

NEC Express5800/T110g-S System Configuration Guide

Liquid cooling model



Introduction

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

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NEC Corporation

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Technical Specification

Key Features

- Ultra compact form of 93mm in width, 13 liters in volume
- Up to 32 GB of high speed DDR3-1600 memory
- Full manageability by integrated EXPRESSSCOPE Engine 3
- Function in maximum 40° C / 104° F ambient temperature

Specification

Model		T110g-S			
Part Number		N8100-2196F			
Processor	Type	Intel® Core™ i3-4350 processor	Intel® Xeon® processor E3-1220 v3	Intel® Xeon® processor E3-1231 v3	Intel® Xeon® processor E3-1275L v3
	Clock speed	3.60 GHz	3.10 GHz	3.40 GHz	2.70 GHz
	Number of Processors	1			
	Cache	4 MB	8MB		
	Cores and Threads	2C / 4T	4C / 4T	4C / 8T	
Chipset		Intel® C224 Chipset			
Memory	Type	DDR3-1600 ECC Unbuffered DIMM			
	Standard Capacity	0 GB			
	Maximum Capacity	32 GB (4 x 8 GB)			
Internal Storage	Standard Capacity	0 GB			
	Maximum Capacity	8 TB (2 x 4 TB)			
	Disk Controller	SATA : 6Gb/s (Integrated)			
	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 (When using N8154-59F or N8154-59F/-56F)			
	Optical Disk Drive	Optional			
	3.5-inch Media Bays	1			
	Disk Drive Bays	2 or 4 or 6			
Expansion Slots		Total: 4 slots available 1 PCIe 3.0 x16 (x16 connector) 1 PCIe 2.0 x4 (x8 connector) 2 PCIe 2.0 x1 (x8 connector)			
Video	Controller (VRAM)	Integrated in Server Management Controller (32MB)			
	Resolution / Color	1280 x 1024 / 16.7M ²			
Interfaces		1 VGA (15-pin mini D-sub, 1 rear) 1 to 2 Serial (9-pin mini D-sub, RS232-C, 1 to 2 rear) 4 USB3.0 (1 front, 2 rear, 1 internal) 4 USB2.0 (1 front, 2 rear, 1 internal) 2 1000BASE-T LAN connector (RJ-45, 2 rear) 1 100BASE-TX LAN connector for Management (RJ-45, 1 rear)			
Server Management		EXPRESSSCOPE Engine 3			
System Fan		Standard			
Power Supply		1 x 250 Watt 80 PLUS® Platinum certified non-Hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			

Model		T110g-S			
Power Consumption	(Max. Config, Idling)	114 VA / 97 Watt		112 VA / 98 Watt	113 VA / 96 Watt
	(Max. Config, Operating)	192 VA / 180 Watt	206 VA / 192 Watt	219 VA / 207 Watt	183 VA / 170 Watt
Acoustic Noise (Sound Pressure Level) ³	Minimum Config.	29 dB			
	Maximum Config.	38 dB			
Dimensions (W x D x H)		98.0 x 386.5 x 341.0 mm / 3.9 x 15.2 x 13.4 in			
Weight (Minimum / Maximum)		8 kg / 11 kg, 17.64 lbs. / 24.25 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, CE, UL, CB, RoHS, BSMI, CCC, RCM, WEEE			
Operating Systems and Virtualization Software		Microsoft® Windows Server® 2008 x86 Standard Microsoft® Windows Server® 2008 x86 Enterprise Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard Microsoft® Windows Server® 2012 Datacenter Microsoft® Windows Server® 2012 R2 Standard Microsoft® Windows Server® 2012 R2 Datacenter Red Hat Enterprise Linux 5.10 or later ⁴ Red Hat Enterprise Linux 5.10 or later (EM64T) ⁴ Red Hat Enterprise Linux 6.5 or later ⁴ Red Hat Enterprise Linux 6.5 or later (EM64T) ⁴ VMware ESXi™ 5.1 Update 1 or later VMware ESXi™ 5.5 Update 1			

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

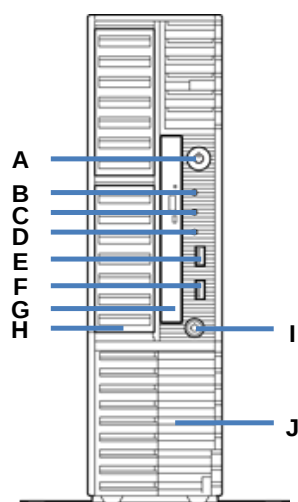
² Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

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

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>

External Views

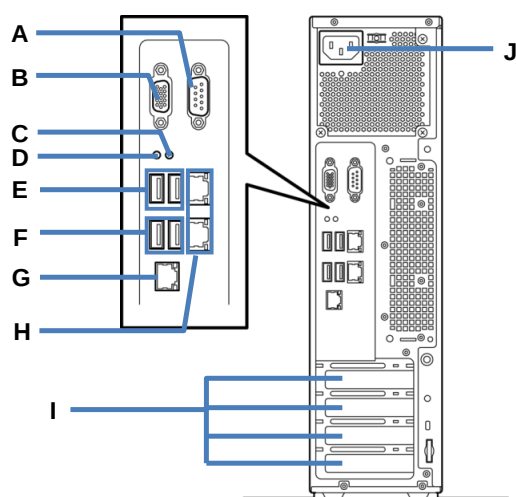
Front View



Legend

A.	Power Button	F.	USB 2.0 Connector
B.	Power LED	G.	Optical Disk Drive
C.	Hard Drive Activity LED	H.	3.5-inch Media Bay
D.	System Status LED	I.	Drive Bay Cover Key
E.	USB 3.0 Connector	J.	Drive Bay Cover

Rear Views



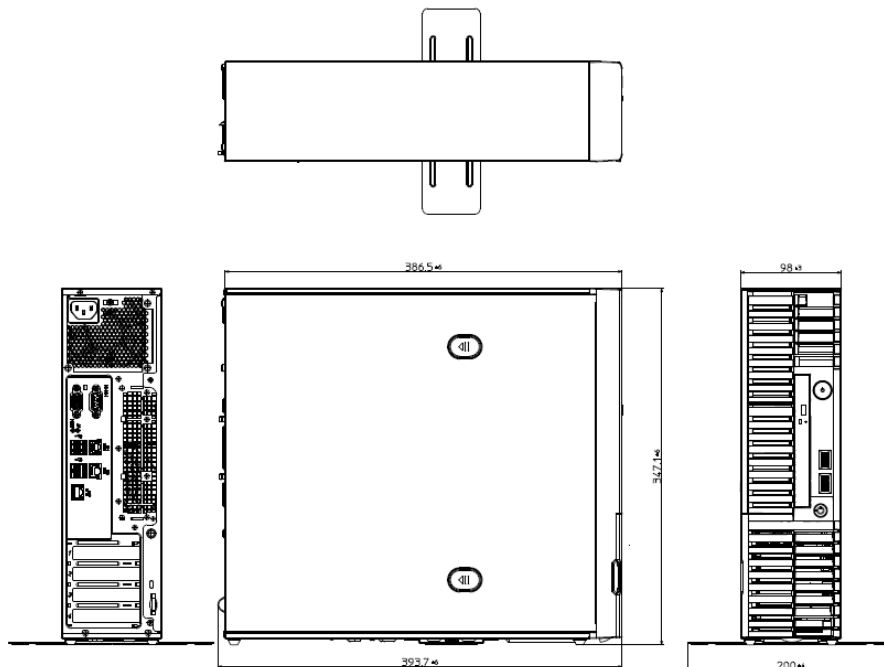
Legend

A.	Serial Port (A) Connector	F.	USB 3.0 Connectors
B.	VGA Connector	G.	Management LAN Connector
C.	BMC Reset Switch	H.	Data LAN Connectors
D.	Dump (NMI) Switch	I.	PCI Slots (Low Profile)
E.	USB 2.0 Connectors	J.	AC Inlet

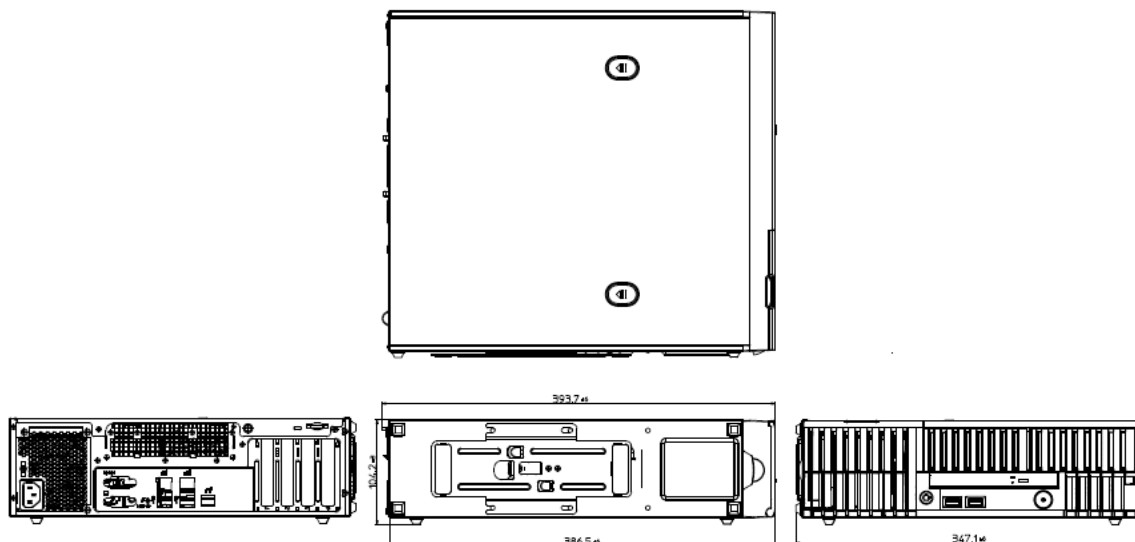
Dimensions (mm)

Standard Bezel

Tower Orientation

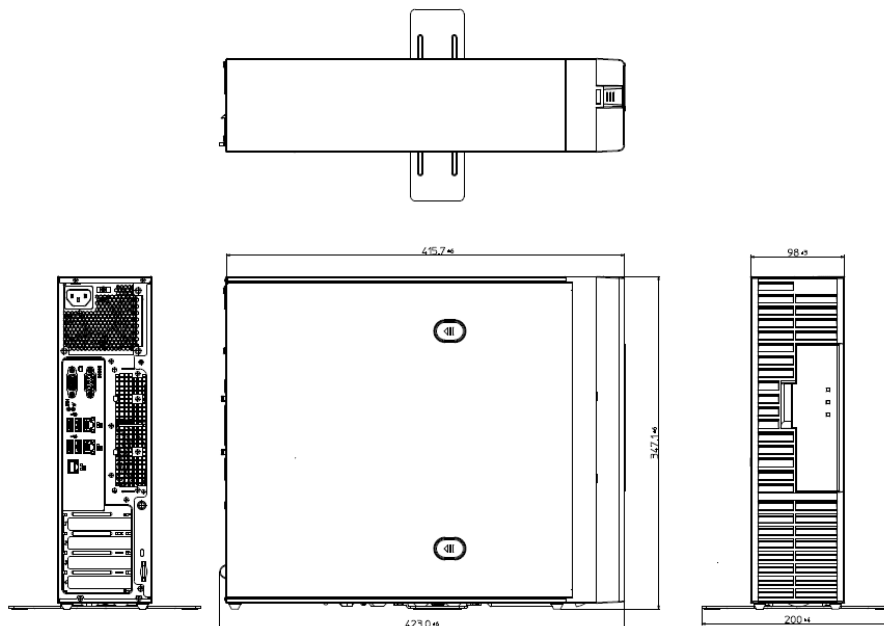


Desktop Orientation

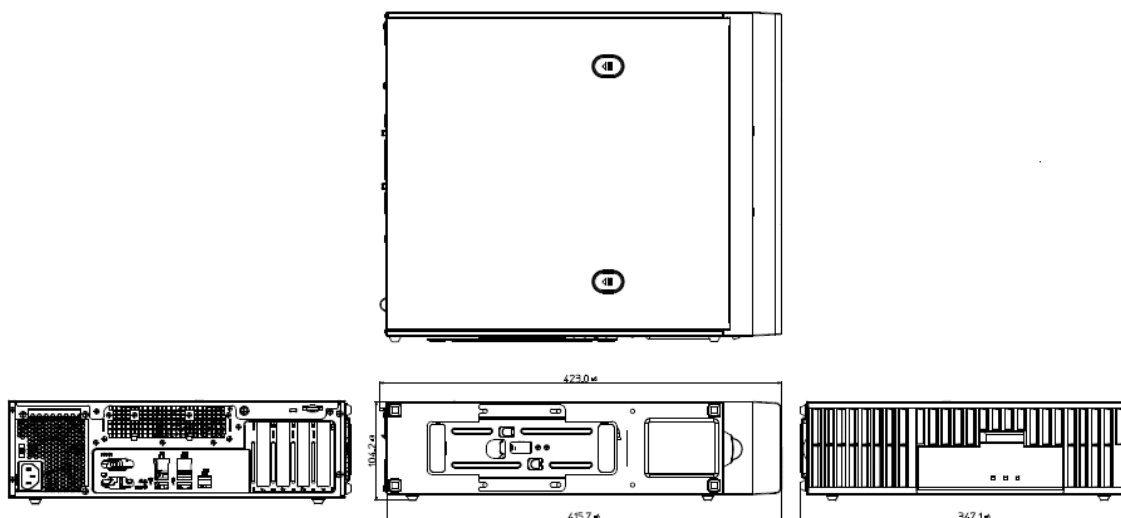


Dust Proof Bezel

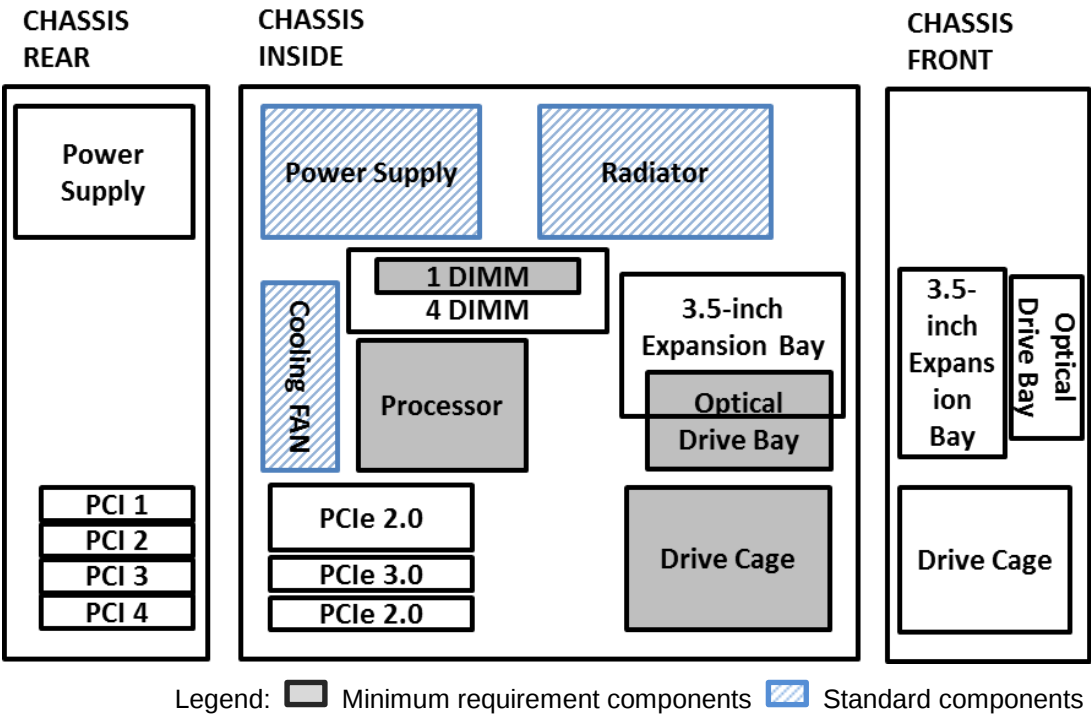
Tower Orientation



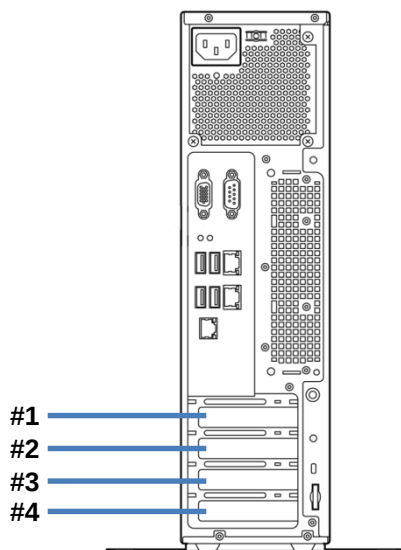
Desktop Orientation



Configuration Diagram



Expansion Slots



Legend	
#1	PCIe 2.0 x1, x8 connector, Low Profile, up to 168mm length
#2	PCIe 2.0 x1, x8 connector, Low Profile, up to 168mm length
#3	PCIe 3.0 x16, x16 connector, Low Profile, up to 168mm length
#4	PCIe 2.0 x4, x8 connector, Low Profile, up to 168mm length

Server Configuration

1 Base Models

Product Name / Description	Part Number
NEC Express5800/T110g-S no Processor, no RAM, no Drive Cage, no HDD, no Optical Drive Including: 250 Watt non-hot plug power supply, EXPRESSBUILDER DVD	N8100-2196F

2 Processor

Available sockets: 1

Category	Product Name / Description	Part Number
Processors 1 Processor Required	Core i3-4350 Processor Kit	N8101-739F
	Intel® Core™ i3-4350 Processor (3.60 GHz, 2C/4T, 4 MB)	
	Xeon E3-1220 v3 Processor Kit	N8101-626F
	Intel® Xeon® Processor E3-1220 v3 (3.10 GHz, 4C/4T, 8 MB)	
	Xeon E3-1231 v3 Processor Kit	N8101-741F
	Intel® Xeon® Processor E3-1231 v3 (3.40 GHz, 4C/8T, 8 MB)	
	Xeon E3-1275L v3 Processor Kit	N8101-742F
	Intel® Xeon® Processor E3-1275L v3 (2.70 GHz, 4C/8T, 8 MB)	

NOTE:

- One processor kit from above must be installed.

3 Memory

Available slots: 4

Product Name / Description	Part Number
2GB DDR3L-1600 UNB Memory Kit 2GB Unbuffered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-523F
4GB DDR3L-1600 UNB Memory Kit 4GB Unbuffered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-524F
8GB DDR3L-1600 UNB Memory Kit 8GB Unbuffered ECC DIMM, DDR3L-1600(PC3L -12800)	N8102-525F

NOTE:

- Minimum one memory kit must be installed.
- To install by double of memory kit is recommended in order to increase memory transfer speed by dual-channel symmetric configuration.
- The memory requirement for installing VMware ESXi™ are below:
 - VMware ESXi 5.1 : at least 3 GB
 - VMware ESXi 5.5 : at least 5 GB

Maximum Available Memory

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

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

Maximum memory size supported by OS		Maximum available memory
Microsoft Windows Server 2008 Standard	4 GB	4 GB(HW-DEP enabled) App. 3.5 GB (HW-DEP disabled)
Microsoft Windows Server 2008 R2 Standard ¹	32 GB	32 GB
Microsoft Windows Server 2008 Enterprise	64 GB	32 GB
Microsoft Windows Server 2008 R2 Enterprise ¹	2 TB	32 GB
Microsoft Windows Server 2012 Standard ¹	4 TB	32 GB
Microsoft Windows Server 2012 Datacenter ¹		
Microsoft Windows Server 2012 R2 Standard ¹		
Microsoft Windows Server 2012 R2 Datacenter ¹		
Red Hat Enterprise Linux 5	16 GB	16 GB
Red Hat Enterprise Linux 6		
Red Hat Enterprise Linux 5 (EM64T)	1 TB	32 GB
Red Hat Enterprise Linux 6 (x86_64)	3 TB	32 GB
VMware ESXi 5.1 ²	2 TB	32 GB
VMware ESXi 5.5 ²	4 TB	32 GB

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, Windows Server 2012 R2 : 4 TB

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

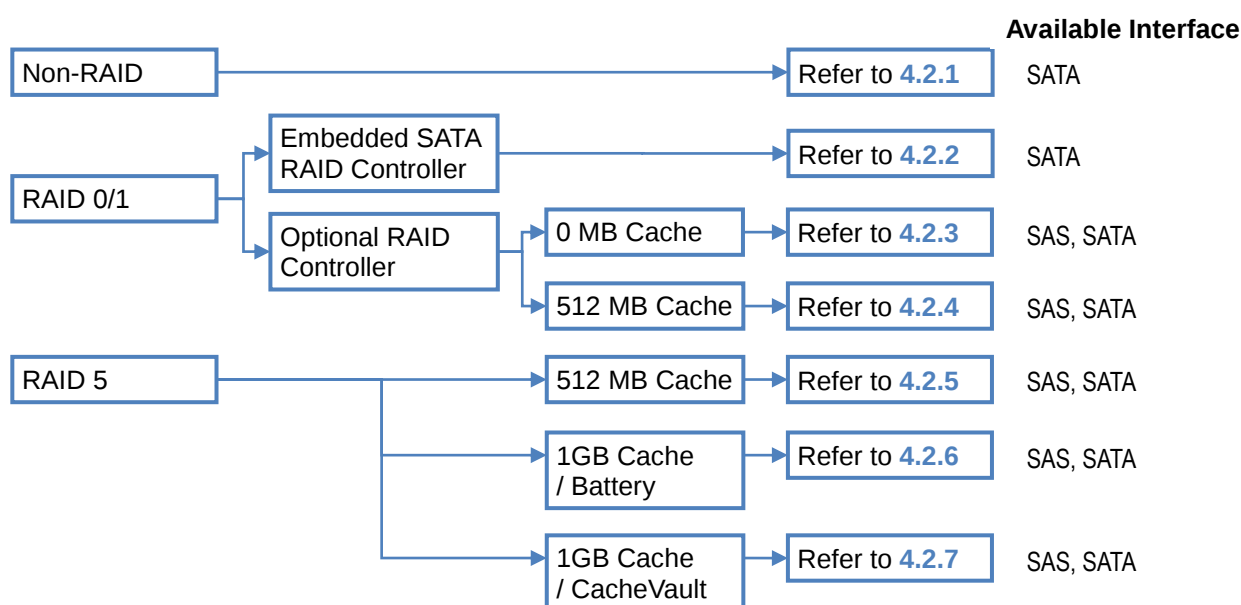
4 Internal Hard Disk Drives

4.1 RAID Configuration

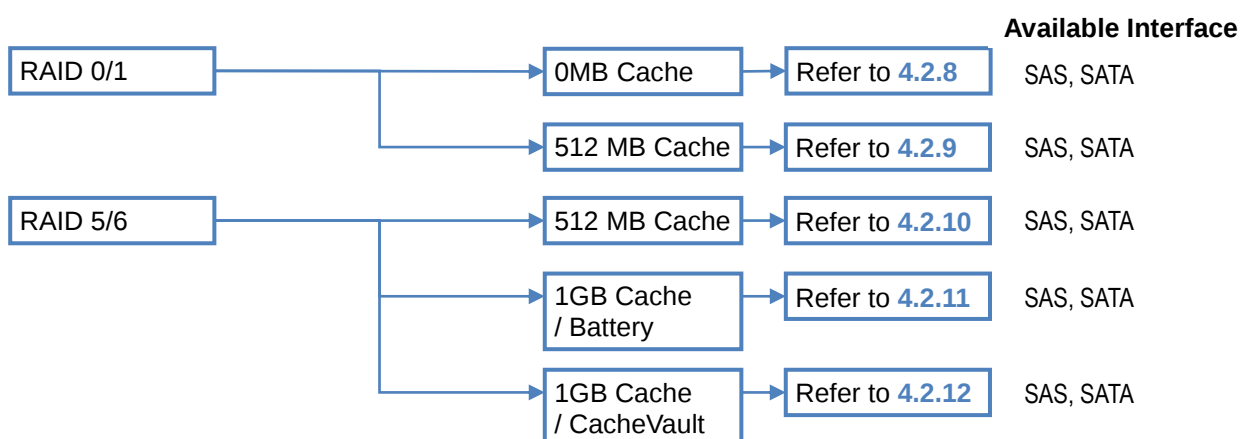
Refer to the section in accordance with your disk form factor and RAID configuration

4.1.1 2.5-inch Drive

Up to four Drives



Up to six Drives

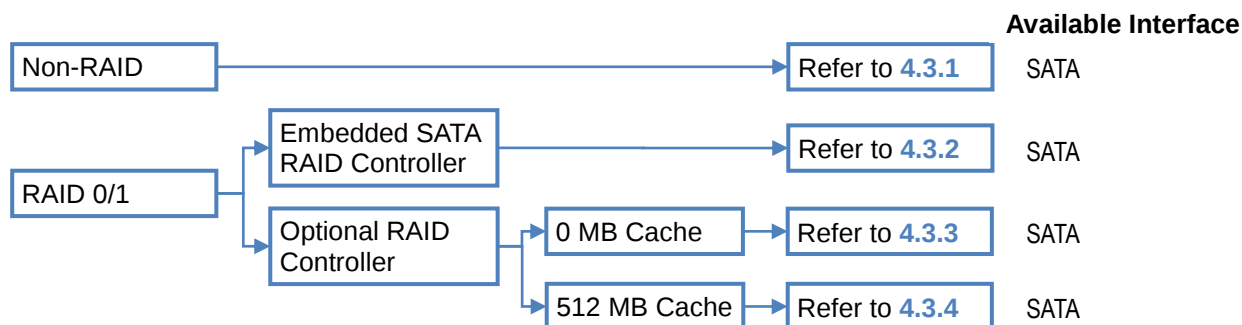


NOTE:

- No tape drive can be installed when installing an optional 2.5-inch drive cage.
- 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](#).
- Up to two kinds of drives can be mixed in a system.
- All drives within a RAID array should be of the same capacity and rotation speed.
- Mixing SAS and SATA hard drives in the same drive cage is not supported.
- All drives within a drive cage should be of the same rotation speed.

4.1.2 3.5-inch Drive

Up to two 3.5-inch Drives



Up to two 3.5-inch Drives plus two 2.5-inch Drives



NOTE:

- No tape drive can be installed when installing an optional 2.5-inch drive cage.
- Hot plug insertion/removal is not supported on the 3.5-inch drive configuration.
- 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 hard drives within a RAID array should be of the same capacity and rotation speed.
- All drives within a RAID array should be of the same capacity and rotation speed.

4.2 2.5-inch Drive Configuration

4.2.1 Up to four Drives with Embedded SATA Controller

Category	Product Name / Description		Part Number
Storage Controller	Embedded SATA Controller 4x 6Gb/s SATA		(Standard)
Cable	Internal SATA Cable Mini-SAS to mini-SAS		(Standard)
Drive Cage Required	2.5-inch Drive Cage 4 x 2.5-inch hot plug drive bays		N8154-71F
Drive 4 slots available	SATA HDD	250GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-452
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454

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 4x 6Gb/s SATA, RAID0/1/10 capable		(Standard)
Cable	Internal SATA Cable miniSAS to miniSAS		(Standard)
Drive Cage Required	2.5-inch Drive Cage 4 x 2.5-inch hot plug drive bays		N8154-71F
Drive 4 slots available	SATA	250GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-452
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454

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](#).
- All hard drives within a RAID array should be of the same capacity and rotation speed.

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

Category		Product Name / Description	Part Number
Storage Controller Required		RAID Controller (0MB, RAID 0/1) LSI MegaRAID SAS 9240-8i RAID0/1/10, no cache memory, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-171
Cable		Internal SATA Cable Mini-SAS to mini-SAS	(Standard)
Drive Cage Required		2.5-inch Drive Cage 4 x 2.5-inch hot plug drive bays	N8154-71F
Drive 4 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-444
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-445
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-446
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-447
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-448
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-449
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-450
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-451
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-522
	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	N8150-452
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed..

4.2.4 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 9272-8i RAID0/1/10, 512 MB, Int. 8, PCIe 3.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-172
RAID BBU Recommended		RAID Battery Backup Unit for LSI MegaRAID SAS 9272-8i	N8103-155
Cable		Internal SAS/SATA Cable Mini-SAS to mini-SAS	(Standard)
Drive Cage Required		2.5-inch Drive Cage 4 x 2.5-inch hot plug drive bays	N8154-71F
Drive 4 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-444
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-445
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-446
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-447
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-448
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-449
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-450
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-451
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-522
	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	N8150-452
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454
	SAS SSD	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.

4.2.5 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 9272-8i RAID0/1/5/6/10/50/60, 512 MB, Int. 8, PCIe 3.0(x8), SAS 6Gb/s, SATA 6Gb/s		N8103-173
RAID BBU Recommended	RAID Battery Backup Unit for LSI MegaRAID SAS 9272-8i		N8103-155
Cable	Internal SAS/SATA Cable Mini-SAS to mini-SAS		(Standard)
Drive Cage Required	2.5-inch Drive Cage 4 x 2.5-inch hot plug drive bays		N8154-71F
Drive 4 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-444
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-445
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-446
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-447
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-448
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-449
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-450
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-451
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-522
	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	N8150-452
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454
	SAS SSD	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.

4.2.6 Up to four Drives with RAID 5 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 9272-8i RAID0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 3.0(x8), SAS 6Gb/s, SATA 6Gb/s		N8103-174
RAID BBU Recommended	RAID Battery Backup Unit for LSI MegaRAID SAS 9272-8i		N8103-155
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 Mini-SAS to mini-SAS		(Standard)
Drive Cage Required	2.5-inch Drive Cage 4 x 2.5-inch hot plug drive bays		N8154-71F
Drive 4 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-444
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-445
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-446
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-447
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-448
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-449
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-450
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-451
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-522
	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	N8150-452
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454
	SAS SSD	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..

4.2.7 Up to four Drives with RAID 5 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 9270CV-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		N8103-168
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 SATA Cable Mini-SAS to mini-SAS		(Standard)
RAID Controller Installation Kit Required	RAID Controller Installation Kit For LSI MegaRAID SAS 9270CV-8i		K410-328(00)
Drive Cage Required	2.5-inch Drive Cage 4 x 2.5-inch hot plug drive bays		N8154-71F
Drive 4 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-444
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-445
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-446
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-447
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-448
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-449
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-450
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-451
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-522
		250GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-452
	SATA HDD	500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454
	SAS SSD	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.

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

Category		Product Name / Description	Part Number
Storage Controller Required		RAID Controller (0MB, RAID 0/1) LSI MegaRAID SAS 9240-8i RAID0/1/10, no cache memory, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 3Gb/s	N8103-171
		Cable Internal SATA Cable mini-SAS to mini-SAS, miniSAS – 2x Single SATA	(Standard)
Drive Cage Required		2.5-inch Drive Cage 4 x 2.5-inch hot plug drive bays	N8154-71F
		Optional Drive Cage 2.5-Inch Hot Plug Drive Cage Kit 2x 2.5-inch hot plug drive bays Including 1x mini-SAS to 2x Single SATA cable	N8154-72F
Drive 6 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-444
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-445
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-446
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-447
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-448
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-449
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-450
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-451
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-522
		250GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-452
	SATA HDD	500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

4.2.9 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 9272-8i RAID0/1/10, 512 MB, Int. 8, PCIe 3.0(x8), SAS 6Gb/s, SATA 6Gb/s		N8103-172
RAID BBU Recommended	RAID Battery Backup Unit for LSI MegaRAID SAS 9272-8i		N8103-155
Cable	Internal SATA Cable mini-SAS to mini-SAS, miniSAS – 2x Single SATA		(Standard)
Drive Cage Required	2.5-inch Drive Cage 4 x 2.5-inch hot plug drive bays		N8154-71F
Optional Drive Cage Required	2.5-Inch Hot Plug Drive Cage Kit 2x 2.5-inch hot plug drive bays Including 1x mini-SAS to 2x Single SATA cable		N8154-72F
Drive 6 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-444
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-445
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-446
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-447
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-448
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-449
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-450
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-451
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-522
	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	N8150-452
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454
	SAS SSD	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 hard drives within a RAID array should be of the same capacity and rotation speed.

4.2.10 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 9272-8i RAID0/1/5/6/10/50/60, 512 MB, Int. 8, PCIe 3.0(x8), SAS 6Gb/s, SATA 6Gb/s		N8103-173
RAID BBU Recommended	RAID Battery Backup Unit for LSI MegaRAID SAS 9272-8i		N8103-155
Cable	Internal SATA Cable mini-SAS to mini-SAS, miniSAS – 2x Single SATA		(Standard)
Drive Cage Required	2.5-inch Drive Cage 4 x 2.5-inch hot plug drive bays		N8154-71F
Optional Drive Cage Required	2.5-Inch Hot Plug Drive Cage Kit 2x 2.5-inch hot plug drive bays Including 1x mini-SAS to 2x Single SATA cable		N8154-72F
Drive 6 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-444
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-445
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-446
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-447
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-448
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-449
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-450
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-451
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-522
	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	N8150-452
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454
	SAS SSD	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.

4.2.11 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 9272-8i RAID0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 3.0(x8), SAS 6Gb/s, SATA 6Gb/s		N8103-174
RAID BBU Recommended	RAID Battery Backup Unit for LSI MegaRAID SAS 9272-8i		N8103-155
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 SATA Cable mini-SAS to mini-SAS, miniSAS – 2x Single SATA	(Standard)	
Drive Cage Required	2.5-inch Drive Cage 4 x 2.5-inch hot plug drive bays	N8154-71F	
Optional Drive Cage Required	2.5-Inch Hot Plug Drive Cage Kit 2x 2.5-inch hot plug drive bays Including 1x mini-SAS to 2x Single SATA cable	N8154-72F	
Drive 6 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-444
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-445
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-446
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-447
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-448
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-449
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-450
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-451
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-522
		250GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-452
	SATA HDD	500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454
		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.

4.2.12 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 9270CV-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		N8103-168
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 SATA Cable mini-SAS to mini-SAS, miniSAS – 2x Single SATA		(Standard)
RAID Controller Installation Kit Required	RAID Controller Installation Kit For LSI MegaRAID SAS 9270CV-8i		K410-328(00)
Drive Cage Required	2.5-inch Drive Cage 4 x 2.5-inch hot plug drive bays		N8154-71F
Optional Drive Cage Required	2.5-Inch Hot Plug Drive Cage Kit 2x 2.5-inch hot plug drive bays Including 1x mini-SAS to 2x Single SATA cable		N8154-72F
Drive 6 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-444
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-445
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-446
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-447
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-448
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-449
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-450
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-451
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-522
		250GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-452
	SATA HDD	500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454
	SAS SSD	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.

4.3 3.5-inch Drive Configuration

4.3.1 Up to two Drives with Embedded SATA Controller

Category	Product Name / Description	Part Number
Storage Controller	Embedded SATA Controller 4x 6Gb/s SATA	(Standard)
Cable Required	Internal SAS/SATA Cable miniSAS to 2x Single SATA	K410-278(00)
Drive Cage Required	3.5-inch Drive Cage 2 x 3.5-inch non hot plug (fixed) drive bays	N8154-65F
Drive 2 slots available	500GB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-460
	1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-461
	2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-462

4.3.2 Up to two Drives with Embedded SATA RAID Controller

Category	Product Name / Description	Part Number
Storage Controller	Embedded SATA Controller 4x 6Gb/s SATA, RAID0/1/10 capable	(Standard)
Cable Required	Internal SATA Cable mini-SAS to 2x Single SATA	K410-278(00)
Drive Cage Required	3.5-inch Drive Cage 2 x 3.5-inch non hot plug (fixed) drive bays	N8154-65F
Drive 2 slots available	500GB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-460
	1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-461
	2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-462
	3TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 3TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-463
	4TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-464

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](#).
- All hard drives within a RAID array should be of the same capacity.

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

Category	Product Name / Description	Part Number
Storage Controller Required	RAID Controller (0MB, RAID 0/1) LSI MegaRAID SAS 9240-8i RAID0/1/10, no cache memory, Int. 8, PCIe 2.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-171
Cable Required	Internal SATA Cable mini-SAS to 2x Single SATA	K410-277(00)
Drive Cage Required	3.5-inch Drive Cage 2 x 3.5-inch non hot plug (fixed) drive bays	N8154-65F
Drive 2 slots available	500GB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-460
	1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-461
	2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-462

NOTE:

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

4.3.4 Up to two 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 9272-8i RAID0/1/10, 512 MB, Int. 8, PCIe 3.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-172
RAID BBU Recommended	RAID Battery Backup Unit for LSI MegaRAID SAS 9272-8i	N8103-155
Cable Required	Internal SATA Cable mini-SAS to 2x Single SATA	K410-277(00)
Drive Cage Required	3.5-inch Drive Cage 2 x 3.5-inch non hot plug (fixed) drive bays	N8154-65F
Drive 2 slots available	500GB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-460
	1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-461
	2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-462
	3TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 3TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-463
	4TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-464

NOTE:

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

4.3.5 3.5-inch and 2.5-inch 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 9272-8i RAID0/1/10, 512 MB, Int. 8, PCIe 3.0(x8), SAS 6Gb/s, SATA 6Gb/s	N8103-172
RAID BBU Recommended		RAID Battery Backup Unit for LSI MegaRAID SAS 9272-8i	N8103-155
Cable Required		Internal SATA Cable mini-SAS to 2x Single SATA, for 3.5-inch drive cage	K410-277(00)
Cable Required		Internal SAS/SATA Cable mini-SAS to 2x Single SATA, for 2.5-inch drive cage	K410-287(00)
3.5-inch Drive Cage Required		3.5-inch Drive Cage 2 x 3.5-inch non hot plug (fixed) drive bays	N8154-65F
2.5-inch Drive Cage Required		2.5-inch Drive Cage 2 x 2.5-inch non hot plug (fixed) drive bays	N8154-72F
3.5-inch Drive 2 slots available		500GB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 500 GB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-460
		1TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 1 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-461
		2TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 2 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-462
		3TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 3TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-463
		4TB 7.2K non-Hot Plug 3.5-inch SATA HDD 1 x 4 TB SATA HDD, 3.5-inch, 6Gb/s, 7,200 rpm	N8150-464
2.5-inch Drive 2 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-444
		450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-445
		600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-446
		900GB 10K Hot Plug 2.5-inch SAS HDD 1x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-447
		1.2TB 10K Hot Plug 2.5-inch SAS HDD 1x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-448
		146.5GB 15K Hot Plug 2.5-inch SAS HDD 1x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-449
		300GB 15K Hot Plug 2.5-inch SAS HDD 1x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-450
		450GB 15K Hot Plug 2.5-inch SAS HDD 1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-451
		600GB 15K Hot Plug 2.5-inch SAS HDD 1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-522
	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	N8150-452
		500GB 7.2K Hot Plug 2.5-inch SATA HDD 1x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-453
		1TB 7.2K Hot Plug 2.5-inch SATA HDD 1x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-454
	SAS SSD	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:

SYSTEM CONFIGURATION GUIDE – NEC Express5800/T110g-S / Liquid cooling model

- Hot plug insertion/removal is not supported on the drive configuration.
- All hard drives within a RAID array should be of the same form factor, capacity and rotation speed.

5 Internal Optical Drive

Category	Product Name / Description	Part Number
Internal 1 slot available Required	Internal Slim DVD-ROM drive Slim DVD-ROM drive	N8151-122
	Internal DVD Super Multi Drive Slim DVD Super Multi drive, not including writing software	N8151-107F
	Optical Drive Bay Cover Blank panel	N8151-121
External	External DVD-ROM drive DVD-ROM drive, Bus powered, 1.2 A required	N8160-91

NOTE:

- Up to 1 optical drive can be connected.
- N8151-121 Optical Drive Bay Cover must be installed when not installing any internal optical drives.

6 Internal RDX Drive

Category	Product Name / Description	Part Number
Controller	Internal USB Controller 1 x USB port or 1 x pin-header for front panel USB	(Standard)
Cable Required	Internal USB cable 1x Internal USB to 1x USB device	K410-276(00)
Drive 1 bays available	Internal RDX (USB)	N8151-105

NOTE:

- The USB bus operates in USB 2.0 mode if the system is running with Windows Server 2008 or Red Hat Enterprise Linux 5 operating system.

7 PCI Card

7.1 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	N8104-133
NOTE: - Network cables with RJ-45 plug covers cannot be used.		

NIC Teaming feature – NIC Teaming and bonding features

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

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

Network Interface	Team	OS
GbE LAN controller Embedded 1GbE NIC and N8104-138/-132/-133	Up to four teams per one system Up to four ports per one team	Windows Server 2008 Windows Server 2008 R2 Windows Server 2012 Windows Server 2012 R2 Red Hat Linux

Using iSCSI

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

Category	Network Interface	Operating Systems
GbE	Embedded 1GbE NIC	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, RHEL*, VMware
	N8104-138	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, RHEL*, VMware
	N8104-132	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, RHEL*, VMware
	N8104-133	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, RHEL*, VMware

* RHEL: Red Hat Enterprise Linux

NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.

7.2 SAS Controller

Product Name / Description	Part Number
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

7.3 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.

8 Other Add-in Components

8.1 Trusted Platform Module Kit

Product Name / Description	Part Number
Trusted Platform Module Kit TPM 1.2 module	N8115-15

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.

8.2 Internal Flash Memory

Available socket: 1

Product Name / Description	Part Number
Internal Flash Memory Internal flash memory to enable software and tools in the EXPRESSBUILDR DVD without DVD media	N8115-14

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 ESM PRO Agent and Universal RAID Utility
- Performance of the Test and Diagnosis Tool

8.3 Flash FDD

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

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

NOTE:

- Up to one device can be connected

8.4 Input Devices

Product Name / Description	Part Number
Keyboard and Mouse Pack (US) 1 x 104-keys White USB keyboard, 1 x USB White Optical Wheel Mouse	(Standard)

9 Add-on Components

9.1 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.	N8115-04

NOTE:

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

9.2 Rack Conversion Kit

Product Name / Description	Part Number
Rack Conversion Kit Convert to 3U form factor	N8143-94

9.3 Dust 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	N8146-59
Filter	Dust proof filter (5 pcs.) For N8146-59 Dust Proof filter Removal capacity of particles : Up to 1 µm-sized	N8147-23

9.4 Tamper Proof Power Button Cover

Product Name / Description	Part Number
Tamper Proof Cover For Standard Bezel Tamper proof cover to prevent erroneous operation of a power button	N8146-42

NOTE:

- The Tamper Proof Cover is not available for N8146-59 Dust Proof Bezel.

9.5 Medium and Cartridge

Category		Product Name	Drive supported	Part Number
RDX	HDD	RDX Cartridge (320GB)	N8151-105	N8153-01
		RDX Cartridge (500GB)	N8151-105	N8153-02
		RDX Cartridge (1TB)	N8151-105	N8153-03
		RDX Cartridge (1.5TB)	N8151-105	N8153-04
		RDX Cartridge (2TB)	N8151-105	N8153-08
	SSD	RDX Cartridge (SSD/128GB)	N8151-105	N8153-06
		RDX Cartridge (SSD/256GB)	N8151-105	N8153-07

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/hard drive ¹ /fan/voltage/power consumption/SystemLAN//degeneration(memory/hard drive ¹)	✓	✓
	Hardware configuration information collection	✓	✓
	Hardware event log collection	✓	✓
Boot monitoring	BIOS/POST stall, Booting, OS stall, shutdown	✓ ³	✓ ³
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, 4, 5}	✓
	CUI-based screen (OS console)	✓ ^{2, 5}	✓
	GUI-based screen (OS console)	-	✓
	Remote KVM Video Record	-	✓
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	✓ ³	✓ ³
	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, require NEC ESM PRO Manager)	✓ ³	✓ ³
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 support	2.0	2.0

¹ The feature is not supported on non-hot plug 3.5-inch drive.

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

³ The feature is not supported on VMware systems.

⁴ Monitoring boot screens is not supported on VMware systems.

⁵ In VMware systems, only the direct console user interface is supported.

OS Support Matrix for PCI Cards and Embedded Controllers

Part Number	Product Name										
		WS 2012 R2	WS 2012	WS 2008 R2	WS 2008	RHEL 6	RHEL 6 x64	RHEL 5	RHEL 5 x64	ESXi 5.5	ESXi 5.1
-	Embedded SATA non-RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-	Embedded SATA RAID Controller	✓	✓	✓	✓	-	-	-	-	-	-
-	Embedded 1GbE NIC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-142	SAS Controller	✓	✓	✓	✓	✓	✓	✓	✓	-	✓
N8103-171	RAID Controller (0MB,RAID 0/1)	✓	✓	✓	✓	✓	✓	✓	✓	-	-
N8103-172	RAID Controller (512MB, RAID 0/1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-173	RAID Controller (512MB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-174	RAID Controller (1GB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-168	RAID Controller (1GB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-138	1000BASE-T Adapter (1ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-132	Quad Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-133	1000BASE-T Adapter (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Supported PCI cards and Installable Slots

Part Number	Product Name	Slots			
		#1	#2	#3	#4
N8103-142	SAS Controller	-	✓	✓	✓
N8103-171	RAID Controller (0MB,RAID 0/1)	-	-	-	✓
N8103-172	RAID Controller (512MB,RAID 0/1)	-	-	-	✓
N8103-173	RAID Controller (512MB,RAID 0/1/5/6)	-	-	-	✓
N8103-174	RAID Controller (1GB,RAID 0/1/5/6)	-	-	-	✓
N8103-168	RAID Controller (1GB,RAID 0/1/5/6)	-	-	-	✓
N8104-138	1000BASE-T Adapter (1ch)	✓	✓	✓	✓
N8104-132	1000BASE-T Adapter (2ch)	✓	✓	✓	✓
N8104-133	Quad Port 1000BASE-T Adapter	✓	✓	✓	✓
N8117-01A	Serial Port Adapter	✓	✓	✓	✓

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

The USB interface is not guaranteed to work properly for all USB devices.

Revision History

Revision	Date	Description
1.0	July 18, 2014	Initial release