

NEC EXPRESS5800/R320e-E4

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 v3 product family
- Up to 512GB of high speed DDR4-1866 memory

Specification

Model	R320e-E4	
Part Number	N8800-201F	
Processor	Type	Intel® Xeon® processor E5-2630 v3
	Clock speed	2.40 GHz
	Logical Number of Processors	1 or 2
	Cache	20MB
	Cores and Threads	8C / 16T
Chipset	Intel® C612 Chipset with GeminiEngine™	
Memory	Type	DDR4-2133 Registered DIMM (8/16GB DIMM), DDR4-2400 Registered DIMM (32GB DIMM)
	Memory Clock	1866MHz
	Logical Standard Capacity	0GB
	Logical Maximum Capacity	512GB (16 x 32 GB)
	Memory protection	ECC, x4 SDDC
Internal Storage	Standard Capacity	0GB
	Maximum Logical Capacity	HDD : SAS 9.6 TB (8×1.2TB) SSD : SAS 1.6 TB (8×200GB)
	Disk Controller	SAS: 12Gb/s (Standard)
	RAID	SAS : RAID 1 (Standard)
	Hot Plug	Supported
	Optical Disk Drive	DVD Super Multi drive ¹
	Optical Drive Bays [free]	1 [0]
Expansion Slots [free]	Standard	Total: 2 slots available 2 Low-profile PCIe x4 Gen 3 (x8 connector)
	Video	Controller (VRAM) Integrated in Server Management Controller (32MB) Resolution / Color Supported 800 x 600,1024 x 768, 1280 x 1024,1,600 x 1,200/ 16.7M
Interfaces	1 VGA (15-pin mini D-sub, 1 rear per system) 4 USB2.0 (1 front, 3 rear per system) 4 1000BASE-T LAN connector (RJ-45, 2 rear per module) 2 Management LAN connector (RJ-45, 1 rear per module) 2 USB3.0 (option, for backup devices)	
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	

Model		R320e-E4
Power Consumption	(Max. Config, Operating)	1,430 VA / 1,420 Watt
Dimensions (W x D x H)		483.0 x 734.0 x 176 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 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, BSMI, CCC, UL, CB, RoHS
Operating Systems		Red Hat® Enterprise Linux® 7.2(x86_64) ²

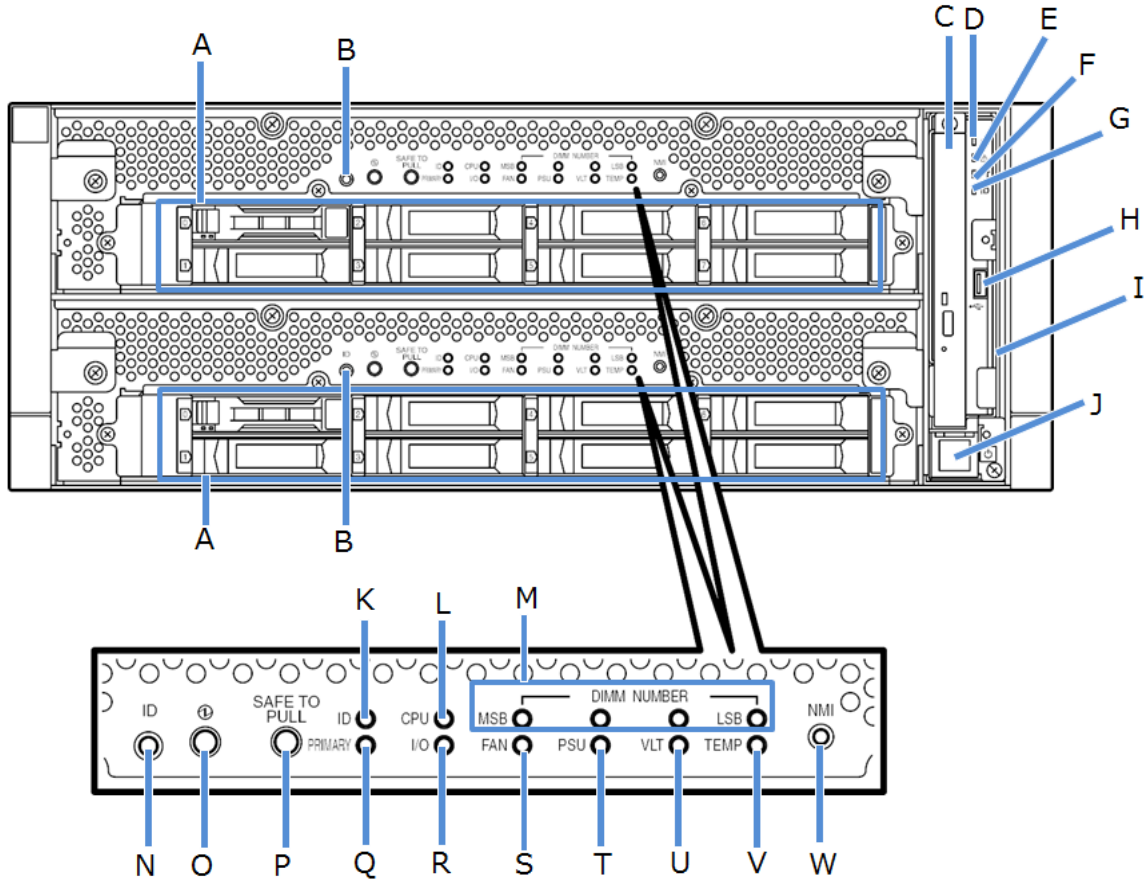
¹ Writing software is not provided for this DVD drive.

² Virtualization (KVM/LXC) is not supported.

External Views

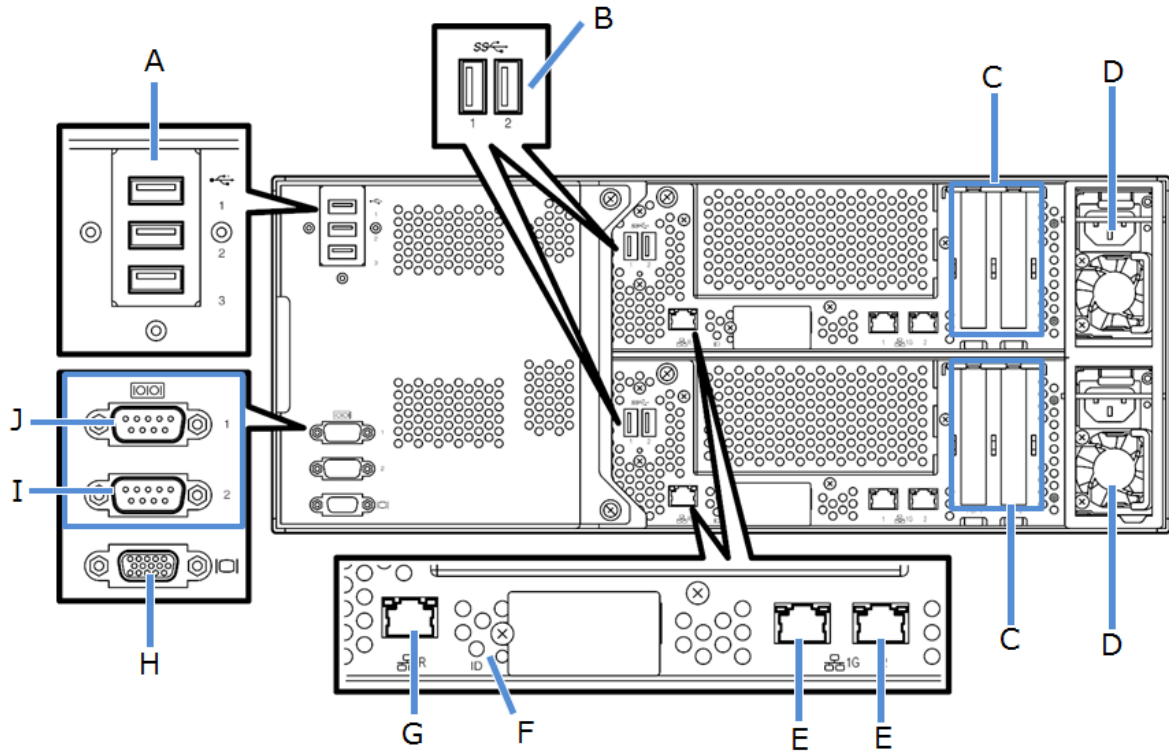
Front and Rear Views

Front View



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

Rear View

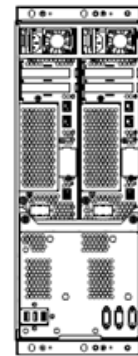
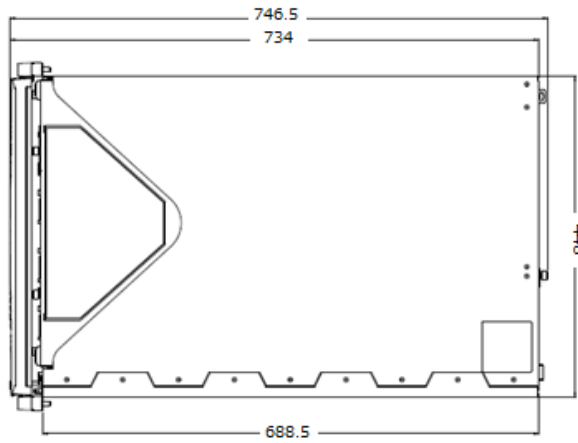
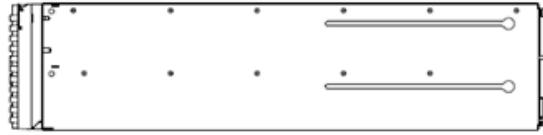
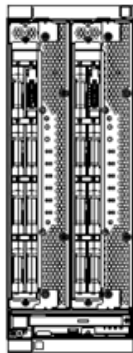


Legend			
A.	USB Connectors	F.	Module ID LED
B.	USB Connectors (option, for backup use)	G.	Management LAN Connector
C.	PCI Slots (Low-Profile)	H.	VGA Connector
D.	Power supply unit	I.J.	Serial Port Connector ¹
E.	Data LAN Connector		

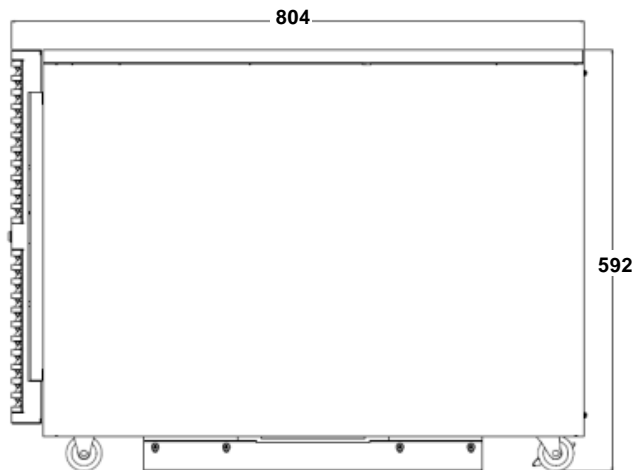
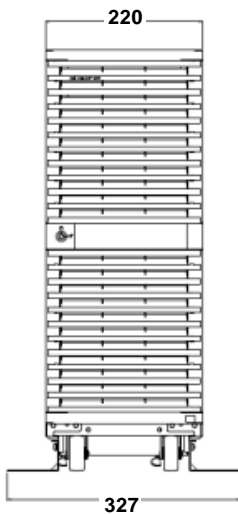
¹ For service personnel only.

Dimensions (mm)

Rack mount

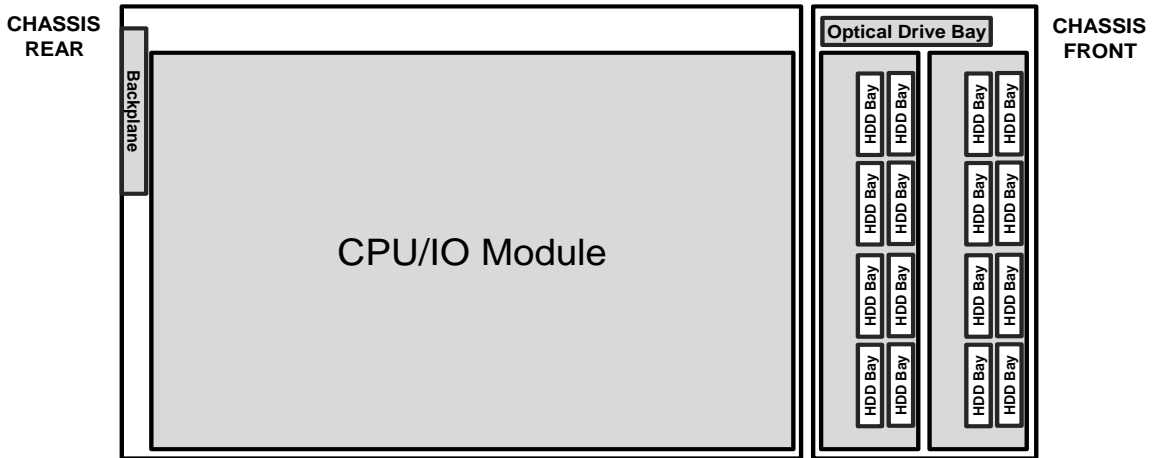


Tower Conversion (Optional)



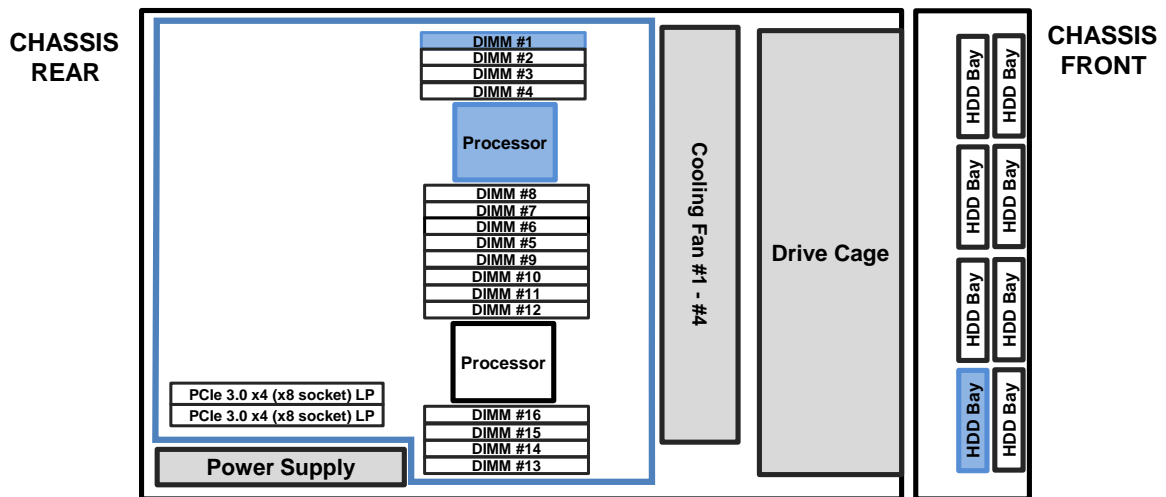
Configuration Diagram

Server

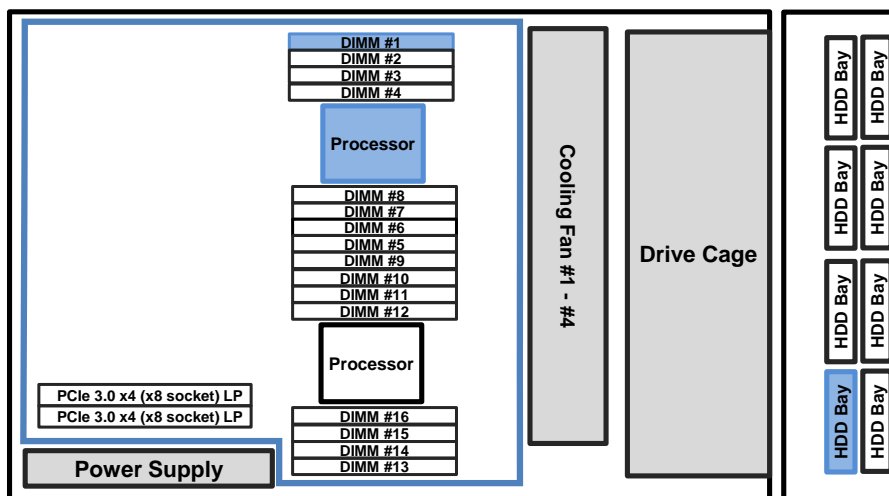


CPU/IO Module

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/R320e-E4(8C/E5-2630v3) no RAM, no 2.5-inch HDD Including: Intel Xeon Processor E5-2630 v3, 1 x DVD Super Multi, EXPRESSBUILDER DVD NOTE: - The base model is common for Windows and Linux. For Linux installation, ft Server Control Software for Red Hat Enterprise Linux 7.2 is required separately.	N8800-201F
Express5800/R320e-E4(8C/E5-2630v3) no RAM, no 2.5-inch HDD Including: Intel Xeon Processor E5-2630 v3, 1 x DVD Super Multi, EXPRESSBUILDER DVD, ft Server Control Software for Red Hat Enterprise Linux 7.2. NOTE: - This is a set product of N8800-201F and UL4349-00AE.	NP8800-201FP2

2 2nd Processor

Available logical sockets: 1

Product Name / Description	Part Number
Xeon E5-2630v3 Processor Kit : 2.40 GHz / 8C-16T / 20 MB, 2 processors included	N8801-048

3 Memory

Available logical slots: 8 per processor

Product Name / Description	Part Number
8GB DDR4-1866 REG Memory Kit : 2 x 1 x 8GB DIMM included	N8802-063
64GB DDR4-1866 REG Memory Kit : 2 x 4 x 16GB DIMM included	N8802-064
128GB DDR4-2400 REG Memory Kit : 2 x 4 x 32GB DIMM included	N8802-068

NOTE:

- Minimum one memory kit must be installed.
- N8802-068 and N8802-065 can't be mixed.

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. 16GB or more memory is recommended for Linux on R320e. At least 16GB is required when installing Fibre Channel controller.

Number of Logical Processors	Logical Main Memory Size	Number of Memory Kits Required			
		8GB	64GB	128GB	
1	8GB ¹	1	-	-	
	16GB	2	-	-	
	24GB	3	-	-	
	32GB	4	-	-	
	48GB	6	-	-	
	64GB	8	-	-	
			-	1	-
	96GB	4	1	-	
	128GB	-	2	-	
			-	-	1
	256GB	-	-	2	
2	8GB ¹	1	-	-	
	16GB ¹	2	-	-	
	24GB ¹	3	-	-	
	32GB	4	-	-	
	48GB	6	-	-	
	64GB	8	-	-	
	96GB	12	-	-	
	128GB	16	-	-	
			-	2	-
		256GB	-	4	-
		-	-	2	
	512GB	-	-	4	

¹ Interleave is not supported.

4 Internal Hard Disk Drives

Available bays: 8

Category	Product Name / Description	Part Number
SAS HDD	300GB 15K Hot Plug 2.5-inch SAS HDD : 1 x 300GB	N8850-063
	600GB 15K Hot Plug 2.5-inch SAS HDD : 1 x 600GB	N8850-064
	900GB 10K Hot Plug 2.5-inch SAS HDD : 1 x 900GB	N8850-065
	1.2TB 10K Hot Plug 2.5-inch SAS HDD : 1 x 1.2TB	N8850-066
SAS SSD (ME)	200GB Hot Plug 2.5-inch SSD: 1 x 200GB	N8850-067

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	Size	File system
1	/boot/efi	200MB	EFI System Partition
	/boot	1024MB	ext4 ³
	/var/crash	16GB	ext4 ⁴
	swap	⁵	swap
	/	32GB	ext4
	Free space	Remaining	-
2	/boot/efi	200MB	EFI System Partition
	/boot	1024MB	ext4 ³
	/var/crash	16GB	ext4 ⁴
	swap	⁵	swap
	/	32GB	ext4
	/home	Remaining	ext4
3	/boot/efi	200MB	EFI System Partition
	/boot	1024MB	ext4 ³
	/var/crash	16GB	ext4 ⁴
	swap	⁵	swap
	/	Remaining	ext4

¹ The actual partition size may slightly differ from the table above. (Because of the cylinder boundary for partition)

² The default file system is xfs, but ext4 is recommended which has long operational experience.

³ To add the latest kernel with security patches and other updates, adequate free space in this partition is needed. At least 300 to 500MB partition size is recommended.

⁴ /var/crash partition for dump is required for ft Server Control Software. The size must be 16 GB regardless of the system memory capacity.

⁵ The recommended swap partition size is as follows:

Memory Size	Swap Capacity
8 GB	8GB
16 GB to 64GB	Half of the memory size
64GB to 512GB	Depends on the load

NOTE:

- The swap may not be used so much when the memory size is large. It depends on the applications and operations.
- Use the free command to confirm the status of swap in operation. If usage rate of swap is high, extend the swap space or add memory.

- 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® Ethernet Server Adapter I350-T2V2	N8804-012
	10GBASE-T 1ch Adapter Kit : 2 x 10GbE NIC Intel® X540-T1 NOTE: - Up to one controller per module - FCoE functionality is not supported	N8804-011

NOTE:

- For iSCSI (data) connection, NEC Storage M110 and M310 are supported. For NEC Storage, contact your sales representative or refer to the NEC Storage WEB site. (<http://www.nec.com/global/prod/storage/>)

6.2 Fibre Channel / SAS Controller

Category	Product Name / Description	Part Number
Fibre Channel Controller	Fibre Channel 1ch Adapter Kit : 2 x FC Controller QLogic QLE2670 16Gbps Fibre Channel Adapters NOTE: - At least 16GB of logical memory is required when installing N8803-040F.	N8803-040F
SAS Controller	SAS Controller : 1 x SAS Controller LSILogic SAS9300-8e 12Gbps Host Bus Adapter NOTE: - K410-322(02) SAS Cable is required for tape drive connection	N8803-041

NOTE:

- For supported NEC Storage products to connect with N8803-040F, 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 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 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, black	N8143-108F
	Keypad Keyboard Unit (JP) JP 108-keys Keyboard with 10-key for N8143-108F 17inch LCD Console Drawer (1port)	N8143-109
	Keyboard Unit (UK) UK 104-keys Keyboard with 10-key, for N8143-108F 17inch LCD Console Drawer (1port)	N8143-111

8.2 KVM Switch

Category	Product Name / Description	Part Number
KVM Switch	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	K410-119(1A)
1.8 m, 1 x 15-pin mini D-sub - 1x 15-pin mini D-Sub / 2x PS/2	

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® 7.2 (x86_64) is supported on the R320e 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 11.0.2 for Red Hat Enterprise Linux 7.2	UL4349-00AE

NOTE:

- ft Server Control Software for Linux is not included in the base model. Be sure to order UL4349-00AE to install Red Hat Enterprise Linux 7.2 on R320e series.

8.6 Tower Conversion Kit

Product Name / Description	Part Number
Tower Conversion Kit 23 inch height pedestal with front bezel	N8843-005

8.7 Dust Proof Filter

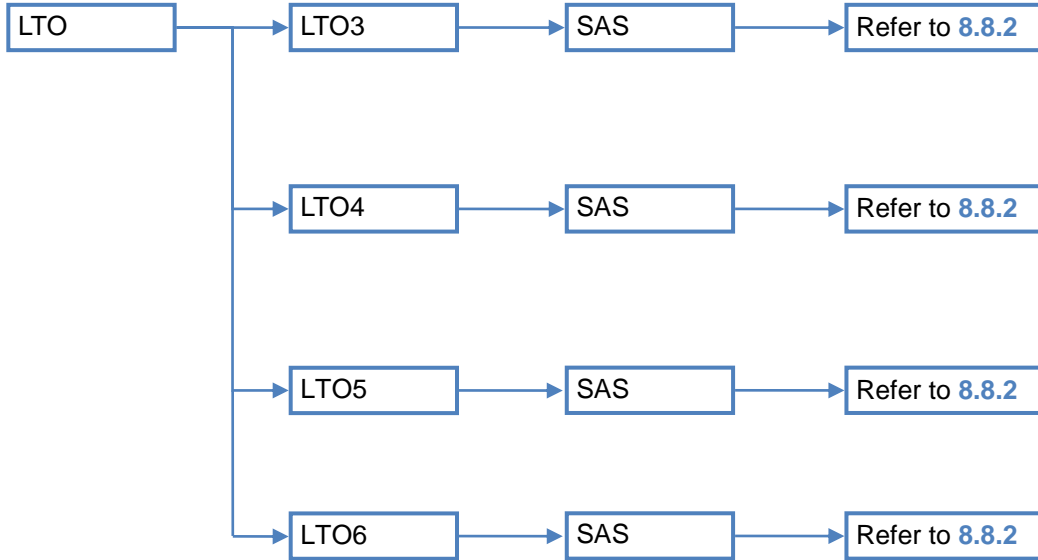
The server supports the dust resistant feature. Choose the following kit to install the system in dusty places.

Category	Product Name / Description	Part Number
Filter	4U-FT Dust Filter For R320e Dust Proof filter 10 pcs, attachment brackets for the front bezel included	N8847-002

8.8 External Tape Drives

8.8.1 Tape Drive Selection

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



8.8.2 LTO / SAS

Category	Product Name / Description	Part Number
Controller Required	SAS Controller 1 x LSILogic SAS9300-8e 12Gb/s SAS, 8(SFF-8644), PCIe3.0(x8), Low Profile / Full Height	N8803-041
External Cable Required	External SAS cable 2 m, for Tape Drive Enclosure connection	K410-322(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
	Internal LTO (SAS) LTO7, Half height, Native capacity 6 TB, black	N8151-136

8.8.3 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.

8.8.4 Supported Backup Software

See the table below for the supported backup software on NEC EXPRESS5800/R320e.

Tape drive		Backup software
Product Name / Description	Part Number	NetVault 11
		RHEL7.2 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	✓
Internal LTO (SAS) LTO7, Half height, Native capacity 6 TB, black	N8151-136	✓

8.8.5 RDX

Category	Product Name / Description	Part Number
Internal Cable <i>Required</i>	Internal USB Cable 1 x Internal USB Cable for USB3.0	K410-349(00)
External Cable <i>Required</i>	External USB Cable 1.17 m, 1 x external USB3.0 to 1 x USB3.0 device, mount bracket included	K410-307(1A)
Tape Enclosure <i>Required</i>	1U Device Expansion Unit 2 x 5-inch media bays	N8141-69F
Power supply <i>Recommended</i>	Power Unit non-hot plug power supply	N8181-124F
Drive <i>Required</i>	Internal RDX (USB) RDX(USB), installed in N8141-69F 1U Device Expansion Unit	N8151-125

Data cartridge:

- RDX Cartridge (500GB) [N8153-02]
- RDX Cartridge (1TB) [N8153-03]
- RDX Cartridge (2TB) [N8153-09]
- RDX Cartridge (3TB) [N8153-10]

NOTE:

- Do not boot the OS from RDX. Remove the RDX from boot order or set the lowest priority on the BIOS setup menu.
- The eject button may be disabled when the OS is running.
- Refer to the User’s guide of RDX for the supported file system.
- For backup software, NetVault 11 has been tested.
- Backup/restore by Linux standard commands has been tested.
- Please do not use RDX for other purposes than backup/restore.

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)	✓
	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	
	PCI Slot:	x4	x4	
	Card height:	LP	LP	
	Slot type:	x8	x8	
N8804-012	1000BASE-T 2ch board kit	✓	✓	
N8804-011	10GBASE-T 1ch board set	✓	✓	Max. 1
N8803-040F	Fibre Channel board kit	✓ ¹	✓ ¹	
N8803-041	SAS board	✓ 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
2.1	2017.10.31	New products added: 128GB DDR4-2400 REG Memory Kit / N8802-068 Discontinued product deleted: 128GB DDR4-1866 LR Memory Kit / N8802-065
2.0	2016.10.03	New products added: Internal LTO (SAS) / N8151-136 RDX Cartridge (3TB) / N8153-10
1.0	2016.08.19	Initial release