



HARDWARE

- **High performance desktop computing system**
- **Compact, unobtrusive design**
- **System installation easily performed by users**
- **Basic system includes an Intel 16-bit 80186 microprocessor with 512 or 1024 KB of RAM**
- **Uses standard high quality NGEN™ keyboard and 12-inch and 14-inch monochrome displays**
- **Systems are linked together via high-speed network operating at 1.8 million bits per second**
- **DMA port for OEM customization**
- **Operating system environments include CTOS™, MS™-DOS, CP/M-86® and DISTRIX™**
- **Software compatible with the Convergent AWS™, IWS™ and NGEN™ Workstations**
- **Runs all standard Convergent workstation programming languages, data management facilities, data communications, and text-based office automation software**

CONVERGENT TECHNOLOGIES

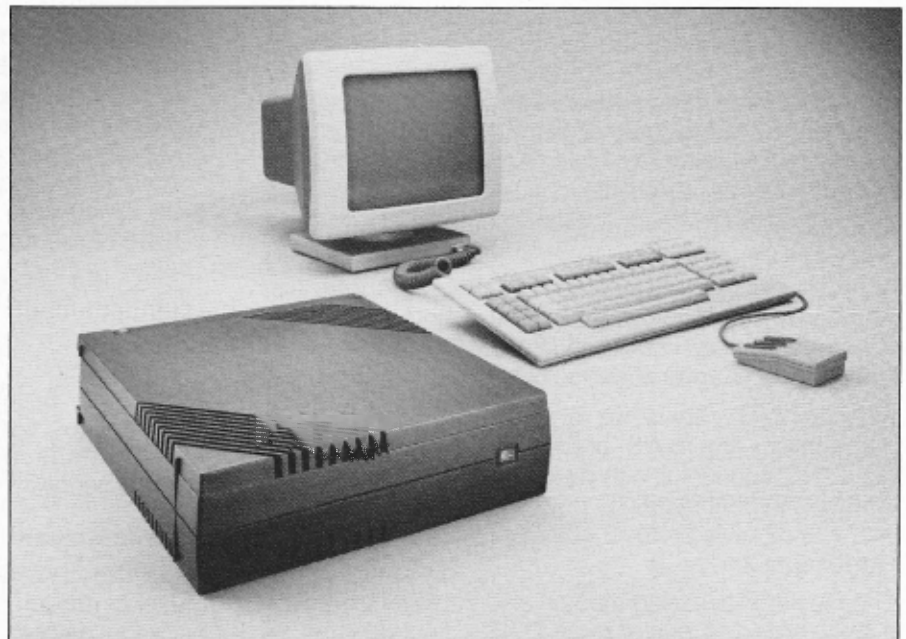
Cluster Workstation (CWS™)

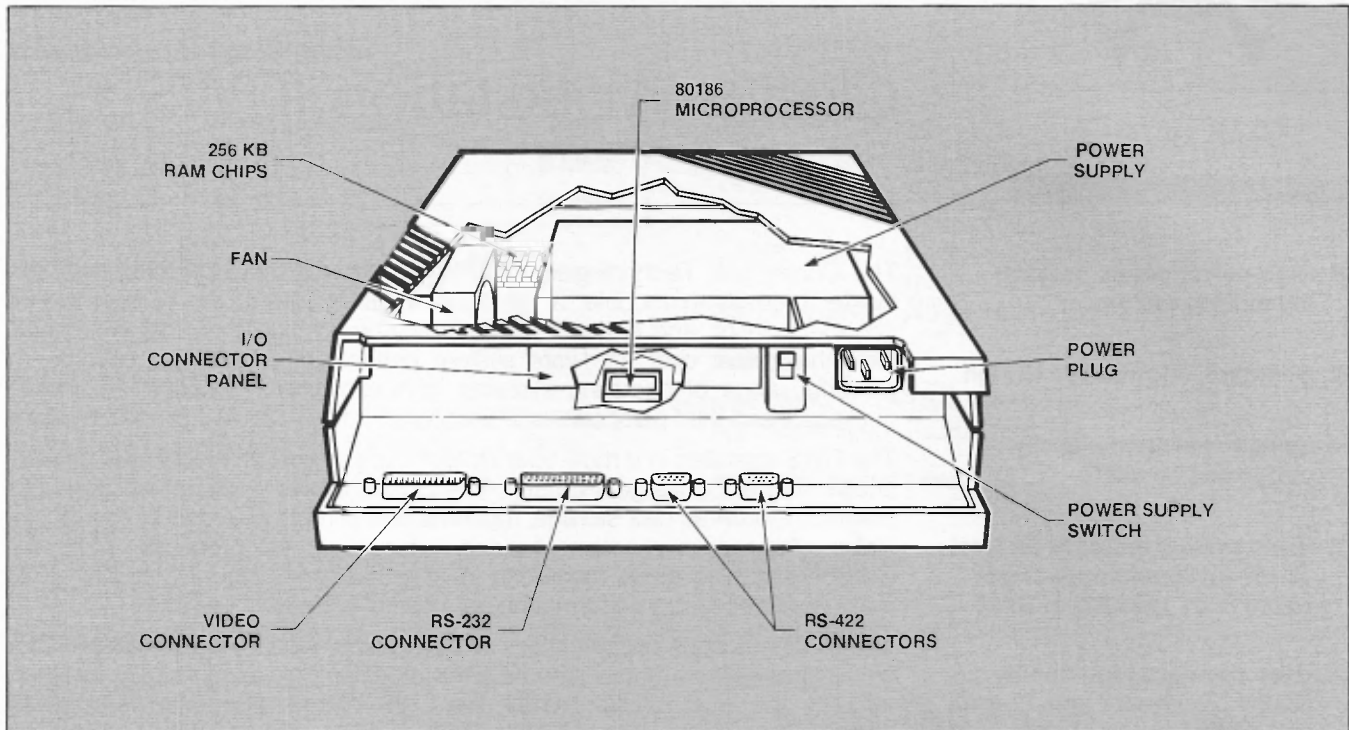
The Convergent Technologies' CWS™ (Cluster Workstation) consists of the cluster processing module, a standard NGEN™ 12-inch or 14-inch monochrome monitor, and a standard NGEN keyboard. Together, these elements form the lowest cost hardware system capable of executing Convergent's powerful range of operating systems, communications software, application packages, and third party software offerings.

The CWS operates in a multi-user environment as part of a local area network known as the Convergent Cluster. The cluster allows workstations to access resources such as disk storage, modems and printers provided by the master station. Application programs typically execute on the processor within the CWS. Distributing these resources to all workstations within a cluster yields maximum processing performance per user, at a low cost per user.

The CWS has been designed for customers who need the power of an NGEN workstation, but do not require NGEN's modularity or expandability for every user on the cluster. Like NGEN, the CWS is built around an Intel 80186 microprocessor, operating at 8 MHz. The I/O and compute-bound performance of the CWS and CP-001/8 diskless NGEN are identical; the I/O and compute-bound performance of the CWS is two times that of the diskless AWS-210.

With its sleek, compact design, the CWS module can be placed vertically or horizontally on, beside, or under the work surface. Attention to design means the CWS module meets with customer cost demands, performance requirements, and user-interface expectations. Access to the DMA channel allows for easy product customization; standard RS-232 communications/printer attachment and RS-422 low-cost LAN ports allow customers access to communications facilities and shared cluster resources.





SYSTEM OVERVIEW

The Cluster Processing Module

The cluster processing module is the heart of the CWS Workstation, and contains the CPU, memory, video/keyboard circuitry, I/O, and power supply. The processing unit uses the Intel iAPX 80186 microprocessor, operating at 8 MHz. Two versions of this module are available: the 512 KB RAM (CM-002) and the 1024 KB RAM (CM-003) versions. Both versions use custom gate arrays to provide memory control and parity/refresh circuitry, and contain 8 KB ROM for bootstrap operations. The microprocessor contains an internal DMA controller that allows data transfer over two independent high-speed DMA channels. One DMA channel is used internally by the CWS for I/O operations, the other DMA channel is provided for OEM custom hardware interfaces.

A Motorola 6845 video driver working in combination with video controller and video attribute gate arrays provides compatibility with current NGEN monitors and keyboards. The 256 character set is stored in a high-speed RAM array known as "Font RAM", and may be loaded by user applications software.

Standard I/O capabilities are provided by a custom gate array. The CWS processing unit includes an RS-232-C connector with multi-protocol serial controller for use with peripheral I/O devices, and an RS-422 port with a 2652 multi-protocol communications controller for cluster operations.

The cluster processing module also contains the power supply, providing power to all CWS components at 65 watts, and is switch-selectable from 110 to 220 volts at 50-60 Hz.

The Video Monitor

CWS video monitors are the standard high-quality NGEN 12-inch monochrome monitor (VM-001), and 14-inch monochrome monitor (VM-002), displaying 29 lines of 80 characters. Both units sit on 'tilt and swivel' bases, have a non-glare surface to reduce eyestrain, and have easily accessible brightness controls.

The Keyboard

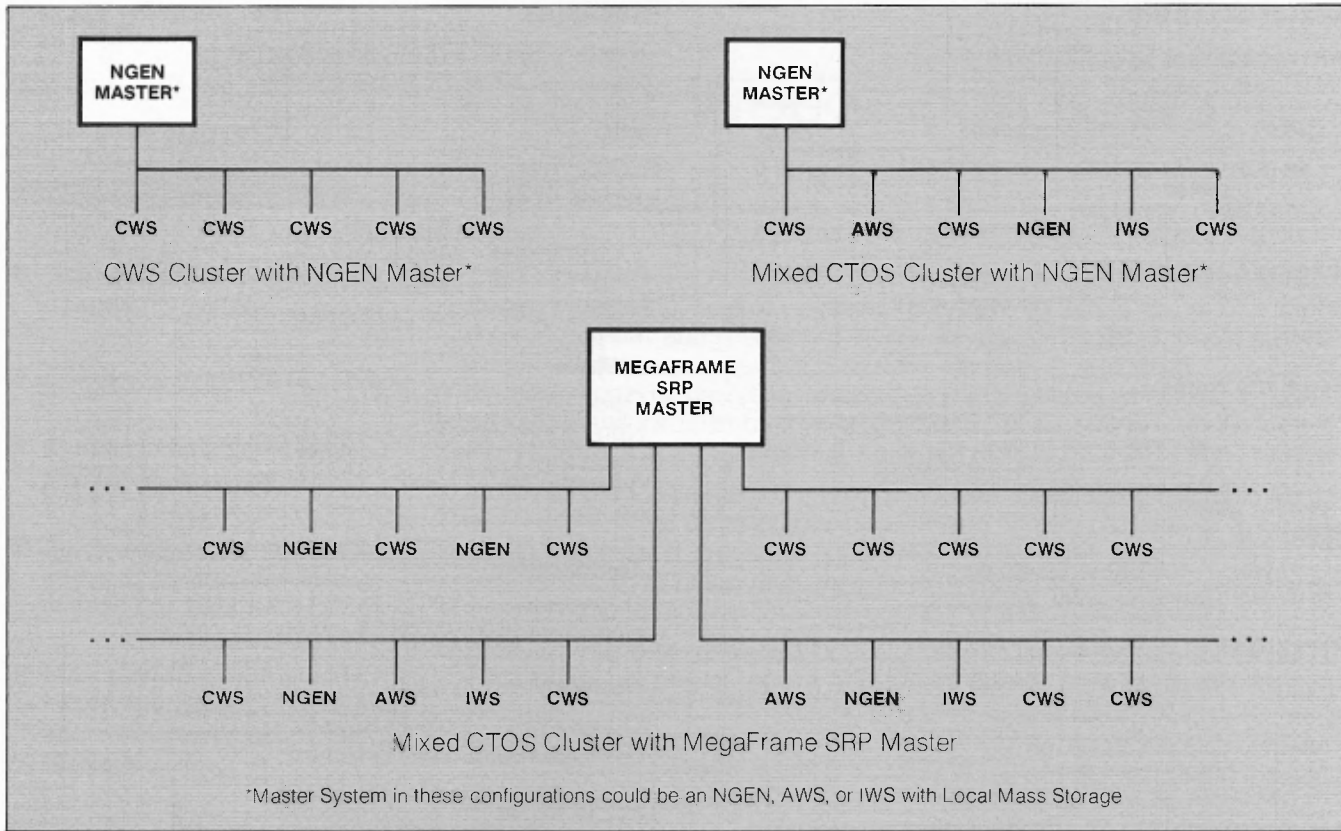
The keyboard is connected to the base of the monitor by a 6-foot coiled cable, which may be connected to either the right side or left side of the keyboard; the unused connector port may be used to connect a second serial input device such as a special-purpose keyboard or mouse. The full range of NGEN keyboards (KM-00x) are available to satisfy various national character set requirements.

CLUSTER SYSTEMS

CWS, like all Convergent Workstations, includes a standard communication port to link workstations together in a local area network known as a cluster. This high-speed data link allows for shared peripherals and data bases, resulting in high responsiveness, lowered cost per user, and the ability to support diverse applications operating on the same data base simultaneously.

Master Stations

A cluster consists of one or more cluster stations linked to one master station. This master station has mass storage devices that can be shared with other workstations in the cluster. The master station can run applications, provide resources to individual cluster



stations, and run server programs. Any of the AWS, IWS, or NGEN workstations with mass storage, and the MegaFrame Shared Resource Processor may be configured as a master station.

Cluster Stations

A workstation within a cluster utilizing resources provided by a master station is called a cluster station. All AWS, IWS, NGEN, and CWS workstations can operate as cluster stations. The CWS's compatibility with other Convergent workstations combined with its low cost make it a logical choice when creating or expanding clusters.

Connecting Workstations

Cluster stations are connected to the master station using the standard RS-422 port, over shielded twisted pair cables; these cables may extend up to 1200 feet from the master station. Cluster communications for the CWS operate at 1.8 million bits per second, but may operate slower when the cluster contains AWS or IWS workstations, or PT™ terminals. The number of stations that can be linked together into a cluster is dependent upon the individual station configurations, the applications being run, and the usage patterns of the individual stations. If all cluster stations are CWS workstations, and thus all are sharing an NGEN master's disk capacity, then a maximum of five CWS workstations is recommended.

CWS workstations can coexist in clusters with other Convergent products. A master station can support

a mixture of AWS, IWS, NGEN, and CWS workstations. In addition, a Convergent MegaFrame SRP master can support clusters containing up to 64 Convergent workstations.

SOFTWARE

The CWS, like all Convergent workstations, runs the CTOS™ Operating System: a reliable, high-performance foundation for real-time, interactive applications. CWS also supports MS™-DOS, CP/M-86®, and DISTRIX™ (Distributed UNIX™) operating systems. CTOS' multi-partition, multi-tasking capabilities allow a number of system activities to take place concurrently. Background services include a variety of spoolers, communications servers, and batch processors.

CWS supports the full range of Convergent software including Programming Languages, Program Development Tools, Data Management Facilities, Communications Software, text-based Office Automation Software, and Third party software.

CWS CONFIGURATIONS

Model No.	Description
CM-002	CWS Processing Unit 512 KB
CM-003	CWS Processing Unit 1024 KB



SPECIFICATIONS

Microprocessor Specifications

CPU	Microprocessor	Clock Rate
CM-002	80186	8 MHz
CM-003	80186	8 MHz

Storage Capacity

RAM: 512 KB, or 1024 KB
ROM: 8 KB

Serial I/O Rates

External Clock: RS-232-C: 50 Baud to 19.2 Kbaud
Internal Clock: RS-422: 100 Baud to 1.8 Million bits/second

Electrical

AC Power: 110-220 V, 50-60 Hz
AC Power Requirements: 65 Watts

PHYSICAL

Height: 3.3 in. (83 mm)
Width: 11.2 in. (302.2 mm)
Length: 12.2 in. (332.8 mm)
Weight: 9 lbs. (4.1 Kg)

ENVIRONMENTAL, SAFETY, AND ERGONOMIC

Safety

Meets UL 478 (EDP) and 114 (Office Equipment)
Meets CSA 154 (EDP) and 143 (Office Equipment)
Meets TUV IEC 380 (Office Equipment)

Emissions

Meets VDE 0871 (Emissions Standards)
Meets FCC Part 15, Sub-Part J for Class A Emissions

ESD

5,000 Volts: No observable effects
12,500 Volts: Errors corrected via Software Intervention
17,500 Volts: Errors corrected via Operator Intervention
25,000 Volts: No permanent damage

Altitude

Operating: 15,000 feet ASL
Non-Operating: 25,000 feet ASL

Acoustic Noise Level

32 dB

Temperature

Operating: 0° to 40°C
Non-Operating: -40°C to 75°C

Humidity

Operating: 5% to 95% RH
Non-Operating: 90% RH at 65°C for 12 hours

Cable Lengths

Keyboard: 14 inches coiled, 6 feet extended
Monitor: 16 feet
Cluster: 1200 feet, maximum

Ergonomic

Designed in accordance with DIN "Safety Regulations for Display Workstations in the Office Sector" (Standard 66234, December 1979) and "Basic Ergonomics for Desktop Workstations."

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