB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-783
	800GB Hot Plug 2.5-inch SATA SSD 1 x 800 GB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-784
	1.6TB Hot Plug 2.5-inch SATA SSD 1 x 1.6 TB SATA SSD, 2.5-inch, 6b/s, 512n sector, VE	N8150-785

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives selected from SAS 10K HDDs (512n), SAS 10K HDDs (512e), SAS 15K HDDs, SATA HDDs, SAS SSDs, SATA SSDs (ME) and SATA SSDs (VE) can be mixed in each drive cage.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

4.3.5 3.5-inch Drives for Embedded SATA Controller

For Windows Server 2008R2

Category		Product Name / Description	Part Number
Drive **4slots available**	**3.5-Inch SATA HDD**	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-524
		1TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-504
		2TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-505

NOTE:

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

4.3.6 3.5-inch Drives for Embedded SATA Controller

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

Category		Product Name / Description	Part Number
Drive **4slots available**	**3.5-inch SATA HDD**	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-524
		1TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-504
		2TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-505
		3TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-506

		4TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-507

NOTE:

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

4.3.7 3.5-inch Drives for Embedded SATA RAID Controller

For Windows Server 2008R2/2012/2012R2, Red Hat Enterprise Linux 6, or Red Hat Enterprise Linux 7.

Category		Product Name / Description	Part Number
Drive **4 slots available**	**3.5-inch SATA HDD**	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-524
		1TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-504
		2TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-505
		3TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-506
		4TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-507

NOTE:

- All drives within a RAID array should be of the same capacity.
- Embedded SATA RAID Controller does not support RAID 10 configured with 2 TB, 3 TB, and 4 TB HDDs.
- For RAID 10 on Windows Server 2008 R2, choose 1TB or less capacity HDDs.

4.3.8 3.5-inch Drives for RAID Controller Configuration (1)

For Windows Server 2008R2, or VMware

Category		Product Name / Description	Part Number
Drive **Standard:4 slots available** **Max :** **8 slots available**	**3.5-inch SATA HDD**	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-524
		1TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-504
		2TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-505
		3TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-506
		4TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512n Sector	N8150-507

NOTE:

- All drives within a RAID array should be of the same capacity.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.

4.3.9 3.5-inch Drives for RAID Controller Configuration (2)

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

Category		Product Name / Description	Part Number
Drive **Standard :** **4 slots available** **Max :** **8 slots available**	**SATA HDD (512n)**	**500GB 7.2K Hot Plug 3.5-inch SATA HDD** 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512 Sector	N8150-524
		1TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512 Sector	N8150-504
		2TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512 Sector	N8150-505
		3TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 3 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512 Sector	N8150-506
		4TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512 Sector	N8150-507
	SATA	**6TB 7.2K Hot Plug 3.5-inch SATA HDD**	N8150-540

HDD (512e)	1 x 6 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512e Sector	
	8TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 8 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512e Sector	N8150-528
	10TB 7.2K Hot Plug 3.5-inch SATA HDD 1 x 10 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm, 512e Sector	N8150-543

NOTE:

- All hard drives within a RAID array should be of the same capacity.
- For 512e sector HDD, the supported operating systems of virtual machines on Hyper-V are:
  - Windows Server 2008 R2 SP1 or later
  - Windows 7 SP1 or later

5 Optical Drive

Available bay: 1

Product Name / Description	Part Number
Internal Slim DVD-ROM drive Slim DVD-ROM drive DVD read speed: 8x (DVD-ROM / DVD-R / DVD-RW) CD read speed: 24x (CD-ROM / CD-R/RW)	N8151-134
Internal DVD Super Multi Drive Slim DVD Super Multi drive, not including writing software DVD Read speed: 8x (DVD-R / DVD-RW / DVD-R DL / DVD+R / DVD+RW / DVD+R DL / DVD-ROM) DVD-RAM read speed: 5x CD read speed: 24x (CD-ROM / CD-R/RW) **NOTE:** - Not supported for Linux or VMware.	N8151-135F

6 Internal Tape / RDX Drives

6.1 Tape / RDX Drive Selection

Refer to the section in accordance with your type of tape drives:

- RDX: Refer to 6.2.1
- LTO: Refer to 6.2.2

NOTE:

- Tape devices cannot be directly connected to VMware ESXi servers. For an ESXi environment, it is recommended to connect and configure an additional backup server via network.

6.2 Tape / RDX Configuration

6.2.1 RDX Drive

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 drive available**	**Internal RDX (USB)** **NOTE:** - Not supported for VMware.	N8151-125

6.2.2 LTO Drive

Category	Product Name / Description	Part Number
Controller	**SAS Controller**	N8103-142

Required	LSI SAS9212-4i4e Host Bus Adapter 6Gbps SAS, Int. 4, Ext. 4, 7-pin SATA / SFF-8088, PCIe 2.0 x8 NOTE: - For using this product in Windows Server 2012 R2 environment, download the driver from the NEC website.	
Cable Required	**Internal SAS Cable** 1x 7-pin Single SATA to 1x SFF-8482 SAS	K410-217(00)
Drive 1 drive available	**Internal LTO (SAS)** LTO3, Half height, Native capacity 400 GB	N8151-126
	Internal LTO (SAS) LTO4, Half height, Native capacity 800 GB	N8151-127
	Internal LTO (SAS) LTO5, Half height, Native capacity 1.5 TB	N8151-128
	Internal LTO (SAS) LTO6, Half height, Native capacity 2.5 TB	N8151-129
	Internal LTO (SAS) LTO7, Half height, Native capacity 6 TB	N8151-136

7 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 Graphics Card Installation Kit

For GPU card installation

Product Name / Description	Part Number
Graphics Card Installation Kit Power cables for video card, a retainer to secure the graphics board **NOTE:** - This option is applicable to N8100-2479F (1000W power supply model) only.	N8116-48

NOTE:

- Since this product is make-to-order manufacturing, the support is provided individually. Contact your sales representative for more details.
- This product does not support/guarantee installation of general video cards on T120g other than listed below.
  NVIDIA Tesla M60
  NVIDIA Tesla K80
  NVIDIA Tesla K40.
- There are following limitations on configuration to use this option
  - Fan kit in all cases must be N8181-131F and operable ambient temperature is up to 35°C.
  - Memory capacity is less than 1024GB.
  - For Tesla M60/K80, the server supports max two 2.5-inch drives cages (max 16 drives) or one 3.5-inch drive cage (max 4 drives)

7.2 Network Interface Controller

Category		Product Name / Description	Part Number
Adapter	**GbE**	**1000BASE-T Adapter** Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-150
		Dual Port 1000BASE-T Adapter Broadcom ® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-151
		Dual Port 1000BASE-T Adapter Intel® 82580 Gigabit Ethernet Controller PCIe 2.0 x4 **NOTE:** - PXE boot is not supported on UEFI environment.	N8104-145
		Quad Port 1000BASE-T Adapter Broadcom ® BCM5719 Gigabit Ethernet Controller PCIe 2.0 x4 **NOTE:** - Network cables with RJ-45 plug covers cannot be used.	N8104-152
	10GbE	**10GBASE SFP+ Adapter (SFP+/2ch)** Qlogic NetXtreme II BCM57810S PCIe 2.0 x8, Low Profile / Full Height **NOTE:** - N8104-129 SFP+ Module is required to connect with an optical cable. - The latest driver is required for Window Server 2008 and Windows Server 2008 R2.	N8104-149
		10GBASE Adapter (SFP+/2ch) Intel Ethernet Converged Network Adapters X710 PCIe 3.0 x8 **NOTE:** - N8104-129 SFP+ Module is required to connect with an optical cable.	N8104-158

	Dual Port 10GBASE-T Adapter Intel® Ethernet Controller X540 PCIe 2.0(x8) , Low Profile / Full Height	N8104-153
	Dual Port 10GBASE-T Adapter Intel® Ethernet Controller X550 PCIe 3.0 x4	N8104-157
SFP+ Module	**SFP+ Module (10G-SR)** 1 x SFP+ Module	N8104-129

NOTE:

- Supports up to three 10GbE network adapters in a single-processor configuration.
- Network performance may be reduced depending on the applications and memory performance when three or more 10GbE Network Adapters are installed.
- For VMware ESXi, there are some limitations concerning the number of installable PCI cards. Refer to **Supported PCI Cards and Installable Slots** for details.

NIC Teaming feature – NIC Teaming and bonding features

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

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

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

NOTE:

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

Using iSCSI

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

Category	Network Interface	Operating Systems
1GbE	**Embedded 1GbE NIC/ N8104-150/-151/-152**	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Windows Server 2016, Red Hat Enterprise Linux, VMware
	N8104-145	Windows Server 2008 R2, VMware
10GbE	**N8104-149**	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Windows Server 2016, Red Hat Enterprise Linux, VMware

N8104-153	Windows Server 2012, Windows Server 2012 R2, Windows Server 2016, Red Hat Enterprise Linux, VMware
N8104-157	Windows Server 2012, Windows Server 2012 R2, Windows Server 2016, Red Hat Enterprise Linux

NOTE:

- Teaming feature is not supported on iSCSI interfaces.

7.3 External Storage Controller

7.3.1 External 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 Backup Unit 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.

7.3.2 Fibre Channel / SAS Controller

Category	Product Name / Description	Part Number
Fibre Channel	**Fibre Channel Controller (1ch)** Emulex LightPulse LPe1250-F8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8	N8190-159
	Fibre Channel Controller (2ch) Emulex LightPulse LPe12002-M8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8	N8190-160
	Fibre Channel Controller (1ch) Emulex LightPulse LPe16000B-M6 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0 x8	N8190-157A
	Fibre Channel Controller (2ch) Emulex LightPulse LPe16002B-M6 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0 x8	N8190-158A
	Fibre Channel Controller (1ch) QLogic, QLE2690 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0(x8)	N8190-161
	Fibre Channel Controller (2ch) QLogic, QLE2692 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0(x8)	N8190-162
SAS	**SAS Controller** LSI SAS9212-4i4e Host Bus Adapter 6Gb/s SAS, Int. 4 / Ext. 4, 7-pin SATA / SFF-8088, PCIe 2.0 x8	N8103-142
	SAS Controller LSI SAS9300-8e Host Bus Adapter 12Gb/s SAS, ext. 8(SFF-8644 x2), PCIe 3.0 x8	N8103-184

NOTE:

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

7.4 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 Redundant Fan

Product Name / Description	Part Number
Redundant Fan Kit Hot plug Cooling Fan for T120g **NOTE:** - The Cooling fan for 700W non-hot plug PSU does not support hot-plug feature.	N8181-130F
Non-redundant Fan Kit Non-hot plug Cooling Fan for T120g	N8181-131F

NOTE:

- One of the fan kits must be installed.

8.2 Trusted Platform Module Kit

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

NOTE:

- The kit is not available in China.
- The kit is not removable after attachment.
- "TPM Support" in BIOS setup menu must be activated prior to use of this 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.

8.3 Internal Flash Memory

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

NOTE:

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

8.4 High Temperature Support Option

Product Name / Description	Part Number
High temperature resistant Kit Required for high temperature operation over 40°C (up to 45°C)	N8181-147F

NOTE:

- This option is applicable to only N8100-2478F (800W power supply model).
- To apply this option, there are some configuration limitations below.

There are following limitations on configuration to use this option:

- Up to two 2.5-inch drive cages of N8154-77F can be installed.
- Up to one 3.5-inch drive cage of N8154-78F can be installed.
- The following options cannot be installed:
- N8101-1075F Xeon E5-2690 v4 Processor Kit
- N8101-1076F Xeon E5-2697 v4 Processor Kit
- N8102-689F 32GB DDR4-2400 REG Memory Kit(1x32GB)
- N8151-125 Internal RDX (USB)
- N8151-126 Internal LTO (SAS)
- N8151-127 Internal LTO (SAS)

- N8151-128 Internal LTO (SAS)
- N8151-129 Internal LTO (SAS)
- N8151-136 Internal LTO (SAS)
- N8181-130F Redundant Fan Kit
- N8146-91 Dust Proof Bezel with Sensor
- N8146-92 Dust Proof Bezel
- N8116-48 Graphics Card Installation Kit

8.5 Flash FDD

Choose the Flash FDD if you need to prepare an alternative 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.
- Not supported when VMware is running on the server.

9 Add-on Components

9.1 Input Devices

Product Name / Description	Part Number
Keyboard 1 x 104-keys USB keyboard	N8170-25
USB Optical Mouse 1 x USB Mouse, 2-button, Optical with wheel	N8170-22

NOTE:

- Keyboard and mouse are not included in the base models. Please order separately if necessary.

9.2 Server Management License

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

9.3 Rack Conversion Kit

The following rack conversion kit is required to install the server into a 19-inch rack system:

Product Name / Description	Part Number
Rack Conversion Kit Convert to 5U form factor	N8143-119

9.4 Dust / Insect Proof Kit

The server supports the dust resistant feature. Choose the following kit to install the system in dusty places.

Category	Product Name / Description	Part Number
Front Bezel	**Dust Proof Bezel with Sensor** Including 1 set of filter replacement sensors, 1 set of dust proof filters	N8146-91
	Dust Proof Bezel Including 1 set of dust proof filters	N8146-92
Filter	**Dust proof filter (5 pcs.)** For N8146-91 and N8146-92 Dust Proof Bezel Removal capacity of particles : Up to 1 µm-sized	N8147-28
Sensor	**Filter Replacement Sensor** For N8146-92 Dust Proof Bezel, Including 1 set of filter replacement sensors	N8146-93

NOTE:

- Filter Replacement Sensor is supported on the Windows and Red Hat Enterprise Linux systems.
- Dust Proof Bezel is supported on the tower configuration only.

9.5 Medium and Cartridge

Category	Product Name	Drive supported	Part Number
RDX	RDX Cartridge (500GB)	N8151-125	N8153-02
	RDX Cartridge (1TB)	N8151-125	N8153-03
	RDX Cartridge (2TB)	N8151-125	N8153-09
	RDX Cartridge (3TB)	N8151-125	N8153-10
	RDX Cartridge (4TB)	N8151-125	N8153-11

References

Boot Mode Setting

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

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

Server Management

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

		Standard	With Remote KVM and Media License kit
Hardware monitoring	Temperature/voltage/power/RAID/ standard LANfan /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	-	✓
	Manual Video recording	-	✓
	Automatic video recording	-	✓[1]
Remote control (via LAN)	Remote reset/power on-off/ dump	✓	✓
	Remote power capping	✓	✓
	BIOS/BMC FW update	✓	✓
	Remote BIOS setup(partial configuration only)	✓	✓
	OS shutdown	✓[1]	✓[1]
	Remote media (CD/DVD/FD/USB)	-	✓
	CLP (Command Line Protocol) (DMTF compliant)	✓	✓
	Remote control via Web browser (multi user login at the same time)	✓	✓
	Scheduling (without UPS)	✓[1]	✓[1]
	BIOS setting by using XML file	✓	✓
Maintenance	EXPRESSSCOPE® Profile key (Backup/restore BIOS/BMC setup information)	✓	✓
Others	Set automatic IP address via DNS/DHCP	✓	✓
	LDAP/Active Directory verification/user control	✓	✓
	Clock synchronization of main unit and the RTC	✓	✓
	Access log collection	✓	✓
	IPMI	2.0	2.0
	IPv6(Web console/CLP only)	✓	✓

1 The feature is not supported on VMware ESXi systems.

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

3 Monitoring boot screens is not supported on VMware systems.

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

OS Support Matrix for PCI Cards and Embedded Controllers

Part number	Product Name	WS 2016	WS 2012 R2	WS 2012	WS 2008 R2	RHEL 7	RHEL 6 x64	ESXi 6.5	ESXi 6.0	ESXi 5.5
-	Embedded SATA non-RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓
-	Embedded SATA RAID Controller	-	✓	✓	✓	-	-	-	-	-
-	Embedded 1GbE NIC	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-176	RAID Controller (1 GB, RAID 0/1)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-177	RAID Controller (1 GB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-178	RAID Controller (2 GB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-186	SAS Expander Card	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-179	RAID Controller (2 GB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-162	Fibre Channel Controller (2ch)	✓	-	-	-	-	-	-	-	-
N8190-161	Fibre Channel Controller (1ch)	✓	-	-	-	-	-	-	-	-
N8190-158A	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-157A	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-158	10GBASE Adapter (SFP+/2ch)	-	-	-	-	✓	-	-	-	-
N8104-157	Dual Port 10GBASE-T Adapter	✓	✓	✓	-	✓	✓	-	-	-
N8103-184	SAS Controller	-	✓	✓	-	✓	✓	✓	✓	✓
N8190-160	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8190-159	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-153	Dual Port 10GBASE-T Adapter	✓	✓	✓	-	✓	✓	✓	✓	✓
N8104-149	10GBASE adapter (SFP+/2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-142	SAS Controller	✓	✓	✓	✓	✓	✓	-	✓	✓
N8104-152	Quad Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-145	Dual Port 1000BASE-T Adapter	✓	-	-	✓	✓	✓	-	-	-
N8104-151	Dual Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-150	1000BASE-T adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓

Supported PCI Cards and Installable Slots

			Slots				
Priority	Part Number	Product Name	#1	#2	#3	#4	#5
(1)	N8103-176	RAID Controller (1 GB, RAID 0/1)	(4)	(2)	(1)	(3)	-
(2)	N8103-177	RAID Controller (1 GB, RAID 0/1/5/6)	(4)	(2)	(1)	(3)	-
(3)	N8103-178	RAID Controller (2 GB, RAID 0/1/5/6)	(4)	(2)	(1)	(3)	-
(4)	N8103-186	SAS Expander Card	-	-	-	-	(1)
(5)	N8103-179	RAID Controller (2 GB, RAID 0/1/5/6)	(4)	(2)	(1)	(3)	-
(6)	N8190-162	Fibre Channel Controller (2ch)	(4)	(2)	(1)	(3)	
(7)	N8190-161	Fibre Channel Controller (1ch)	(4)	(2)	(1)	(3)	
(8)	N8190-158A	Fibre Channel Controller (2ch)	(4)	(2)	(1)	(3)	-
(9)	N8190-157A	Fibre Channel Controller	(4)	(2)	(1)	(3)	-
(10)	N8104-158	10GBASE Adapter (SFP+/2ch)	(4)	(2)	(1)	(3)	-
(11)	N8104-157	Dual Port 10GBASE-T Adapter	(4)	(2)	(1)	(3)	-
(12)	N8103-184	SAS Controller	(4)	(2)	(1)	(3)	-
(13)	N8190-160	Fibre Channel Controller (2ch)	(4)	(2)	(1)	(3)	-
(14)	N8190-159	Fibre Channel Controller	(4)	(2)	(1)	(3)	-
(15)	N8104-153	Dual Port 10GBASE-T Adapter	(4)	(2)	(1)	(3)	(5)
(16)	N8104-149	10GBASE adapter (SFP+/2ch)	(4)	(2)	(1)	(3)	(5)
(17)	N8103-142	SAS Controller	(4)	(2)	(1)	(3)	(5)
(18)	N8104-152	Quad Port 1000BASE-T Adapter	(4)	(2)	(1)	(3)	(5)
(19)	N8104-145	Dual Port 1000BASE-T Adapter	(4)	(2)	(1)	(3)	(5)
(20)	N8104-151	Dual Port 1000BASE-T Adapter	(4)	(2)	(1)	(3)	(5)
(21)	N8104-150	1000BASE-T adapter	(4)	(2)	(1)	(3)	(5)
(22)	N8117-01A	Serial Port Adapter	-	-	(1)	(2)	(3)

NOTE:

- The slot #1 is available in a dual-processor system.
- The number between parentheses shows the population priority (recommendation). For example, install N8103-176 (1) in the slot #3, N8190-160 (11) in the slot #2 and N8104-153 (13) in the slot #4 when you have those cards.
- For VMware ESXi 5.5, there are some limitations as follows:
  - When any of N8104-149/-153/-157 is installed, N8104-152 cannot be installed and the number of installable N8104-150/-151 is limited up to one.
  - Up to two cards of N8104-152 can be installed.
  - Up to four cards of N8104-150/-151 can be installed.
  - Up to three cards of N8104-149/-153/-157 can be installed.
  - Up to four cards of N8190-158A/N8190-160/N8103-184 can be installed.
  - When the above four groups are mixed (N8104-152, N8104-150/-151, N8104-149/-153/-157, and N8190-158A/N8190-160/N8103-184), the number of installable cards among them becomes up to three.
  - When configured with Xeon E5-2660 v4/2690 v4/2697 v4, up to one card of N8103-176/-177/-178/-179 can be installed
  - When configured with Xeon E5-2650 v4, up to two cards of N8103-176/-177/-178/-179 can be installed
- For VMware ESXi 6.0, there are some limitations as follows:
  - When any of N8104-149/-153/-157 is installed, N8104-152 cannot be installed and the number of installable N8104-150/-151 is limited up to one.
- For the configuration limitation for VMware ESXi, refer to the following documents.
  VMware ESXi5.5
  https://www.vmware.com/pdf/vsphere5/r55/vsphere-55-configuration-maximums.pdf
  VMware ESXi6.0
  https://www.vmware.com/pdf/vsphere6/r60/vsphere-60-configuration-maximums.pdf

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

Revision History

Revision	Date	Description
6.0	August 24, 2017	**New products added:** 200GB Hot Plug 2.5-inch SATA SSD / N8150-779 400GB Hot Plug 2.5-inch SATA SSD/ N8150-780 800GB Hot Plug 2.5-inch SATA SSD/ N8150-781 200GB Hot Plug 2.5-inch SATA SSD / N8150-782 400GB Hot Plug 2.5-inch SATA SSD / N8150-783 800GB Hot Plug 2.5-inch SATA SSD / N8150-784 1.6TB Hot Plug 2.5-inch SATA SSD / N8150-785 **Discontinued product deleted:** 200GB Hot Plug 2.5-inch SATA SSD / N8150-725 400GB Hot Plug 2.5-inch SATA SSD/ N8150-726 800GB Hot Plug 2.5-inch SATA SSD/ N8150-727 200GB Hot Plug 2.5-inch SATA SSD / N8150-732 400GB Hot Plug 2.5-inch SATA SSD / N8150-733 800GB Hot Plug 2.5-inch SATA SSD / N8150-734 1.6TB Hot Plug 2.5-inch SATA SSD / N8150-735 **Others:** Removed the content of the Endurance of SSD
5.0	February 24, 2017	**New products added:** Fibre Channel Controller(1ch) / N8190-161 Fibre Channel Controller(2ch) / N8190-162 **Others:** Added VMware ESXi 6.5 to the list of operating system supported Updated OS support matrix
4.0	January 26, 2017	**New products added:** 10TB 7.2K Hot Plug 3.5-inch SATA HDD / N8150-543 RDX Cartridge (4TB) / N8153-11 **Others:** Added Windows Server 2016 to the list of operating system supported Updated OS support matrix
3.0	October 12, 2016	**New products added:** 6TB 7.2K Hot Plug 3.5-inch SATA HDD / N8150-540 1.8TB 10K Hot Plug 2.5-inch SAS HDD / N8150-541 10GBASE Adapter (SFP+/2ch) / N8104-158 **Discontinued product deleted:** 6TB 7.2K Hot Plug 3.5-inch SATA HDD / N8150-503 1.8TB 10K Hot Plug 2.5-inch SAS HDD / N8150-490 **Others:** Removed 4Kn sector HDD descriptions
2.0	July 20, 2016	**New products added:** 64GB DDR4-2400 REG Memory Kit (1x64GB) / N8102-690F 8TB 7.2K Hot Plug 3.5-inch SATA HDD / N8150-528 Internal LTO (SAS) / N8151-136
1.2	June 30, 2016	**Others:** Corrected the notes for N8116-48 Graphics Card Installation Kit
1.1	May 17, 2016	**Others:** Added DVD read speed information
1.0	April 25, 2016	Initial release