

## NEC Express5800 PRODUCT GUIDE



# NEC Express5800/120Rf-2

NEC Corporation

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# PRODUCT OVERVIEW

## NEC Express5800/120Rf-2



### *The HIGH DENSITY E-business Rack Server*

NEC Express5800/120Rf-2 is a system designed to deliver scalable performance to data centres, workgroup environments or remote sites, for which **space limitation is a prime consideration**. It is especially intended to ASPs/ISPs for hosting Internet and Web applications, and to general corporations willing to consolidate their applications or infrastructure services. All these customers want to be able to grow and deploy additional servers in the same amount of space.

NEC Express5800/120Rf-2 is housed in a **compact 2U rack-optimized chassis**, which allows up to 21 servers in an industry-standard 19" 42U rack. Based on the **E7501 chipset** from Intel supporting **533MHz Front Side Bus** and **3-peer PCI**, the Express5800/120Rf-2 takes full benefits of the **latest Xeon processors with FC-mPGA2 packaging** and high-performance **DDR266 SDRAM** memories.

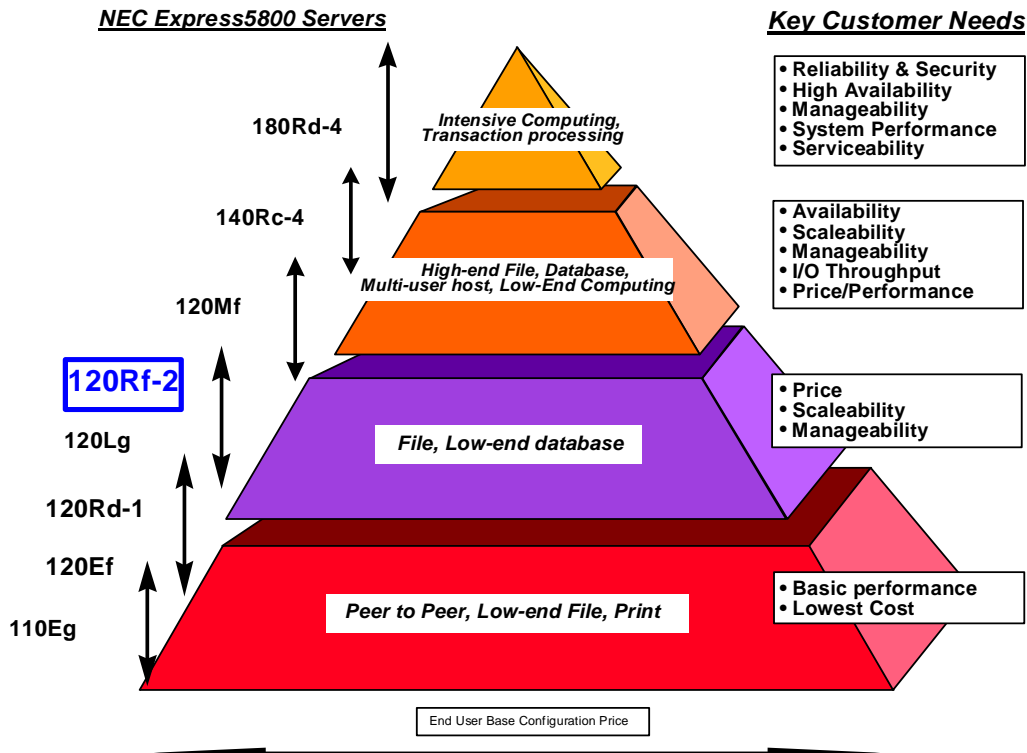
NEC Express5800/120Rf-2 is a bi-processor design supporting Xeon processors **from 2.8BGHz with 512KB L2 cache up to 3.20GHz with 1MB L3 cache**. The Express5800/120Rf-2 offers up to **12GB SDRAM** memory (6 DIMM sockets) with ECC protection and **6 free PCI slots** for optimal expandability. **Embedded Ultra 320 SCSI controller** and integrated auto-sensing 10/100/1000Mbps Ethernet also guarantee outstanding power and performance.

NEC Express5800/120Rf-2 provides high availability features such as **hot-swap power supplies** and hard disk drives to meet the demand of business critical applications. Despite its small 2U form factor, the Express5800/120Rf-2 can support **up to 7 hot-swap drives (1,025.5GB max)** with **Ultra 320 technology** for transfer rates up to 320MB/s.

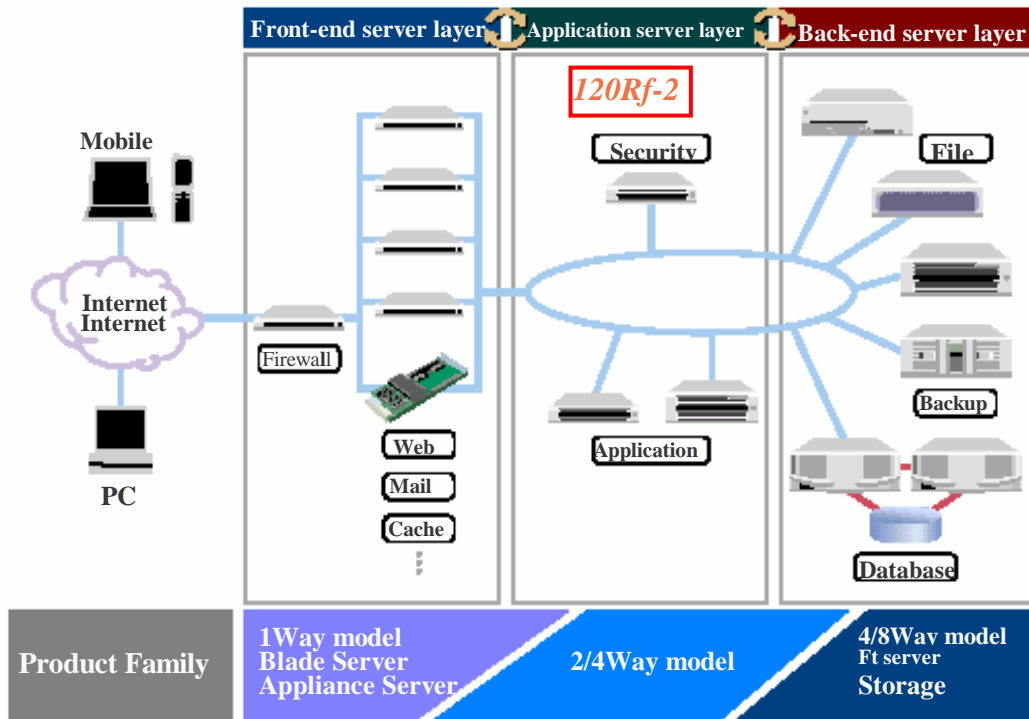
Designed with simplicity for easy installation and manageability, NEC Express5800/120Rf-2 comes standard with **NEC EXPRESSBUILDER** set-up and configuration software and **NEC ESMPRO** management software. In addition, it incorporates unique **integrated remote management capabilities** providing remote emergency access and control of server resources (via LAN or modem connection) in any situation.

Designed to run demanding and business critical applications in space-conscious environments, the Express5800/120Rf-2 is **the high density e-business rack server** your growing business can depend on.

# TARGET AUDIENCES



# 3 layer Architecture



# HIGHLIGHTS

**Up to two Xeon processors**  
(2.80GHz/3.06GHz/3.20GHz)



**533MHz Front Side Bus (FSB)**



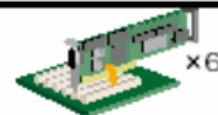
**Up to 1,025.5GB (7x 146.5GB\*) hot-swap**



**Embedded dual-channel Ethernet**  
(1000BASE-Tx 2)



**6x Expansion Slots**  
(64-bit/100MHz PCI-X)



**Slim rack mount chassis (2U)/**  
**Full lockable front bezel**



2 CPU

\* Standard HDD bays are six. When standard FDD/CD-ROM is removed, 7 HDD can be mounted.

533

266

LAN  
Connectors

2U design

Key lock

Model 120Rf-2

CPU

Memory

N-code

# KEY PRODUCT FEATURES & USER BENEFITS

## Next-generation Xeon Processing and Enhanced System Architecture

NEC Express5800/120Rf-2 is built to take full advantage of the latest Xeon processors from 2.80BGHz up to 3.20GHz. These processors are packaged in the new FC-mPGA2 form factor, a 603-pin socket version of the Xeon.

The design of NEC Express5800/120Rf-2 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 the Intel Netburst microarchitecture on Intel's 0.13-micron manufacturing process, Hyper-Threading technology, a larger cache size 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.



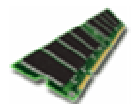
Xeon TM processor

The I/O subsystem of NEC Express5800/120Rf-2 is built on a dual 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): IDE, graphics and I/O ports
- Second PCI bus (64-bit): Dual-port LAN and 3x 64-bit full-height PCI slots
- Third PCI bus (64-bit): Ultra 320 SCSI channels and 3x 64-bit low-profile PCI slots

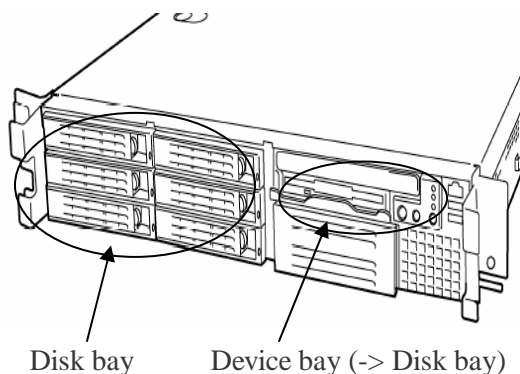
## Improved Memory Architecture

NEC Express5800/120Rf-2 offers 6 DIMM sockets for industry-standard 128MB, 256MB, 512MB, 1GB or 2GB SDRAM DDR266 DIMM. The Express5800/120Rf-2 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.



## High-performance Ultra 320 Disk Drives and Flexible Storage Configurations

NEC Express5800/120Rf-2 supports the latest disk drives with Ultra 320 SCSI technology (10Krpm or 15Krpm), giving data rates of up to 320MB/s for maximum throughput.



The Express5800/120Rf-2 includes a 3.5-inch diskette drive, a CD-ROM drive, six hot-swap SCSI hard disk drive bays, and removable media device bay.

The hot-swap SCSI hard disk drive bays support up to seven 1-inch SCSI hard disk drives that can be swapped in or out of the system without powering it down, if RAID functionality is configured in the system.

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## Integrated Ultra 320 I/O Controller

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NEC Express5800/120Rf-2 system board features an integrated dual-channel SCSI controller providing Ultra 320 SCSI interfaces for the support of Ultra 320 hard disk drives and SCSI media devices (DAT, AIT).



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

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## Multiple RAID Options

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NEC Express5800/120Rf-2 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.



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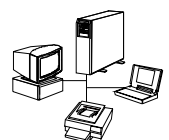
## Embedded Auto-sensing 10/100/1000Mbps Ethernet

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NEC Express5800/120Rf-2'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<sup>2</sup> 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 802.3u auto-negotiation support
- Chained memory structure similar to the 82559, 82558, 82557 and 82596
- Full duplex support at both 10 Mbps, 100Mbps and 1000Mbps operation
- Low power +3.3 V device



The auto-sensing PRO/100+ Server Adapter from Intel can also be supported on NEC Express5800/120Rf-2. By installing multiple PRO/100+ boards, high-availability (load balancing, fault tolerance) and top performance features are provided for the most demanding networking environments.

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## Integrated Video

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NEC Express5800/120Rf-2 has an integrated ATI Rage XL PCI graphics accelerator with 8 MB of video SDRAM. The embedded SVGA video subsystem supports:

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

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## 6 Expansion Slots

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The server's expansion capabilities meet the needs of workgroup and department servers for high-performance I/O by providing 6 free 64bit PCI-X slots including 3x LowProfile.

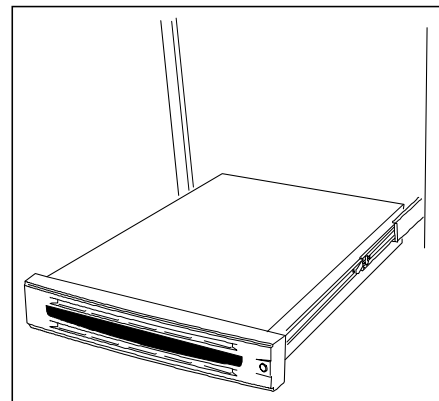
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## 2U Rack-Optimized Design

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NEC Express5800/120Rf-2's compact and practical 2U packaging is ideal for space-constrained environments. Up to 22 systems can fit in an industry-standard 19-inch 44U rackframe, occupying a limited floor space. In addition, the chassis allows tool-free access, simplifying upgrades even more.

Finally, NEC Express5800/120Rf-2 is part of a comprehensive portfolio of rackable NEC Express5800 servers, rack enclosures and accessories for optimal flexibility.



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## External Device Connectors

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The external I/O connectors of NEC Express5800/120Rf-2 provide support for a PS/2-compatible mouse and a keyboard, connectors for VGA monitor, two serial port connectors (RJ-45 x1, D-sub 9pin x1), three USB connections and a 68-pin Wide SCSI connector.



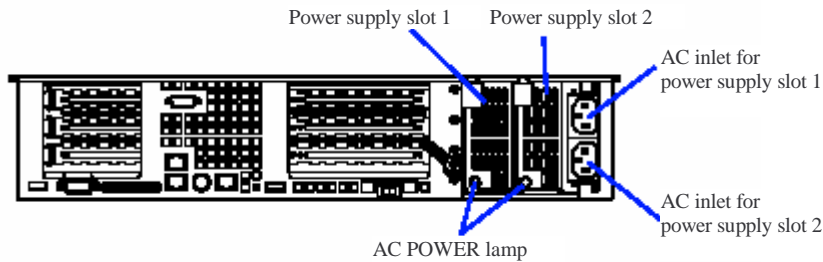
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## Redundant Hot-Swap Power Supplies

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NEC Express5800/120Rf-2 supports redundant hot-swap power supplies to ensure system operation even if one of the power supplies fails. The system comes standard with one 500W power supply and a second one is optional for redundancy.

Each power supply has auto-ranging input 50/60Hz, automatic voltage sensing (100-240V) and comes with its own AC cord for better reliability.



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## Optional Backup Devices

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NEC Express5800/120Rf-2 can accommodate optional high-performance DAT tape options for back-up: DDS3 (12/24GB) and DDS4 (20/40GB) and AIT tape options for back-up: AIT-1A (25GB/35GB), AIT-2 (50GB) and AIT-3 (100GB).

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## Operating Environments

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NEC Express5800/120Rf-2 is certified for the following NOS: Windows 2000 Server / Advanced Server; Windows Server 2003 Standard Edition/Enterprise Edition and Red Hat Linux.



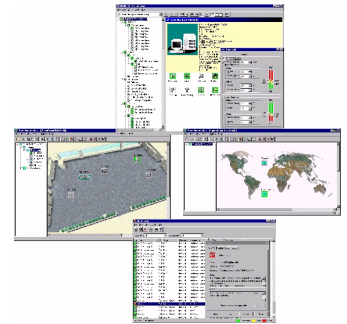
## NEC ESMPRO Server Management Software

NEC Express5800/120Rf-2 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

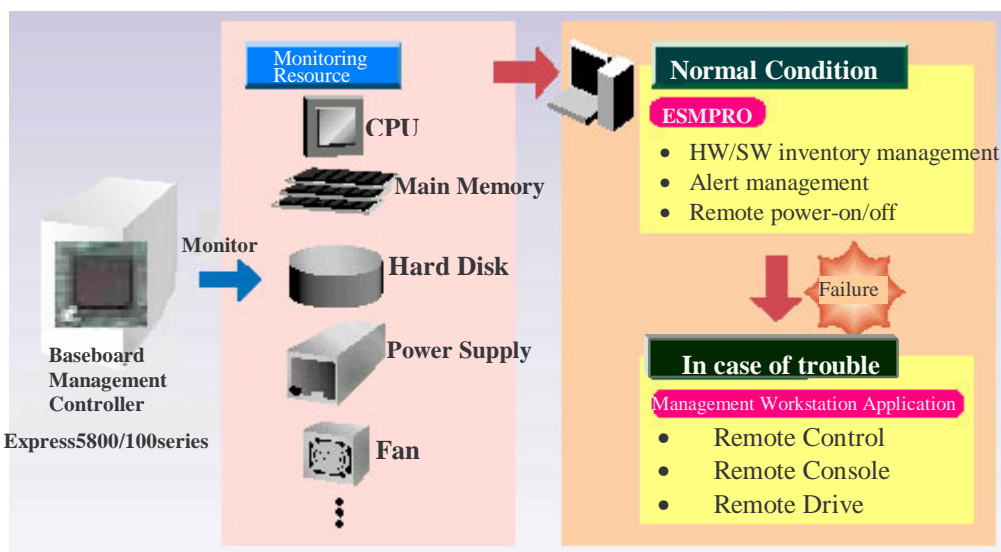
It allows system administrators to optimise server operations through an easy-to-use Windows-based graphical user interface.



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 TNG.

To lower the Total Cost of Ownership even more, NEC Express5800/120Rf-2 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.



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## NEC EXPRESSBUILDER System Installation Software

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NEC Express5800/120Rf-2 systems come with NEC EXPRESSBUILDER set-up and configuration software that provides a logical and comprehensive process for your server installation.

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### Degradation Feature

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The degradation feature automatically isolates a failed DIMM or processor to assure continuous operation of the server when the POST (Power on Self-Test, self-diagnosis program after power on) detects such a DIMM or processor.

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### Remote Power-On Feature (Wake On LAN)

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NEC Express5800/120Rf-2'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.

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### System Security and Front Bezel Removing

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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.

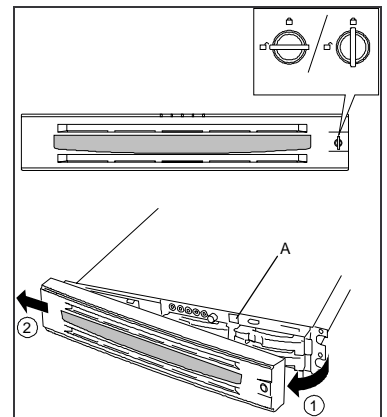
- Security with mechanical locks and monitoring:

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.

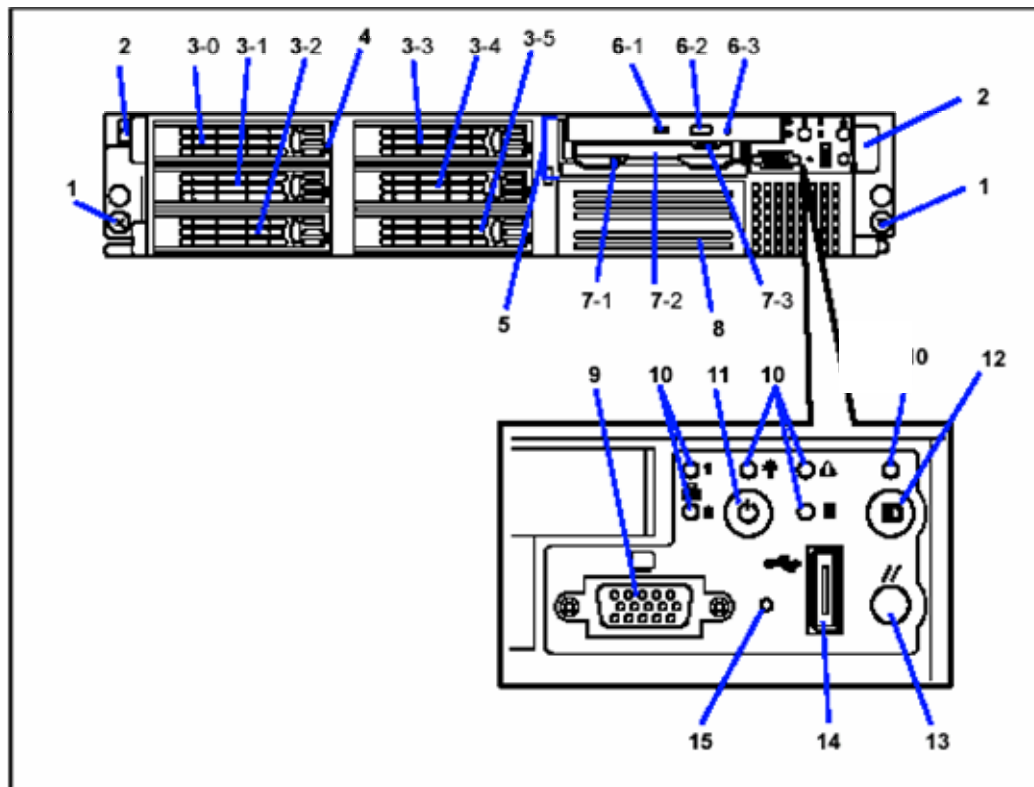
- Software Locks via the system set up utility

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 120 min)
- 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
- Disable writing to the diskette drive when secure mode is set.



## NEC Express5800/120Rf-2 FRONT VIEWS



- 1 Captive thumb 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 Hard disk bays**  
Mount hard disks in the bays. Each number following the bold-faced number indicates the SCSI ID. Dummy trays are mounted in the bays except 3-0 in the standard configuration.
- 4 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).
- 5 Flex bay**  
A hard disk, CD-ROM, or floppy disk drive can be mounted in this bay. A CD-ROM or floppy disk drive is mounted in the standard configuration. If a hard disk drive is mounted, SCSI ID8 is assigned to the bay.

- 6 CD-ROM drive**

This drive reads data from the CD-ROM.

  - 6-1 Disk access lamp
  - 6-2 CD tray eject button
  - 6-3 Emergency hole
- 7 3.5-inch floppy disk drive**

This drive reads/writes data from/to the 3.5-inch floppy disk.

  - 7-1 Disk access lamp
  - 7-2 Disk slot
  - 7-3 Eject button
- 8 Backup device bay**

Mount an optional DAT or AIT drive in this bay.
- 9 Front VGA connector**

Connect the display unit to this connector.
- 10 Lamps** (See the previous page for the six lamps.)
- 11 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.
- 12 UID (Unit ID) switch**

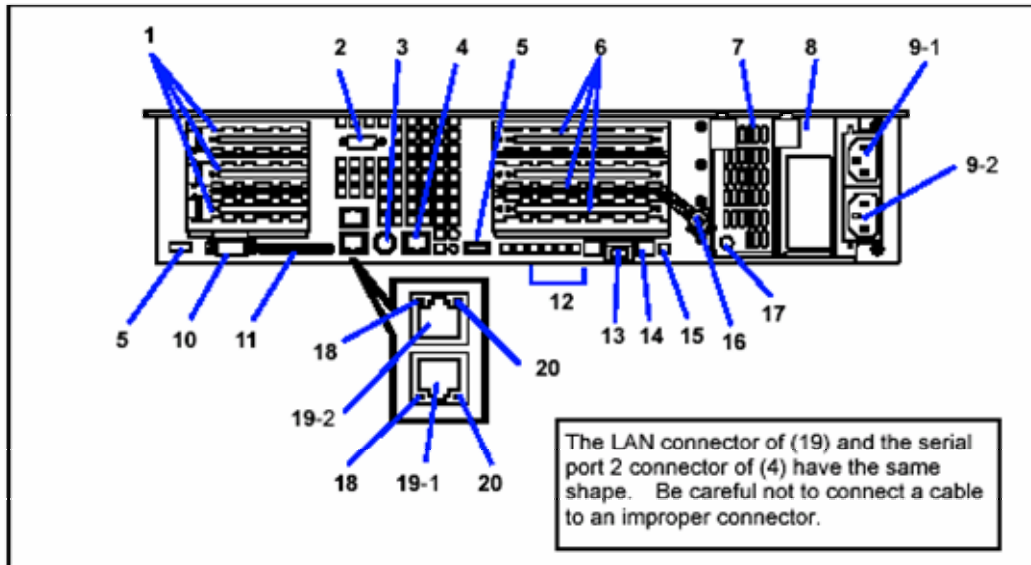
Press this switch to turn on/off the UID lamps on the front and rear panels of the server. Pressing the switch once turns on the lamps. Pressing it again turns them off.
- 13 Reset switch**

Press this switch to reset operation.
- 14 USB connectors (2 ports)**

Connect device compliant with the USB interface to the connectors.
- 15 DUMP switch (NMI switch)**

Press this switch to dump memory.

# NEC Express5800/120Rf-2 REAR VIEW

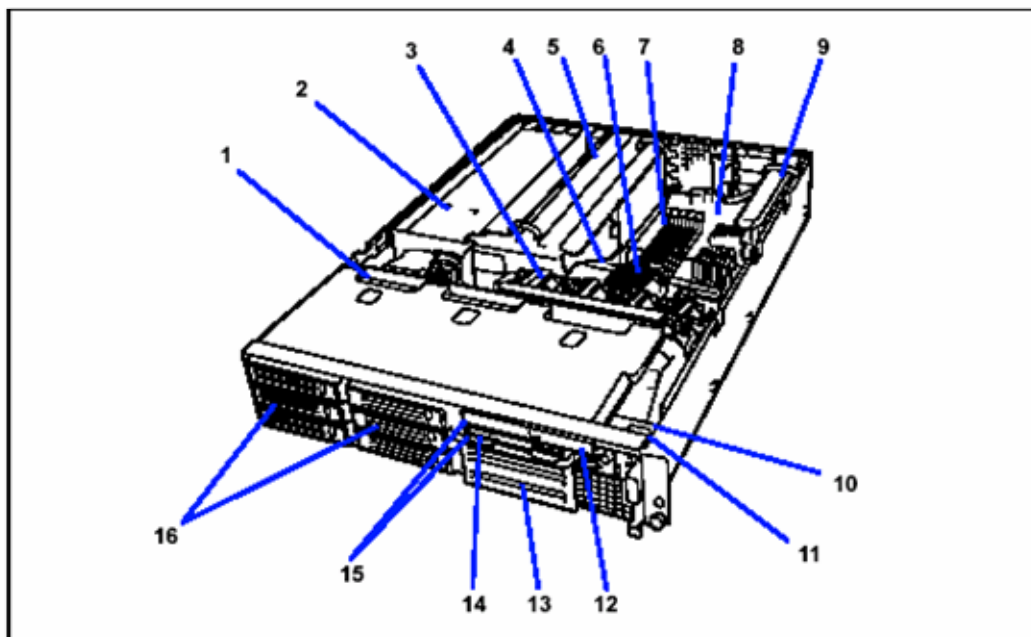


- 1 Low-profile PCI board extension slots**  
Mount PCI boards of the low-profile type into the slots. The slots are called 3C, 2C, and 1C from top.
- 2 Serial port 1 connector (DB-9)**  
Connect device having a serial interface to this connector.  
Note the following:
  - The console of a management PC, etc. can be connected to only serial port 2. (BIOS setting required) A leased line cannot be connected directly to this connector.
- 3 Mouse/keyboard connectors**  
Connect the mouse and keyboard to the connectors through the provided relay cables.
- 4 Rear serial port 2 connector (RJ-45)**  
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. A leased line cannot be connected directly to this connector.
- 5 USB connectors**  
Connect device compliant with the USB interface to this connector. (Windows NT 4.0 needs the compliant driver.)
- 6 Full-height PCI board extension slots**  
Mount PCI boards of the full-height type in the slots. The slots are called 3B, 2B, and 1B from top.
- 7 Power supply unit (power supply slot 1)**  
This unit supplies power to the server.
- 8 Power supply unit extension slot (power supply slot 2)**  
Mount an optional power supply unit in this slot. The slot is protected with the blank cover in the standard status.

- 9-1 AC inlet (for the power supply unit provided as standard)**  
Connect the power cord to this socket when the power supply unit is mounted in power supply slot 0.
- 9-2 AC inlet (for an additional power supply unit)**  
Connect the power cord to this socket when the power supply unit is mounted in power supply slot 1.
- 10 Rear VGA connector**  
Connect the display unit to this connector.
- 11 SCSI connector**  
Connect external SCSI device to this connector.
- 12 POST lamps (on the mother board)**  
The lamps are mounted on boards. They are on during POST after the power is turned on.
- 13 Console Redirection switch**  
This switch enables the console redirection feature via serial port 2.
- 14 UID lamp (blue) (on the mother board)**  
This lamp goes on when the UID switch is pressed. (The lamp also goes on when software issues a command.)
- 15 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.
- 16 AC cord holder**  
Bundle the AC cords.
- 17 AC POWER lamp**  
This lamp turns green and flashes when the server receives AC power from the power cord. The lamp turns green when the server power switch is turned on, and it turns amber when a power failure occurs.
- 18 LINK/ACT lamp (green)**  
This lamp indicates the access status of the LAN.
- 19 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.
- 20 Speed lamp (amber)**  
This lamp indicates the transmission speed of the LAN.



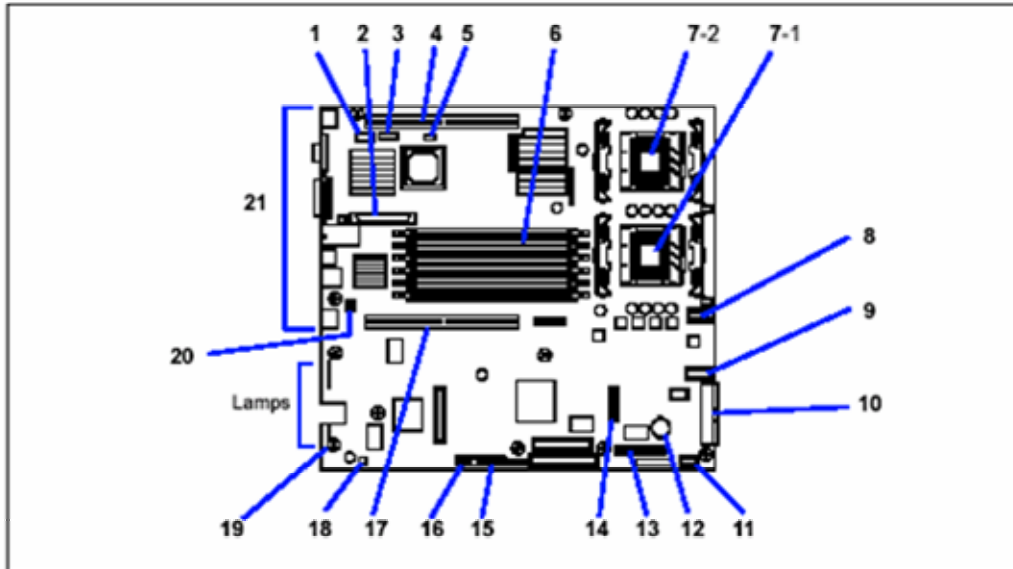
## NEC Express5800/120Rf-2 INTERIOR VIEW



- 1 SCSI backplane
- 2 Power supply unit
- 3 Cooling fans
- 4 Processor duct (dashed-line)
- 5 Riser card (for full-height boards)
- 6 Processor (mounted under the CPU and heat sink)
- 7 DIMM (Two DIMMs are mounted as standard in slots #1A and #1B.)
- 8 Mother board
- 9 Riser card (for only low-profile boards)
- 10 Front panel board
- 11 Cover open sensor
- 12 CD-ROM drive
- 13 Backup device bay
- 14 Floppy disk drive
- 15 Flex bays
- 16 Disk bays

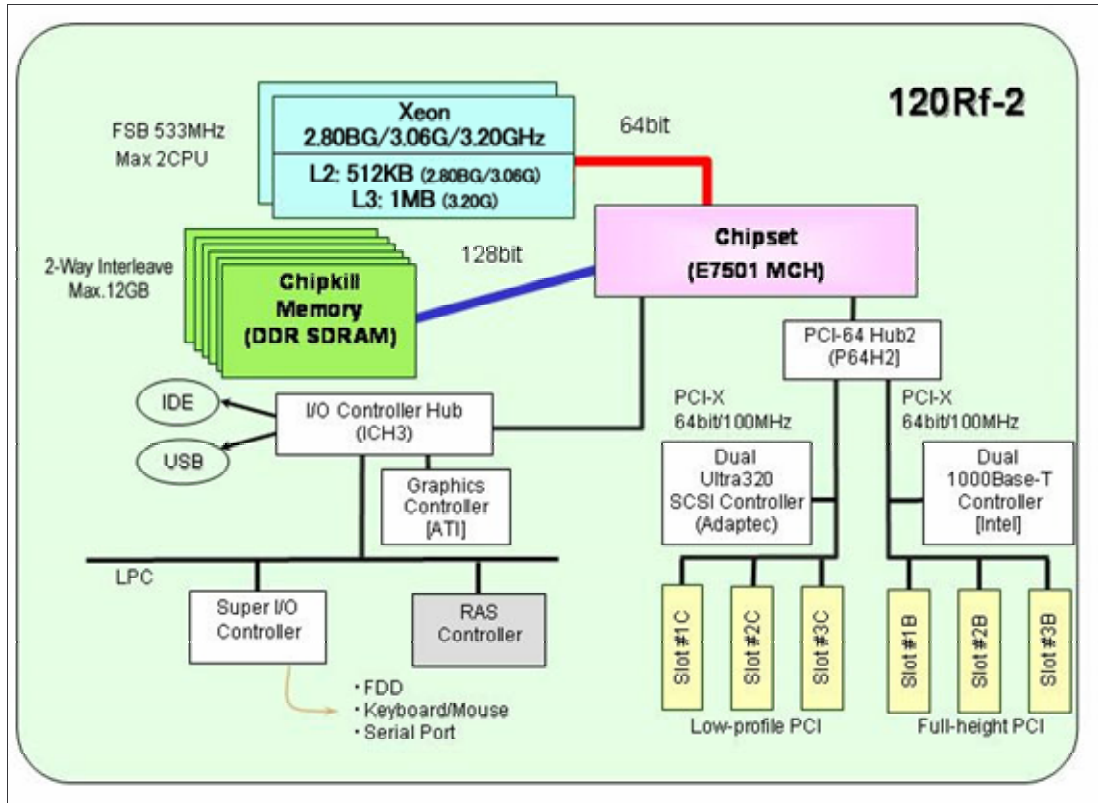


# NEC Express5800/120Rf-2 Mother Board



- 1 Rear serial port connector
- 2 Internal SCSI connector (for relay with internal hard disk)
- 3 ICMB connector
- 4 PCI riser slot  
(For only low-profile boards. 66 MHz/64-bit, 3.3V, PCI)
- 5 IPMB connector
- 6 DIMM sockets (for the interleaved 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  
(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 Express5800/120Rf-2 SYSTEM BLOCK DIAGRAM



# NEC Express5800/120Rf-2 TECHNICAL SPECS

## FORM FACTOR

Tower-Rack convertible	2U Rack
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## PROCESSOR

Number of processors	2
Type	Xeon 2.80GHz, 3.06GHz and 3.20GHz
Socket / slot type	FC-mPGA2
Integrated L1 cache	8KB
L2/L3 cache	Xeon 2.80GHz 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	512MB / Up to 12GB / ECC SDRAM DDR266
Memory sockets	6 DIMMs

## STORAGE

Optional Hard disk drives	36.3/73.2/146.5GB 10Krpm Ultra 320 SCSI 18.1/36.3/73.2GB 150Krpm Ultra 320 SCSI
Hard disk drive and media interface	2x Ultra 320 1x EIDE
RAID controller	Optional
Maximum internal storage capacity	1,025.5GB (7x 146.5GB)
CD ROM drive	Load on tray type, x24 speed
Floppy disk drive	1.44MB
Disk expansion unit	Optional

## BAYS

3.5" Media bays (total / free)	1 / 1
3.5" Hot swap HDD bays	7x 1" (6x 1" + 1 x 1" in removing FDD/CD-ROM)

## SLOTS

Bus slots	6 PCI-X (64-bit/100MHz)
Bus slots free	All

## VIDEO

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

## NETWORK

Network interface controller	Embedded 10/100/1000 Ethernet
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## SECURITY

Limited access to front panel / bays	Yes / Yes
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## I/O PORTS

USB ports	3
Serial port	2
Parallel port	-
Mouse / keyboard port	1
System Management	On-board
Ethernet Port	2 (RJ45)

## POWER SUPPLY

Power supply specs	500W w/ PFC
Power supply numbers (standard/max)	1/2
Hot-swap power supply	Yes, with optional 2 <sup>nd</sup> power supply
Maximum consumption power	800W

## VENTILATION

Fan specifications	Standard , Non-Redundant
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## PHYSICAL SPECIFICATIONS

Size (W x D x H)	483x613(660*)x88 mm
Weigh (standard/max)	16kg / 25kg
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
Installation & configuration software	NEC ExpressBuilder Setup and Configuration software

## REGULATORY & SAFETY

Regulatory compliance	UL/FCC, C-Tick, Taiwan EMC
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\*When a front bezel is included

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Developed by Client And Server Division  
NEC Corporation  
October, 2003

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