FUJITSU COMPUTERS SIEMENS

RM400 E Models

Servers for Reliant UNIX®

The new RM400 E UNIX® servers offer scalable performance from mono-processor up to quad-processor configurations on the basis of an innovative and flexible system design. Main-memory configurations are expandable up to 8 GB and the servers incorporate a high-performance SCSI subsystem (Ultra-2 with max. 80 MB/s) for external accessible devices. Ultra-2 with burst transfer rates as high as 80 MB/s is an option for the internal hard disks.

Integration of advanced technologies, including Ultra-2 SCSI and fibre channel with their ongoing development using the same system architecture are the long-term guarantee for application viability. This is also supported by the flexible housing concept, which permits use of the same basic layout in standalone and rack configurations.

The high-availability functions are exemplary and include: ECC-protected main memory and second level cache (SLC), redundant power supply unit, hot-replace hard disks, fans and power supplies, warm-replace functionality for external accessible drives.

The hard-disk capacities in the system cabinet extends from 18 up to 432 GB. This capacity can be expanded up to over 2 TB by adding peripheral cabinets. The maximum capacity can be further on increased with external RAID subsystems.

Eminently straightforward maintainability and all-inclusive server management made for significant savings on service and administration costs. A good example in this respect is the planned replacement of defective memory or CPU modules. The operating system automatically deconfigures these modules if they are faulty (LAR).

The new RM400 E models constitute the departmental class in the emerging Enterprise UNIX server generation; these are exceptional versatile systems for ultra-high requirements.

Extensive high-availability functions and integration of the very latest technologies are the long-term guarantee for dependable and expandable operation of Reliant UNIX solutions for the future.

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The New Quad-Processor Line

RM400 E

RM400 E60

1 .. 4 R10000, 250 MHz, 4 MB SLC

RM400 E70

1 .. 4 R12000, 285 MHz, 8 MB SLC

Max. main memory	8 GB
Hard-disk capacity	432 GB (internal)
16-bit Ultra-2 SCSI	80 MB/s
Hard disks	hot-replace
I/O bus	PCI
Ethernet	10/100 Mb/s
Internal RAID	Levels 0, 1, 5
PSU & fan	redundant & hot-replace

Drive bays:	**12 x 3.5" (hot-replace), 4 x 5.25"**
I/O slots:	**8 x PCI** **2 x PCI/EISA** **2 x EISA**

Reliant UNIX® 5.44 and 5.45

The RM400 E models require a 64-bit Reliant UNIX 5.44 operating system and further releases. This new version of Reliant UNIX offers the 64-bit developments support such as large main-memory configurations, file systems and address areas. Reliant UNIX 5.44 and 5.45 are fully compatible with earlier versions.

Areas of application

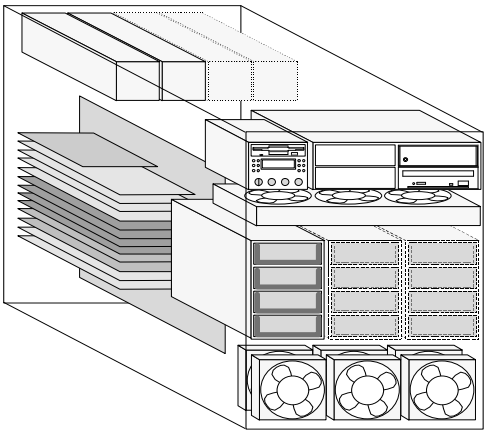
Its broad scalability and versatility qualifies the RM400 E ideal for a very wide field of application.

Special areas are applications such as:

- Application server
  e. g. BAAN, R/3
- Cluster server
  e. g. in conjunction with OBSERVE, RMS or OPS
- Database server
  e. g. with ORACLE or INFORMIX
- Internet server
- Multi-user system

System cabinet

- Innovative housing usable as tower or as 19" rack-assembly



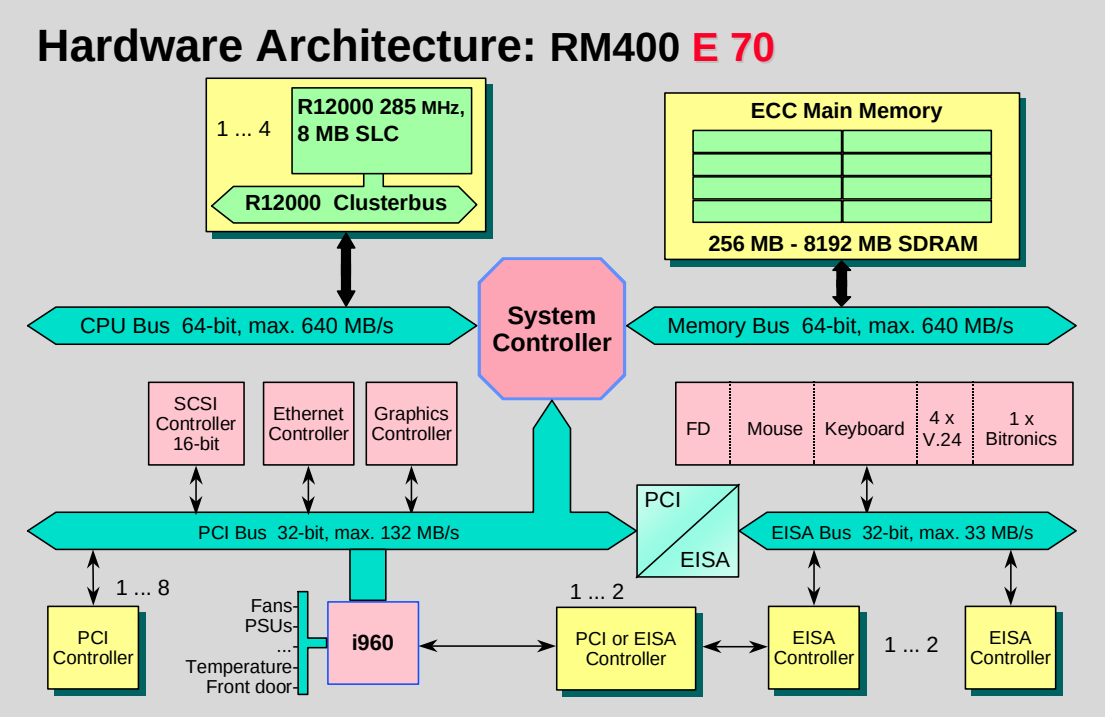
- Max. 12 hot-replace hard disks in up to three hard-disk subsystems
- 4 bays for external accessible drives
- Integrated floppy disk drive
- RAID possible inside the system cabinet;
  RAID levels 1 or 5
- Hot-replace power supply units, with optional redundancy
- Integrated server-management hardware for diagnosis and monitoring
- No tools needed for installing and removing expansion cards
- Remote diagnosis and monitoring for power supply units and fans

System board

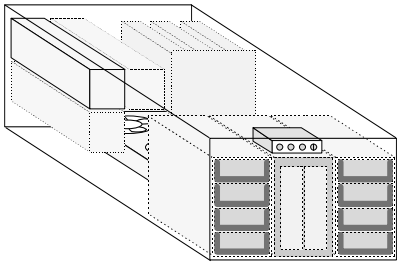
The system's principal functions are all implemented on the system board by the following components:

- **CPU board:**
  - Basic processor board R10000, 250 MHz, 4 MB SLC, upgradable to max. 4 CPUs
  - Basic processor board R12000 285 MHz, 8 MB SLC, upgradable to max. 4 CPUs
- **CPU bus, 64 bits:**
  64-bit bus, max. 640 MB/s, connects the CPU boards to the system controller.
- **System controller:**
  Bus coordinator between CPU, main memory and I/O bus
- **Memory bus, 64 bits:**
  64-bit bus, max. 640 MB/s, connects the main memory to the system controller.
- **Main memory:**
  1-2 base cards with 16 resp. 32 slots for memory modules with 256 MB. The maximum memory configuration is therefore 8192 MB. The modules are ECC protected.
- **Slots for controllers**
  8 PCI controllers
  2 EISA controllers
  2 slots for PCI or EISA controllers
- **LAN controller Ethernet**
  with a transfer rate of 10/100 Mbit/s for 10BaseT/100BaseTX
- **SCSI controller**
  with a transfer rate of max. 40 MB/s for operating the external accessible drives. The internal magnetic hard disks can be operated at up to 80 MB/s with the appropriate controllers.
- **Graphics controller**
  with 2 MB memory for driving a graphic monitor
- **I/O controller with the following interfaces:**
  - Four V.24, 38.4 Kbit/s with modem support
  - Mouse and keyboard ports
  - Parallel interface, Bitronics for printer (Centronics-compatible)

  – Floppy Disk interface.



Peripheral cabinet



- Innovative compact housing usable as office rack or as 19" rack assembly
- 3 drive cages each capable of accommodating up to 4 hot-replace hard disks or max. 2 external accessible drives
- Drive cages are driven via one or more separate SCSI channels.
- Usable as standard SCSI or RAID-SCSI subsystem
- Optional switchover modules for high availability
- Optional redundant hot-replace power supply units
- Integrated server- diagnosis and monitoring
- Max. hard-disk storage capacity 432 GB.

High availability

Continuous availability and a very high level of protection against failures were major objectives in the design for the new RM400 E models. They support up to 8 GB of main memory with error correction code (ECC). The second-level caches (SLC) of the MIPS processors are also ECC-protected, so data integrity in server operation is double assured.

The hard disks in the system can be replaced during operation (hot-replace capability) and can be RAID-protected against loss of data.

System diagnosis

The network capability of the server management plus a graphical configuration tool support the decentralized monitoring of the RM400 E models.

All status information and all measured values are accepted by the central hardware on the system board, saved and forwarded on request to the corresponding management software. This hardware functionality monitors the entire system, including the peripheral cabinets.

For this purpose the system board includes a processor system with its own battery-backed memory, built around an i960 microprocessor. The incoming information streams include measured temperatures for housings, power supply units and fans, plus status information on the power supply and the drives.

Console

An operating screen can be connected as console via the I/O controller on the system board. This in question can also be a graphical monitor. In normal operation the system can also operate without a console.

Graphical monitor

A 17” or 21” graphical monitor can be connected to the graphics controller on the system board. All monitors comply with the MPR II standard. It is also possible to use LCD monitors.

PCs and workstations

Workstations and X-terminals are connected directly to Ethernet. PCs can be connected to serial interfaces (V.24, IHSS) or directly to Ethernet. PCs can be operated with a variety of terminal emulations.

Printers

Most printers have a V.24 interface and/or a parallel interface. Consequently, they can be connected either via the V.24 interfaces or directly via the Bitronics interface on the system board. A printer with Centronics interface can also be operated via this port.

Communication

LAN

The controllers to connect the systems to local area networks are as follows:

- Onboard Ethernet
  - 10/100 Mbit/s
  - 10BaseT or 100BaseTX connection to IEEE 802.3
  - TCP/IP, OSI, and SNA protocols

- Fast Ethernet controller
  - in 1-channel and 4-channel versions
  - 10/100 Mbit/s
  - 10BaseT and 100BaseTX connection to IEEE 802.3
  - TCP/IP, OSI, and SNA protocols

- Gigabit Ethernet controller
  - 1000 Mbit/s
  - 1000BaseSX connection to IEEE 802.3z
  - TCP/IP, OSI, and SNA protocols

- Token Ring controller
  - 4/16 Mbit/s
  - to IEEE 802.5
  - TCP/IP and SNA protocols

WAN

The controllers to connect the systems to wide area networks of the various types are as follows:

- PWXV controller (2-port)
  - 2 x V.24 /V.35/X.21 interfaces controlled by smart cable
  - Maximum aggregated data transfer rate 4 Mbit/s
  - expandable to 4 ports with submodule
  - Protocols: TCP/IP, NEA, OSI, SNA, X.25, X.32, PPP, Frame Relay

- ISDN S_0 controller PWS0
  - Basic card with two S_0 interfaces
  - each S_0: two B-channels with 64 kbit/s and one D-channel with 16 kbit/s
  - D-channel signaling: 1TR6 or DSS1 (Euro ISDN)
  - Protocols: TCP/IP, NEA, OSI, SNA, X.25, X.31, PPP

- ISDN-S_{2M} controller PWS2
  - 30 B-channels, 1 D-channel with 64 kbit/s
  - D-channel signaling DSS1 (Euro-ISDN)
  - Protocols: TCP/IP, NEA, OSI, SNA, X.25, X.31, PPP

Other controllers

- Fibre Channel
  - Multimode fibre optic
  - Connecting external sub-systems: PXRE and EMC^2 Symmetrix
  - Max. transfer rate 100 MB/s
  - Bridgeable distances max. 500 m direct, with HUBs and single-mode fibre optics up to 10 km possible

- RAID controller
  - 1 SCSI interface on basic board
  - 2 additional interfaces can be added with expansion card
  - RAID modes: 0, 1, 5
  - Max. transfer rate 80 MB/s

Teleservice

The RM400 E system can be connected to a service center by modem and telephone network for remote diagnostics. Connection is by means of a V.24 interface on the system board, plus an external modem.

Technical data

RM400	E60	E70
Processor	1 - 4 R10000	1 - 4 R12000
Clock frequency (MHz)	250	285
Floating Point Unit	on chip	on chip
First Level Cache per processor (KB)		
- data	32	32
- instructions	32	32
Second Level Cache per processor (MB)	4	8
Main memory		
Number of modules per basic card	1 - 16	1 - 16
Number of basic cards	2	2
Capacity per memory module (MB)	256	256
Capacity per basic card (MB)	256-4096	256-4096
Max. aggregate capacity	8192	8192
Interfaces on the system board		
Ethernet controller	1	1
SCSI controller (8/16 bits)	1	1
V.24/Bitronics interfaces	4/1	4/1
Processor-board slots	1	1
PCI-/EISA-bus slots	8/2/2	8/2/2

Hard disk configurations (expandability)		
Hard disks in system cabinet	1 - 12	1 - 12
Hard disks in peripheral cabinet	1 - 12	1 - 12
Max. hard-disk capacity (GB)	2376	2376

Hard disk configurations (technical data)

Capacity per drive formatted (GB*)	18	36	73
Form factor	3½"	3½"	3½"
Revolutions per min..	10000	10000	10000
Mean positioning time (read/write) (ms)	5.2/5.8	5.2/6.2	5.3/6.2
SCSI-2 interface	16-bit ultra-2	16-bit ultra-2	16-bit ultra-2

* 1 GB = 10^9 bytes

DVD-ROM drive	
Form factor	5 ¼", half-height
Capacity range (CD-ROM medium)	≤ 650 MB
Capacity range (DVD-ROM medium)	≤ 4,3 GB
Interface	SCSI-2
Data transfer rate (MB/s)	5 MB/s

Magnetic tape cartridge device 8 mm (with data compression)	20-40 GB
Capacity (GB, formatted)	20.0
Capacity, compressed typically (GB)	40.0
Form factor	5 ¼", half-height
Interface	SCSI-2
Recording format	8 mm helical scan
Recording speed (KB/s) native	3000
with compression (KB/s)	6000

Magnetic tape cartridge device DLT 8000 (with data compression)	40-80 GB
Capacity, native (GB)	40.0
Capacity, compressed	
Higher compression factors are possible, depending on the data structure.	
typically (GB)	80.0
Form factor	5¼", full-height
Interface	SCSI-2
Recording format	SPR Symm. Phase Recording.
Recording speed (KB/s) native	6000
with compression	12000

Magnetic tape cartridge drive, ¼"	
Capacity, native (GB)	4
with compression (GB)	8
Higher compression factors are possible, depending on the data structure.	
Form factor	5 ¼", half-height
Interface	SCSI-2
Recording format	QIC 2GB/ 1000/525
Recording density (bpi)	49550
Data transfer rate (Kb/s), native	380
with compression	760

Floppy disk drive	
Form factor	3½"
Capacity, net (MB)	1.44
Supports MS-DOS formats	yes

Magnetic tape cartridge device 4 mm (DAT)	12-24 GB	20-40 GB
Capacity, native (GB)	12.0	20.0
Capacity, compressed typically (GB)	24.0	40.0
Form factor	3 ½"	3 ½"
Interface	SCSI-2	SCSI-2
Recording format	DDS-1	DDS-1
	DDS-2	DDS-2
	DDS-3	DDS-3
		DDS-4
Recording speed (Kb/s) native	1000	3000
with compression	2000	6000

Magnetic tape cartridge changer 4 mm (DAT autoloader)	120-240 GB
Capacity without compression (GB) per cartridge	20
Total	120
With compression (GB, typical) per cartridge	40
Total	240
Higher compression factors are possible, depending on the data structure.	
Form factor	5 ¼"
Interface	SCSI-2
Recording format	DDS-1
	DDS-2
	DDS-3
	DDS-4
Recording speed (Kb/s) native	3000
with compression	6000

All standalone devices released for the RM system can be used with the RM400 E models (if supported by the operating system), including for example DLT8000, MTC changer 8 mm, MTC ½" (3490), optical disk library.

Installation data

Environmental conditions (to DIN EN 60 721-3)	
Climatic environmental conditions (limit range of operation):	
	Class 3K3
- Temperature (°C)	5 to 40
- Relative humidity (%)	5 to 85
Transportation:	Class 2K2
- Temperature (°C)	-25 to 60
- Relative humidity (%)	15 to 98
Mechanical environmental conditions	
Operation:	Class 3M2
Transportation	Class 2M1

CE

Conformity with standards	
Product safety and ergonomics:	IEC 950, EN 60950, UL 1950 CSA 950, ZH1/618
Electromagnetic	compatibility:
- Interference emissions:	EN 55022, class B
- Interference resistance:	EN 50082-2
CE labeling:	Low Voltage Directive LVD 73/23/EEC EMC Directive 89/339/EEC
Approvals:	GS, UL (USA); cUL (CND), CB certificate

Cabinet variants	System cabinet	Peripheral cabinet DU41
Electrical ratings:		
Rated voltage	100 - 240 V	100 - 240 V
Mains voltage tolerance	+6/-10%	+6/-10%
Rated frequency	50 Hz/60 Hz	50 Hz/60 Hz
Rated current	max. 3.2 A at 240 V max. 7.9 A at 100 V	max. 2.8 A at 240 V max. 7.1 A at 100 V
Power consumption		
Active power (= heat loss)	max. 720 W	max. 725 W
Apparent power	max. 720 VA	max. 725 VA
Dimensions and weights	Office rack/ 19” rack	Office rack/19” rack
Height (mm) [incl. castors]	625 [680] 622 (14 HE)	266 (6 HE)
Width (mm) [incl. castors]	486 [570] 486	486
Depth (mm)	753	720
Weight (kg)	max. 110 kg	max. 50
Acoustic emissions (ISO 9296)		
Sound power level L_{WAd}	7.2 B	6.5 B
Workplace sound pressure level L_{pAm}	55 dB	45 dB

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