PCM-5890

All-in-One Single Board Pentium Computer with SVGA, Ethernet and 4 serial ports

FCC STATEMENT

THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE. (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES. THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINTST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQENCY ENERGY AND , IF NOT INSTATLLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

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Acknowledgements

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Packing list

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

- 1 PCM-5890 All-in-One Single Board Computer
- 1 CPU Cooling fan
- 1 utility disk with system BIOS, VGA BIOS, and Ethernet utility programs
- 1 utility disk with Ethernet drivers
- 2 utility disks with PCI SVGA utility programs and drivers for Windows 3.1, Windows 95, and OS/2
- 1 utility disk with Boot ROM BIOS file

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

Contents

CHAPTER 1

General Information

This chapter gives background information on the PCM-5890.

Sections include:

- Card specifications
- Card layout and dimensions

Introduction

The PCM-5890 is an all-in-one single board Pentium computer with an on-board PCI SVGA controller, a PCI Ethernet interface and a PCI expansion slot. Equipped with 64 bits and local bus architecture, the PCM-5890 releases Pentium's full potential and provides unprecedented performance compared to current 32-bit processor boards. The PCM-5890 offers all the functions of an industrial computer on a single board, but fits in the space of a 5¼" floppy drive (only 5.75" x 8"). For maximum performance, the PCM-5890 also supports 2nd level cache sized from 256 KB to 512 KB.

On-board features include four serial ports (three RS-232 and one RS-232/422/485), one multi-mode parallel (ECP/EPP/SPP) port, a floppy drive controller and a keyboard/PS/2 mouse interface. The built-in high speed PCI IDE controller supports both PIO and bus master modes. Up to two IDE devices can be connected, including large hard disks, CD-ROM drives, tape backup drives and other IDE devices.

The PCM-5890 also features power management to minimize power consumption. It complies with the “Green Function” standard and supports three types of power saving features: Doze mode, Standby mode and Suspend mode. In addition, the board’s watchdog timer can automatically reset the system or generate an interrupt in case the system stops due to a program bug or EMI.

On-board peripherals with true PCI performance

The PCM-5890 is a highly integrated, all-in-one single board computer. All on-board peripherals (including PCI flat panel/VGA interface, PCI Ethernet and PCI IDE) adopt PCI technology and operate through an internal PCI bus. Integrating a Pentium board with PCI architecture has unleashed a revolutionary level of performance. *The PCM-5890 is the smallest and most powerful all-in-one Pentium board available.*

Features

- Accepts Intel Pentium 75-166 MHz CPUs
- Award Flash BIOS, Flat-Panel configured by programming Flash chip
- 2nd level cache: supports both asynchronous SRAM and Pipeline burst RAM module, up to 512 KB cache memory
- 32-bit PCI-bus SVGA controller, supports LCD, EL and CRT displays
- 32-bit PCI-bus Ethernet interface, Novell NE 2000 compatible
- One PCI expansion slot
- Built-in, bus-master PCI IDE controller supports two IDE devices (large hard disk, CD-ROM, tape backup, etc.)
- Supports both normal and EDO type DRAM, from 1 MB to 64 MB of DRAM
- One enhanced multi-mode SPP/EPP/ECP parallel port, four serial ports: three RS-232 and one RS-232/RS-422/RS-485 selectable
- Watchdog timer, time interval 1.6 seconds
- Green function: supports doze/standby/suspend modes
- ISA-bus expansion with PC/104 modules
- Dimensions: 5.75" x 8"

Specifications

Standard SBC functions

- **CPU**: Intel Pentium 75/90/100/120/133 MHz; AMD K5; Cyrix M1
- **BIOS**: AWARD 128 KB Flash memory
- **Chipset**: VIA 82C575 M
- **2nd Level Cache**: Direct map write back or write through cache; 256 K/512 K Asynchronous (Standard) SRAM or 256 K/512 K Synchronous (Pipeline Burst) SRAM
- **RAM**: Two 72-pin SIMM sockets. Supports 32-bit Normal or EDO DRAM with memory capacity from 1 MB to 64 MB.
- **IDE hard disk drive interface**: Bus-master PCI IDE hard disk drive interface. Supports up to two IDE hard disk drives in both PIO and bus master modes
- **Floppy disk drive interface**: Supports up to two floppy disk drives: 3½" (720 KB, 1.44 MB and 2.88 MB) and/or 5¼" (360 KB or 1.2 MB)
- **Parallel port**: Configured to LPT1, LPT2, LPT3 or disabled. Supports Multimode parallel (SPP/ECP/EPP) port
- **Serial ports**: One enhanced bi-directional parallel port, three RS-232 and one RS-232/422/485 port. Ports can be configured as COM1, 2, 3, 4 or disabled individually.
- **Battery**: 3.6 V @ 600 mAh lithium battery for up to 10 years of data retention
- **Watchdog timer**: Can generate a system reset or IRQ 15. Software enabled/disabled. Time interval is 1.6 seconds
- **Power Management**: I/O peripheral devices support power saving and doze/standby/suspend modes. APM 1.1 compliant

PCI Flat panel/VGA Interface

- **Chipset**: C&T 65545
- **Display memory**: 1 MB DRAM (standard); 512 KB DRAM (optional)
- **Display type**: Supports CRT and flat panel (EL, LCD and gas plasma) display. Can display both CRT and flat panel simultaneously
- **CRT/flat panel display modes**: Supports resolutions up to 1024 x 768. Non-interlaced CRT monitors resolutions up to 1024 x 768 @ 256 colors. True-color and Hi-color display capability with flat panels and CRT monitors at 640 x 480 resolution

Ethernet Interface (PCI Bus)

- **Chipset**: REALTEK RTL8029 PCI Local bus Ethernet controller
- **Ethernet interface**: Software compatible with Novell NE 2000 driver. On-board 10-Base-T, 10-Base2 and 10-Base5 (AUI) optional. Software drivers optional. Supports boot ROM function

PC/104 bus expansion

- **PC/104**: 104-pin connector for a 16-bit bus
- **Driving capacity**: Six PC/104 modules

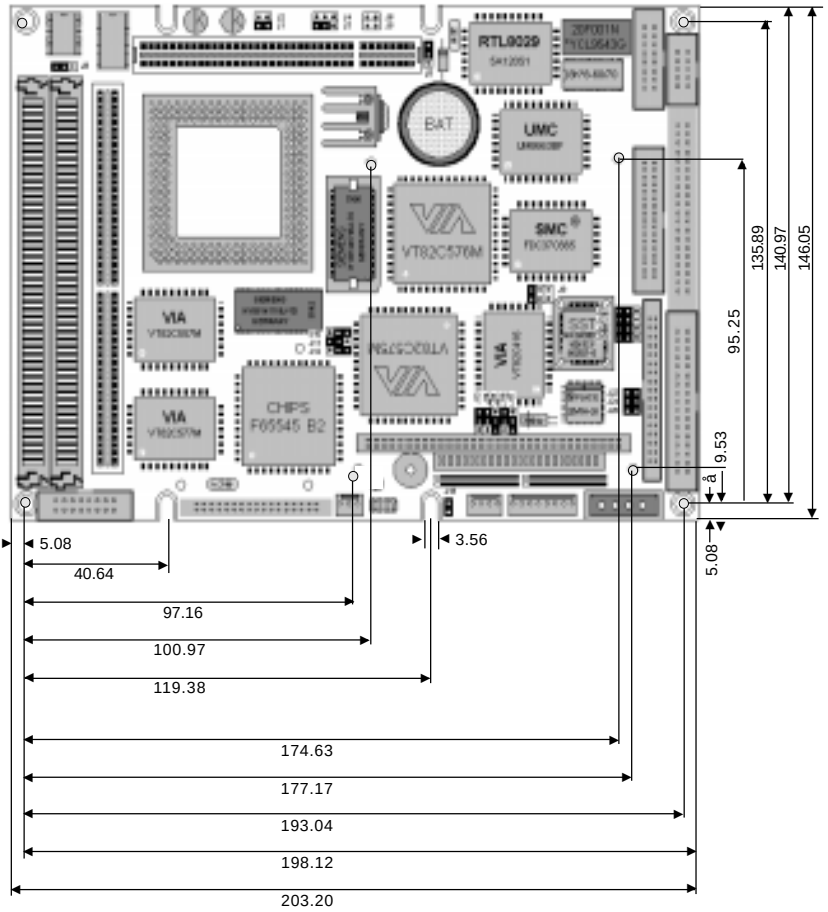
PCI-bus interface

- **PCI slot**: Supports 1 PCI-bus slot

Mechanical and environmental

- **Max. power requirements**: +5 V (4.75 to 5.25 V) @ 5.5 A
- **Operating temperature**: 32 to 140°F (0 to 60°C)
- **Size**: 8" (L) x 5.75" (W) (203 mm x 146 mm)
- **Weight**: 0.5 kg

Board dimensions



Dimensions in mm

PCM-5890 dimensions

CHAPTER 2

Installation

This chapter tells how to set up the PCM-5890 hardware, including instructions on setting jumpers and connecting peripherals, switches and indicators. Be sure to read all the safety precautions before you begin the installation procedure.

Jumpers

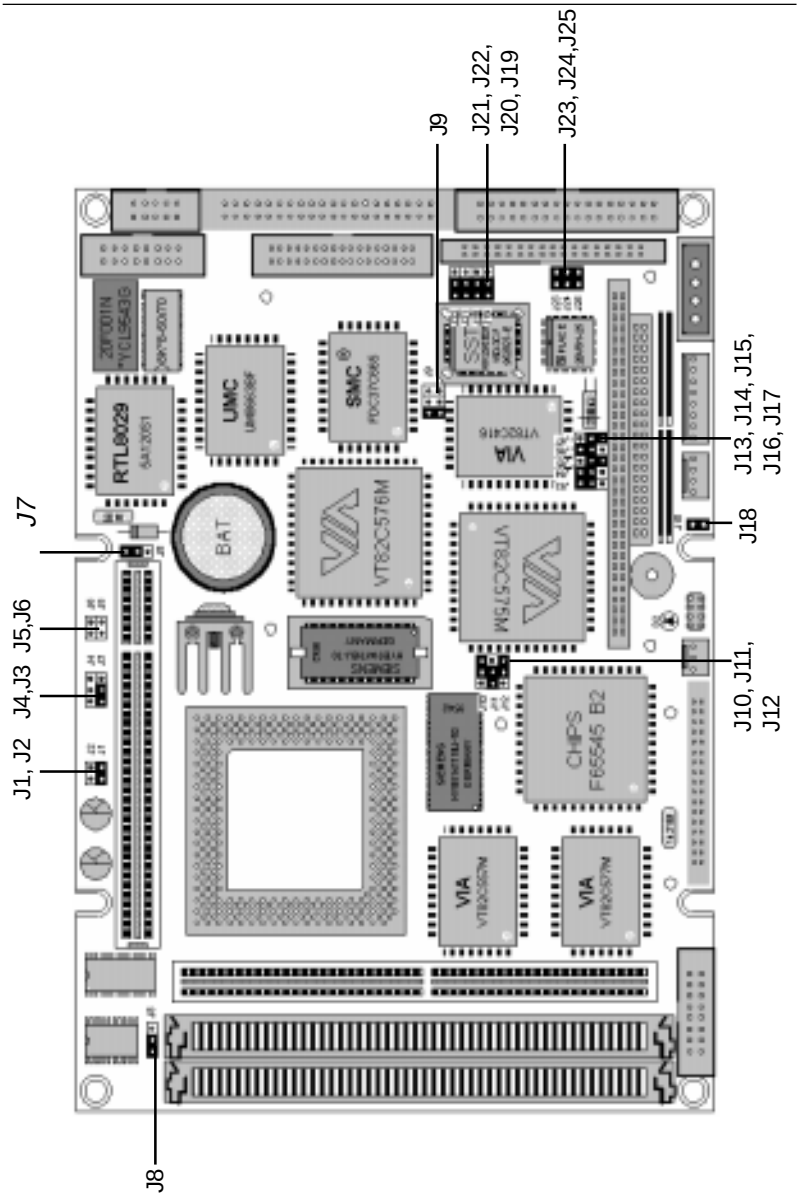
Connectors on the board link it to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.

The table below lists the function of each of the board's jumpers and connectors.

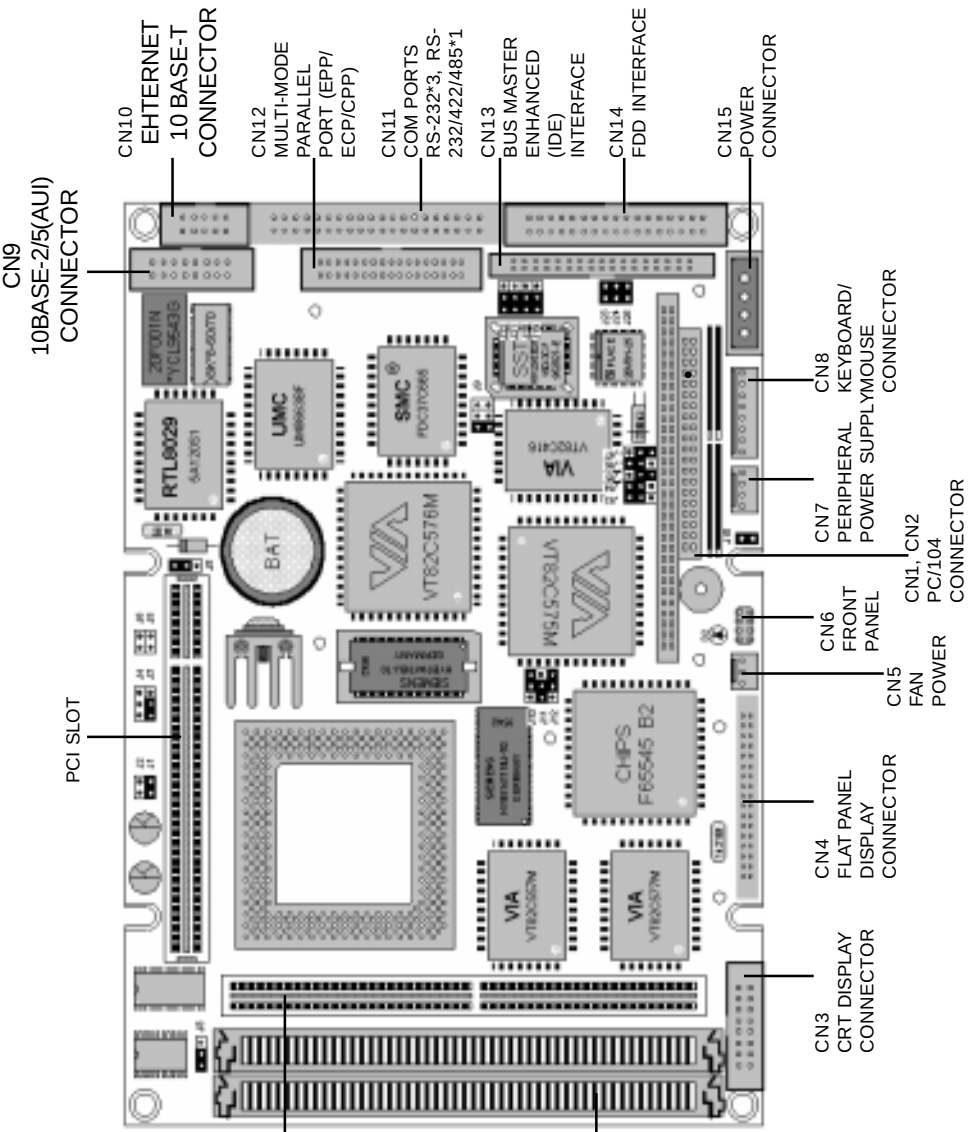
Jumpers	
Label	**Function**
J1	CPU frequency ratio
J2	CPU frequency ratio
J3	CPU voltage
J4	CPU voltage
J5	Ethernet LED (CRSL)
J6	Ethernet LED (BNCL)
J7	CMOS setup
J8	SRAM type (cache size selection)
J9	COM2 RS-232/422/485 selection
J10	CPU clock setting
J11	CPU clock setting
J12	CPU clock setting
J13	ECP/EPP DMA channel
J14	ECP/EPP DMA channel
J15	IRQ selection
J16	IRQ selection
J17	Parallel port IRQ selection
J18	Buzzle enable
J19	COM2 RS-232/485 selection
J20	COM2 RS-232/485 selection
J21	COM2 RS-232/485 selection
J22	COM2 RS-232/485 selection
J23	System reset
J24	Watchdog timer invoke
J25	Watchdog enable/disable

Connectors	
Label	**Function**
CN1	PC/104 ISA-bus expansion
CN2	PC/104 ISA-bus expansion
CN3	CRT display connector
CN4	Flat panel display connector
CN5	Fan Power connector
CN6	Front panel connector
CN7	Peripheral power connector (-5V, -12V)
CN8	Keyboard and mouse connector
CN9	Ethernet 10BASE-2/10BASE-5 AUI connec tor
CN10	Ethernet 10BASE-T connector
CN11	Serial port (RS-232/422/485)
CN12	Parallel port connector
CN13	IDE hard drive connector
CN14	Floppy drive connector
CN15	Main power connector (+5V, +12V)

Locating jumpers

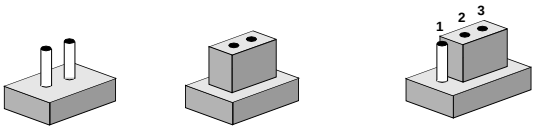


Locating connectors



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.

Generally, you simply need a standard cable to make most connections.

CPU installing and upgrading

You can upgrade to a higher power Pentium CPU at any time. Simply remove the old CPU, install the new one, and set the jumpers for the new CPU type and speed.

Warning! *Always disconnect the power cord from your chassis when you are working on it. Do not make connections while the power is on as 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 PC board. 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.*

1. If you are upgrading the CPU, remove the old CPU from the socket. If it is difficult to remove, you may find chip lubricant (designed for pin-grid-array devices, PGAs) and a chip puller helpful. Both are available at electronics hobby supply stores.
2. Plug the new CPU into the empty socket. Follow the instructions that came with the CPU or math coprocessor. If you have no instructions, do the following: Lubricate the CPU pins with lubricant made for PGA devices. This will make the new CPU slide in much more easily and reduce the chance of damaging it. Next, carefully align the CPU so it is parallel to the socket and the notch on the corner of the CPU corresponds with the notch on the inside of the socket. Gently slide the CPU in. There will probably be a gap between the CPU and the connector when it is fully seated - Do not push too hard!

When you install a new CPU, be sure to adjust the board settings, such as CPU type and CPU clock. **Improper settings may damage the CPU.**

System clock setting (J10, J11, J12)

J10, J11, and J12 are used to sychronize the system clock with the CPU type. When the board is shipped, it is set for a Pentium 75 MHz. You may need to adjust the CPU clock according to the base CPU speed.

CPU clock select

	50 MHz	60 MHz	*66MHz
J10			
J11			
J12			

CPU frequency ratio (J1 and J2)

CPU frequency ratio

System frequency	2.5x	2x	3x	*1.5x
J1				
J2				

CPU voltage setting (J3, J4)

J3 and J4 must be set to match the CPU type. The chart below shows the proper jumper settings for their respective V_{cc}.

CPU voltage setting

	*3.3 V	3.45 V	3.6 V	3.8 V
J3				
J4				

CMOS setup (J7)

CMOS setup

	*3.6V Battery On	Clear CMOS
J7		

*** default setting**

Buzzer enabled/disabled (J18)

Buzzer enabled/disabled		
	***Enable**	**Disable**
J18		

Installing DRAM (SIMMs)

The PCM-5890 CPU card provides two 72-pin SIMM (Single In-line Memory Module) sockets and supports either Fast Page Mode (FPM) or Extended Data Output (EDO) DRAM with a speed of at least 70 ns. Unlike most other CPU cards, the PCM-5890 supports both single and dual insertion into the memory bank. Depending on the combination of modules you use, you can install from 1 MB to 64 MB of RAM.

Installing SIMMs

NOTE: The modules can only fit into a socket one way. Their chips must face the CPU, and their gold pins must point down into the SIMM socket.

1. Ensure that all power sources are disconnected.
2. Slip the memory module into the socket at a 45 degree angle.
3. 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.
4. Repeat steps 2 and 3 for each module you install.

Selecting cache module type (J8)

The PCM-5890 features a 2nd level memory cache that supports both asynchronous SRAM (standard) and pipelined burst RAM modules cache memory. The best performance can be achieved using the pipelined burst RAM in the Pentium class system. Refer to the table below to configure your cache module types: Synchronous SRAM(SYNC) or Asynchronous SRAM(ASYNC).

L2 Cache Configuration

Cache Module Type	*SYNC	ASYNC.
J8		

*** default setting**

Cache module installation

The cache module is installed with the chips on the module facing towards the CPU chip.

IDE hard drive connector (CN13)

You can attach one or two Enhanced Integrated Device Electronics hard disk drives to the PCM-5890's internal controller.

Connecting the hard drive

Connecting drives is done in a daisy-chain fashion and requires one of two cables, depending on the drive size. 1.8" and 2.5" drives need a 1 x 44-pin to 2 x 44-pin flat-cable connector. 3.5" drives use a 1 x 44-pin to 2 x 40-pin connector.

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

1. Connect one end of the cable to CN13. Make sure that the red (or blue) wire corresponds to pin 1 on the connector, which is labeled on the board (on the right side).
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.)

Connect a second drive as described above.

Unlike floppy drive, IDE hard drives can connect to either end of the cable. If you install two drives, you will need to set one as the master and one as the slave by using jumpers on the dirves. If you install just one drive, set it as the master.

Floppy drive connector (CN14)

You can attach up to two floppy disks to the PCM-5890's on-board controller. You can use any combination of 5¼" (360 KB and 1.2 MB) and/or 3½" (720 KB, 1.44 MB, and 2.88 MB) drives.

A 34-pin daisy-chain drive connector cable is required for a dual-drive system. On one end of the cable is a 34-pin flat-cable connector. On the other end are two sets of floppy disk drive connectors. Each set consists of a 34-pin flat-cable connector (usually used for 3½" drives) and a printed-circuit board connector (usually used for 5¼" drives).

Connecting the floppy drive

1. Plug the 34-pin flat-cable connector into CN14. Make sure that the red wire corresponds to pin one on the connector.
2. Attach the appropriate connector on th eother 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: drive. The set in the middle connects to the B: drive.
3. If you are connecting a 5¼" floppy drive, line up the slot in the printed circuit board with the blocked-off part of the cable connector.

   If you are connecting a 3½"floppy drive, you may have trouble determining which pin is pin number one. Look for a number printed on the circuit board indicating pin number one. Also, the connector on the floppy drive connector may have a slot. When the slot is up, pin number one should be on the right. Check the documentation that came with the drive for more information.

   If you sesire, connect the B: drive to the connectors in the middle of the cable as described above.

If you need to make your own cable, you can find the pin assignments for the card's connector in Appendix C.

Parallel port connector (CN12)

Normally, the parallel port is used to connect the card to a printer. The PCM-5890 includes an on-board parallel port, accessed through CN12, a 26-pin flat-cable connector. You will need an adapter cable if 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.

Parallel port IRQ

The PCM-5890 supports one parallel port. The port is designated as LPT1 and can be disabled or changed to LPT2 or LPT3 in the system BIOS setup.

Parallel port IRQ selection

	IRQ5	*IRQ7
J17		

You can select ECP/EPP DMA channel by setting J13 and J14.

ECP/EPP DMA channel

	*DMA1	DMA3
J13		
J14		

*** default setting**

Keyboard and PS/2 connector (CN8)

The PCM-5890 board 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 PCM-5890's BIOS standard setup menu allows you to select "All, But Keyboard" under the "Halt On" selection. This allows no-keyboard operation in embedded system applications without the system halting under POST (power-on-self-test).

Front panel connector (CN6)

Next you may want to install external switches to monitor and control the PCM-5890. These features are completely optional —install them only if you need them. The front panel connector (CN6) is an 8-pin male, dual in-line header and provides connections for a speaker, hard disk access indicator and an input switch for resetting the card.

Speaker

The PCM-5890 can drive an 8 W speaker at 0.5 watts. Ensure that alternatives to this specification do not overload the card.

LED interface

The front panel LED indicator for hard disk access is an active low signal (24 mA sink rate).

Reset switch

If you install a reset switch, it should be a open single pole switch. Momentarily pressing the switch will activate a reset. The switch should be rated for 10 mA, 5 V.

If you need to make your own cable, you can find the pin assignments for the card's connector in Appendix C.

Flat panel display connector (CN4)

CN4 consists of a 44-pin, dual-in-line header. Power supplies (+12 V, -12 V) present on CN4 depend the supply connected to the board. Ensure that both CN7 and CN15 are connected for ±12 V power supply.

The PCM-5890 provides a bias control signal on CN4 which can be used to control the LCD bias voltage. It is recommended that the LCD bias voltage not be applied to the panel until the logic supply voltage (+5 V) and panel video signals are stable. Under normal operation the control signal (ENAVEE) is active high. When the PCM-5890's power is applied, the control signal is low until just after the relevant flat panel signals are present.

Power connectors (CN7, CN15, CN5)

Peripheral power connector, -5V, -12V (CN7)

Supplies secondary power to devices that require -5 V and -12 V.

Main power connector, +5V, +12V (CN15)

Supplies main power to the PCM-5890 (+5 V) and devices that require +12 V.

Fan power supply connector (CN5)

Provides power supply to optional CPU cooling fan. Only present when +5 V and +12 V power is supplied to the board.

Serial ports (CN11)

The PCM-5890 offers four serial ports: three RS-232 and one RS-232/422/485. These ports let you connect to serial devices (a mouse, printers, etc.) or a communication network.

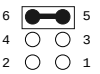
Serial port RS-232/422/485

The serial port connectors are mounted on the right hand edge of the card. The 40-pin, dual-in-line, male header to the right of the card is for the RS-232 and RS-232/422/485 ports.

IRQ Selection

	*COM3:IRQ5 and COM4:IRQ10	COM3:IRQ10 and COM4:IRQ5
J15		
J16		

COM2 Selection (J9)

	*RS-232	RS-422	RS-485
J9			

*default setting

COM2 RS-232/422/485 SELECTION

	*RS-232	RS-422/485
J19		
J20		
J21		
J22		

The IRQ and address range for those ports are fixed. However if you wish to disable the port or change these parameters later you can do this in the system BIOS setup. The table below shows the settings for the PCM-5890's ports.

PCM-5890 Serial port settings (Default)

Port	Address Range	Interrupt	Default
COM1	2E8~3F8	IRQ4	3F8
COM2	2E8~3F8	IRQ3	2F8
COM3		IRQ5/IRQ10	3E8
COM4		IRQ10/IRQ5	2E8

VGA interface connections

The PCM-5890's PCI SVGA interface can drive conventional CRT displays and is capable of driving a wide range of flat panel displays, including electroluminescent (EL), gas plasma, passive LCD and active LCD displays. The card has two connectors to support these displays, one for standard CRT VGA monitors and one for flat panel displays.

CRT display connector (CN3)

CN3 is a 16-pin, dual-in-line header used for conventional CRT displays. A simple one-to-one adapter can be used to match CN3 to a standard 15-pin D-SUB connector commonly used for VGA.

Pin assignments for CRT display connector CN3 are detailed in Appendix C.

When the PCM-5890's power is applied, the control signal is low until just after the relevant flat panel signals are present.

Configuration of the VGA interface is done completely via the software utility. You don't have to set any jumpers. Refer to Chapter 3 for software setup details.

Refer to Chapter 3 for details on connecting the four standard LCD's: Sharp LM64183P, Toshiba LTM09C016, Sharp 64C142, and Planar EL Display.

Ethernet configuration

The PCM-5890 is equipped with a high performance 32-bit PCI-bus Ethernet interface which is fully compliant with IEEE 802.3 10Mbps CSMA/CD standards. It is supported by all major network operating systems and is 100% Novell NE-2000 compatible.

Configuration is very simple and is done via the Award BIOS setup. See Chapter 4 for IRQ setup. The medium type can be configured via the RSET8029.EXE program included on the utility disk. (See Chapter 3 for detailed information.)

When there is a PCI expansion card installed, the I/O address will be 6500, but when there is no card, the I/O address will be 6400.

PCM-5890 Ethernet settings

	IRQ Options	I/O Address
w/card	7, 9, 11, 14	6500
w/o card	7, 9, 11, 14	6400

NOTE: *You can select an IRQ from the options shown above, but make sure your selection does not conflict with other I/O devices.*

10BASE-2/10BASE-5 AUI connector (CN9)

On-board 10-Base-T, 10BASE-2 and 10BASE-5 coax connections are made via an attachment unit interface or AUI (CN9). This consists of a 16-pin, dual-in-line male header.

10BASE-T connector (CN10)

10BASE-T connects to the PCM-5890 via an adapter cable to a 10-pin polarized header (CN10). For 10BASE-T RJ-45 operation, an adapter cable converting CN10 into a standard RJ-45 jack is required.

Network boot

The Network Boot feature can be utilized by incorporating the Boot ROM image files for the appropriate network operating system. The Boot ROM BIOS files are on the included utility disk.

Watchdog timer configuration

An on-board watchdog timer reduces the chance of disruptions which EMP (electro-magnetic pulse) interference can cause. This is an invaluable protective device for standalone or unmanned applications. Setup involves two jumpers and running the control software (refer to Appendix A). The two jumpers are:

Watchdog timer enable/disable (J25)

You can enable or disable the watchdog timer by reading the card's I/O ports with your program. Read address 443 hex to enable and refresh the watchdog or address 043 to disable the watchdog. For information on programming the watchdog timer see Appendix A. Configure the watchdog timer to be enabled or disabled via a two-pin jumper (J25) as shown below:

Watchdog timer enable/disable		
	***Enable**	**Disable**
J25		○ ○

Watchdog timer action (J23, J24)

When the watchdog timer activates (CPU processing has come to a halt), it can reset the system or generate an interrupt on IRQ15. This can be set via two 2-pin jumpers (J23, J24) as shown below:

Watchdog timer invokes system reset		
	***Enable**	**Disable**
J23		○ ○

Watchdog timer invokes IRQ15		
	***Enable**	**Disable**
J24		○ ○

CHAPTER 3

Software Configuration

This chapter details the software configuration information. It shows you how to configure the card to match your application requirements. AWARD System BIOS is covered in Chapter 4.

Sections include:

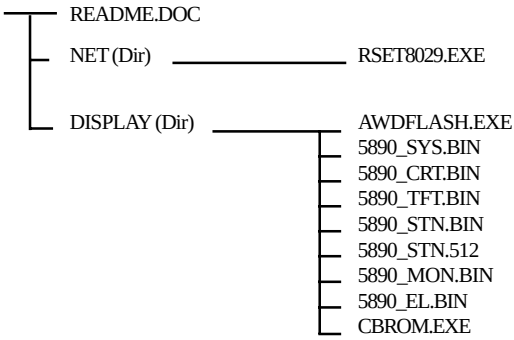
- LCD display configuration
- Connections for four standard LCDs
- Ethernet interface configuration

Introduction

The PCM-5890 system BIOS and custom drivers are located in a 128 Kbyte, 32-pin (JEDEC spec.) Flash ROM device, designated U12. A single Flash chip holds the system BIOS, VGA BIOS, and network Boot ROM image. The display can be configured via software. This method minimizes the number of chips and eases configuration. You can change the display BIOS simply by reprogramming the Flash chip.

Utility disk

The PCM-5890 is supplied with a software utility disk. This disk contains the necessary file for setting up the VGA display and Ethernet controller. Directories and files on the disk are as follows:



RSET8029.EXE
This program enables you to view the current Ethernet configuration, reconfigure the Ethernet interface (medium type, etc.), and execute useful diagnostic functions.

AWDFLASH.EXE
This program allows you to write the VGA display driver files to the BIOS Flash ROM. The VGA files all come ready formatted for the PCM-5890 with .BIN extensions. See README.DOC. These files support various CRT and flat panel displays. They are custom written and can be made available upon request.

5890_SYS.BIN
This binary file contains the system BIOS.

5890_CRT.BIN
Supports CRT only.

5890_TFT.BIN (default)
Supports 640 x 480 color TFT (Sharp LQ9D011, Toshiba LTM09C015A/016).

5890_STN.BIN (1 MB VRAM)
Supports 640 x 480 color STN DD 8/16-bit displays (Sharp LM64C142).

5890_STN.512 (512 KB VRAM)
Supports 640 x 480 color STN DD 8/16-bit displays (Sharp LM64C142).

NOTE: This BIOS does not support simultaneous CRT and flat panel display with 512 KB VRAM

5890_MON.BIN
Supports 640 x 480 dual scan monochrome displays (Sharp LM64P8X/837).

5890_EL.BIN
Supports 640 x 480 EL displays (PLANAR EL640480 - A Series).

CBROM.EXE
This program allows you to combine your own VGA BIOS with system BIOS (5890_SYS.BIN).

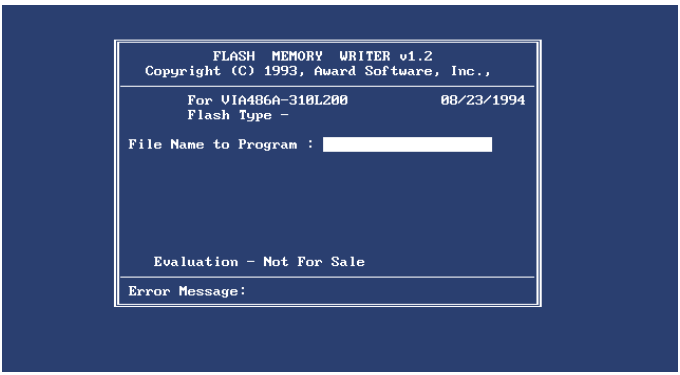
VGA display software configuration

The PCM-5890's on-board VGA interface supports a wide range of popular LCD, EL, gas plasma flat panel displays and traditional analog CRT monitors. The interface can drive CRT displays with resolutions up to 1024 x 768 in 256 colors. It is also capable of driving color panel displays with resolutions of 640 x 480 in 64K colors. The VGA interface is configured completely via the software utility, so you don't have to set any jumpers. Configure the VGA display as follows:

1. Apply power to the PCM-5890 with a color TFT display attached. This is the default setting for the PCM-5890. Ensure that the AWDFLASH.EXE and *.BIN files are located in the working drive.

NOTE: Ensure that you do not run AWDFLASH.EXE while your system is operating in EMM386 mode.

2. At the prompt, type AWDFLASH.EXE and press <Enter>. The VGA configuration program will then display the following:



VGA Setup screen

3. At the prompt, enter the new BIN file which supports your display. When you are sure that you have entered the file name correctly press <Enter>.
4. The screen will ask “Do you want to save BIOS?” If you change your mind or have made a mistake, press N to abort and end the setup procedure. Press Y if you wish to save the existing configuration before changing it. Then type the name under which you want to save the current configuration.
5. The prompt will then ask “Are you sure to program?” Press Y if you want the new file to be written into the BIOS. Press N to exit the program.

The new VGA configuration will then write to the ROM BIOS chip. This configuration will remain the same until you run the AWDFLASH.EXE program and change the settings.

Connections for four standard LCDs

Connections to Sharp LM64183P (640 x 480 DSTN MONO LCD)

LM64P83		PCM-5890 CN4	
Pin	**Pin name**	**Pin**	**Pin name**
CN1-1	S	36	FLM
CN1-2	CP1	38	LP
CN1-3	CP2	35	SHFCLK
CN1-4	DISP	5	+5 V
CN1-5	VDD	6	+5 V
CN1-6	VSS	3	GND
CN1-7	VEE	-	-17 V (external power)
CN1-8	DU0	12	P3
CN1-9	DU1	11	P2
CN1-10	DU2	10	P1
CN1-11	DU3	9	P0
CN1-12	DL0	16	P7
CN1-13	DL1	15	P6
CN1-14	DL2	14	P5
CN1-15	DL3	13	P4

Connections to PLANAR EL (640 x 480 AD4 EL)

PLANAR 640 x 480 AD4		PCM-5890 CN4	
Pin	**Pin name**	**Pin**	**Pin name**
1	GND	3	GND
2	DO	21	P12
3	GND	3	GND
4	D1	22	P13
5	GND	3	GND
6	D2	23	P14
7	NC	—	—
8	D3	24	P15
9	NC	—	—
10	D4	17	P8
11	NC	—	—
12	D5	18	P9
13	NC	—	—
14	D6	19	P10
15	GND	4	GND
16	D7	20	P11
17	GND	4	GND
18	VCLK	42	ASHFCLK
19	GND	4	GND
20	/BLANK	—	—
21	GND	8	GND
22	HS	37	M
23	NC	—	—
24	VS	36	FLM
25	NC	—	—
26	SELFTST	39	GND
27	COLMAP	39	GND
28	ENABLE	—	—
29	RESERVED	—	—
30	/LOWPOW	—	—
31,32	NC	—	—
33	RESERVED	—	—
34	NC	—	—

Connections to Sharp LM 64C35P (640 x 480 STN Color LCD)

Sharp LM 64C35P		PCM-5890 CN4	
Pin No.	**Function**	**Pin No.**	**Function**
1	DL4	16	P7
2	Vss	3	GND
3	DL5	15	P6
4	YD	36	FLM
5	DL6	14	P5
6	LP	38	LP
7	DL7	13	P4
8	Vss	4	GND
9	Vss	8	GND
10	XCK	35	SHFCLK
11	DL0	24	P15
12	Vcon	-	Contrast Adjust
13	DL1	23	P14
14	Vdd	5	+5V
15	Vss	33	GND
16	Vdd	6	+5V
17	DL2	22	P13
18	DISP	6	+5V
19	DL3	21	P12
20	NC	-	-
21	Vss	34	GND
22	DU3	17	P8
23	DU4	12	P3
24	DU2	18	P9
25	DU5	11	P2
26	DU1	19	P10
27	Vss	39	GND
28	DU0	20	P11
29	DU6	10	P1
30	Vss	39	GND
31	DU7	9	P0

Connections to NEC NL8060AC26 (800 x 600 TFT Color)

NL8060AC26		PCM-5890 CN-4	
Pin No.	**Function**		**Pin No. Function**
1	GND	3	GND
2	Dot Clock	35	SHFCLK
3	GND	4	GND
4	Hsync	38	LP
5	Vsync	36	FLM
6	GND	8	GND
7	GND	8	GND
8	GND	8	GND
9	R0	27	P18
10	R1	28	P19
11	R2	29	P20
12	GND	8	GND
13	R3	30	P21
14	R4	31	P22
15	R5	32	P23
16	GND	39	GND
17	GND	39	GND
18	GND	39	GND
19	G0	19	P10
20	G1	20	P11
21	G2	21	P12
22	GND	39	GND
23	G3	22	P13
24	G4	23	P14
25	G5	24	P15
26	GND	41	GND
27	GND	41	GND
28	GND	41	GND
29	B0	11	P2
30	B1	12	P3
31	B2	13	P4
32	GND	41	GND

Connections to NEC NL8060AC26 (continued)

NL8060AC26		PCM-5890 CN-4	
Pin No.	**Function**	**Pin No.**	**Function**
33	B3	14	B5
34	B4	15	P6
35	B5	16	P7
36	GND	41	GND
37	DE	37	M
38	VCC	43	VCC
39	VCC	44	VCC
40	VCC	5	VCC
41	MODE	-	-

Connections to Sharp LM64C142 (640 x 480 DSTN Color LCD)

LM64C142		PCM-5890 CN4	
Pin	**Pin name**	**Pin**	**Pin name**
CN1-1	YD	36	FLM
CN1-2	LP	38	LP
CN1-3	XCX	35	SHFCLK
CN1-4	DISP	5	+5 V
CN1-5	VDD	6	+5 V
CN1-6	VSS	3	GND
CN1-7	VEE	-	+27 V (external power)
CN1-8	DU0	20	P11
CN1-9	DU1	19	P10
CN1-10	DU2	18	P9
CN1-11	DU3	17	P8
CN1-12	DU4	12	P3
CN1-13	DU5	11	P2
CN1-14	DU6	10	P1
CN1-15	DU7	9	P0
CN2-1	VSS	4	GND
CN2-2	DL0	24	P15
CN2-3	DL1	23	P14
CN2-4	DL2	22	P13
CN2-5	DL3	21	P12
CN2-6	DL4	16	P7
CN2-7	DL5	15	P6
CN2-8	DL6	14	P5
CN2-9	DL7	13	P4
CN2-10	VSS	8	GND

Ethernet software configuration

The PCM-5890's on-board Ethernet interface supports all major network operating systems. I/O addresses and interrupts are easily configured via the Award BIOS Setup. To configure the medium type, to view the current configuration, or to run diagnostics, do the following:

1. Power the PCM-5890 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 your are sure that this is the configuration 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.

CHAPTER 4

Award BIOS Setup

This chapter describes how to set BIOS configuration data.

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 non-fatal. The system can usually continue the boot up sequence with non-fatal errors. Non-fatal 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

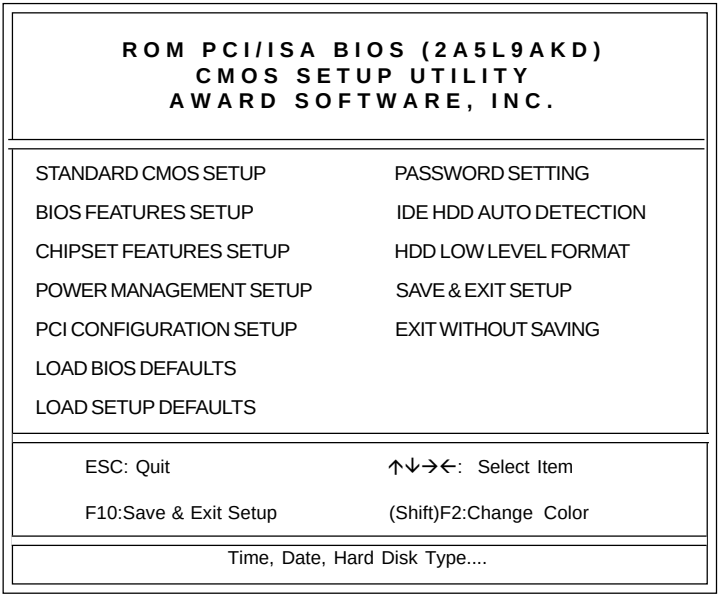
These routines check the current system configuration against the values stored in the card's CMOS memory. If they don't match, the program outputs an error message. You will then need to run the BIOS setup program to set the configuration information in memory.

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.

The PCM-5890 CMOS memory has an integral lithium battery backup. The battery backup should last ten years in normal service, but when it finally runs down, you will need to replace the complete unit.

AWARD BIOS setup



Setup program initial screen

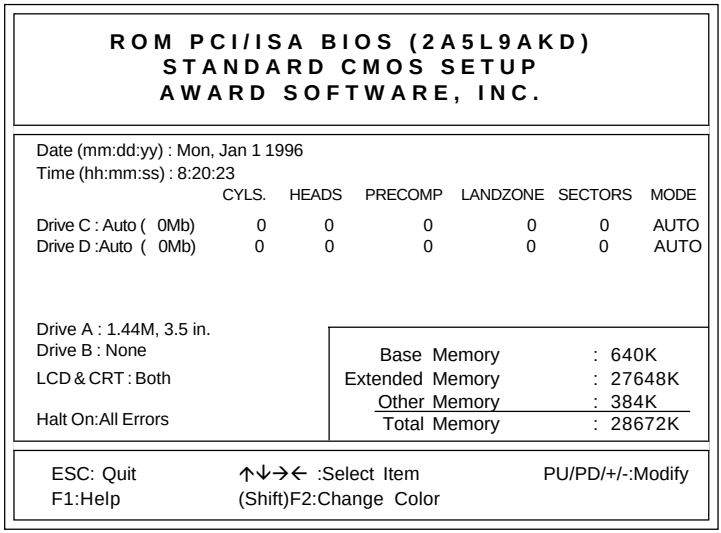
Award's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed CMOS RAM so that it retains the Setup information when the power is turned off.

Entering setup

Power on the computer and press <Del> immediately. This will allow you to enter Setup.

Standard CMOS setup

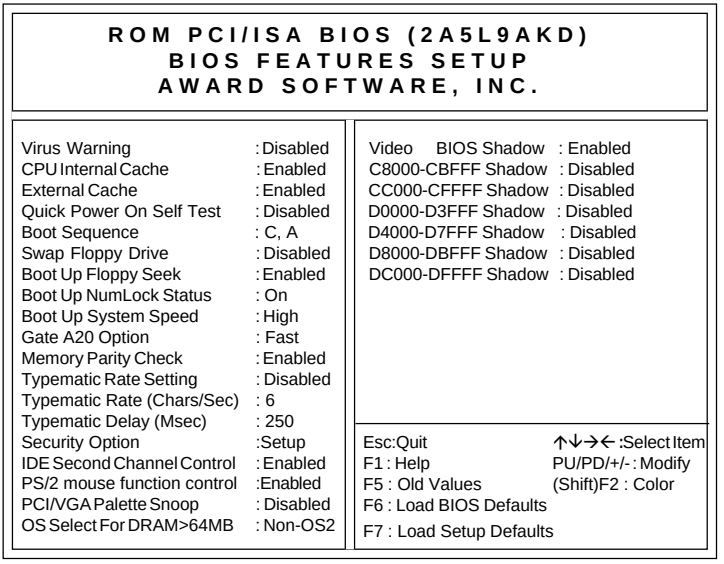
When you choose the STANDARD CMOS SETUP option from the INITIAL SETUP SCREEN menu**,** the screen shown below is displayed. This standard Setup Menu allows users to configure system components such as date, time, hard disk drive, floppy drive, display, and memory. Once a field is highlighted, on-line help information is displayed in the left bottom of the Menu screen.



CMOS setup screen

BIOS features setup

By choosing the BIOS FEATURES SETUP option from the INITIAL SETUP SCREEN menu, the screen below is displayed. The following configurations are based on the SETUP DEFAULTS settings.



BIOS features setup

CPU Internal Cache/External Cache

These two categories speed up memory access. However, it depends on 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 Enable, BIOS will shorten or skip some check items during POST.

Boot Sequence

This category determines which drive to search first for the disk operating system (i.e., DOS).

Swap Floppy Drive
This item allows you to determine whether you want to swap floppy drive or not.

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

Boot Up NumLock Status
This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on.

Boot Up System Speed
This allows you to determine the Boot Up Speed. The choice : High / Low.

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

Memory Parity Check
Set this option to Enabled to Check the Parity of all system memory.

Security Option
This category allows you to limit access to the system.

PS/2 Mouse Function Control
The settings of the option is *Enabled* or *Disabled*.

Video BIOS Shadow
Determines whether video BIOS will be copied to RAM. However, it is optional depending on chipset design. Video shadow will increase the video speed.

CHIPSET features setup

By choosing the CHIPSET FEATURES SETUP option from the INITIAL SETUP SCREEN menu, the screen below is displayed. The following configurations are based on the SETUP DEFAULTS settings.

ROM PCI/ISA BIOS (2A5L9AKD)
CMOS SETUP UTILITY
CHIPSET FEATURES SETUP

Auto Configuration	: Enabled	SRAM Tag/Alt Bit Config.	: 8 Tags
AT Bus Clock	: CLKIN/8	Data Link Bus Master	: Normal
Decoupled Refresh	: Disabled	CPU to DRAM Write Buffer	: Disabled
Video BIOS Cacheable	: Disabled	Onboard FDC Controller	: Enabled
System BIOS Cacheable	: Disabled	Onboard Serial Port 1	: 3F8H
Memory Hole At 15 Mb Addr.	: Disabled	Onboard Serial Port 2	: 2F8H
Cache Timing Control	: Normal	Onboard COM3 Port	: 3E8H
DRAM Timing Control	: Normal	Onboard COM4 Port	: 2E8H
Concurrent Write-Back	: Enabled	Onboard Parallel Port	: 378H
NA	: Enabled	Parallel Port Mode	: Normal
BOOT ROM Fucntion	: Disabled		
OnChip IDE first channel	: Enabled		
IDE HDD Block Mode	: Enabled		
IDE Primary Master PIO	: Auto		
IDE Primary Slave PIO	: Auto		

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

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.

Power management setup

By choosing the POWER MANAGEMENT SETUP option from the INITIAL SETUP SCREEN menu, the screen below is displayed. The following configurations are based on SETUP DEFAULTS Settings.

ROM PCI/ISA BIOS (2A5L9AKD)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

Power Management	: Disable
PM Control by APM	: Yes
Video Off Option	: Suspend → Off
Video Off Method	: V/H SYNC+Blank
PM Timers	
HDD Power Down	: Disable
Doze Mode	: Disable
Suspend Mode	: Disable
PM Events	
VGA	: OFF
LPT & COM	: LPT/COM
HDD & FDD	: ON
IRQ3 (COM 2)	: Primary
IRQ4 (COM 1)	: Primary
IRQ5 (LPT 2)	: Primary
IRQ6 (Floppy Disk)	: Primary
IRQ7 (LPT 1)	: Primary
IRQ8 (RTC Alarm)	: Secondary

IRQ9 (IRQ2 Redir)	: Primary
IRQ10 (Reserved)	: Secondary
IRQ11 (Reserved)	: Secondary
IRQ12 (PS/2 Mouse)	: Secondary
IRQ13 (Coprocessor)	: Secondary
IRQ14 (Hard Disk)	: Primary
IRQ15 (Reserved)	: Secondary

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

Power management setup

PCI Configuration setup

By choosing the PCI CONFIGURATION SETUP option from the INITIAL SETUP SCREEN menu, the screen below is displayed. This section describes configuring the PCI bus system. PCI, or Personal Computer Interconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings. The following configurations are based on SETUP DEFAULTS Settings.

ROM PCI/ISA BIOS (2A5L9AKD)
PCI CONFIGURATION SETUP
AWARD SOFTWARE, INC.

PnP BIOS Auto-Config	: Disabled	CPU to PCI Write Bufer	:Disabled
		PCI Master Write Buffer	:Disabled
1st Available IRQ	:10	PCI Master Prefetch	:Disabled
2nd Available IRQ	:11	PCI Master Burst Read	: Disabled
3rd Available IRQ	:9	PCI Master Burst Write	: Disabled
4th Available IRQ	:5	PCI Byte Merge	: Disabled
PCI IRQ Actived By	: Level	Local Memory Detect Point	: Fast
PCI IDE IRQ Map To	: PCI-AUTO	PCI Burst	: Disabled
Primary IDE INT#	: A	PCI Master O WS Write	: Enabled

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

PCI Configuration setup

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 otherwise by your system manufacturer.

Choices are *Level* and *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 or D) is associated with the connected hard drives.

Remember that this setting refers to the hard disk drive itself, rather that individual partitions. Since each IDE controller supports two separate hard drives, you can select the INT# for each. Again, you will note that the primary has a lower interrupt than the secondary.

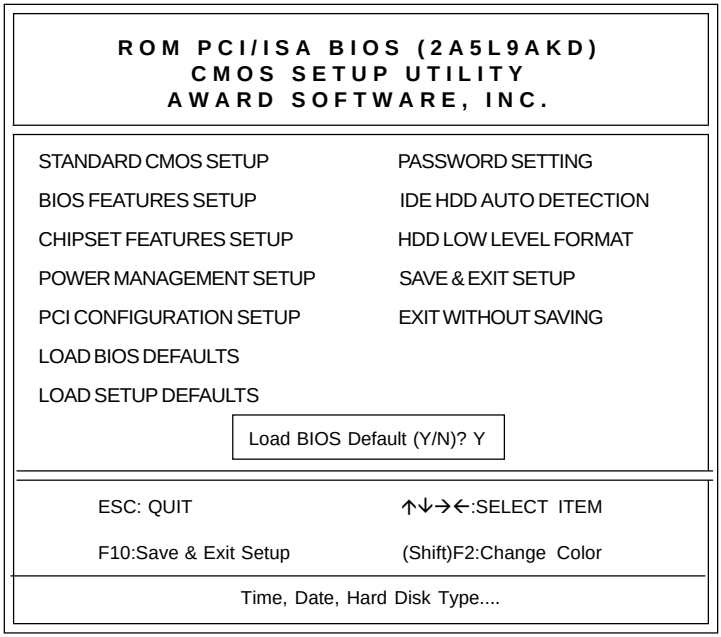
Selecting *PCI Auto* allows the system to automatically determine how your IDE disk system is configured.

Primary IDE INT#

Refer to the above description .

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 program becomes corrupted (and therefore unusable), BIOS defaults will load automatically when you turn the PCM-5890 on.



Load BIOS defaults screen

Change password

To change the password, choose the PASSWORD SETTING option form the Setup main menu and press <Enter>.

1. If the CMOS is bad or this option has never been used, there is default password which is stored in the ROM. The screen will display the following messages:

Enter Password:

Press <Enter>.

2. If the CMOS is good or this option has been used to change the default password, the user is asked for the password stored in the CMOS. The screen will display the following message:

Confirm Password:

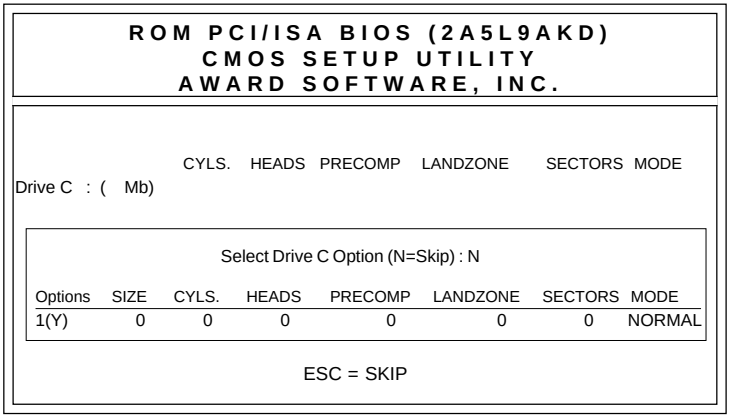
Enter the current password and press <Enter>.

3. After pressing <Enter> (ROM password) or the current password (user-defined), you can change the password stored in the CMOS. The password can be at most 8 characters long.

Remember - to enable this feature, you must first select either Setup or System in the BIOS FEATURES SETUP.

Auto detect hard disk

The IDE HDD AUTO DETECTION utility can automatically detect the IDE hard disk installed in your system. You can use it to self-detect and/or correct the hard disk type configuration.

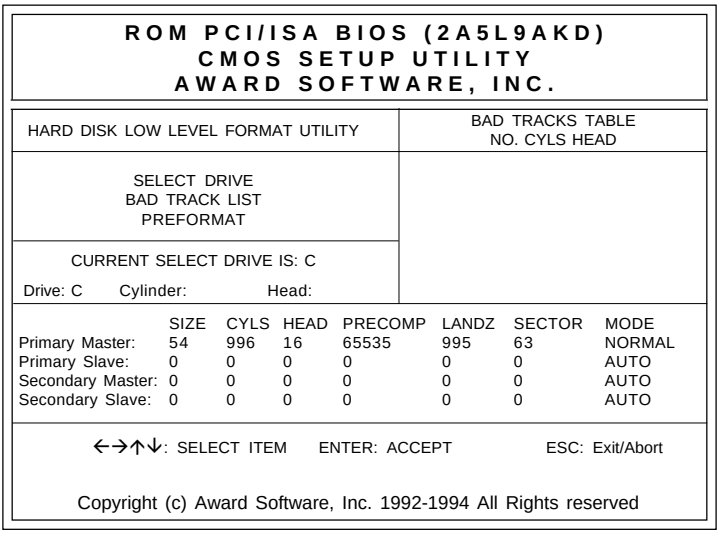


IDE HDD auto detection screen

HDD low level format

Selecting this utility allows you to execute HDD low level formatting. This Award Low-Level-Format Utility is designed as a tool to save your time formatting your hard dsk. The Utility automatically looks for the necessary information of the drive you selected. The Utility also searches for bad tracks and lists them for your reference.

Shown below is the menu appears after you enter into the Award Low-Level-Format Utility.



HDD low level format screen

Save & exit setup

If you select this option and press <Enter>, the values entered in the setup utilities will be recorded in the chipset's CMOS memory. The microprocessor will check this every time you turn your system on and compare this to what it finds as it checks the system. This record is required for the system to operate.

Exit without saving

Selecting this option and pressing <Enter> lets you exit the Setup program without recording any new values or changing old ones.

CHAPTER 5

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 *Display Driver Diskettes* that are shipped with your VGA adapter.

Your 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 floppy disk to a directory on the hard disk
- Understand the MS-DOS directory structure
- Know how to format a floppy disk

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

Before you begin the driver software installation, you should make backup copies of the *Display Driver Diskettes.* Store the original disks in a safe place.

Make sure you know the version of the application for which you are installing drivers. Your *Display Driver Diskettes* 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 Microsonft® 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 **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**. Type A:\Win95 and press <**ENTER**>. The name of the ***Chips And Technologies* 65545 PCI (new)** will appear highlighted in the ***Models*** list box. 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 new settings to take effect.

Windows® 3.1

These drivers are designed to work with Microsoft Windows Version 3.1. You may install these drivers either through Windows or in DOS.

Driver installation - Windows Setup

1. Install Windows as you normally would for a VGA display. Run Windows to make sure that it is working correctly.
2. Place the Display Driver Diskette #1 in drive A. In Windows Program Manager, choose *File* from the Options Menu. Then from the pull-down menu, choose *Run*. At the Command Line prompt, type A:\WINSETUP. Press the <ENTER> key or click OK to begin the installation.

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 ChipsCPL under the Control Panel. The ChipsCPL icon allows you to select and load the installed drivers.

Another method of installing these drivers is through the File Manager. Click on *Drive A:*, and then double-click on WINSETUP.EXE to begin installation.

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 ***Options*** 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.

DOS

Driver installation - DOS Setup

1. Install Windows as you normally would for a VGA display. Run Windows to make sure that it is working correctly. Then exit from Windows.
2. Place the Display Driver Diskette #1 in drive A. Type `A:` <ENTER> to make this the default drive.
3. Type `SETUP <ENTER>` to run the driver SETUP program. Press any key to get to the applications list.
4. Using the arrow keys, select *Windows Version 3.1* and press the <ENTER> key. Press the <ENTER> key to select *All Resolutions*, then press <END> to begin the installation.
5. At this point you will be asked for the path to your Windows System directory (default C:\WINDOWS). When the installation is complete, press any key to continue. Press <ESC> followed by `Y` to exit to DOS.
6. Change to the directory where you installed Windows (usually C:\WINDOWS).
7. Type `SETUP` <ENTER> to run the Windows Setup program. It will show the current Windows configuration. Use the up arrow key to move to the *Display* line and press <ENTER>.
8. A list of display drivers will be shown. Use the arrow keys to select one of the drivers starting with an asterisk (*) and press <ENTER>.

9. Follow the directions on the screen to complete the setup. In most cases, you may press <ENTER> to accept the suggested option. When Setup is done, it will return to DOS. Type `WIN` <ENTER> to start Windows with the new display driver.

Changing Display Drivers from DOS

To change display drivers from DOS, change to the Windows directory and run Setup, repeating steps 4 and 5 from the previous page. Besides the special display drivers marked by an asterisk (*), you should be able to use the following standard drivers:

VGA	640 x 480, 16 colors
Super VGA	800 x 600, 16 colors

Panning Drivers

Special panning drivers are provided to allow high-resolution modes to be displayed on a flat panel or CRT. These drivers will show a section of a larger screen, and will automatically pan or scroll the screen horizontally and vertically when the mouse reaches the edge of the display.

OS/2

These drivers are designed to function with the OS/2 Version 3 operating system.

Driver installation

NOTE: Always use the INSTxx.CMD for the FIRST *installation of the video device drivers. To change video resolutions, follow* Step 3 *below.*

To install the drivers, follow these instructions:

1. If System is not in VGA mode, select VGA mode.
2. Insert the driver diskette into drive A (or any other diskeet drive).
3. Open an OS/2 full-screen or OS/2 windows session.
4. Type `A:`<ENTER> to make this the default drive. Type `INST30 A: C:` <ENTER> (for OS/2 Version 3 systems). Once the Install Program is completed, do a system shutdown and reboot.
5. After the system has rebooted, follow these instructions:

   OS/2 Version 3

   Go to the System Setup folder and run Selective Install to install the new device driver and configure the video system.

   Follow the instructions of the program to set up the OS/2 drivers in your system. First, select *Primary Display*. From the list of Primary Display Adapter Types, select *Chips and Technologies 655XX*. From the list of available Display Resolutions, select a display resolution. The correct source directory must be specified. Once the installation is complete, the system must be shut down and restarted for changes to take effect.

SOFTWARE UTILITIES

This chapter describes the operation and installation of the software utility supplied on the *Display Driver Diskettes*:

• CHIPSCPL

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:

- 640x480
- 800x600
- 1024x786
- 1280x1024

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 (15bpp)
- 64K (16bpp)
- 16M (24bpp)

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

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)

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.

APPENDIX A

Programming the Watchdog Timer

The PCM-5890 is equipped with a watchdog timer that resets the CPU or generates an interrupt if processing comes to a standstill for whatever reason. This feature ensures system reliability in industrial standalone, or unmanned, environments.

Jumpers J23, J24, and J25 control the watchdog settings. The default configuration of the timer is enabled with system reset.

To enable the watchdog timer, you must write a program which reads I/O port address 443 (hex) at regular intervals. The first time your program reads the port, it enables the watchdog timer. After that, your program must read the port at time interval of less than 1.6 seconds, otherwise the watchdog timer will activate and reset the CPU or generate an interrupt on IRQ15. When you want to disable the watchdog timer, your program should read I/O port 043 (hex).

If CPU processing comes to a standstill because of EMI or a software bug, your program's signals to I/O port address 443 to the timer will be interrupted. The timer will then automatically reset the CPU or invoke an IRQ, and data processing will continue normally.

You must write your program so that it reads I/O port address 443 at an interval shorter than the timer's preset interval. The timer's intervals have a tolerance of ±30%, so you should program an instruction that will refresh the timer about every second.

The following program shows how you might program the watchdog timer in BASIC:

```
10     REM   Watchdog timer example program
20     X=INP (&H443) REM   Enable and refresh the watch-
dog
30     GOSUB 1000 REM   Task #1, takes 1 second to com-
plete
40     X=INP (&H443) REM   Refresh the watchdog
50     GOSUB 2000 REM   Task #2, takes 1 second to com-
plete
60     X=INP (&H043) REM   Disable the watchdog
70     END
1000   REM   Subroutine #1, takes 1 second to complete
       .
       .
       .
1070   RETURN
2000   REM   Subroutine #2, takes 1 second to complete
       .
       .
       .
2090   RETURN
```

APPENDIX B

Installing PC/104 Modules

This appendix gives instructions for installing PC/104 modules.

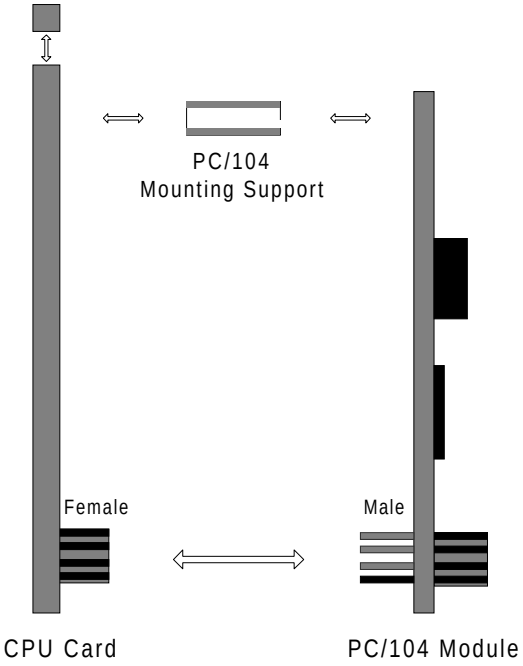
Installing PC/104 modules

The PCM-5890'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:

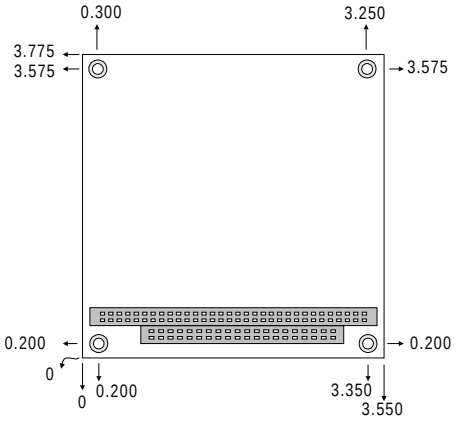
- **PCM-3290** GPS Module
- **PCM-3810** Solid State Disk Module
- **PCM-3820** High Density Flash Disk Module
- **PCM-3110** PCMCIA Module
- **PCM-3111** Secondary PCMCIA Module
- **PCM-3610** Isolated RS-232 and RS-422/485 Module
- **PCM-3660** Ethernet Module
- **PCM-3718** 30 KHz A/D Module
- **PCM-3724** 48-Channel DIO Module
- **PCM-3640** 4-Port RS-232 Module
- **PCM-3680** Dual Port CAN Module

Installing these modules on the PCM-5890 is quick and simple. The following steps show how to mount the PC/104 modules:

1. Remove the PCM-5890 from your system paying particular attention to the safety instructions already mentioned above.
2. 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.
3. Normal PC/104 modules have male connectors and mount directly onto the main card. However, to ensure better bus matching, the connectors on the PCM-5890 and the PC/104 module are both female. For this reason, you may need to use the "male-male" adapter included with the PCM-5890 in order to properly connect your PC/104 module. (Refer to the diagram on the following page.)
4. Mount the PC/104 module onto the CPU card by pressing the module firmly but carefully onto the mounting connectors.
5. Secure the PC/104 module onto the CPU card using the four mounting spacers and srews.



PC/104 Module Mounting Diagram



PC/104 module dimensions (inches ±5 %)

APPENDIX C

Pin Assignments

This appendix contains information of a detailed or specialized nature. It includes:

- CRT display connector
- Flat panel display connector
- PC/104 connector
- Front panel connector
- Main power connector
- 10BASE-2/10BASE-5 AUI connector
- RS-232/422/485 serial port connector
- Keyboard and mouse connector
- 10BASE-T connector
- Peripheral power connector
- IDE connector
- CPU fan power connector
- Floppy drive connector
- Printer/parallel port connector

CRT display connector (CN3)

PCM-5890 CRT display connector

Pin	Signal	Pin	Signal
1	RED	9	SIGNAL GND
2	N/C	10	H-SYNC
3	GREEN	11	CHASSIS GND
4	SIGNAL GND	12	V-SYNC
5	BLUE	13	CHASSIS GND
6	N/C	14	N/C
7	N/C	15	CHASSIS GND
8	N/C	16	N/C

Flat panel display connector (CN4)

PCM-5890 Flat panel display connector

Pin	Function	Pin	Function
1	+12 V	2	+12 V
3	GND	4	GND
5	Vcc	6	Vcc
7	ENAVEE	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
37	M	38	LP
39	GND	40	ENABKL
41	GND	42	ASHFCLK
43	V_{cc}	44	V_{cc}

PC/104 connectors (CN1, CN2)

PCM-5890 PC/104 connectors

Pin Number	Signal (CN1) RowA	RowB	Signal (CN2) RowA	RowB
0	—	—	0V	0V
1	IOCHCHK	0V	SBHE	MEMCS16
2	SD7	RESETDRV	LA23	IOCS16
3	SD6	+5V	LA22	IRQ10
4	SD5	IRQ9	LA21	IRQ11
5	SD4	-5V	LA20	IRQ12
6	SD3	DRQ2	LA19	IRQ15
7	SD2	-12V	LA18	IRQ14
8	SD1	ENDXFR	LA17	DACK0
9	SD0	+12	MEMR	DRQ0
10	IOCHRDY	(KEY)	MEMW	DACK5
11	AEN	SMEMW	SD8	DRQ5
12	SA19	SMEMR	SD9	DACK6
13	SA18	IOW	SD10	DRQ6
14	SA17	IOR	SD11	DACK7
15	SA16	DACK3	SD12	DRQ7
16	SA15	DRQ3	SD13	+5V
17	SA14	DACK1	SD14	MASTER
18	SA13	DRQ1	SD15	0V
19	SA12	REFRESH	(KEY)	0V
20	SA11	SYSCLK	—	—
21	SA10	IRQ7	—	—
22	SA9	IRQ6	—	—
23	SA8	IRQ5	—	—
24	SA7	IRQ4	—	—
25	SA6	IRQ3	—	—
26	SA5	DACK2	—	—
27	SA4	TC	—	—
28	SA3	BALE	—	—
29	SA2	+5V	—	—
30	SA1	OSC	—	—
31	SA0	0V	—	—
32	0V	0V	—	—

Front panel connector (CN6)

PCM-5890 Front panel connector

Pin	Signal
1	HDD LED- (HARD DISK ACTIVE)
2	HDD LED+ (V_{CC})
3	SPEAKER+
4	SPEAKER- (GND)
5	GND
6	WATCHDOG TIMER OUT
7	RESET SWITCH- (GND)
8	RESET SWITCH+

Peripheral power connector (CN7)

PCM-5890 Peripheral power connector

Pin	Function
1	GND
2	-5 V
3	GND
4	-12 V

10BASE-2/10BASE-5 AUI connector (CN9)

PCM-5890 Ethernet 10BASE-2/10BASE-5 AUI connector

Pin	Signal
1	GND
2	CD-
3	CD+
4	Tx-
5	Tx+
6	GND
7	GND
8	Rx-
9	Rx+
10	+12 V
11	GND
12	GND

PCM-5890 Ethernet 10BASE-2/10BASE-5 AUI connector	
Pin	**Signal**
13	N/C
14	N/C
15	N/C
16	+5 V

Keyboard and mouse connector (CN8)

PCM-5890 Keyboard and mouse connector

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

COM 1-4 RS-232/422/485 serial ports (CN11)

PCM-5890 COM1, COM2, COM3, COM4 RS-232/422/485 serial port

	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(422RXD+)
	13	RXDB (422TXD+/485DATA+)	14	RTSB(422RXD-)
	15	TXDB	16	CTSB
	17	DTRB	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.

Ethernet 10BASE-T connector (CN10)

PCM-5890 Ethernet 10BASE-T connector

Pin	Signal
1	V_{CC}
2	CRS LED
3	RCV+
4	RCV-
5	BNC LED
6	GND
7	N/C
8	GND
9	XMT+
10	XMT-

Main power connector (CN15)

PCM-5890 Main power connector

Pin	Signal
1	+12 V
2	GND
3	GND
4	+5 V

IDE hard drive connector (CN13)

PCM-5890 IDE hard drive connector

Pin	Signal	Pin	Signal
1	IDE RESET	2	GND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	SIGNAL GND	20	N/C
21	N/C	22	GND
23	IO WRITE	24	GND
25	IO READ	26	GND
27	IO CHANNEL READY	28	ALE
29	N/C	30	GND
31	IRQ14	32	IOCS16
33	ADDR 1	34	N/C
35	ADDR 0	36	ADDR 2
37	HARD DISK SELECT 0	38	HARD DISK SELECT 1
39	IDE ACTIVE	40	MGND
41	VCC	42	MVCC

43	GND	44	N/C

Fan power connector (CN5)

PCM-5890 Fan power connector

Pin	Signal
1	+5 V
2	GND
3	+12 V

Floppy drive connector (CN14)

PCM-5890 Floppy drive connector

Pin	Signal	Pin	Signal
1	GND	2	DENSITY SELECT
3	GND	4	N/C
5	GND	6	DRIVE TYPE
7	GND	8	INDEX
9	GND	10	MOTOR 0
11	GND	12	DRIVE SELECT 1
13	GND	14	DRIVE SELECT 2
15	GND	16	MOTOR 1
17	GND	18	DIRECTION
19	GND	20	STEP
21	GND	22	WRITE DATA
23	GND	24	WRITE GATE
25	GND	26	TRACK 0
27	GND	28	WRITE PROTECT
29	GND	30	READ DATA

31	GND	32	HEAD SELECT
33	GND	34	DISK CHANGE

Parallel port connector (CN12)

PCM-5890 Parallel port connector

Pin	Signal
1	\STROBE
2	\AUTOFD
3	D0
4	ERR
5	D1
6	\INIT
7	D2
8	\SLCTINI
9	D3
10	GND
11	D4
12	GND
13	D5
14	GND
15	D6
16	GND
17	D7
18	GND
19	\ACK
20	GND
21	BUSY
22	GND
23	PE
24	GND
25	SLCT
26	N/C

APPENDIX D

Optional Extras

PCM-10489-1 Cable kit for PCM-5890

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	PCM-5890 connector	Termination connector
1701440350	2.5" and 1.8" IDE	CN13	44-pin, 2 mm, female IDC (350 mm)
1701440500	3.5" IDE (40P)	CN13	40-pin, 2.54 mm, female IDC (500 mm)
1701340700	Dual floppy, 3.5" and 5.25" (34P)	CN14	34-pin dual floppy
1701260301	Parallel port	CN12	25-pin female DSUB
1701100201	Network 10/100BASE-T	CN10	RJ-45 8-pin modular jack
1701150150	VGA CRT	CN3	15-pin DSUB
1700060200	Keyboard and PS/2 mouse	CN8	5-pin circular DIN 6-pin circular DIN
1703040301	Peripheral power (-5 V, -12 V)	CN7	4-conductor type
1701080300	Front panel	CN6	8-conductor pigtail
1701400220	RS-232 Serial Port, 4 COM Port	CN11	40 pin, 2.54 mm

PCM-10589-1 PCI interface riser card

The PCI interface riser card is available. You can add many accessories and components to the mainboard.

For further information, please contact our sales department