CONVERGENT™ FAMILY OF AWS™ TURBO WORKSTATIONS

Convergent Technologies

- High performance, low cost desktop minicomputers
- Each desktop unit consists of a powerful 16-bit CPU, up to 1/2 million bytes of RAM, keyboard, video display, and optional mass storage
- Desktop units can be linked together via a high-speed local network, providing multi-station access to shared resources, such as data bases
- Selectable mass storage devices ranging from low-cost mini-floppy units to high performance mini-Winchester units
- High quality 15-inch display with multiple split screens, and a wide range of display attributes
- Real-time, multi-task operating system provides all the functionality needed for real-time and interactive applications
- Programming languages, COBOL, FORTRAN, BASIC, and Pascal, all meet industry standards
- Data management facilities include ISAM, Sort/Merge, and Forms Facility
- Powerful Word Processor designed specifically for DP integration
- Communications protocols include IBM 3270, 2780/3780, and X.25.
- AWS Turbo Workstations can be connected to IWS™ Workstations in the same local network
- Applications written on other Convergent workstations can execute with no software change

The Convergent™ Family of AWS™ Turbo Workstations is the low-end member of the Convergent Family of desktop minicomputers.

Configured around a 16-bit 8 MHz 8086 processor and the latest 5 1/4-inch mass storage technologies, the AWS Turbo Workstations are designed specifically for applications that require the power and flexibility of a minicomputer at a fraction of its costs.

Specifications subject to change without notice.

11-00008-D

Utilizing a distributed intelligence architecture, each AWS Workstation provides a high performance CPU, a high-quality 15-inch video display unit, a programmable keyboard, and up to 1/2 million bytes of RAM.

AWS Turbo Workstations can stand alone, or they can be connected together to a local network via a high-speed data link, sharing peripherals and data bases, but not processing. The result is high responsiveness, with the ability to support complex and diverse applications operating on the same data base, simultaneously.

The AWS Workstation hardware and software architecture are totally modular, with several entry-level versions and multiple upgrade paths. A standalone system can be upgraded to local networking—without software modifications.

The real-time, multi-task operating system is designed to be built upon. Four standard programming languages (COBOL, FORTRAN, BASIC, and Pascal) plus assembler are supported. Data management facilities include ISAM, Forms, and Sort/Merge. Word Processing is organized specifically for DP integration. Communications protocols include Asynchronous Terminal Emulator, 3270, 2780/3780, X.25, and SNA.

The AWS Turbo Workstation is designed with sensitivity to the physiological and psychological needs of the operator. The slender, elegant package establishes the ideal spatial relationship between eye, screen, keyboard, and the built-in document holder. The innovative use of the lectern houses the workstation electronics and the optional mass storage devices.

The design of the AWS Workstations is another example of Convergent's dedication to total compatibility. Not only do they maintain the same distinct Convergent appearance, the AWS Workstations are compatible in software and hardware with the entire IWS™ Family of Workstations.

Distributed intelligence has long been discussed as desirable; Convergent Technologies has made it a low cost reality. The AWS Turbo Family of desktop minicomputers represents a new standard that provides an ideal solution for applications of the 80s.

SYSTEM OVERVIEW

Each AWS Workstation consists of a 16-bit 8 MHz 8086 processor, RAM memory, keyboard, video display unit, and optional mass storage devices, all integrated into a compact desktop unit.

The AWS Turbo Workstation can support up to 512K bytes of RAM memory, and has a display of 80 characters by 28 lines.

The 15-inch high quality video is mounted horizontally in "landscape" mode. The display is fully articulated and may be tilted from 10° to 30° above the horizontal plane, and rotated ±30° for easy viewing. The display has an 18 MHz monitor, green phosphor to help reduce eyestrain, and an etched surface that eliminates glare. A brightness control for the display is easily accessible to the operator.

The electronics and optional mass storage devices are housed in a lectern with document holders and LED indicator(s) for visual feedback of disk access.

The 98-key keyboard has a typewriter-style sculptured surface and contoured keycaps. It is detachable and connected to the video display unit via a 5-ft. coiled cable. The keyboard provides a 14-key numeric pad, an 8-key status/control function pad, a 6-key cursor control pad, a 4-key page control pad, and 10 user-definable function keys. The keyboard also provides software controllable LED indicators on 8 keys.

Two kinds of mass storage devices are supported by the AWS Turbo Workstation:

- 5 1/4-inch mini-floppy unit with a formatted capacity of 630K bytes
- 5 1/4-inch mini-Winchester units with a formatted capacity of 5.6 bytes, or 9.2M bytes, or 13.2M bytes.

Each AWS Turbo Workstation can support:

- one mini-floppy unit, or
- two mini-floppy units, or
- one mini-floppy and one mini-Winchester unit, or
- no mass storage.

Standalone and Cluster Systems

Convergent's AWS Turbo Family of desktop minicomputers are configured as follows:

- An AWS Workstation with mass storage devices is an ***"AWS standalone system"***.
- An AWS Workstation with mass storage devices that can provide resources such as disk storage to other AWS Workstations is called an ***"AWS master station"***.
- An AWS Workstation that uses resources provided by a master station is called an ***"AWS cluster station"***.
- A high-speed local network connects AWS cluster stations to the AWS master station. A collection of AWS cluster stations and an AWS master station is called an ***"AWS cluster system"***.

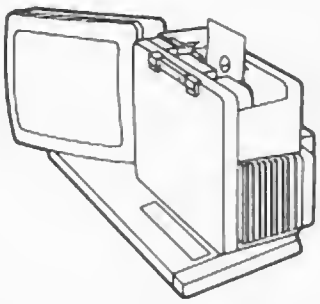
A master station serves two functions:

- Running applications
- Providing resources to the individual cluster stations.

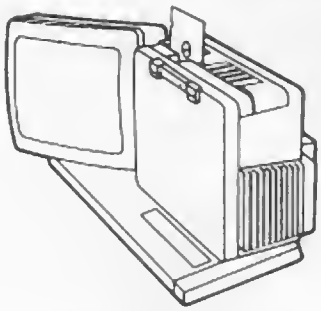
The balance between the two functions depends on the kind of applications being run, the number of connected cluster stations, and the amount of memory in the master station. The master station can run the same application programs as the cluster stations. The master station can also run only server programs: ISAM, the Print Spooler, the 2780/3780 RJE server, and the 3270 servers. Typically the master station serves both functions: running a standard application program plus a number of server functions.

The AWS cluster systems range in size from one to four AWS cluster stations. Any of the AWS Workstations can be used as a cluster station.

Clusters can also mix IWS Workstations with members of the AWS Family. Clusters in which the master station is an IWS Workstation can support up to 16 workstations.

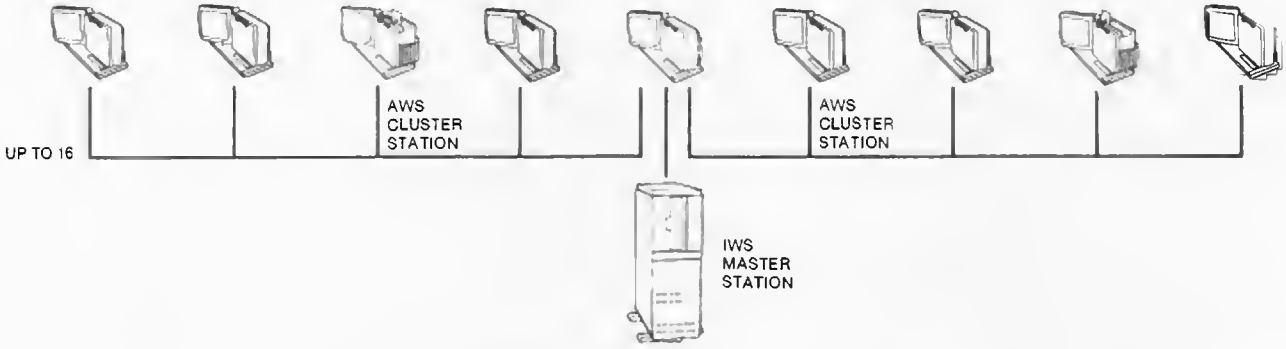


An AWS Standaione System with Two Mini-Floppy Units



An AWS Standaione System with One Mini-Winchester and One Mini-Floppy Unit

Exampie of an AWS Cluster System with One AWS Master Station Supporting Three AWS Cluster Stations



Example of AWS Cluster Stations Supported by an iWS Master Station

The AWS Turbo Family

The AWS Turbo Family consists of six members:

- ***AWS-215*** supports from 256K to 512K bytes of RAM memory, and has no mass storage devices. It can be used only as a cluster station.
- ***AWS-225*** supports from 256K to 512K bytes of RAM memory, and one mini-floppy unit with a formatted capacity of 630K bytes. It is used only as a cluster station with local mass storage.

- ***AWS-235*** supports from 256K to 512K bytes of RAM memory, and two mini-floppy units with a total formatted capacity of 1.2M bytes. It can be used as a cluster station with local mass storage. However, for certain applications, this model may also be used as a standalone system if the RAM memory capacity is sufficient.

- ***AWS-245*** supports from 256K to 512K bytes of RAM memory, and one mini-floppy and one mini-Winchester units with a total formatted capacity of 5.6M bytes. It can be used as a standalone system, or as an AWS master station supporting several AWS cluster stations, or as a cluster station with local mass storage.

- ***AWS-255*** has similar characteristics as the AWS-245; but the mini-Winchester unit has a formatted capacity of 8.6M bytes.
- ***AWS-265*** also has similar characteristics as the AWS-245 and -255; but the mini-Winchester unit has a formatted capacity of 12.6M bytes.

The table below summarizes the characteristics of the four AWS Workstation members:

THE AWS FAMILY

	AWS-215	AWS-225	AWS-235	AWS-245	AWS-255	AWS-265
Maximum RAM Memory	512K	512K	512K	512K	512K	512K
Display	80 × 28	80 × 28	80 × 28	80 × 28	80 × 28	80 × 28
Mass Storage	None	1 5 1/4" floppy (630KB formatted)	2 5 1/4" floppies (1.2MB total formatted)	1 5 1/4" floppy 1 5 1/4" Winch. (5.6MB total formatted)	1 5 1/4" floppy 1 5 1/4" Winch. (9.2MB total formatted)	1 5 1/4" floppy 1 5 1/4" Winch. (13.2MB total formatted)
Serial Communication	1 RS-422	2 RS-232C 1 RS-422	2 RS-232C 1 RS-422	2 RS-232C 1 RS-422	2 RS-232C 1 RS-422	2 RS-232C 1 RS-422
Parallel Printer Port	None	1 Centronics Interface	1 Centronics Interface	1 Centronics Interface	1 Centronics Interface	1 Centronics Interface
Uses	• Cluster station only	• Cluster station	• Standalone • Cluster station	• Standalone • Cluster station • Master station	• Standalone • Cluster station • Master station	• Standalone • Cluster station • Master station

SOFTWARE

Convergent software is structured for the system builder. It provides the necessary components to speed application development:

- A real-time multi-task operating system
- Four standard programming languages plus assembler
- Program development tools
- Data management facilities
- Text management facilities
- Standard communications protocols

The ***CTOS™ Operating System*** provides a reliable, high-performance foundation for real-time, interactive applications. It is efficient, easily extended, and highly configurable. Its modular structure combined with its carefully planned model for extension provide an adaptable environment that is ideal for implementing applications.

The Convergent programming languages are:

- COBOL — ANSI '74
- FORTRAN — ANSI '77
- Pascal — ISO draft 5
- BASIC — ANSI '78
- Assembler

Each of these languages implements the relevant standard, augmented by extensions aimed at enhancing its utility in its application area.

Productive program development requires good tools. Convergent Technologies supplies a complete, state-of-the-art environment. The ***Editor*** makes it easy to write and revise source code. The ***Linker/Librarian*** is used to maintain object libraries and to link together independently compiled modules. The ***Debugger*** is a powerful software debugging tool designed to help debug programs efficiently, including real-time programs.

The data management facilities are optimized for the Convergent system architecture. The multi-key ***ISAM*** provides flexible access to records with an option for record-level locking; its B-Tree implementation allows efficient retrieval by exact match, range match, or prefix match. The ***Forms Facility*** makes it easy to design screen forms, display them on the screen, and accept operator-supplied data. The ***Sort/Merge Facility*** sorts multiple files of unordered records and merges multiple files of ordered records into one ordered file.

The text management facilities are organized by the system builder. To be used as part of an OEM's complete multi-application system, the ***Word Processor*** is a state-of-the-art word processing package that includes a document assembly feature to allow merging of data processing and word processing capabilities.

Four industry standard communications packages are supported: 3270 Terminal Emulator, 2780/3780 RJE Terminal Emulator, Asynchronous Terminal Emulator, and X.25.

AWS TURBO WORKSTATION ELECTRONICS

The AWS Turbo Workstation electronics integrates an Intel 8 MHz 8086 processor, up to 512K bytes of RAM memory, I/O, and video control logic into one single PC (printed circuit) board. An optional second PC board contains the mini-floppy and mini-Winchester controller electronics, two RS-232C communications channels, and a Centronics-compatible printer interface. These printed circuit assemblies are mounted vertically in a cardcage. A motherboard connects these logic assemblies to the I/O panel at the rear of the desktop enclosure, and to a 150-watt power supply.

The AWS Turbo Processor Board contains a 16-bit 8086 processor operating at 8 MHz with one wait state on memory accesses.

The AWS Turbo Processor Board provides the following system functions:

- Memory control and refresh logic
- External interrupt control logic
- RAM parity check and generate logic
- Direct Memory Access (DMA) control
- Bootstrap (ROM) software and logic
- Video control logic
- Expansion interface

The AWS Turbo Workstation RAM memory is based on 64K-bit RAM chips, organized in 8 banks of 9 chips each. Memory sizes range from 256K to 512K bytes. RAM validation is through a single-bit-per-byte error detection parity unit.

A 4K-byte ROM is provided on the AWS Turbo Processor Board for system bootstrapping and cluster communication line initialization. In addition, the bootstrap ROM contains diagnostics that are executed as part of the system power-on procedures or whenever the system reset button is pressed.

The DMA control logic is based on an Intel 8257 multichannel DMA control chip. Three DMA channels are provided: high-speed cluster communications, video display refresh, and Winchester/floppy disk.

The video display control logic is provided by an Intel 8275 CRT controller. The 80-column display is refreshed directly from system memory. Character generation is performed via a font ROM that contains 256 displayable characters.

Cluster communications is controlled by an Intel 8274 communications controller. The high-speed local network is implemented via a multi-drop RS-422 line running at 307K baud.

The two RS-232C communications channels on the optional Winchester/floppy controller board may be programmed to perform a variety of tasks, with software-selectable baud rates ranging from 110 to 19.2K baud. The RS-422 channel operates up to 410K baud. All three channels may be programmed to support a variety of synchronous and asynchronous bit- and byte-oriented protocols, including BiSync, ADCCP, SDLC, and HDLC.

Video Display Subsystems

The AWS Turbo Workstation displays are organized as 80 characters by 28 lines. The screen may be split into multiple parts, called "frames". The number of frames, and their layout on the display is established by the user with calls to the CTOS Operating System. Scrolling may be performed in each frame independently of other frames.

Each character in the AWS Workstation display is built in a 9 × 11 pixel cell. Various display attributes may be added to each character individually, or to the entire display. Attributes are shown below:

Type of Attributes	Standard
SCREEN	Reverse Video
	Cursor Position
CHARACTER	Half Bright
	Underline
	Reverse Video
	Blinking

CAPACITY:

Maximum RAM: 512K bytes **ROM:** 4K

Mass Storage:

- 5 1/4" Floppy disk drive:
  Unformatted: 1M bytes
  Formatted: 630K bytes
- 5 1/4" Winchester disk drives:
  Unformatted: 6.38 megabytes
  Formatted: 5 megabytes

  Unformatted: 10 megabytes
  Formatted: 8.6 megabytes

  Unformatted: 16 megabytes
  Formatted: 12.6 megabytes

TIMING:

Processor Clock: 8 MHz with 1 wait state when accessing internal RAM.

Memory Refresh Rate: 78 kHz

Mass Storage Timing:

5 1/4" Winchester Disk Drive

Transfer Rate:	5M bits/second
Access Time (Avg.):	105 msec.
Access Time (Track to Track):	3 msec.

Floppy Disk Drive

Transfer Rate:	256K bits/second
Access Time (Avg.):	158 msec.
Access Time (Track to Track):	5 msec.
Settling Time:	15 msec.
Motor Start Time:	500 msec.

Serial I/O Rates:

External Clock:
RS-232C: 110 baud to 19.2K baud

Internal Clock:
RS-232C: 50 to 19.2K baud
RS-422: 10 to 410K baud

Parallel I/O rate (printer interface):

Programmed I/O — 9.6K characters/second typical

ELECTRICAL:

AC Power Capacity: 60 Hz ± 0.5 Hz
50 Hz ± 0.5 Hz

Voltage: 85 to 130 Vrms
220 to 240 Vrms

AC Power Requirements (maximum @ 105 Vrms):

AWS Workstation: 0.8 Amps (no disk)
1.25 Amps (floppy disks)
2 Amps (floppy and hard disk)

PHYSICAL:

	Height		Width		Depth	
	Inches	Cms	Inches	Cms	Inches	Cms
AWS-215	13.75	34.92	30.00	76.20	12.00	30.48
AWS-225	13.75	34.92	30.00	76.20	12.00	30.48
AWS-235	13.75	34.92	30.00	76.20	12.00	30.48
AWS-245/255/256	13.75	34.92	30.00	76.20	12.00	30.48
Keyboard	2.40	6.09	18.00	45.72	8.50	21.59

ENVIRONMENTAL AND SAFETY:

Safety

- Meets UL 478 (EDP) and 114 (Office Equipment)
- Meets CSA 154 (EDP) and 143 (Office Equipment)
- Designed to meet VDE 0730 Parts I and II (available at extra cost)
- Designed to meet BSI BS 3861 Parts I, II and III (available at extra cost)

EMI

- Designed to meet US FCC Rules and Regulations, Part 15, Subpart J, Class A
- Designed to meet VDE 0871 Level A (available at extra cost)

ESD

- 5000 Volts — No observable effect
- 15000 Volts — No operator perceived errors
- 25000 Volts — No permanent damage

Altitude:

With Mass Storage:
Operating: 6000 feet ASL
Non-operating: 12000 feet ASL

Without Mass Storage:
Operating: 15,000 feet ASL
Non-operating: 25,000 feet ASL

Acoustic Noise Level:

Without mass storage: NR 30
With mass storage: NR 40

	Operating Temperature		Non-Operating Temperature		Humidity
	°C	°F	°C	°F	%
Disk Media	10 to 40	50 to 104	−22 to +47	−7 to +116.6	20 to 80
System	0 to 40	32 to 104	−40 to +75	−40 to +167	5 to 95

DC Power Capacity:

	+5 Volts Amps	+12 Volts Amps	−12 Volts Amps	+24 Volts Amps
AWS-215	4.6	—	—	1.25
AWS-225	4.6	3.4	.2	1.25
AWS-235	4.6	3.4	.2	1.25
AWS-245	4.6	3.4	.2	1.25
AWS-255	4.6	3.4	.2	1.25
AWS-265	4.6	3.4	.2	1.25

Cable Lengths:

AC: 10 feet

Keyboard to workstation: 14 inches coiled, 5 feet extended

Maximum cluster diameter: 1,200 feet

Printed in U.S.A. 10K-0982-BA

Convergent Technologies
2500 Augustine Drive, Santa Clara, Ca. 95051
(408) 727-8830