

# RC2030 RISCComputer

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*The entry-level  
RC2030 RISCComputer  
broadens the MIPS  
RISCComputer family of  
binary-compatible  
servers.*

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**A** promise of RISC technology has been to provide a single, binary compatible architecture that can easily be scaled to span an entire product line from high-end mainframes to low-end desktop systems.

MIPS™ Computer Systems, the leader in RISC technology, delivers on this promise by combining the entry-level RC2030 RISCComputer with other members of the RISCComputer™ and RISCstation™ product lines.

With over 12 mips and 1.8 Mflops (DP) of compute performance, expandable memory and

disk capacity, standardized networking, advanced software, and an open architecture, the RC2030 brings the power of RISC to the convenient, low cost domain of the desktop.



## Performance

- 12 mips of processing power using a 16.67 MHz R2000 CPU, R2010 FPU, and separate 32 KB instruction and data caches
- 31,000 Dhrystones/sec for general-purpose computing
- 1.8 DP and 3.3 SP MFlops LINPACK performance for technical computing
- 10 MB/sec Ethernet interface for high-speed LAN networking
- 4 MB/sec synchronous SCSI interface for high-speed peripherals

## Configurability

- Up to 16 MB of main memory expandable in 4 MB increments
- High-speed, thick or thin Ethernet for connections to X-stations, workstations, and other networked servers
- High-speed SCSI interface for disk storage and backup devices
- Centronics parallel printer port for high-speed hard copy device

- Two RS-232 ports for serial I/O devices, including low cost terminals and printers
- Up to two internal 3.5-inch half-height peripherals, including 1.44 MB floppy and 172 MB disk
- Optional desktop expansion unit with 120 MB cartridge tape drive
- Optional under-the-desk-side expansion unit for up to five 328 MB or 663 MB, 5.25-inch SCSI disks

## Standards

- SVID-compliant UNIX™ operating system converging System V and BSD
- Ethernet and SCSI for standard LAN and peripheral devices
- Integrated family of RISCCompilers™ C, FORTRAN, Pascal, COBOL, Ada, and PL/I
- TCP/IP, NFS,™ and RISCwindows™ for standard networking, file sharing, and graphics user interface
- RISC/os for binary software compatibility with the complete family of MIPS RISCComputers and RISCstations

## The Power of RISC is in the System

The RC2030 incorporates the performance advantages of RISC technology into a low cost computer for the office environment. In comparison to traditional computers, the RC2030 offers revolutionary price/performance characteristics in a compact desktop design.

Just as with all MIPS RISComputers, the RC2030's power lies in its advanced software and open architecture. MIPS was the first company to offer RISC systems in which the compiler technology was jointly designed and carefully integrated with the fundamental hardware architecture.

The RC2030's RISC technology foundation includes an integrated family of compilers that share a common optimizing backend, and an implementation of UNIX that converges AT&T System V and BSD.

On top of this solid foundation lies a full complement of third-party software from MIPS, OEMs, VARs, ISVs and Synthesis Software Solutions, Inc.

With the advent of the RC2030, the power of RISC is now on the desktop.

### System Packaging

The RC2030 is a highly optimized, single-board computer that is designed to operate in a standard office environment.

The base system configuration consists of a single desktop package. The package uses AC power

from a standard wall outlet, and stands 3"H x 14"W x 13"D. Within this small footprint, two 3.5-inch half-height peripherals can be housed. The peripherals include a floppy drive, and a 172 MB disk.

Optional expansion packages provide increased functionality and capacity that enable the RC2030 to act as a stand-alone host, as well as a networked server. For media distribution or file back-up, a 120 MB cartridge tape unit is available in a convenient desktop package.

For greater disk capacity, up to five 328 MB or 663 MB, 5.25-inch SCSI disks are available in a space-saving, under-the-desk package. Internal and external disk expansion enables the RC2030 to support up to 3.7 GB of disk storage.

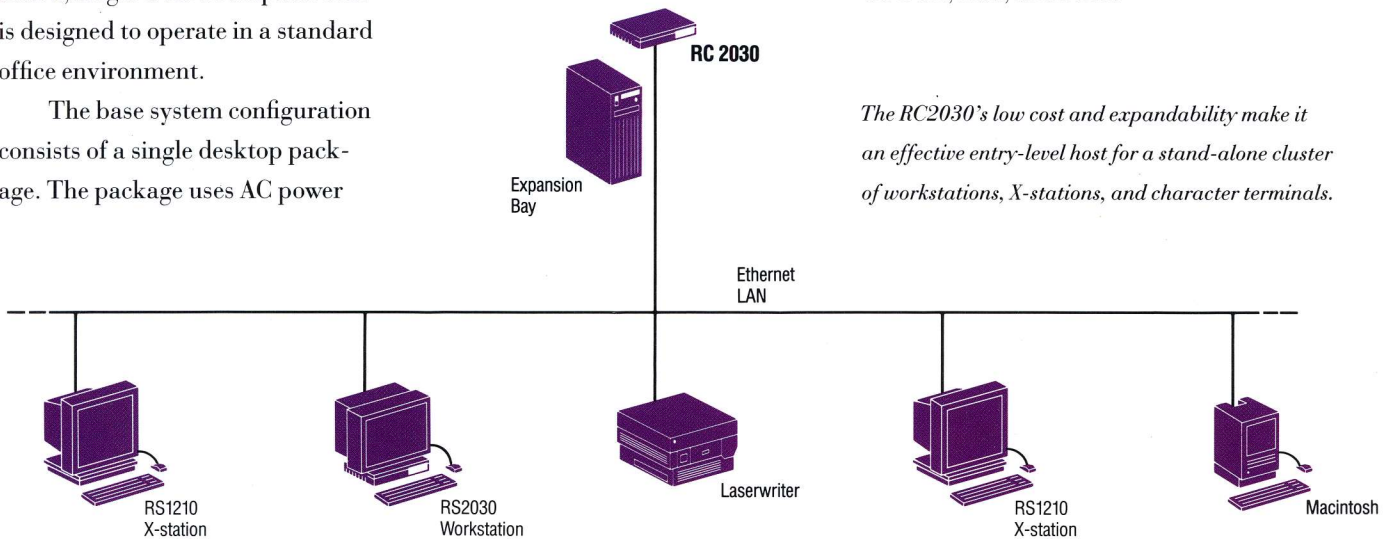
### Binary Compatible Operating System

The operating system for all MIPS RISComputers including the RC2030 is RISC/os™ — MIPS converged implementation of the System V and BSD versions of the UNIX operating system. RISC/os includes MIPS C compiler, TCP/IP for Ethernet networking, and NFS for remote file sharing. For networked graphics applications, the RC2030 supports RISCwindows — MIPS tuned implementation of the industry-standard, X-based OSF user interface.

### Optimizing Compiler Suite

For software development, the RC2030 features MIPS RISCompilers. RISCompilers are a suite of languages with a common optimizing backend that together provide a cohesive programming environment. In addition to C, other RISCompilers include FORTRAN with VMS extensions, Pascal, COBOL, Ada, and PL/I.

*The RC2030's low cost and expandability make it an effective entry-level host for a stand-alone cluster of workstations, X-stations, and character terminals.*



### Integrated Macintosh Networking

In conjunction with MIPS uShare™ software, the RC2030 makes an excellent server for a cluster of Apple Macintosh personal computers. With the AppleShare™-compatible uShare software, the RC2030 seamlessly provides Mac users with industry standard email, flexible print spooling, automatic backup of data, terminal emulation, and support for large compute-intensive applications.

### Application Software

A wide breadth and depth of application software is available in areas such as database management, communications, software development, office automation, and computer-aided engineering.

Software solutions are available through MIPS OEMs, VARs, ISVs and Synthesis Software Solutions, Inc.™

Synthesis is an independent company chartered to acquire, port, distribute, and support third-party software for MIPS systems, and many other vendors that use the MIPS RISC architecture.

### Multifaceted Roles

The RC2030 is a powerful, general purpose computer that is well suited to support a variety of stand-alone or networked tasks.

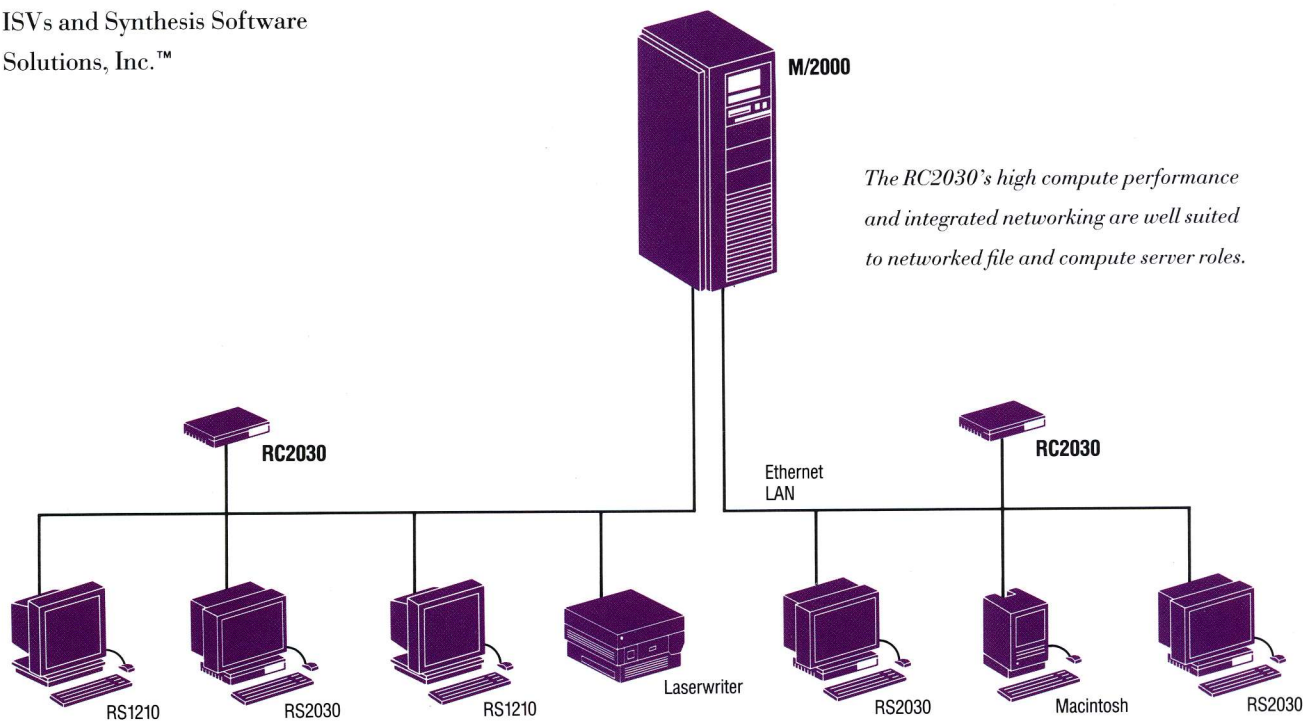
The RC2030's low-cost, 12 mips processing power, and modular expandability make it an excellent entry-level host for a

stand-alone network of workstations, X-stations, character terminals, and printers.

In addition to its stand-alone capabilities, the RC2030's 1.8 Mflops (DP FORTRAN) of LINPACK performance, integrated Ethernet, and X-based software make it a cost-effective compute or file server in a network of heterogeneous systems.

### RISComputer Family

The RC2030 is a member of MIPS binary-compatible family of RISComputers and RISCstations. MIPS single, open architecture protects customer investments in software and training, and also facilitates the rapid integration of industry-wide technological advances into the product line.



*The RC2030's high compute performance and integrated networking are well suited to networked file and compute server roles.*

## Technical Overview: RISC Computer RC2030

Optimized for price/performance and office operation, the RC2030 is a single-board computer housed in a compact desktop unit. The base unit has a small footprint, can accommodate two 3.5-inch half-height peripherals, and uses standard AC wall power. Optional desktop and desktside expansion units are available for additional media and disk capacity.

### Single Board Computer

The RC2030's 8-layer board is 13" by 14.5". This board contains the system's CPU, FPU, caches,

main memory, I/O processor, and several peripheral controllers.

### RISC CPU

The core processor is a 16.67 MHz MIPS R2000 RISC processor. The R2000 design uses simple loads and stores for memory access and large caches for speed and efficiency. It contains thirty-two 32-bit registers and all instructions and addresses are 32 bits long. The R2000 has an on-chip MMU, coprocessor interface, and cache control.

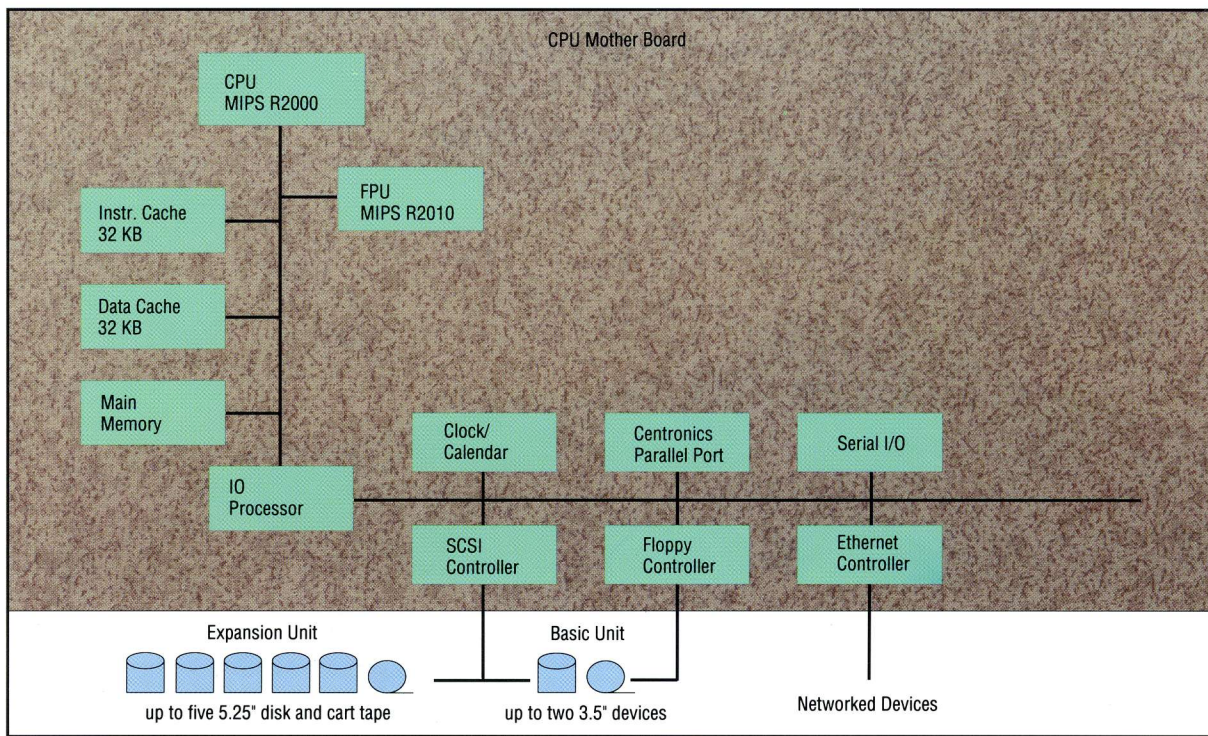
### Standard Floating-Point

The tightly coupled R2010 FPU seamlessly extends the R2000's instruction set for ANSI/IEEE standard floating-point

operations. The FPU executes instructions in parallel with the CPU, and up to 4 floating point instructions can execute simultaneously. The R2010 contains sixteen 64-bit registers that can each support single- or double-precision floating-point calculations.

### Fast Cache Memory

The RC2030 uses separate caches for data and instructions to improve access times. Each cache consists of 32 KB of static RAM. Cache control logic is internal to the CPU.



### **Expandable Main Memory**

The RC2030 can be configured with up to 16 MB of DRAM. Memory is expandable in 4MB increments using 1M memory chips in SIP memory modules. Memory refresh operations are independent of both the CPU and I/O coprocessor.

### **I/O Coprocessor for Balance**

The RC2030 delivers balanced performance through a dual-processor architecture that uses the NEC V50 to offload the CPU from all I/O tasks. The V50 operates at 10-MHz and is 80186-compatible. It manages the SCSI, Ethernet, floppy, parallel, and serial interface controllers, and also serves as the

DMA master for the SCSI bus, floppy drive, and Centronics parallel interface. The Ethernet controller acts as its own dedicated DMA master to maximize network performance.

### **Industry Standard Connectivity**

The RC2030 has a versatile range of connectivity options that enables it to act as a stand-alone host or networked server. These industry standard options include an SCSI bus interface for disk and tape peripherals, thick and thin Ethernet for networked devices, two RS-232 ports for serial devices, and a Centronics parallel port for high speed, hard-copy devices.

### **Choice of Peripherals**

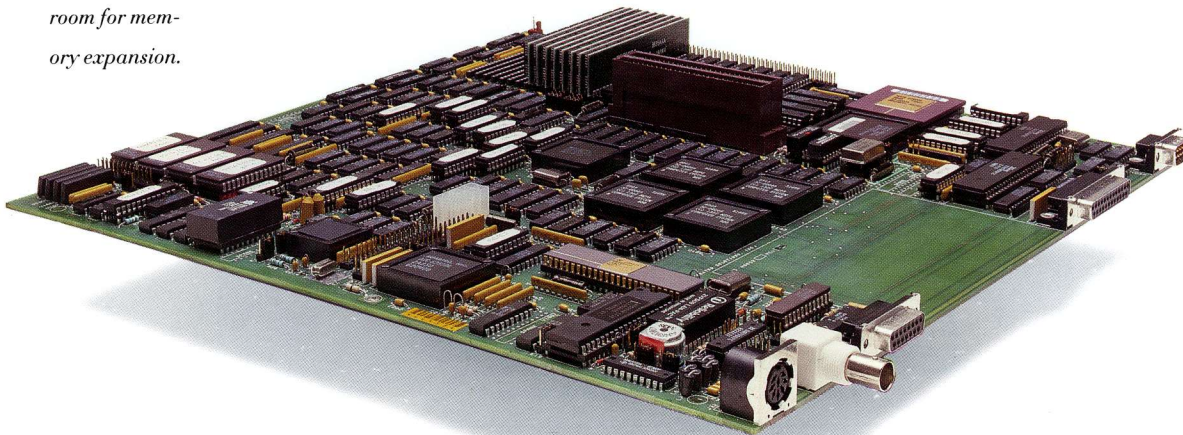
The base unit of the RC2030 can accommodate up to two 3.5-inch, half-height peripherals including a floppy drive, and a 172 MB hard disk. An optional desktop expansion package supports a 120 MB cartridge tape unit for backup

and software distribution. For greater disk capacity, an optional under-the-desk expansion unit can support up to five 328 MB or 663 MB 5.25-inch full-height SCSI disks as well as a cartridge tape unit. Internal and external disk expansion enables the RC2030 to support a maximum of 3.7 GB of disk storage.

### **Binary Software Compatibility**

Software on the RC2030 is binary-compatible with all other MIPS RISCcomputers. The RC2030 supports RISC/os — MIPS converged implementation of the System V and BSD versions of UNIX, RISCwindows — MIPS tuned implementation of the industry standard, X-based OSF user interface, and RISCcompilers — MIPS suite of language products with a common optimizing backend.

*The RC2030 is a single board computer with room for memory expansion.*



# RC2030 Specifications

## Performance

|               |                |
|---------------|----------------|
| Mips rating*  | 12 Mips        |
| Dhrystone/sec | 31,000         |
| Linpack SP/DP | 3.3/1.8 mflops |

## CPU

|             |                    |
|-------------|--------------------|
| Processor   | MIPS R2000 RISC    |
| Clock Speed | 16.67 MHz          |
| Word Length | 32 bit             |
| Registers   | 32                 |
| On-chip     | MMU, cache control |

## FPU

|                 |                 |
|-----------------|-----------------|
| Coprocessor     | MIPS R2010 RISC |
| Chip Technology | Custom VLSI     |
| Clock Speed     | 16.67 MHz       |
| Standard        | IEEE 754        |
| Registers       | 16              |

## Cache Memory

|                   |              |
|-------------------|--------------|
| Instruction Cache | 32 KB        |
| Data Cache        | 32 KB        |
| Write Buffers     | 4 words deep |
| CPU/Cache Bus     | 133 MB/sec   |

## Main Memory

|                 |             |
|-----------------|-------------|
| DRAM            | Up to 16 MB |
| Bus Width       | 32 bit      |
| Error Detection | Byte Parity |

## IO Coprocessor

|              |         |
|--------------|---------|
| Coprocessor  | NEC V50 |
| Clock Speed  | 10 MHz  |
| DMA channels | 3       |

## Software

|                    |  |
|--------------------|--|
| Operating System   | RISC/os (converged System V and BSD)               |
| Languages          | RISCompilers: C, FORTRAN, Pascal, Ada, COBOL, PL/I |
| Networking         | Ethernet, TCP/IP, NFS, MIPS uShare                 |
| Graphics Interface | RISCwindows (X)                                    |

## Peripherals

|                                |  |
|--------------------------------|--|
| Base Unit                      | Two 3.5", half-height devices                        |
| Disks (formatted)              | 172 MB   |
| Media                          | Floppy Drive   |
| <i>Desktop Expansion Unit</i>  |  |
| Media                          | 120 MB Cartridge Tape Unit                           |
| <i>Deskside Expansion Unit</i> |  |
| Disk                           | Five 328 MB or 663 MB 5.25", full-height, SCSI disks |

## Communications

|               |                      |
|---------------|----------------------|
| Ethernet      | 802.3, thick or thin |
| Serial Port   | Two RS-232           |
| Parallel Port | One Centronics       |
| Bus Interface | SCSI (synchronous)   |

## Base Unit

|              |                   |
|--------------|-------------------|
| Dimensions   | 3"H x 14"W x 16"D |
| Weight       | 25 lbs            |
| Power Supply | 125 Watts         |

## Regulatory

|               |                          |
|---------------|--------------------------|
| RFI Emissions | FCC Class A, VDE Class A |
| Safety        | UL, CSA, TUV, VDE        |

## Electrical

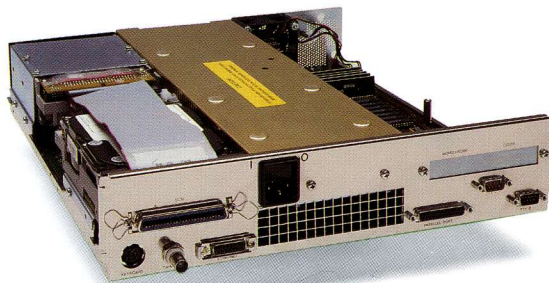
|                   |                                       |
|-------------------|---------------------------------------|
| AC Voltage        | 90-132 VAC, or 180-264 VAC            |
| AC Frequency      | 47.5-66 Hz                            |
| Operating Current | 1.35 A @ 115 VAC<br>0.675 A @ 230 VAC |

## Environmental

|   |              |
|---|--------------|
| Thermal Output                            | 342 BTU/Hr.  |
| <i>Temperature (ambient)</i>              |              |
| Operating                                 | 10° to 35°C  |
| Non-operating                             | -20° to 70°C |
| <i>Relative Humidity (non-condensing)</i> |              |
| Operating                                 | 20% to 80%   |
| Non-operating                             | 8% to 90%    |

\*Based on a suite of 12 benchmarks using a VAX 11/780 running VMS as a reference. See "Mips Performance Brief" for additional information

Specifications subject to change without notice.



The RC2030 compact base unit has a small footprint yet can support up to two 3.5-inch half-height peripherals.



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