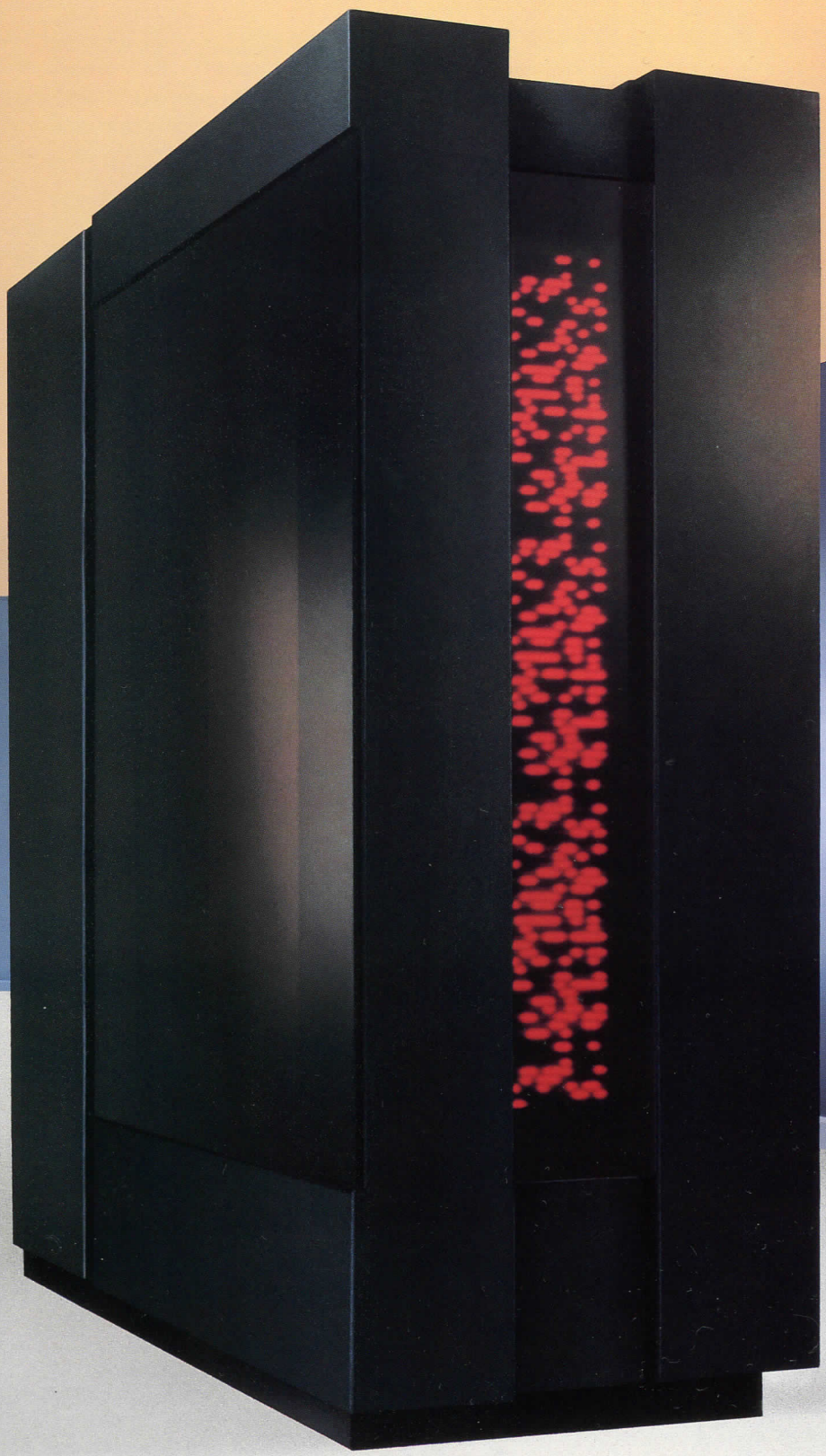
Thinking Machines Corporation



Connection Machine

CM-5

Scale 4

CM-5 Scale 4

CM5

The CM-5 Scale 4 is a high-performance supercomputing resource for scientific and commercial data centers. Housed in a single air-cooled cabinet, the Scale 4 system can provide all the processing power of a vector-based supercomputer or the data-handling capacity of a large mainframe—at a fraction of the cost.

Scale 4 systems support a variety of processing-intensive, file-intensive, and general-purpose applications. A processing-intensive Scale 4 has a peak floating-point performance of 16 Gflops. And a file-intensive Scale 4 offers from 700 to over 1,000 Mips of processing power, more than 95 Gbytes of storage, and a sustained input/output transfer rate exceeding 100 Mbytes/sec.

A single CM-5 Scale 4 may be divided into distinct partitions, each a complete computing environment unto itself. And you can establish timesharing controls within each partition.

Each Scale 4 processing node is a computational unit composed of a 32-MHz SPARC microprocessor, 32 Mbytes of memory, and a network interface. Four optional vector units can be added for a total per-node performance of 128 Mflops. The applications you develop on a Scale 4 can run unchanged on larger or smaller CM-5s.

All CM-5 processing nodes and I/O modules are interconnected by the industry's only truly scalable network. The Data Network handles high-bandwidth, point-to-point data transfers. It is optimized to support applications with complex, irregular, and dynamic data structures. A Scale 4 Data Network has 256 addresses to which you may attach processing nodes, disk storage units, and other I/O devices. The network's minimum bisectional bandwidth ranges from 160 to 640 Mbytes/sec, depending on the configuration.

A Scale 4 system's Control Network handles coordinated interactions that involve many processors, such as broadcasting and synchronization. The Diagnostic Network provides, under supervisor control, privileged access to all system components.

Disk storage nodes plug into the CM-5 to form a Scalable Disk Array (SDA). A processing-intensive Scale 4 has 6 disk storage nodes, a 48-Gbyte storage capacity, and a 58-Mbyte/sec data transfer rate. A file-intensive system has 12 disk storage nodes, a 96-Gbyte storage capacity, and a 115-Mbyte/sec transfer rate. A highly efficient data protection scheme guards against media- and transfer-induced data loss. The SDA is NSF-mountable for remote network access.

Like all CM-5s, a Scale 4 system uses CMOST (Connection Machine Operating System with Timesharing), an enhanced version of UNIX, which is optimized to support parallel computation, communication, and I/O. CMOST provides a complete range of functionality, including timesharing, batch processing, NFS, NQS, and UNIX-style security. CMOST also includes the Scalable File System (SFS), which supports the Scalable Disk Array.

Each Scale 4 system supports up to four SPARC Control Processors. Control Processors let you manage partitions, provide system administration services, control I/O, and provide links to SDAs, Integrated Tape Systems (ITS), and FDDI network connections.

Whether you perform billions of calculations or rapidly sift through gigabytes of data, Thinking Machines can assemble a system to suit your needs. A table on the facing page illustrates processing-intensive, file-intensive, and general-purpose Scale 4 systems.

Scale 4 System Features

- Includes software licenses for:

CMOST	UNIX operating system
CM Fortran	Data parallel Fortran
C*	Data parallel C
CMAX	Fortran 77-to-CM Fortran conversion tool
CMMD	Message-passing library
CMSSL	Scientific software library
CMX11	X Window-based graphics package
CM/AVS	AVS-based distributed visualization system
Prism	OSF/Motif-based environment for application evaluation and data visualization

- Completely compatible with all CM-5 systems, from the Scale 3 to the teraflops Scale 7
- Supports both message-passing and data-parallel global address space programming models
- Supports up to four SPARC Control Processors with 64 Mbytes of memory and 848 Mbytes of disk storage
- Provides links to Scalable Disk Array (SDA), Integrated Tape System (ITS), as well as FDDI and HIPPI network connections
- Supports information exchange with other supercomputers at their full data transfer rates
- Includes 3 years hardware maintenance and software support
- Includes 5 credits for training classes

Scale 4 System Summary

	Processing-Intensive Configuration	General-Purpose Configuration	File-Intensive Configuration
Processing Nodes	128	64	32
Network Addresses	256	256	256
Storage Nodes	6	9	12
Hardware Performance[1]			
Peak Floating-Point Operations (Gflops)	16	8	4
Peak Integer Operations (Gops)	16	8	4
Kernel Performance			
LINPACK 64-bit Floating Point (Gflops)	7.6	3.8	1.9
Matrix Multiply (Gflops)	9.5	4.7	2.3
Memory			
Capacity (Gbytes)	4	2	1
Bandwidth (Aggregate Gbytes/sec)	66	33	16
Scalable Disk Array (SDA)			
Storage Capacity (Gbytes)	48	72	96
Data Transfer Rate (Mbytes/sec)	58	86	115
Communications Link	1 CM-5 HIPPI	1 CM-5 HIPPI	1 CM-5 HIPPI
Interprocessor Communications Bisectional Bandwidth (Mbytes/sec)[2]	640	320	160
HIPPI Bandwidth (Mbytes/sec)	100	100	100

[1] Using 4 vector units

[2] Bisectional bandwidth for random communications, all nodes active

Physical Dimensions (Cabinet)

Height, in. (cm)	86	(218)
Width, in. (cm)	71	(180)
Depth, in. (cm)	34	(86)
Weight, lb. (kg)	3,000	(1,380)

Power Characteristics

Primary Power: Cabinet/Console	100A 3-phase/15A 1-phase
Voltage: Cabinet/Console	208/115
Hertz	50 or 60
Power Cord	5-conductor hardwired to cabinet
Power Dissipation	
Maximum	25,000W / 87,000 BTU/hr.
Typical	17,000W / 58,000 BTU/hr.

Environmental Specifications

Recommended Ambient Air Temperature (at floor inlet)	73°F (23°C) maximum
Maximum Ambient Air Temperature Above 5,000 ft. (1,500m)	Reduce by 1°F/1,000 ft. (1°C/500m)
Relative Humidity, Non-Condensing	20%-80% max wet bulb 77°F (24°C)

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