WS80-X, 8-BIT INTELLIGENT WORKSTATION From Intercontinental Micro Systems

The WS80-X is a Single Board Computer that is not BUS dependent. It converts a simple terminal into an 8-bit "Intelligent" Workstation. Available with 128K Bank Selectable RAM the WS80-X features 4 MHZ, Z80A (WS80-4) or 6 MHZ, Z80B (WS80-6) versions. The Workstation contains an on-board Local Area Network controller using Datapoint's ARCnet[™] modified token passing protocol. A Coaxial Cable connector is provided for ease of installation. The WS80-X has been designed to operate as a Diskless Slave Processor within a multi-user network running under the TurboDOS[™] Operating System's architecture. By adding a SASI Personality Board a powerful network File Server can be implemented. The SASI interface allows adding Floppy drives, Hard Disks, and Tape or Removable Cartridge Backup. Serial and Parallel peripherals such as printers or modems can also be added through the serial and parallel ports provided. With ICM's MicroNet™ architecture, the WS80 will interface with most 8-bit and 16-bit processors including other ICM hardware and Workstations. A low profile enclosure with power supply is also available. Look for ICM's 16-bit Workstation to be released 4th guarter of 1984.

OTHER STANDARD FEATURES

Two Serial I/O Ports: One asynchronous and one asynchronous/synchronous. Two parallel I/O ports; eight data bits and two handshake lines per port. I/O or Interrupt driven. 2/4/8 Kbyte EPROM with monitor and network related software. Realtime Clock for TurboDOS Complex Slave operation. Complex Slaves allow local FLOPPY, Hard-disk or Tape storage to be implemented. 128 Kbytes (2 Switchable 64K banks) of Onboard Dynamic RAM. Software selectable baud rates. Fully Interrupt Driven. Compatible with ICM's LANS100 S-100 Bus ARCnet Controller. 16-bit CRC check and generation. No host processor overhead for link control.

MicroNet[™] NETWORK ARCHITECTURE

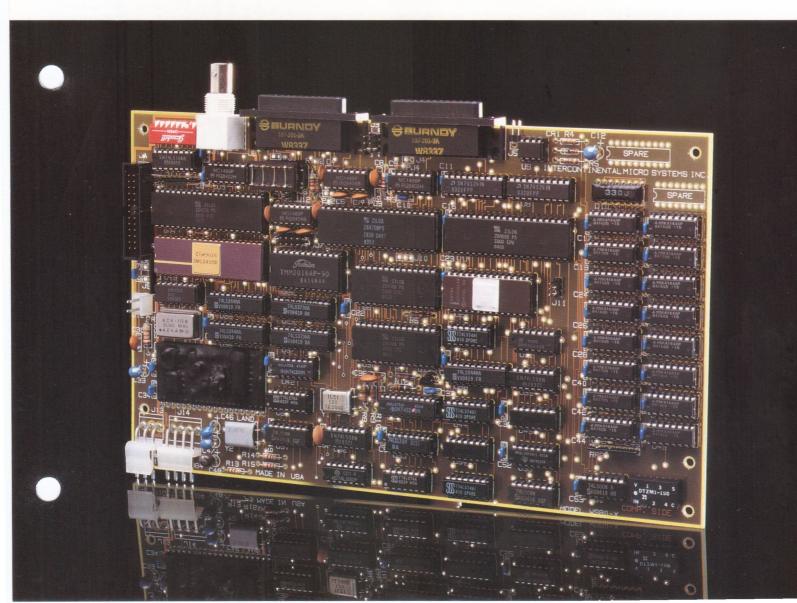
ICM's revolutionary MicroNet architecture uses the TurboDOS[™] Operating System to build sophisticated, cost effective multi-user systems and networks. MicroNet provides the flexibility of building multiuser systems with S-100 BUS Structured Networks and ARCnet Local Area Networks. MicroNet and its TurboLAN drivers offers:

□ Ability to network WS80 Workstations, S-100 Bus



Systems, IBM-PC's PC Compatibles, other 8-bit and 16-bit computers.

- Uses Master Processor/File Server such as ICM's CPZ-4800X Single Board Computer.
- Up to 4000 users per network with 255 nodes per network segment.
- Network self configures and efficiency increases as nodes are added.



Up to 40 miles between processors (Active Hub) or 2300 FT (Passive Hub).

□ 2.5 MBITS/SEC data transfers

Communication across S-100 BUS, Coax cable, or twisted pair.

TurboDOS OPERATING SYSTEM

TurboDOS is a true multi-user Operating System because it was designed from its beginnings to handle multiple computers running simultaneously on one or more networks. Each user is assigned an individual PC or a terminal attached to a Single Board Computer/Processor. This PC or individual processor is called a Slave Processor in the TurboDOS architecture and acts independently of all other slaves on the network. A Master Processor, also known as a File Server, controls the network by downloading the operating system to each slave. The Master also downloads system files and orchestrates the use of all common peripherals. With its modular architecture, TurboDOS can increase the number of users or add peripherals on the network with a general software command that "links and patches." TurboDOS is the most sophisticated, yet cost effective Multiuser operating system available today. It offers FEATURES such as:

- □ Compatible with many OS's Application Software: CP/M,[™] CP/M-86,[™] PC-DOS,[™] MS-DOS,[™] MP/M,[™] MP/M 86,[™] CP/M PLUS,[™] CONCURRENT CP/M 86.[™]
- Ability to mix Z-80, 8-bit; and 8086, 16-bit families of processors.
- Flexibility to build Bus Structured (Tightly Coupled) Networks and Local Area (Loosely Coupled) Networks using ICM's MicroNet.
- Record and File Locking with File Sharing among multiple users.
- □ Typically 300% faster than CP/M, MP/M, Oasis™ or similar multi-user, single-processor, multitasking OS's.
- 16 Logical Disk Drives per Master Processor/File Server.
- Up to 1000 MB per drive and 134 MB per file.
- □ 32 user areas (file libraries) on each disk.
- 25% to 30% more floppy disk capacity.
- Each user can independently STOP, RESUME or ABORT a program.
- □ Sharing of costly peripherals and disk drives.
- Read after Write verification of floppy and hard disks.
- Logon/Logoff and Privileged/Non-privileged Security.
- Background processing and Archival Back-up of files.
- □ Queing of multiple tasks processing or printing.
- Automatic Print Spooling.
- Each individual TurboDOS OS has 4 Circuit Drivers with 255 nodes (slaves) per circuit driver = 1020 users per File Server.
- □ Multiple File Servers can be linked together with ICM's TurboLAN[™] drivers.



Performance Specifications

PROCESSOR:

Type and Clock Rate WS80-4Z80A, 4 MHz WS80-6Z80B, 6 MHz	
I/O CHANNELS:	
Serial I/O channels (two ports) WS80-4 (asynchronous) up to 800 Kbaud WS80-6 (asynchronous) up to 1.2 Mbaud WS80-4 (synchronous) up to 800 Kbaud WS80-6 (synchronous) up to 1.2 Mbaud Parallel I/O channels (20 lines) Data rate up to 300 Kbytes/sec Interface signals eight data lines plus two	
handshaking lines per port.	

Timer/Counter channels (eight channels):

Two BAUD Clock channels, two interrupts and four channels for Realtime Clock.

128 KBYTE DYNAMIC RAM:

Wait states none required Arranged as two 64 Kbyte banks, switchable under software control, permitting typical TPA of 64, 253 bytes in user bank 1. Bank 0 holds Operating System.

2/4/8 KBYTE EPROM:

Provided with monitor which signs on at reset. Also provided with software to integrate workstation into TurboDOS network.

NETWORK INTERFACE

 Modified Token Passing Local Area Network (ARCnet Protocol)

 Transmission Mode
 Baseband Frequency

 Transmission Distance
 Coaxial Cable/RG62 (930hm)

 Transmission Distance
 2300 feet (max)

 Without repeaters
 40 miles (max)

 Transmission speed
 2.5 Mbits/sec, Typical

 Transmit Mode
 20.1V p-p Typical

 Receive Mode
 6.7V P-P Typical

DATA PACKET BUFFER 2 Kbyte X 8-Bit Static RAM Memory transparent during message transfer mode.

TurboDOS is a Trademark of Software 2,000, Inc. ARCnet is a Trademark of Datapoint.

CP/M, CP/M 86, MP/M, MP/M 86, CP/M PLUS, Concurrent CP/M 86

are Trademarks of Digital Research.

PC-DOS, IBM-PC are Trademarks of International Business Machines

MS-DOS is a Trademark of Microsoft. TurboLAN, MicroNet are Trademarks of Intercontinental Micro Systems

OPERATING ENVIRONMENT:

Temperature							
POWER REQUIREMENTS:							
Voltages +5 VDC @ 1.0 A (max) +12 VDC @ 25 mA (max) -12 VDC @ 25 mA (max) Power							
CONSTRUCTION							
Circuit Board Multi-layer Glass Epoxy, Vacrel Solder over Bare Copper. Fully socketed. Dimensions							
TESTING Completely tested and 24 hour burned-in							

WARRANTY One Year Warranty (Parts and Labor)

I/O PORT ADDRESS BIT ASSIGNMENTS:

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	A7	A6	A5	A4	A3	A2	A1	AO	
	0	0	0	0	0	0	0	0 - 0	OH SIO Chan A Data
	0	0	0	0	0	0	0	1 - 0	1H SIO Chan A
								C	md/Status
	0	0	0	0	0	0	1	0 -0	2H SIO Chan B Data
	0	0	0	0	0	0	1	1 -0	3H SIO Chan B
								C	md/Status
	0	0	0	0	0	1	0	0 - 0	4H PIO Chan A Base
	0	0	0	0	0	1	1	0 - 0	6H PIO Chan B Base
	0	0	0	0	1	0	0	0 -0	8H CTCO Chan 0
	0	0	0	0	1	0	0	1 - 0	9H CTCO Chan 1
	0	0	0	0	1	0	1	0 -0	AH CTCO Chan 2
	0	0	0	0	1	0	1	1 -0	BH CTCO Chan 3
	0	0	0	0	1	1	0	0 -0	CH LAN CONTROLLE
	0	0	0	1	0	0	0	0 - 1	OH CTC1 Chan 0
	0	0	0	1	0	0	0	1 - 1	1H CTC1 Chan 1
	0	0	0	1	0	0	1	0 - 1	2H CTC1 Chan 2
	0	Q	D	1	D	D	1	1-1	3H CTC1 Chan 3
	0	0	0	1	0	1	0	0 -1	4H BANK SWITCH
								В	ank 0
	0	0	0	1	0	1	0	1 -1	5H BANK SWITCH
								В	ank 1
	0	0	0	1	1	0	0	0 - 1	8H 2/4/8 KBYTE
								E	PROM
	0	0	0	1	1	1	0	0 -1	CH PACKET BUFFER
								0	VERLAY

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