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OPERATIONS MANUAL
PPM-TX

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REVISION HISTORY
P/N 403-0302-000

ECO Number	Date Code	Rev Level
ORIGINATED	020109	C
02-17	020731	D
03-40	030911	D1
04-22	040308	D2
04-42	040510	D3
04-62	040805	D4

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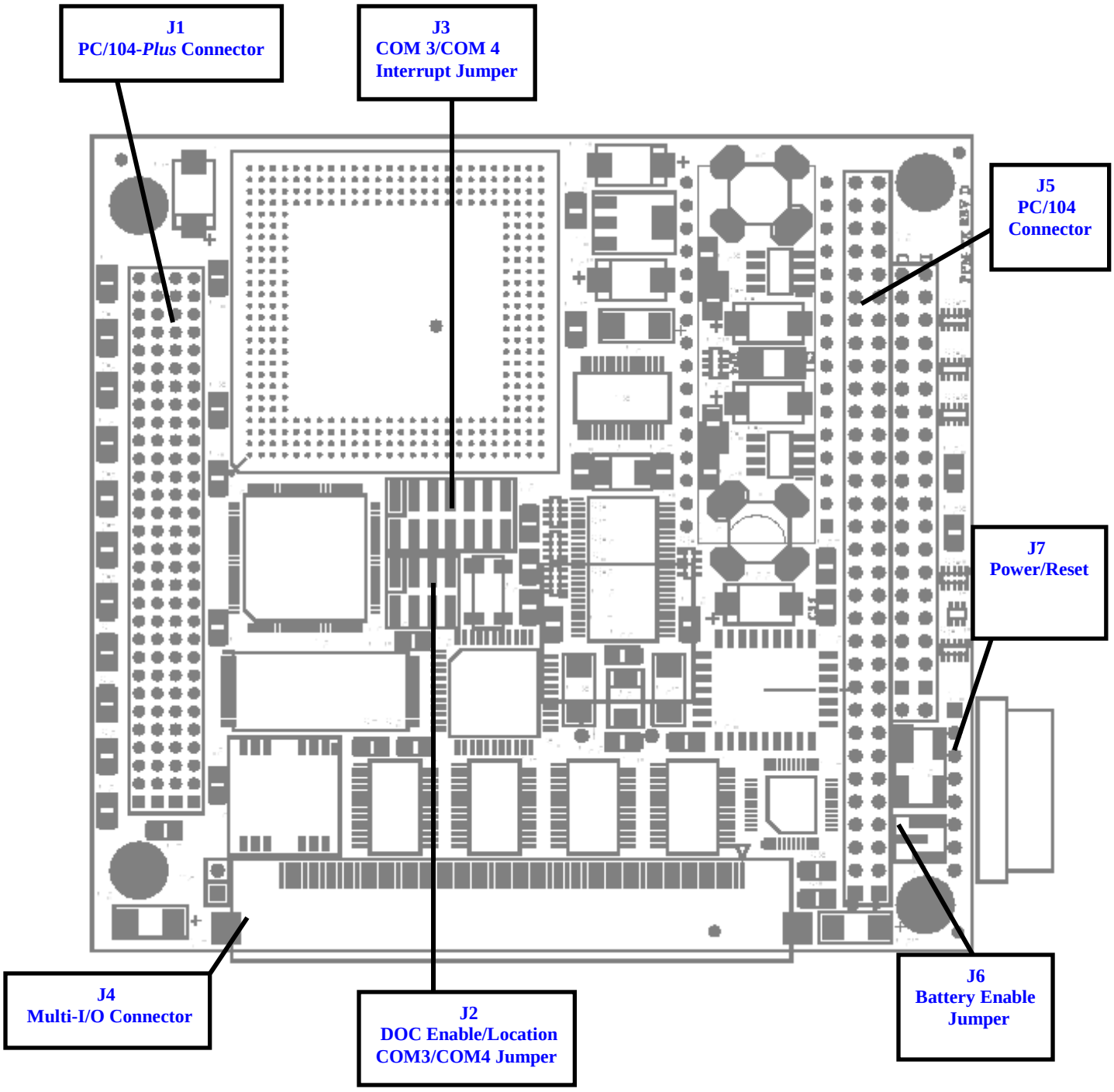
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APPENDIX B Interrupt Map
APPENDIX C Mechanical Drawing
APPENDIX D Cable Drawings and Software Drivers & Examples

Warranty and Repair Information

Visual Index – Quick Reference

Top View

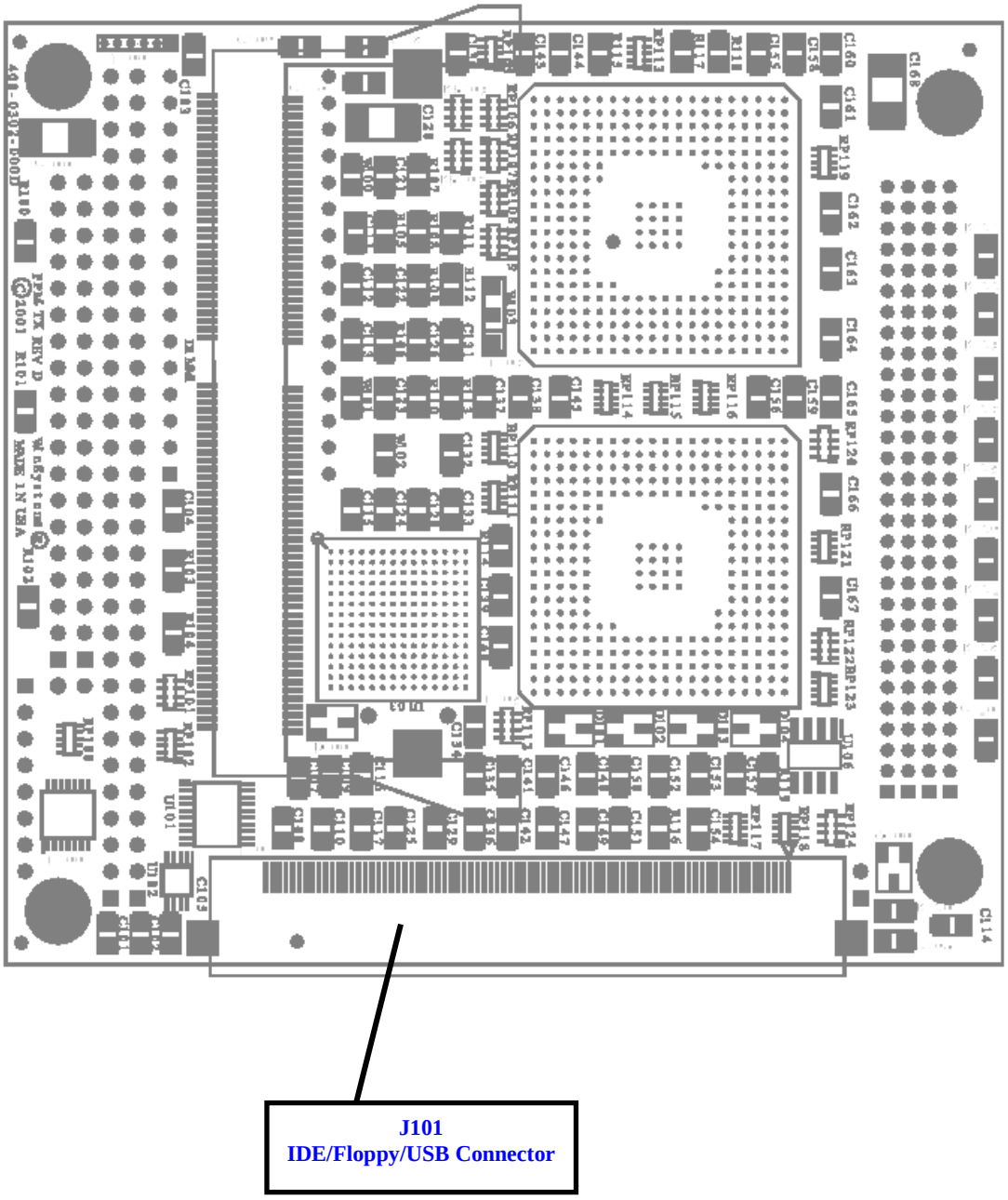
For the convenience of the user, a copy of the Visual Index has been provided with direct links to connector and jumper configuration data.



Visual Index – Quick Reference

Bottom View

For the convenience of the user, a copy of the Visual Index has been provided with direct links to connector and jumper configuration data.



1 General Information

1.1 Features

- Intel Tillamook Pentium® MMX 166MHz or 266MHz
- 32 to 256 Megabytes of system memory
- Socket for up to 288MB bootable DiskOnChip® or BIOS extension EPROM
- Industry standard Award BIOS
- Four RS-232 serial ports with 16 byte FIFO
- USB (Universal Serial Bus) support
- Ultra DMA/33 IDE Hard drive controller
- PC/104 and PC/104-*Plus* expansion connectors
- AT keyboard controller and PS2 mouse support
- Two interrupt controllers and 7 DMA channels
- Three 16-bit counter/timers
- 10/100 Enet support using the Intel 82559ER

1.2 General Description

The PPM-TX is a small, high-performance, embeddable computer system on a single PC/104-*Plus* form factor board. It integrates a number of popular I/O options including Solid-State Disk. Four PC compatible serial ports are standard, as are the floppy, hard disk, and parallel printer interfaces. The PPM-TX is populated with an Intel Pentium MMX 166MHz or 266MHz processor and supports up to 256MB of SODIMM DRAM. A full 16-bit PC/104 and 32-bit PC/104-*Plus* expansion bus is provided for further expansion to an entire industry of add-on peripherals including sound and speech modules, SCSI controllers, analog I/O modules, and literally hundreds of other options available from WinSystems and a variety of vendors supporting the PC/104 and PC/104-*Plus* standards. An onboard 32-pin silicon disk socket supports the M-Systems DiskOnChip Flash modules in sizes ranging from 8 Megabytes to 288 Megabytes.

1.3 Specifications

1.3.1 Electrical

Bus interface :	PC/104 8-bit or 16-bit expansion bus PC/104-*Plus* 32-bit expansion bus
CPU Clock :	66MHz
Interrupts :	TTL Level input
VCC :	+5V +/-5% at 1.5A typical with an Intel Pentium166MMX processor with 32M SDRAM +5V +/-5% at 1.9A typical with an Intel Pentium 266MMX processor with 32M SDRAM
VCC1 :	+12V +/-5% (Not required. PC/104 Expansion only)
VCC2 :	-12V +/-5% (Not required. PC/104 Expansion only)

1.3.2 Memory

Addressing :	4 Gigabyte addressing
BIOS ROM :	128KB Atmel Flash
Memory :	32 to 256 Megabyte SDRAM SODIMM w/gold fingers (PC66 to PC100)
SSD Memory :	M-Systems 32-pin DiskOnChip (8MB to 288MB)

1.3.3 Mechanical

Dimensions :	3.6" X 3.8" X 0.6" (Without PC/104-*Plus* modules or cables)
PC-Board :	FR4 Epoxy Glass with 7 signal layers and 3 power planes with screened Component legend, and plated through holes
Jumpers :	0.020mm square posts on 2mm centers
Connectors :	Multi-I/O and Multi-Disk - Hirose FX2A-80P-0.635SH

PC/104 Bus :	104-pin Comm Con type 50711C-104G
PC/104-*Plus* :	120-pin Comm Con type 50808-120Q
Power/Reset :	8-pin AMP

1.3.4 Environmental

Operating Temperature :	-40°C to +85°C using Pentium 166MHz -40°C to +60°C using Pentium 266MHz
Non-condensing relative humidity :	5% to 95%

2 PPM-TX Technical Reference

2.1 Introduction

This section of the manual is intended to provide sufficient information regarding the configuration and usage of the PPM-TX board. WinSystems maintains a Technical Support group to help answer questions regarding configuration, usage, or programming of the board. For answers to questions not adequately addressed in this manual, contact Technical Support at (817) 274-7553 between 8AM and 5PM Central Time.

2.2 Intel FW82439TX Chipset

The PPM-TX utilizes the Intel FW82439TX Chipset which provides a highly-integrated, high-performance backbone for full Pentium class compatibility. The Chipset contains the logic for DRAM and bus state control as well as the standard complement of 'AT' class peripherals, including :

Two-82C37 DMA controllers
Two-82C59 Interrupt controllers
82C54 Timer/Counter
Real Time Clock
Enhanced Power Management
Full PnP compatibility
UDMA/33 EIDE controller

These functional units are 100% PC/AT compatible and are supported by the Award BIOS and setup. Users desiring to access these internal peripherals directly should refer to any manufacturers' generic literature on the equivalent discrete component.

There are a number of internal registers within the Intel TX chipset that are used by the BIOS for control and configuration. Refer to the I/O map in Appendix A for port usage to avoid conflicts when adding external I/O devices.

2.3 Memory Selection and Installation

The PPM-TX comes from the factory with 0MB of RAM installed. RAM memory must be installed by the user and must meet the following criteria :

32, 64, 128, or 256MB 144-Pin SODIMM SDRAM (PC66 minimum) with gold plated fingers

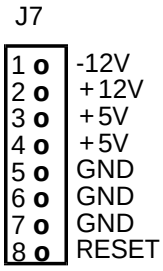
WinSystems qualified parts are available online at **www.winsystems.com**, or directly from WinSystems. WinSystems cannot warrant the operation of systems using non-qualified SODIMM modules.

Installation is accomplished by inserting the module into the connector on the back of the board at approximately a 30 degree angle. Press firmly to fully seat the module into the connector and then press the module downward to snap it into the retaining clamps.

Removal is accomplished by gently pulling outward on the retaining clamps until the module springs up to the appropriate removal angle.

2.4 Power/Reset Connection

Power is supplied to the PPM-TX through the 8-pin Molex connector at J7. The pin definitions for J7 are shown here.



An optional momentary-contact, normally-open reset button can be connected between pin 8 and ground. There is also a reset push-button supplied on the CBL-251-1 Multi-I/O cable.

2.5 Mouse Interface

The PPM-TX supports a standard PS/2-type mouse. The mouse connection is made through the Multi-I/O cable P/N CBL-251-1. There are two PS/2 style connectors on the CBL-251-1, keyboard and mouse, the mouse connects on the same ribbon cable as the printer port. The cable is terminated with the standard 6-pin mini DIN connector.

2.6 Serial Interface

The PPM-TX contains four 16550 compatible RS-232 serial ports. All four ports are terminated at the Multi-I/O connector at J4. When using the WinSystems' adapter cable CBL-251-1, COM1 can be identified by the red stripe on the ribbon cable. COM2, COM3, and COM4 follow consecutively on the cable.

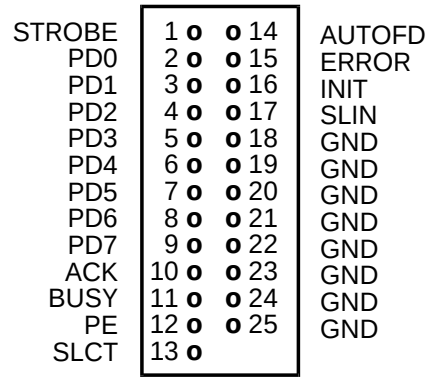
The pin definitions for all 4 serial ports are the same and are shown here :

COM1-COM4
DB9 Pin Definitions

1 DCD
2 RX Data
3 TX Data
4 DTR
5 GND
6 DSR
7 RTS
8 CTS
9 RI

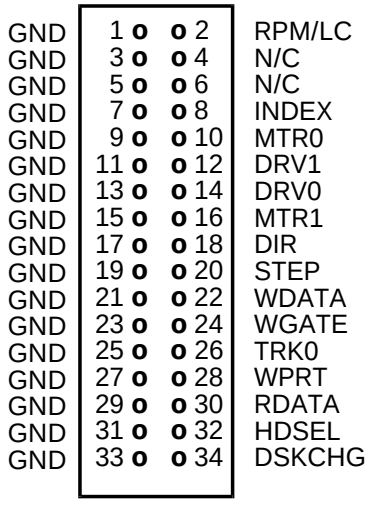
2.7 Parallel Printer Port

The PPM-TX supports a fully bi-directional parallel printer port capable of EPP and ECP operations. The PnP parallel port is mapped at 378H and is terminated at the Multi-I/O connectors at J4. The pin definitions for the parallel port DB25 connector when using the CBL-251-1 cable are shown below:



2.8 Floppy Disk Interface

The PPM-TX and AWARD BIOS support up to two 5 ¼" or 3 ½" floppy disk drives. The drive types are configured using the BIOS setup menus. Drive attachment is most easily accomplished using the WinSystems' adapter cable P/N CBL-252-1. This cable supports a single 3 ½" floppy drive as well as up to two IDE devices and one USB host. The pin definitions for the 34-pin IDC connector are shown here for reference :



2.9 IDE Interface

The PPM-TX supports up to two IDE devices. Connection to IDE Hard disks and CD-ROMs is most easily accomplished when using the WinSystems adapter cable P/N CBL-252-1 connected to J101. This cable allows for the attachment of two standard 40-pin IDE devices. Configuration of the IDE devices is accomplished using the Phoenix BIOS setup menus. A red activity LED is present at D2 for the primary hard drive controller.

The pin definitions for the 40-pin IDC connectors are shown here for reference :

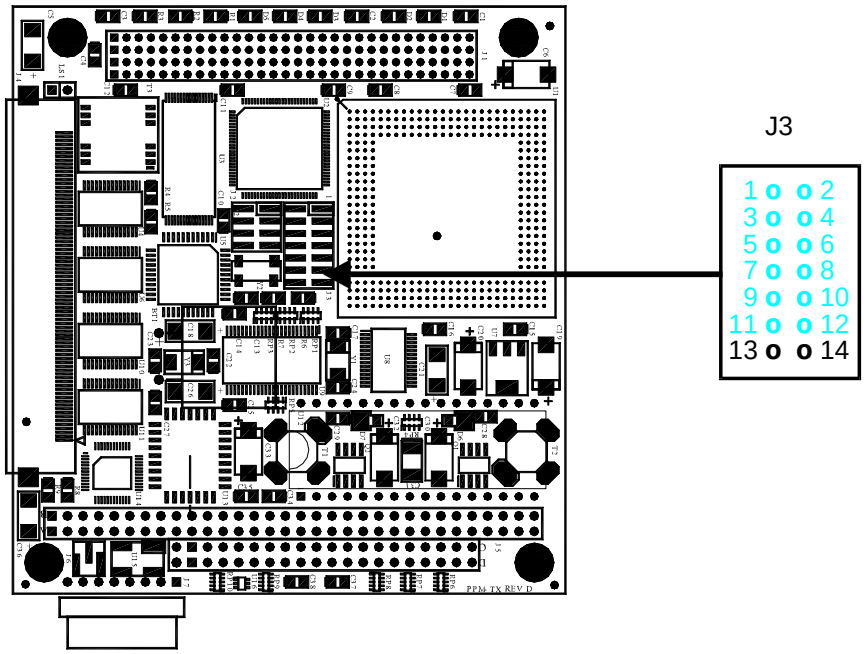
RESET	1	2	GND
D7	3	4	D8
D6	5	6	D9
D5	7	8	D10
D4	9	10	D11
D3	11	12	D12
D2	13	14	D13
D1	15	16	D14
D0	17	18	D15
GND	19	20	N/C
GND	21	22	GND
IOW	23	24	GND
IOR	25	26	GND
N/C	27	28	ALE
N/C	29	30	GND
INTRQ	31	32	IOCS16
A1	33	34	N/C
A0	35	36	A2
HDCS0	37	38	HDCS1
N/C	39	40	GND

2.10 Keyboard Interface

The PPM-TX contains an onboard PS/2 style keyboard controller. Connection is made through the Multi-I/O cable connection at J4. An adapter cable P/N CBL-251-1 is available from WinSystems to make ready access to all of the devices terminated at the Multi-I/O connector. Users who may wish to construct their own cables should refer to the Multi-I/O connector pin definitions given later in this manual.

Note : The keyboard and mouse connections are both present on the CBL-251-1 cable. The keyboard connector is on the same flat ribbon cable as the four DB9 serial connectors.

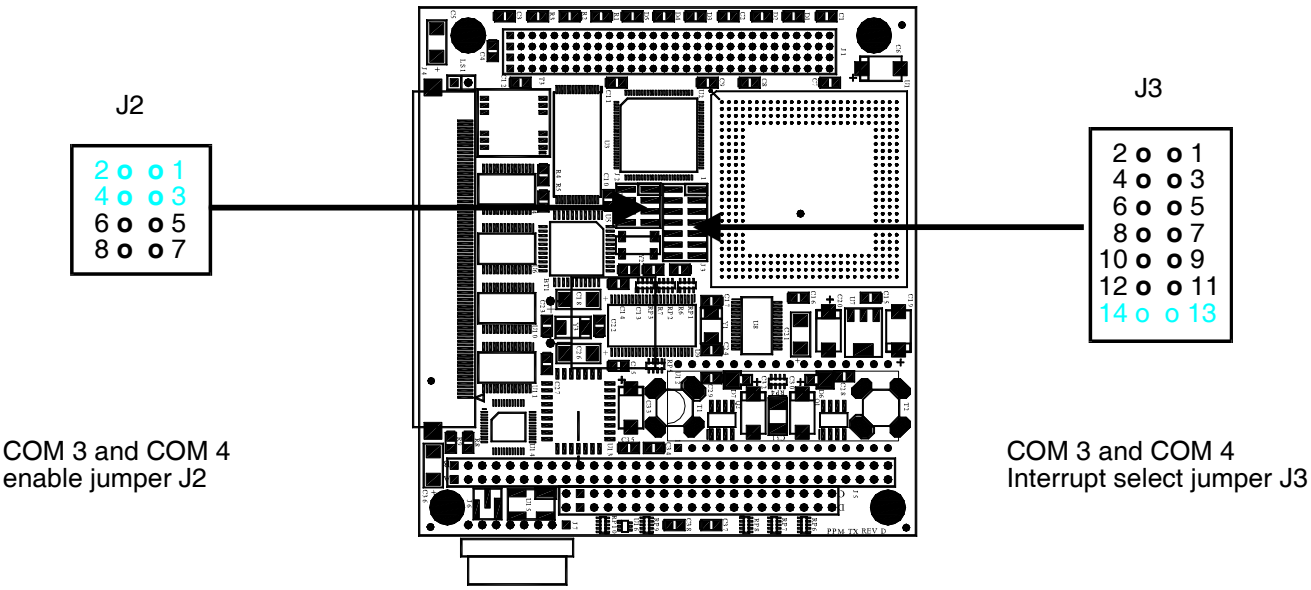
2.11 Watchdog Timer Configuration



The PPM-TX features a power-on voltage detect and power-down/power brown-out reset circuit to protect memory and I/O from faulty CPU operation during periods of illegal voltage levels. The supervisor circuitry also features a watchdog timer which can be used to guard against software lockups. An internal timer with a period of 1.5 seconds will, when enabled, reset the CPU if the watchdog has not been serviced within the allotted time. There are two watchdog modes available on the PPM-TX. With a jumper installed on J3 pins 13 and 14, the watchdog is totally disabled and can never reset the CPU.

The second mode is set by removing J3 pins 13 and 14. In this mode the watchdog timer powers up disabled and must be enabled in software before timing will begin. Enabling is accomplished by writing a 1 to I/O port 1EEH. Writing a 0 to I/O port 1EEH will disable the watchdog. After enabling, petting may be accomplished by writing any value to port 1EFH at least every 1.5 seconds or a reset will occur. This mode of operation can be used with the BIOS or DOS provided that the watchdog is disabled before making any extensive BIOS or DOS calls, especially video or Disk I/O calls which could exceed the 1.5 seconds allowed. The drawback to this mode is that a lockup during the time the watchdog is disabled will not allow for auto-recovery and will require an external reset.

2.12 COM 3 and COM 4 Interrupt Routing Header



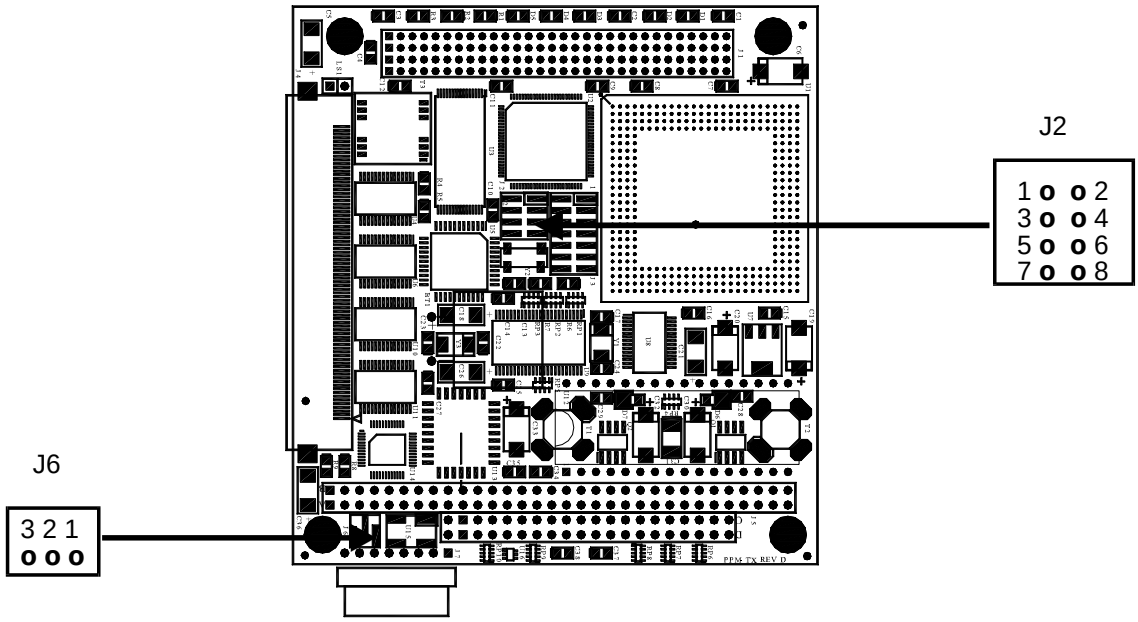
All COM 3 and COM 4 interrupts are routed to their appropriate PC/104 pins using the interrupt header at J3. COM ports 3 and 4 can be enabled or disabled individually via the jumper block at J2. When J2 pins 5-6 are jumpered, COM3 is enabled. When J2 pins 7-8 are jumpered, COM4 is enabled. The pinouts for J2 and J3 are shown below.



The chart below shows the jumper settings for COM 3 and COM 4.

COM Channel	Interrupt	J3 Pins
COM3	IRQ5	2-4
COM3	IRQ11	5-7
COM3	IRQ12	10-12
COM4	IRQ9	1-3
COM4	IRQ10	6-8
COM4	IRQ15	9-11

2.13 Battery Select Control



An onboard 350mAH nominal capacity, lithium battery is provided for the CMOS Clock/Calendar. A master battery enable jumper is provided at J6. When J6 is jumpered pins 2-3, battery power is supplied to the Clock/Calendar. When J6 is jumpered, pins 1-2, the battery is totally disconnected and no current will be drawn from it. Battery life is highly dependent upon duty cycle as there is no current drawn from the battery when +5 volts is applied to the board. Both storage and operational temperatures play a prominent factor in battery life. High temperatures will shorten battery life significantly. J6 must be jumpered to 1-2 if a battery is not installed.

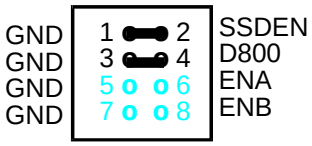
Note : It may become necessary at some time to make the CMOS RAM forget its current configuration and to start fresh with factory defaults. This may be accomplished by removing power from the board . Then remove the jumper from pins 2-3 on J6 and place on pins 1-2 for 30 seconds. Replace the jumper on J6 pins 2-3, power-up, and reconfigure the CMOS settings as desired.

2.14 DiskOnChip Configuration

The PPM-TX supports the use of M-Systems' DiskOnChip (DOC) device to be used as a Solid State Disk (SSD) drive. This section documents the required hardware configurations for the DOC devices. The 32-pin JEDEC memory socket at U12 is used to contain the DOC devices used for the disk. When installing DOC device at U12, please refer to Pin 1 location in Appendix C. The silicon disk array is memory mapped into a 32Kbyte hole at segment D000 or D800 hex. Jumper settings for J2 are shown the following page.

The DiskOnChip is enabled by jumpering J2 pins 1-2. The silicon disk array is memory mapped into a 32Kbyte hole at segment D000 or D800. D000 being the default, can be selected by leaving J2 pins 3-4 un-jumpered. D800 can be selected by jumpering J2 pins 3-4 as shown below.

J2



2.15 PC/104 Bus Interface

The PPM-TX supports I/O expansion through the standard PC/104 connector at J5. The PPM-TX supports both 8-bit and 16-bit PC/104 modules. The PC/104 connector pin definitions are provided here for reference purposes :

J5

GND	D0	C0	GND	IOCHK*	A1	B1	GND
MEMCS16*	D1	C1	SBHE*	SD7	A2	B2	RESET
IOCS16*	D2	C2	LA23	SD6	A3	B3	+5V
IRQ10	D3	C3	LA22	SD5	A4	B4	IRQ9
IRQ11	D4	C4	LA21	SD4	A5	B5	-5V
IRQ12	D5	C5	LA20	SD3	A6	B6	DRQ2
IRQ15	D6	C6	LA19	SD2	A7	B7	-12V
IRQ14	D7	C7	LA18	SD1	A8	B8	ENDXFR*
DACK0*	D8	C8	LA17	SD0	A9	B9	+12V
DRQ0	D9	C9	MEMR*	IOCHRDY	A10	B10	GND
DACK5*	D10	C10	MEMW*	AEN	A11	B11	SMEMW*
DRQ5	D11	C11	SD8	SA19	A12	B12	SMEMR*
DACK6*	D12	C12	SD9	SA18	A13	B13	IOW*
DRQ6	D13	C13	SD10	SA17	A14	B14	IOR*
DACK7*	D14	C14	SD11	SA16	A15	B15	DACK3*
DRQ7	D15	C15	SD12	SA15	A16	B16	DRQ3
VCC	D16	C16	SD13	SA14	A17	B17	DACK1*
MASTER*	D17	C17	SD14	SA13	A18	B18	DRQ1
GND	D18	C18	SD15	SA12	A19	B19	REFRESH*
GND	D19	C19	GND	SA11	A20	B20	SYSCLK
				SA10	A21	B21	IRQ7
				SA9	A22	B22	IRQ6
				SA8	A23	B23	IRQ5
				SA7	A24	B24	IRQ4
				SA6	A25	B25	IRQ3
				SA5	A26	B26	DACK2*
				SA4	A27	B27	TC
				SA3	A28	B28	BALE
				SA2	A29	B29	+5V
				SA1	A30	B30	OSC
				SA0	A31	B31	GND
				GND	A32	B32	GND

2.16 PC/104-*Plus* Bus Interface

J16 is the PC/104-*Plus* bus connector. The pin definitions for this connector are shown here for reference purposes :

J16				
Pin	A	B	C	D
1	GND/5.0 KEY	Reserved	+5	AD00
2	VI/O	AD02	AD01	+5V
3	AD05	GND	AD04	AD03
4	C/BE0*	AD07	GND	AD06
5	GND	AD09	AD08	GND
6	AD11	VI/O	AD10	M66EN
7	AD14	AD13	GND	AD06
8	+3.3V	C/BE1*	AD15	+3.3V
9	SERR*	GND	SB0*	PAR
10	GND	PERR*	+3.3V	SDONE
11	STOP*	+3.3V	LOCK*	GND
12	+3.3V	TRDY*	GND	DEVSEL*
13	FRAME*	GND	IRDY*	+3.3V
14	GND	AD16	+3.3.V	C/BE2*
15	AD18	+3.3V	AD17	GND
16	AD21	AD20	GND	AD19
17	+3.3V	AD23	AD22	+3.3V
18	IDSEL0	GND	IDSEL1	IDSEL2
19	AD24	C/BE3*	VI/O	IDSEL3
20	GND	AD26	AD25	GND
21	AD29	+5V	AD28	AD27
22	+5V	AD30	GND	AD31
23	REQ0*	GND	REQ1*	VI/O
24	GND	REQ2*	+5V	GNT0*
25	GNT1*	VI/O	GNT2*	GND
26	+5V	CLK0	GND	CLK1
27	CLK2	+5V	CLK3	GND
28	GND	INTD*	+5V	RST*
29	+12V	INTA*	INTB*	INTC*
30	-12V	Reserved	Reserved	GND/3.3V KEY

2.17 Status LED

An onboard LED can be used by software for signaling status or error conditions. The LED is illuminated by writing a 1 to I/O port 1EDH. The LED is turned off by writing a 0 to I/O port 1EDH. The green activity LED is present at D6.

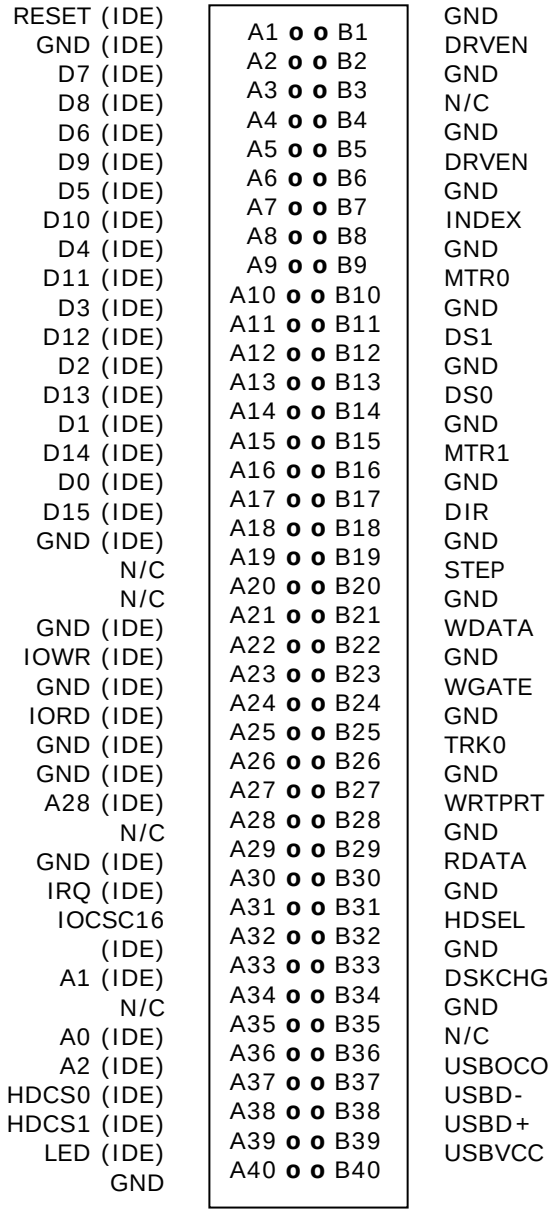
2.18 Multi-I/O Connector

All of the peripherals connect to the PPM-TX through two 80-pin high-density connectors at J4 and J101. The pin definitions for connectors J4 and J101 are provided here for reference purposes. Cable drawings for the CBL-251-1 and CBL-252-1 are provided in the appendices to document the connections from the Multi-I/O connections to the appropriate peripheral connector.

J4

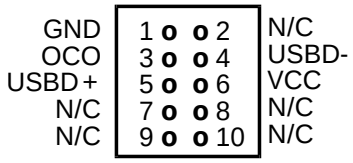
PSTB (LPT)	A1	B1	(COM1) DCD
AUTOFD (LPT)	A2	B2	(COM1) DSR
PD0 (LPT)	A3	B3	(COM1) RX
ERROR (LPT)	A4	B4	(COM1) RTS
PD1 (LPT)	A5	B5	(COM1) TX
INIT (LPT)	A6	B6	(COM1) CTS
PD2 (LPT)	A7	B7	(COM1) DTR
SLIN (LPT)	A8	B8	(COM1) RI
PD3 (LPT)	A9	B9	(COM1) GND
GND (LPT)	A10	B10	(COM2) DCD
PD4 (LPT)	A11	B11	(COM2) DSR
GND (LPT)	A12	B12	(COM2) RX
PD5 (LPT)	A13	B13	(COM2) RTS
GND (LPT)	A14	B14	(COM2) TX
PD6 (LPT)	A15	B15	(COM2) CTS
GND (LPT)	A16	B16	(COM2) DTR
PD7 (LPT)	A17	B17	(COM2) RI
GND (LPT)	A18	B18	(COM2) GND
ACK (LPT)	A19	B19	(COM3) DCD
GND (LPT)	A20	B20	(COM3) DSR
BUSY (LPT)	A21	B21	(COM3) RX
GND (LPT)	A22	B22	(COM3) RTS
PE (LPT)	A23	B23	(COM3) TX
GND (LPT)	A24	B24	(COM3) CTS
SLCT LPT)	A25	B25	(COM3) DTR
RX+ (ETH)	A26	B26	(COM3) RI
RX- (ETH)	A27	B27	(COM3) GND
TX+ (ETH)	A28	B28	(COM4) DCD
TX- (ETH)	A29	B29	(COM4) DSR
LED0 (ETH)	A30	B30	(COM4) RX
LED1 (ETH)	A31	B31	(COM4) RTS
LED2 (ETH)	A32	B32	(COM4) TX
LED3 (ETH)	A33	B33	(COM4) CTS
+5V	A34	B34	(COM4) DTR
RESET	A35	B35	(COM4) RI
GND	A36	B36	(COM4) GND
MDAT (MOUSE)	A37	B37	(KYBD) KCLK
GND (MOUSE)	A38	B38	(KYBD) KDAT
+5V (MOUSE)	A39	B39	(KYBD) GND
MCLK (MOUSE)	A40	B40	(KYBD) +5V

J101


RESET (IDE)
GND (IDE)
D7 (IDE)
D8 (IDE)
D6 (IDE)
D9 (IDE)
D5 (IDE)
D10 (IDE)
D4 (IDE)
D11 (IDE)
D3 (IDE)
D12 (IDE)
D2 (IDE)
D13 (IDE)
D1 (IDE)
D14 (IDE)
D0 (IDE)
D15 (IDE)
GND (IDE)
N/C
N/C
GND (IDE)
IOWR (IDE)
GND (IDE)
IORD (IDE)
GND (IDE)
GND (IDE)
A28 (IDE)
N/C
GND (IDE)
IRQ (IDE)
IOCSC16 (IDE)
A1 (IDE)
N/C
A0 (IDE)
A2 (IDE)
HDCS0 (IDE)
HDCS1 (IDE)
LED (IDE)
GND
A1 o o B1
A2 o o B2
A3 o o B3
A4 o o B4
A5 o o B5
A6 o o B6
A7 o o B7
A8 o o B8
A9 o o B9
A10 o o B10
A11 o o B11
A12 o o B12
A13 o o B13
A14 o o B14
A15 o o B15
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A33 o o B33
A34 o o B34
A35 o o B35
A36 o o B36
A37 o o B37
A38 o o B38
A39 o o B39
A40 o o B40
GND
DRVEN
GND
N/C
GND
DRVEN
GND
INDEX
GND
MTR0
GND
DS1
GND
DS0
GND
MTR1
GND
DIR
GND
STEP
GND
WDATA
GND
WGATE
GND
TRK0
GND
WRTPRT
GND
RDATA
GND
HDSEL
GND
DSKCHG
GND
N/C
USBOCO
USBD-
USBD+
USBVCC

2.19 USB Connector

The PPM-TX supports USB connections through the ten-pin connector on the IDE interface cable CBL-252-1. An adapter board, the ADP-USB is available from WinSystems for connection from the ten-pin harness to standard USB connectors. The pinout for the ten-pin connector on CBL-252-1 is shown here.



2.20 Ethernet Controller

One of the principal features of the PPM-TX is the inclusion of the 10/100 Ethernet controller. The popular Intel 82559ER high-integration NIC supports both IEEE 802.3 10BASE-T and 100BASE-T in a fully auto-negotiating mode. The 82559ER integrates both the Media Access Controller (MAC) and the physical layer (PHY) on a single chip. The 82559ER is a full bus mastering PCI controller and also incorporates 6K of buffer memory. Full duplex operation provides throughput of up to 200MBs on fast Ethernet segments.

Intel provides a vast array of driver support for all of the popular network operating systems including : Windows CE, Windows 95, Windows 98, Windows98SE, Windows ME, Windows NT, Windows 2000, Novell Netware 3.11-4.1, Solaris, Linux, and Unix.

The Ethernet section of the PPM-TX is a full PCI PnP (plug-n-play) implementation coupled with the Award PCI BIOS which assigns the necessary I/O, memory, DMA, and IRQ resources required by the controller. Connection to the network is most easily accomplished using the adapter cable CBL-251-1 from WinSystems which terminates in the RJ-45 suitable for Ethernet and fast-Ethernet connectivity. There are three Ethernet status LEDs on one corner of the board. The purpose of each LED is shown here :

D3 (Green) Activity
D4 (Red) Speed Indication - Lit = 100BASE-T
D5 (Yellow) Link Active

NOTE: WinSystems cannot provide technical support for direct programming of the 82559ER controller. We suggest utilizing a TCP/IP stack or Network O/S that allows the use of preexisting 82559ER drivers.

The 82559 is software compatible with the Intel line of Pro 100+ PCI adapters. The 82559 is supported by a number of operating systems directly. Intel provides the latest drivers through their web site at :

http://developer.intel.com/design/network/drivers/

Alternately, most drivers will be available from the WinSystems site at :

http://www.winsystems.com

2.21 Jumper/Connector Summary

Jumper/ Connector	Description	Page Number
J1	PC/104-*Plus* Connector	2-10
J2	DOC Enable/Location/COM3/COM4 Jumper	2-8
J3	COM 3 and COM 4 Interrupt Jumper	2-7
J4	Multi-I/O Connector	2-11
J5	PC/104 Connector	2-9
J6	Battery Enable Jumper	2-8
J7	Power/Reset Connector	2-2
J101	IDE/Floppy/USB Connector	2-12

3 Award BIOS Configuration

3.1 General Information

The PPM-TX comes equipped with a standard Award BIOS with setup in ROM that allows users to modify the basic system configuration. This type of information is stored in battery-backed CMOS RAM so that it retains setup information when power is turned off.

3.2 Entering Setup

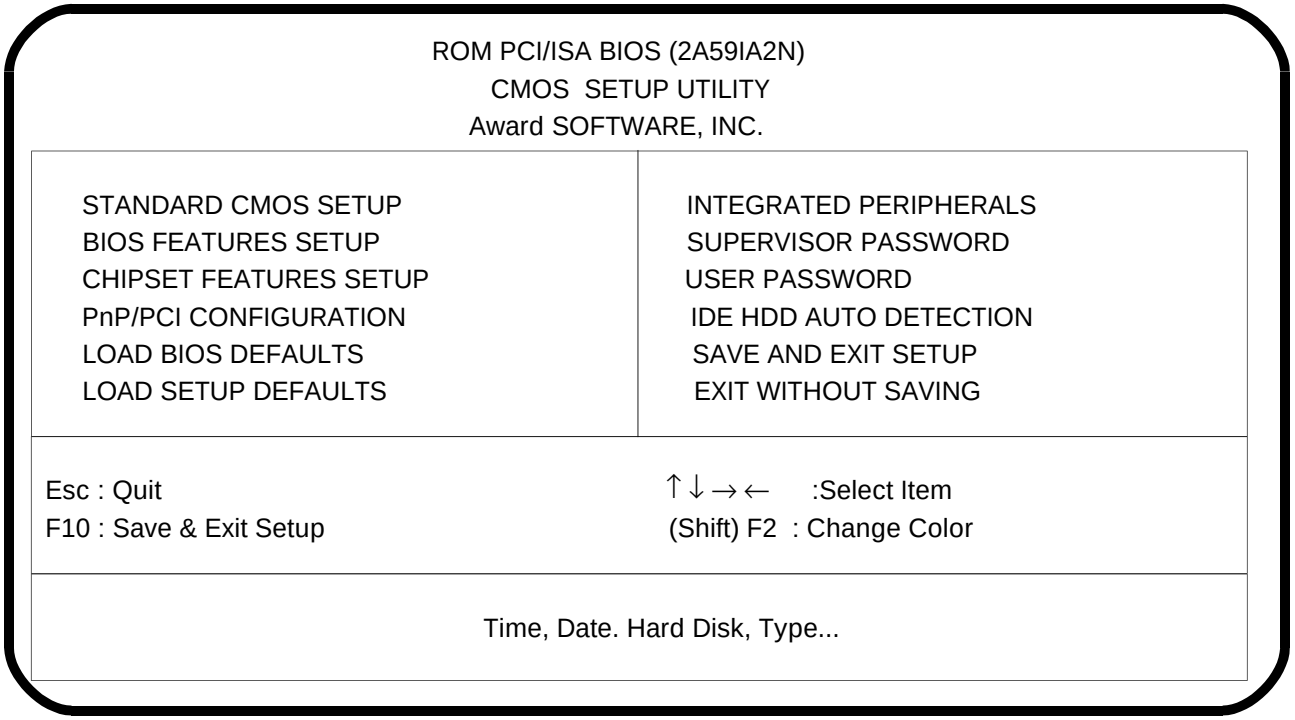
To enter setup, power on the computer and press the DEL key immediately after the message "Press DEL to Enter Setup" appears on the lower left of the screen. If the message disappears before you respond and you still wish to enter setup, restart the system by turning it OFF and then ON or by pressing the RESET button, if so equipped, or by pressing the CTRL, ALT, and DEL key simultaneously. Alternately, under certain error conditions of incorrect setup the message:

"Press F1 to continue or DEL to Enter Setup"

may appear. To enter setup at that time press the DEL key. To attempt to continue, ignoring the error condition, press the F1 key.

3.3 Setup Main Menu

The main menu screen is displayed on the following page. Each of the options will be discussed in this section. Use the arrow keys to highlight the desired selection and press ENTER to enter the sub-menu or to execute the function selected.



3.4 Standard CMOS Setup

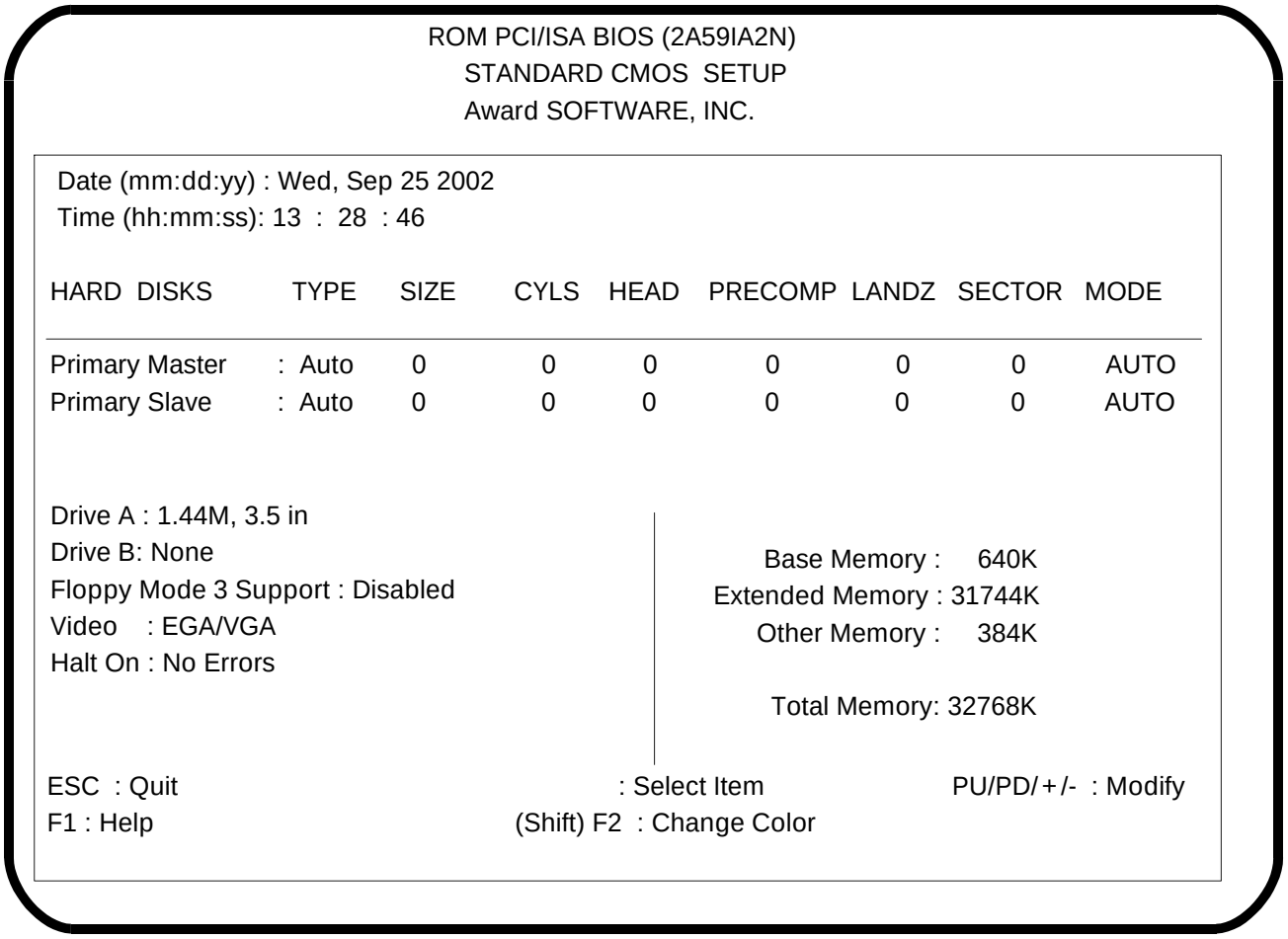
The items in the standard CMOS setup menu are divided into several categories. Each category may include one or more setup items. Use the arrow keys to highlight the item and then use the PgUp, PgDn, +.-. keys to select the desired value for the item.

Date

The date format is <day>,< date>,< month>, <year>
day = The day, from Sun to Sat, determined by the BIOS and is display only
Date = the date, from 1 to 31 (or the maximum for the current month)
month = the month, JAN through DEC
year = The year, from 1900 to 2099

Time

The time is hour, minute, second. The time is calculated on the 24-hour, military-time clock such that 1:00PM is 13:00:00.



Drive C: / Drive D: type

This category identifies the type of hard disk C: or hard disk D: that has been installed in the system. There are 46 predefined types and a user definable type. Types 1-46 are shown in the following table.

Type	Size	Cylinders	Heads	Sectors	Precomp	Landzone
1	10	306	4	17	128	305
2	20	615	4	17	300	615
3	30	615	6	17	300	614
4	62	940	8	17	512	940
5	46	940	6	17	512	940
6	20	615	4	17	None	615
7	30	462	8	17	256	511
8	30	733	5	17	None	733
9	112	900	15	17	None	901
10	20	820	3	17	None	820

11	35	855	5	17	None	855
12	49	855	7	17	None	855
13	20	306	8	17	128	319
14	42	733	7	17	None	733
15		Reserved				
16	20	612	4	17	0	663
17	40	977	5	17	300	977
18	56	977	7	17	None	977
19	59	1024	7	17	512	1023
20	30	733	5	17	300	732
21	42	733	7	17	300	732
22	30	306	5	17	300	733
23	10	977	4	17	0	336
24	40	1024	5	17	None	976
25	76	1224	9	17	None	1023
26	71	1224	7	17	None	1223
27	111	1224	11	17	None	1223
28	152	1024	15	17	None	1223
29	68	1024	8	17	None	1023
30	93	918	11	17	None	1023
31	83	925	11	17	None	1023
32	69	1024	9	17	None	926
33	85	1024	10	17	None	1023
34	102	1024	12	17	None	1023
35	110	1024	13	17	None	1023
36	119	1024	14	17	None	1023
37	17	1024	2	17	None	1023
38	136	1024	16	17	None	1023
39	114	918	15	17	None	1023
40	40	820	6	17	None	820
41	42	1024	5	17	None	1023
42	65	1024	5	26	None	1023
43	40	809	6	17	None	852
44	61	809	6	26	None	852
45	100	776	8	33	None	775
46	203	684	16	38	None	685

Press PgUp or PgDn to select a numbered hard disk type, or type the number and press ENTER. Most manufacturers supply type information with their drives that can be used to help identify the proper drive type. Modern IDE drives seldom fall into the predefined types and are usually best handled with the “auto” or “user” types. The “auto” mode, reads the hard disk type information from the drive at boot time and uses it to access the drive. The “user” mode allows for either manual or automatic entry, via the setup option “IDE Auto Detect” of the drive parameters.

If you decide to create the user type manually, you must supply the required parameters as to Cylinder count, Head count, Precomp Cylinder, Landing Zone Cylinder, and number of sectors per track.

On Hard disks larger than 528MB, it will be necessary to choose the Logical Block Addressing mode (LBA) if you wish the drive to be accessible as a single drive letter.

If there is not hard disk installed, be sure to select “None”.

Drive A /Drive B type

This category identifies the type of floppy drives attached as Drive A: or Drive B:. The choices are as follows :

NONE 360K, 5.25 in.
1.2M, 5.25 in.
720K, 3.5 in
1.44M, 3.5 in.

Video

This category specifies the type of video adapter used for the primary system monitor that matches your video display board and monitor. The available choices are:

EGA/VGA
CGA40
CGA80
MONO

Error Halt

This category determines whether the system will halt if a non-fatal error is detected during the power-up self test. The choices are:

No Errors : The system will not be stopped for any error that may be detected.

All Errors : Whenever the BIOS detects a non-fatal error, the system will be stopped and a prompt will appear.

All, but Keyboard : The system will not stop for a keyboard error, it will stop for all other errors.

All, but diskette : The system will not stop for disk errors. All others will result in a prompt.

All but Disk/Key : All errors except diskette or keyboard will result in a halt and a prompt.

Memory

This category is display only and is determined by the BIOS POST (Power-On Self Test).

Base Memory

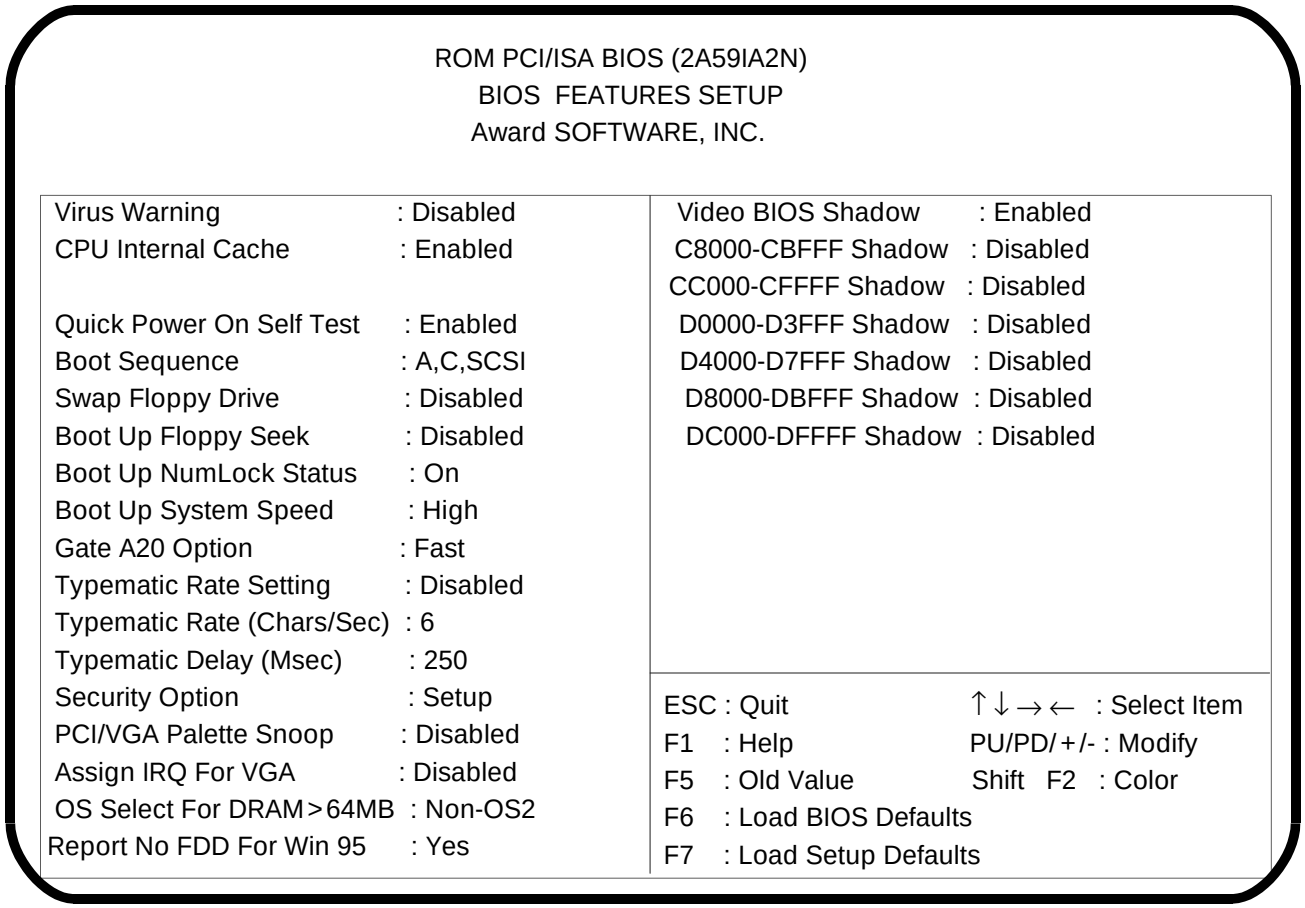
The POST routines in the BIOS will determine the amount of base (conventional) memory installed in the system. The value of the base memory is typically 640K for systems with a Megabyte of memory or greater.

Extended Memory

The BIOS determines how much extended memory is present during the POST. This is the amount of memory located above 1MB in the CPU's memory address space.

Other Memory

This refers to memory located in the 640K to 1024K address space. This is memory that can be used for different applications. DOS may use this area to load device drivers and TSRs to keep as much base memory free as possible for application programs. The most common use of this area is for shadow RAM.



3.5 BIOS Features Setup

Virus Warning

This option, when enabled, protects the boot sector and partition table of the hard disk against unauthorized writes through the BIOS. Any attempt to alter these areas will result in an error message and a prompt to authorize the activity.

CPU Internal Cache

This option, when enabled, provides maximum performance by caching instructions and data using the on-chip cache of the Pentium or K6 processor.

External Cache

This option, when enabled, further enhances performance by caching recently used instructions and data into fast SRAM.

Quick Power On Self Test (POST)

This option, when enabled, speeds up the POST during power up. If it is enabled, the BIOS will shorten and/or skip some items during POST.

Boot Sequence

This option determines the boot attempt sequence for the fixed disk and floppy disk. If there is no media available at first drive choice, the system automatically moves to next drive in list. The choices are:

C, A
A, C
A, C, SCSI
C, A, SCSI
C, CD ROM, A
D, A, SCSI
E, A, SCSI
F, A, SCSI
SCSI, A, C
SCSI, C, A
C ONLY
LS120, C

Swap Floppy Drive

This option allows for swapping of the A: and B: floppy drives without actually relocating the drives on the cable.

Boot Up Floppy Seek

During POST, when this option is enabled, the BIOS will determine if the floppy drive is 40 tracks or 80 tracks. If disabled, no seek test will be performed and no error can be reported.

Boot Up Numlock Status

This allows user selection of the Numlock state at boot time.

Boot Up System Speed

This option allows specification of the processor speed at boot time. The options are:

HIGH
LOW

Gate A20 Option

This option allows for the selection of the source for the gate A20 signal. The choices are:

Normal - Sourced from the keyboard controller
Fast - Sourced from the Chipset

Typematic Rate Setting

This option enables or disables the typematic rate programming at boot time. Typematic is the auto-repeat function for the keyboard.

Typematic Rate

When the typematic rate setting is enabled the typematic repeat speed is set via this option. The supported rates are :

6 characters per second
8 characters per second
10 characters per second
12 characters per second
15 characters per second
20 characters per second
24 characters per second
30 characters per second

Typematic Delay

When typematic rate setting is enabled, this option specifies the time in milliseconds before auto-repeat begins. The supported values are:

250 mS
500 mS
750 mS
1000 mS

Security Option

This option allows you to limit access to the system and setup, or just to setup. The choices are:

System - The system will not boot and access will be denied if the correct password is not entered at the prompt.

Setup - The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

NOTE: To disable security, select "Password Setting" at the Setup Main Menu and then you will be asked to enter a password. Do not type anything, just hit ENTER. Once the security is disabled, the system will boot and you can enter Setup freely.

PCI/VGA Palette Snoop

This option allows for enabling or disabling of the PCI/VGA Palette snoop.

Assign IRQ for VGA

This option, when enabled, assigns an IRQ to the video adapter.

OS Select for DRAM > 64MB

This option allows selection of an operating system for DRAM greater than 64MB. The options are:

OS2
Non-OS2

Report No FDD for Win 95

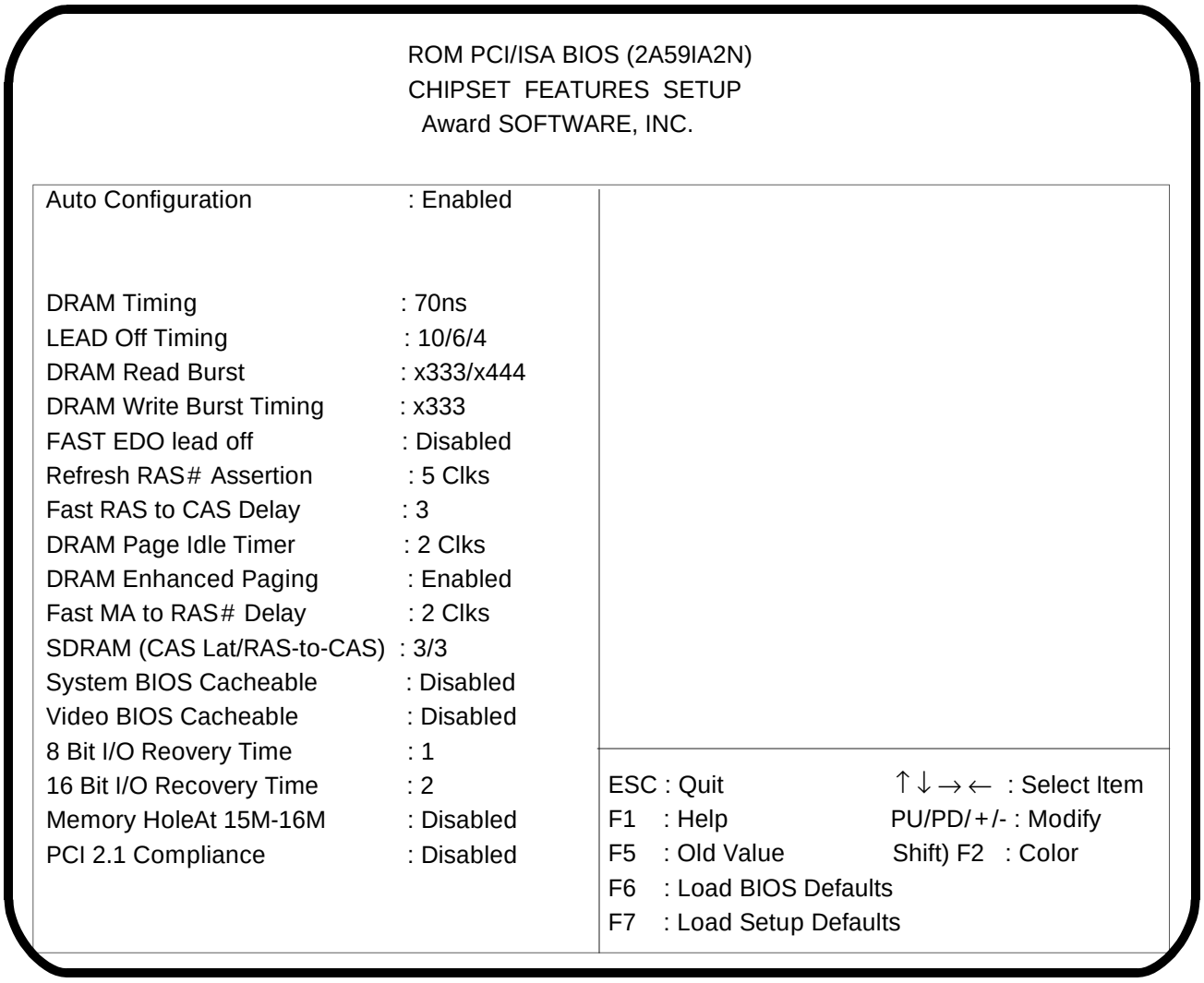
This option, when enabled, signals Windows 95 if there is no floppy present. The options are:

Yes
No

Shadowing Options

When shadowing for a particular address range is enabled, it instructs the BIOS to copy the BIOS located in ROM into DRAM. This shadowing from an 8-bit EPROM into fast 32-bit DRAM results in a Multi-magnitude increase in performance. The main BIOS is shadowed automatically but there are other areas that may be selected for shadowing as shown here:

Video BIOS Shadow - C000-C7FFF EGA/VGA BIOS ROM
C8000-CBFFF
CC000-CFFFF
D0000-D3FFF
D4000-D7FFF
D8000-DBFFF
DC000-DFFFF



3.6 Chipset Features Setup

The options in this section control the chipset programming at boot time. In most cases, the default settings should be used unless you have a clear understanding of the significance of the change. It is possible using these options to create a system that will either not boot or is very unstable or unreliable. If this should occur, there are two methods to return the system to a stable configuration. If the system works well enough to get into Setup, simply choose the “Load BIOS Defaults” option and then select “Save and Exit Setup” to restore factory defaults. If the system will not run well enough to run Setup, it will be necessary to remove the battery source temporarily until the CMOS memory is lost. Refer to Section 2.14 for details on reinitializing the CMOS RAM.

Each of the options for the Chipset Features Menu will be briefly discussed in the sections that follow.

Auto Configuration

This option, when enabled, instructs the BIOS to auto-select the proper DRAM timing, lead Off timing, DRAM read burst, DRAM write burst timing, Fast EDO lead off, Refresh RAS # Assertion, Fast RAS to CAS Delay, DRAM Page Idle Timer, DRAM Enhanced Paging, Fast MA to RAS # Delay, SDRAM (CAS Lat/RAS-to-CAS) upon the calculated CPU speed. The default is “Enabled”.

System BIOS Cacheable

This option enables or disables cacheability of the system BIOS.

Video BIOS Cacheable

This option enables or disables cacheability of the video BIOS.

8 Bit I/O Recovery

Enables and defines 8-bit I/O recovery time in number of clocks.

16 Bit I/O Recovery

Enables and defines 16-bit I/O recovery time in number of clocks.

Memory Hole At 15M-16M

Memory Hole, when enabled, disables onboard memory in the specified range.

PCI 2.1 Compliance

This option, when enabled, makes the PPM-TX PCI 2.1 compliant. The options are:

Enabled
Disabled

ROM PCI/ISA BIOS (2A59IA2N)
POWER MANAGEMENT SETUP
Award SOFTWARE, INC.

ACPI Function	: Enabled	** Reload Global Timer Events **	
Power Management	: Disabled	IRQ [3-7, 9-15] ,NMI	: Disabled
PM Control by APM	: No	Primary IDE 0	: Disabled
Video Off Method	: Blank Screen	Primary IDE 1	: Disabled
Video Off After	: NA	Secondary IDE 0	: Disabled
MODEM Use IRQ	: NA	Secondary IDE 1	: Disabled
Doze Mode	: Disabled	Floppy Disk	: Disabled
Standby Mode	: Disabled	Serial Port	: Disabled
Suspend Mode	: Disabled	Parallel Port	: Disabled
HDD Power Down	: Disabled		
Throttle Duty Cycle	: 12.5%		
ZZ Active in Suspend	: Disabled		
PCI/VGA Act-Monitor	: Disabled		
Soft-Off by PWR-BTTN	: Instant-Off		
CPUFAN Off In Suspend	: Disabled	ESC : Quit	↑↓→← : Select Item
PowerOn by Ring	: Disabled	F1 : Help	PU/PD/+/- : Modify
Resume by Alarm	: Disabled	F5 : Old Value	Shift) F2 : Color
		F6 : Load BIOS Defaults	
IRQ 8 Break Suspend	: Disabled	F7 : Load Setup Defaults	

3.7 Power Management

ACPI Function

This option enables the advanced configuration and power interface.

Power Management

This option, enables advance power management on the PPM-TX.

PM Control by APM

This option allows power management control throughout the advanced power management software interface.

Video Off Method

There are 3 video off methods to select from when power management is enabled. The options are:

Blank Screen
V/H Sync + Blank
DPMS

Video Off After

This option, when Doze mode is enabled, will shut off video using one of the following methods:

NA
Suspend
Standby
Doze

MODEM Use IRQ

This option allows selection of the interrupt to use for wake-up on modem activity. The interrupt choices are:

NA
3
4
5
7
9
10
11

Doze Mode

This option, when power management is enabled, allows the user to select the length of time the system will wait with no activity before entering Doze mode. The choices are:

Disabled
1 minute
2 minutes
4 minutes
8 minutes
12 minutes
20 minutes
30 minutes
40 minutes
1 hour

Standby Mode

This option, when power management is enabled, allows the user to select the length of time the system will wait with no activity before entering Standby mode. The choices are:

Disabled
1 minute
2 minutes
4 minutes
8 minutes
12 minutes
20 minutes
30 minutes
40 minutes
1 hour

Suspend Mode

This option, when power management is enabled, allows the user to select the length of time the system will wait with no activity before entering Suspended mode. The choices are:

Disabled
1 minute
2 minutes
4 minutes
8 minutes
12 minutes
20 minutes
30 minutes
40 minutes
1 hour

HDD Power Down

This option, when power management is enabled, allows the user to select the length of time the system will wait with no activity before entering hard disk power down mode. The choices are:

1 minute
2 minutes
3 minutes
4 minutes
5 minutes
6 minutes
7 minutes
8 minutes
9 minutes
10 minutes
11 minutes
12 minutes
13 minutes
14 minutes
15 minutes

Throttle Duty Cycle

This option selects the throttle rate of the main system clock during power management. The choices are:

12.5%
25.0%
37.5%
50.0%
62.5%
75.0%

ZZ Active in Suspend

This option, when enabled, puts the on-board L2 cache into sleep mode during power management.

PCI/VGA Act-Monitor

This option, when enabled, monitors activity of VGA for power management.

CPU Fan Off In Suspend

This option, when enabled, shuts off power to the CPU fan when the system is in suspended mode.

PowerOn by Ring

This option is not supported on the PPM-TX. Contact WinSystems' tech support for further information.

Resume by Alarm

This option, when enabled, will wake the system from power management mode.

IRQ 8 Break Suspend

This option, when enabled, will wake the system from suspended mode using interrupt request 8.

IRQ [3-7, 9-15],NMI

This option, when enabled, will reset the power management timer if any of the following are accessed.

IRQ 3-7
IRQ 9-15
NMI

Primary IDE 0

This option, when enabled, will reset the power management timer when the primary IDE drive is accessed.

Primary IDE 1

This option, when enabled, will reset the power management timer when the primary IDE drive is accessed.

Secondary IDE 0

This option, when enabled, will reset the power management timer when the secondary IDE drive is accessed.

Secondary IDE 1

This option, when enabled, will reset the power management timer when the secondary IDE drive is accessed.

Floppy Disk

This option, when enabled, will reset the power management timer when the floppy drive is accessed.

Serial Port

This option, when enabled, will reset the power management timer when the serial port is accessed.

Parallel Port

This option, when enabled, will reset the power management timer when the parallel port is accessed.

ROM PCI/ISA BIOS (2A59IA2N)
PnP/PCI CONFIGURATION
Award SOFTWARE, INC.

PnP OS Installed	: NO	PCI IDE IRQ Map	: ISA
Resources Controlled By	: Manual	Primary IDE INT#	: A
Reset Configuration Data	: Disabled	Secondary IDE INT#	: A
IRQ-3 assigned to	: PCI/ISA PnP		
IRQ-4 assigned to	: PCI/ISA PnP	Used MEM base addr	: N/A
IRQ-5 assigned to	: Legacy ISA		
IRQ-6 assigned to	: PCI/ISA PnP		
IRQ-7 assigned to	: PCI/ISA PnP		
IRQ-9 assigned to	: Legacy ISA		
IRQ-10 assigned to	: PCI/ISA PnP		
IRQ-11 assigned to	: PCI/ISA PnP		
IRQ-12 assigned to	: PCI/ISA PnP		
IRQ-14 assigned to	: Legacy ISA		
IRQ-15 assigned to	: PCI/ISA PnP		
DMA-0 assigned to	: PCI/ISA PnP		
DMA-1 assigned to	: PCI/ISA PnP		
DMA-3 assigned to	: PCI/ISA PnP		
DMA-5 assigned to	: PCI/ISA PnP		
DMA-6 assigned to	: PCI/ISA PnP		
DMA-7 assigned to	: PCI/ISA PnP		

ESC : Quit	↑↓→← : Select Item
F1 : Help	PU/PD/+/- : Modify
F5 : Old Value	Shift) F2 : Color
F6 : Load BIOS Defaults	
F7 : Load Setup Defaults	

3.8 PNP/PCI Configuration

PnP OS Installed

This option allows the user to assign whether the operating system is PnP. The options are:

YES
NO

Resources Controlled By

This option allows the user to select resource control of the system. The options are:

Auto
Manual

Reset Configuration Data

This option, when enabled, will reset the configuration data on power up. The options are:

Enabled
Disabled

IRQ3-15 / DMA 0-7

The options in this section of the manual will assign each of the interrupts to a PCI/ISA Plug and Play device, or to a Legacy ISA device. The available options are:

PCI/ISA PnP
Legacy ISA

PCI IDE IRQ Map

This option allows the selection of the PCI IDE IRQ map. The options are:

ISA
PCI-AUTO
PCI-SLOT 1
PCI-SLOT 2
PCI-SLOT 3
PCI-SLOT 4

Used MEM Base Address

This option allows selection of the base address used by memory. The options are:

N/A
C800
CC00
D000
D400
D800
DC00

3.9 Load BIOS Defaults

This main-menu option will cause the CMOS RAM to be loaded with the default values assigned by the factory. These are usually considered safe values and do not necessarily represent the highest performance values.

3.10 Load Setup Defaults

This option will cause the CMOS RAM to be loaded with default setup values assigned by the factory. These are usually values that were determined to give a higher level of performance along with reliable operation.

ROM PCI/ISA BIOS (2A59IA2N)
INTEGRATED PERIPHERALS
Award SOFTWARE, INC.

IDE HDD Block Mode	: Enabled	Onboard Parallel Port	:378/IRQ7
IDE Primary Master PIO	: Auto	Parallel Port Mode	: ECP+EPPI.9
IDE Primary Slave PIO	: Auto	ECP Mode Use DMA	: 3
IDE Primary Master UDMA	: Auto		
IDE Primary Slave UDMA	: Auto		
On-Chip Primary PCI IDE	: Enabled		
USB Keyboard Support	: Disabled		
Onboard FDC Controller	: Enabled		
Onboard Serial Port 1	: Auto	ESC : Quit	↑↓→← : Select Item
Onboard Serial Port 2	: Auto	F1 : Help	PU/PD/+/- : Modify
UART2 Mode	: Standard	F5 : Old Value	Shift) F2 : Color
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

3.11 Intergrated Peripherals

IDE HDD Block Mode

This option allows selection of IDE HDD block mode. The options are:

Enabled
Disabled

IDE Primary Master PIO

This option allows selection of the IDE primary master PIO. The options are:

Auto
Mode 1
Mode 2
Mode 3
Mode 4

IDE Primary Slave PIO

This option allows selection of the IDE primary slave PIO. The options are:

Auto
Mode 1
Mode 2
Mode 3
Mode 4

IDE Primary Master UDMA

This option allows selection of the IDE primary master UDMA. The options are:

Auto
Disabled

IDE Primary Slave UDMA

This option allows selection of the IDE primary slave UDMA. The options are:

Auto
Disabled

On-Chip Primary PCI IDE

This option allows selection of the on-chip primary PCI IDE. The options are:

Enabled
Disabled

USB Keyboard Support

This option allows selection of USB keyboard support. The options are:

Enabled
Disabled

Onboard FDC Controller

This option allows selection of the onboard FDC controller. The options are:

Enabled
Disabled

Onboard Serial Port 1 Controller

This option allows selection of the onboard serial port 1 controller. The options are:

Auto
Disabled
3F8/IRQ4
2F8/IRQ3
3E8/IRQ4
2E8/IRQ4

Onboard Serial Port 2 Controller

This option allows selection of the onboard serial port 2 controller. The options are:

Auto
Disabled
3F8/IRQ4
2F8/IRQ3
3E8/IRQ4
2E8/IRQ4

UART 2 Mode

This option allows selection of the UART 2 mode. The options are:

Standard
Disabled
IrDA 1.0
ASK-IR
IrDA 1.1

Onboard Parallel Port

This option allows selection of the onboard parallel port. The options are:

Disabled
3BC/IRQ7
378/IRQ7
278/IRQ5

Parallel Port Mode

This option allows selection of the parallel port mode. The options are:

Normal
EPP1.7+SPP
SPP
EPP1.9+SPP
ECP
ECP+EPP1.9

ECP Mode Use DMA

This option allows selection of the DMA in ECP Mode. The options are:

1
3

3.12 Password Setting

This option allows the setting of the security password. Pressing enter at the password prompt disables the security function completely.

3.13 IDE HDD Auto Detection

This function allows modern IDE fixed disks to be used to their maximum potential by interrogating the driver as to its preferred configuration of tracks, heads, and sectors; and automatically loads these parameters into a “user defined” hard disk type.

3.14 Save and Exit Setup

This function writes all changes to CMOS RAM and restarts the system.

3.15 Exit Without Saving

This option exits setup without saving any changes made and then restarts the system.

4 PPM-TX DiskOnChip Configuration

4.1 DiskOnChip Usage

The PPM-TX supports the M-Systems' DiskOnChip (DOC) Flash device in sizes ranging from 8MB to 288MB. The DOC device contains a BIOS extension, the TFFS (True Flash File System), and the Flash memory, all in a single 32-pin device. The DOC emulates a hard disk and can be used as a secondary hard disk to a physical IDE drive or it can be the only hard disk in the system.

The DOC is installed into the socket at U12. Refer to the section 2.15 for correct device jumpering and enabling of the DOC.

4.1.1 DOC Initialization

The DOC is initialized in an identical fashion to a fixed disk. DOS is booted (from floppy or hard disk), FDISK is run on the DOC drive (be sure to get the right drive), the system is rebooted and then the DOC is formatted using the DOS format command.

If the /S switch was used during formatting and there is no other fixed disk device specified or attached to the system the DOC will become the boot device. If a hard disk is present, the DOC will become a secondary fixed disk.

5 APPENDIX A I/O Port Map

The following is a list of PC I/O ports. Addresses marked with a '-' are not used on the PPM-TX but their use should be carefully qualified so as not to conflict with other I/O boards. I/O addresses marked with a '+' are used on the PPM-TX board and are unique to the WinSystems' design. I/O addresses marked with '**' are generally unused and should be the basis for the first choices in I/O address selection.

Hex Range	Usage
000-00F	8237 DMA #1
**010-01F	FREE
020-021	8259 PIC #1
**022-03F	FREE
040-043	8254 Timer
**044-05F	FREE
060-06F	8042 Keyboard Controller
070-073	CMOS RAM/RTC
**074-07F	FREE
080-08F	DMA Page Registers
**090-091	FREE
+092	Chipset register
**93-9F	FREE
0A0-0BF	8259 PIC #2
0C0-0DF	8237 DMA #2
**0E0-0EF	FREE
0F0-0F1	Coprocessor Control
**0F2-11F	FREE
-120-12F	WS16C48 HDIO
**130-16F	FREE
-170-17F	Secondary fixed disk I/O
**180-1EC	FREE
+1ED-1EF	LED, Watchdog control
1F0-1FF	Fixed Disk I/O
-200-20F	Joystick port
-210-21F	PCM SSD I/O Ports
-220-22F	Soundblaster I/O ports
**230-237	FREE
-238-23B	Bus Mouse
**240-277	FREE
-278-27F	LPT1
**280-2AF	FREE
-2B0-2DF	EGA Video
-2E0-2E7	GPIB Interface
2E8-2EF	COM4
**2F0-2F7	FREE
2F8-2FF	COM2
-300-31F	Prototype Card
-320-32F	AT Hard Disk

**330-377	FREE
378-37F	Parallel Printer
-380-3AF	SDLC
-3B0-3BB	DMA
-3C0-3CF	EGA
3E8-3EF	COM3
3F0-3F6	Floppy Disk
3F8-3FF	COM1

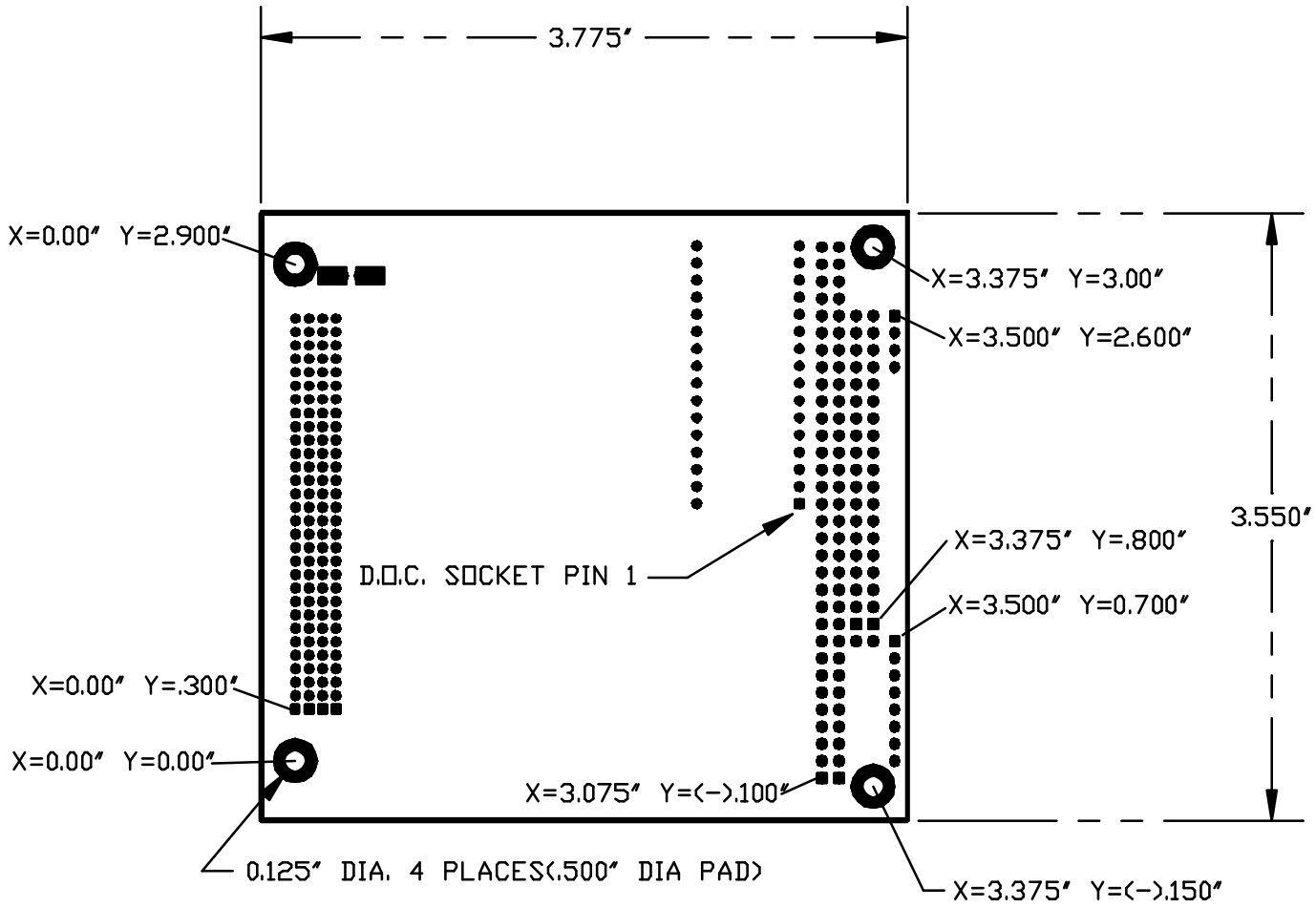
6 APPENDIX B Interrupt Map

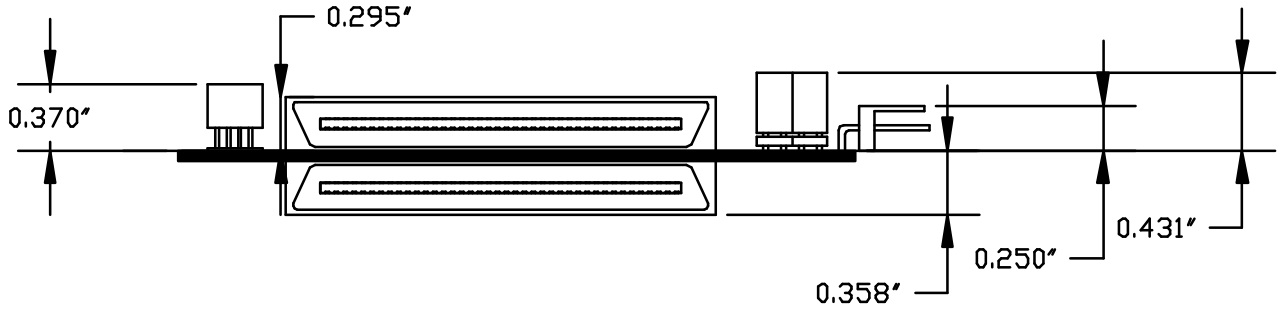
No.	Address	Type	Description
0	00	CPU	Divide by 0
1	04	CPU	Single Step 386 Debug Exception
2	08	CPU	NMI
3	0C	CPU	Breakpoint
4	10	CPU	Overflow
5	14	BIOS	Print Screen
		186	Bound Exception
6	18	186	Invalid opcode exception
7	1C	186	Coprocessor unavailable
8	20	Hardware	IRQ0 - 18.2Hz heart beat
		286	LIDT - Double fault exception
9	24	Hardware	IRQ1 - Keyboard interrupt
		286	Coprocessor segment
A	28	Hardware	IRQ2 - XT Reserved, AT-Slaved Controller
		286	Invalid TSS exception
B	2C	Hardware	IRQ3 - COM2
		286	Segment not present
C	30	Hardware	IRQ4 - COM1
		286	Stack fault exception
D	34	Hardware	IRQ5 - XT Hard Disk, AT Free
		286	Protection fault exception
E	38	Hardware	IRQ6 - Floppy Disk Interrupt
		386	Page fault exception
F	3C	Hardware	IRQ7 - LPT1
10	40	BIOS	Video BIOS functions
		286	Coprocessor exception
11	44	BIOS	BIOS Equipment check
		486	Alignment check exception
12	48	BIOS	Memory Size function
13	4C	BIOS	BIOS Disk functions
14	50	BIOS	BIOS serial functions
15	54	BIOS	Cassette/protected mode functions
16	58	BIOS	Keyboard BIOS functions
17	5C	BIOS	BIOS printer functions
18	60	BIOS	SROM Basic Entry point (IBM)
19	64	BIOS	Boot loader function
1A	68	BIOS	BIOS time of day functions
1B	6C	BIOS	Keyboard break vector
1C	70	BIOS	User chained timer tick
1D	74	BIOS	Video Initialization
1E	78	BIOS	Floppy Disk parameter table
1F	7C	BIOS	CGA graphic character font

20	80	MS-DOS	Program terminate
21	84	MS-DOS	DOS function call
22	88	MS-DOS	Terminate Address
23	8C	MS-DOS	Ctrl-Break Address
24	90	MS-DOS	Fatal Error Vector
25	94	MS-DOS	Absolute disk read
26	98	MS-DOS	Absolute disk write
27	9C	MS-DOS	Terminate
28	A0	MS-DOS	Idle Signal
29	A4	MS-DOS	TTY output
2A	A8	MS-DOS	MS-Net services
2F	BC	MS-DOS	Print Spool
30	C0	MS-DOS	Long jump interface
33	CC	MS-DOS	Mouse functions
3F	FC	MS-DOS	Overlay interrupt
40	100	BIOS	Floppy I/O when fixed disk is present
41	104	BIOS	Fixed disk 1 parameter table
42	108	BIOS	EGA Chain
43	10C	BIOS	EGA Parameter table pointer
44	110	BIOS	EGA graphics character font
4A	128	BIOS	AT Alarm exit address
50	140	BIOS	AT Alarm interrupt
51	144	BIOS	Mouse functions
5A	168	NET	Functions
5B	16C	NET	Boot chain
5C	170	NET	Net BIOS entry
67	19C	MS-DOS	EMS functions
6D	1B4	VGA	VGA Service
70	1C0	Hardware	IRQ8 - Real Time clock
71	1C4	Hardware	IRQ9 - Redirected IRQ2
72	1C8	Hardware	IRQ10 - Unassigned
73	1CC	Hardware	IRQ11 - Unassigned
74	1D0	Hardware	IRQ12 - Unassigned
75	1D4	Hardware	IRQ13 - Unassigned
76	1D8	Hardware	IRQ14 - IDE Fixed Disk
77	1DC	Hardware	IRQ15 - Unassigned
80	200		
F0	3C0	Basic	
F1	3C4		
FF	3FC	Not Used	

APPENDIX C

Mechanical Drawing





UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
TOLERANCE:
FRACTIONS: ANGLES: ± 1/2°
DECIMALS: .XX ± .03
.XXX ± .010

MACHINE FINISH ✓

WinSystems, Inc.
"THE EMBEDDED SYSTEMS AUTHORITY"

PPM-TX
MECHANICAL DIMENSIONS

CUSTOMER	DATE		
APPRV	DATE	SIZE A / CAGE 1AU87	DRAWING NO. DIMSPPMTX / REV B
CHKD	DATE		
DRAFT/DESIGN M.BROWNING	DATE 08/31/01	SCALE	CAD ID: DIMSPPMTX / SHEET NO. 1 OF 1

I:\DRAWINGS\M-STD\PPMTX\DIMSPPMTX.DWG

APPENDIX D

Cable Drawings

Part Number	Description
CBL-174-1	Power cable for sbc (unterminated)
CBL-251-1	Multi I/O cable
CBL-252-1	Multi disk cable

Software Drivers & Examples

Drivers for Intel 82559ER 10/100 Ethernet Controller	
Linux Kernels 2.2.x and 2.4.x	e100-2.1.6.tar.gz
NDIS4 (Windows 98)	82559erWin98.zip
NDIS4 (Windows NT 4 & 2000)	e100ndis4.zip
Windows NT Embedded 4.0	e100ent.zip
Windows XP/2000	e100exp.zip
Windows CE 3.0	e100ce3.zip
Windows CE.NET	e100ce.zip
DOS	e100bdos.zip
Latest BIOS and Utilities	rel0314.zip
Example of reprogramming DOS tick for high resolution timing	TICKDEMO.ZIP
Serial Console Utilities:	
Generic 38400baud Serial console redirect for COM1	SCON1.ZIP
Generic 38400baud Serial console redirect for COM2	SCON2.ZIP
Generic 9600baud Serial console redirect for COM1	SC19600.ZIP
Generic 9600baud Serial console redirect for COM2	SC29600.ZIP



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1. Description and quantity of the product(s) to be returned including its serial number.
2. Reason for the return.
3. Invoice number and date of purchase (if available), and original purchase order number.
4. Name, address, telephone and FAX number of the person making the request.
5. Do not debit WinSystems for the repair. WinSystems does not authorize debits.

After the RMA number is issued, please return the products promptly. Make sure the RMA number is visible on the outside of the shipping package.

The customer must send the product freight prepaid and insured. The product must be enclosed in an anti-static bag to protect it from damage caused by static electricity. Each bag must be completely sealed. Packing material must separate each unit returned and placed as a cushion between the unit(s) and the sides and top of the shipping container. WinSystems is not responsible for any damage to the product due to inadequate packaging or static electricity.

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