

NEC EXPRESS5800/R320e-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 v3 product family
- Up to 512GB of high speed DDR4-1866 memory

Specification

| Model | R320e-M4 | |
|------------------------|---|--|
| Part Number | N8800-202F | |
| Processor | Type | Intel® Xeon® processor E5-2670 v3 |
| | Clock speed | 2.30 GHz |
| | Logical Number of Processors | 1 or 2 |
| | Cache | 30 MB |
| | Cores and Threads | 12C / 24T |
| 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] | Logical Disk Drive Bays [free] | 8 [8] |
| | Standard | Total: 4 slots available 2 Low-profile PCIe x4 Gen 3 (x8 connector) 2 Full-height PCIe x8 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 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) 2 USB3.0(option, for backup devices) | |
| Server Management | EXPRESSSCOPE Engine 3 | |

| Model | R320e-M4 |
|--|---|
| Power Supply | 2 x 800 Watt (1 per module, 80 PLUS® Platinum certified) 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz |
| 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 |

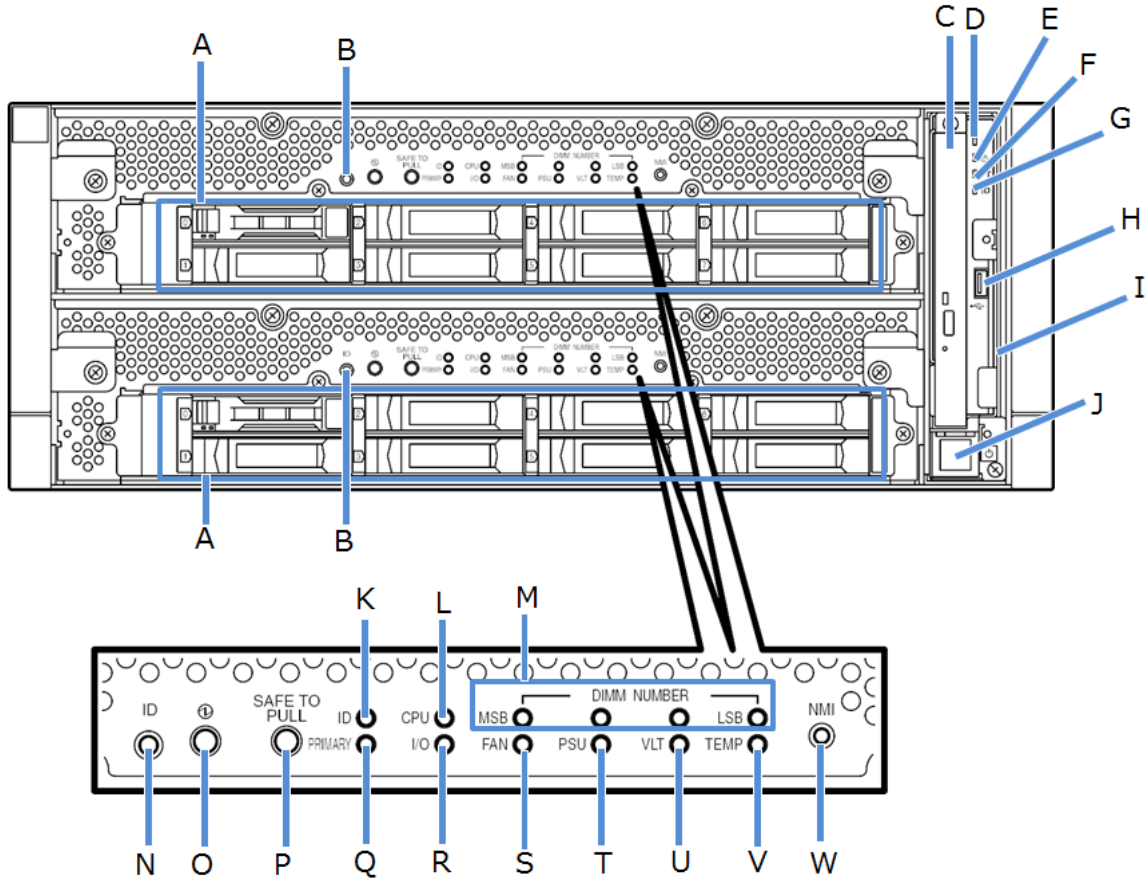
¹ Writing software is not provided for this DVD drive.

² Virtualization (KVM/LXC) is not supported.

External Views

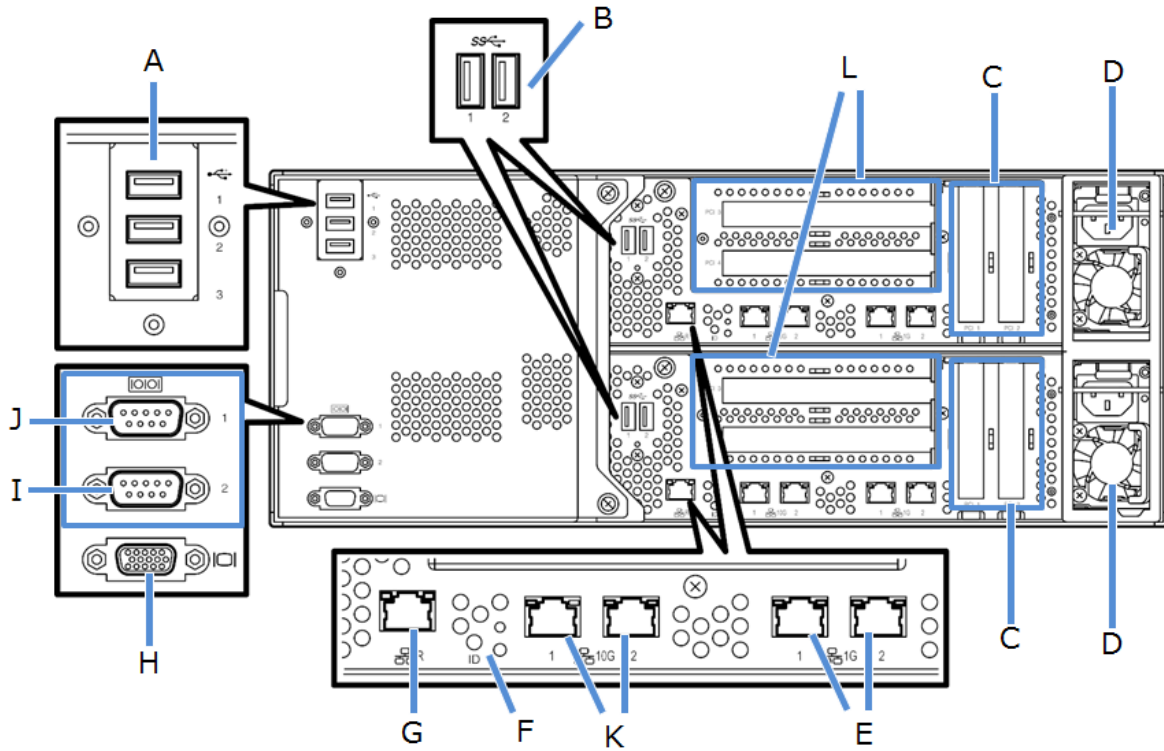
Front and Rear Views

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

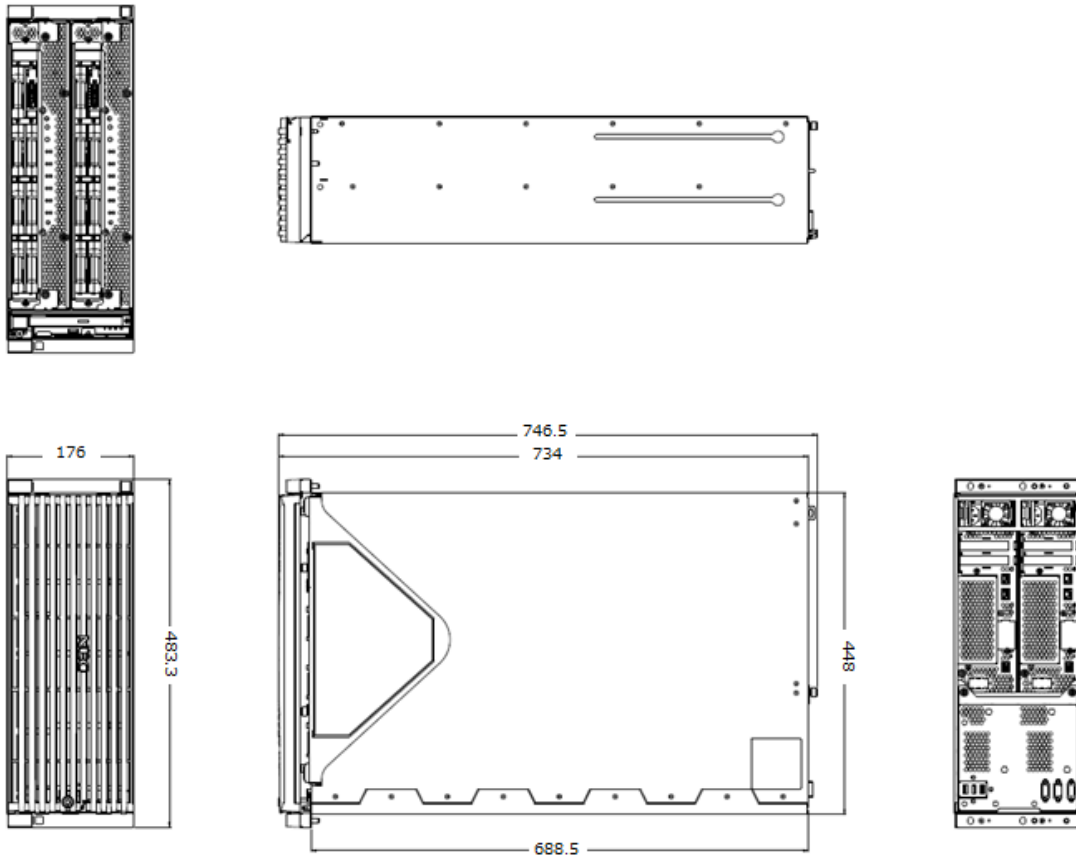


| Legend | | | |
|--------|---|------|------------------------------------|
| A. | USB Connectors | G. | Management LAN Connector |
| B. | USB Connectors (option, for backup use) | H. | VGA Connector |
| C. | PCI Slots (Low-Profile) | I.J. | Serial Port Connector ¹ |
| D. | Power supply unit | K. | Data LAN Connector (10GBase-T) |
| E. | Data LAN Connector (1000Base-T) | L. | PCI Slots (Full-height) |
| F. | Module ID LED | | |

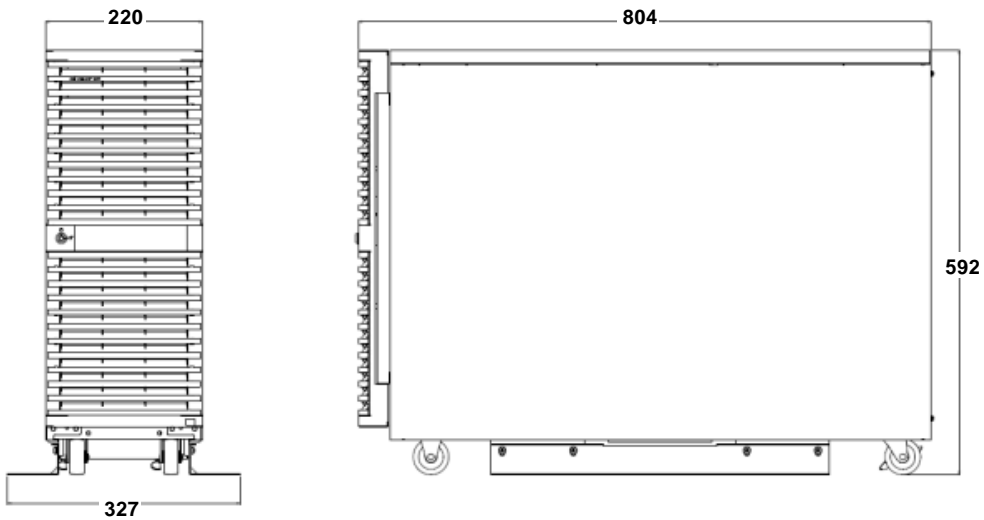
¹ For service personnel only.

Dimensions (mm)

Rack mount

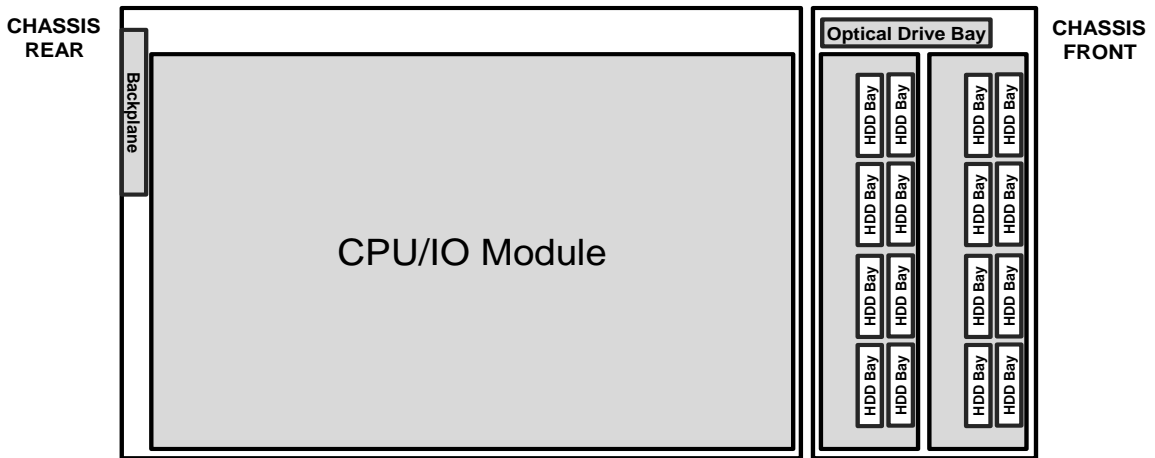


Tower Conversion (Optional)



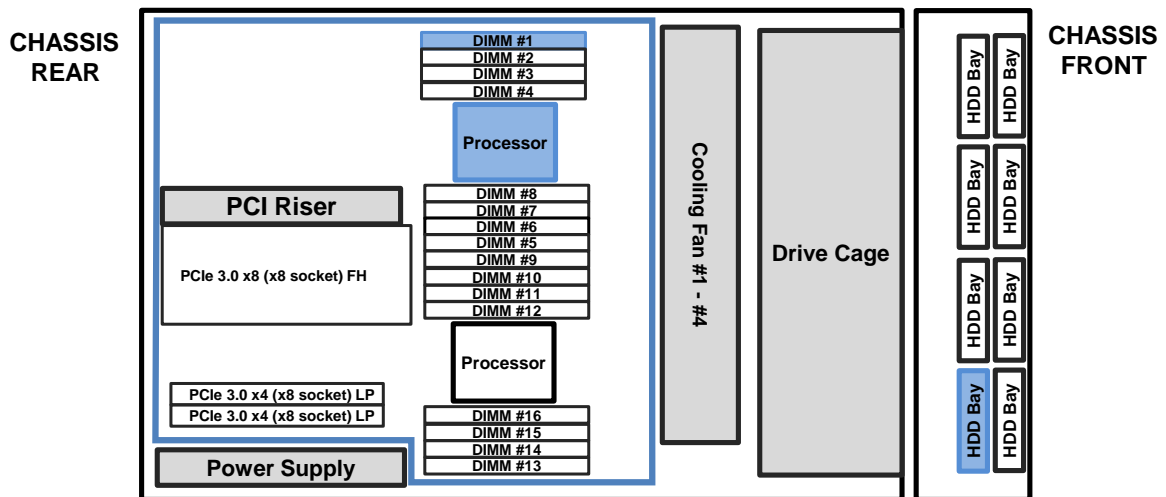
Configuration Diagram

Server

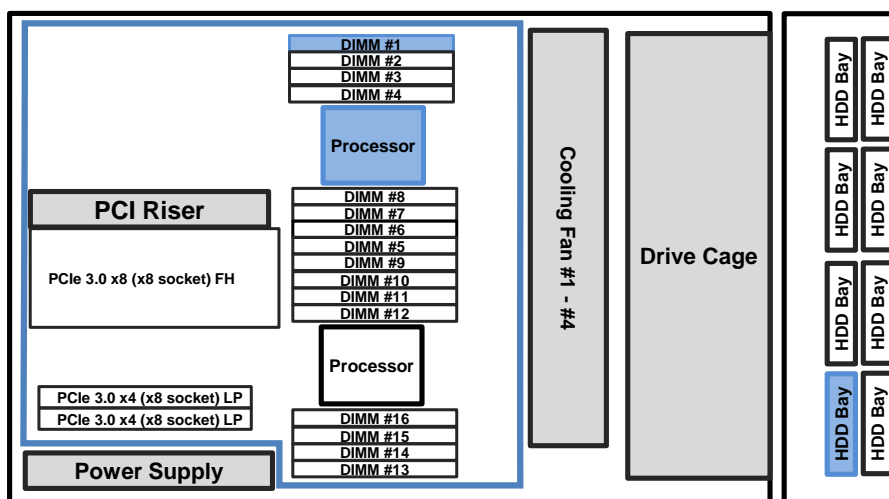


CPU/IO Module

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-M4(12C/E5-2670v3) no RAM, no 2.5-inch HDD Including: Intel Xeon Processor E5-2670 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. | N8800-202F |
| Express5800/R320e-M4(12C/E5-2670v3) no RAM, no 2.5-inch HDD Including: Intel Xeon Processor E5-2670 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 N8800-202F and UL4349-00AE. | NP8800-202FP2 |

2 2nd Processor

Available logical sockets: 1

| Product Name / Description | Part Number |
|---|-------------|
| Xeon E5-2670v3 Processor Kit : 2.30 GHz / 12C-24T / 30 MB, 2 processors included | N8801-049 |

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.

Required System Disk Capacity

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 - Installation in full height slots only supported on R320e-M4 - 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

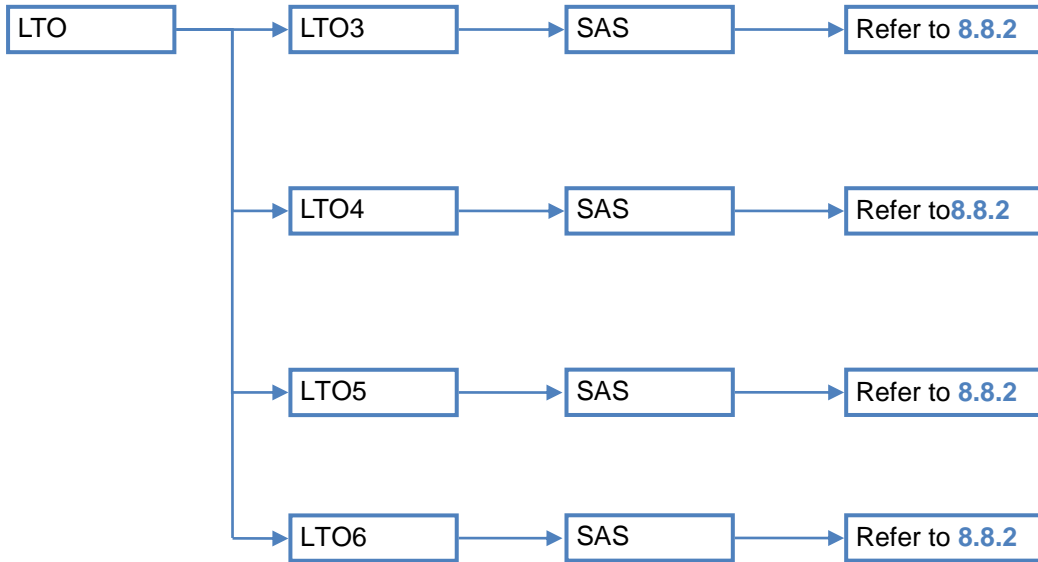
The server supports the dust resistant feature. Choose the following kit to install the system in dusty places.

| 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 <i>Required</i> | SAS Controller 1 x LSI Logic SAS9300-8e 12Gb/s SAS, 8(SFF-8644), PCIe3.0(x8), Low Profile / Full Height | N8803-041 |
| External Cable <i>Required</i> | External SAS cable 2 m, for Tape Drive Enclosure connection | K410-322(02) |
| 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 |
| Internal Cable | SAS Cable For 1U Device Expansion Unit internal connection NOTE: Required one per each tape drive. | K410-335(00) |
| Drive <i>2 bays available</i> | 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) | ✓ |
| Others | Scheduling (without UPS) | ✓ |
| | 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 | |
| N8804-012 | 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 | ✓ 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 |