NEC Express5800 PRODUCT GUIDE

NEC Express5800/120Rd-1

NEC Corporation

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PRODUCT OVERVIEW

NEC Express5800/120Rd-1, successor of 120Rc-1, is an innovative slim rack-dense server designed to deliver **maximum performance in a very limited space**. It is an easy-to-deploy general purpose solution ideal for ISPs, ASPs, dot-coms companies and enterprises looking for a front-end Web application hosting server or a network infrastructure server.

NEC Express5800/120Rd-1

The ULTRA SLIM Front-End Server

Front-end or general-purpose Internet servers, featuring two processors, are increasingly popular for companies conducting e-Business. Reliable and affordable NEC Express5800/120Rd-1 address the infrastructure trend of "scaling out," where companies and service providers quickly deploy more servers to accommodate growth in server workloads.

NEC Express5800/120Rd-1 is housed in a **compact 1U rack-optimised chassis**, which allows up to 42 servers in an industry-standard 19" 42U rack. Based on the **E7501** from Intel supporting **533MHz Front Side Bus** and **3-peer PCI**, the Express5800/120Rd-1 takes full benefits of the **latest Xeon processors** with **FC-mPGA2 packaging** and high-performance **DDR266 SDRAM** memories.

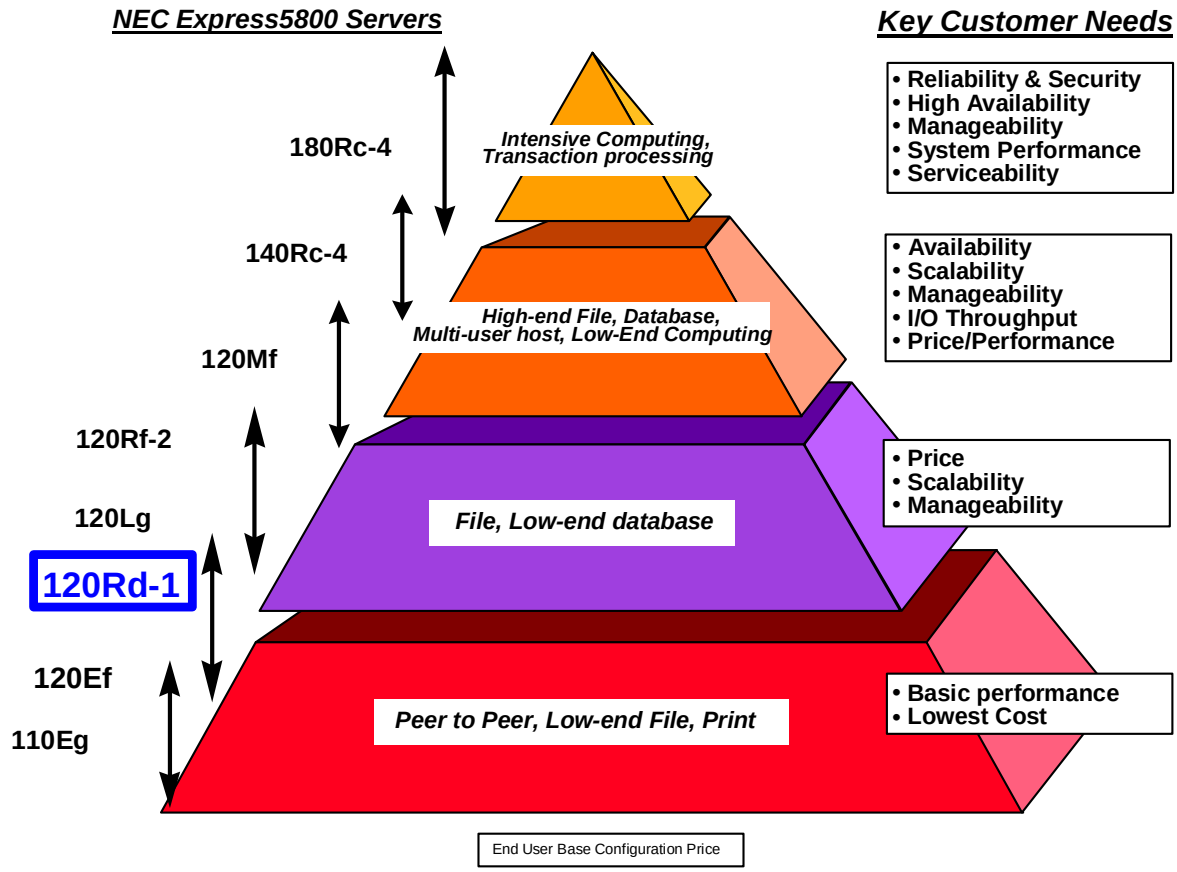
NEC Express5800/120Rd-1 is a bi-processor design supporting Xeon processors **2.4BGHzwith 512KB cache, 3.06GMHz with 512KB and 3.20GHz with 1MB cache**. NEC Express5800/120Rd-1 offers up to **12GB SDRAM** memory (Standard DIMM must be replaced) with ECC protection and **2 free PCI slots** for convenient expandability. **Embedded Ultra 320 SCSI controllers** and **integrated dual-channel auto-sensing 10/100/1000Mbps Ethernet** also guarantee outstanding performance and flexible network configuration.

Despite its small 1U form factor, NEC Express5800/120Rd-1 can support **3 internal hot-swap drives (439.5GB max) with Ultra 320 technology** for transfer rates up to 320MB/s. Several external disk expansion units are also available offering maximum storage modularity.

Designed with simplicity for easy installation and manageability, the Express5800/120Rd-1 comes standard with **NEC EXPRESSBUILDER** set-up and configuration software and **NEC ESMPRO** management software. In addition, it incorporates unique **integrated remote management capabilities** providing remote emergency access and control of server resources (via LAN or modem connection) in any situation.

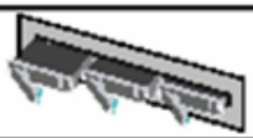
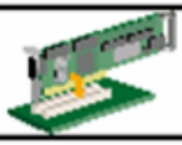
Coupled with NEC comprehensive portfolio of storage products, rack-optimised servers and space-saving rack options, the **ultra slim NEC Express5800/120Rd-1** is a robust, cost effective computing solution your quickly growing business can rely on.

TARGET AUDIENCES



The Express5800/120Rd-1 is an easy-to-deploy, ultra-slim server for IP networking (firewall/proxy, load balancing, cache server) and front-end applications.

HIGHLIGHTS

Up to two Xeon processors (2.4BGHz/3.06GHz/3.20GHz)	
533MHz Front Side Bus (FSB)	
Up to 439.5GB (3x 146.5GB) hot-swap	
Embedded dual-channel Ethernet (1000BASE-Tx2)	
2x Expansion slots (64-bit/100MHz PCI-X)	
Ultra compact 1U design/ Full lockable front bezel	

KEY PRODUCT FEATURES & USER BENEFITS

Next-generation Xeon Processing and Enhanced System Architecture

NEC Express5800/120Rd-1 is built to take full advantage of the latest Xeon processors 2.4BGHz with 512KB cache, 3.06GHz with 512KB cache and 3.20GHz with 1MB cache. These processors are packaged in the new FC-mPGA2 form factor, a 603-pin socket version of the Xeon.

The design of NEC Express5800/120Rd-1 is built upon a 533MHz Front Side Bus (FSB), the E7501 chipset from Intel and DDR266 SDRAM memory. The Intel Xeon processor for dual-processing servers offers users several new system performance boosts, with Hyper-Threading technology and the E7501 server chipset.

The Intel E7501 chipset supports DDR memory technology and is optimized for the Intel Xeon processor. The new chipset will accelerate memory access to increase platform performance and deliver new levels of performance for I/O intensive server applications.

This chipset also allows increased throughput and enhanced overall system performance through the high-performance 533MHz FSB and full-speed 266MHz memory access.

The I/O subsystem of NEC Express5800/120Rd-1 is built on a 3 peer PCI bus architecture that provides concurrency of data transfers between the different high speed I/O channels and CPU or memory. I/O traffic is balanced as follows:

- First PCI bus (32-bit): ATA-100 controller, IDE, graphics and I/O ports
- Second PCI bus (64-bit): dual-port LAN and 1x 64-bit PCI slots
- Third PCI bus (64-bit): Ultra 320 SCSI channels and 1x 64-bit PCI slots

Improved Memory Architecture

NEC Express5800/120Rd-1 offers 6 DIMM sockets for industry-standard 128MB, 256MB, 512MB, 1GB or 2GB SDRAM DDR266 DIMM. NEC Express5800/120Rd-1 allows easy expansion of system's capabilities to memory-intensive environments (scalability up to 12GB) and comes standard with 9-bit parity/ECC 266MHz SDRAM for maximum data integrity. The memory controller supports memory scrubbing, single-bit error correction and multiple-bit error detection and chip kill is supported. Memory can be implemented with either single sided (one row) or double-sided (two row) DIMMs.

Chipkill Correct Memory

NEC Express5800/120Rd-1 supports Chipkill Correct Memory architecture. Chipkill gives the memory system the ability to withstand a multibit failure within a DRAM device, including a failure that causes incorrect data on all data bits of the device.

High-performance Ultra 320 Disk Drives and Flexible Storage Configurations

NEC Express5800/120Rd-1 includes a 3.5-inch diskette drive, a CD-ROM drive and three hot-swap SCSI hard disk drive bays. The hot-swap Ultra 320 hard disk drive bays support up to three 1.0-inch SCSI hard disk drives(439.5GB MAX) that can be swapped in or out of the system without powering it down, if RAID functionality is configured in the system.

Integrated Ultra 320 I/O Controllers

NEC Express5800/120Rd-1 system board features an integrated dual-channel SCSI controller providing Ultra 320 SCSI interface for the support of Ultra 320 hard disk drives.

The system board also includes a single channel EIDE controller providing support for the internally mounted CD-ROM.

Multiple RAID Options

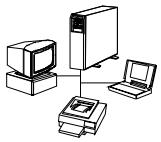
NEC Express5800/120Rd-1 comes with a complete range of optional high-performance Ultra 320 RAID boards. These boards give top levels of performance, maximum reliability and fault tolerance when running demanding server applications.

The 64bit RAID controller features 2x Ultra 320 SCSI channels, Intel GC80303 processor and 128MB of cache with battery backup unit.

The 64bit RAID controller features 1x Ultra 320 SCSI channel, Intel GC80302 processor and 64MB of cache without battery backup unit. It is possible to add optional battery backup unit.

Embedded Auto-sensing Dual-Channel 10/100/1000Mbps Ethernet

NEC Express5800/120Rd-1's system board includes a dual-channel gigabit network interface controller based on the Intel 82546EB. The 82546EB is a highly integrated PCI LAN controller in a 21 mm^2 PBGA package. The controller supports 10/100/1000 operation on both the channels and it supports alert-on-LAN functionality.



The 82546EB controller supports the following features:

- 64-bit, 100MHz PCI-X interface
- Integrated IEEE 802.3 10Base-T, 100BASE-TX, and 1000Base-T compatible PHY
- IEEE 820.3u auto-negotiation support
- Chained memory structure similar to the 82559, 82558, 82557 and 82596
- Full duplex support at both 10 Mbps, 100 Mbps and 1000 Mbps operation
- Low power +3.3 V device

The auto-sensing PRO/100+ Server Adapter from Intel can also be supported on NEC Express5800/120Rd-1. By installing multiple PRO/100+ boards, high-availability (load balancing, fault tolerance) and top performance features are provided for the most demanding networking environments.

Integrated Video

NEC Express5800/120Rd-1 has an integrated ATI Rage XL PCI graphics accelerator with 8MB of video SDRAM that supports all standard IBM VGA modes.

The embedded SVGA video subsystem supports:

- Pixel resolutions up to 1600 x 1200 under 2D and 1024 x 768 under 3D
- CRT and LCD monitors up to 100 Hz vertical refresh rate

2 Expansion Slots

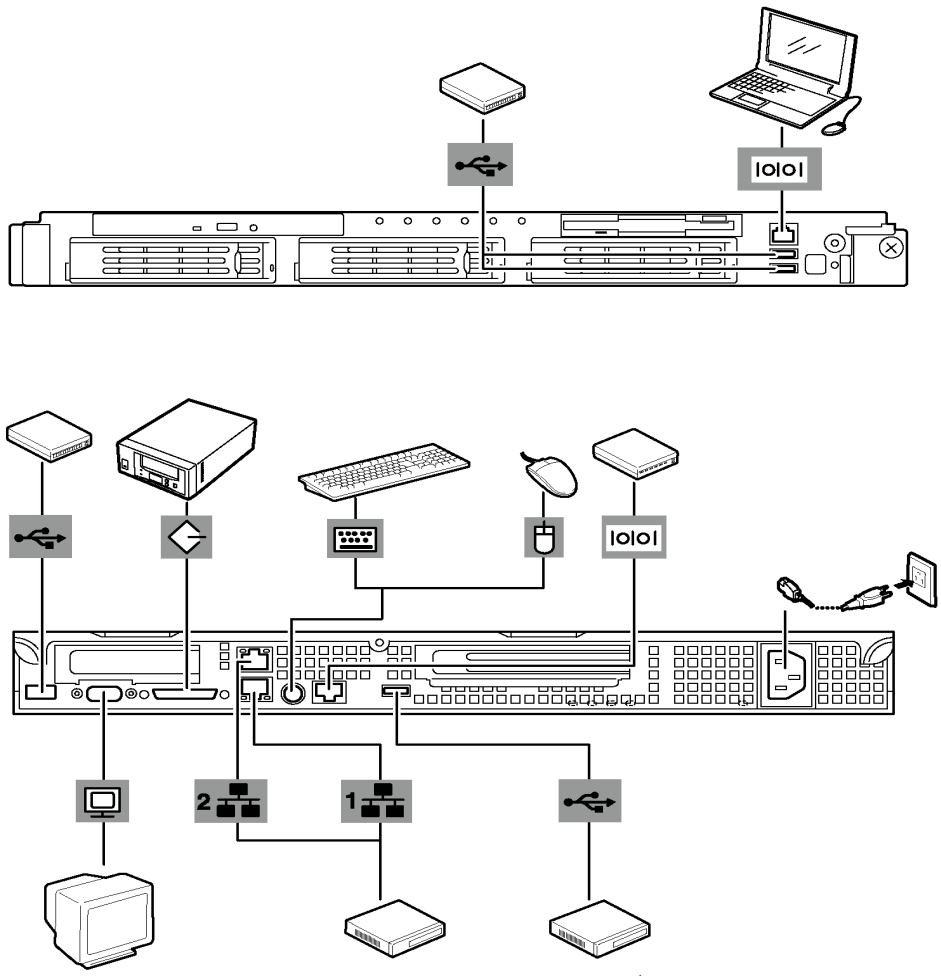
NEC Express5800/120Rd-1 offers 2 free 64-bit/100MHz PCI slot:

1 slot is full length, other one is low profile.

These I/O slots are mounted on a PCI riser card.
They are all Plug and Play ready and PCI connectors are parity enabled.

External Device Connectors

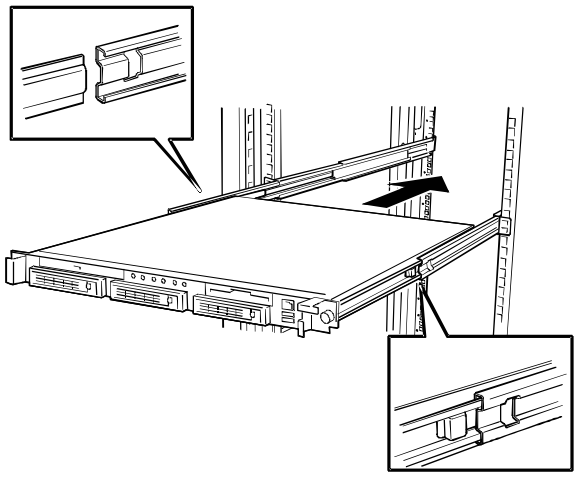
The external I/O connectors of NEC Express5800/120Rd-1 provide support for a PS/2-compatible mouse and a keyboard, connectors for VGA monitor, two 9-pin serial port connectors, two RJ45 port connectors, four USB connections and a 68-pin Ultra 320 SCSI connector.

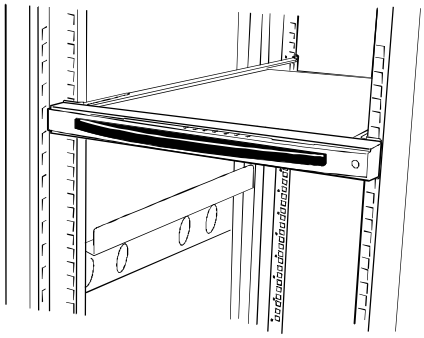


1U Rack-Optimised Design

NEC Express5800/120Rd-1's compact and practical 1U packaging is ideal for space-constrained environments. Up to 44 systems can fit in an industry-standard 19" 44U rack frame, occupying a limited floor space. In addition, the chassis offers a cable management arm option and allows tool-free access, simplifying upgrades even more.

Finally, NEC Express5800/120Rd-1 is part of a comprehensive portfolio of rack-possible NEC Express5800 servers, rack enclosures and accessories for optimal flexibility.





Power and Cooling

NEC Express5800/120Rd-1 comes standard with one 350W power supply at an operating frequency of 50/60Hz and a voltage of 100/240V.

The chassis includes a fan module with five fans for cooling the processor(s), hard drives, and PCI cards. The fan system is located in the middle of the chassis to pull cooling air through the chassis. The power supply contains two built-in fans for cooling.

Operating Environments

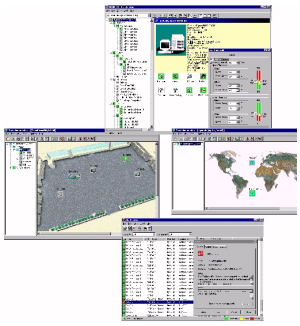
NEC Express5800/120Rd-1 is certified for the following NOS: Windows 2000 Server/Advanced Server and RedHat Linux.

REMOTE POWER-ON FEATURE (WAKE ON LAN)

NEC Express5800/120Rd-1's system board supports Wake-on-LAN. The remote power-on function turns on the server through a network. It sends a special packet from the management computer to a remote server to turn it on if the server is off-powered.

NEC ESMPRO Software and Integrated Remote Management Capabilities

NEC Express5800/120Rd-1 includes NEC ESMPRO Server Management Software that allows network administrators to monitor, control and manage NEC Express5800 servers and desktops across a network from a management console or any PC with an Internet browser.



NEC ESMPRO enables:

- Local or remote management (via your network or the Web)
- Comprehensive real-time fault management
- Performance and load monitoring
- Broad configuration and asset management

It allows system administrators to optimise server operations through an easy-to-use Windows-based graphical user interface.

NEC ESMPRO comes with SNMP agents for Microsoft Windows environments accommodating all NEC Express5800 servers.

"Plug-in" applications are also available to comprehensively integrate NEC Express5800 systems with leading enterprise and network managers such as HP OpenView NNM for Windows, Tivoli Enterprise, or CA Unicenter.

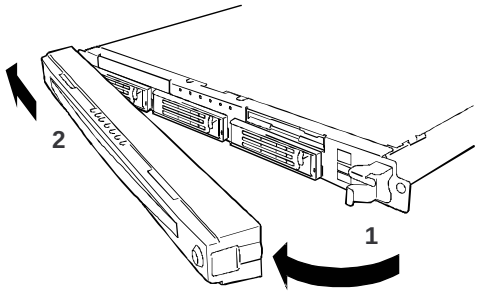
To lower the Total Cost of Ownership even more, NEC Express5800/120Rd-1 features hardware integrated remote management capabilities implemented through the Baseboard Management Controller (BMC) and RomPilot (extended BIOS). This built-in solution provides remote emergency access and control of server resources (via LAN or standard modem connection) from a Management Workstation Application (MWA) allowing critical actions such as remote power control, remote Event Log access or remote console redirection, regardless of the state of the operating system or the network. In the past, this capability was available only through an expensive emergency management ISA/PCI add-in card.

NEC EXRESSBUILDER System Installation Software

NEC Express5800/120Rd-1 systems come with NEC EXPRESSBUILDER set-up and configuration software that provides a logical and comprehensive process for your server installation.

System Security and Front Bezel Removing

To help prevent unauthorized entry or use of the system, the system includes a full lockable front bezel and Server Management software that monitors the front bezel intrusion switch.



- Security with mechanical locks and monitoring:

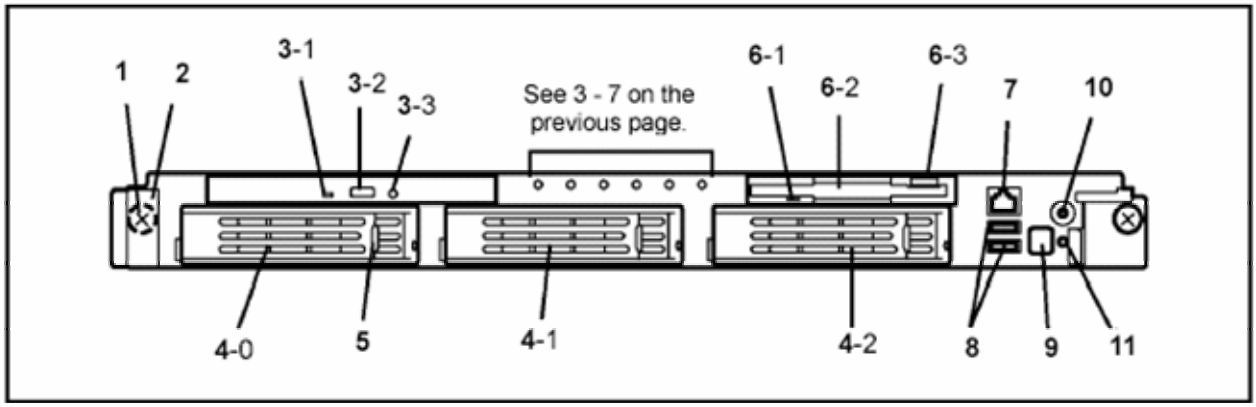
The front bezel contains a mechanical lock and an intrusion switch to prevent access to the computer chassis. When the cover is opened, the switch transmits an alarm signal to the system board, where server management software processes the signal.

- Software Locks via the system set up utility

The BIOS set up utility provides a number of security features to prevent unauthorized or accidental access to the system. Once the security measures are enabled, access to the system is allowed only after the user enters the correct password(s). For example:

- Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time-out period (1 to 120min)
- Set and enable an administrative password
- Set and enable a user password
- Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset and power switches
- Activate a hot key combination to enter secure mode quickly
- Disable writing to the diskette drive when secure mode is set
- Disable access to the boot sector of the operating system hard disk drive.

NEC Express5800/120Rd-1 FRONT VIEWS



1 **Set screws (1 at the right and left each)**
The screws secure the server to the rack.

2 **Handles (1 at the right and left each)**
Hold the handles when dismounting/mounting the server from/in the rack.

3 **CD-ROM drive**
This drive reads data from the CD-ROM.
3-1 Disk access lamp
3-2 CD tray eject button
3-3 Emergency hole

4 **Hard disk bays**
Mount hard disks in the bays. Each number following the bold-faced number indicates the SCSI ID. Dummy sponge blocks are mounted in the bays except **4**-1 in the standard configuration.

5 **DISK lamp (green/amber)**
Hard disk lamp. Each hard disk lamp is green during access to the hard disk. The lamp turns amber when the hard disk fails. The lamp flashes switching back and forth between green and amber during build processing (in only disk array configuration).

6 **3.5-inch floppy disk drive**
This drive reads/writes data from/to the 3.5-inch floppy disk.
6-1 Disk access lamp
6-2 Disk slot
6-3 Eject button

7 **Front serial port 2 connector**
Connect device having a serial interface to this connector. The setting of the server needs to be changed depending on the device to be connected. This connector is capped for preventing incorrect connection in the standard status.

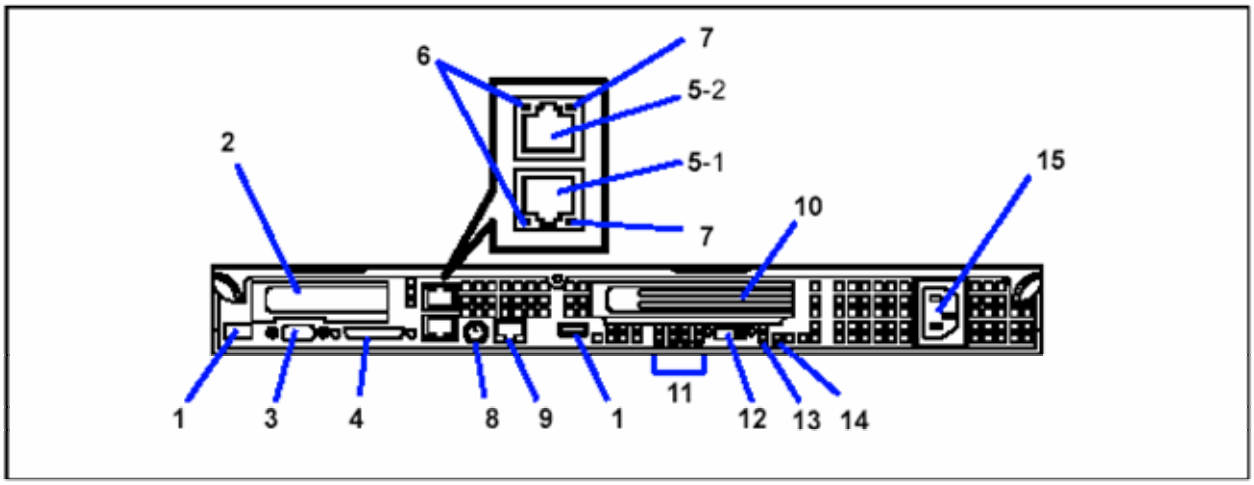
8 **USB connectors (2 ports)**
Connect device compliant with the USB interface to the connectors.

9 **POWER switch**
Press this switch to turn on/off the power. Pressing the switch once turns on the power, and the POWER lamp goes on. Pressing it again turns off the power. Keep pressing the switch for 4 seconds or more forcibly turns off the power.

10 **UID (Unit ID) switch**
Press this switch to turn on/off the UID lamps on the front and rear panels of the server. Pressing the switch once turns on the lamps. Pressing it again turns them off.

11 **DUMP switch**
Press this switch to dump memory.

NEC Express5800/120Rd-1 REAR VIEWS



1 **USB connector**
Connect device compliant with the USB interface to this connector.

2 **Low-profile PCI board extension slot**
Mount PCI board of the low-profile type into this slot. The slot number is 1C.

3 **Monitor connector**
Connect the display unit to this connector.

4 **SCSI connector**
Connect external SCSI device to this connector.

5 **LAN connectors**
Connect network systems on the LAN to the connectors.
The number "1" following the bold-faced number indicates LAN port 1, and the number "2" indicates LAN port 2.
The connector in LAN port 1 is hard to remove. Thus, you may use a flat-tip screwdriver to push the catch of the connector. Care should be taken not to damage the LAN port or any other ports with screwdriver.

6 **LINK/ACT lamp (green)**
This lamp indicates the access status of the LAN.

7 **Speed lamp (amber)**
This lamp indicates the transmission speed of the LAN.

8 **Mouse/keyboard connectors**
Connect the mouse and keyboard to the connectors through the provided relay cables.

9 **Rear serial port 2 connector**
Connect device having a serial interface to this connector. The jumper setting on the mother board needs to be changed depending on the device to be connected. This connector is capped for preventing incorrect connection in the standard status.
A leased line cannot be connected directly to this connector.

10 **Full-height PCI board extension slots**
Mount PCI board of the full-height type in the slot. The slot number is 1B.

11 POST lamps (on the mother board)

They are on during POST after the power is turned on.

12 Console Redirection switch

This switch enables the console redirection feature via serial port 2.

Move the switch to ON position when using the terminal applications other than NEC MWA (such as Windows Hyper Terminal to connect tiwth the server.

13 STATUS lamp (green/amber) (on the mother board)

This lamp indicates the server status. The lamp is green during normal operation. The lamp turns amber or flashes when the server enters the abnormal state.

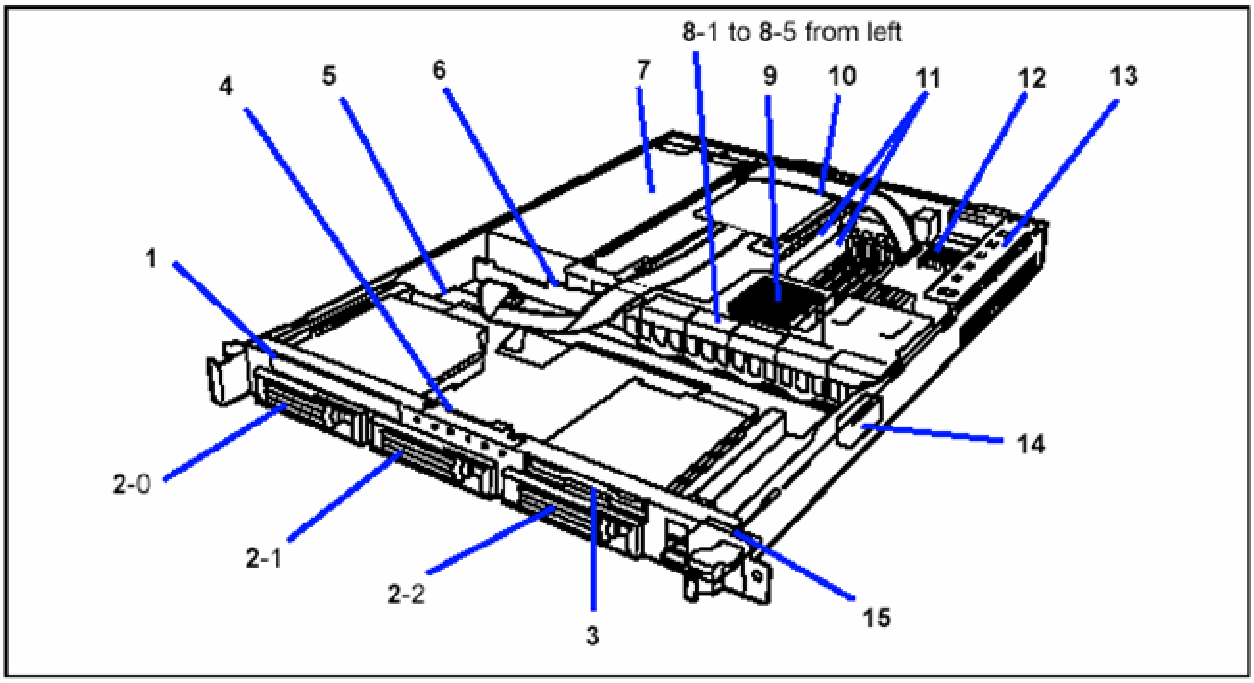
14 UID lamp (blue)

This lamp goes on when the UID switch is pressed. (The lamp also goes on when software issues a command.)

15 AC inlet

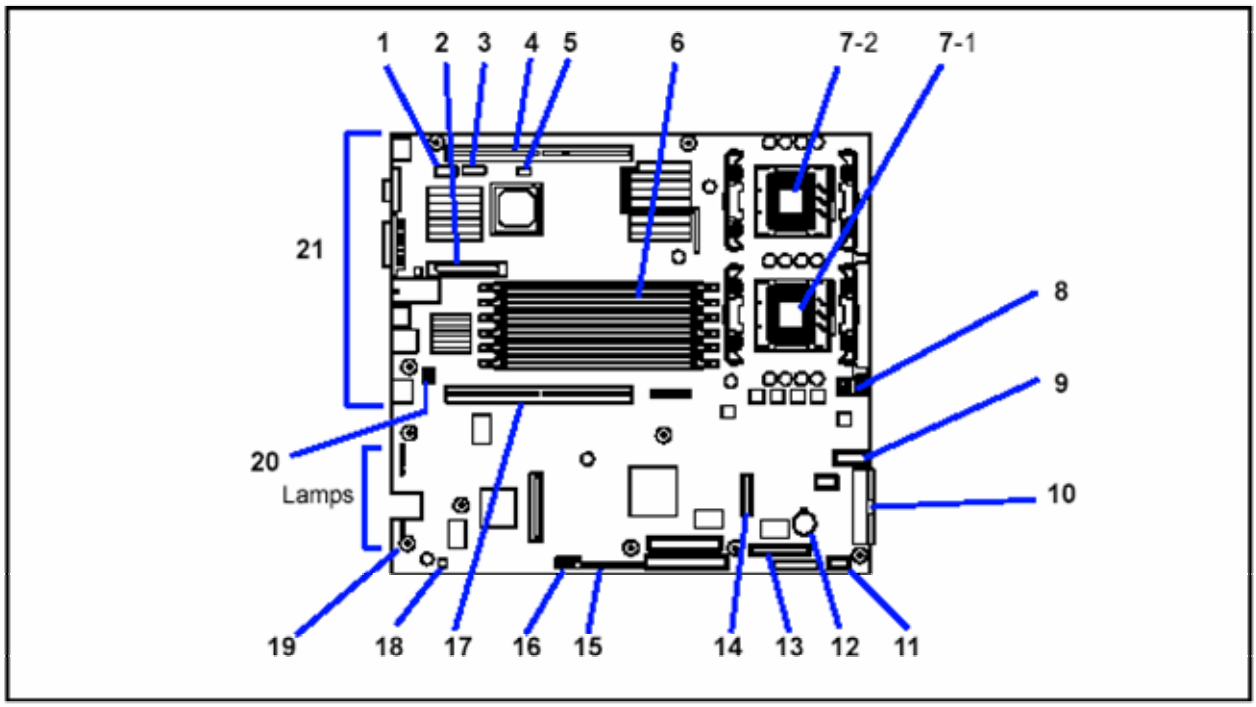
Connect the power cord to this socket.

NEC Express5800/120Rd-1 INTERNAL VIEW



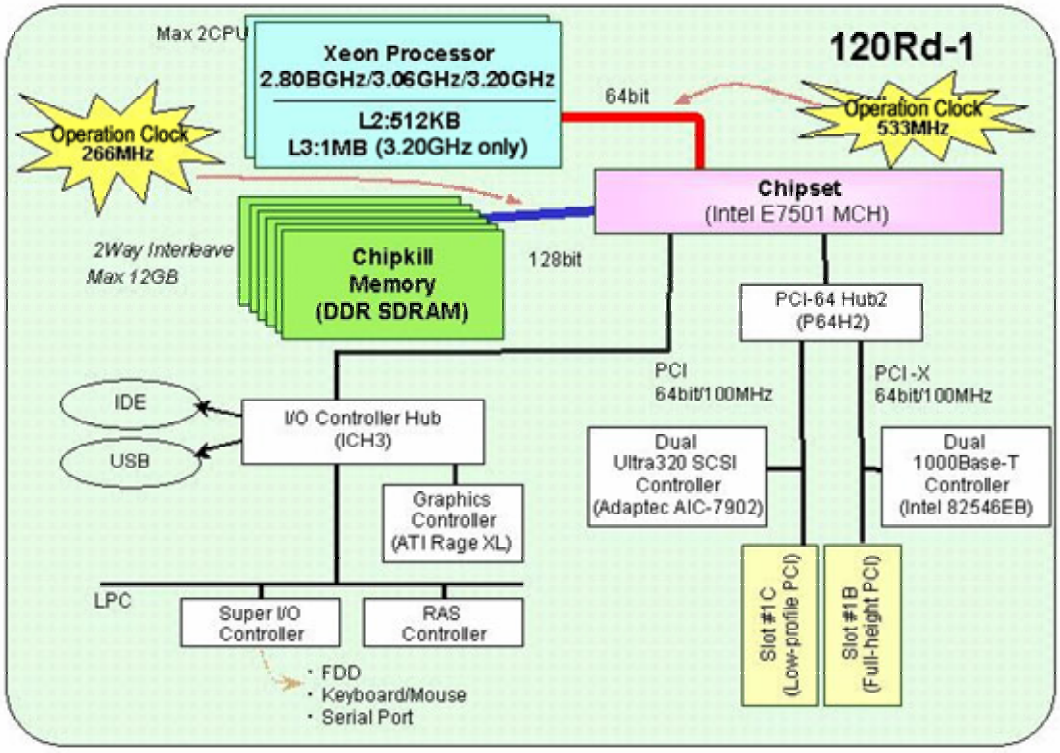
1 CD-ROM drive
2 Disk bays
(Each number following the bold-faced number indicates the SCSI ID number.)
3 Floppy disk drive
4 Front LED board
5 SCSI backplane
6 Power jumper board
7 Power supply unit
8 Cooling fans
(Each number following the bold-faced number indicates the baseboard fan number.)
9 Processor (mounted under the CPU and heat sink)
10 Riser card B (for full-height boards)
11 DIMM (Two DIMMs are mounted as standard in slots #1A and #1B.)
12 Mother board
13 Riser card C (for only low-profile boards)
14 Cover open sensor
15 Front panel board

NEC Express5800/120Rd-1 MOTHER BOARD VIEW



1 **Rear serial port connector**
2 **Internal SCSI connector** (for relay with internal hard disk)
3 **ICMB connector**
4 **PCI riser card slot C**
(For only low-profile boards. 66 MHz/64-bit, 3.3V, PCI)
5 **IPMB connector**
6 **DIMM sockets (for the interleave type)**
(The sockets are called #3A, #3B, #2A, #2B, #1A, and #1B sequentially from top.)
7 **Processor sockets**
7-1 Processor #1 (CPU #1) **7-2** Processor #2 (CPU #2)
8 **Processor power connector**
9 **System fan connector**
10 **Main power connector**
11 **Power signal connector**
12 **Lithium battery**
13 **Front serial port connector**
14 **FDD/CD-ROM/front panel connector**
15 **Configuration jumper switch**
16 **Front panel USB connector**
17 **PCI riser card slot B**
(For full-height boards. 100 MHz/64-bit, 3.3V, PCI-X)
18 **Hard disk drive access lamp pin header**
(Connect the LED relay cable of an additional SCSI/disk array controller.)
19 **Speaker**
20 **Jumper (J5A2)**
21 **Connectors for external device**

NEC Express5800/120Rd-1 SYSTEM BLOCK DIAGRAM



NEC Express5800/120Rd-1 TECHNICAL SPECS

FORM FACTOR	
Tower-Rack convertible	1U Rack

PROCESSOR	
Number of processors	1 or 2
Type	Xeon 2.40BGHz, 3.06GHz and 3.20GHz
Socket / slot type	FC-mPGA2
L2 cache std / max / type (/CPU)	Xeon 2.40BGHz and 3.06GHz: 512KB L2 cache Xeon 3.20GHz: 1MB L3 cache

ARCHITECTURE & MOTHERBOARD	
Chipset	INTEL E7501
Processor front side bus (FSB) speed	533MHz
I2O ready	Yes

MEMORY	
Memory min / max / type	256MB / Up to 12GB / ECC DDR266 SDRAM
Memory sockets	6 DIMMs (6GB)

STORAGE	
Optional Hard disk drives	36.3/73.2/146.5GB 10Krpm Ultra 320 SCSI 18.1/36.3/73.2GB 15Krpm Ultra 320 SCSI
Hard disk drive and media controllers	2x Ultra 320 SCSI
RAID controller	Optional
CD ROM drive	Load on tray type, x24 speed, ATAPI interface x 1
Floppy disk drive	3.5-inch 2 mode 720KB/1.44MB is supported
Disk expansion unit	Optional

BAYS	
5.25" Media bays	-
3.5" Hot swap HDD bays	1-inch x3

SLOTS	
Bus slots	2 64-bit/100MHz PCI-X
Bus slots free	All

VIDEO	
Video controller	Embedded PCI SVGA
Video memory std / max / type	8MB

NETWORK	
Network interface controller	Embedded dual-channel 10/100/1000 Ethernet

SECURITY	
Limited access to front panel / bays	Yes / Yes

I/O PORTS	
USB ports	4 (from x 2, rear x 2)
Serial port	RJ-45 x 2 (Front x 1, Rear x 1, exclusive use)
Mouse / keyboard ports (shared)	Min DIN 6 pin x 1
External SCSI connector	VHDCI 68 pin x 1
System Management	On-board
Ethernet Port	2x RJ45

POWER SUPPLY	
Power supply specs	350W (w/ PFC)
Power supply numbers (standard/max)	1/1
Hot-swap power supply	Not supported
Maximum consumption power	290W

VENTILATION	
Fan specifications	Equipped as standard

PHYSICAL SPECIFICATIONS	
Size (WxDxH)	483 x 614 (660*) x 44mm
Weight	11kg (std.) - 14kg (max.)
Operating constraints	10°C to 35°C, 20% to 80% RH

OS AND SOFTWARES	
Operating system	Windows 2000 Server/Advanced Server; Windows Server 2003 Standard Edition / Enterprise Edition, Red Hat Linux
Management software	NEC ESMPRO Management Software
Installation & configuration software	NEC EXPRESSBUILDER Set-up and Configuration software

REGULATORY & SAFETY	
Regulatory compliance	UL, C-Tick, Taiwan EMC

* When a front bezel is included.

TRADEMARK ACKNOWLEDGMENT

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