

INX-386SX SBC User's Manual

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For MCSI PART NO. 73000 INX-386SX  
All-In-One Single Board Computers  
For Industrial/Embedded Systems Applications

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## PREFACE

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This manual provides information about the MCSI INX-386SX All-In-One Single Board Computer. This information is intended for users who must implement IBM PC/AT compatible computer solutions to a wide variety of applications which cannot be satisfied using conventional desktop computers. This manual assumes that the reader has a good understanding of MS-DOS and the standard IBM PC/AT compatible architecture. For more information on the IBM PC compatible hardware and software architecture, refer to any of the many books available on the subject. A few suggestions are listed below:

- *Advanced MS-DOS Programming*, Microsoft Press
- *Programmers Guide to the IBM PC*, Microsoft Press
- *Programming the 80386*, Sybex
- *Undocumented DOS*, Addison Wesley

## INVENTORY CHECKLIST

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The complete INX-386SX All-In-One Single Board Computer package consists of the following:

INX-386SX All-In-One Single Board Computer  
PROMDISK-Chip Software Utilities with ROM-DOS ver 6.22 (optional)  
This Manual

If any of the above is missing or appears to be damaged, inform MCSI immediately.



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## SECTION 1 - INTRODUCTION

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The INX-386SX All-In-One Single Board Computer (SBC) is a high performance system board that provides the primary elements for building an IBM PC/AT compatible computer for a wide variety of embedded systems applications. The INX-386SX SBC contains all the basic elements found in a standard IBM PC/AT compatible desktop computer system.

The INX-386SX SBC provides the user with a high-performance PC/AT compatible computer on a standard PC/XT half-size plug-in board that is fully compatible with the IBM PC/AT (ISA Bus) which means virtually all the software written for the IBM PC/AT will run on the INX-386SX SBC.

The INX-386SX uses an 80C386SX mega cell, which is 100% compatible with the Intel 80C386SX microprocessor.

### FEATURES

A complete list of features is listed below:

Comment [DJ1]: Page: 1

- IBM PC/AT Compatible Plug-in Computer
- Includes an Intel 80C386SX compatible microprocessor
- ALI Chip Set
- AMI Industry Standard BIOS
- 40MHz Operation
- Passive Backplane Architecture
- 4M-Byte DRAM System Memory Include On-Board
- 72-pin SIMM Socket Expands System Memory to 32M-bytes
- PS2/AT Compatible Keyboard and Mouse Ports
- Two High Speed Serial Ports, COM1, COM2, COM3, COM4, or disabled
- Enhanced Parallel Printer Port, LPT1, LPT2, LPT3, or disabled
- Clock/Calendar with Battery Back-up
- PROMDISK-Chip Socket Supports 32MB PROMDISK-Chip Disk Emulator
- 1K-bit E<sup>2</sup>Key Memory for Storing User Data
- Low Power CMOS Design
- IBM PC/XT Half Size Plug-in Multilayer Board for Low EMI and High Reliability
- WatchDog Timer and Power Monitor
- Operates on Single 5V Supply (4.0 Watts Max)
- Dual Floppy Disk Port Supports Two 3.5" or 5.25" Drives up to 2.88M-bytes
- IDE Hard Disk Port
- On-board Mini Speaker
- On-board External Power Connector for Stand-alone Operation
- Optional External Reset
- Optional *Datalight* DOS 6.22 Operating System

## SECTION 2 - SYSTEM DESCRIPTION

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The following sections describe the major system features of the INX-386SX All-In-One Single Board Computer.

### PROCESSOR

The INX-386SX SBC uses a high performance 40MHz, 386SX compatible microprocessor. The 386SX microprocessor is fully object code compatible with the 8086/8088, 80286, and 80386 family of products. Some of the distinctive features include:

- 16-bit External Data Bus
- 32-bit Internal Architecture
- 32M-byte Directly Addressable Memory Space
- Internal 14 Word by 16-bit Register Set
- Operand Addressing Modes
- Bit, Byte, Word, and String Operations
- 8 & 16-bit Signed/Unsigned Arithmetic
- Integrated Memory Manager

### SYSTEM MEMORY (DRAM)

The INX-386SX SBC includes 4M-bytes of dynamic random access memory (DRAM) on-board. A 72-pin SIMM socket is provided to replace the on-board memory with up to 32M-bytes of dynamic random access memory (DRAM) organized as one bank of 8Mx32 bits. The SIMM sockets will accept single-sided Fast Page Mode (FPM) memory modules configured as 1Mx32, 4Mx16, 4Mx32, and 16Mx16 with a maximum access time of 60ns.

### DMA CONTROLLER

The INX-386SX SBC memory refresh and DMA functions are included in the System Controller chip which includes the equivalence of two 82C37 DMA controllers. The two DMA controllers are cascaded to provide four DMA channels for transfers to 8-bit peripherals (DMA1) and three channels for transfers to 16-bit peripherals (DMA2). DMA2 Channel 0 provides the cascade interconnection for the two DMA devices thereby maintaining IBM PC/AT compatibility. The DMA channel assignments are listed below:

- DMA Channel 0: Not Used (8-bit)
- DMA Channel 1: Not Used (8-bit)
- DMA Channel 2: Floppy Disk (8-bit)
- DMA Channel 3: Not Used (8-bit)
- DMA Channel 5: Not Used (16-bit)
- DMA Channel 6: Not Used (16-bit)
- DMA Channel 7: Not Used (16-bit)

The DMA request (DRQx) and acknowledge (DACKx/) lines are available on the P1 98-pin edge connector.

## INTERRUPT CONTROLLER

The INX-386SX SBC has the equivalence of two 82C59A interrupt controllers included in the System Controller chip. The controllers accept requests from peripherals, resolve priorities on pending interrupts and interrupts in service, interrupt the CPU, and provide the vector address of the interrupt service routine. The two interrupt controllers are cascaded in a fashion compatible with the IBM PC/AT. The interrupt priority and assignments are shown below in descending order of priority:

<i>Highest</i>	IOCHCK/	Parity Check (Non-maskable)
	IRQ0	System Timer (Not Available)
	IRQ1	Keyboard (Not Available)
	IRQ8	Real Time Clock (Not Available)
	IRQ9	Not Used
	IRQ10	Not Used
	IRQ11	Not Used
	IRQ12	On-board Mouse Port
	IRQ13	Co-processor (Not Available)
	IRQ14	IDE Port
	IRQ15	Not Used
	IRQ3	Serial Port 2
	IRQ4	Serial Port 1
	IRQ5	Not Used
	IRQ6	Floppy Disk Controller
<i>Lowest</i>	IRQ7	Parallel Port 1

The interrupt request lines IRQx and IOCHCK/ are available on the 98-pin edge connector except as noted above.

## TIMERS

The INX-386SX SBC has the equivalence of an 82C54 Programmable Timer included in the System Controller chip. The 82C54 is a three channel Programmable Counter/Timer chip. The three timers are driven by a 1.19MHz clock source derived from the on-board 14.31818MHz crystal oscillator. The three timers are used as follows:

- TIMER Channel 0: System Timer
- TIMER Channel 1: Timer for DRAM refresh
- TIMER Channel 2: Tone Generation for Audio

## CLOCK/CALENDAR AND CMOS RAM

The INX-386SX SBC uses an SGS Thompson M4T28 which is the equivalence of an MC146818 real time clock/calendar with 128 bytes of CMOS RAM. The chip's unique package includes a replaceable external lithium battery that provides power to the RTC chip for at least ten years when the system power is off.

The 128 byte CMOS RAM consists of 14 bytes used by the clock/calendar, and 114 bytes used by the system BIOS.

Should your CMOS become corrupted, i.e. loss of battery power or accidentally clobbered, strange

errors may occur while attempting to run your programs. Refer to Section 3.0 for instructions on resetting the initial SETUP values.

## **KEYBOARD**

The INX-386SX SBC contains an IBM PC/AT compatible keyboard controller for interfacing to a generic IBM PC/AT compatible keyboard. The keyboard controller assembles the serial data from the keyboard into bytes and interrupts the CPU via IRQ1 after each byte is ready to be read. The IRQ1 service routine reads port 60H to get the keyboard scan code and acknowledges by sending a positive pulse to port 61H to clear the interrupt for the next byte. Refer to Appendix D for the keyboard connector location and pin assignments.

## **SPEAKER PORT**

The INX-386SX SBC contains an on-board sub-miniature audio speaker to provide audio interface to the user. Because of the small size of the speaker, the sound output is much reduced over that of the standard speaker found in most desktop computers. A connector is provided to connect an external speaker if the sound output is not sufficient. Refer to Appendix D for the speaker port connector location and pin assignments.

## **RESET SWITCH**

The INX-386SX SBC includes an on-board power detector and power on reset circuit to reset the computer after power is applied, and to hold the computer reset during low power, brown-out conditions. In addition, there are provisions for connecting an external, normally open, push button reset switch. Refer to Appendix D for the reset switch connector location and pin assignments.

## **PRINTER PORT**

The INX-386SX SBC contains a multimode parallel port which has the equivalence an IBM PC/AT Parallel Printer Port. The multimode parallel printer port supports the PS/2 type bi-directional parallel port (SPP), the enhanced parallel port (EPP), and the extended capabilities port (ECP) parallel port modes. The port can be configured as a standard IBM PC/AT compatible LPT1, LPT2, or LPT3 printer port, or disabled completely using the CMOS SETUP utility. Refer to Appendix D for the connector location and pin assignments.

## **SERIAL PORTS**

The INX-386SX SBC has the equivalence of two NC16C550 UARTs. The two UARTs can be configured as standard IBM PC/AT RS-232C compatible COM1, COM2, COM3, or COM4 serial ports or individually disabled using the CMOS SETUP utility. In addition, serial port two can be jumper selectable to operate in RS-232, RS-422, or RS-485 mode. The data rates are independently programmable up to 115.2K baud. The serial ports use an enhanced RS-232 interface chip that operates on +5VDC only. Refer to Appendix E for the serial port configuration jumpers and Appendix D for the connector location and pin assignments.

## **FLOPPY DISK PORT**

The INX-386SX SBC contains an IBM PC/AT compatible dual floppy disk port with the equivalence of an NEC PD72056B Floppy Disk Controller, an on-chip analog data separator, and an IBM PC/AT

compatible floppy disk adapter bus interface circuit. The Floppy Disk Port can be disabled using the CMOS SETUP Utility. An on-board three section analog filter provides optimum performance with the following disk drive types:

5.25"	360K Double-Sided
3.5"	720K High Capacity
5.25"	1.2M High Capacity
3.5"	1.44M High Density
3.5"	2.88M High Density

Refer to Appendix D for the connector location and pin assignments.

## **IDE HARD DISK PORT**

The INX-386SX SBC contains an Integrated Drive Electronics (IDE) Port which directly interfaces to hard disk drives with embedded controllers. The IDE Port can be configured using the CMOS SETUP Utility. Refer to Appendix D for the connector location and pin assignments.

## **WATCHDOG TIMER**

The INX-386SX SBC includes a WatchDog Timer circuit. The WatchDog Timer ensures that if an application program gets "lost or bombs", the system will reset or a non-maskable interrupt will be issued to the CPU. The WatchDog Timer is enabled by reading I/O port 443H. Once enabled, the WatchDog Timer must be triggered by reading I/O port 443H within the time out period, otherwise the WatchDog Timer will force a hardware reset or activate the IOCHCK/ line, generating a non-maskable interrupt. The WatchDog Timer can be disabled by reading I/O port 43H. A jumper is provided to select the time out period and to enable the WatchDog Timer circuit. The time out period can be set at 1, 2, 10, 20, 110, or 220 seconds. Refer to Appendix E for the WatchDog Timer configuration jumpers.

## **OPTIONAL PROMDISK-CHIP DISK EMULATOR**

The INX-386SX includes a 32-pin socket designed to accept the MCSI PROMDISK-Chip. The PROMDISK-Chip Disk Emulator is a unique Flash Memory array that emulates a bootable read/write hard disk drive. The PROMDISK-Chip is offered in 4MB, 8MB, 16MB, and 32MB capacities and comes complete with ROM-DOS version 6.22 installed. The PROMDISK-Chip occupies a 4K block of memory space above 640K, whose starting address is selected by jumper JP9. The PROMDISK-Chip uses the Datalight CardTrick® VBF integrated Flash File System and boot utilities.

The CardTrick Variable Block Flash (VBF) File System and ROM-DOS allow the PROMDISK-Chip to operate as a non-volatile Read/Write disk drive. This means that you can list directories, copy files, and read and write the Flash memory on PROMDISK-Chip through standard DOS interrupts and commands.

## **E<sup>2</sup> KEY 1K-BIT USER EEPROM**

The INX-386SX SBC includes the E<sup>2</sup> Key 1K-bit electrically erasable memory. This memory is useful for storing user data such as password, terminal address, configuration parameters, etc. The memory is configured as 64 words, which can be accessed a word at a time, and uses the parallel port for the hardware interface. Software utilities are provided on our WebSite (<http://www.mcsi1.com>) which includes a demo program, and two C library functions for integrating into your application program.



## SECTION 3 - SETUP

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The INX-386SX SBC uses an AMI BIOS which contains an internal Setup Utility for configuring the system. The system configuration settings are stored in the on-board CMOS memory, which is backed up by a Lithium battery. Should your CMOS become corrupted, i.e. loss of battery power or accidentally clobbered, strange errors may occur while attempting to run your programs. A jumper at JP3 has been provided to force the BIOS to use its internal default SETUP values. This is accomplished by momentarily installing JP3 with the power on. After waiting a few seconds, remove JP3.

The Setup Utility can be invoked by first causing a cold boot (reset) or a warm boot (**Cntrl Alt Del**) and pressing the **Del** key when instructed. This will cause the memory diagnostics to be aborted and the Setup Utility to display the MAIN SETUP MENU. Using the **↑↓** cursor keys, move the highlighted bar to the option you wish to modify and then press **Enter** to select it. When in the MAIN SETUP MENU, the **F2** and **F3** keys are used to select the colors used in the setup screens, and the **F10** key is used to save the changes before exiting the Setup Utility. The **Esc** key may be used to exit the Setup Utility without saving the changes. The **PgUp** and **PgDn** keys are used to scroll through the selections for a given setting. **PgUp** is also used to decrease the setting and **PgDn** to increase the setting.

After making the desired selections from the various setup menus press the **Esc** key to exit the current menu. You save your selections by pressing the **F10** key or by selecting the appropriate selection from the MAIN SETUP MENU.

### Notes:

1. The user should be aware that improper selection of certain values in the ADVANCED SETUP UTILITY may cause unpredictable results. If this occurs select the AUTO CONFIGURATION WITH FAIL SAFE SETTINGS from the MAIN SETUP MENU or use the **F6** key.
2. If your system does not require a keyboard or display be sure to set the "Primary Display" and "Keyboard" to **Not Installed**.

## **SECTION 4 - USING THE PROMDISK-CHIP DISK EMULATOR**

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The PROMDISK-Chip Disk Emulator operates as a Read/Write fixed disk drive. The paragraphs that follow describe how to use the optional PROMDISK-Chip.

### **USING ROM-DOS AND OTHER DISK OPERATING SYSTEMS**

The PROMDISK-Chip has been pre-configured at the factory with the latest version of the Datalight ROM-DOS disk operating system. In addition, a current copy of the operating system is supplied on a floppy diskette.

If the operating system is accidentally erased from the PROMDISK-Chip it may be restored using the SYS command. The DOS format utility should not be used to restore the operating system.

To change the operating system version or type you should simply use the equivalent DOS SYS command to transfer the operating system.

### **PROMDISK LOW LEVEL FORMAT**

The Flash memory contained on the PROMDISK-Chip board was initialized with the Datalight CardTrick low level format at the factory. During normal operation the Flash memory should never require reformatting unless there is a serious hardware or software malfunction. In the event it has been determined that the low-level format is corrupted, proceed as follows:

1. At the DOS prompt, run the PROMDISK-Chip low-level format utility PDCFMT.EXE located on the distribution diskette in the PDCHIP subdirectory.
2. Install a bootable floppy diskette in drive A and boot the system.
3. At the DOS prompt type SYS C: to transfer a bootable copy of DOS to PROMDISK-Chip.
4. Remove the floppy diskette from drive A: and reboot the system from PROMDISK-Chip.

**CAUTION: Do Not use the DOS Fdisk utilities on the PROMDISK-Chip.**

## SECTION 5 - INSTALLATION

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This section describes the procedures for installing the INX-386SX All-In-One Single Board Computer into your system. The following is a list of typical peripherals required to build a minimum system:

- Passive Backplane and Power Supply
- IBM PC/AT Type Keyboard
- Display Adapter Card
- Display Monitor
- Floppy or Hard Disk with MS-DOS or PROMDISK Disk Emulator

### INSTALLING THE SIMM

When installing or removing the DRAM SIMM, be sure to first touch a grounded surface to discharge any static electricity from your body. Use the following procedure to install the SIMMs:

1. Insert the SIMM edge connector at a slight angle into the SIMM socket. Note that the SIMM is keyed and will only go in one way.
2. Push the SIMM back into the connector carefully until it snaps into place.
3. Check to make sure the SIMM is inserted securely.

To remove the SIMM, use a small screwdriver to pull back the holding clip on each side of the SIMM and lift the SIMM from the connector.

### INSTALLING THE PROMDISK-CHIP

When installing or removing the PROMDISK-Chip, be sure to first touch a grounded surface to discharge any static electricity from your body. Use the following procedure to install the PROMDISK-Chip:

1. Align pin one (square pad) on the PROMDISK-Chip with pin one of socket U21 on the CPU board.
2. Push the PROMDISK-Chip into the socket carefully until it is fully seated.
3. Check to make sure the PROMDISK-Chip is installed securely, and there are no bent pins.  
**CAUTION: The PROMDISK-Chip will be permanently damaged if installed incorrectly!**

To remove the PROMDISK-Chip, insert a small screwdriver between the PROMDISK-Chip and the socket and gently pry around the edge until the PROMDISK-Chip is released from the socket.

### COMPLETING THE INSTALLATION

To complete the installation, the following steps should be followed:

1. Set the configuration jumpers in accordance with Appendix E.

2. Install the INX-386SX SBC into one of the 98-pin I/O slots in a passive backplane.
3. Install a Display Adapter into one of the slots in the backplane.
4. Connect the applicable I/O cables and peripherals, i.e. floppy disk, IDE hard disk, monitor, keyboard, power supply, etc.
5. Connect an IBM PC compatible keyboard.
6. Turn power on to the display monitor.
7. Turn power on to the backplane power supply.
8. After the BIOS sign-on message is displayed, press the **De1** key to enter the Setup Utility.
9. Reconfigure the INX-386SX CMOS using the internal SETUP.
10. Boot the system.

## APPENDIX A - SPECIFICATIONS

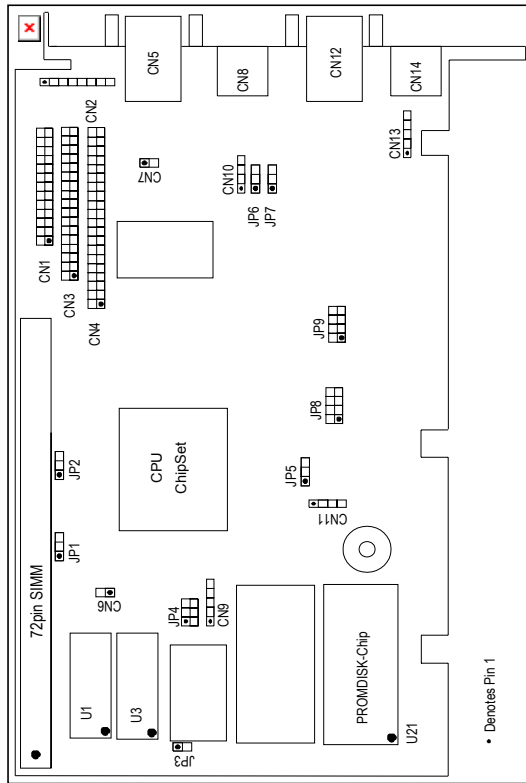
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This appendix lists the specifications for the INX-386SX All-In-One Single Board Computer.

CPU:	Includes Intel compatible 80C386SX (40MHz)
Memory:	System Memory: 4M-bytes On-board DRAM. (1) 72-pin single-sided SIMM Socket provided to replace on-board DRAM up to 32M-bytes)
BIOS:	AMI with Internal SETUP and ROM defaults
Clock/Cal:	PC/AT Compatible with battery back-up
I/O Bus:	IBM PC/AT Compatible 98-pin Edge Connector
DMA:	7 Channels (4 8-bit & 3 16-bit)
Timers:	3 Programmable
Interrupts:	16
Reset:	Controlled by on-board power detector with provisions for external reset switch CN6
I/O Ports:	2 - RS-232 Serial Ports (Ports 1 & 2 at rear connector CN12 & CN5) 1 - Parallel Printer Port (at connector CN1) 1 - PS2 Keyboard Port (at header CN13 and at rear PS2 type connector CN14) 1 - PS2 Mouse Port (CN8) 1 - On-board Speaker with Speaker Port (CN11) 1 - Dual 3.5"/5.25" Floppy Disk Port (CN3) 1 - IDE Hard Disk Port (CN4) 1 - WatchDog Timer 1 - External Power Connector (CN2)
PROMDISK Port:	1- 32-pin socket (U21) supports MCSI PROMDISK-Chip
Speed:	8-40MHz
Battery:	Lithium for Clock/Calendar & CMOS RAM (ten years typical)
Benchmark:	LANDMARK v2.0 = 32MHz
Size:	1/2 Size XT board 7.08"L X 4.2"H
Weight:	12 Oz.
Power:	+5VDC @ 0.8A

# APPENDIX B - BOARD OUTLINE

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## APPENDIX C - MEMORY AND I/O MAPS

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The following is the memory map for the INX-386SX SBC. The addresses are fully PC/AT compatible, unless otherwise specified.

**INX-386SX SBC Memory Map**

Address	Used For	Size
00000H - 003FFH	Interrupt Vectors	1.0K
00400H - 005FFH	BIOS Values	0.5K
00600H - 9FFFFH	User RAM (DOS)	638.5K
A0000H - AFFFFH	Reserved for EGA*	64.0K
B0000H - B7FFFH	Video RAM (MDA)*	32.0K
B8000H - BFFFFH	Video RAM (CGA)*	32.0K
C0000H - C7FFFH	Video BIOS*	32.0K
C8000H - DFFFFH	ROM Scan Devices*	96.0K
E0000H - EFFFFH	BIOS Extensions*	64.0K
F0000H - FFFFFH	BIOS	64.0K
100000H - 1FFFFFFH	User Memory	32.0M

*\*External to the INX-386SX*

The following is the I/O map for the INX-386SX SBC. I/O addresses are fully PC/AT compatible, unless otherwise specified.

**INX-386SX SBC I/O Map**

Address	Function
000H - 01FH	DMA Controller #1
020H - 021H	Interrupt Controller #1
022H - 023H	Configuration Address Register
040H - 05FH	System Timers
060H - 06FH	Keyboard, Status, & System Control
070H - 07FH	Clock/Calendar & CMOS Ram Access
080H - 09FH	DMA Page Register
0A0H - 0BFH	Interrupt Controller #2
0C0H - 0DFH	DMA Controller #2
0F0H	Clear Math Co-processor Busy
0F1H	Reset Math Co-processor
108H - 109H	I/O Controller Configuration Registers
1F0H - 1F8H	IDE Hard Disk
278H - 27FH	Parallel Printer Port LPT2
2E8H - 2EFH	Serial Port COM4
2F8H - 2FFH	Serial Port COM2
378H - 37FH	Parallel Printer Port LPT1
3E8H - 3EFH	Serial Port COM3
3F0H - 3F7H	Floppy Disk Controller
3F8H - 3FFH	Serial Port COM1
043H	WatchDog Timer Disable
443H	WatchDog Timer Enable

## APPENDIX D - CONNECTORS

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### CN3 Floppy Disk Port Connector

Pin	Signal Name
2	RPMLC
4	Not Used
6	Not Used
8	INDEX/
10	MOTOR0/
12	DRIVE SELECT1/
14	DRIVE SELECT0/
16	MOTOR1/
18	DIRECTION
20	STEP/
22	WRITE DATA/
24	WRITE GATE/
26	TRACK0/
28	WRITE PROTECT/
30	READ DATA/
32	HEAD SELECT/
34	DISK CHANGE/

All odd numbered pins are GND

### CN4 IDE Hard Disk Port Connector

Pin	Signal	Pin	Signal
1	IDERST/	2	GND
3	IDED7	4	IDED8
5	IDED6	6	IDED9
7	IDED5	8	IDED10
9	IDED4	10	IDED11
11	IDED3	12	IDED12
13	IDED2	14	IDED13
15	IDED1	16	IDED14
17	IDED0	18	IDED15
19	GND	20	Not Used
21	Not Used	22	GND
23	IDEIOW/	24	GND
25	IDEIOR/	26	GND
27	IDE CHRDY	28	Not Used
29	Not Used	30	GND
31	IRQ14	32	IOCS16/
33	IDESA1	34	Not Used
35	IDESA0	36	IDESA2
37	HDCS0/	38	HDCS1/
39	IDEACT/	40	GND

### CN1 Printer Interface Connector

Pin	Signal	Pin	Signal
1	STROBE/	14	AUTOFD/
2	PDAT0	15	ERROR/
3	PDAT1	16	INIT/
4	PDAT2	17	SLCTIN/
5	PDAT3	18	GND
6	PDAT4	19	GND
7	PDAT5	20	GND

**CN1 Printer Interface Connector (continued)**

Pin	Signal	Pin	Signal
8	PDAT6	21	GND
9	PDAT7	22	GND
10	ACK/	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT	26	N/C

**CN13 Keyboard Header/Connector**

Pin	Signal
1	KBCLK
2	KBDATA
3	N/C
4	GND
5	+5VDC

**CN2 Auxiliary Power Connector**

Pin	Signal Name
1	+5VDC
2	+12VDC
3	-12VDC
4	GND
5	GND
6	-5VDC
7	+12VDC
8	+5VDC

**CN12 Serial Port #1 Connector**

Pin	Signal Name
1	CARRIER DETECT #1
2	RECEIVE DATA #1
3	TRANSMIT DATA #1
4	DATA TERMINAL READY #1
5	GND
6	DATA SET READY #1
7	REQUEST TO SEND #1
8	CLEAR TO SEND #1
9	RING INDICATOR #1

**CN5 Serial Port #2 RS-232 Connector**

Pin	Signal Name
1	CARRIER DETECT #2
2	RECEIVE DATA #2
3	TRANSMIT DATA #2
4	DATA TERMINAL READY #2
5	GND
6	DATA SET READY #2
7	REQUEST TO SEND #2
8	CLEAR TO SEND #2
9	RING INDICATOR #2

**CN10 Serial Port #2 RS-422/485 Connector**

Pin	Signal Name
1	TX-
2	TX+
3	RX-
4	RX+

**CN14 Keyboard Connector (PS2 type)**

Pin	Signal
1	KBDATA
2	N/C
3	GND
4	+5VDC
5	KBCLOCK
6	N/C

**CN8 Mouse Connector (PS2 type)**

Pin	Signal
1	MADATA
2	N/C
3	GND
4	+5VDC
5	MCLOCK
6	N/C

**CN6 Reset Header/Connector**

Pin	Signal Name	Description
1	RESET/	Connect to switch, ground this pin to reset
2	GND	Ground

**CN7 IDE LED Header/Connector**

Pin	Signal Name	Description
1	+5VDC	Connect to IDE LED anode (+)
2	IDE LED	Connect to IDE LED cathode (-)

**CN9 Keylock Header/Connector**

Pin	Signal Name	Description
1	LED POWER (+)	Connect to anode of power LED
2	N/C (Key)	N/C (Key)
3	GND	Connect to cathode of power LED
4	KB LOCK/	Connect to ground to inhibit keyboard
5	GND	Ground

**CN11 Speaker Port Header/Connector**

Pin	Signal Name	Description
1	SPEAKER	Connect to Speaker (-)
2	+5VDC	Connect to Speaker (+)
3		
4		

## APPENDIX E - CONFIGURATION JUMPERS

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### JP4 CPU Speed Setting

CPU Speed	1-2	3-4	5-6
8MHz	ON	ON	ON
20MHz	OFF	ON	ON
25MHz	ON	OFF	ON
33MHz	ON	ON	OFF
40MHz	OFF	OFF	ON

### JP1 & JP2 DRAM Selection Jumpers

Time	JP1	JP2
On-Board 2MB (U1)*	OFF	1-2
On-Board 4MB (U1,U3)	1-2	1-2
72pin SIMM	OFF	OFF

*\*Custom Option*

### JP5 WatchDog Timer Control Jumper

2-3	RESET when time out occurs. (Default)
1-2	NMI (IOCHRDY) when time out occurs.
OFF	Disable

### JP8 WatchDog Timer Time-out Period Jumper

Time	1-2	3-4	5-6	7-8
1 second	OFF	OFF	ON	OFF
2 seconds	OFF	OFF	ON	ON
10 seconds	OFF	ON	OFF	OFF
20 seconds	OFF	ON	OFF	ON
110 seconds	ON	OFF	OFF	OFF
220 seconds	ON	OFF	OFF	ON

### JP9 PROMDISK-Chip Address Selection Jumper

Address	1-2	3-4	5-6
CE000H	ON	OFF	OFF
D6000H	OFF	ON	OFF
DE000H	OFF	OFF	ON

### JP3 Clear CMOS Jumper

OFF	Normal Operation (Default)
ON	Clear CMOS Setup

### JP6 & JP7 Serial Port 2 Interface Selection Jumpers

Time	JP6	JP7
RS-422	2-3	1-2
RS-485*	2-3	2-3
RS-232	1-2	1-2

*\*Enable/Direction controlled by RTS*

## APPENDIX F - BIOS ERROR BEEP CODES

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During the POST (Power On Self Test) routines, which are performed each time the system is powered on, errors may occur.

**Nonfatal errors** are those which, in most cases, allow the system to continue the boot up process. The error messages normally appear on the screen.

**Fatal errors** are those which will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with MCSI Customer Service for possible repairs.

These fatal errors are communicated through a series of audible beeps. The numbers on the fatal error list below correspond to the number of beeps for the corresponding error. All errors listed, with the exception of number eight, are fatal errors.

No. of Beeps	Error Message
1	<b>Refresh Failure</b> - The memory refresh circuitry is faulty.
2	<b>Parity Error</b> - A parity error was detected in the first 64K block of system memory.
3	<b>Base 64KB Memory Failure</b> - A memory failure occurred within the first 64KB of memory.
4	<b>Timer Not Operational</b> - Timer #1 has failed to function properly.
5	<b>Processor Error</b> - The CPU chip has generated an error.
6	<b>8042-Gate A20 Failure</b> - The keyboard controller (8042) contains the Gate A20 switch which allows the CPU to operate in virtual mode. This error message means that the BIOS is not able to switch the CPU into protected mode.
7	<b>Processor Exception Interrupt Error</b> - The CPU chip has generated an exception interrupt.
8	<b>Display Memory Read/Write Error</b> - The video adapter is either missing or the video memory is faulty. PLEASE NOTE: This is not a fatal error.
9	<b>ROM Checksum Error</b> - The ROM checksum value does not match the value encoded in the BIOS.
10	<b>CMOS Shutdown Register Read/Write Error</b> - The shutdown register for the CMOS memory has failed.