

NEC EXPRESS5800/R320c-M4

Configuration Guide

For Linux



Introduction

This document contains product and configuration information that will enable you to configure your system. The guide will ensure fast and proper configuration of your NEC EXPRESS5800 server.

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Technical Specification

Key Features

- Fault tolerant technology based on GeminiArchitecture™
- Full manageability by integrated EXPRESSSCOPE Engine 3
- High performance with the latest Intel® Xeon® processor E5-2600 product family
- Up to 256GB of high speed DDR3L-1600 memory

Specification

Model	R320c-M4	
Part Number	N8800-174F	
Processor	Type	Intel® Xeon® processor E5-2670
	Clock speed	2.60 GHz
	Logical Number of Processors	1 or 2
	Cache	20 MB
	Cores and Threads	8C / 16T
Chipset	Intel® C602 Chipset with GeminiEngine™	
Memory	Type	DDR3L-1600 Registered DIMM with ECC
	Memory Clock	1333Mhz
	Logical Standard Capacity	0GB
	Logical Maximum Capacity	256GB (16 x 16 GB)
	Memory protection	ECC, x4 SDDC
Internal Storage	Standard Capacity	0GB
	Maximum Logical Capacity	9.6 TB (8 x 1.2TB)
	Disk Controller	SAS: 6Gb/s (Standard)
	RAID	SAS : RAID 1 (Standard)
	Hot Plug	Supported
	Optical Disk Drive	DVD Super Multi drive ¹
	Optical Drive Bays [free]	1 [0]
Logical Disk Drive Bays [free]	8 [8]	
Expansion Slots [free]	Standard	Total: 4 slots available 2 Low-profile PCIe x4 Gen 2 (x8 connector) 2 Full-height PCIe x8 Gen 2 (x8 connector)
	Video	Integrated in Server Management Controller (32MB)
	Resolution / Color Supported	800 x 600 / 16.7M, 1024 x 768 / 16.7M, 1280 x 1024 / 65K
Interfaces	1 VGA (15-pin mini D-sub, 1 rear per system) 4 USB2.0 (1 front, 3 rear per system) 4 10GBASE-T LAN connector (RJ-45, 2 rear per module) 4 1000BASE-T LAN connector (RJ-45, 2 rear per module) 2 Management LAN connector (RJ-45, 1 rear per module)	
Server Management	EXPRESSSCOPE Engine 3	
Power Supply	2 x 800 Watt (1 per module, 80 PLUS® Platinum certified) 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz	

CONFIGURATION GUIDE – NEC EXPRESS5800/R320c-M4 for Linux

Model	R320c-M4
Power Consumption (Max. Config, Operating)	1,300 VA / 1,290 Watt
Dimensions (W x D x H)	483.0 x 736.0 x 178 mm / 19.0 x 29.0 x 7.0 in (4U)
Weight (Minimum / Maximum)	45 kg / 51 kg, 99.21 lbs. / 112.44 lbs.
Temperature, Relative Humidity (non-condensing)	Operating: 10° to 35° C / 50° to 95° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%
Regulatory and Safety	FCC, CE, BSMI, CCC, UL, CB, RoHS
Operating Systems	Red Hat® Enterprise Linux® 6.5(x86_64) ² Red Hat® Enterprise Linux® 6.6(x86_64) ^{2,3} Red Hat® Enterprise Linux® 6.7(x86_64) ^{2,3}

¹ Writing software is not provided for this DVD drive.

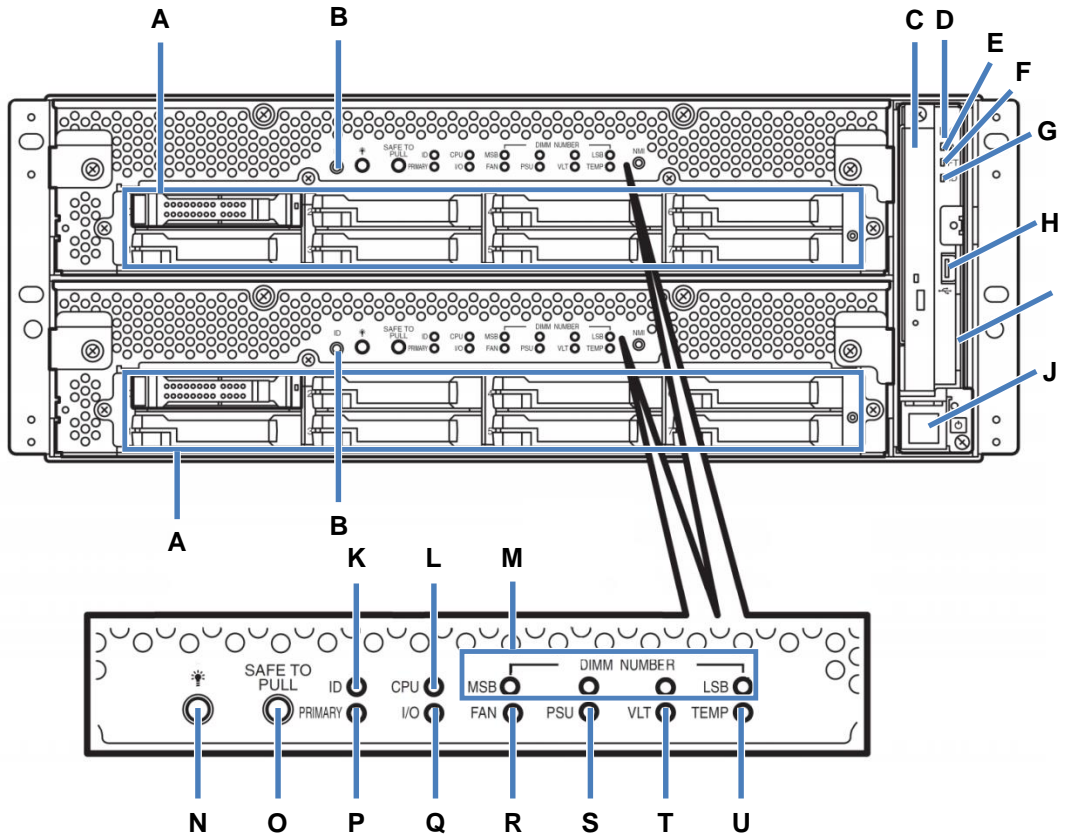
² Xen/KVM (Kernel-based Virtual Machine) is not supported.

³ ft Server Control Software update is required. Contact your sales representative for the update module.

External Views

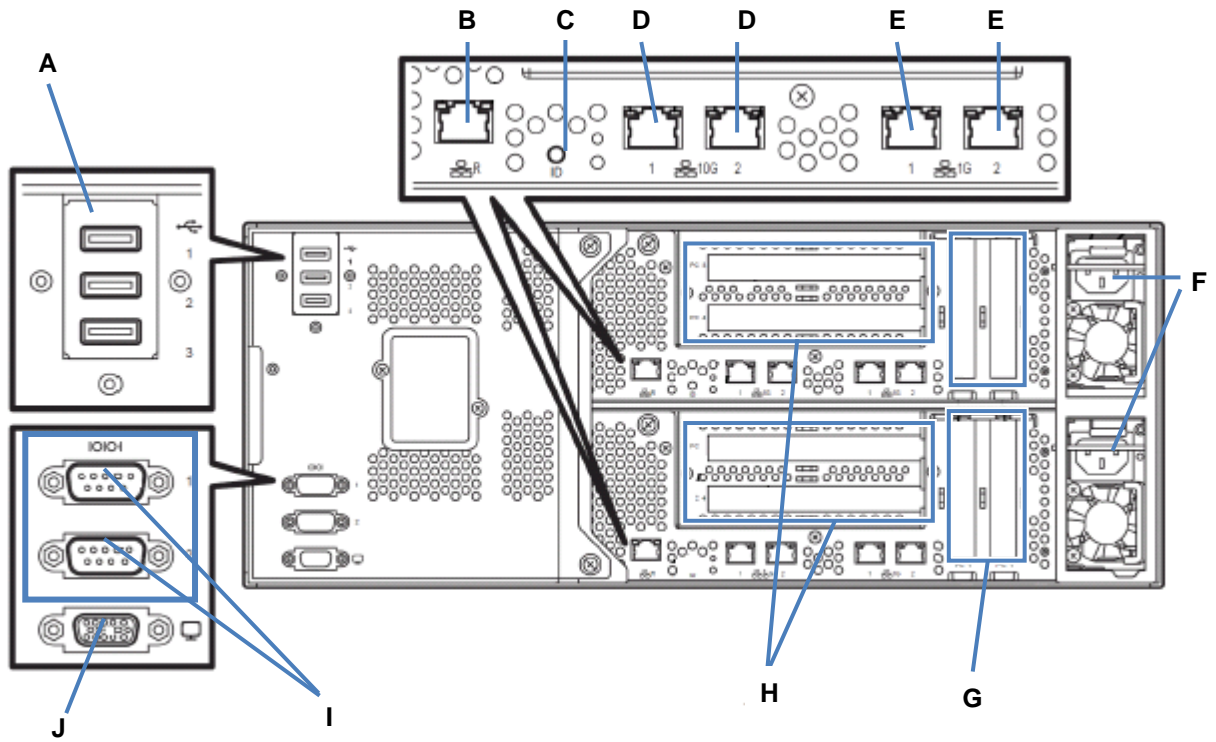
Front and Rear Views

Front View



Legend	
A.	Drive Bays
B.	UID Button
C.	DVD Super Multi Drive
D.	System Power LED
E.	System Status LED
F.	System FT LED
G.	UID LED
H.	USB Connector
I.	Pull-out Tab
J.	Power Button
K.	Module ID LED
L.	CPU Fault LED
M.	Memory Fault LED
N.	Module Power LED
O.	SAFE TO PULL LED
P.	PRIMARY LED
Q.	IO Module Fault LED
R.	Fan Fault LED
S.	PSU Fault LED
T.	DC Power Fault LED
U.	Temperature Fault LED

Rear View



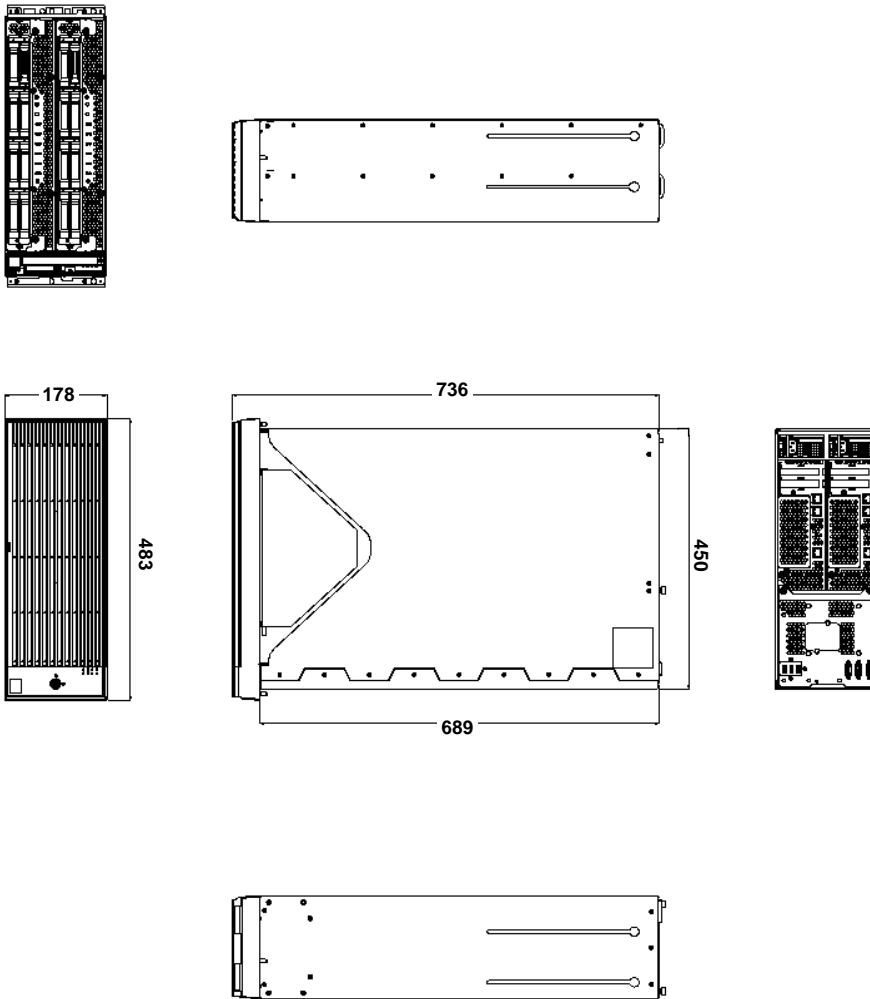
Legend

A.	USB Connectors	F.	AC Inlet
B.	Management LAN Connector	G.	PCI Slots (Low-Profile)
C.	Module ID LED	H.	PCI Slots (Full-Height)
D.	Data LAN Connectors (10GBase-T)	I.	Serial Port Connector ¹
E.	Data LAN Connectors (1000Base-T)	J.	VGA Connector

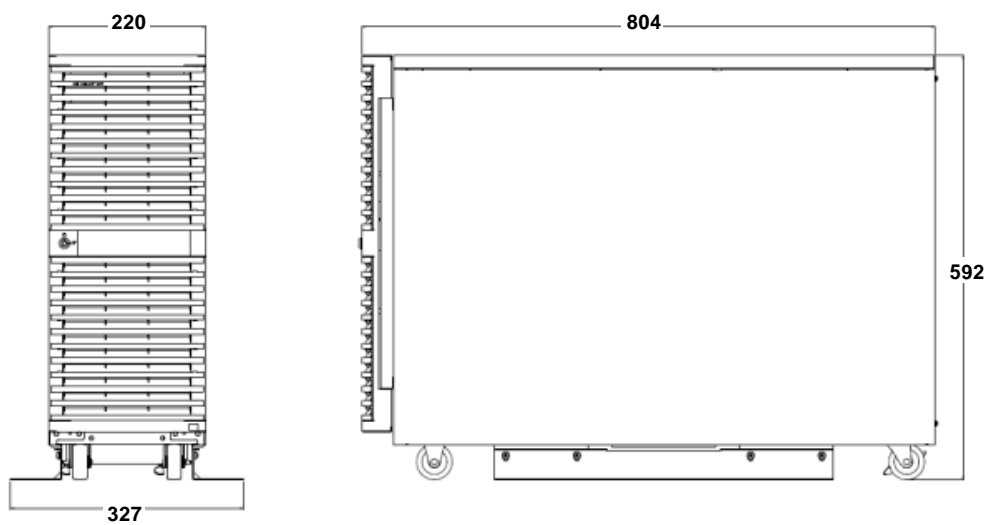
¹ For service personnel only.

Dimensions (mm)

Rack mount

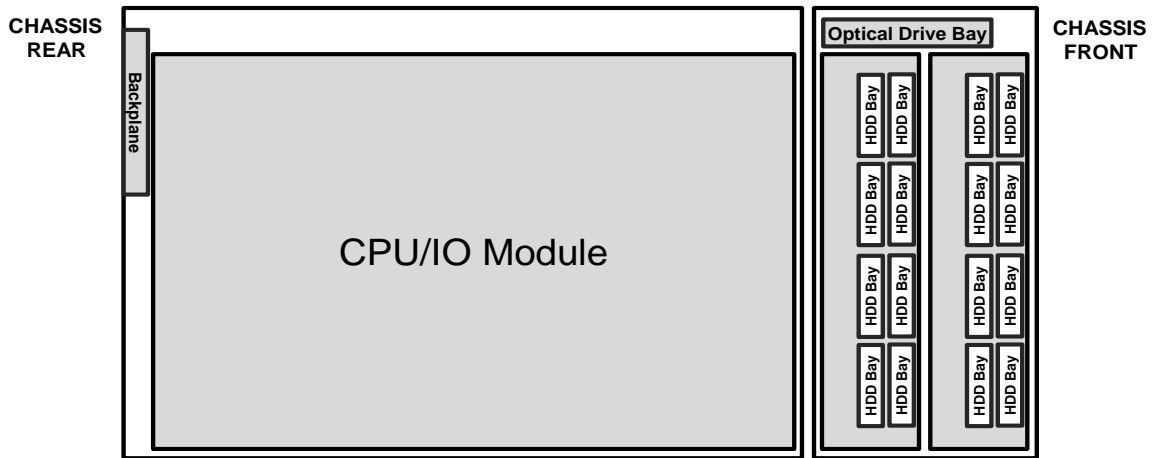


Tower Conversion (Optional)



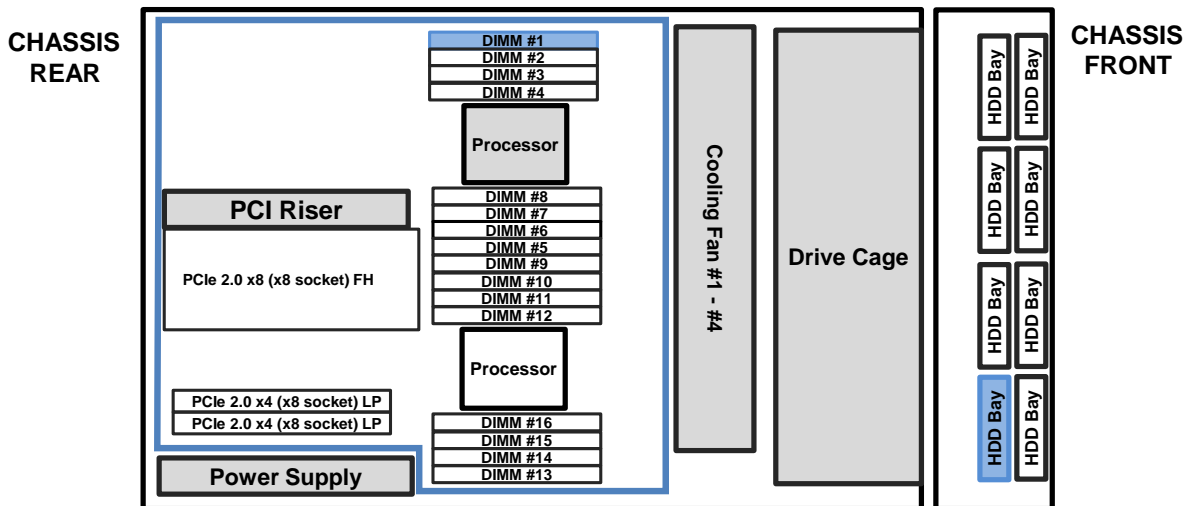
Configuration Diagram

Server

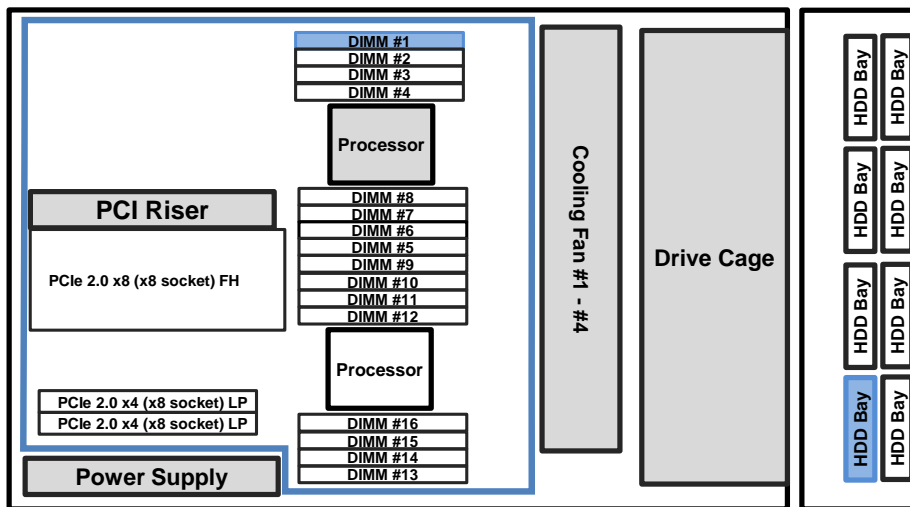


CPU/IO Module

CPU/IO module #0 :



CPU/IO module #1 :



Legend: Minimum required components Standard components

Server Configuration

1 Base Models

Product Name / Description	Part Number
EXPRESS5800/R320c-M4 no RAM, no 2.5-inch HDD Including: Intel Xeon Processor E5-2670, 1 x DVD Super Multi, EXPRESSBUILDER DVD NOTE: - The base model is common for Windows and Linux. Active Upgrade DVD is included but not supported on Linux	N8800-174F

2 2nd Processor

Available logical sockets: 1

Product Name / Description	Part Number
Intel® Xeon® Processor E5-2670 2nd Processor Kit : 2.6 GHz / 8C-16T / 20 MB, 2 processors included	N8801-045

3 Memory

Available logical slots: 8 per processor

Product Name / Description	Part Number
4GB DDR3-1600 REG Memory Kit : 2 x 1 x 4GB DIMM included	N8802-057
32GB DDR3-1600 REG Memory Kit : 2 x 4 x 8GB DIMM included	N8802-058
64GB DDR3-1600 REG Memory Kit : 2 x 4 x 16GB DIMM included	N8802-059

NOTE:

- Minimum one memory kit must be installed.

Memory Configuration Guideline

See the table below for the number of memory kits required in accordance with logical main memory size and number of logical processors. Memory configurations which are not listed below are not supported in the system.

Number of Logical Processors	Logical Main Memory Size	Number of Memory Kits Required			
		4GB	32GB	64GB	
1	4GB ¹	1	-	-	
	8GB	2	-	-	
	12GB	3	-	-	
	16GB	4	-	-	
	20GB	5	-	-	
	24GB	6	-	-	
	28GB	7	-	-	
	32GB	8	-	-	
			-	1	-
	48GB	4	1	-	
	64GB	-	2	-	
	64GB	-	-	1	
	96GB	-	1	1	
	128GB	-	-	2	
	2	4GB ¹	1	-	-
8GB ¹		2	-	-	
12GB ¹		3	-	-	
16GB		4	-	-	
24GB		6	-	-	
32GB		8	-	-	
40GB		10	-	-	
48GB		12	-	-	
56GB		14	-	-	
64GB		16	-	-	
			-	2	-
96GB		8	2	-	
128GB		-	4	-	
			-	-	2
192GB		-	2	2	
256GB	-	-	4		

¹ Interleave is not supported.

4 Internal Hard Disk Drives

Available bays: 8

Category	Product Name / Description	Part Number
SAS HDD	600GB 10K Hot Plug 2.5-inch SAS HDD : 1 x 600GB	N8850-047
	900GB 10K Hot Plug 2.5-inch SAS HDD : 1 x 900GB	N8850-048
	1.2TB 10K Hot Plug 2.5-inch SAS HDD : 1 x 1.2TB	N8850-051
	146.5GB 15K Hot Plug 2.5-inch SAS HDD : 1 x 146.5GB	N8850-049
	300GB 15K Hot Plug 2.5-inch SAS HDD : 1 x 300GB	N8850-050
SAS SSD	200GB Hot Plug 2.5-inch SSD: 1 x 200GB	N8850-052

NOTE:

- Hard drives must be installed in identical pairs to configure RAID 1.

Recommended Partition layout

See the table below for the recommended partition layout.

Pattern	Setting		
	Partition	File system	Size
1	/boot	ext4	512MB ¹
	/var/crash	ext4	24GB ^{2,4}
	swap	swap	2GB - ³
	/	ext4	16GB
	Free area	-	Remaining
2	/boot	ext4	512MB ¹
	/var/crash	ext4	24GB ^{2,4}
	swap	swap	2GB - ³
	/	ext4	16GB
	/home	ext4	Remaining
3	/boot	ext4	512MB ¹
	/var/crash	ext4	24GB ^{2,4}
	swap	swap	2GB - ³
	/	ext4	Remaining

¹ /boot partition size is recommended to be 300MB to 500MB in case of additional installation of the latest kernel including security updates and bug fixes in the future.

² 24GB is required regardless of memory size. Otherwise, ft Server Control Software installation may fail.

³ Required swap partition size differs depending on the installed memory size in the server. See the table below for the memory size and swap capacity.

Memory Size	Swap Capacity
Less than 4GB	2GB
4GB to 16GB	4GB
16GB to 64GB	8GB
64GB to 256GB	16GB

⁴ /var/crash partition for dump is required for ft Server Control Software. It is mandatory for the R320c.

NOTE:

- Only RAID1 is supported for hard drives including system partition. RAID1 or RAID1+0 can be configured for other data drives.

- LVM of hard drives including system partition is not supported. LVM is supported on data drives configured as RAID1 or RAID1+0. However, configuring RAID with LVM logical volumes is not supported.
- Be sure to place /usr partition in the /(root) partition because boot process would be complex if located in any other partition.

Notes for BTO with HDD/SSD

The smallest capacity HDD/SSD is installed in the 1st HDD bay (as system disk) at factory.

5 Optical Drive

Available bays: 1

Product Name / Description	Part Number
Internal DVD Super Multi Drive : 1 x DVD Super Multi drive, not including writing software	(Standard)

6 PCI Card

6.1 LAN Controller

Category	Product Name / Description	Part Number
LAN Controller	1000BASE-T 2ch board kit : 2 x GbE NIC Intel® Gigabit ET Dual Port Server Adapter	N8804-009
	10GBASE-T 1ch Adapter Kit : 2 x 10GbE NIC Intel® X540-T1 NOTE: - Up to one controller per module - Installation in full height slots only supported on R320c-M4 - FCoE functionality is not supported	N8804-011

NOTE:

- For iSCSI (data) connection, only 1000BASE-T ports (Including standard LAN ports) are supported.

6.2 Fibre Channel / SAS Controller

Category	Product Name / Description	Part Number
Fibre Channel Controller	Fibre Channel board kit (8Gbps) : 2 x FC Controller QLogic QLE2560 8Gbps Fibre Channel Adapters NOTE: Installation in full height slots only supported on R320c-M4	N8803-038
SAS Controller	SAS Controller : 1 x SAS Controller LSI SAS9212-4i4e Host Bus Adapter NOTE: Up to one controller per module	N8803-039

NOTE:

- For supported NEC Storage products to connect with N8803-038, contact your sales representative or refer to the NEC Storage WEB site. (<http://www.nec.com/global/prod/storage/>)

7 Other Add-in Components

7.1 Input Devices

Category	Product Name / Description	Part Number
Keyboard	USB Keyboard	N8870-002AF
Mouse	USB Optical Wheel Mouse	N8870-012
Cable	USB cable : 1.5m USB extension cable	K410-177(1A)

8 Add-on Components

8.1 17-inch LCD Console Drawer

Category		Product Name / Description	Part Number
Drawer w/ KVM Switch	Drawer	17inch LCD Console Unit (1U/8port) 17-inch LCD, US 83-keys Keyboard, Optical mouse, 8 port KVM switch, 1U height	N8143-77F
		17-inch LCD Console Drawer (8port) 17-inch LCD, US 83-keys Keyboard, Optical mouse, 8 port KVM switch, 1U height, black	N8143-106F
	Cable	Switch Unit Connection Cable Set (USB, 1.8m) 1.8 m, 1 x 15-pin mini D-SUB to 1 x 15-pin mini D-SUB / 1 x 4-pin USB A	K410-118(1A)
		Switch Unit Connection Cable Set (USB, 3m) 3 m, 1 x 15-pin mini D-SUB to 1 x 15-pin mini D-SUB / 1 x 4-pin USB A	K410-118(03)
		Switch Unit Connection Cable Set (USB, 5m) 5 m, 1 x 15-pin mini D-SUB to 1 x 15-pin mini D-SUB / 1 x 4-pin USB A	K410-118(05)
	Drawer w/o KVM Switch	Drawer	17inch LCD Console Unit 1U 17-inch LCD, US 83-keys Keyboard, Optical mouse, 1U height, 4-pin USB B to 4-pin USB A cable 2m, PS/2 Y-splitter cable 2m, 15-pin mini D-sub VGA cable 2m
17inch LCD Console Unit 1U 17-inch LCD, US 83-keys Keyboard, Optical mouse, 1U height, 4-pin USB B to 4-pin USB A cable 2 m, PS/2 Y-splitter cable 2m, 15-pin mini D-sub VGA cable 2 m, black			N8143-105F
		17inch LCD Console Drawer (1port) 17-inch LCD, US 103-keys Keyboard with 10-key, Touch pad with 3-button, 1U height, 4-pin USB B to 4-pin USB A cable 1.8 m, Two PS/2 cable 1.8 m, 15-pin mini D-sub VGA cable 1.8 m	N8143-84F
		17inch LCD Console Drawer (1port) 17-inch LCD, US 103-keys Keyboard with 10-key, Touch pad with 3-button, 1U height, 4-pin USB B to 4-pin USB A cable 1.8 m, Two PS/2 cable 1.8 m, 15-pin mini D-sub VGA cable 1.8 m, black	N8143-108F
Keypad		Keyboard Unit (JP) JP 108-keys Keyboard with 10-key for N8143-84F 17inch LCD Console Drawer (1port)	N8143-85
		Keyboard Unit (UK) UK 104-keys Keyboard with 10-key, for N8143-84F 17inch LCD Console Drawer (1port)	N8143-87
		Keyboard Unit (JP) JP 108-keys Keyboard with 10-key for N8143-108F 17inch LCD Console Drawer (1port)	N8143-109
		Keyboard Unit (UK) UK 104-keys Keyboard with 10-key, for N8143-108F 17inch LCD Console Drawer (1port)	N8143-111

8.2 KVM Switch

Category	Product Name / Description	Part Number
KVM Switch	Server Switch Unit (8 server) 1U USB 8 port KVM switch	N8191-12F
	Server Switch Unit (8 server) 1U USB 8 port KVM switch, black	N8191-14F
Cable	KVM	
	Switch Unit Connection Cable Set (USB,1.8m) 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
	Switch Unit Connection Cable Set (USB,3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
	Switch Unit Connection Cable Set (USB,3m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)
Cascading	Switch Unit Connection Cable 1.8 m 1.8 m, 1 x 15-pin mini D-sub - 1x 15-pin mini D-Sub / 2x PS/2	K410-119(1A)

8.3 Flash FDD

Order 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

8.4 Operating System

Red Hat® Enterprise Linux® 6.5, 6.6, 6.7 (x86_64) is supported on the R320c series. Purchase the OS and support service from a Red Hat reseller directly.

8.5 ft Server Control Software

Product Name / Description	Part Number
ft Server Control Software 9.0.5 for Red Hat Enterprise Linux 6.5	UL4349-008E

NOTE:

- ft Server Control Software for Linux is not included in the base model. Be sure to order UL4349-008E to install Red Hat Enterprise Linux 6.5 on R320c series.
- For update module for Red Hat Enterprise Linux 6.6 or 6.7, please contact your sales representative.

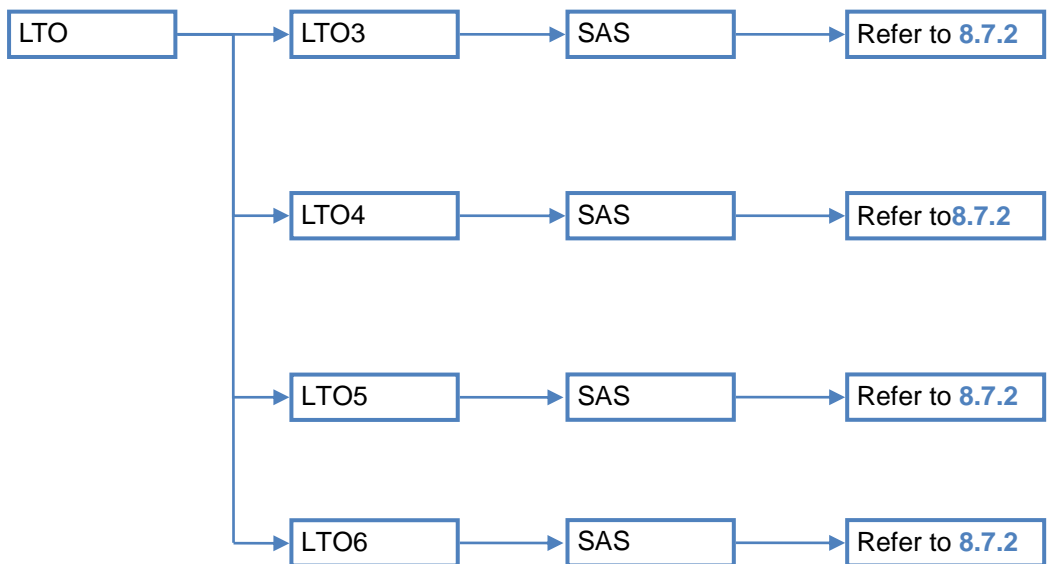
8.6 Tower Conversion Kit

Product Name / Description	Part Number
Tower Conversion Kit 23 inch height pedestal with front bezel	N8843-004

8.7 External Tape Drive

8.7.1 Tape Drive Selection

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



8.7.2 LTO / SAS

Category	Product Name / Description	Part Number
Controller Required	SAS Controller LSI SAS9212-4i4e Host Bus Adapter 6Gb/s SAS, Int. 4 / Ext. 4, 7-pin SATA / SFF-8088, PCIe 2.0 x8, LP/FH NOTE: Up to one controller per module	N8803-039
External Cable Required	External SAS cable 2 m, for Tape Drive Enclosure connection	K410-191(02)
Tape Enclosure Required	1U Device Expansion Unit 2 x 5-inch media bays	N8141-69F
Power Supply Recommended	Power Unit non-hot plug power supply	N8181-124F
Internal Cable	SAS Cable For 1U Device Expansion Unit internal connection NOTE: Required one per each tape drive.	K410-335(00)
Drive 2 bays available	Internal LTO (SAS) LTO3, Half height, Native capacity 400GB, black	N8151-126
	Internal LTO (SAS) LTO4, Half height, Native capacity 800GB, black	N8151-127
	Internal LTO (SAS) LTO5, Half height, Native capacity 1500GB, black	N8151-128
	Internal LTO (SAS) LTO6, Half height, Native capacity 2.5 TB, black	N8151-129

8.7.3 Notes for Double Backup

In a single backup configuration, in case a CPU/IO module or backup device fails, backup is not possible until the failed part is repaired or replaced. If this does not meet your system requirements, consider a double backup configuration.

Refer to the following notes on double backup configuration.

- When configuring two sets of a SAS controller, a SAS cable and a backup device, two backup devices are recognized separately by the OS. When scheduling an automatic backup job, make a job for each backup device so that the other backup device can backup in case one device fails.

8.7.4 Supported Backup Software

See the table below for the supported backup software on NEC EXPRESS5800/R320c.

Tape drive		Backup software	
Product Name / Description	Part Number	NetVault 9.2	NetVault 10.0
		RHEL6.5 or later	RHEL6.5 or later
Internal LTO (SAS) LTO3, Half height, Native capacity 400 GB	N8151-102/126	✓	✓
Internal LTO (SAS) LTO4, Half height, Native capacity 800 GB	N8151-90/127	✓	✓
Internal LTO (SAS) LTO5, Half height, Native capacity 1.5 TB	N8151-103/128	✓	✓
Internal LTO (SAS) LTO6, Half height, Native capacity 2.5 TB	N8151-106/129	✓	✓

References

Server Management

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

Hardware monitoring	Temperature/voltage/power/fan	✓
	HDD	-
	Degeneration (memory/hard drive)	-
	Hardware configuration collection	✓
	Hardware event log collection	✓
Boot monitoring	Booting, BIOS/POST stall, OS stall, shutdown	✓
Alerting	HW error, Boot error and OS panic (by SNMP, E-Mail)	✓
Remote KVM (via LAN)	POST/BIOS setup, DOS utility	✓
	Panic screen, Boot screen	✓
	Text-based screen (OS console)	✓
	GUI-based screen (OS console)	✓
Remote control (via LAN)	Remote reset/power on-off/ dump	✓
	Power Capping	-
	BIOS/BMC FW update	-
	Remote BIOS setting	-
	OS shutdown	✓
	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)	-	
Others	Set automatic IP address via DNS/DHCP	✓
	LDAP/Active Directory verification/user control	✓
	Clock synchronization of main unit and the RTC	✓
	Access log collection	✓
Industry standard	IPMI	2.0

Supported PCI Cards and Installable Slots

Part Number	Product Name	Slots				Notes
	Slot # :	#1	#2	#3	#4	
	PCI Slot:	x4	x4	X8	X8	
	Card height:	LP	LP	FH	FH	
	Slot type:	x8	x8	x8	x8	
N8804-009	1000BASE-T 2ch board kit	✓	✓	✓	✓	
N8804-011	10GBASE-T 1ch board set	-	-	✓	✓	Max. 1
N8803-038	Fibre Channel board kit	-	-	✓ ¹	✓ ¹	
N8803-039	SAS board	✓ ¹	✓ ¹	✓ ¹	✓ ¹	Max. 1

¹ Not installable when using Tower Conversion Kit.

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

Revision History

Revision	Date	Description
3.1	2016.4.27	Others: Added Red Hat® Enterprise Linux® 6.7(x86_64) to the list of operating system supported
3.0	2015.12.18	New products added: 1U Device Expansion Unit / N8141-69F Power Unit / N8181-124F Discontinued product deleted: 2U Tape Drive Enclosure / N8141-75F Power Supply / N8181-54F Others: Add Red Hat® Enterprise Linux® 6.6(x86_64) to the list of operating system supported Added notes for Internal Hard Disk Drives
2.0	2015.4.28	New products added: 17-inch LCD Console Drawer (8port) N8143-106F 17inch LCD Console Unit 1U N8143-105F 17inch LCD Console Drawer (1port) N8143-108F Keyboard Unit (JP) N8143-109 Keyboard Unit (UK) N8143-111 Server Switch Unit (8 server) N8191-14F Flash FDD N8160-96 2U Tape Drive Enclosure N8141-75F SAS cable K410-335(00) Internal LTO (SAS) N8151-126/ N8151-127/ N8151-128/ N8151-129 Discontinued products removed: Flash FDD N8160-86 2U Tape Drive Enclosure N8141-59F Internal SAS cable K410-249(00) Internal LTO (SAS) N8151-102/ N8151-90/ N8151-103/ N8151-106
1.0	2014.10.24	Initial release