PCM-4894

All-in-One 486 single Board computer
with Flat Panel / CRT SVGA, Ethernet,
and 4 Serial Ports

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Packing list

Before you begin installing your card, please make sure that the following materials have been shipped:

- 1 PCM-4894 Single board computer
- 1 Quick Installation Guide
- 1 CD-ROM contains the followings:
    - -- User's Manual (this manual in PDF file)
    - -- VGA drivers and utilities
    - -- Ethernet drivers and utilities
    - -- Latest BIOS (as of this CD-ROM was made)
- PC/104 Module mounting support kit

The PCM-4894 require several cables for operation. You can make them yourself or purchase an optional cable kit, PCM-10489-1 (Part No : 9969048900).

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

Contents

General Information

This chapter provides background information for the PCM-4894.

Sections include:

- Specifications

- Board layout

- Dimensions

Introduction

The PCM-4894 is an all-in-one single board 486 computer with an **onboard flat panel/CRT SVGA controller** and **PCI Ethernet interface**. It offers all the functions of an industrial computer and its display capabilities on a single board, but fits in the space of a 5.25" floppy drive (only 5.75" x 8"). This means the PCM-4894 is your absolute best solution for embedded applications.

The onboard PCI-bus, flat panel/CRT SVGA controller uses the CHIPS 65550 chipset with up to 2 MB of video memory (onboard 1MB). This chipset, used with the local PCI-bus, enables 32-bit graphic throughput at up to 33 MHz. Excellent for display-intensive applications, it supports various LCD types including TFT, STN, B/W, and EL.

The onboard Ethernet Realtek RTL 8029AS PCI bus Ethernet controller supports remote boot ROM functions.

The PCM-4894 supports the M-Systems DiskOnChip 2000 (optional) which is a new generation of high performance single-chip Flash Disk. It provides a Flash Disk (as a BIOS expansion) which does not require any bus, slots, or connectors. It is also the optimal solution for Single Board Computers because of its small size, easy integration, plug-and-play functionality, and its low power consumption. The DiskOnChip is available in capacities from 2MB to 72MB and fits in a standard 32-pin DIP socket.

Another feature of the PCM-4894 is the inclusion of a high speed, local bus IDE controller. This controller supports (through ATA PIO) mode 3 and mode 4 hard disks, enabling data transfer rates in excess of 11 MB/second. Up to two IDE devices can be connected, including large hard disks, CD-ROM drives, tape backup drives, or other IDE devices. The built-in, enhanced IDE controller provides a 4-layer, 32-bit, posted write buffer and a 4-layer, 32-bit read-prefetch buffer to boost IDE performance.

Specifications

Standard SBC functions

CPU: AMD 5X86-P75 (486DX5-133) SQFP

BIOS: Award 128KB FLASH BIOS

Chipset: ALI 1487/1489

Super I/O Chipset: WINBOND83877TF

2nd Level Cache: On board 128KB 2nd level cache. Could be upgraded to 512KB by factory.

RAM memory: 4MB to 128MB. Two 72-pin SIMM sockets on board.

Enhanced IDE hard disk drive interface: Support up to two hard disk drives. BIOS auto-detect. Supports PIO mode 4 and Bus Master. 22 x 2 header, pitch 2.00mm with housing.

Floppy disk drive interface: Supports up to two floppy disk drives, 5.25" (360KB and 1.2MB) and /or 3.5" (720KB, 1.44MB and 2.88MB). 17 x 2 header, pitch 2.54mm with housing.

Multi-mode parallel port: Configured to LPT1, LPT2, LPT3 or disabled. Supports SPP, ECP and EPP. 13 x 2 header, pitch 2.54mm with housing.

Serial ports: Three RS-232 and one RS-232/422/485 serial ports. Ports can be configured as COM1, COM2, COM3, COM4 or disabled individually. Four 16C550 serial UARTs. 20 x 2 header, pitch 2.54mm with housing for RS-232 x 4.

Keyboard/mouse connector: 8 pin connector supports standard PC/AT keyboard and PS/2 mouse.

Real Time Clock/Calendar: Dallas DS-12887A or equivalent, powered by lithium battery for data retention of up to 10 years.

Watchdog Timer: Can generate a system reset, IRQ15. Support Windows 3.1, Windows 95. Software selectable timeout interval. (1 ~ 255 sec., 1 sec./step)

DMA channels: 7

Interrupt levels: 15

Power connector: 4 pin 3.5" HDD male power connector.

Power management: I/O peripheral devices support power saving and doze/standby/suspend modes. APM 1.1 compliant.

Flat panel VGA interface

Chipset: C&T65550

Display memory: 2MB on board.

Display type: Supports CRT and flat panel (TFT, DSTN, mono and EL) display. Can display both CRT and flat panel simultaneously.

Resolution: Up to 1024x768@64K colors.

Ethernet interface

Chipset: Realtek RTL8029AS PCI Ethernet controller.

Ethernet interface: On board RJ-45 connector. Software drivers optional. Supports boot ROM function.

SSD interface

One 32-pin DIP socket supports M-system DiskOnChip 2000 series, memory capacity from 2MB to 72MB.

Digital I/O interface

4 TTL Digital Input bits & 4 Open Collector Digital Output bits.

(Port address : 294H, Bit : 0, 1, 2, 3)

Expansion Slots

PC/104 connector: 104 pin connector for a 16 bit bus expansion. One PCI/ISA bus slot.

Mechanical and environmental

Power supply voltage: +5V (4.75V to 5.25V)

Max. power requirements: +5V @ 4A

Operating temperature: 32 to 140° F (0 to 60° C)

Board Size: 8"(L) x 5.75"(W) (203mm x 146mm)

Weight: 1.32 lb. (0.6 Kg)

Board layout

Card dimensions

95.25
135.89
140.97
146.05

5.08
9.53

5.08
40.64
97.16
100.97
119.38
3.56
174.63
177.17
193.04
198.12
203.20
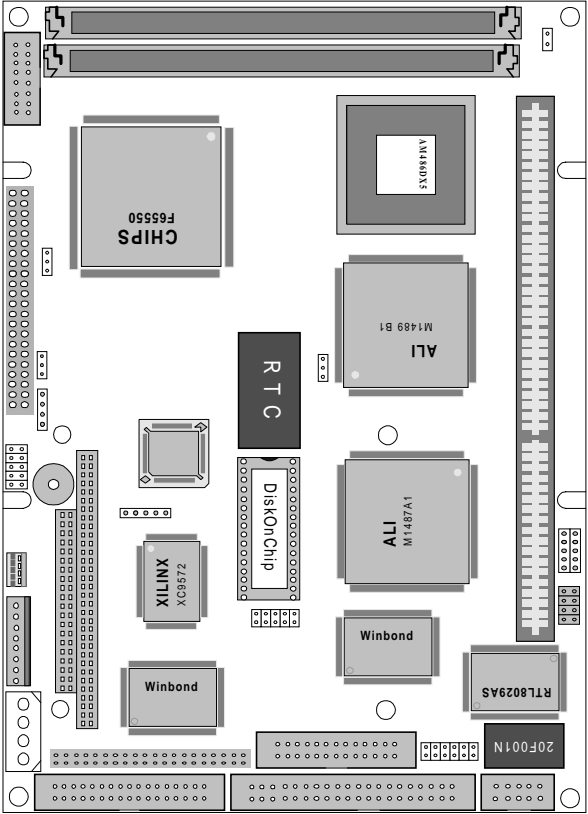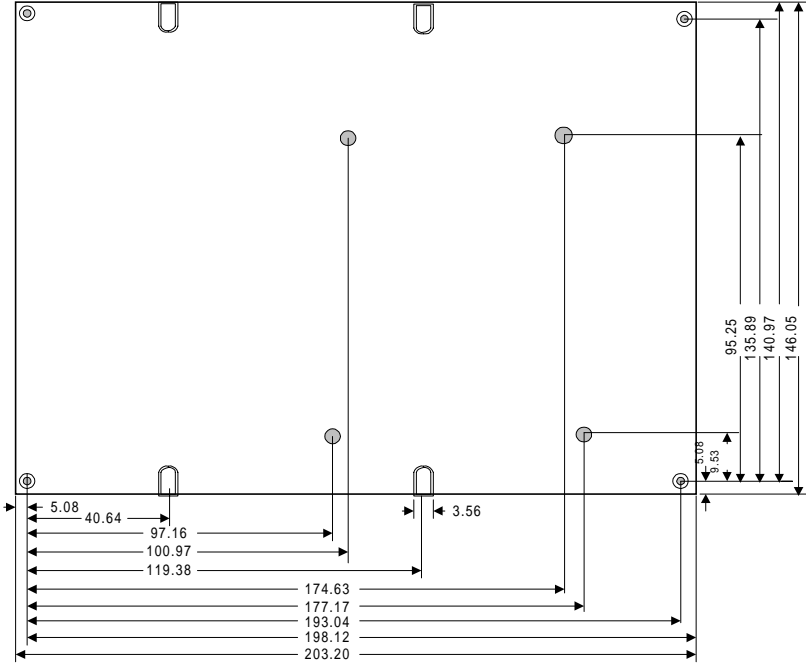
Installation

This chapter explains set up procedures for the PCM-4894 hardware, including instructions on setting jumpers and connecting peripherals, switches and indicators. Be sure to read all safety precautions before you begin the installation procedure.

Jumpers and connectors

Connectors on the board link it to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.

The table below lists the function of each of the board jumpers and connectors:

Jumpers and connectors	
Label	**Function**
CN1	Ethernet connector
CN2	Serial ports connector
CN3	Parallel port connector
CN4	HDD connector
CN5	FDD connector
CN6	Main power connector
CN7	Keyboard / PS2 mouse connector
CN8	Power LED / Keyboard lock
CN9	Reserved IR connector
CN10	Digital I/O connector
CN13	LED indicators / Hardware reset
CN14	External speaker connector
CN15	LCD connector
CN16	VGA connector
CN17	Auxiliary power connector
CN18	CPU fan power connector
JP1	COM3/4 RI function selection
JP2	DOC address / COM2 mode setting
JP4	LCD voltage selection
JP5	LCD SHF/ASHF clock selection
U20	DiskOnChip socket

Locating jumpers and connectors
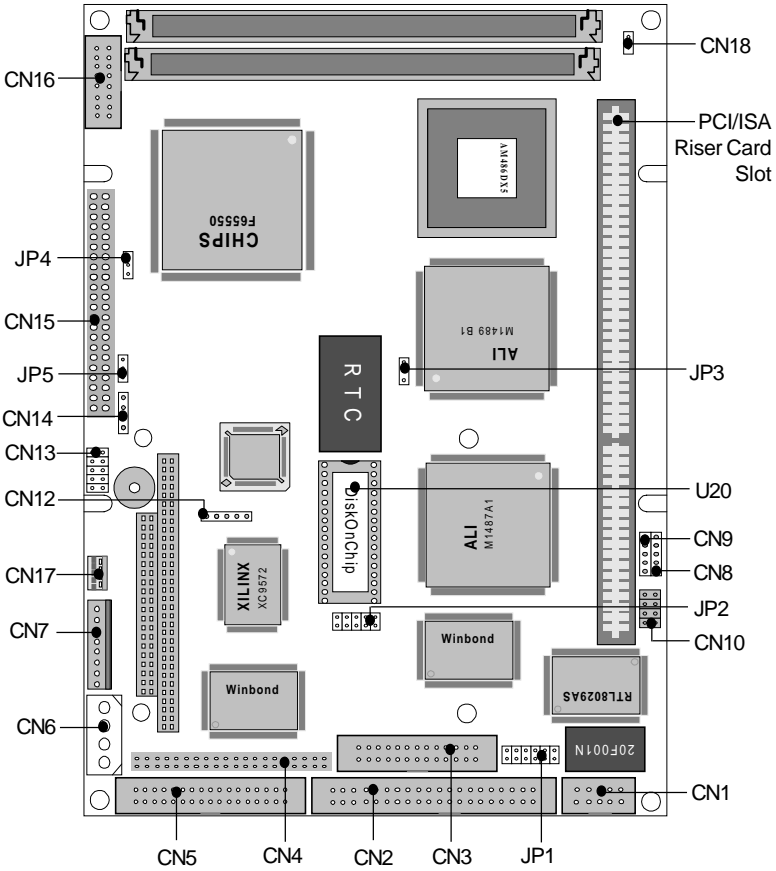
Setting jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To close a jumper you connect the pins with the clip. To "open" a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case you would connect either pins 1 and 2 or 2 and 3.

Open   **Closed**   **Closed 2-3**
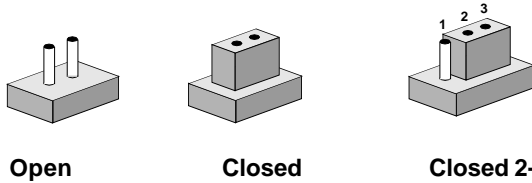
The jumper settings are schematically depicted in this manual as follows:

Open   **Closed**   **Closed 2-3**

A pair of needle-nose pliers may be helpful when working with jumpers.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

Safety precautions

Warning!   Always completely disconnect the power cord
from your chassis whenever you are working on
it. Do not make connections while the power is
on because sensitive electronic components can
be damaged by the sudden rush of power. Only
experienced electronics personnel should open
the PC chassis.

Caution!   Always ground yourself to remove any static
charge before touching the CPU card. Modern
electronic devices are very sensitive to static
electric charges. Use a grounding wrist strap at
all times. Place all electronic components on a
static-dissipative surface or in a static-shielded
bag when they are not in the chassis.

Installing DRAM (SIMMs)

The PCM-4894 CPU card provides two 72-pin SIMM (Single In-line Memory Module) sockets and supports between 4MB and 64MB.

When installing SIMMs, make sure that Bank 1 is filled first.

Installing SIMMs

Note: that the modules can only fit into a socket one way.

1. Insert the memory module into the socket at a moderate angle.

2. Push the module toward the vertical posts at both ends of the socket until the module is upright and the retaining clips at both ends of the module click into place. When positioned correctly, the pins on top of the vertical posts should correspond to the circular holes on the ends of the module.

3. Repeat steps 1 and 2 for each module you install.

Removing SIMMs

If you need to remove a SIMM, follow the procedures below:

1. Supporting the SIMM with a finger, use a pen or a similarly shaped object and press one retaining clip straight down.

2. Repeat for the other side. When released, the retaining clips will push the SIMM up and out of its upright position.

3. Carefully pull the SIMM out of the socket with your fingers.

4. Repeat the above steps for each module you remove.

Ethernet connector (CN1)

The Ethernet connects to the PCM-4894 via an adapter cable to a 10-pin polarized header (CN1). For 10Base-T RJ-45 operation, an adapter cable converting CN1 into a standard RJ-45 jack is required.

Ethernet connector (CN1)

Pin	Signal
1	+5V
2	Link LED
3	RX+
4	RX-
5	RX LED
6	GND
7	NC
8	GND
9	TX+
10	TX-

Serial ports connector (CN2)

The mainboard offers four serial ports: three RS-232 and one RS-232/422/485. These ports allow you to connect them to serial devices (mouse, printers, etc.).

COM 1-4 RS-232/422/485 serial ports (CN2)

COM1, COM2, COM3, COM4 RS-232/422/485 serial port (CN2)				
	PIN	**SIGNAL**	**PIN**	**SIGNAL**
COM1	1	DCDA	2	DSRA
	3	RXDA	4	RTSA
	5	TXDA	6	CTSA
	7	DTRA	8	RIA
	9	GND	10	N.C.
COM2	11	DCDB (422TXD-/485DATA-)	12	DSRB
	13	RXDB (422TXD+/485DATA+)	14	RTSB
	15	TXDB (422RXD+)	16	CTSB
	17	DTRB (422RXD-)	18	RIB
	19	GND	20	N.C.
COM3	21	DCDC	22	DSRC
	23	RXDC	24	RTSC
	25	TXDC	26	CTSC
	27	DTRC	28	RIC/+5V/+12V
	29	GND	30	N.C.
COM4	31	DCDD	32	RSRD
	33	RXDD	34	RTSD
	35	TXDD	36	CTSD
	37	DTRD	38	RID/+5V/+12V
	39	GND	40	N.C.

Parallel port connector (CN3)

Normally, the parallel port is used to connect the card to a printer. The PCM-4894 includes an onboard parallel port, accessed through the CN3 connector, a 26-pin flat-cable connector. The CPU card comes with an adapter cable, which lets you use a traditional DB-25 connector. The cable has a 26-pin connector on one end and a DB-25 connector on the other.

Pin assignments

Parallel port connector (CN3)

Pin	Signal	Pin	Signal
1	Strobe	14	-Auto feed
2	Data 0	15	-Error
3	Data 1	16	-Init printer
4	Data 2	17	-Select input
5	Data 3	18	GND
6	Data 4	19	GND
7	Data 5	20	GND
8	Data 6	21	GND
9	Data 7	22	GND
10	-Acknowledge	23	GND
11	Busy	24	GND
12	Paper empty	25	GND
13	+Select		

IDE hard drive connector (CN4)

You can attach two Enhanced Integrated Device Electronics hard disk drives to the PCM-4894's internal controller. The card comes with a 40-pin flat piggyback cable. This cable has one 44-pin 2.0mm pitch and two identical 40-pin flat-cable connectors.

Connecting the hard drive

Usually, wire number 1 on the cable is red or blue, and the other wires are gray.

1. Connect one end of the cable to the IDE connector. Make sure that the red (or blue) wire corresponds to pin 1 on the connector, which is labeled on the board.

2. Plug the other end of the cable to the Enhanced IDE hard drive, with pin 1 on the cable corresponding to pin 1 on the hard drive. (See your hard drive's documentation for the location of the connector.)

Unlike floppy drives, you can make the connections with any of the connectors on the cable. If you install two drives, you will need to set one as the master and one as the slave. You do this using jumpers on the drives. If you install just one drive, set it as the master.

Pin assignments

The following table lists the pin numbers and their respective signals:

IDE Connector (CN4)			
Pin	**Signal**	**Pin**	**Signal**
1	Reset	2	GND
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	GND	20	N.C.
21	N.C.	22	GND
23	IOW	24	GND
25	IOR	26	GND
27	IORDY	28	NC
29	N.C.	30	GND
31	IRQ 14	32	-I/O CS16
33	A1	34	N.C.
35	A0	36	A2
37	CS0	38	CS1
39	-ACT	40	GND
41	+5V	42	+5V
43	NC	44	GND

Floppy drive connector (CN5)

You can attach up to two floppy disks to the PCM-4894's on-board controller. You can use any combination of 5 1/4" (360 KB and 1.2 MB) and/or 3 1/2" (720 KB, 1.44 MB, and 2.88 MB) drives.

The PCM-4894 CPU card comes with a 34-pin daisy-chain drive connector cable. On one end of the cable is a 34-pin flat-cable connector. There are two sets of floppy disk drive connectors, one in the middle, and one on the other end. Each set consists of a 34-pin flat-cable connector (usually used for 3.5" drives) and a printed-circuit board connector (usually used for 5.25" drives).

Connecting the floppy drive

1. Plug the 34-pin flat-cable connector into the CN5 connector.

2. Attach the appropriate connector on the other end of the cable to the floppy drive(s). You can use only one connector in the set. The set on the end (after the twist in the cable) connects to the A: floppy. The set in the middle connects to the B: floppy.

Pin assignments
The following table lists the pin assignments for the CN5 connector:

FLOPPY drive connector (CN5)

Pin	Signal	Pin	Signal
1~33 (odd)	GND	2	High density
4	+5V	6	High density
8	Index	10	Motor enable A
12	Driver select B	14	Driver select A
16	Motor enable B	18	Direction
20	Step pulse	22	Write data
24	Write enable	26	Track 0
28	Write protect	30	Read data
32	Select head	34	Disk change

Power connector (CN6, CN17, CN18)

Main power connector (CN6)

Pin	Signal
Main power conector (CN6)	
Pin	**Signal**
1	+12V
2	GND
3	GND
4	+5V

Auxiliary power connector (CN17)

Pin	Signal
Auxiliary power connector (CN17)	
Pin	**Signal**
1	-12V
2	GND
3	GND
4	-5V

CPU fan power connector (CN18)

Pin	Signal
CPU fan power connector (CN18)	
Pin	**Signal**
1	+5V
2	GND

Keyboard and PS/2 mouse connectors (CN7)

The mainboard provides a keyboard connector which supports both a keyboard and a PS/2 style mouse. In most cases, especially in embedded applications, a keyboard is not used. The standard PC/AT BIOS will report an error or fail during power-on self-test (POST) after a reset if the keyboard is not present. The mainboard BIOS Advanced setup menu allows you to select "System Keyboard" under the "Present" or "Absent" selection. This allows no-keyboard operation in embedded system applications without the system halting under POST (power-on-self-test).

Keyboard and PS/2 mouse connector (CN7)

Pin	Signal
1	GND
2	MS V_{CC}
3	MS DATA
4	MS CLOCK
5	GND
6	KB V_{CC}
7	KB DATA
8	KB CLOCK

Power LED and keylock (CN8)

You can connect an LED to indicate when the CPU card is on. Pin 1 of CN8 supplies power to the LED; Pin 3 is the ground.

You can use a switch (or a lock) to disable the keyboard. In this state, the PC will not respond to any input. This is useful if you do not want anyone to change or stop a running program. Simply connect the switch between Pins 4 and 5. The pin assignments appear in the following table:

Power LED and keylock (CN8)	
Pin	**Function**
1	LED Power (+5 V)
2	NC
3	GND
4	Keyboard lock
5	GND

Reserved IR connector (CN9)

Reserved IR connector (CN9)	
Pin	**Function**
1	Vcc
2	FIR_RX
3	IR_RX
4	GND
5	IR_TX

Digital I/O connector (CN10)

The digital I/O interface of PCM-4894 provides 4 TTL input bits & 4 Open-Collector output bits. The following table lists the pin assignment for CN10.

Digital I/O (DIO) connector (CN10)

Pin	Function
1	TTL Input Bit 0
2	O.C. Output Bit 0
3	TTL Input Bit 1
4	O.C. Output Bit 1
5	TTL Input Bit 2
6	O.C. Output Bit 2
7	TTL Input Bit3
8	O.C. Output Bit3
9	+5V
10	GND

LED indicators / Hardware reset (CN13)

Ethernet link signal LED (CN13, 1-2)

A continuously lit LED indicates good linkage between the PCM-4894 and its supporting hub.

Ethernet active signal LED (CN13, 3-4)

A flashing LED indicates that the PCM-4894 is transmitting or receiving data.

HDD LED (CN13, 5-6)

A flashing LED indicates that PCM-4894 is accessing the hard drive.

Hardware reset (CN13, 9-10)

The following table lists the pin assignment of CN13:

LED indicators / Hardware reset (CN13)	
Pin	**Signal**
1	LAN Link
2	+5V
3	LAN Active
4	+5V
5	HDD LED
6	+5V
7	Reserved
8	GND
9	Reset
10	GND

Buzzer or external speaker (CN14)

The CPU card has its own buzzer. You can disable the internal buzzer and connect an external speaker to CN14. Enabling the external speaker automatically disables the internal buzzer.

Buzzer or External Speaker

Buzzer	External Speaker	
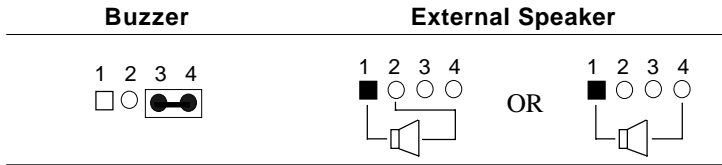
Buzzer or External speaker (CN14)

Pin	Function
1	Vcc
2	Speaker output
3	Buzzer in
4	Speaker output

LCD connector (CN15)

The board also features an LCD connector (CN15), which allows you to connect various flat panel displays. The following table lists their pin assignments:

LCD connector (CN15)

Pin	Signal	Pin	Signal
1	+12 V$_{DC}$	2	+12 V$_{DC}$
3	GND	4	GND
5	Vcc(+5V/+3.3V)	6	Vcc(+5V/+3.3V)
7	ENA VEE	8	GND
9	P0	10	P1
11	P2	12	P3
13	P4	14	P5
15	P6	16	P7
17	P8	18	P9
19	P10	20	P11
21	P12	22	P13
23	P14	24	P15
25	P16	26	P17
27	P18	28	P19
29	P20	30	P21
31	P22	32	P23
33	GND	34	GND
35	SHFCLK	36	FLM (V SYS)
37	M	38	LP (H SYS)
39	GND	40	ENABKL
41	NC	42	$\overline{\text{SHFCLK}}$/ASHFCLK
43	NC	44	NC

VGA connectors (CN16)

The PCM-4894 CPU card's SVGA connector (CN16) with PCI bus supports monochrome display as well as high resolution color displays.

SVGA connector (CN16)

Pin	Signal	Pin	Signal
1	Red video	9	Key (no pin)
2	Green video	10	Sync return (GND)
3	Blue video	11	Monitor ID (not used)
4	Not used	12	Monitor ID (not used)
5	GND	13	Horizontal sync
6	Red return (GND)	14	Vertical sync
7	Green return (GND)	15	Not used
8	Blue return (GND)	16	NC

COM3/4 RI function selection (JP1)

You can set the RI function mode of COM3/4 via JP1. The
available configurations are as follows:

COM3/COM4 RI function selection
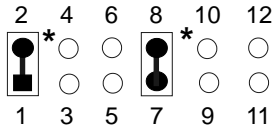
|					
1-2*	COM3 RI = RI function				
3-4	COM3 RI = +5V output				
5-6	COM3 RI = +12V output				
7-8*	COM4 RI = RI function				
9-10	COM4 RI = +5V output				
11-12	COM4 RI = +12V output				

* default

DOC address setting (JP2, 1-6)

The DiskOnChip 2000 occupies a 8 KB window in the upper
memory address range of C800 to E000. You should ensure this
does not conflict with any other device's memory address. JP2
pin 1-6 controls the memory address of the Flash disk.

DOC address setting (JP2, 1-6)		
CC00	D000	D400

2 4 6	2 4 6	2 4 6

D800	DC00 *	E000

2 4 6	2 4 6 *	2 4 6

* default

COM2 RS-232/422/485 select (JP2, 7-10)

The serial port COM2 of this board can be configured as RS-232,
RS-422, or RS-485.

The settings are as follows:

COM2 RS-232/422/485 select (JP2, 7-10)		
RS-232	**RS-422**	**RS-485**
7 ○ ○ 8 * 9 ○ ○ 10	7 ●─● 8 9 ●─● 10	7 ●─● 8 9 ○ ○ 10

* default

LCD panel's voltage setting (JP4)

You can select the LCD connector (CN15) driving voltage by setting JP4. The configuration is as follows:

LCD panel's voltage setting (JP4)

3.4 V	5 V
1 2 3 □●—●	1 2 3 * ■—● ○
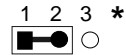
* default

LCD SHF/ASHF clock select (JP5)

You can select the LCD control signals by setting JP5. The following charts show the available options.

LCD SHF/ASHF Clock select (JP5)

SHF CLK from C&T65550	ASHF CLK
■—● ○ * 1 2 3	□●—● 1 2 3
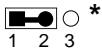
* default

DiskOnChip socket (U20)

The DiskOnChip 2000 family of products provides a single chip solid-state flash disk in a standard 32-pin DIP package. The DiskOnChip 2000 is a solid-state disk with no moving parts, resulting in a significant reduction in power consumption and an increase in reliability. The DiskOnChip is a small, plug and play Flash disk. It is easy to use and saves integration overhead.

The DiskOnChip 2000 family of products is available in capacities ranging from 2MB up to 72 MB, unformatted. In order to manage the disk, the DiskOnChip 2000 includes the TrueFFS, M-Systems' Flash File System proprietary software. The DiskOn-Chip 2000 package is pin-to-pin compatible with standard 32-pin EPROM devices.

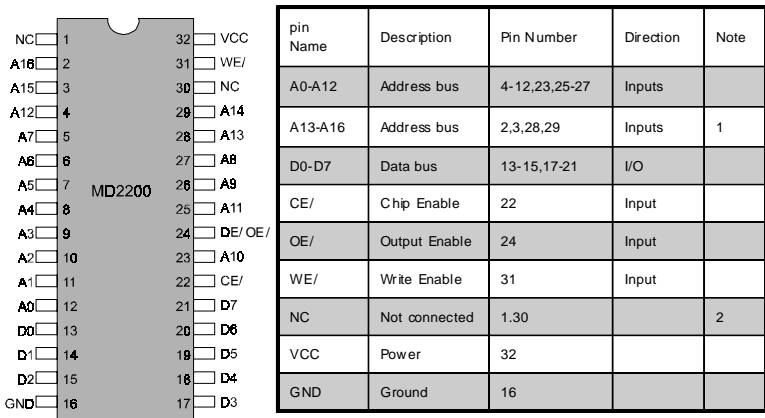| pin Name	Description	Pin Number	Direction	Note
A0-A12	Address bus	4-12,23,25-27	Inputs	
A13-A16	Address bus	2,3,28,29	Inputs	1
D0-D7	Data bus	13-15,17-21	I/O	
CE/	Chip Enable	22	Input	
OE/	Output Enable	24	Input	
WE/	Write Enable	31	Input	
NC	Not connected	1.30		2
VCC	Power	32		
GND	Ground	16		

Figure1-MD2200 Pin-out

Note 1: Pins A13 through A16 are not used by the MD2200. They are kept for socket backward compatibility with ED 1100 (DiskOnChip 1000)

Note 2: Pins 1 and 30 are not used by MD2200

Award BIOS Setup

This chapter describes how to configure the BIOS for the PCM-4894.

System test and initialization

These routines test and initialize board hardware. If the routines encounter an error during the tests, you will either hear a few short beeps or see an error message on the screen. There are two kinds of errors: fatal and nonfatal. The system can usually continue the boot up sequence with nonfatal errors. Nonfatal error messages usually appear on the screen along with the following instructions:

```
  press <F1> to RESUME
```

Write down the message and press the F1 key to continue the bootup sequence.

System configuration verification

These routines check the current system configuration against the values stored in the card's CMOS memory. If they don't match, the program outputs an error message. You will then need to run the BIOS setup program to set the configuration information in memory.

There are three situations in which you will need to change the CMOS settings:

1. You are starting your system for the first time.

2. You have changed the hardware attached to your system.

3. The CMOS memory has lost power and the configuration information has been erased.

Award BIOS setup

Entering setup

Power on the computer and press <DEL> immediately. This will allow you to enter the utility and the utility screen should appear (below).

Setup Utility Initial Screen

Award's BIOS ROM has a built-in setup utility that allows users to modify the basic system configuration. This type of information is stored in a battery-backed CMOS RAM so that the information is retained when the power is turned off.

Many fields in the setup screens have on-line help descriptions available: press F1 to access this help.

Standard CMOS setup

When you choose the STANDARD CMOS SETUP option from the INITIAL SETUP SCREEN menu, the screen below is displayed. This standard setup menu allows users to configure system components such as the date, time, hard disk drive, floppy drive, display, and memory. Online help for each field can be accessed by pressing F1.

CMOS setup screen

Date and Time Configuration
Select the Date and Time in the Standard setup. The current values for each category are displayed. Enter new values through the keyboard.

Floppy A, Floppy B
Select these icons to configure the type of floppy drive that is attached to the system: 360 KB 5 1/4", 1.2 MB 5 1/4", 720 KB 3 1/2", 1.44 MB 3 1/2", and/or 2.88 MB 3 1/2". The settings have not been pre-installed.

LCD & CRT

In the display selection item, you can use PageUp/PageDown key to select Both , LCD, CRT or Auto.

Pannel:

This selection item allow user to select LCD BIOS to match the LCD types. There are eight LCD types available for users to select as their LCD display modes as below:

Brand name	Model name	Format
Sharp	LX 15X80	1024 x 768 DSTN
Sharp	LM 64183P	640 x 480 MONO
Sharp	LM 64C35P	640 x 480 DSTN
Sharp	LM 12S40	800 x 600 DSTN
NEC	NL 6448AC33-10	640 x 480 TFT (12 bits)
Toshiba	LTM 10C209A	640 x 480 (18 bits)TFT
NEC	NL 8060AC26-04	800 x 600 TFT
Sharp	14x 03	1024x768 TFT (36 bits)

BIOS features setup

By choosing the BIOS FEATURES SETUP option from the INITIAL SETUP SCREEN menu, the screen below is displayed. The displayed configuration is based on the manufacturer's SETUP DEFAULTS settings.

BIOS features setup

Virus Warning
When this item is enabled, the Award BIOS will monitor the boot sector and partition table of the hard disk drive for any modification attempts. If an attempt is made, the BIOS will halt the system and the following error message will appear. Afterwards, you can run an anti-virus program to locate and remove the problem before any damage is done.

! WARNING !

Disk boot sector is to be modified

Type "Y" to accept write or "N" to abort write

Award Software, Inc.

CPU Internal Cache/External Cache
These two categories, if enabled, can speed up memory access. However, it depends on the CPU/chipset design.

Quick Power On Self Test
This category speeds up Power On Self Test (POST) after you power up the computer. If it is set to *Enabled*, BIOS will shorten or skip some check items during POST.

Boot Sequence
This category determines which drive to search first for the operating system.

Swap Floppy Drive
This item allows you to swap the floppy drive assignments so that drive A is treated as drive B and drive B is treated as drive A under DOS. The default setting is *Disabled*.

Boot Up Floppy Seek
During POST, the BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360KB type is 40 tracks while 760KB, 1.2MB, and 1.44MB are all 80 tracks.

Boot Up NumLock Status
This allows you to determine the default state of the numeric keypad on an IBM-compatible extended keyboard.

Boot Up System Speed
This allows you to determine the Boot Up Speed. The choices are *High/Low*.

Gate A20 Option
This entry allows you to select how gate A20 is handled. Gate A20 is a device used to address memory above 1 MB. Initially, gate A20 was handled via a pin on the keyboard. Today keyboards still provide this support, however it is more common and much faster for the system chipset to provide support for gate A20. The choices are thus: *Normal* and *Fast.*

Security Option
This category allows you to limit access to the system. The choices are *System*: which requires a password at boot up and *Setup*: which only requires a password to access the setup utility.

Video BIOS Shadow
Determines whether the video display card BIOS will be copied into system DRAM in order to increase display speed and is required for system performance. However, it is optional depending on the chipset design. The default setting is *Enabled.*

Shadowing Address Ranges
The next 3 lines, from C8000-CBFFF Shadow to DC000-DFFFF Shadow are address ranges for shadowing other expansion card ROMs. If there are any expansion cards with ROMs installed in your system, you have to know the address range they use in order to shadow them specifically. The default setting for all of these is *Disabled*.

CHIPSET features setup

By choosing the BIOS FEATURES SETUP option from the INITIAL SETUP SCREEN menu, the screen below is displayed. The displayed configuration is based on the manufacturer's SETUP DEFAULTS settings.

CHIPSET features setup

This section allows you to configure the system based on the specific features of the installed chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM and the external cache. It also coordinates communications between the conventional ISA bus and the PCI bus. It must be stated that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for your system. The only time you might consider making any changes would be if you discovered that data was being lost while using your system.

Because of the complexity and technical nature of some of the options, not all of the options are described here.

Power management setup

By choosing the POWER MANAGEMENT SETUP option from the initial SETUP SCREEN menu, the screen below is displayed. The displayed configuration is based on the manufacturer's SETUP DEFAULTS settings.

Power management setup

Power Management
Power management lets you set up your computer to save electricity when it is not actively in use by putting the system into progressively greater power saving modes. In the power management scheme there are four system states which proceed in the following sequence:

  Normal → *Doze* → *Standby* → *Suspend*

There are four selections for Power Management (PM):

Disabled   Turns off PM

Max Saving   Maximized power saving by activating
                maximum power saving settings after one
                minute of system inactivity.

Min Saving   Produces less power saving by activating
                moderate power saving settings after one hour
                of system inactivity.

User Defined You set the power saving options manually.

With the exception of *Disabled*, three of the above selections
have "fixed-mode" settings. Therefore, when PM is set to
Disabled, some items which are predefined will become unmodi-
fiable.

PM Control by APM
When this is set to *Yes*, the Advanced Power Management feature
in Microsoft Windows controls power management operation.
The default setting is *No.*

Video Off Option
User can select 4 different modes for turning off the video. The
modes are a function of the PM mode of the computer. The
choices are *All Modes➔Off*, *Always On, Suspend➔Off,* and
Susp, Stby➔Off.

The table below summarizes the behavior of the monitor in
relation to the four PM modes.

PM Mode	Monitor Behavior
All Modes	*Off*
-	*Always On*
Suspend	*Off*
Susp, Stby	*Off*

For example, if you choose *Suspend➔Off,* then the monitor will
turn off if the computer is in the *Suspend* PM mode.

Video Off Method

This governs monitor power saving by controlling how power management blanks the monitor screen. The default setting blanks the screen and turns off vertical and horizontal scanning and requires a monitor with "green" features. If you don't have this type of monitor, use the *Blank* option. DPMS (Display Power Management System) allows the BIOS to control the video display card if the card has the DPMS feature.

V/H SYNC+Blank	(Default)
BLANK	(non-green monitor, less saving)
DPMS	(Display card must support DPMS)

Modem Use IRQ

If you have a modem installed in your system, you can enter which IRQ it is using so that APM can control it.

HDD Power Down

When enabled and after the selected time of system inactivity, the hard disk drive will be powered down while all other devices will remain active.

Doze Mode

This sets the period of system inactivity after which the system goes into *Doze* mode, the most limited power saving state. The settings range from 10 seconds to 1 hour and can be set manually when power management is in *User Define* mode. The default setting is *Disabled*. When the system goes into power saving mode, power management will skip to the next mode in the sequence if this is disabled.

Standby Mode

This sets the period of system inactivity after which the system goes into *Standby* mode, the intermediate power saving state. The settings range from 10 seconds to 1 hour and can be set manually when power management is in *User Define* mode. The default setting is *Disabled*. When the system goes into power saving mode, power management will skip to the next mode in the sequence if this is disabled.

Suspend Mode

This sets the period of system inactivity after which the system goes into *Suspend* mode, the maximum power saving state. The settings range from 10 seconds to 1 hour and can be set manually when power management is in *User Define* mode. The default setting is *Disabled*. When the system goes into power saving mode, power management will skip to the next mode in the sequence if this is disabled.

PM Events

PM events are I/O events whose occurrence can prevent the system from entering a power saving mode or can awaken the system from such a mode. In effect, the system remains alert for anything which occurs to a device which is configured as *Enabled*, even when the system is in a power down mode.

When an I/O device wants to gain the attention of the operating system, it signals this by causing an IRQ (Interrupt Request) to occur. When the operating system is ready to respond to the request, it interrupts itself and performs the service. The following is a list of IRQs, which can be disabled:

• COM Ports Activity
• LPT Ports Activity
• HDD Ports Activity
• VGA Activity
• IRQ3 (COM 2)
• IRQ4 (COM 1)
• IRQ5 (LPT 2)
• IRQ6 (Floppy Disk)
• IRQ7 (LPT 1)
• IRQ8 (RTC Alarm)
• IRQ9 (IRQ2 Redir)
• IRQ10 (Reserved)
• IRQ11 (Reserved)
• IRQ12 (PS/2 Mouse)
• IRQ13 (Coprocessor)
• IRQ14 (Hard Disk)
• IRQ15 (Reserved)

PCI configuration setup

By choosing the PCI CONFIGURATION SETUP option from the initial SETUP SCREEN menu, the screen below is displayed. The displayed configuration is based on the manufacturer's SETUP DEFAULTS settings.

PCI configuration setup

This section describes configuring the Peripheral Component Interconnect (PCI) bus system which allows I/O devices to operate at speeds nearing the speed of the CPU when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users make any changes to the default settings.

PnP BIOS Auto-Config
The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices.

However, this will only work if you are running a Plug and Play operating system such as Windows™ 95.

Reset Configuration Data
This item allows you to reset the configuration data.

PCI IRQ Activated By
This sets the method by which the PCI bus recognizes that an IRQ service is being requested by a device. Under all circumstances, you should retain the default configuration unless advised by your system manufacturer. The choices are *Level/Edge*.

PCI IDE IRQ Map To
This allows you to configure your system to the type of IDE disk controller in use. The more apparent difference is the type of slot being used.

If you have equipped your system with a PCI controller, changing this allows you to specify which slot has the controller and which PCI interrupt (A, B, C, D) is associated with the connected hard drives.

This setting refers to the hard disk drive itself, rather than individual partitions.

Selecting *PCI Auto* allows the system to automatically determine how your IDE disk system is configured.

Load BIOS defaults / Load setup defaults

LOAD BIOS DEFAULTS loads the default system values directly from ROM. The BIOS DEFAULTS provides the most stable settings, though they do not provide optimal performance. LOAD SETUP DEFAULTS, on the other hand, provides for maximum system performance. If the stored record created by the setup utility becomes corrupted (and therefore unusable), BIOS defaults will load automatically when you turn the PCM-4894 on.

Load BIOS default / Load setup defaults

Flat Panel/CRT Controller Display Drivers and Utilities

This chapter provides information about:

- Driver types and installation

- Software utility installation and use

Software drivers

This chapter describes the operation and installation of the software drivers supplied on the *Supporting CD-ROM* that are shipped with your product.

The onboard VGA adapter is based on the CHIPS VGA Flat Panel/CRT controller and is fully IBM VGA compatible. This controller offers a large set of extended functions and higher resolutions. If you intend to use your VGA adapter in standard VGA modes only, you do not need to install any of these drivers. Since your VGA adapter is fully compatible, it does not require any special drivers to operate in standard modes.

The purpose of the enclosed software drivers is to take advantage of the extended features of the CHIPS VGA Flat Panel/CRT controller.

Hardware configuration

Some of the high-resolution drivers provided in this package will work only in certain system configurations. If a driver does not display correctly, try the following:

1. Change the display controller to CRT-only mode, rather than flat panel or simultaneous display mode. Some high-resolution drivers will display correctly only in CRT mode.

2. If a high-resolution mode is not supported on your system, try using a lower-resolution mode. For example, 1024 x 768 mode will not work on some systems, but 800 x 600 mode is supported on most.

Necessary prerequisites

The instructions in this manual assume that you understand elementary concepts of MS-DOS and the IBM Personal Computer. Before you attempt to install any driver or utility, you should:

- Know how to copy files from a CD-ROM to a directory on the hard disk

- Understand the MS-DOS directory structure

If you are uncertain about any of these concepts, please refer to the **DOS or OS/2 user reference guides for more information** *before* you proceed with the installation.

Before you begin

Make sure you know the version of the application for which you are installing drivers. The *Supporting CD-ROM* contain drivers for several versions of certain applications. For your driver to operate properly, you must install the driver for your version of the application program.

Windows 95

These drivers are designed to work with Microsoft Windows. You just install these drivers through the Windows operating system.

Driver installation

1. Install Windows 95 as you normally would for a VGA display. Click the **Start** button, go to **Settings** and click on **Control Panel**. Choose the **Display** icon and double click on the icon. In the *Display Properties* window, click on the **Settings** tab. Then click on **Change Display Type**. In the *Change Display Type* window, click on the **Change** button under *Adapter Type*. This will bring up the *Select Device* window.

2. Place the Windows 95 *Display Driver Diskette* in drive A. In the *Select Device* window, click on **Have Disk**, Press <**ENTER**> and the name of the *Chips and Technologies*, *Inc*. *Video Controller* driver will appear highlighted in the *Models* list box. Select Chips and Tech. 65550 PCI (new) and Click **OK** to install the selected driver. Click OK to install the selected driver.

3. Once the installation is complete, the *Change Display Type* window will reappear. Click on Close to close the window. Then the *Display Properties* window will reappear. Click on **Apply**. Restart the system for the new settings to take effect.

Windows 3.1

These drivers are designed to work with Microsoft Windows Version 3.1. You should install these drivers through Windows.

Driver installation

1. Install Windows as you normally would for a VGA display. Run Windows to make sure that it is working correctly.

2. **Place the** *Supporting CD-ROM* into your CD-ROM drive. In Windows Program Manager, choose *File* from the Options Menu. Then from the pull-down menu, choose *Run*. At the Command Line prompt, type.

   cd-rom: \CD ROM***model name**\driver\vga driver\win31\setup.exe

   Press the <ENTER> key or click OK to begin the installation.

   "***cd-rom:***": the drive letter of your CD-ROM drive

   "***model name***": the model number of your product

At this point the setup program locates the directory where Windows is installed. **For proper operation, the drivers must be installed in the Windows subdirectory**.

3. Press <ENTER> to complete the installation. Once completed, you can find the icon Chips CPL under the Control Panel. The icon allows you to select and load the installed drivers.

Changing Display Drivers from Windows

To change display drivers from Windows, select the ***Windows Setup*** icon from the ***Main*** window. You will be shown the current setup configuration. Select ***Change System Settings*** from the ***Option*** menu. Click on the arrow at the end of the ***Display*** line. You will be shown a list of display drivers. Click on the driver you want to select it. Then click on the ***OK*** button. Follow the directions to complete the setup.

Changing color schemes

After you change display drivers, you may notice that the color scheme used by Windows looks strange. This is because different drivers have different default colors. You can correct this by choosing the same color scheme or a new color scheme. First select the ***Control Panel*** from the ***Main*** window. Select the ***Color*** icon. You will be shown the current color scheme. Choose a new color scheme and click the ***OK*** button.

SOFTWARE UTILITIES

This chapter describes the operation and installation of the following software utilities supplied on the *Supporting CD-ROM:*

• CHIPSDSP

• CHIPSCPL

The CHIPSDSP utility program

This utility program is designed to work with Microsoft Windows 95.

Installing the utility

You can find the CHIPDSP.DLL in the following path:

cd-rom:\CD ROM*model name*\driver\vga tools\chipsdsp

 "*cd-rom*": the dirve letter of your CD-ROM dirve

 "*model name*": the model number of your product

This file is a Winsows 95 based utility for selecting display type and refresh rate. It is a *Display Properties Refresh* window that is automatically installed when installing CHIPS Windows 95 display drivers. The **Display** icon is in the **Control Panel** group. To invoke the **Display** icon, simply click on the Start button, go to **Settings**, click on **Control Panel**, and then double click on the **Display** icon. Click on the property sheet with the heading *Refresh*.

How to use the utility

DISPLAY DEVICE allows you to select the display type from the following:

  • CRT Only   **<ALT C>**

  • LCD (Flat Panel) only   **<ALT I >**

  • Both CRT and LCD (Flat Panel) **<ALT B>**

REFRESH RATE allows you to select the refresh rate from the following:

- Interlaced
- 56 Hz
- 60 Hz
- 70 Hz
- 72 Hz
- 75 Hz
- 85 Hz

The refresh rate is available in **CRT Mode** only.

Note: 1. The refresh rates that are supported by the selected monitor are the only refresh rates that will show and be selectable.

2. The above refresh rates may not be supported by all Chips products.

WINDOWS DEFAULT allows you to return to the default refresh rate setting for the selected monitor in Windows 95.

The CHIPSCPL utility program

This utility program is designed to work with Microsoft Windows Version 3.1.

Installing the utility

CHIPSCPL.CPL is a Windows based utility to select resolutions and color depth. It is a Control Panel Applet with its own icon that is automatically installed when installing CHIPS Windows 3.1 linear drivers. The **Control Panel** icon is in the *Main* Windows group. To invoke the control panel applet, simply click on the icon. The driver resolution and color depth take effect only after Windows is rebooted with the new driver.

How to use the utility

SCREEN SIZE <ALT S> allows you to select from the following resolutions:

- 640 x 480

- 800 x 600

- 1024 x 786

- 1280 x 1024

By selecting the resoution first, it will determine the allowable selections for color depth.

COLOR <ALT O> allows you to select the number of colors from the following:

- 16 (4bits per pixel)

- 256 (8 bpp)

- 32K (15 bpp)

- 64K (16 bpp)

- 16M (24 bpp)

By selecting the color depth first, will be displayed the allowable resolutions.

DPI<ALT P> allows you to select a large or small font.

DISPLAY<ALT D> allows you to select the display type from the following:

- CRT only

- LCD (Flat Panel) only

- Both CRT and LCD (Flat Panel)

MONITOR SELECTION <ALT M> allows you to select from the list of monitors.

REFRESH<ALT R> allows you to select the refresh rate from the following:

- Interlaced

- 56 Hz

- 60 Hz

- 70 Hz

- 72 Hz

- 75 Hz

The refresh rate is available on **CTR Mode** only. The refresh rates supported by the selected monitor are the only available refresh rates that can be selected.

CURSOR-ANIMATION <ALT A> allows you to select an animated cursor instead of the hour glass wait cursor.

BIG CURSOR <ALT G> allows you to select a big cursor for better visibility on the Flat Panel.

Version <ALT V> displays version information about the current driver.

HELP <ALT H> displays help information on how to use the Display Driver Control Panel.

Ethernet Software Configuration

This chapter describes how to configure the onboard Ethernet to match your application requirements.

Ethernet software configuration

The onboard Ethernet interface supports all major network operating systems. I/O addresses and interrupts are easily configured via the AMIBIOS Setup. To configure the medium type, to view the current configuration, or to run diagnostics, please refer to the following istructions:

1. Power the mainboard on. Ensure that the RSET8029.EXE file is located in the working drive.

2. At the prompt, type RSET8029.EXE and press <ENTER>. The Ethernet configuration program will then be displayed.

3. This simple screen shows all the available options for the Ethernet interface. Just highlight the option you wish to change by using the Up and DOWN keys. To change a selected item, press <ENTER>, and a screen will appear with the available options. Highlight your option and press <ENTER>. Each highlighted option has a helpful message guide displayed at the bottom of the screen for additional information.

4. After you have made your selections and the configuration is what you want, press <ESC>. A prompt will appear asking if you want to save the configuration. Press "Y" if you want to save.

The Ethernet Setup Menu also offers three very useful diagnostic functions. These are:

1. Run EEPROM test

2. Run Diagnostics on Board

3. Run Diagnostics on Network

Each option has its own display screen which shows the format and result of any diagnostic tests undertaken.

A

Watchdog Timer Demo Program

The following demo program illustrates the programming steps required to enable, set, and disable the watchdog timer.

Watchdog timer demo program

How to program the WATCHDOG TIMER

1. To enable the time-out interval of watchdog timer:

   -- output the desired value to port 0x443. The resolution of watchdog timer is 1 sec. Since the data is of 1 byte, the time-out interval will be 1 sec ~ 255 sec.

   Whenever the value of timer is not zero, the timer will automatically count down

   e.g. *outportb(0x443, 30);*   *// set interval to 30 sec and count down*

2. To set the time-out event:

   -- output data to port 0x444. The default setting is "reset system".

   · 0: reset system (default)

   · 1, 2, 3: IRQ 10, 15, 11 respectively

   · 4: NMI

   e.g. *outportb(0x444, 0);*   *// set time-out event to reset-system*

3. To disable watchdog timer:

   -- output value "0" to port 0x443.

   e.g. *outportb(0x443, 0);*   *// disable watchdog timer*

4. To refresh watchdog timer:

-- output the desired value to port 0x443. The timer will reset to the new value and count down.

e.g. *outportb(0x443,10);*   *// set time-out interval to 10 sec*

   …

   outportb(0x443,20);   *// reset watchdog timer to 20 sec*

Demo program in C

outportb(0x444, 0);   *// set time-out event to reset-system*

outportb(0x443, 10);   *// set time-out interval to 10 seconds*

job1();   *// execute your job here, be sure your job will finished within 10 seconds*

outputb(0x443,20);   *// set time-out interval to 20 seconds and refresh watchdog timer, otherwise the system will reset after time-out*

job2();   *// another job finished within 20 seconds*

outportb(0x443, 0);   *// disable watchdog timer*

…

B

Installing PC/104 Modules

This appendix gives instructions for installing PC/104 modules.

Installing PC/104 modules

The PCM-4894's PC/104 connectors give you the flexibility to attach PC/104 expansion modules. These modules perform the functions of traditional plug-in expansion cards, but save space and valuable slots. Modules include:

- **PCM-3110B** PCMCIA Module (one-slot)
- **PCM-3115B** PCMCIA Module (two-slot)
- **PCM-3200** PC/104 Sound Module
- **PCM-3420** PC/104 Fast SCSI Module
- **PCM-3521** Advanced Flat-Panel/CRT VGA Module
- **PCM-3522** LCD Panel Adapter
- **PCM-3600** PC/104 Fax/Modem Module
- **PCM-3610** Isolated RS-232 and RS-422/485 Module
- **PCM-3640** PC/104 4-port RS-232 Module
- **PCM-P50** PC/104 Vehicle Power Supply
- **PCM-3660** Ethernet Module
- **PCM-3718** 30 KHz A/D Module
- **PCM-3724** 48-channel DIO Module
- **PCM-3910** Breadboard Module
- **PCM-3810** Solid State Disk Module
- **PCM-3820** High Density Flash Solid State Disk Module

Installing these modules on the PCM-4894 is a quick and simple operation. The following steps show how to mount the PC/104 modules:

Step1   Remove the PCM-4894 from your system, paying particular attention to the safety instructions already mentioned above.

Step2   Make any jumper or link changes required to the CPU card now. Once the PC/104 module is mounted, you may have difficulty in accessing these.

Step3   Mount the PC/104 module onto the CPU card. Do this by pressing the module firmly but carefully onto the mounting connectors.

Step4   Secure the PC/104 module onto the CPU card using the four mounting spacers and srews.
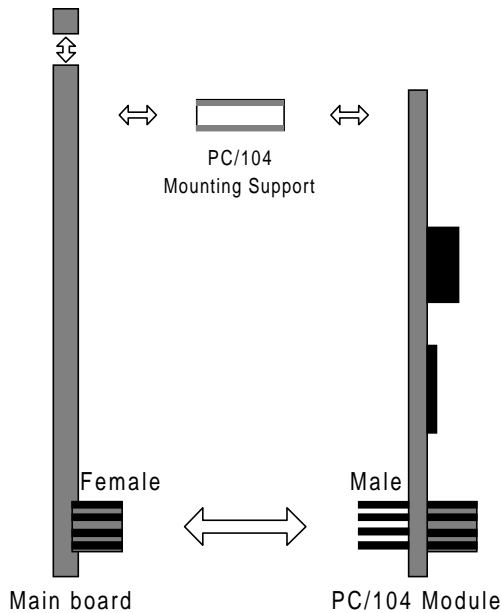
PC/104 Module Mounting Diagram
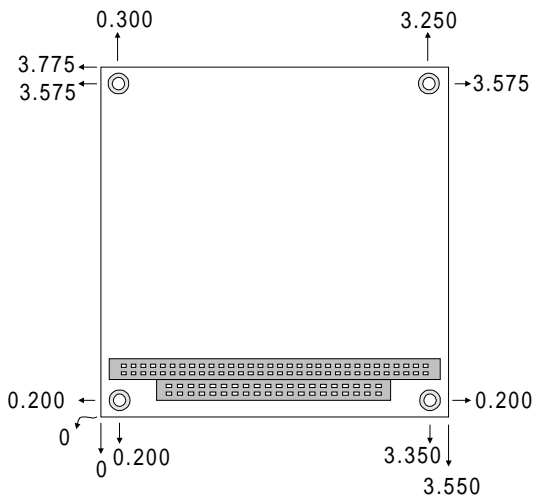
PC/104 module dimenstions (inches ± 5%)

APPENDIX

C

Optional Extras

PCM-10489-1 Cable kit for PCM-4894 (P/N : 9969048900)

The mainboard requires several cables for normal operation. You can make them yourself or purchase an optional cable kit assembly which includes the following:

Part No.	Cable description	Termination connector
1701440350	2.5" and 1.8" IDE	44-pin, 2 mm, female IDC (350 mm)
1701440500	3.5" IDE (40P)	40-pin, 2.54 mm, female IDC (500 mm)
1701340700	Dual floppy, 3.5" and 5.25" (34P)	34-pin dual floppy
1701260301	Parallel port	25-pin female DSUB
1701150150	VGA CRT	15-pin DSUB
1700060200	Keyboard and PS/2 mouse	5-pin circular DIN 6-pin circular DIN
1703040301	Peripheral power (-5V and -12V)	4 conductor
1701080300	Front panel	8-conductor pigtail
1701400220	RS-232 Serial Port, 4 COM Port	40 pin, 2.54 mm
1701100200	Ethernet 10BASE-T	RJ-45