

# LEADING EDGE S100 SLAVES

## From Intercontinental Micro Systems

### LEADING EDGE? EVERYONE SAYS THAT. PROVE IT.

When you read the features, the specs and the description, we're betting you'll be impressed by the capabilities of our CPS-MX slaves. Compare them to *any* of the competition. And when you discover our prices, we hope you'll allow us to help you with your distributed processing needs.

#### FEATURES.

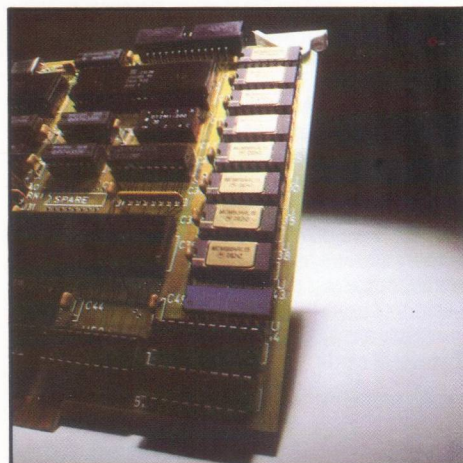
- IEEE 696.1/D2 S100 bus compliance.
- Compatible with CPZ-48000 SBCP, any Z-80A based CPU with extended address capability or 16 bit based CPUs complying with IEEE 696.1/D2 bus specification.
- Z-80B™ 6Mhz (CPS-6X) or Z80A 4Mhz (CPS-4X) operation.
- Two synchronous (CPS-MS) or asynchronous (CPS-MA) serial I/O ports.
- TURBOdos™ & CP/NET™ compatible.
- Master confiscation of slave memory for diagnostic purposes.
- Two parallel I/O ports; eight data bits + 2 handshake lines per port.

- 64 Kbytes of onboard dynamic RAM.
- Master/slave memory-to-memory transfers under DMA control @ 571 Kbyte/sec transfer rate when used with CPZ-48000 SBCP.
- Software selectable baud rates.
- Usable as an intelligent I/O processor in single user systems.

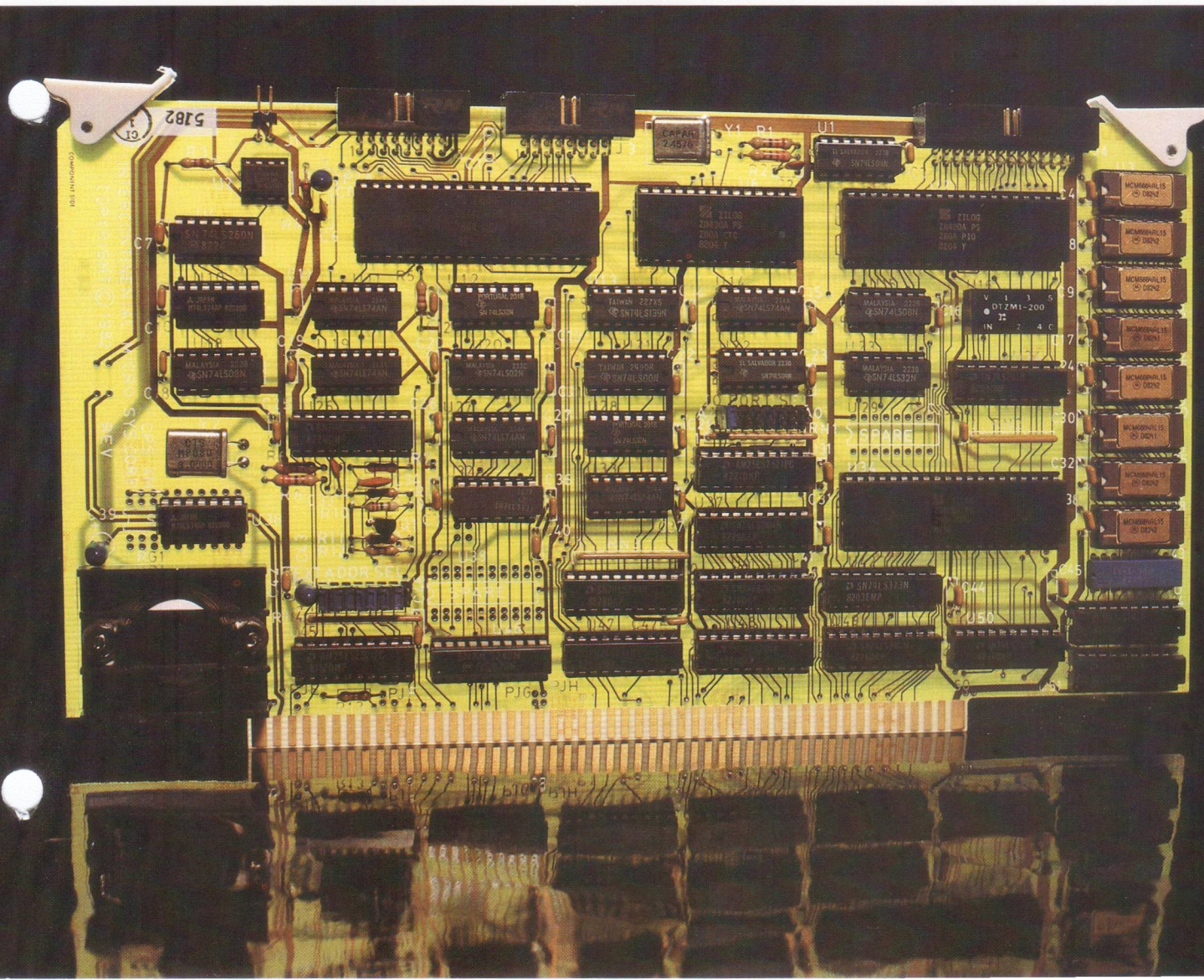
#### FEATURES ARE FINE BUT IT'S PERFORMANCE THAT COUNTS.

The model CPS-MX slave processors are Z-80A (4Mhz) or Z-80B (6Mhz) based single board computers compatible with TURBOdos and CP/NET distributed processing operating systems.

CPS-MX slave processors together with an S100 bus master (host) like Intercontinental's CPZ-48000 SBCP, constitute a high performance, high throughput network which can be integrated into most S100 bus mainframes. Master/slave communications take place over the S100 Bus via slave/host bidirectional memory transfers under control of the host processor. In an architecture where the host is the CPZ-48000 SBCP, those memory transfers may take place under direct memory access (DMA) control. The data transfer rate under DMA is 571



Kbytes/sec which is a 300% increase in speed over Z-80A block move rates. Data transfer rates in non-DMA mode are one-half of the maximum transfer rates for I/O mapped slave processors. Data transfer rates in DMA mode are up to one-sixth of the maximum transfer rates of I/O mapped slave processors.



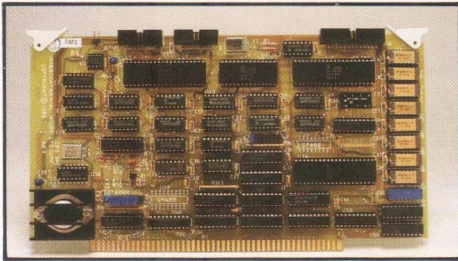
# Performance Specifications

Master to slave handshaking is enhanced even further by implementing master-to-slave requests under interrupt control. In this manner the slave responds immediately to the bus master's request for service.

Because the CPS-MX is memory mapped, no EPROM is required on the slave as the slave operating system is down-loaded to the slave at reset time. Execution commences upon release of the reset condition.

The CPS-MX can function as an intelligent I/O processor where either serial or parallel I/O functions may be implemented such as a printer spooler for either single-user or multiprocessor systems.

Finally with the CPS-MX the host may "confiscate" the slave memory indefinitely. The slave memory appears as a page in the master's extended address range and the master may exercise the memory or execute diagnostics in the slave. This essentially allows the CPS-MX to function as a 64 Kbyte RAM card.



## SOUNDS GOOD, BUT WHAT ARE THE ADVANTAGES?

Memory mapping on the CPS-MX enhances throughput and eliminates expensive additional on-board hardware. Transfer rates are no longer limited by I/O block move rates. FIFO buffers and other complex techniques are also not required to increase throughput. The result is a high performance, low cost slave processor making distributed processing comparable to mainframe performance at a fraction of the cost.

## HOW USING OUR WHOLE PRODUCT LINE WILL HELP YOU.

Our CPZ-48000 SBCP and 256KMB-100 gives you the perfect team for the most demanding tasks. Multi/user, multi-tasking, RAM disk, single user functions—and now with the CPS-MX, sophisticated, inexpensive, distributed processing.

## WE'VE GOT PERSONALITY.

Our complete line of personality boards allow you to interface your system with anything from floppies to hard disks, including modems and printers. They're also small and don't take up any S-100 bus space.

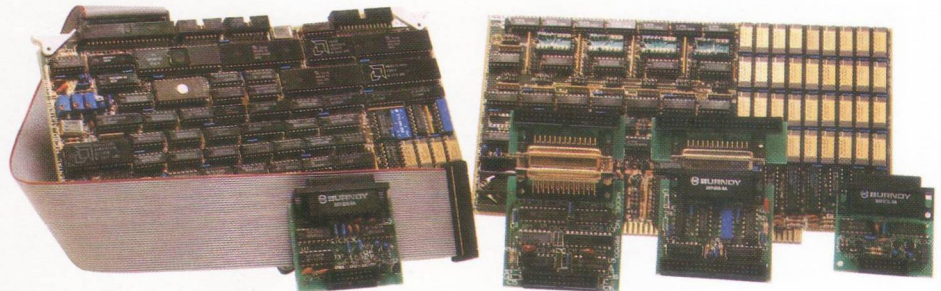
## WE SAVED THE BEST FOR LAST.

Prices. The CPS-MX series start at under \$500.00 (CPS-4A). That's right, up to 65% less than what you have been paying for products that may not measure up. Call Intercontinental Micro Systems today.



Processor	
Clock rate	4 Mhz
CPS-4X	6 Mhz
CPS-6X	
Type	Z80A
CPS-4X	Z80B
CPS-6X	
Bus Interface	IEEE 696.1/D2 S100
	STATUS, control, data and address. I/O port address switch selectable for address range from 00 <sub>h</sub> to FF <sub>h</sub> . Memory address switch selectable for address range from 010000 <sub>h</sub> to FFFFFF <sub>h</sub> .
I/O Channels	
Serial I/O Channels (2 ports)	
Baud Rate	
CPS-6S	Up to 1.26 Megabits/sec
CPS-4S	Up to 880 Kbits/sec
I/O Interface	Through personality boards
Parallel I/O Channels (2 ports)	
Data Rate	Up to 300 Kbytes/sec
Interface Signals	8 data lines PLUS 2 handshaking lines per port
I/O Interface	Through personality boards
64 Kbyte Dynamic RAM	
Wait States	None required
Direct Memory Transfers	To/from CPZ-48000 SBCP
Data transfer rate (Non-DMA)	190 Kbyte/sec
Data transfer rate (DMA)	571 Kbyte/sec
Memory Address	Switch selectable in 64 Kbyte boundaries for a total of 256 Kbyte pages
Power Requirements	
Voltages	+8 VDC @ 1.2 A (max)
	+16 VDC @ 0.15 A (max)
	-16 VDC @ 0.15 A (max)
	14.5 W (max)
Power	
Operating Environment	
Temperature	0 to 45 degrees Celsius
Relative Humidity	0 to 95%
Construction	
Circuit Board	Two layer glass epoxy, VACREL™ soldermask over bare copper. All IC's in sockets. Shrouded for protection
Connectors	
Testing	Tested and burned-in
Warranty	One year warranty (parts and labor)

Z80 is a trademark of Zilog Corporation  
 TURBOdos is a trademark of Software 2000, Inc.  
 CP/NET is a trademark of Digital Research Corporation  
 VACREL is a trademark of Dupont Corporation



4015 Leaverton Court, Anaheim, CA 92807, (714) 630-0964 Telex: 678401-TAB-IRIN

# Four Answers To Your S-100, Multi-User Problems.

Intercontinental Micro Systems makes everything you need for S-100 bus multi-user systems, networks or single user systems.

At a price that won't break your budget.

Quite simply, our single board computers, slaves, 256K memories and personality boards let you build a system *now*, not later. The hardware works, the software works,

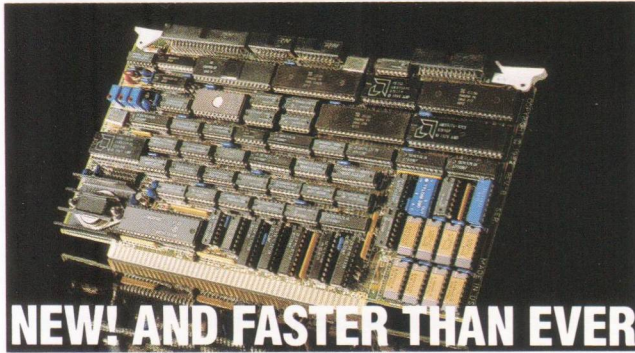
and the prices are what you'd expect from a company that uses the most advanced design, software and production techniques to keep costs down.

What you won't expect is the almost awesome sophistication of Intercontinental Micro System's products.

So stop messing around with multiple sourc-

ing, hardware integration problems and software nightmares. Come to Intercontinental Micro and get it all — price, performance and delivery.

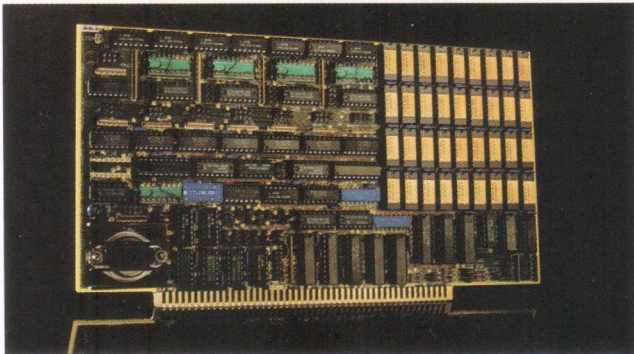
Read the specs, then call, write or circle the bingo number below. We'd be glad to send more information and help solve your S-100, multi-user system problems.



**NEW! AND FASTER THAN EVER**

## CPX-MX SLAVES.

**2**  IEEE 696.1/D2 S-100 compliance.  Compatible with CPZ-48000 SBCP any Z-80A based CPU with extended address capability or 16 bit based CPUs complying with IEEE 696.1/D2 bus specification.  Z-80B™ 6MHz (CPS-6X) or Z80A 4MHz (CPS-4X) operation.  Two synchronous (CPS-MS) or asynchronous (CPS-MA) serial I/O ports.  TurboDOS™ & CP/NET™ compatible.  Master confiscation of slave memory for diagnostic purposes.  Two parallel I/O ports; eight data bits + 2 handshake lines per port.  64 Kbytes of onboard dynamic RAM.  Master/slave memory-to-memory transfers under DMA control @ 571 Kbyte/sec transfer rate when used with CPZ-48000 SBCP.  Software selectable baud rates.  Usable as an intelligent I/O processor in single user system.

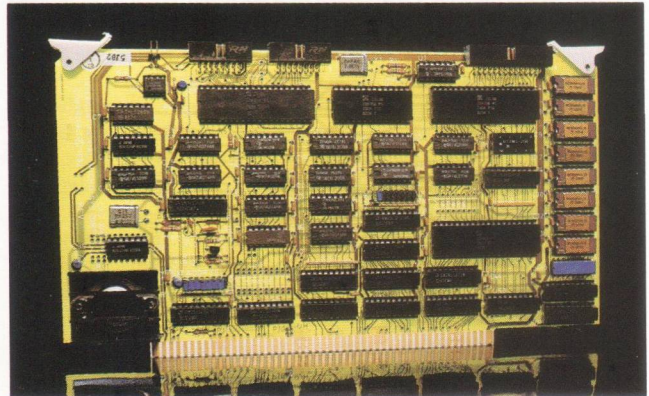


## PERSONALITY BOARDS.

**4**  Centronics printer.  8 inch floppy disk.  5 1/4 inch floppy disk.  RS232 serial communications.  Synchronous/asynchronous modem.  Priam smart/smart E hard disk.  Long distance serial communication (2000 ft @ 9600 baud).  Shugart Associates Systems Interface (SASI).  Clock/calendar.  Konan David, Jr.™ hard disk.  Archive tape drive.

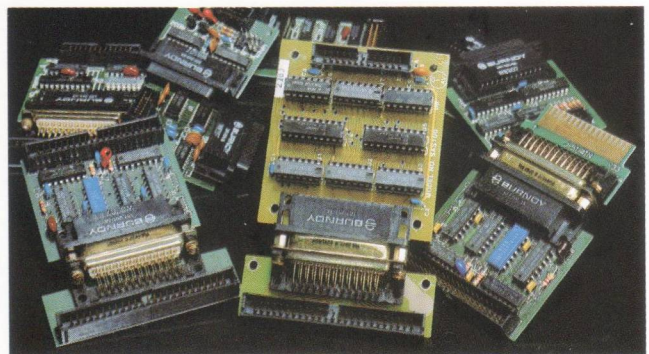
## CPZ-48000 SINGLE BOARD COMPUTER.

**1**  IEEE 696.1/D2 S-100 compliance.  Z80A™ 4 MHz or Z80B, 6 MHz operation.  Floppy disk controller (FDC). Single or double sided. Single or double density, 8" or 5 1/4", any combination of four disks.  Two synchronous or asynchronous serial I/O channels (SIO).  Two parallel I/O channels (PIO).  Four channel DMA controller.  64K on-board RAM.  Memory management unit (MMU).  Addresses up to 16 megabytes of system memory.  Eighteen Vectored priority interrupts.  Provisions for 2K, 4K or 8K on-board EPROM.  Software selectable baud rates.  IBM Bisync, HDLC, SDLC and other protocols.  CP/M™ MP/M™ and TurboDOS™ operating systems available.  Turbo-Disk® implementation included.



## 256KMB-100 256K MEMORY.

**3**  IEEE S-100 bus, spec 696.1/D2 compliance. The 256KMB-100 is compatible with most IEEE S-100 board products now on the market.  Linear addressable to 2 megabytes.  225 nano-second access time, maximum, 160 nano-seconds, typical.  295 nano-second read-write time, minimum.  Bank selectable 16K increments.  I/O port address bank selection.  Configures for phantom deselection.  Parity error detection, visual and/or interrupts.  Bank selection compatible with CROMIX™, CP/M2.2™, MP/M™, Alpha Micro, and other major systems.



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# WHAT IS A TURBODOS SYSTEM?

TURBODOS is an operating system that allows multiple processors to be networked together to support multiple users in a MASTER/SLAVE configuration. One of the processors, the Master Processor, acts as the program director for the network. The other processors, Slave Processors, service one user each, and can operate independently of the Master processor. When Turbodos is used on the S-100 BUS, up to 16 users can be networked together with one Master, in one chassis.

MASTER-TO-MASTER networking is also possible using an ETHERNET control card on the S-100 bus. Current technology will allow us to network 16 masters together, resulting in a very efficient, 256 USER network, with all the advantages of TURBODOS.

There are many advantages to a multi-user/multi-processor network:

1. Each user has a dedicated processor to work with. The master will transfer the operating system and the file down to the slave processor being used, and the user can then process independent of any other user on the system. Thus there is no "sharing" of a single processor between users, as with many other networks.

2. Since all processors and peripheral controllers are normally mounted on the S-100 Bus, all data transfers are parallel across the bus, rather than serially as with a network of personal computers. Thus, data transfers can be accomplished at a much faster speed than with a serial transfer protocol.

3. All users can share common peripherals, thus lowering the cost of a multi-user system. The common peripherals are usually connected to the Master processor. Although the PC network can put a printer on each PC, their users CANNOT share those printers. On a TURBODOS network we can put printers on the master, as well as each slave, and all users can share all printers.

4. All boards: Master, Slave, Memory Boards, and Peripheral Controllers are contained in a single chassis, therefore each user only

needs a simple terminal. Again, this is less expensive than a complete personal computer at each work station.

5. The system is very versatile because each slave also has 2 serial and 2 parallel ports to allow connecting to dedicated peripherals if you don't want all users to share the common peripherals.

6. Most personal computer networks are designed to operate effectively at up to 10 users. More than 10 users will cause significant degradation in the network. A Turbodos network can accommodate 16 users per Master very efficiently. Current technology will allow up to 16 Masters to be networked, resulting in a very sophisticated 256 user system. The networking of masters is accomplished through ETHERNET or ARCNET S-100 boards.

7. TURBODOS multi-user systems have become as powerful as MINI-COMPUTERS, and yet are much less expensive. This type of network is a very cost-effective approach to the typical "4 user" system. The 4 user system can be expanded to additional users more quickly and at a much lower price than adding more PC's to a network.

8. The TURBODOS network allows all users to share the same files, and yet provides for record and file locking to prevent two or more users from modifying the same file at the same time. PC NETWORKS DO NOT YET FEATURE RECORD LOCKING.

9. ICM's MASTER/SLAVE processors are the most sophisticated, cost effective SINGLE BOARD COMPUTERS in the TURBODOS marketplace. They offer more processing power, faster throughput and excellent reliability. The features and advantages of using ICM's processors are discussed in the attached brochures.

10. FINALLY, the ICM MASTER/SLAVE Turbodos network was originally designed to operate as a network. The PC was not designed to operate in a network environment. Therefore, it is only logical that your clients will be sacrificing some of the advantages of a 16 bit PC when they begin networking them together.

# APPLICATION PROCESSORS (SLAVES) S-100 BUS 8-BIT, 64K AND 128K From InterContinental Micro (ICM)

Our fast and reliable 8-Bit Application Processors (Slaves), the CPS-6X with 64K RAM (pictured right) and CPS-B6X with 128K RAM (pictured below), are compatible with either of our S-100 Bus Fileservers (Masters), the CPZ-4800X (8-Bit) and the CPZ-186 (16-Bit). Used in combination with the CPZ-4800X or the CPZ-186, these Application Processors offer throughput and performance capability unmatched by any other Fileserver/8-Bit Application Processor combination available in the S-100 market today.

These Application Processors are based on the Z80B (6 MHz) processor. Full compliance with the IEEE 696.1/D2 S-100 Bus standard means they can be used with any S-100 SBC with extended address capability. They can also be used as intelligent I/O processors in single user systems or in 16-bit architectures.

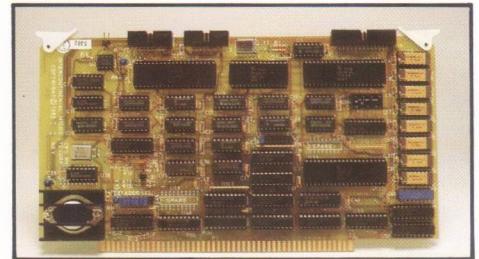
The CPS-B6X with 128K RAM has been designed specifically for TurboDOS™ applications. TurboDOS supports 128K bank-switched memory on Z80 com-

puters with two banks of 64K RAM. One bank holds the operating system and a large pool of disk buffers. Almost all (64,253 bytes) of the other bank is available for user programs. This transient program area (TPA) gives application programs significantly more space than on previous TurboDOS versions.

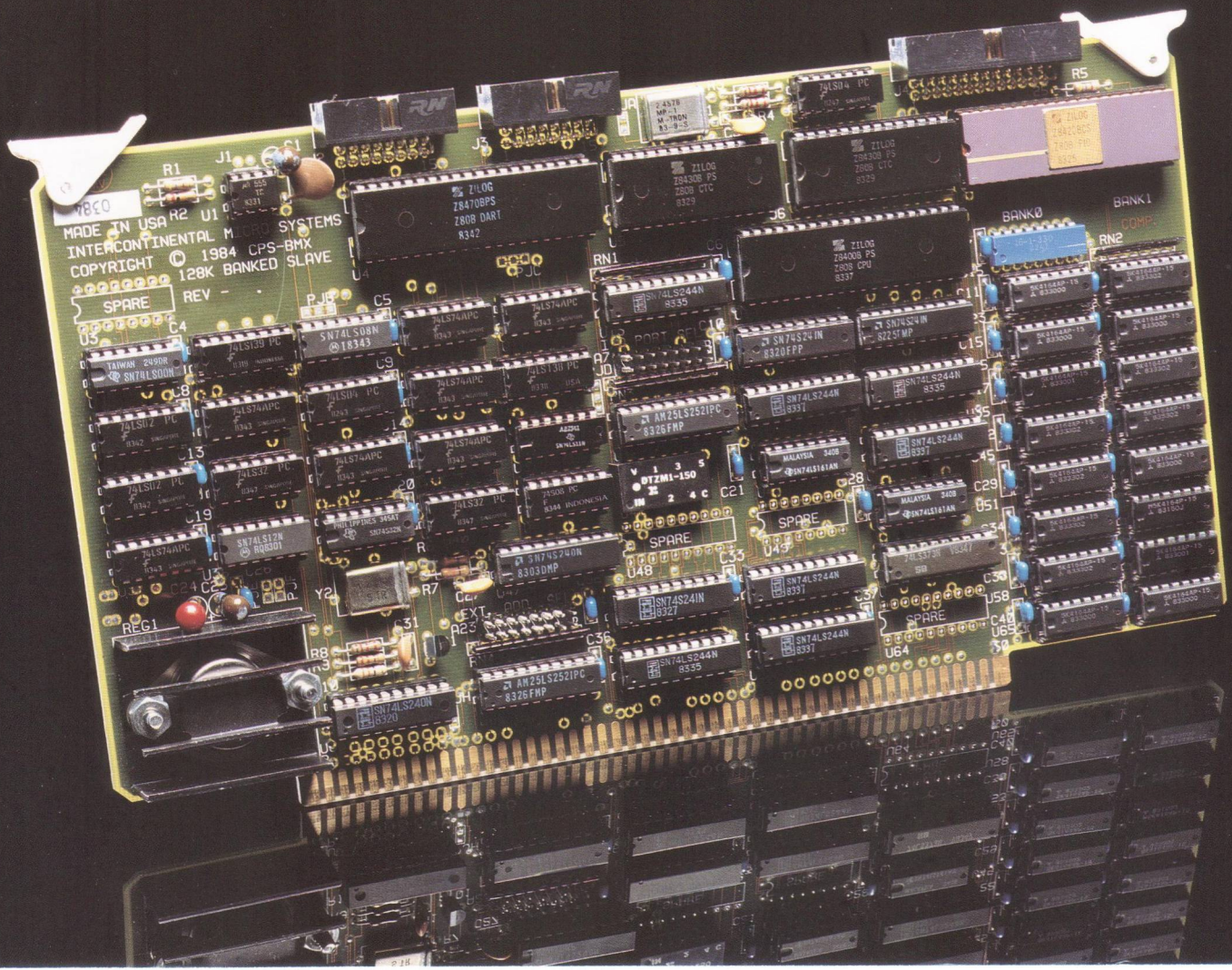
Under TurboDOS, processing of console I/O functions is now more than twice as fast as before. This results in greatly improved performance with console-intensive applications such as WordStar.

The CPS-B6X and CPS-6X are used as Memory Mapped Slaves (Application Processors) using the Memory Management Unit (MMU) available on the InterContinental Micro Fileservers. A memory mapped Application Processor is at least twice as fast as a standard I/O mapped Application Processor. Memory mapping also eliminates expensive on-board hardware such as EPROM and FIFO buffers. Memory mapping allows the Fileserver to download the Operating System and application software

directly to the Application Processor's memory, eliminating the time and protocol code usually required by both the Fileserver's and Application Processor's CPUs. When networked with the CPZ-4800X



or CPZ-186, the CPS-B6X offers unmatched 8-bit speed and reliability. ICM's CPZ-4800X and CPZ-186 can accommodate both I/O mapped and memory mapped Application Processors operating concurrently on the same bus.



## OPERATING SYSTEM COMPATIBILITY

Our Application Processors have been specifically designed to operate under the TurboDOS Operating System. TurboDOS is compatible with virtually all off-the-shelf CP/M and MP/M application software. Since CP/M has been the standard 8-bit Operating System for a number of years, there are literally thousands of application software packages readily available.

TurboDOS is also compatible with CP/M 86, MS-DOS, and PC-DOS 16-bit application software. ICM's 16-bit processors and LAN products will allow you to upgrade to 16-bit whenever you're ready. You can connect up to 4000 8-bit and 16-bit computers (including PCs) on one network simultaneously.

## FILESERVER/APPLICATION PROCESSOR TurboDOS NETWORKS

A typical TurboDOS S-100 Bus multi-user network consists of a Fileserver (Master) CPZ-4800X or CPZ-186 and up to 16 Slaves (Application Processors). Fileservers can be networked together via ICM's TurboLAN® to build up to a 4000 user system. Each Application Processor CPU acts independently of the Fileserver, resulting in a dedicated processor for each user. The Fileserver acts as the file processor and Bus arbitrator. This type of network is inherently faster than a multi-tasking, time-shared, single-processor arrangement like MP/M or UNIX,™ because each user can work independently of the other users on the network. TurboDOS is also quite user friendly, unlike the scientifically oriented UNIX. TurboDOS networks are very cost effective because all users can share common, costly peripherals. Approximately 1/3 the cost of networking personal computers under Ominet™ and 1/55 the cost of an Ethernet PC network. Peripherals can be connected to the serial and parallel ports on the Fileserver and on the Application Processors.

## OTHER STANDARD FEATURES

- 2 Serial I/O Ports—Synchronous or asynchronous. Can interface with Micro, Mini, or Mainframe level peripherals.
- 2 Parallel I/O Ports with 24 I/O lines (8 data lines and 4 status lines per port)—Programmable I/O mode. Two 8-bit lines and two handshake lines allow 2-way communication between CPU and peripheral.
- Discrete Refresh Circuitry—Relieves the CPU of having to refresh the memory. Putting the CPU into a HALT state will not result in memory loss.
- Software Selectable Baud Rates—Allows very flexible peripheral interfacing. Eliminates complicated hardware jumpering and switching to change baud rates. Up to 1.26 megabits/sec in synchronous mode, 50K BAUD in asynchronous mode.
- Interrupt control of Application Processor to Fileserver requests enhance Fileserver to Application Processor communication. The Fileserver responds immediately to the Application Processor's request for service.

- The Fileserver's ability to confiscate the Application Processor's memory to download programs into the Application Processor's memory allows the Application Processor to process independently of Fileserver, thus allowing the user to process at the Application Processor's clock rate. Confiscation also allows the Fileserver to perform diagnostics on the Application Processor.

## HOW USING OUR WHOLE PRODUCT LINE WILL HELP YOU

InterContinental Micro's 8-Bit and 16-Bit Fileservers, 8-bit and 16-bit Application Processors, Hard Disk Controllers, ARCnet™ Controllers, HUBs, Workstations, Fileserver Packages, Node Packages, Personality Boards, TurboLAN Software, and Manuals give you the perfect team for the most demanding networking tasks. When combining ICMs multi-user,

multi-processing RAM disks, with single user functions and ARCnet capability, a sophisticated network of up to 4000 users is possible.

## WE'VE GOT PERSONALITY

Our complete line of personality boards allows you to interface your system with any peripheral from floppies, hard disks, and tape drives (in any combination), to terminals, printers, and modems. ICM's personality boards are small and don't take up any S-100 Bus space.

## WE SAVED THE BEST FOR LAST

Prices. That's right, probably less than what you have been paying for products that may not measure up. Check our reputation—reliability, support, and pricing—you get it all. Call InterContinental Micro today.

# Performance Specifications

## MICROPROCESSOR

Clock rate . . . . . 6 MHz Z80B

## BUS INTERFACE . . . . . IEEE 696.1/D2 S-100

STATUS, control, data and address, I/O port address switch selectable for address range from 00 (Hex) to FF (Hex). Memory address switch selectable for address range from 010000 (Hex) to FFFFFFFF (Hex).

## DYNAMIC RAM MEMORY

Capacity . . . . . 128K or 64K Bytes

Wait States . . . . . None

Direct Memory Transfers. . . . . To/From ICM's SBCP

Data transfer rate (non-DMA) . . . . . 190 Kbytes/sec

Data transfer rate (DMA) . . . . . 571 Kbytes/sec

## SERIAL I/O CHANNELS

Synchronous Operation

Baud Rate . . . . . Up to 1.2 Megabits/sec

Data Transfer . . . . . DMA, interrupt or Programmed I/O

Asynchronous Operation

Baud Rate . . . . . Up to 1.2 Megabits/sec

Clock Rate . . . . . 1, 16, 32 or 64 times

Baud Rate

Bits/Character . . . . . 5, 6, 7, or 8

Stop Bits . . . . . 1, 1½, or 2

Parity . . . . . Odd, Even or None

Data Transfer . . . . . DMA, Interrupt or

Programmed I/O

I/O Interface . . . . . Through Personality Boards

(Typically 2"x3")

## PARALLEL I/O CHANNELS

DATA RATE . . . . . Up to 300 Kbytes/sec

Channel A Data Transfer. . . . . Interrupt, Programmed I/O, or DMA

Channel B Data Transfer . . . . . Interrupt or Programmed I/O

Interface Signals . . . . . 8 data lines plus 2 handshaking lines per port

I/O Interface . . . . . Through Personality Boards

## REALTIME CLOCK

Operation . . . . . Software Polled or Interrupt Driven

Range . . . . . 37.5 Hz to 921.6 KHz

## POWER REQUIREMENTS

Voltages . . . . . + 8 VDC @ 1.8A (max)

+ 16 VDC @ 0.15A (max)

- 16 VDC @ 0.15A (max)

Power . . . . . 11 W, 14 A

## OPERATING ENVIRONMENT

Temperature . . . . . 0 to 45 degrees Celsius (32 to 122 Degrees Fahrenheit)

Relative Humidity . . . . . 0 to 95%

## CONSTRUCTION

Circuit Board . . . . . Two or four layer glass epoxy, VACREL™ soldermask over bare copper.

All ICs in sockets.

Connectors. . . . . Shrouded for protection.

TESTING . . . . . Completely tested and 24 hour burn-in

WARRANTY . . . . . One Year Warranty (Parts and Labor).

UNIX is a Trademark of Bell Labs  
ARCnet is a Trademark of Data Point  
Ominet is a Trademark of Corvus  
TurboDOS is a Trademark of Software 2000, Inc.  
VACREL is a Trademark of Dupont Corporation  
TurboLAN is a Registered Trademark of InterContinental Micro Systems Corporation.

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Micro**

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**THREE NEW PRODUCTS.** With the addition of a new 6 MHz Master/SBC, a 128K RAM slave processor board and ARCNET capability through our ARC-100 ARCNET controller board you can build sophisticated S100 bus systems for one to 4000 users.

Intercontinental Micro continues to make State of the Art simple to use.

**SYSTEM FLEXIBILITY.** With 4 MHz or 6 MHz 8-bit SBC/masters, 4 or 6 MHz 8-bit slave processors with 64K or 128K RAM, TurboDOS™ and PC-DOS™ operating systems, ARCNET links between systems and a complete line of interface and controller boards, Intercontinental Micro System's give you and your customers flexibility—to grow and change.

Imagine, with the introduction of our 16 bit slave in the second quarter, you'll be able to use both 8 and 16 bit processors on the same network—allowing you to keep your 8 bit software library as you grow into the 16 bit world. Soon even IBM PCs will be able to act as slaves in an Intercontinental S-100 bus system.

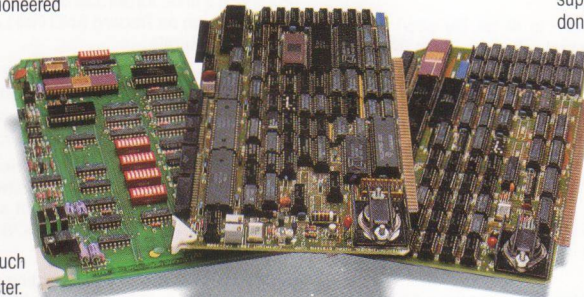
TurboDOS allows you to construct true multiuser systems with CP/M,™ MP/M,™ CP/M 86 and soon PC-DOS capability. And ARCNET makes local area networks with up to 4000 users possible—and very cost effective. From a simple single user station to large scale ARCNET business system groups, Intercontinental provides flexibility. In fact, our products have been used for a host of functions—from process control and robotics to satellite communications, special movie effects and building demolition.

**SPEED AND POWER.** Intercontinental Micro pioneered the use of 4 channels of Direct Memory Access (DMA), in the micro world—making our master slave combinations up to 300% faster than the competition. Other state of the art features found in Intercontinental products include: 16 MegaByte Memory Management Unit (MMU) on all SBC/Masters, bank selectable slave memory, vectored priority interrupts, and multiple parallel/serial ports.

Features are great—but they don't mean much unless they help you do your job better and faster.

# ANNOUNCING THE FASTEST, MOST POWERFUL, COMPREHENSIVE LINE OF S-100 PRODUCTS EVER AVAILABLE.

Ask for confidential benchmark studies on our product's speed. We think you'll agree we can save you and your customers time.



**A COMPLETE PRODUCT LINE. CPZ-4800X—Single Board Computer.** 4 or 6 MHz processor (Z80A/B), onboard floppy disk controller, 64K RAM, 4 channel DMA controller, 18 vectored priority interrupts, two parallel I/O channels, two synchronous or asynchronous serial I/O channels, real time clock. 16 bit version available 3rd quarter 1984.

**CPS-MBX—slave processor.** 4 or 6 MHz processors, 64K or 128 RAM basic selectable memory mapped, two serial ports synchronous or asynchronous, two parallel ports, software selectable baud rates. 16 bit version available 2nd quarter 1984.

**256KMB—Memory Board,** linear addressable to two megabytes, 220 nano second access time—maximum, bank selectable in 16K increments, I/O port address bank selection, in 16K increments, I/O port address bank selection, configures for phantom deselection, parity error detection, Cromix ZPU compatible.

**ARC-100—ARCNET controller** meets 696.2/D1 S-100 spec, coax cable interface, 255 nodes per network segment, 2.5 megabit data rate.

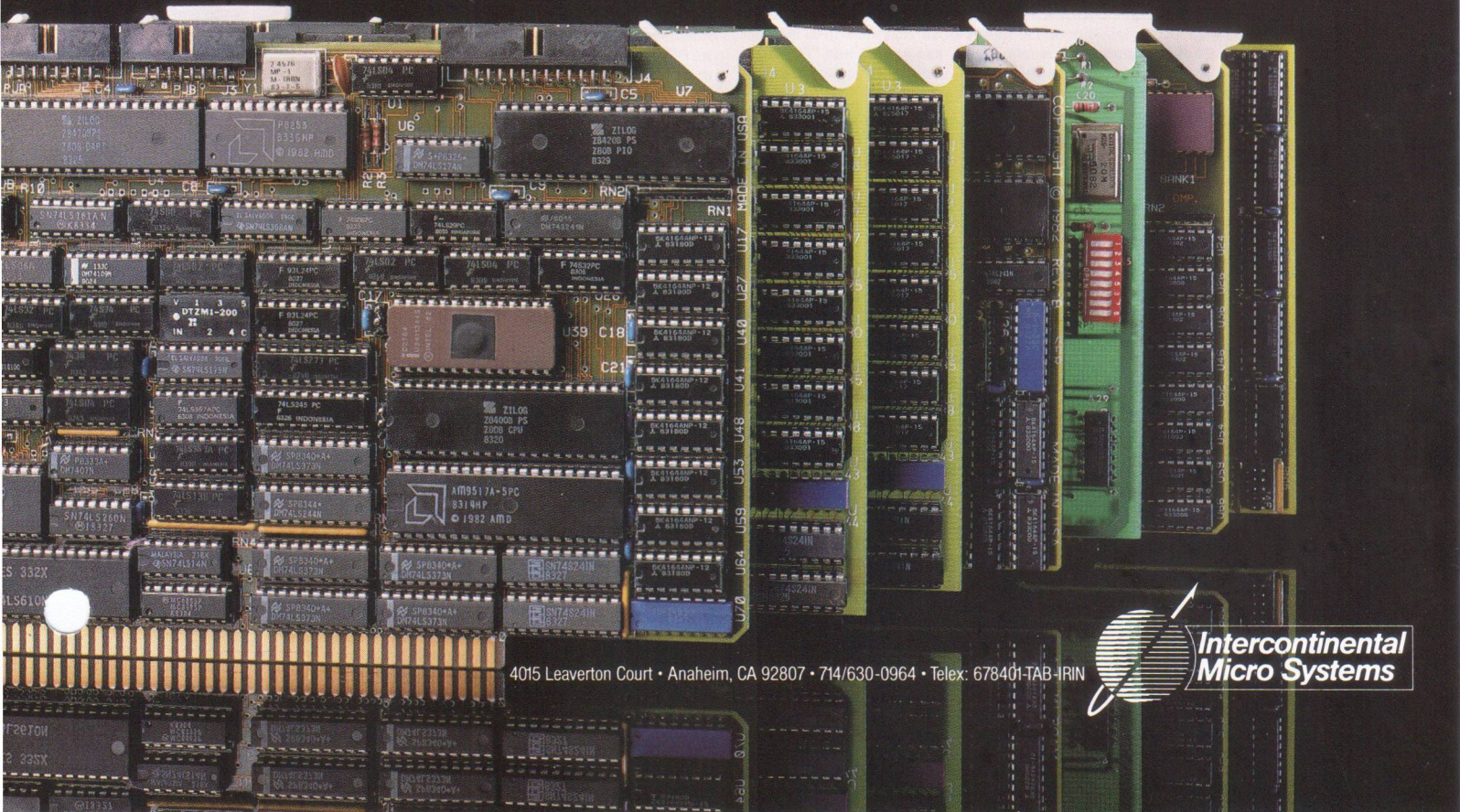
**MD-1013—Hardisk controller,** user selectable sector sizes of 256, 512 or 1024 bytes, implied seek and error recovery, user selectable controller address. Handles up to two drives, 5MB to 140MB.

**Personality Boards—SASI, Centronix, PRIAM, Clock/Calendar, RS232, Modem, RS422,** long distance serial communications (up to 4000 ft).

**SUPPORT, SUPPORT, SUPPORT.** Everyone talks about support. Intercontinental Micro Systems does more. We don't build systems, so you are our most important customer. Ask us for references or call our dedicated support team. You'll find out that support is more than just a word at Intercontinental Micro Systems. It's what we're here for.

**SO GET IT ALL.** A comprehensive product line loaded with benefits for you and your customers. Flexibility to grow. And support that sets industry standards. Call Intercontinental Micro Systems today—we can help you with your S-100 bus system needs.

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## ANSWERS TO QUESTIONS YOUR CUSTOMERS MAY BE ASKING

### 1. WHY GO INTO THE 8-BIT MARKET, WHEN IBM HAS ESTABLISHED THE 16-BIT MARKET AS THE FUTURE STANDARD FOR MICROCOMPUTERS?

We disagree with the basic premise that everyone will eventually be going to a 16-bit computer. There are currently a large number of users that have a considerable investment in their 8-bit Application Software packages. They also have found that the 8-bit software packages are more than adequate for their business needs. They may consider converting to a 16-bit machine, but the expense of conversion will discourage a number of them. This group of people will decide to stay with an 8-bit machine.

We liken this to the hand held calculator. Sure, the Scientific Calculator is now affordable by most people; but surprisingly enough, you'll find a basic 4 function calculator in most businessmen's office. The price of that 4 function calculator makes it very difficult to justify the Scientific Calculator, and it is usually much easier to use. Thus we believe that, just like the 4 function calculator, there will always be an 8-bit market.

Granted, quite a few people will eventually convert to 16-bit. By offering a TurboDOS based system, you can offer a system that will accept both 8-bit and 16-bit computers on the same network. Thus you can position yourself in both (or is it 3?) markets: the 8-bit and the 16-bit market. The end user may eventually want to convert only a portion of his system to 16-bit.

### 2. WHY SHOULD I USE ICM BOARDS?

Our current 8-bit boards contain technical features that are state-of-the-art, features hard to find, even on 16-bit computers. Features such as:

1. 4 channels of DIRECT MEMORY ACCESS (DMA), whereas many 16-bit computers offer only 1 DMA channel. DMA has increased memory transfers by 300%, and we offer 4 DMA channels, not 1.
2. MEMORY MANAGEMENT UNIT (MMU) which increases the address bus to 24 bits, and allows addressing up to 16 MBytes of memory, 24 bits of address, not the 20 bits that most 16-bit CPU's offer. 16 MB of main memory addressing, not 1 MB.
3. VECTORED PRIORITY INTERRUPT (VPI) allows the CPU to recognize, prioritize, and respond to simultaneous requests for service from up to 18 interrupt sources. VPI eliminates the problems usually associated with "Polled I/O": Failure to recognize (much less respond to) simultaneous requests for service, and the resultant data loss.
4. TURBODISK (RAM disk) allows using RAM memory to emulate a disk at data transfer rates of 1 MByte/sec—the fastest method of storing and retrieving data.
5. MEMORY MAPPED SLAVES eliminate expensive on-board hardware such as EPROM and FIFO buffers. Data transfers to the slaves are 200% faster than standard I/O mapped slaves. Memory mapping also eliminates much of the code usually required to access a slave, thus leaving more memory for TPA.

OUR FUTURE PRODUCTS WILL CONTAIN THESE FEATURES AND ADDITIONAL "LEADING EDGE TECHNOLOGY" AS WELL.

In addition, we offer all of the Single Board Computer features that you would expect from the technological leader in the field. By the way, Microsystems magazine's review of S-100 single board computers concluded that our CPZ-48000 is "the most hardware advanced" and a programmer's "Nirvana."

### 3. WHAT IS ICM DOING TO HELP ME GET POSITIONED IN THE 16-BIT MARKETPLACE?

We considered the entire family 8086 CPU's, including the 186 and 286 CPU's. However, the 186 & 286 are highly allocated, and won't be available in production level quantities for quite some time. In addition, our 16-bit 8086 board

will contain all of the features that a 186 can offer, and then some. For instance, MMU is already an onboard feature of our 8-bit board. We also offer 4 channels of DMA. An 8086 SBC will allow you to deliver a 16-bit product in a very timely fashion. You won't be facing 6 week delays in delivery from ICM. We will be releasing an 8086 based, 16-BIT Slave Processor in April, 1984. We are also designing a 16-bit Master Processor for future TurboDOS configurations.

### 4. EVERYONE'S TALKING THE MULTI-USER MARKET. AGAIN, WHY ICM BOARDS, AND WHAT CAN WE DO WITH THE PC'S ALREADY PURCHASED?

Our CPZ-48000 is a true single board computer. It is an excellent stand alone, single-user computer; but it also has been specifically designed as a master computer for networking applications. Our Master/Slave TurboDOS architecture is a true multi-user system that assigns an independent processor to each user. This multi-user/multi-processor network is inherently faster than a multi-tasking, time shared network, because all users are not sharing a single processor's time. TurboDOS offers a number of features that are hard to match—Features such as Record AND File Locking, shared peripherals AND dedicated peripherals.

TurboDOS connects 16 SLAVES per MASTER on an S-100 bus. Our ARCNET capability now allows building a 4000 user system by networking up to 256 MASTERS. Now you can build a cost effective BUS STRUCTURED NETWORK and add the flexibility of LOCAL AREA NETWORKING.

In addition, TurboDOS 1.4 (which went into beta-test in January, 1984) will permit connecting PC's onto the network as slaves via ARCNET. Thus, the businessman who has already bought a PC will be able to build a low-cost, sophisticated, ICM based, TurboDOS multi-user system, and also add his existing PC's to that network.

TurboDOS 1.4 will also allow building a network with 8-bit and 16-bit processors on the same bus. This type of flexibility is hard to beat.

DON'T FORGET! A TurboDOS network is the most cost effective network available today. You can build a multi-user/multi-processor network for approximately 1/3 to 1/2 the cost of a network of PC's. The Master/Slave architecture puts all the processors and peripheral controller boards in one S-100 chassis (mainframe). The user ties into his slave processor via a "dumb" terminal and an RS-232 interface. The master processor, slave processors, and peripheral controllers are networked together on the S-100 bus. With this architecture, a user can be added to a network for less than \$1000, including terminal. REMEMBER—LOW COST DOES NOT MEAN LESS SOPHISTICATION, ICM OFFERS THE MOST SOPHISTICATED BOARDS IN THE S-100 MARKET.

### 5. PC-DOS IS THE STANDARD OF THE FUTURE, CP/M IS DEAD.

Again, we do not accept this premise, CP/M is too prevalent in the market. There are literally thousands of CP/M software packages available. Perhaps the CP/M market will slow down, but it will not go away for quite a few years. Not to be redundant, but why not take advantage of both worlds. TurboDOS will soon be CP/M, CP/M 86 and PC-DOS compatible. You could be hedging your bets by offering a product that will be compatible with all the major software available not only tomorrow, but today as well.