

## IBM RISC System/6000 Model R21 is the Most Powerful Rack-Mountable Open Systems Technical Server in the RS/6000 Product Line

IBM now offers a rack-mountable technical server, the RISC System/6000® 7015 Model R21. The Model R21 has a powerful, 77MHz POWER2™ processor. With the flexibility of a six EIA-unit rack drawer, it provides the most powerful, rack-mountable uniprocessor in the RS/6000™ line to date. The R21 offers more performance and the same POWER2 Architecture™ as its predecessor, the POWERserver™ 990.

The POWER2 architecture has dual floating-point units, dual fixed-point units, a 256KB data cache, and a memory bus wide enough to take full advantage of the architecture. For best performance, four or eight memory cards should be installed.

Upgrades from R10 and R20 rack systems are available. Memory exchanges are provided to accommodate upgrades.

The new Model R21 operates with either the latest version of AIX/6000® Version 3.2.5 or AIX Version 4.1.3. It also has been tested and approved for use in a cluster environment running HACMP/6000 Version 3.1.1 and AIX Version 3.2.5. AIX/6000 applications written for a POWER-based RISC System/6000 will run on the new POWER2-based models without recompilation, and may run significantly faster.

**Purchase Price:** \$64,500 (Model R21)

Description	Planned Availability Date
RISC System/6000 Model R21	August 18, 1995
Model Upgrades and MESSs	September 8, 1995
HACMP/6000™ Version 3.1.1 support PTF	August 31, 1995

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### IN BRIEF . . .

These rack-mountable servers offer:

- ◆ Memory of 128MB expandable to 2GB
- ◆ A 77MHz POWER2 processor (13 nanoseconds)
- ◆ Standard 1.1GB disk and quad-speed CD-ROM
- ◆ Storage with expansion racks expandable to 476GB without RAIDiant Array or 590GB with RAIDiant Array
- ◆ The ability to run existing AIX/6000 applications without recompilation
- ◆ The ability to be configured in a High-Availability (HA) clustered system with AIX/6000 Version 3.2.5
- ◆ Upgrades from Models R10/R20 and memory exchanges

## Technical Description

### POWER2 Technology

The POWER2 technology implemented in this machine is a next-generation multichip RISC processor implementation of the POWER Architecture™. The processor chips are fabricated in .5-micron, 4-level metal/1-level polysilicon CMOS 4R and are packaged on a single multichip ceramic module.

Like the POWER2 technology introduced in September 1993, the primary features of the system include:

- A 32KB two-way set associative instruction cache and a multiport 256KB four-way set associative data cache.
- Dual fixed-point execution units and dual floating-point add-subtract-multiply-divide units.

The architecture provides a quad-word, floating-point load/store instruction, convert-to-integer instruction, square-root instruction, new address translation, and a new interrupt structure.

- Hardware performance monitors accessible by software.
- The memory interface:
  - Four-words wide when two memory cards are installed
  - Eight-words wide when four or eight equal memory cards are installed
  - Supports memory up to 2GB
- Binary-compatible with previous IBM RISC System/6000 systems.

### High-End Open System with Emphasis on Technical Compute Performance

The RISC System/6000 Model R21 uses a 77MHz CMOS processor and POWER2 technology to provide greater performance than previously announced rack models. The standard 128MB of memory expandable to 2GB, and a 256KB data cache, coupled with eight available 80MB/sec 32-bit Micro Channel® expansion slots, integrated SCSI controller, 1.1GB SCSI-2 disk storage, standard Quad-Speed CD-ROM drive, and a full range of optional features makes the Model R21 a powerful open systems computer server.

### Service Director® for RISC System/6000

You can receive the Service Director for RISC System/6000 at no additional charge if your RISC System/6000 processor is covered by an IBM Warranty or IBM Maintenance Service Agreement. When installed on your RISC System/6000, the Service Director for RISC System/6000 can enhance the ability of IBM to provide you with maintenance service.

The Service Director for RISC System/6000:

- Monitors and analyzes system errors, and if needed, can automatically place a service call to IBM without customer intervention
- Can reduce the effect of business disruptions because of unplanned system outages and failures
- Performs problem analysis on a subset of hardware-related problems and can automatically report the results to IBM Service

## Feature Availability

The following feature availability matrix uses the letter "A" to indicate features that are available and orderable on the specified models. "S" indicates a feature that is supported on the new model during a model conversion; these features will work on the new model, but additional quantities of these features cannot be ordered on the new model; they can only be removed. "N" indicates that the feature is not supported on the new model and must be removed during the model conversion. As additional features are announced, supported, or withdrawn, this list will be updated in the Sales Manual. Check with your IBM representative for additional information.

Feature Number		Description
	R 2 1	A = Available S = Supported N = Not Supported, Must Be Removed
0986	A	CCS Customer Service Specify
1906	A	Fibre Channel Adapter/266
2402	A	Network Terminal Accelerator — 256 Session
2403	A	Network Terminal Accelerator — 2048 Session
2410	S	SCSI-2 High-Performance External I/O Controller
2412	A	Enhanced SCSI-2 Differential Fast/Wide Adapter/A
2415	A	SCSI-2 Fast/Wide Adapter/A
2416	S	SCSI-2 Differential Fast/Wide Adapter/A
2420	S	SCSI-2 Differential High-Performance External I/O Controller
2422	A	SCSI-2 Differential Y-Cable
2423	A	SCSI-2 Differential System to System Cable
2424	A	0.6M 16-bit SCSI-2 Differential System to System Cable
2425	A	2.5M 16-bit SCSI-2 Differential System to System Cable
2426	A	16-bit Y-Cable for IBM SCSI-2 Differential Fast/Wide Adapter/A
2427	A	8-bit Y-Cable for IBM SCSI-2 Differential Fast/Wide Adapter/A
2435	A	16-bit IBM SCSI-2 Fast/Wide Adapter/A to Dual-Ported Device Cable
2436	A	16-bit IBM SCSI-2 Differential Fast/Wide Adapter/A to Dual-Ported Device Cable
2437	A	8-bit IBM SCSI-2 Fast/Wide Adapter/A to Dual-Ported Device Cable
2438	A	8-bit IBM SCSI-2 Differential Fast/Wide Adapter/A to Dual-Ported Device Cable
2439	A	8-bit IBM SCSI-2 Fast/Wide Adapter/A to Single-Ported Device Cable
2515	A	1GB SCSI-2 Disk Drive for Drawer
2518	A	2GB SCSI-2 Disk Drive for Drawer
2555	A	1GB SCSI-2 Disk Drive
2580	A	2GB SCSI-2 Disk Drive
2583	S	1GB to 2GB SCSI-2 Disk Drive Select

Feature Number	R 2 1	Description
		A = Available S = Supported N = Not Supported, Must Be Removed
2603	S	Internal CD-ROM-2
2604	S	600MB SCSI-2 Double Speed Tray-Loading CD-ROM
2614	S	600MB SCSI-2 Double Speed Tray-Loading CD-ROM Select
2616	A	Quad-Speed Tray-Loading CD-ROM
2617	S	Quad-Speed Tray-Loading CD-ROM Select
2630	A	Internal 1.2GB 1/4-Inch Cartridge Tape Drive
2700	A	4-Port Multiprotocol Communications Controller
2702	A	Multiprotocol Attachment Cable — V.35
2704	A	Multiprotocol Attachment Cable — X.21
2705	A	4-Port Multiprotocol Interface Cable
2706	A	Multiprotocol Modem Attachment Cable — EIA-232/V.24
2723	A	FDDI-Fiber Dual-Ring Upgrade
2724	A	FDDI-Fiber Single-Ring Adapter
2725	A	FDDI-STP Single-Ring Adapter
2726	A	FDDI-STP Dual-Ring Upgrade
2754	A	S/390 (R) ESCON (R) Channel Emulator
2755	A	Block Multiplexer Channel Adapter
2756	A	ESCON Control Unit Adapter
2757	A	Block Multiplexer Channel Adapter Cable
2758	A	Block Multiplexer Channel Cable Assembly
2759	A	System/370 (TM) Channel Emulator/A
2800	A	System/370 Host Interface Adapter
2832	A	SCSI Controller Cable
2835	S	SCSI High-Performance External I/O Controller
2921	A	Artic960 Co-Processor (1MB)
2922	A	Cable Option EIA 232
2923	A	Cable Option EIA 530 RS-422
2924	A	Artic960 Co-Processor (4MB)
2926	A	Cable Option ISO 4902 V.36
2927	A	Cable Option ISO 4903 X.21
2928	A	Artic960 Co-Processor (8MB)
2930	A	8-Port Asynchronous Adapter — EIA 232
2934	A	Asynchronous Terminal/Printer Cable EIA 232
2936	A	Asynchronous Cable EIA 232/V.24
2937	A	Printer/Terminal Interposer — EIA 232
2940	A	8-Port Asynchronous Adapter — EIA 422A
2945	A	Terminal Cable — EIA 422A
2950	A	8-Port Asynchronous Adapter — MIL-STD 188
2955	A	16-Port Asynchronous Adapter — EIA 232

Feature Number	R 2 1	Description
		A = Available S = Supported N = Not Supported, Must Be Removed
2957	A	16-Port Asynchronous Adapter — EIA 422A
2960	A	X.25 Interface Co-Processor/2
2970	A	Token-Ring High-Performance Network Adapter
2972	A	Auto Token-Ring LANstreamer (TM) 32 MC adapter
2976	A	X.25 Attachment Cable X.21 — 6-Meter (20 feet)
2977	A	X.25 Attachment Cable V.24 — 6-Meter (20 feet)
2978	A	X.25 Attachment Cable V.35 — 6-Meter (20 feet)
2980	A	Ethernet High-Performance LAN Adapter
2984	A	TURBOWAYS (TM) 100 ATM Adapter
2990	A	3270 Connection Adapter
2995	A	Multiport Interface Cable
2996	A	16-Port Interface Cable — EIA 232
2997	A	16-Port Interface Cable — EIA 422A
3030	A	1.1GB SCSI-2 Disk Drive
3031	A	2.2GB SCSI-2 Disk Drive
3089	A	2.2GB 8-Bit SCSI-2 Select
3100	A	PC Parallel Printer Cable
3120	A	External SCSI Controller Cable (60-Pin Connector)
3121	A	External SCSI-2 Controller Cable (50-Pin Connector)
3122	A	Serial to Re-IPL Port Cable for Drawer/Drawer
3123	A	Serial to Re-IPL Port Cable for Rack/Rack
3124	A	Serial to Serial Port Cable for Drawer/Drawer
3125	A	Serial to Serial Port Cable for Rack/Rack
4038	A	128MB S5 Memory Select
4039	A	256MB S5 Memory Select
4067	N	32MB HD3 Memory Card
4069	N	64MB HD3 Memory Card
4076	A	32MB S5 Memory
4077	A	64MB S5 Memory
4078	A	128MB S5 Memory
4079	A	256MB S5 Memory
4090	N	128MB Memory Card
4094	N	64MB to 128MB Memory Select
4095	N	256MB Memory Card
4097	N	64MB to 256MB Memory Select
4224	A	Ethernet 10BaseT Transceiver
5005	A	AIX (R) Operating System Preinstall
5064	N	64MB Memory SIMM Kit

Feature Number	R 2 1	Description
		A = Available S = Supported N = Not Supported, Must Be Removed
5065	A	64MB S5 Memory SIMM Upgrade
5128	A	128MB Memory SIMM Kit
6140	A	1/2-Inch 9-Track Tape Drive Drawer
6141	A	CD-ROM to 5GB 8 MM Tape Select
6142	A	4GB/8GB 4 MM Internal Tape Drive
6147	A	5GB/10GB 8 MM Internal Tape Drive
6212	A	High-Performance Subsystem Adapter (40/80MB/sec)
6213	A	High-Performance Subsystem Adapter Select
6226	A	SCSI-2 Drawer
6300	A	Digital Trunk Adapter
6301	S	M-Audio Capture Playback Adapter
6302	A	Ultimedia (R) Audio Adapter
6305	A	Digital Trunk Dual Adapter
6524	A	Media Mounting Hardware for SCSI Drawer
6525	A	5.25-inch Disk Mounting Hardware for SCSI Drawer
6526	A	3.5-inch Disk Mounting Hardware for SCSI Drawer
7002	A	Realtime Interface Co-Processor: Multiport/2 Adapter (.5MB)
7004	A	Realtime Interface Co-Processor: Multiport/2 Adapter (1MB)
7006	A	Realtime Interface Co-Processor: Portmaster (R) Adapter/A (1MB)
7008	A	Realtime Interface Co-Processor: Portmaster Adapter/A (2MB)
7022	A	Realtime Interface Co-Processor: Multiport/2 4-Port RS-232 Interface Board
7024	A	Realtime Interface Co-Processor: Multiport/2 6-Port RS-232-C Synchronous Interface Board
7026	A	Realtime Interface Co-Processor: Multiport/2 8-Port RS-232 Interface Board
7028	A	Realtime Interface Co-Processor: Multiport/2 8-Port RS-422-A Interface Board
7030	A	Realtime Interface Co-Processor: Multiport/2 RS-232/RS-422 Interface Board
7042	A	Realtime Interface Co-Processor: 8-Port RS-232 Interface Board/A
7044	A	Realtime Interface Co-Processor: 8-Port RS-422 Interface Board/A
7046	A	Realtime Interface Co-Processor: 6-Port V.35 Interface Board/A
7102	A	Realtime Interface Co-Processor: EIA RS-232-C Multiport Interface Cable
7104	A	Realtime Interface Co-Processor: Synchronous Interface Cable
7106	A	Realtime Interface Co-Processor: 6-Port V.35 Cable

Feature Number	R 2 1	Description
		A = Available S = Supported N = Not Supported, Must Be Removed
7107	A	Realtime Interface Co-Processor: V.35 Network Cable
7108	A	Realtime Interface Co-Processor: 8-Port Cable
7111	A	Realtime Interface Co-Processor: X.21 Network Cable
8128	A	128-Port Asynchronous Controller
8130	A	Remote Asynchronous Node 16-Port EIA 232
8131	A	128-Port Asynchronous Controller Cable, 4.5 Meter (15 feet)
8132	A	128-Port Asynchronous Controller Cable, 23 cm (9 inches)
8133	A	RJ-45 to DB-25 Converter Cable
9042	N	1MB L2 Cache Specify
9077	A	64MB Base S5 Memory
9130	A	1.1GB Base SCSI-2 Disk Drive
9218	S	Internal CD-ROM-2 Specify
9221	A	3.5-Inch 1.44MB Diskette Drive Specify
9238	N	64MB HD3 Memory Specify
9249	S	1GB SCSI-2 Disk Drive Specify
9290	A	CPU Drawer Specify
9300	A	Language Group Specify — U.S. English
9606	A	Base Quad-Speed Tray-Loading CD-ROM
9893	A	Drawer Glide and Cable Management Hardware Specify
9894	A	Remote Reset Port Specify
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### Devices Supported for Model R21

**External Storage Machines:** The following machines are rack-mountable:

- IBM 9333 Model 010 High-Performance Disk Drive Subsystem
  - Interface: Serial link (#6212)
  - Rack mount: 4 EIA
  - Power input: 200-240 V AC/300 V DC (or - 48 V DC option)
- IBM 9333 Model 011 High-Performance Disk Drive Subsystem
  - Interface: Serial link (#6212)
  - Rack mount: 4 EIA
  - Power input: 200-240 V AC/300 V DC (or - 48 V DC option)
- IBM 9334 Model 010 Drawer Expansion Unit
  - Interface: SCSI (#2410, #2415, #2835)
  - Rack mount: 4 EIA
  - Power input: 200-240 V AC/300 V DC (or - 48 V DC RPQ)

- IBM 9334 Model 011 Drawer Expansion Unit
    - Interface: SCSI (#2420, #2416)
    - Rack mount: 4 EIA
    - Power input: 200-240 V AC/300 V DC (or - 48 V DC RPQ)
  - IBM 0562 Model 001 LAGO\*\* Systems 270GB LS/380L DataWheel\*\* 8 mm Tape Library
    - Interface: SCSI (#2410, #2415)
    - Rack mount: 4 EIA
    - Power input: 100-240 V AC
  - IBM 0562 Model 002 LAGO Systems 270GB LS/380L DataWheel 8 mm Tape Library with Laser Bar Code Scanner
    - Interface: SCSI (#2410, #2415)
    - Rack mount: 4 EIA
    - Power input: 100-240 V AC
  - IBM 3490 Model C11 4.8GB Enhanced Capability Magnetic Tape Subsystem
    - Interface: SCSI (#2420, #2416)
    - Rack mount: 14 EIA
    - Power input: 200-240 V AC/300 V DC
  - IBM 3490 Model C22 9.6GB Enhanced Capability Magnetic Tape Subsystem
    - Interface: SCSI (#2420, #2416)
    - Rack mount: 14 EIA
    - Power input: 200-240 V AC/300 V DC
  - IBM 3490 Model E11 Enhanced Capability Magnetic Tape Subsystem
    - Interface: SCSI (#2420, #2416)
    - Rack mount: 8 EIA for pair of E11s
    - Power input: 200-240 V AC/300 V DC
  - IBM 3590 High Performance Tape Subsystem Model B1A
    - Interface: SCSI (#2416, #2420, and #2412)
    - Rack mount: 12 EIA
    - Power input: 200-240 V AC/300 V DC (or - 48 V DC RPQ)
  - IBM 7134 Model 010 High Density SCSI Disk Subsystem
    - Interface: SCSI (#2416)
    - Rack mount: 4 EIA
    - Power input: 200-240 V AC/300 V DC (or - 48 V DC RPQ)
  - IBM 7135 Model 010 RAIDiant Array
    - Interface: SCSI (#2420, #2416)
    - Rack mount: 6 EIA
    - Power input: 200-240 V AC/300 V DC (or - 48 V DC RPQ)
  - IBM 7135 Model 110 RAIDiant Array<sup>1</sup>
    - Interface: SCSI (#2420, #2416)
    - Rack mount: 6/10 EIA
    - Power input: 200-240 V AC/300 V DC (or - 48 V DC RPQ)
  - IBM 7135 Model 210 RAIDiant Array<sup>2</sup>
    - Interface: SCSI (#2412)
    - Rack mount: 6/10 EIA
    - Power input: 200-240 V AC/300 V DC (or - 48 V DC RPQ)
  - IBM 7137 Model 512, 513, and 514 Disk Array Subsystem
    - Interface: SCSI (#2416)
    - Rack mount: 4 EIA
    - Power input: 200-240 V AC, auto-ranging; 50/60Hz
- <sup>1</sup> Supported by AIX/6000 Version 3.2.5 only  
<sup>2</sup> Supported by AIX Version 4.1.3 only
- The following machines may be attached but are not rack-mountable:
- IBM 0840 Model 001 Exabyte EXB-10e 50GB 8 mm Tape Cartridge Handling Subsystem
  - IBM 3514 Models 212 and 213 Disk Array Subsystems
  - IBM 3995 Optical Library Dataserver Models A63, 063, and 163
  - IBM 3494 Models L10 and L12 Tape Library Dataservers
  - IBM 7331 8 mm Tape Library Model 205
  - IBM 7131 SCSI MultiStorage Tower Model 105
  - IBM 7332 4 mm DAT Tape Autoloader Model 005
  - IBM 7137 Models 412, 413, and 414 Disk Array Subsystems
- The following machines are positioned on top of the rack:
- IBM 7203 Model 001 Portable Disk Unit
  - IBM 7204 Model 001 1GB External Disk Drive
  - IBM 7204 Model 010 1GB External Disk Drive
  - IBM 7204 Model 215 2GB External Disk Drive
  - IBM 7204 Model 315 2GB Fast/Wide External Disk Drive
  - IBM 7204 Model 317 External Disk Drive
  - IBM 7204 Model 325 External Disk Drive
  - IBM 7206 Model 001 2.0GB External 4 mm Tape Drive (2.0GB)
  - IBM 7206 Model 005 2.0GB External 4 mm Tape Drive (4.0GB)
  - IBM 7207 Model 001 150MB ¼-inch Tape Drive
  - IBM 7207 Model 011 525MB External ¼-Inch Cartridge Tape Drive
  - IBM 7207 Model 012 1.2GB External ¼-Inch Cartridge Tape Drive
  - IBM 7208 Model 001 External 8 mm Tape Drive (2.3GB)
  - IBM 7208 Model 011 External 8 mm Tape Drive (5.0GB)
  - IBM 7208 Model 012 External 8 mm Tape Drive (5.0GB)
  - IBM 7209 Model 001 Optical Disk Drive (595MB)
  - IBM 7209 Model 002 Optical Disk Drive (1.19GB)
  - IBM 7210 Model 001 External CD-ROM Drive
  - IBM 7210 Model 010 External CD-ROM Drive
  - IBM 7210 Model 005 External CD-ROM Drive
- The following unit is a Micro Channel adapter with software:
- IBM 0562 Model 004 Prestoserve for IBM AIX/6000
- Trunk Processors:** The following machine can be attached, but is not rack mounted:
- IBM 9291 Single Digital Trunk Processor
- The following machine is rack mounted:
- IBM 9295 Multiple Digital Trunk Processor
    - Interface: Trunk adapter (#6300, #6305)
    - Rack mount: 6 EIA
    - Power Input: 200-240 V AC/300 V DC

**Network Servers:** The following machine can be attached but is not rack mounted:

- IBM 7318 Serial Communication Network Servers

**Fibre Channel:** The following machine is rack mounted:

- IBM 7319 Fibre Channel Switch 16/266
  - Interface: Fibre Channel Adapter (#1906)
  - Rack mount: 2 EIA
  - Power Input: 100-240 V AC

**S/370 Channel Attached Machines (Require #2759)**

- IBM 3825 Page Printer
- IBM 3827 Page Printer
- IBM 3838 Advanced Function Magnetic Ink Character Recognition (MICR) Printer
- IBM 3835 Page Printer Model 1
- IBM 3835 Page Printer Model 2
- IBM 3900 Advanced Function Printer
- IBM 3480 Magnetic Tape Subsystem, all models
- IBM 3490 Magnetic Tape Subsystem, all models
- IBM 3490E Magnetic Tape Subsystem, all models
- IBM 3494 Tape Library Dataserver
- IBM 3495 Tape Library Dataserver

**S/390 ESCON Channel Attached Machines (Require #2754)**

- IBM 3490 Magnetic Tape Subsystem, all models
- IBM 3490E Magnetic Tape Subsystem, all models
- IBM 3494 Tape Library Dataserver
- IBM 3495 Tape Library Dataserver

**ASCII Terminals:** The IBM 3151, 3161, 3162, 3163, and 3164 are supported in 3161 mode. Support of the IBM 3164 includes color attributes.

- IBM 3151 Model 310/410<sup>3</sup>
- IBM 3161<sup>3</sup>
- IBM 3162<sup>3</sup>
- IBM 3163<sup>3</sup>
- IBM 3164<sup>3</sup>
- DEC\*\* VT100
- DEC VT220
- DEC VT320
- DEC VT330
- WYSE\*\* 30
- WYSE 50
- WYSE 60
- WYSE 350

<sup>3</sup> National language models are supported by a cartridge with ISO 8859-1 and national language keyboards.

**X Terminals**

- IBM Xstation 120
- IBM Xstation 130
- IBM Xstation 140
- IBM Xstation 150
- IBM Xstation 160

**Plotters**

- IBM 6180 Model 1 Color
- IBM 6182 Color
- IBM 6184 Color
- IBM 6185 Model 1 Color
- IBM 6185 Model 2 Color
- IBM 6186 Color
- IBM 6187 Color
- IBM 7372 Color

**Modems:** Modem support is provided to allow communication through telecommunications networks using dial-up or leased lines with asynchronous protocols or the synchronous half-duplexed synchronous data link control (SDLC) or binary synchronous communication (BSC) protocols. Not all of the features supported by the listed modems are supported by AIX Version 3 for RISC System/6000.

Modems	Protocols	Standards
IBM 5822 up to 56 Kbps		SYNC CCITT V.35
IBM 5841 1200 bps	ASYN	SYNC EIA-232D
IBM 5853 2400 bps	ASYN	SYNC EIA-232D, CCITT V.24
IBM 5865 9600 bps		SYNC EIA-232D, CCITT V.24
IBM 7855 up to 19.2 Kbps	ASYN	CCITT V.32 V.22 bis Bell 103, 212
IBM 7861 up to 19.2 Kbps		SYNC EIA-232D, CCITT V.24
IBM 7868 up to 19.2 Kbps		SYNC EIA-232D, CCITT V.24
Hayes Smartmodem 1200**	ASYN	EIA-232D
Hayes Smartmodem 2400**	ASYN	SDLC EIA-232D, CCITT V.24
Hayes V-Series 9600	ASYN	SDLC EIA-232D, CCITT V.24
Racal-Vadic** 1200PA	ASYN	EIA-232D
Racal-Vadic 1200VP	ASYN	EIA-232D
Racal-Vadic VI2422	ASYN	EIA-232D
Racal-Vadic 2400PA	ASYN	EIA-232D
Racal-Vadic 2400VP	ASYN	EIA-232D
Racal-Vadic VI1222VP	ASYN	EIA-232D
Telebit Trailblazer Plus	ASYN	EIA-232D

**Printers**

- IBM 2380-001 Personal Printer II
- IBM 2381-001 Personal Printer II
- IBM 2390-001 Personal Printer II
- IBM 2391-001 Personal Printer II
- IBM 2380 Plus Printer
- IBM 2381 Plus Printer
- IBM 2390 Plus Printer
- IBM 2391 Plus Printer
- IBM 3112-001 Page Printer<sup>1</sup>
- IBM 3116-001, -002, -003 Page Printers<sup>1</sup>
- IBM 3130 Page Printer with PSF/6000™
- IBM 3812-002 Page Printer
- IBM 3816-01D and 01S Page Printers
- IBM 3825 Advanced Function Printer
- IBM 3827 Advanced Function Printer
- IBM 3829 Advanced Function Printer
- IBM 3831 Page Printer
- IBM 3835-001 Advanced Function Printer
- IBM 3835-002 Advanced Function Printer
- IBM 3900 Advanced Function Printer
- IBM 3912 Page Printer
- IBM 3916 Page Printer, Models AS0, AS1, NS0, NS1
- IBM 3930-03D, -03S Page Printers
- IBM 4019-001 LaserPrinter
- IBM 4019-E01 LaserPrinter E
- IBM 4028-NS1, AS1 LaserPrinters
- IBM 4029-010 LaserPrinter 5E
- IBM 4029-020 LaserPrinter 6
- IBM 4029-022 LaserPrinter

- IBM 4029-030 LaserPrinter 10
- IBM 4029-040 LaserPrinter 10L
- IBM 4029-042 LaserPrinter
- IBM 4037 5E Page Printer
- IBM 4039-10R LaserPrinter 10R
- IBM 4039-10D LaserPrinter 10D
- IBM 4039-12L LaserPrinter 12L
- IBM 4039-12R LaserPrinter 12R Plus
- IBM 4039-16L LaserPrinter 16L
- IBM 4070 IJ Printer Model 1
- 4072-001 ExecJet® Printer
- IBM 4076 ExecJet II Printer
- IBM 4079-001 Color JetPrinter
- 4201-002 Proprinter® II
- IBM 4201-003 Proprinter III
- IBM 4202-002 Proprinter II XL
- IBM 4202-003 Proprinter III XL
- IBM 4207-002 Proprinter X24E
- IBM 4208-002 Proprinter XL24E
- IBM 4212-001 Proprinter 24P
- IBM 4216-031 Personal Page Printer II
- IBM 4224-301, 302, 3C2, and 3E3 Serial Printers
- IBM 4226-302 Printer
- IBM 4230 Impact Printer Models 4S3, 4I3, 5S3, and 5I3
- IBM 4232-302 Impact Dot Matrix Printer
- IBM 4234-009 Line Dot Matrix Printer
- IBM 4234-13 Line Dot Matrix Printer
- 5202-001 Quietwriter® III
- 5204-001 Quickwriter®
- 6252 AP2, AS2, AP8, and AS8 Impactwriters®
- IBM 6262 A12, A14, and A22
- IBM 6408 Line Matrix Printer<sup>4</sup>
- IBM 6412 Model CTA Line Matrix Printer<sup>4</sup>
- IBM 4208-502 Proprinter XL24E
- IBM 4216-510 Personal Page Printer II
- IBM 5327-011 Line Dot Matrix Kanji Printer
- IBM 5572 Model B02 Kanji Printer
- IBM 5573 Model H02 Kanji Printer
- IBM 5575 Models B02, F02, and H02 Serial Dot Matrix Kanji Printers
- IBM 5577 Models B02, F02, FU2, G02, H02, J02, and K02 Serial Dot Matrix Kanji Printers
- IBM 5579 Models H02 and K02 Kanji Printers
- IBM 5584 Models G02 and H02 Kanji Printers
- IBM 5585 Model H01 Kanji Printer
- IBM 5587 Models G01 and H01 Page Kanji Printers
- IBM 5589 Model H01 Kanji Printer
- Bull Compuprint PageMaster 1015
- Bull Compuprint PageMaster 1021
- Bull Compuprint PageMaster 1025
- Bull Compuprint PageMaster 1625
- Bull Compuprint PageMaster 200
- Bull Compuprint PageMaster 201
- Bull Compuprint PageMaster 411
- Bull Compuprint PageMaster 413
- Bull Compuprint PageMaster 422
- Bull Compuprint PageMaster 721
- Bull Compuprint PageMaster 815
- Bull Compuprint PageMaster 825
- Bull Compuprint 1070
- Bull Compuprint 4/51
- Bull Compuprint 4/54
- Bull Compuprint 914
- Bull Compuprint 914N
- Bull Compuprint 922
- Bull Compuprint 923
- Bull Compuprint 924
- Bull Compuprint 924N
- Bull Compuprint 956
- Bull Compuprint 970
- Bull PR-88
- Bull PR-88 VFU Handling
- Bull PR-90 Printer
- Canon Laser Shot LBP-A404PS/Lite

- Canon Laser Shot LBP-B406G
- Canon Laser Shot LBP-B406/S/D/E, A404/E, and A304/E
- DATAPRODUCTS LZR 2665\*\*
- DATAPRODUCTS BP 2000\*\*
- HP\*\* Color LaserJet<sup>5</sup>
- HP LaserJet Series II\*\*
- HP LaserJet Series III\*\*
- HP LaserJet Series III Si
- HP LaserJet 4/4M<sup>5</sup>
- HP LaserJet 4Si/4Si MX<sup>5</sup>
- HP LaserJet 4 Plus/4M Plus<sup>5</sup>
- HP LaserJet 4V/4MV<sup>4</sup>
- Lexmark 4039-10R LaserPrinter Plus 10R<sup>5</sup>
- Lexmark 4039-12L LaserPrinter Plus 12L<sup>5</sup>
- Lexmark 4039-12R LaserPrinter Plus 12R<sup>5</sup>
- Lexmark 4039-16L LaserPrinter Plus 16L<sup>5</sup>
- Lexmark 4047 5E
- Lexmark 4047-05E ValueWriter 600<sup>5</sup>
- Lexmark 4076-02C ExecJet IIc<sup>5</sup>
- Lexmark 4079-001 Color JetPrinter Plus<sup>5</sup>
- Lexmark Optra Laser Printer Lxi, Lx, Rx, L, and R<sup>5</sup>
- OKI Microline 801PS/+F
- OKI Microline 801PSII/+F
- OKI Microline 800PSIIILT
- PRINTRONIX P9012\*\*
- QMS\*\* Colorscript 100 Model 20
- TI OmniLaser 2115\*\*

#### Printer Notes:

1. When using the serial ports, the IBM 4019 requires feature number 9143 (System serial interface adapter) for attachment to the RISC System/6000 system.
2. Impactwriter Models AP8 and AS8 emulate the IBM 4202-3 Printer for traditional line printing of simple text and numbers. Graphics, all points addressable, and large characters cannot be printed.
3. AIX support software for the IBM LaserPrinter Integrated Network Option has the Network Option cards (#5495, #5496, #5497) on the IBM 4039 LaserPrinter.

#### Printer Information:

1. The IBM RISC System/6000 system supports Code Page 850. The Code Page 850 cartridge must be installed on the IBM 5202 Printer to fully use the full characters sets of the system. For details on available cartridges, refer to the IBM 5202 Sales Manual. Other IBM printers have Code Page 850 resident.
2. For optimum system performance, high-speed serial printers should be attached to the native ports or 128-Port Async Subsystem.
3. The parallel printer port is provided for the convenience character printer. High-speed printers or applications requiring a large amount of data transfer per page (for example, high-density graphics) should use the serial interface for optimum system performance.

#### Printer Peripherals

- 4033-001 IBM LAN Connection for Printers and Plotters (Token-Ring)
- 4033-002 IBM LAN Connection for Printers and Plotters (Ethernet, Twisted Pair)
- 4033-003 IBM LAN Connection for Printers and Plotters (Ethernet, Thick and Thin)
- HP JetDirect Network Attachment
- MarkNet LAN Adapters for Printers and Plotters Models 201, 202, 301, and 302

<sup>4</sup> Some models are supported in emulation mode.

<sup>5</sup> AIX Version 4.1.3, or later, releases are required for these printers.

**Mathematical Acceleration SubSystem (MASS):** MASS provides users of the RISC System/6000 family of systems with a set of programs that may be used to improve the performance of their scientific and technical applications. The program set includes accelerated mathematical intrinsic functions (sin, cos, log), which can be used in place of the corresponding functions in the AIX run-time library *libm.a* without requiring the user to make changes in application source code. Possible performance improvements using MASS intrinsic functions are indicated from the following application measurement data:

Application	POWER2 Runtime Percent Reduction
SPECFP92	2.6
Crystallography	6.5 to 71
Fluid Dynamics	11
Reactor Modelling	14

MASS also includes some vector functions (vlog, vexp) whose use requires that source code be modified. Performance gains may be substantial if these functions are used extensively in an application that uses them on long vectors. These functions have been designed to take advantage of special features in the POWER2 systems (for example, multiple functional units and quad-word loads and stores).

MASS is available to all AIX users at no charge. It can be downloaded from the Austin Home Page on the Internet at the URL:

<http://www.austin.ibm.com/tech/MASS>

Follow the directions seen there. Software vendors who want to include MASS in their programs can obtain it from the AIX DEVCON CD-ROM service.

MASS is licensed to you under the terms and conditions of your AIX license with IBM and the following additional provisions: Notwithstanding anything to the contrary contained in your AIX license, MASS is provided to you AS IS. IBM MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IBM has no obligation to defend or indemnify against any claim of infringement, including, but not limited to, patents, copyright, trade secret, or intellectual property rights of any kind.

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## Product Positioning

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The RISC System/6000 Model R21 provides the highest level of floating-point intensive application performance in the RS/6000 rack server product line. Its level of performance exceeds the Model 990, and is packaged as an R-series rack drawer.

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## Publications

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The System Library Subscription Service (SLSS) is available by order number only. Customers currently subscribing to SLSS will receive publication updates automatically.

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## Education Support

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Education to support the IBM RISC System/6000 hardware and related software is available to support effective installation planning, programming, and efficient day-to-day operations. For a complete listing of available courses, contact your IBM representative or call IBM

Education and Training at 800-IBM-TEACH (426-8322), for education catalogs, schedules, and enrollments.

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## Technical Information

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### Specified Operating Environment

**Physical Specifications:** The Model R21 is a CPU drawer that can be installed in a rack that meets the requirements of Electronics Industries Standards (EIA) EIA-310C standard.

#### Net Weight and Physical Size of CPU Drawer

- Width: 445.5 mm (17.5 inches)
- Depth: 610 mm (24 inches)
- Height: 266.7 mm (10.5 inches)
- EIA Units: 6
- Weight: 30.3 kg (65 pounds) (configuration dependent)

#### Power Supply

- Thermal Output: 125 to 770 joules/sec (430 to 2630 Btu per hour)
- Power Source Loading: 0.14KVA to 0.77KVA

#### Operating Environment

**Electro Magnetic Compatibility (EMC) Conformance Classification:** This equipment is subject to FCC rules and it shall comply with the appropriate FCC rules before final delivery to the buyer or centers of distribution.

- U.S.A. —FCC Class A
- Germany —VDE Class A (IOP)
- Japan —VCCI-1
- Europe and New Zealand — CISPR 22 Class A - CEMARK A
- Temperature: Dry Bulb 10° to 40°C (50° to 104°F)
- Relative Humidity: 8% to 80%
- Maximum Wet Bulb: 27°C (81°F)
- Noise Level: 42 dBa idle, 44 dBa operating, average sound pressure level at a 1 meter position.
- Sound Power Level: 5.7 Bels idle and 5.9 Bels operating. The principal machine configuration tested for sound power includes the following:
  - CPU drawer with two 2.0GB SCSI Disk Drives, one CD-ROM device, and one 3.5-inch diskette drive.
  - CPU drawer mounted in a R00 System Rack. The empty spaces above and below the unit are covered with blank panels.
  - The machine is operating in a nominal environment 25°C (77°F).

#### Hardware Requirements

- R00 System Rack: None
- Model R21: An IBM-supported ASCII terminal must be attached to Model R21. This terminal must be located within six meters (19.6 feet) of the system rack. The Model R21 operator's panel must be viewable from this terminal.

**Limitations:** Memory must be installed in combinations of 2, 4, or 8 cards. The first two (if only two cards installed) or first four (if four cards installed) memory cards installed **must** be of equal capacity. The second set of four memory cards installed can be of any available supported capacity but also must be of equal capacity to each other and installed simultaneously. An example of a useable configuration follows:



Memory card one	128MB
Memory card two	128MB
Memory card three	128MB
Memory card four	128MB
Memory card five	64MB
Memory card six	64MB
Memory card seven	64MB
Memory card eight	64MB

Similarly, if Memory SIMM kits are installed, the memory capacity of cards one-four and cards five-eight must be kept equal.

**Software Requirements:** AIX/6000 Version 3.2.5 with additional program temporary fixes (PTFs) or AIX Version 4.1.3, or later releases, must be installed and ordered separately for the Model R21 and for upgrades to the Model R21. The additional Version 3.2.5 PTFs are included on all AIX/6000 Version 3.2.5 orders shipped after May 19, 1995, labeled **AIX 3.2.5 Enhancement 5** (3250-05-00). To determine the level of AIX operating system installed, use the command "oslevel -b"; a response of "3251" indicates AIX 3.2.5 Enhancement 5.

AIX/6000 applications written for POWER-based RISC System/6000s can run on the new POWER2-based models without recompilation, and may run significantly faster. Additional performance can be achieved by recompiling with the latest versions of the IBM XL compilers to further exploit the POWER2 technology.

Applications compiled using a compiler option to exploit POWER2 technology may not function properly on systems that do not use the new POWER2 technology. Customers with any combination of POWER-, PowerPC™ 6xx- and POWER2-based systems may continue to run their applications unmodified. New applications and recompilation of existing applications for use in a mixed processor environment should be compiled using the POWER or common mode options available in the new XL compilers or any other compilers that support those options.

Refer to Software Announcements 293-488 and 293-493, dated September 21, 1993, for more information.

The RS/6000 Model R21 has been tested and approved for use in a clustered environment running HACMP/6000 Version 3.1.1 and AIX/6000 Version 3.2.5. HACMP support requires a PTF available August 31, 1995.

**Model Conversions:** The following model upgrades are offered:

- R10 to the R21
- R20 to the R21

An upgraded machine must have a minimum of two memory cards totaling 128MB or more. Total memory cards in the machine can only be 2, 4, or 8. The first two cards (if only two installed) or first four cards (if four installed) must be of equal capacity. Also, the last four cards must be of equal capacity.

Existing RISC System/6000 R-series memory cards are not compatible with the new Model R21. Special exchange prices are available for the R10 features as shown in the matrix below. The 128MB memory requirement may be satisfied by purchasing new memory cards or exchanging 32MB, 64MB, 128MB, or 256MB memory cards as required.

An upgraded machine must have a minimum of 1GB SCSI-2 disk storage and a CD-ROM or tape select from the CD-ROM feature. The customer must purchase and

have these features installed before beginning the upgrade.

Special prices for the following memory feature exchange are offered on upgrades to a Model R21. IBM will exchange currently installed memory cards for equal capacity memory cards compatible to the R21.

Feature From Models		Feature To Model	Special Memory Exchange Offering	
R10	R20	R21	From	To
4067	4067	4076	32MB to	32MB
4069	4069	4077	64MB to	64MB
9238	9238	4077	64MB to	64MB
4090	4090	4078	128MB to	128MB
4094	4094	4078	128MB to	128MB
N/A	4095	4079	256MB to	256MB
N/A	4097	4079	256MB to	256MB

AIX/6000 Version 3.2.5 or AIX Version 4.1.3 must be installed and operational before beginning the upgrade.

The model conversion MESSs contain some or all of the following items and are ordered through the HONE configurator:

- Processor replacement
- Power supply
- As-required engineering changes
- Installation instructions
- New publications

Features removed in performing an upgrade remain the property of IBM and must be returned to IBM.

**Limitations for R21 (Per Processor)**

- A maximum of one SCSI-2 Drawer (#6226) may be ordered. One SCSI Adapter (#2415) is required for feature number 6226.
- Feature numbers 2515, 2518, 2603, 2630, 6142, and 6147 are available only with the SCSI-2 Drawer (#6226).
- A maximum of one ½-Inch 9-Track Tape Drive Drawer (#6140) may be attached per processor.
- A maximum of seven SCSI and Serial-link Adapters in combination (#2410, #2415, #2416, #2835, #6212, and #6213).
- A maximum of four SCSI-Differential Adapters (#2420).
- A maximum of six Serial-link Adapters (#6212 or #6213).
- A maximum of eight RAIDiant (IBM 7135) subsystems. One SCSI-2 adapter is required for each one or two 7135 subsystems.
- A maximum of one Async Adapter or 4-Port Multiprotocol Communications Controller (#2700, #2930, #2940, #2950, #2955, or #2957).
- A maximum of five Fiber Distributed Data Interface Adapters in combination (#2723, #2724, #2725, or #2726).
- A maximum of four X.25 Interface Co-Processors (#2960).
- A maximum of two Block Multiplexer Channel Adapter (#2755).
- A maximum of four S/370 Channel Emulator/A (#2759).

- A maximum of seven 128-Port Async Adapters (#8128).
- A maximum of seven Network Terminal Accelerator Adapters in combination (#2402, #2403).
- A maximum of seven Token-Ring (#2970) and/or Ethernet (#2980) adapters in combination.
- Memory cards for Model R21 must be EC level 33 or greater.

**Limitations for Disk Storage Adapters and Subsystems on Model R21:** Storage configurations can be maximized for individual types of storage or combination of types (for example, all SCSI, all serial-link, SCSI and serial-link in combination). The following chart shows maximum disk capacity for each maximized configuration. The **Assumptions** section defines each adapter/subsystem combination. The **Configuration** sections show the type or combination of types of storage in each header followed by the quantity of each adapter in the left-hand column with the quantity of each type of storage in the center and right-hand columns.

- Assumptions
  - SCSI-2 SE Adapter connects to one IBM 9334-010
    - 9334-010 contains one 2GB and three 2.41GB disks = 9.23GB
  - Each 7134 contains 67.50GB
  - SCSI-2 Differential Adapter connects to one bus of 15 4.5GB disks
  - SCSI-2 Differential Adapter connects to two IBM 7135 RAIDiant arrays
    - Each 7135 contains 30 to 2GB disks
    - Assume Protected Mode = 48GB
  - Serial-link Adapter connects to four IBM 9333
    - Each 9333 contains four 2GB disks = 8GB
  - Integrated SCSI supports internal media and disk devices
- Calculated storage limits:
  - Maximum without IBM 7135 RAIDiant Array: 499GB
  - Maximum with IBM 7135 RAIDiant Array: 1070GB

Number of Adapters	Internal and RAID7135	9333 and SCSI Drawers
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**CONFIGURATION 1 —  
BASE + SCSI-SE: 69GB**

7 SCSI-2 SE	INTERNAL @	4GB	7 -9334 @	9.23GB
0 SCSI-2 DIFF	0 -RAID7135 @	108GB	0 -Diff @	67.50GB
0 SERIAL			0 -9333 @	8.00GB

**CONFIGURATION 2 —  
BASE + SCSI-DIFF: 476GB**

0 SCSI-2 SE	INTERNAL @	4GB	0 -9334 @	9.23GB
7 SCSI-2 DIFF	0 -RAID7135 @	108GB	7 -Diff @	67.50GB
0 SERIAL			0 -9333 @	8.00GB

**CONFIGURATION 3 —  
BASE + SERIAL: 196GB**

0 SCSI-2 SE	2 INTERNAL @	2GB	0 -9334 @	9.23GB
0 SCSI-2 DIFF	0 -RAID7135 @	108GB	0 -Diff @	67.50GB
6 SERIAL			24 -9333 @	8.00GB

**CONFIGURATION 4 —  
BASE + RAID: 868GB**

0 SCSI-2 SE	2 INTERNAL @	2GB	0 -9334 @	9.23GB
4 SCSI-2 Diff	8 -RAID7135 @	108GB	0 -Diff @	67.50GB
0 SERIAL			0 -9333 @	8.00GB

**CONFIGURATION 5 —  
BASE + RAID + SCSI: 1070GB**

0 SCSI-2 SE	2 INTERNAL @	2GB	0 -9334 @	9.23GB
7 SCSI-2 Diff	8 -RAID7135 @	108GB	3 -Diff @	14.00GB
0 SERIAL			0 -9333 @	8.00GB

**CONFIGURATION 6 —  
BASE + RAID + SERIAL: 964GB**

0 SCSI-2 SE	2 Internal @	2GB	0 -9334 @	9.23GB
4 SCSI-2 DIFF	8 -RAID7135 @	108GB	0 -Diff @	67.50GB
3 SERIAL			12 -9333 @	8.00GB

**Planning Information**

**Cable Orders:** No cables required.

**Security, Auditability, and Control**

Security and auditability features of this product include a three-position, key-operated MODE switch that helps provide logic security for the system.

This product uses the security and auditability features of host hardware, software, and/or application software.

User management is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

**Terms and Conditions**

This product is available for purchase under the terms of the IBM Customer Agreement (ICA).

**Volume Orders:** For information regarding volume orders, contact your IBM representative.

**IBM Credit Corporation Financing:** Term leases and installment payment plans are available for commercial and state and local government customers.

**Warranty Period:** One year

**Warranty Service:** IBM On-Site Repair (IOR)

**Maintenance Service:** IOR

**IBM Hourly Service Rate Classification:** Two

IBM Warranty Service, Maintenance Service, or IBM Hourly Service may be obtained by calling 800-IBM-SERV (426-7378). IBM Hourly Service is available at the applicable rate and terms, including element exchange price if applicable.

**Mid-Range System Option:** The announced product is an eligible machine for the Mid-Range System Option\* of the ICA.

Eligible Type	Discount	
	Three-Year	Five-Year
Machine Type 7015	12%	17%

**Corporate Service Option:** The announced product is an eligible machine for the Corporate Service Option\* of the ICA.

**Discount**  
**Three-Year      Five-Year**

Network	15%	20%
System	12%	17%

\* A revised exhibit will be available at a later date.

**IBM Software Support Services:** IBM offers several on-going support services designed to meet your varying system support requirements. The AIX/6000 Support Family, announced on March 16, 1993, includes AIX/6000 SupportLine, AIX/6000 ConsultLine, AIX/6000 Associate, AIX/6000 HouseCall, AIX/6000 Performance Management, and AIX Technical Library/6000. The support family also includes three reduced-price support packages, each designed for specific types of user environments.

SystemXtra™ for RISC System/6000, an IBM software support service that provided a single place to call for assistance with questions and problems, was withdrawn from marketing concurrently with the availability of the AIX/6000 Support Family on March 16, 1993. AIX/6000 Support Family includes services that are effective replacements for both the Technical Support Center option and the Program Upgrade Installation option of SystemXtra.

For complete details on the new family of services and the withdrawal of SystemXtra, refer to Services Announcement 693-004, dated March 16, 1993, or contact your IBM representative.

**Extended Maintenance Option:** The announced product is an eligible machine under the Extended Maintenance Option of the ICA.

**Product Availability Status:** New product available

**Field Installable Features:** Yes

**Model Conversions:** Yes

**Customer Setup:** No

**Licensed Internal Code:** Yes

**Educational Allowance:** A 15% educational allowance is available to qualifying institutions in accordance with the Attachment for Educational Allowance for the Model R21. The educational allowance may not be added to any other discount or allowance.

**Charges**

Description	Feature Number	Purchase Price	Monthly MMC
<b>Model R21</b>			
RISC System/6000 2.2GB 8-Bit SCSI2 SE Select		\$64,500	\$645
128MB S5 Memory Select	3089	800	
256MB S5 Memory Select	4038	4,800	
32MB S5 Memory	4039	15,600	
64MB S5 Memory	4076	3,600	
128MB S5 Memory	4077	6,000	
256MB S5 Memory	4078	10,800	
64MB S5 Memory SIMM Upgrade	4079	21,600	
64MB Base S5 Memory	5065	4,400	
	9077	0	

**Model R00**

Rack Content Specify: 7511/R21 — 6EIA	0118	0
Rack Content Specify: 7115/R21 with 6226 — 10EIA	0019	0
Rack Content Specify: 7135/210 — 10EIA	0151	0

MMC = Minimum Maintenance Charge

**Model Conversion Purchase Prices**

Model From	Model To	Model Conversion Purchase Price <sup>6</sup>
R10	R21	\$35,000
R20	R21	20,000

<sup>6</sup> If field installed on a purchased machine, parts removed or replaced become the property of IBM and must be returned.

\*\* Company, product, or service name may be a trademark or service mark of others.