Model PCA-6136

ALL-IN-ONE 386 CPU CARD WITH CACHE

PCA-6136

ALL-IN-ONE 386 CPU CARD
WITH CACHE

USER'S MANUAL

CREDITS AND ACKNOWLEDGEMENTS

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CHAPTER 1. INTRODUCTION

1.1. Introduction

Congratulations on your purchase of Advantech's latest PC-386 compatible, all-in-one CPU card--the PCA-6136.

Designed to offer the latest in state-of-the-art technology for your industrial needs, the PCA-6136 is equipped with the most advanced, user friendly system BIOS-AMI BIOS.

The PCA-6136 is also equipped with an **Intel** or AMD 33 MHz 80386DX microprocessor, and is socketed for **Intel**'s 80387 or **Weitek**'s 3167 **math** co-processor. Its 128 KB cache memory breaks through the memory access speed bottleneck, allowing the 80386DX CPU to run at peak performance levels. And the PCA-6136's on-board memory is expandable from 1 MB to 16 MB of DRAM SIMM.

An added feature for industrial stand-alone applications in unmanned environments is the PCA-6136's watchdog timer. The watchdog timer can be hardware or software enabled and disabled to reset the CPU in case power drops, software bugs, or infinity loops cause it to come to a halt while processing data.

Other PCA-6136 all-in-one features include:

* Standard ISA bus add-on card size
* ETEQ's Cougar chipset for low power consumption
* Built-in IDE hard disk drive interface
* Built-in floppy disk drive controller
* Two RS-232 serial ports
* One parallel/printer port
* On-board keyboard connector
* Real-time clock/calendar with lithium battery backup
* Seven DMA channels
* 15 interrupt levels
* Piggyback Module connector

This manual has been written for you, the user, to install, setup, and run the PCA-6136 with industrial applications easily. Each section guides you through its procedures clearly and concisely, allowing you to proceed on to the next section with confidence.

Please follow instructions carefully. Remember you are working with electronic equipment that, if you were to accidently damage or tamper with a peripheral device or power supply while installing the CPU card, could cause serious injury to yourself or others around you.

1.2. Specifications

* **Chipset**: ETEQ's Cougar chipset.

* **RAM Memory**:
    1 MB to 16 MB, using 256Kx9 (SIMM-256-8), 1Mx9, or 4Mx9 SIMMs with an access time of 80ns or less.

Total Memory	SIMM-256-8	SIMM-1000-8	SIMM-4000-8
1 MB	4	–	–
4 MB	–	4	–
16 MB	–	–	4

* **Cache Memory Size**: 128 KB

* **Cache Memory Speed:**

CPU	Access Time
80386DX-33	25ns
80386DX-40	20ns

* **Shadow RAM Memory:**
  Shadow RAM (for system BIOS and Vidio BIOS) and 256KB Memory remapping.

* **IDE Hard Disk Drive Interface:**
  Supports up to two IDE hard disk drives (jumper enabled or disabled).

* **Floppy Disk Drive Interface:**
  Supports up to two 5.25 inch (360 KB and 1.2 MB), and/or two 3.5 inch (720 KB and 1.44 MB) floppy disk drives (jumper enabled or disabled).

* **Parallel Ports:**
  Configurable to LPT1, LPT2, LPT3, or disabled. Standard D-25 female connector adaptor included.

* **Serial Ports:**
  Two RS-232 serial ports configured as COM1(3F8H), COM2(2F8H), or disabled individually. Interfaced with a D-9 male connector.

* **Real-time Clock/Calendar:**
  Real-time clock/calendar with lithium battery back-up(3.6V@850mAH). External, battery connector is provided.

* **Watchdog Timer:**
  Configured to always enabled, always disabled, or user programmable enable/disable. Timer intervals may be set at 1.5, 15, or 150 seconds. I/O ports 043 hex and 443 hex are used to access the watchdog timer.

* **DMA Channels:** Seven channels of DMA (Direct Memory Access).

* **Interrupts:** 15 levels of vectored interrupts.

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* **Keyboard Port:**
  A 6-pin, mini DIN keyboard connector is located on the mounting bracket for easy access. An external keyboard adapter is included. An on-board keyboard pin header connector is also included.

* **Bus Speed:** 8 MHz

* **PC Board:** 6 layers for noise reduction and to minimize vibrations.

* **System Performance:** Landmark speed (V 1.14): 52 MHz.

* **Maximum Power Requirements:** +5V @ 2.5A.

* **Power Supply Voltage:** +5V Vcc > 4.75V and < 5.25V.

* **Operating Temperature:** 0 to 60°C (140°F).

* **Board Size/Weight:**
  13.8" (L) x 4.72" (W) (334mm x 122mm), 1.54lb. (0.7 kg).

1.3. Packing List Inspection

Before begin installing your PCA-6136, take a moment to make sure that the following items have been included inside the package.

* **1 PCA-6136 all-in-one, 33 MHz 80386DX CPU card**
* **1 PCA-6136 User's Manual**
* **1 Keyboard adapter**
* **1 40-pin, hard disk drive (IDE) interface cable**
* **1 34-pin, floppy disk drive interface cable**
* **1 26-pin, parallel port adapter kit**

If there are any discrepancies, please contact your Advantech distributor immediately.

CHAPTER 2. INSTALLATION

Before you proceed any further, please review the diagrams in Figures 2-1 familiarize yourself with the PCA-6136's jumper and connector pin layout.

The descriptions of jumpers and connectors are as below:

JP1: Keyboard connector

JP2: Speaker connector

JP3: Power LED and Keylock connector

JP4: Turbo LED connector

JP5: External battery connector

JP7: HDD enable/disable select

JP8: Watchdog PGM

JP9: Watchdog off

JP10: Watchdog on

JP15: Watchdog time 1.5 seconds

JP16: Watchdog time 15 seconds

JP18: Watchdog time 150 seconds

JP19: Color/Monochrome Select

JP21: HDD LED connector

J2: Reset connector

J3: Turbo switch

J4: FDD/parallel port/serial port configure Jumper

J5: Golden finger 18 x 2

J6: Golden finger 31 x 2

CN1: HDD connector

CN2: FDD connector

CN3: Printer connector

CN4: Piggyback connector 32 x 2

CN5: Piggyback connector 18 x 2
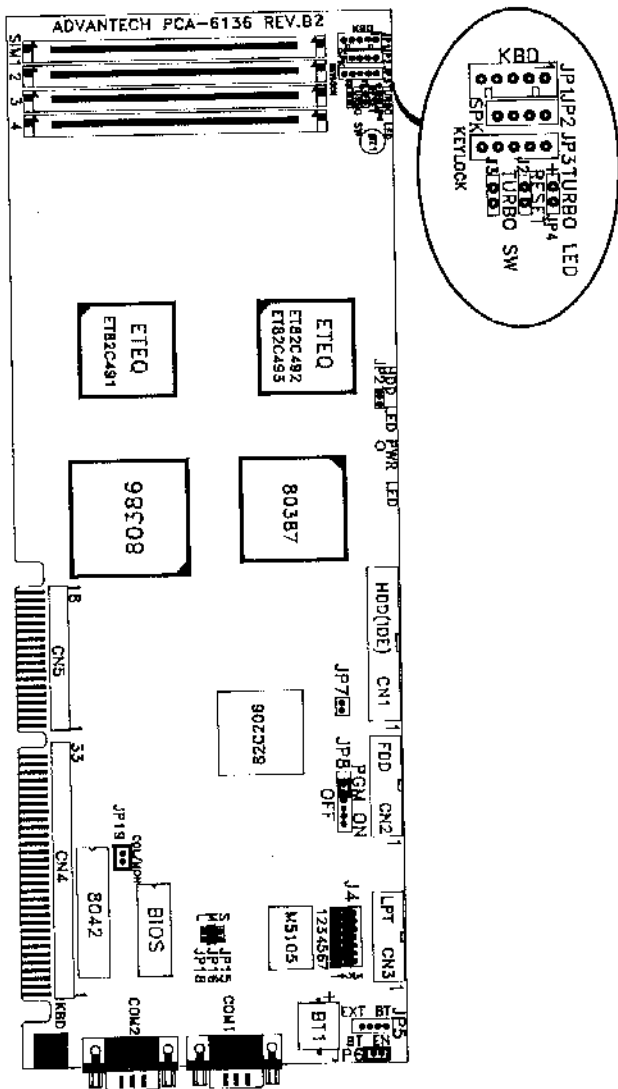
Figure 2-1

2.1. Jumper Pin Setting

at J4. Positions 7 and 6, pins 1, 2, and 3, in this series enable/disable parallel ports LPT1(3BCH), LPT2(378H), or LPT3(278H).

The Table 2-1 illustrates the jumper setting for the parallel port.
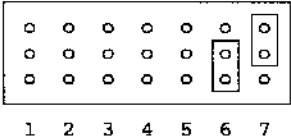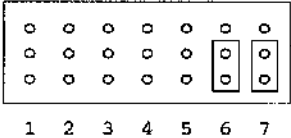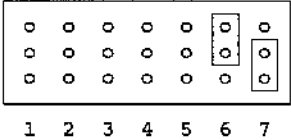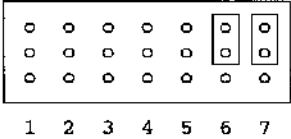
J4	Parallel Port
3 o o o o o o [o] 2 o o o o o [o] o 1 o o o o o [o] o 1 2 3 4 5 6 7	LPT 1 (3BCH)
3 o o o o o o o 2 o o o o o [o] [o] 1 o o o o o [o] [o] 1 2 3 4 5 6 7	LPT 2 (378H) (Default)
3 o o o o o [o] o 2 o o o o o [o] [o] 1 o o o o o o [o] 1 2 3 4 5 6 7	LPT 3 (278H)
3 o o o o o [o] o 2 o o o o o [o] o 1 o o o o o o o 1 2 3 4 5 6 7	Disable Parallel port

Table 2-1

2.1.2. Serial Port Enable/Disable

The PCA-6136's two serial ports are located on the card's retaining bracket. They can be enabled/disabled as cither COM1 (3F8H) or COM2 (2F8H) by setting the J4 jumper pin series located at positions 5, 4, and 3, pins 1, 2, and 3.

Also, the PCA-6136 allows you to alternate the location of COM1 (3F8H) and COM2 (2F8H). This means that COM1, may be changed to COM2, and COM2, may be changed to COM1. This gives the user a little more versatility when connecting serial equipment to the CPU card's serial ports.

The Table 2-2 illustrates the jumper settings for the scrial ports:

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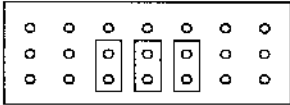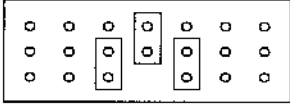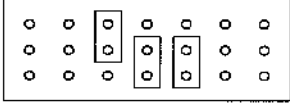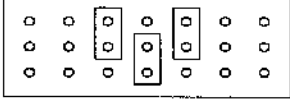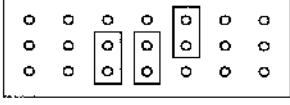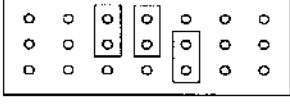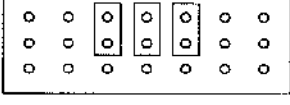
J4	Serial Port 1 (Upper)	Serial Port 2 (Lower)
3 ○ ○ ○ ○ ○ ○ ○ 2 ○ ○ □ □ □ ○ ○ 1 ○ ○ □ □ □ ○ ○ 1 2 3 4 5 6 7	COM 1 (3F8H) (Default)	COM 2 (2F8H) (Default)
3 ○ ○ ○ □ ○ ○ ○ 2 ○ ○ □ □ □ ○ ○ 1 ○ ○ □ ○ □ ○ ○ 1 2 3 4 5 6 7	COM 1 (3F8H)	Disable
3 ○ ○ □ ○ ○ ○ ○ 2 ○ ○ □ □ □ ○ ○ 1 ○ ○ ○ □ □ ○ ○ 1 2 3 4 5 6 7	COM 2 (2F8H)	COM 1 (3F8H)
3 ○ ○ □ ○ □ ○ ○ 2 ○ ○ □ □ □ ○ ○ 1 ○ ○ ○ □ ○ ○ ○ 1 2 3 4 5 6 7	Disable	COM 1 (3F8H)
3 ○ ○ ○ ○ □ ○ ○ 2 ○ ○ □ □ □ ○ ○ 1 ○ ○ □ □ ○ ○ ○ 1 2 3 4 5 6 7	Disable	COM 2 (2F8H)
3 ○ ○ □ □ ○ ○ ○ 2 ○ ○ □ □ □ ○ ○ 1 ○ ○ ○ ○ □ ○ ○ 1 2 3 4 5 6 7	COM 2 (2F8H)	Disable
3 ○ ○ □ □ □ ○ ○ 2 ○ ○ □ □ □ ○ ○ 1 ○ ○ ○ ○ ○ ○ ○ 1 2 3 4 5 6 7	Disable	Disable

Table 2-2

2.1.3. Floppy Disk Drive Controller (Enable/Disable)

The PCA-6136 comes equipped with its own floppy disk drive controller which controls any combination of up two (360 KB, 720 KB, 1.2 MB, and/or 1.44 MB) floppy disk drives. Again, the jumper pins for this controller are located at position 1 and 2, pins 1, 2, and 3, on J4.

To enable or disable the PCA-6136's floppy disk drive controller, follow the specifications in Table 2-3:

Table 2-3

2.1.4. Hard Disk Drive Controller (Enable/Disable)

The PCA-6136's hard disk controller supports up to two IDE hard disk drives. To enable or disable this feature, please locate JP7 on the CPU card, and open or close the pins according to the specifications in Table 2-4:

Table 2-4

2.1.5. Color/Mono Display Setting

Color graphics or monographics display for the PCA-6136 is set at JP19 on the CPU card.

Table 2-5 indicates the proper jumper settings for color or mono graphics configuration:

JP19 (Color/Mono graphics)	
Color	Mono
o o	o o

Table 2-5

2.1.6. Watchdog Timer (Enable/Disable and Timer Interval)

The PCA-6136's watchdog timer can be enabled (ON), disabled (OFF), or programmable enabled/disabled (PGM), by closing the jumper pins at JP8-JP10, located just below the floppy disk drive connector (CN2) on the CPU card.

Before you configure the watchdog timer, you should be aware that if you choose to use the watchdog's programmable feature, you will have to write a program that will read either I/O ports, 043 hex or 443 hex, to enable or disable the watchdog (programming the watchdog timer will be discussed in a later chapter).

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To Enable/Disable/Programmable the watchdog timer close the ON/OFF/PGM
position with a jumper at JP8, JP9, JP10, see Table 2-6:

JP8 PGM	JP9 OFF	JP10 ON	Watchdog
o o	o o	[o o]	Enable

JP8 PGM	JP9 OFF	JP10 ON	Watchdog
o o	[o o]	o o	Disable

JP8 PGM	JP9 OFF	JP10 ON	Watchdog
[o o]	o o	o o	(Default) Programmable

Table 2-6

The PCA-6136's watchdog timer has three timed intervals--1.5 seconds, 15
seconds, and 150 seconds. To set the watchdog's timed interval you must close
either JP15, JP16, or JP18 on the CPU card. Before you do this, locate the
three sets of jumper pins that lie just under the Maxim watchdog timer chip.
To set the watchdog's timed interval at 1.5 seconds, close JP15 (see Table 2-7).

JP15 (1.5 Seconds)

[o   o] JP15

 o   o   JP16

 o   o   JP18

Table 2-7

To set the watchdog's timed interval at 15 seconds, close JP16 (see Table-2-8).

```
┌─────────────────────────────────────┐
│  ┌───────────────────────────────┐  │
│  │    JP13  (15 Seconds)          │  │
│  └───────────────────────────────┘  │
│                                      │
│           o   o    JP15              │
│                                      │
│        ┌─────────┐                   │
│        │ o   o   │  JP16             │
│        └─────────┘                   │
│                                      │
│           o   o    JP18              │
│         (Default)                    │
│                                      │
└─────────────────────────────────────┘
```
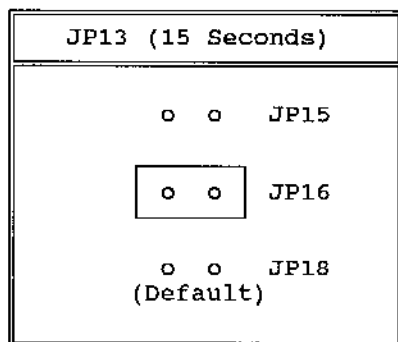
Table 2-8

To set the watchdog's timed interval at 150 seconds, close JP18 (see Table 2-9).

```
┌─────────────────────────────────────┐
│  ┌───────────────────────────────┐  │
│  │    JP18  (150 Seconds)         │  │
│  └───────────────────────────────┘  │
│                                      │
│           o   o    JP15              │
│                                      │
│           o   o    JP16              │
│                                      │
│        ┌─────────┐                   │
│        │ o   o   │  JP18             │
│        └─────────┘                   │
│                                      │
└─────────────────────────────────────┘
```

Table 2-9

13
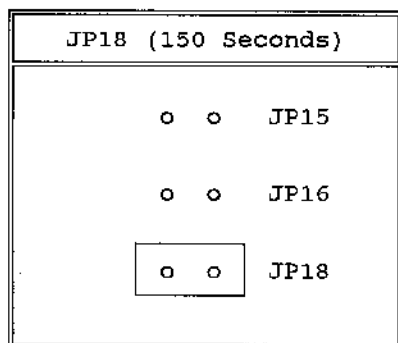
2.2. Memory Configuration and Installation

The PCA-6136 has been designed to support from 1 MB to 16 MB of on-board RAM memory, using 256Kx9, 1Mx9, or 4Mx9 SIMMs (Single In-line Memory Modules) with access times of 80ns or less.

Table 2-10 gives the specifications of each memory configuration that should suit your application needs while using the PCA-6136.

SIMM/MEMORY	1 MB	4 MB	16 MB
256Kx9 SIMM	4	-	-
1Mx9 SIMM	-	4	-
4Mx9 SIMM	-	-	4

Table 2-10

Choose the memory configuration that will best suit your application needs, and insert the appropriate SIMM cards into the PCA-6136's memory banks.

To insert the SIMM card into the memory banks, follow the instructions outlined below:

A.   First locate memory banks SIM1, SIM2, SIM3, and SIM4 on the CPU card.

B.   Beginning with bank, SIM1, insert each SIMM card into each consecutive bank with the memory chips facing away from the two ETEQ chipset chips.

C.   When inserting each SIMM card into the memory banks, you should make sure that each card's connector pins fit snugly inside each bank's pin connector socket. Each SIMM has a retaining hole on both sides of the card that is used with the memory bank's retaining clip to secure it inside the bank's socket. Make sure that the memory bank's retaining clip is set inside the SIMM's retaining hole to ensure that the SIMM fits snugly in its socket.

CHAPTER 3. INSTALLING THE PCA-6136 ON THE PASSIVE BACKPLANE

Now that you have finished with the preliminary setup of the PCA-6136, it is time to install the CPU card onto the passive backplane inside your system unit.

Before you plug in the PCA-6136 CPU card, be sure that all power cords, and peripheral cables (monitors, printers, etc.) are disconnected from the chassis.

A.   Choose an available 16-bit expansion slot on the backplane, and plug in the CPU card. Use the CPU card's retaining bracket as a guide between the edge of the backplane and the chassis' retaining wall.

B.   Make sure that the CPU card is properly seated in the expansion slot.

3.1. Connectors

Once the PCA-6136 is installed inside your system unit, you will need to connect your keyboard lead wire, the system's turbo LED and switch, the power LED, hard disk drive LED, and the keylock switch to the CPU card. The following instructions will assist you in connecting these features to their proper connectors on the CPU card.

3.1.1. Keyboard Connector

Locate the white keyboard connector (KBD) at the upper left-hand corner of the PCA-6136, and connect your keyboard lead wire from the passive backplane to this connector.

3.1.2. Speaker Connector

The PCA-6136 comes equipped with its own buzzer. If you want to connect the computer chassis' external speaker, you may do so by connecting the speaker's lead wire to the CPU card's external speaker connector (JP2), located at SPEAKER.

Table 3-1 gives the external speaker connector's specifications:

JP2 Connector	Description
Pin - 1	SPEAKER OUT
Pin - 2	N.C.
Pin - 3	GROUND
Pin - 4	+5V DC

Table 3-1

3.1.3. Reset Connector

Locate the reset lead wire on the computer chassis, and connect it to the CPU card's RESET connector (J2).

3.1.4. Turbo LED and Turbo Switch Connector

Locate the turbo LED lead wire on the computer chassis, and connect it to the CPU card's Turbo LED connector (JP4).

Now, locate the turbo switch lead wire on the computer chassis, and connect that to the CPU card's turbo switch (J3).

3.1.5. Hard Disk Drive LED Connector

Locate the hard disk drive LED lead wire on the computer chassis, and connect it to the CPU card's HDD LED (JP21) connector, located left to the card's red power LED.

3.1.6. External Battery Connector

The PCA-6136 has a connector (JP5) for an optional, external battery pack. An external battery pack serves as a backup for the PCA-6136's on-board, lithium battery that supplies power to the computer's real-time clock.

If you have an external battery pack and wish to use it with the PCA-6136, connect it to the CPU card's EXT BT connector.

Table 3-2 gives the EXT BT connection's specifications:

JP5	Description
Pin - 1	+5V - +6V (BATTERY+)
Pin - 2	N.C.
Pin - 3	GND
Pin - 4	GND (BATTERY-)

Table 3-2

3.1.7. Power and Keylock Connector

The power and keylock connector is a 5-pin connector (JP3) located near the white, keyboard connector. Connect the power and keylock lead from the chassis to the JP3 connector.

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Table 3-3 specifies the KEYLOCK pin connections:

JP3	Description
Pin - 1	LED POWER +
Pin - 2	N.C.
Pin - 3	GROUND
Pin - 4	KEYBOARD LOCK
Pin - 5	GROUND

Table 3-3

3.1.8. Hard Disk Drive (IDE) Connector

The PCA-6136 supports an IDE (ISA bus), hard disk drive interface, which supports two hard disk drives. The IDE interface connector is located on the CPU card at CN1.

A.   Take the 40-pin ribbon connector that is provided with the PCA-6136, and connect it to the connector at CN1, making sure that the red or blue stripe on the connector cable corresponds with pin 1 on CN1.

B.   Now, connect the other end of the cable to your hard disk drive.

JP3	Description
Pin - 1	LED POWER +
Pin - 2	N.C.
Pin - 3	GROUND
Pin - 4	KEYBOARD LOCK
Pin - 5	GROUND

Table 3-3

3.1.8. Hard Disk Drive (IDE) Connector

The PCA-6136 supports an IDE (ISA bus), hard disk drive interface, which supports two hard disk drives. The IDE interface connector is located on the

```
-RST     1  -  ┌──────────┐  -  2    GND
   D7    3  -  │          │  -  4    D8
   D6    5  -  │          │  -  6    D9
   D5    7  -  │          │  -  8    D10
   D4    9  -  │          │  - 10    D11
   D3   11  -  │          │  - 12    D12
   D2   13  -  │          │  - 14    D13
   D1   15  -  │   IDE    │  - 16    D14
   D0   17  -  │ (AT BUS) │  - 18    D15
  GND   19  -  │   Hard   │  - 20    N.C.
  N.C.  21  -  │   Disk   │  - 22    GND
  IOW   23  -  │   Drive  │  - 24    GND
  IOR   25  -  │ Interface│  - 26    GND
IORDY   27  -  │          │  - 28    BALE
  N.C.  29  -  │          │  - 30    GND
  IRQ   31  -  │          │  - 32    IO16
   A1   33  -  │          │  - 34    N.C.
   A0   35  -  │          │  - 36    A2 CS0
  CS0   37  -  │          │  - 38    CS1
 -ACT   39  -  └──────────┘  - 40    GND

  39                                        1
  ┌────────────────────────────────────────┐
  │ o o o o o o o o o o o o o o o o o o o o │
  │ o o o o o o o o o o o o o o o o o o o o │
  └────────────────────────────────────────┘
  40                                        2
```
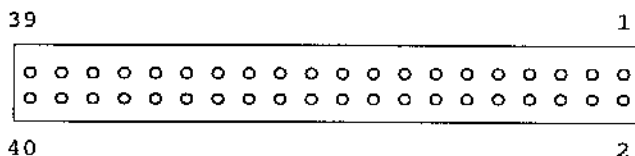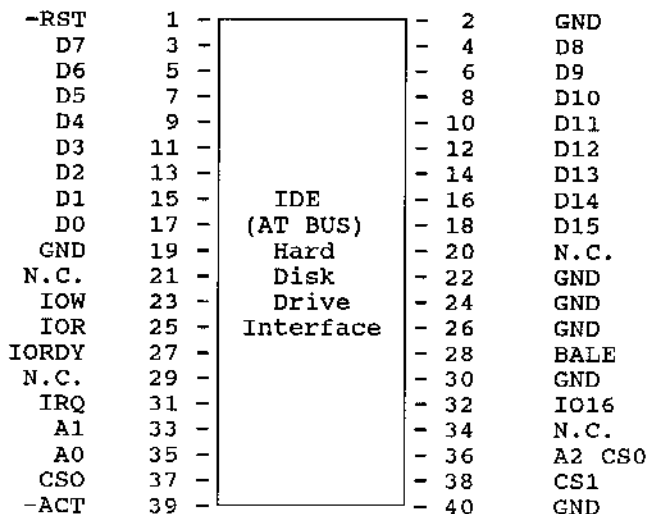
Figure 3-1

NOTE: The color of pin 1 of the connector cable is red or blue. All other pins on the cable are gray.

3.1.9. Floppy Disk Drive Connector

The PCA-6136's floppy disk drive interface supports any combination of two floppy disk drives (5.25 inch, 360 KB and 1.2 MB, and/or 3.5 inch, 720 KB and 1.44 MB).

A.   Locate the floppy disk drive connector, at CN2, on the CPU card.

B.　Take the 34-pin, daisy-chain, connector that has been provided with the card, and make sure that the red or blue stripe corresponds with pin 1 of the CPU card's disk drive connector (CN2).

C.　Once you have identified pin 1, connect the cable to the card.

D.　Connect the other end of the cable to your floppy disk drive. The end with the twisted cable designates the disk drive that you connect it to as drive 'A.' The connector below that designates drive 'B.'

Figure 3-2 illustrates the floppy disk drive's 34-pin connector assignments:

```
┌──────────┐   <   GROUND         Pin -1 -33 (odd)      ┌──────────┐
│          │   <   HIGH DENSITY   Pin - 2               │          │
│          │   <   UNUSED         Pin - 4, 6            │          │
│          │       INDEX          Pin - 8         >     │          │
│          │   <   MOTOR ENABLE A Pin - 10              │          │
│ Floppy   │   <   DRIVER SELECT B Pin - 12             │ Floppy   │
│ Driver   │   <   DRIVER SELECT A Pin - 14             │ Interface│
│ Device   │   <   MOTOR ENABLE B Pin - 16              │ Connector│
│          │   <   DIRECTION      Pin - 18              │  (CN2)   │
│          │   <   STEP PULSE     Pin - 20              │          │
│          │   <   WRITE DATA     Pin - 22              │          │
│          │   <   WRITE ENABLE   Pin - 24              │          │
│          │       TRACK 0        Pin - 26        >     │          │
│          │       WRITE PROTECT  Pin - 28        >     │          │
│          │       READ DATA      Pin - 30        >     │          │
│          │   <   SELECT HEAD    Pin - 32              │          │
└──────────┘       DISK CHANGE    Pin - 34        > └──────────┘
```

```
   33                                        1
  ┌──────────────────────────────────────────┐
  │ o o o o o o o o o o o o o o o o o o │
  │ o o o o o o o o o o o o o o o o o o │
  └──────────────────────────────────────────┘
   34                                        2
```

Figure 3-2

NOTE:　The color of pin 1 on the connector cable is red or blue. All other pins on the cable are grey.

3.1.10. Parallel Printer Connector

The PCA-6136 is equipped with an on-board parallel port, located at CN3, and comes with a 26-pin adapter cable that has a D-25 connector mounted to a retaining bracket.

The following instructions will assist you in connecting the parallel printer cable to the PCA-6136's parallel printer connector:

A.   To connect the adapter cable to CN3, make sure that the cable's red or blue stripe corresponds to pin 1 on the CN3 connector.

B.   Once the adapter cable has been connected to the CN3 connector, fasten the D-25 connector to the chassis' retaining wall with a screw.

Table 3-4 gives a description of the parallel port's configuration:

Parallel (DB-25)	Signal Name	Printer (C-36)
Pin - 1	STROBE	Pin - 1
Pin - 2	DATA 0	Pin - 2
Pin - 3	DATA 1	Pin - 3
Pin - 4	DATA 2	Pin - 4
Pin - 5	DATA 3	Pin - 5
Pin - 6	DATA 4	Pin - 6
Pin - 7	DATA 5	Pin - 7
Pin - 8	DATA 6	Pin - 8
Pin - 9	DATA 7	Pin - 9
Pin - 10	-ACKNOWLEDGE	Pin - 10
Pin - 11	BUSY	Pin - 11
Pin - 12	PAPER EMPTY	Pin - 12
Pin - 13	+SELECT	Pin - 13
Pin - 14	-AUTO FEED	Pin - 14
Pin - 15	-ERROR	Pin - 15
Pin - 16	-INIT PRINTER	Pin - 16
Pin - 17	-SELECT INPUT	Pin - 17
Pin - 18-25	GROUND	Pin - 19-30, 16, 33
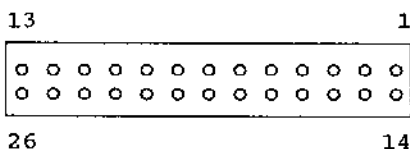
Table 3-4

3.1.11. Serial Port Connector

The PCA-6136 is equipped with two on board serial port, located at COM1 and COM2.

Table 3-5 lists the pin assignments for both COM1 and COM2:
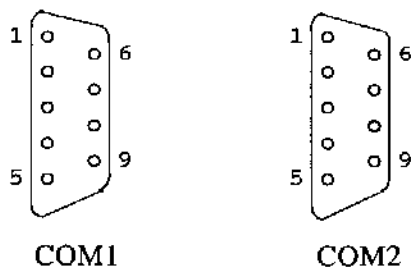
COM1   COM2

COM1	COM2	Signal
pin1	pin1	DCD
pin2	pin2	RX
pin3	pin3	TX
pin4	pin4	DTR
pin5	pin5	GND
pin6	pin6	DSR
pin7	pin7	RTS
pin8	pin8	CTS
pin9	pin9	RI

Table 3-5

3.1.12. Piggyback Connector

The PCA-6136 comes equipped with a PCB connector (located at CN4 and CN5) and a fastener for a piggyback module.

A piggyback RAM/ROM Disk Module is also available. If you intend to use the RAM/ROM Disk Module with the PCA-6136, please refer to the instructions for its installation in the RAM/ROM Disk Module user's manual. Figure 3-3, Table 3-6, Table 3-7 and Table 3-8 illustrates the piggyback module's 64 pin and 36 pin PCB connector assignments.

CN4

1	A1	B1	33
2	A2	B2	34
3	A3	B3	35
4	A4	B4	36
5	A5	B5	37
6	A6	B6	38
7	A7	B7	39
8	A8	B8	40
9	A9	B9	41
10	A10	B10	42
11	A11	B11	43
12	A12	B12	44
13	A13	B13	45
14	A14	B14	46
15	A15	B15	47
16	A16	B16	48
17	A17	B17	49
18	A18	B18	50
19	A19	B19	51
20	A20	B20	52
21	A21	B21	53
22	A22	B22	54
23	A23	B23	55
24	A24	B24	56
25	A25	B25	57
26	A26	B26	58
27	A27	B27	59
28	A28	B28	60
29	A29	B29	61
30	A30	B30	62
31	A31	B31	63
32	A32	B32	64

HEADER 32 X 2

CN5

1	C1	D1	19
2	C2	D2	20
3	C3	D3	21
4	C4	D4	22
5	C5	D5	23
6	C6	D6	24
7	C7	D7	25
8	C8	D8	26
9	C9	D9	27
10	C10	D10	28
11	C11	D11	29
12	C12	D12	30
13	C13	D13	31
14	C14	D14	32
15	C15	D15	33
16	C16	D16	34
17	C17	D17	35
18	C18	D18	36

HEADER 18 X 2

CN4		
I/O Pin	Signal Name	Input/Output
1	-I/O CH CK	Input
2	SD7	Input/Output
3	SD6	Input/Output
4	SD5	Input/Output
5	SD4	Input/Output
6	SD3	Input/Output
7	SD2	Input/Output
8	SD1	Input/Output
9	SD0	Input/Output
10	-I/O CH RDY	Input
11	AEN	Output
12	SA19	Input/Output
13	SA18	Input/Output
14	SA17	Input/Output
15	SA16	Input/Output
16	SA15	Input/Output
17	SA14	Input/Output
18	SA13	Input/Output
19	SA12	Input/Output
20	SA11	Input/Output
21	SA10	Input/Output
22	SA9	Input/Output
23	SA8	Input/Output
24	SA7	Input/Output
25	SA6	Input/Output
26	SA5	Input/Output
27	SA4	Input/Output
28	SA3	Input/Output
29	SA2	Input/Output
30	SA1	Input/Output
31	SA0	Input/Output
32	BAT	Output

Table 3-6

CN4		
I/O Pin	Signal Name	Input/Output
33	GND	Ground
34	RESET DRV	Output
35	+5Vdc	Power
36	IRQ9	Input
37	-5Vdc	Power
38	DRQ2	Input
39	-12Vdc	Power
40	0WS	Input
41	+12Vdc	Power
42	GND	Ground
43	-SMEMW	Output

52	CLK	Output
53	IRQ7	Input
54	IRQ6	Input
55	IRQ5	Input
56	IRQ4	Input
57	IRQ3	Input
58	-DACK2	Output
59	T/C	Output

CN 5		
I/O Pin	Signal Name	Input/Output
1	SBHE	Input/Output
2	LA23	Input/Output
3	LA22	Input/Output
4	LA21	Input/Output
5	LA20	Input/Output
6	LA19	Input/Output
7	LA18	Input/Output
8	LA17	Input/Output
9	-MEMR	Input/Output
10	-MEMW	Input/Output
11	SD08	Input/Output
12	SD09	Input/Output
13	SD10	Input/Output
14	SD11	Input/Output
15	SD12	Input/Output
16	SD13	Input/Output
17	SD14	Input/Output
18	SD15	Input/Output
19	-MEM CS16	Input
20	-I/O CS16	Input
21	IRQ10	Input
22	IRQ11	Input
23	IRQ12	Input
24	IRQ15	Input
25	IRQ14	Input
26	-DACK0	Output
27	DRQ0	Input
28	-DACK5	Output
29	DRQ5	Input
30	-DACK6	Output
31	DRQ6	Input
32	-DACK7	Output
33	DRQ7	Input
34	+5Vdc	Power
35	-MASTER	Input
36	GND	Ground

Table 3-8

NOTE: CN4 pin32 BAT is the higher output of VCC or Vbatt (the battery's output voltage).

CN4 pin64 LOW LINE is set low when the VCC falls below the reset threshold, 4.75V. It then return to high once the VCC rises above the reset threshold.

3.1.13. Piggyback Module Mechanical specifications

The PCA-6136 supports a PCB connector for a piggyback module. Figure 3-4 gives the dimensions for those of you who may need to develope your own piggyback module with PCA-6136.
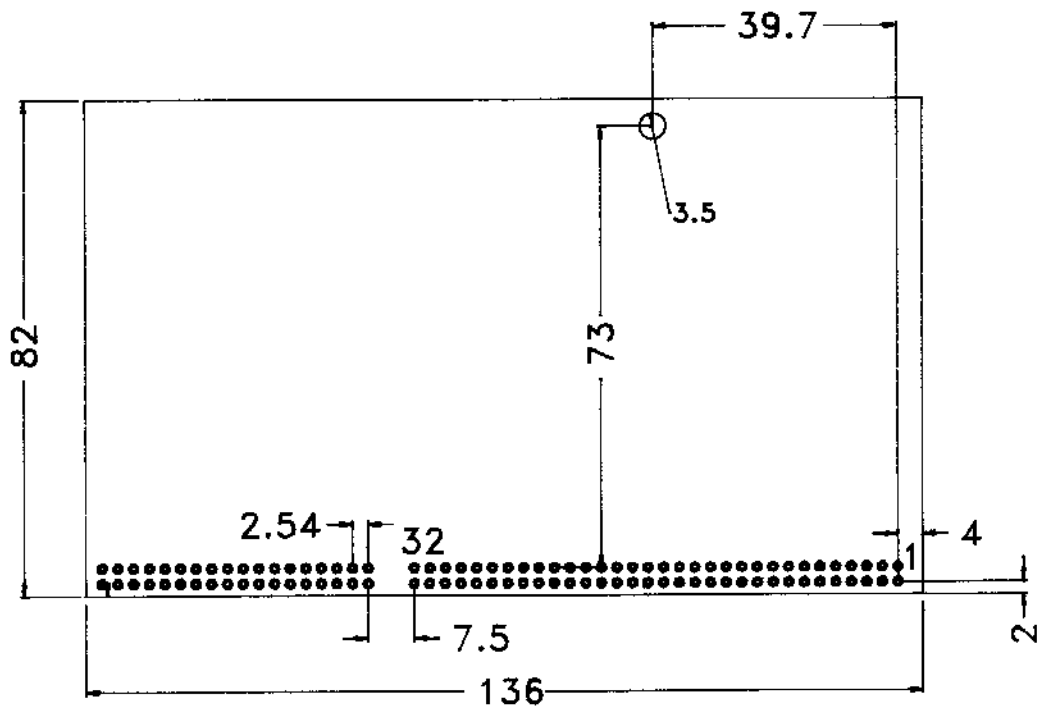
Fuigure 3-4

2. Press DEL, and the SETUP menu will appear:

```
┌──────────────────────────────────────────────────────────────────────┐
│                BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES            │
│            (C)1990 American Megatrends Inc., All Rights Reserved        │
├──────────────────────────────────────────────────────────────────────┤
│                                                                        │
│                         STANDARD CMOS SETUP                            │
│                         ADVANCED CMOS SETUP                            │
│                         ADVANCED CHIPSET SETUP                         │
│                  AUTO CONFIGURATION WITH BIOS DEFAULTS                 │
│                  AUTO CONFIGURATION WITH POWER-ON DEFAULTS             │
│                           CHANGE PASSWORD                              │
│                          HARD DISK UTILITY                             │
│                         WRITE TO CMOS AND EXIT                         │
│                       DO NOT WRITE TO CMOS AND EXIT                    │
│                                                                        │
├──────────────────────────────────────────────────────────────────────┤
│                                                                        │
│        Standard CMOS Setup for Changing Time, Date, Hard Disk Type, etc.│
│                                                                        │
├──────────────────────────────────────────────────────────────────────┤
│        ESC=Exit    ↓→↑←=Sel    F2/F3=Color    F10=Save & Exit          │
└──────────────────────────────────────────────────────────────────────┘
```

Please choose one to enter the setup program.

Following pages, we will show the default value for each step of setting. Please follow starts from standard CMOS setup, for changing Time, Date, Hard Disk Type, etc.

```
┌──────────────────────────────────────────────────────────────────────┐
│                BIOS SETUP PORGRAM - WARNING INFORMATION                 │
│           (C) 1990 American Megatrends Inc., All Rights Reserved        │
├──────────────────────────────────────────────────────────────────────┤
│                                                                        │
│                                                                        │
│              Improper Use of Setup may Cause Problems!!                │
│                                                                        │
│   If System Hangs, Reboot System and Enter Setup by Pressing the <DEL> key│
│                                                                        │
│              Do any of the following After Entering Setup              │
│                  (i)   Alter Options to make System Work               │
│                  (ii)  Load BIOS Setup Defaults                        │
│                  (iii) load Power-On Defaults                          │
│                                                                        │
│              Hit <ESC> to Stop now, Any other Key to Continue          │
│                                                                        │
│                                                                        │
│                                                                        │
└──────────────────────────────────────────────────────────────────────┘
```

If mistaken Setup, please hit <ESC> key to reset.

```
           BIOS SETUP PROGRAM - STANDARD CMOS SETUP
        (C)1990 American Megatrends Inc., All Rights Reserved
```

Date (mn/date/year): Sat, Jan 04 1992   Base memory: 640 KB
Time (hour/min/sec): 09 : 12 : 12   Ext. memory: 256 KB
Daylight saving: Disabled   Cyln Head WPcom LZone Sect Size
Hard disk C: 35   65535 1024   17   77MB
Hard disk D: Not Installed

Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	31	1	2	3	
5	6	7	8	9	10	1
12	13	14	15	16	17	1
19	20	21	22	23	24	2
26	27	28	29	30	31	
2	3	4	5	6	7	

```
Floppy drive A:      1.2 MB, 5¼"
Floppy drive B:      Not Installed
Primary display:     VGA/PGA/CGA
Keyboard:            Installed

   Month: Jan, Feb,.................Dec
   Date:  01, 02, 03,...............31
   Year:  1901, 1902,..............2099

ESC=Exit↓→↑←=SelF2/F3=ColorPU/PD=Modify
```

"Date" is to set your computer in exact date, month, year, and week. According to relity, and use PgUp/PgDn to adjust the date.

```
           BIOS SETUP PROGRAM - STANDARD CMOS SETUP
        (C)1990 American Megatrends Inc., All Rights Reserved

Date (mn/date/year): Sat, Jan 04 1992        Base memory: 640 KB
Time (hour/min/sec): 09 : 12 : 12           Ext. memory: 256 KB
Daylight saving:     Disabled      Cyln  Head  WPcom  LZone  Sect  Size
Hard disk C:         35                         65535  1024   17   77MB
Hard disk D:         Not Installed
```

Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	31	1	2	3	
5	6	7	8	9	10	1
12	13	14	15	16	17	1
19	20	21	22	23	24	2
26	27	28	29	30	31	
2	3	4	5	6	7	

```
Floppy drive A:      1.2 MB, 5¼"
Floppy drive B:      Not Installed
Primary display:     VGA/PGA/CGA
Keyboard:            Installed

   Time is 24 hour format:-
   Hour:(00-23),Minute:(00-59),Second:(00-59)
   (1:30 AM = 01:30:00),(1:30 PM = 13:30:00)

ESC=Exit↓→↑←=SelF2/F3=ColorPU/PD=Modify
```

"Time" is to set your computer exactly on correct itme. Please notice to set the time by the order of hour, minute, and second. Also use PgUp/PgDn to adjust the time.

```
              BIOS SETUP PROGRAM - STANDARD CMOS SETUP
           (C)1990 American Megatrends Inc., All Rights Reserved
 ┌─────────────────────────────────────────────────────────────────────
 Date (mn/date/year): Sat, Jan 04 1992        Base memory: 640 KB
 Time (hour/min/sec): 09 : 13 : 35            Ext. memory: 256 KB
 Daylight saving:     Disabled         Cyln  Head  WPcom  LZone  Sect  Size
 Hard disk C:         35                            65535  1024   17    77MB
 Hard disk D:         Not Installed
 Floppy drive A:      1.2 MB, 5¼"      ┌─────┬─────┬─────┬─────┬─────┬─────┬─────
 Floppy drive B:      Not Installed    │ Sun │ Mon │ Tue │ Wed │ Thu │ Fri │ Sat
 Primary display:     VGA/PGA/CGA      ├─────┼─────┼─────┼─────┼─────┼─────┼─────
 Keyboard:            Installed        │  29 │  30 │  31 │   1 │   2 │   3 │
                                       │   5 │   6 │   7 │   8 │   9 │  10 │  1
 ┌──────────────────────────────────┐ │  12 │  13 │  14 │  15 │  16 │  17 │  1
 │ Options:-                         │ │  19 │  20 │  21 │  22 │  23 │  24 │  2
 │ Enabled  : Daylight saving ON     │ │  26 │  27 │  28 │  29 │  30 │  31 │
 │ Disabled : Daylight saving OFF    │ │   2 │   3 │   4 │   5 │   6 │   7 │
 └──────────────────────────────────┘ └─────┴─────┴─────┴─────┴─────┴─────┴─────
 ESC=Exit↓→↑←=SelF2/F3=ColorPU/PD=Modify
```

The AMI BIOS has a built-in daylight savings feature that automatically sets the
PCA-6136's real-time clock to adjust itself when it needs to be set either
forward or backward during Daylight Saving or Pacific Standard Time. To do
this set the DAYLIGHT SAVINGS field to enable.

```
              BIOS SETUP PROGRAM - STANDARD CMOS SETUP
           (C)1990 American Megatrends Inc., All Rights Reserved
 ┌─────────────────────────────────────────────────────────────────────
 Date (mn/date/year): Sat, Jan 04 1992        Base memory: 640 KB
 Time (hour/min/sec): 09 : 13 : 35            Ext. memory: 256 KB
 Daylight saving:     Disabled         Cyln  Head  WPcom  LZone  Sect  Size
 Hard disk C:         35                            65535  1024   17    77MB
 Hard disk D:         Not Installed
 Floppy drive A:      1.2 MB, 5¼"      ┌─────┬─────┬─────┬─────┬─────┬─────┬─────
 Floppy drive B:      Not Installed    │ Sun │ Mon │ Tue │ Wed │ Thu │ Fri │ Sat
 Primary display:     VGA/PGA/CGA      ├─────┼─────┼─────┼─────┼─────┼─────┼─────
 Keyboard:            Installed        │  29 │  30 │  31 │   1 │   2 │   3 │
                                       │   5 │   6 │   7 │   8 │   9 │  10 │  1
 ┌──────────────────────────────────┐ │  12 │  13 │  14 │  15 │  16 │  17 │  1
 │ FIXED type=01...46, USER defined  │ │  19 │  20 │  21 │  22 │  23 │  24 │  2
 │ type=47,                          │ │  26 │  27 │  28 │  29 │  30 │  31 │
 │ For type 47 Enter:Cyln,head,WPcom,│ │   2 │   3 │   4 │   5 │   6 │   7 │
 │ Lzon,Sec                          │ └─────┴─────┴─────┴─────┴─────┴─────┴─────
 │ (WPcom is 0 for ALL, 65535 for    │
 │  NONE)                            │
 └──────────────────────────────────┘
 ESC=Exit↓→↑←=SelF2/F3=ColorPU/PD=Modify
```

This screen is the selection of your "Hard Disk C" and "D" types. The basic types come from type 1 to type 46. Type 47 defined by the user. Not Installed can be selected when the system is not equipped with hard disk drive. Please notice that the BIOS can not auto-scan the hard disk type, so you have to use PU/PD to select by yourself.

To define the parameters of a hard disk drive that is not listed in the Hard Disk Drive Tables, move the cursor over to the hard disk drive "Type 47". Next, move the cursor to the right field, and enter the number of cylinders your hard disk drive has. Follow this procedure, entering the appropriate values for each consecutive field ("Heads", "Precomp", "Landing Zone", and "Sectors"). That's all there is to it.

```
                    BIOS SETUP PROGRAM - STANDARD CMOS SETUP
                (C)1990 American Megatrends Inc., All Rights Reserved

 Date (mn/date/year): Sat, Jan 04 1992              Base memory: 640 KB
 Time (hour/min/sec): 09 : 13 : 35                  Ext. memory: 256 KB
 Daylight saving:     Disabled          Cyln  Head  WPcom  LZone   Sect   Size
 Hard disk C:         35                              65535  1024    17    77MB
 Hard disk D:         Not Installed
 Floppy drive A:      1.2 MB, 5¼"      ┌─────┬─────┬─────┬─────┬─────┬─────┬─────┐
 Floppy drive B:      Not Installed    │ Sun │ Mon │ Tue │ Wed │ Thu │ Fri │ Sat │
 Primary display:     VGA/PGA/CGA      ├─────┼─────┼─────┼─────┼─────┼─────┼─────┤
 Keyboard:            Installed        │  29 │  30 │  31 │   1 │   2 │   3 │     │
                                       ├─────┼─────┼─────┼─────┼─────┼─────┼─────┤
                                       │   5 │   6 │   7 │   8 │   9 │  10 │   1 │
  ┌──────────────────────────────────┐├─────┼─────┼─────┼─────┼─────┼─────┼─────┤
  │ Options:-                         ││  12 │  13 │  14 │  15 │  16 │  17 │   1 │
  │ 360 KB 5¼", 1.2 MB 5¼            │├─────┼─────┼─────┼─────┼─────┼─────┼─────┤
  │ 720 KB 3½", 1.44 MB 3½, Not Installed│  19 │  20 │  21 │  22 │  23 │  24 │   2 │
  └──────────────────────────────────┘├─────┼─────┼─────┼─────┼─────┼─────┼─────┤
                                       │  26 │  27 │  28 │  29 │  30 │  31 │     │
                                       ├─────┼─────┼─────┼─────┼─────┼─────┼─────┤
                                       │   2 │   3 │   4 │   5 │   6 │   7 │     │
 ESC=Exit↓→↑←=SelF2/F3=ColorPU/PD=Modify └─────┴─────┴─────┴─────┴─────┴─────┴─────┘
```

This screen showed is to select the type of your "Floppy drive A" and "Floppy drive B", according to your equipment.

Basically, there are five possiblities: 360K, 720K, 1.2MB, 1.44MB, and Not Installed. If you do not clearly know what type of floppy you are using, you may just ignore it by typing "Enter". The BIOS then will auto-scan and appear on the screen the type of floppy you use.

33

```
              BIOS SETUP PROGRAM - STANDARD CMOS SETUP
          (C)1990 American Megatrends Inc., All Rights Reserved

  Date (mn/date/year): Sat, Jan 04 1992          Base memory: 640 KB
  Time (hour/min/sec): 09 : 13 : 35             Ext. memory: 256 KB
  Daylight saving:     Disabled        Cyln  Head  WPcom  LZone  Sect  Size
  Hard disk C:         35                          65535  1024   17    77MB
  Hard disk D:         Not Installed
  Floppy drive A:      1.2 MB, 5¼"     ┌─────┬─────┬─────┬─────┬─────┬─────┬─────
  Floppy drive B:      Not Installed   │ Sun │ Mon │ Tue │ Wed │ Thu │ Fri │ Sat
  Primary display:     VGA/PGA/CGA     ├─────┼─────┼─────┼─────┼─────┼─────┼─────
  Keyboard:            Installed       │  29 │  30 │  31 │   1 │   2 │   3 │
                                       ├─────┼─────┼─────┼─────┼─────┼─────┼─────
                                       │   5 │   6 │   7 │   8 │   9 │  10 │   1
  ┌─────────────────────────────────┐ ├─────┼─────┼─────┼─────┼─────┼─────┼─────
  │ Options:-                       │ │  12 │  13 │  14 │  15 │  16 │  17 │   1
  │ Monochrome,    Color 40x25,     │ ├─────┼─────┼─────┼─────┼─────┼─────┼─────
  │ VGA/PGA/EGA,   Color 80x25, Not Installed │  19 │  20 │  21 │  22 │  23 │  24 │   2
  └─────────────────────────────────┘ ├─────┼─────┼─────┼─────┼─────┼─────┼─────
                                       │  26 │  27 │  28 │  29 │  30 │  31 │
                                       ├─────┼─────┼─────┼─────┼─────┼─────┼─────
                                       │   2 │   3 │   4 │   5 │   6 │   7 │
  ESC=Exit↓→↑←=SelF2/F3=ColorPU/PD=Modify
```

"Primary display" is to select the display used in the system. Monochrome, CGA, EGA, PGA, VGA, and Not Installed are the types for selection.

Also, if you are not sure, you may just type "Enter", the system then will auto-scan.

```
              BIOS SETUP PROGRAM - STANDARD CMOS SETUP
          (C)1990 American Megatrends Inc., All Rights Reserved

  Date (mn/date/year): Sat, Jan 04 1992          Base memory: 640 KB
  Time (hour/min/sec): 09 : 13 : 35             Ext. memory: 256 KB
  Daylight saving:     Disabled        Cyln  Head  WPcom  LZone  Sect  Size
  Hard disk C:         35                          65535  1024   17    77MB
  Hard disk D:         Not Installed
  Floppy drive A:      1.2 MB, 5¼"     ┌─────┬─────┬─────┬─────┬─────┬─────┬─────
  Floppy drive B:      Not Installed   │ Sun │ Mon │ Tue │ Wed │ Thu │ Fri │ Sat
  Primary display:     VGA/PGA/CGA     ├─────┼─────┼─────┼─────┼─────┼─────┼─────
  Keyboard:            Installed       │  29 │  30 │  31 │   1 │   2 │   3 │
                                       ├─────┼─────┼─────┼─────┼─────┼─────┼─────
                                       │   5 │   6 │   7 │   8 │   9 │  10 │   1
  ┌─────────────────────────────────┐ ├─────┼─────┼─────┼─────┼─────┼─────┼─────
  │ Options:-                       │ │  12 │  13 │  14 │  15 │  16 │  17 │   1
  │ Installed    : Test keyboard    │ ├─────┼─────┼─────┼─────┼─────┼─────┼─────
  │ Not Installed : Do not test keyboard │  19 │  20 │  21 │  22 │  23 │  24 │   2
  └─────────────────────────────────┘ ├─────┼─────┼─────┼─────┼─────┼─────┼─────
                                       │  26 │  27 │  28 │  29 │  30 │  31 │
                                       ├─────┼─────┼─────┼─────┼─────┼─────┼─────
                                       │   2 │   3 │   4 │   5 │   6 │   7 │
  ESC=Exit↓→↑←=SelF2/F3=ColorPU/PD=Modify
```

"Keyboard" is to select the keyboard you use. There are only two choice, Installed and Not Installed. The system will auto-scan too.

After this procedure, please press < ESC > to return to the main menu. If you will set standard setup only, please choose "Write to CMOS and Exit", if not, please go on to the next "Advanced CMOS Setup", of course, if you feeel the standard setup is not correct, you may repeat again.

```
┌─────────────────────────────────────────────────────────────────┐
│            BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES          │
│       (C)1990 American Megatrends Inc., All Rights Reserved       │
├─────────────────────────────────────────────────────────────────┤
│                                                                   │
│                      STANDARD CMOS SETUP                          │
│                      ADVANCED CMOS SETUP                          │
│                      ADVANCED CHIPSET SETUP                       │
│               AUTO CONFIGURATION WITH BIOS DEFAULTS               │
│             AUTO CONFIGURATION WITH POWER-ON DEFAULTS             │
│                      CHANGE PASSWORD                              │
│                      HARD DISK UTILITY                            │
│                    WRITE TO CMOS AND EXIT                         │
│                  DO NOT WRITE TO CMOS AND EXIT                    │
│                                                                   │
├─────────────────────────────────────────────────────────────────┤
│                                                                   │
│                                                                   │
│        Advanced CMOS Setup for Configuring System Options         │
│                                                                   │
│                                                                   │
│  ═══ ESC=Exit   ↓→↑←=Sel   F2/F3=Color   F10=Save & Exit ═══      │
└─────────────────────────────────────────────────────────────────┘
```

After standard CMOS Setup, enter Advanced CMOS Setup, for configuring System options. The value shows in the screen is the default value, please follow.

```
           BIOS SETUP PROGRAM - ADVANCED CMOS SETUP
        (C)1990 American Megatrends Inc., All Rights Reserved
 ─────────────────────────────────────────────────────────────────
 Typematic Rate Programming: Disabled│Video ROM Shadow C000,16K: Enable
 Typematic Rate Delay (msec):500      │Video ROM Shadow C400,16K: Disabled
 Typematic Rate (chars/Sec): 15       │AdaptorROM Shadow C800,16K:Disabled
 Above 1 MB Memory Test:     Enabled  │AdaptorROM Shadow CC00,16K:Disabled
 Memory Test Tick Sound:     Enabled  │AdaptorROM Shadow D000,16K:Disabled
 Memory Parity Error Check:  Enabled  │AdaptorROM Shadow D400,16K:Disabled
 Hit <DEL> Message Display:  Enabled  │AdaptorROM Shadow D800,16K:Disabled
 Hard Disk Type 47 Data Area:0:300    │AdaptorROM Shadow DC00,16K:Disabled
 Wait For <F1> If Any Error: Enabled  │AdaptorROM Shadow E000,16K:Disabled
 System Boot Up Num Lock:    On       │AdaptorROM Shadow E400,16K:Disabled
 Numeric Processor:          Enabled  │AdaptorROM Shadow E800,16K:Disabled
 Weitek Processor:           Absent   │AdaptorROM Shadow EC00,16K:Disabled
 Floppy Drive Seek At Boot:  Disabled │System ROM Shadow F000,64K:Enabled
 System Boot Up Sequence:    A:, C:
 System Boot Up Speed:       High
 Cache Memory:               Enabled
 Fast Gate A20 Option:       Enabled
 Turbo Switch Function:      Enabled
 password Checking Option:   Disabled
 ─────────────────────────────────────────────────────────────────
     ESC=Exit  ↓→↑←=Sel  (CTRL) Pu/Pd=Modify  F1=Help  F2/F3=Color
     F5=Old Values  F6=BIOS Setup Defaults  F7=Power-on Defaults
```

Options:

```
Typematic Rate Programming  :  Disabled/Enable
Typematic Rate Delay (msec) :  500/750/1000/250
Typematic Rate (chars/Sec)  :  15/20/24/30/6/8/10/12
Above 1 MB Memory Test      :  Enabled/Disabled
Memory Test Tick Sound      :  Enabled/Disabled
Memory Parity Error Check   :  Enabled/Disabled
Hit <DEL> Message Display   :  Enabled/Disabled
Hard Disk Type 47 Data Area :  0:300/DOS:1KB
Wait For <F1> If Any Error  :  Enabled/Disable
System Boot Up Num Lock      :  On/Off
Numeric Processor test      :  Disabled/Enabled
Weitek Processor            :  Absent/present
Floppy Drive Seek At Boot   :  Disable/Enabled
System Boot Up Sequence     :  A:, C:/C:, A:
System Boot Up Speed        :  High/Low
Cache Memory                :  Enabled/Disabled
Turbo Switch Function       :  Enabled/Disable
Password Checking Option    :  Disabled/Setup/Always
Video ROM Shadow C000, 16K  :  Enabled/Disabled
Video ROM Shadow C400, 16K  :  Enabled/Disabled
Adaptor ROM Shadow C800,16K :  Disabled/Enabled
Adaptor ROM Shadow CC00,16K :  Disabled/Enabled
Adaptor ROM Shadow D000,16K :  Disabled/Enabled
Adaptor ROM Shadow D400,16K :  Disabled/Enabled
Adaptor ROM Shadow D800,16K :  Disabled/Enabled
Adaptor ROM Shadow DC00,16K :  Disabled/Enabled
Adaptor ROM Shadow E000,16K :  Disabled/Enabled
Adaptor ROM Shadow E400,16K :  Disabled/Enabled
Adaptor ROM Shadow E800,16K :  Disabled/Enabled
Adaptor ROM Shadow EC00,16K :  Disabled/Enabled
System  ROM Shadow F000,64K :  Enabled/Disabled
```

4.1.1. The Keyboard Configuration Utility

The AMI BIOS Keyboard Configuration utility provides an option that will automatically enable and disable your keyboard's NUMLock key upon system boot-up. Also, the BIOS provides an option to increase your keyboard's typematic speed rate. The following sections further explain these options in some detail.

4.1.2. NUMLOCK State

The NUMLock key on PC/AT keyboards is used to enable or disable the keyboard's numeric keypad. Enabling the numeric keypad disables the cursor pad function, allowing you to enter numeric values.

If you use the enhanced, 101/102-key AT keyboard, you may want to select the NUMLock enable option with the AMI BIOS Keyboard utility. Selecting this option enables the keyboard's numeric keypad, disabling the keypad's cursor movement capability. Enabling the keyboard's numeric keypad upon system boot-up is useful, especially if you enter numeric values quite often. Cursor movements on the enhanced AT keyboard are made with the keyboard's alternate cursor keypad.

If you use a standard 84-key AT keyboard, you will most likely want to leave the NUMLock function disabled (unless, of course, you use the numeric keypad more than the cursor pad).

4.1.3. Keyboard Typematic Rate

When you press a key for an extended period of time on the keyboard, the character that appears on the screen will repeat itself until you release the key. The keystroke's initial delay, from the time you press a key and the time its character appears on the screen, is usually set at a default of 500 msec. The rate at which the character repeats itself is normally set to a default of 15 characters per second (cps).

4.1.4. Numeric Processor Test

If you have the 80387 on the PCA-6136, set the fucntion to "Enabled", if not, set to "Disabled".

4.1.5. Weitek Processor

If you have the Weitek 3167 on the PCA-6136, set the function to " Present", if not, set to "Absent".

4.1.6. The Boot Sequence Utility

The PCA-6136's AMI BIOS' Boot Sequence utility allows you to choose which drive DOS will search for the COMMAND.COM file to boot your system.

Ordinarily, DOS automatically searches drive 'A' for the system files, and boots your system. If no diskette is present in the drive, either a message will appear asking you to insert a bootable diskette into drive 'A' or the operating system will search the root directory on your hard disk drive for the system files.

The AMI BIOS Boot Sequence utility supports the following options you may choose to boot your system:

A.   **Search A: first, then boot from and set the screen prompt to C:**
     This is the usual way DOS searches for its system files, if you are using a hard disk drive with your system. If not, DOS will boot from the bootable diskette in drive 'A.'

B.   **Auto-boot from C:**
     This speeds up disk operation time during boot-up by auto-booting from C:, thereby overriding drive 'A.' This way you can leave a diskette in drive 'A' without having to remove it when you turn on or reset your system.

4.1.7. The System Boot Up Speed

The AMI BIOS' Speed Configuration utility allows you to select a slower or faster speed at which the PCA-6136's CPU will boot up your system.

As a general rule of thumb, you should set the CPU speed to "High." This increases CPU data processing performance during system boot-up, and while running application programs.

If you want to change the PCA-6136's CPU speed "on the fly," while your system is up and running, simultaneously press the Ctrl, Alt, and + keys to increase the speed. Or, you can simultaneously press Ctrl, Alt, and - to decrease the PCA-6136's CPU speed.

NOTE: Some programs and operating systems, such as Unix, that actually take over the keyboard routine will automatically override these two hot keys, making them ineffective.

The PCA-6136 also has a Hardware Turbo switch J3.

The Turbo switch J3 is ON (close), you can press the " Ctrl,Alt,+" or "Ctrl,Alt,-" to change the CPU speed.

The Turbo switch J3 OFF (open) the CPU speed always low.

4.1.8. The Security Configuration Utility

The AMI BIOS Security Configuration Utility allows you to enable or disable its security password feature.

To enable the password, you have 2 choose: "Setup" or "Always".

When you power up (cold-boot) your system, you are given three opportunities to key in your security password. Two mistakes are allowed while keying in your password; if you fail on the third attempt the BIOS will lock you out of the system. Performing a warm-boot by simultaneously pressing Ctrl, Alt, and Del will not re-invoke the security clearance procedure. You must turn off and

reboot the system in order to enter your password again.

The "Setup" is only protect to run the Setup Utility.

The "Always" is both protect to run the Setup Utility or System Boot.

4.1.9. Shadow RAM Configuration Utility

The AMI BIOS Shadow Ram Configuration Utility configures the PCA-6136's shadow RAM, and provides a screen display that shows the read-only-memory (ROM) that occupies the 640 KB - 1 MB region. (This information can be very useful to users of EMS drivers and Virtual-86 programs.)

Retention of data written into the PCA-6136's shadow RAM (system BIOS, VGA/EGA BIOS, and other firmware data) is stored in ROM.

ROM data is accessed two or three times slower than data stored in RAM. Actually, data stored ROM is normally processed in 8 or 16-bit quantities in comparison to data stored in RAM, which is processed in 32-bit quantities in a 386DX system.

Data in shadow RAM is copied from ROM to RAM during your system's boot-up sequence. This way all data that was stored in ROM will be accessible via your system's RAM, thereby increasing the PCA-6136's CPU processing capabilities.

The PCA-6136's entire 384 KB ROM space is subdivided into ten segments (shown on the editing screen). The system and ROM BIOS segments are divided into two, 64 KB segments (E000H and F000H). The video adapter ROM segment is generically divided into eight, 16 KB segments.

4.1.10. The Cache Configuration Utility

The AMI BIOS' Cache Configuration utility enables or disables the PCA-6136's memory cache system.

The PCA-6136 uses 128 KB of static-random-access-memory (SRAM) with an access time of 25ns for its memory caching capability. When your system is up and running, it continually updates and stores its most frequently used data files into memory cache. This process reduces the time that the PCA-6136 takes to access this data, thereby improving CPU data processing efficiency.

During normal system operation, the PCA-6136's memory cache should always be set to Enabled with the Cache Configuration utility.

```
        BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES
      (C)1990 American Megatrends Inc., All Rights Reserved

                      STANDARD CMOS SETUP
                      ADVANCED CMOS SETUP
                     ADVANCED CHIPSET SETUP
             AUTO CONFIGURATION WITH BIOS DEFAULTS
           AUTO CONFIGURATION WITH POWER-ON DEFAULTS
                       CHANGE PASSWORD
                      HARD DISK UTILITY
                    WRITE TO CMOS AND EXIT
                  DO NOT WRITE TO CMOS AND EXIT




          Advanced CMOS Setup for Configuring System Options


        ESC=Exit   ↓→↑←=Sel   F2/F3=Color   F10=Save & Exit
```

After Advanced CMOS setup, next step is Advanced Chipset Setup, for configuring Chipset Registers.

The value shows in the screen is the default value, please follow:

```
┌─────────────────────────────────────────────────────────────────────────┐
│           BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES                   │
│        (C)1990 American Megatrends Inc., All Rights Reserved              │
├─────────────────────────────────────────┬───────────────────────────────┤
│ BUS Clock Selection:        CLIKIN /4   │Non-Cacheable Block-2 Size:64 MB │
│ Extended I/O Decode:        Disabled    │Non-Cacheable Block-3 Base: 0 KB  │
│ Concurrent Refresh:         Enabled     │Non-Cacheable Block-3 Size:Disabled│
│ Relocated 256KB Cacheable: NO           │                               │
│ 256KB Memory Relocation:    Enabled     │                               │
│ DRAM Write Wait State:      1 W/S       │                               │
│ DRAM Read Wait State:       3 W/S       │                               │
│ RAS* Timeout Conter:        Disabled    │                               │
│ Page Mode:                  Enabled     │                               │
│ DRAM State Machine Select: Cache        │                               │
│ CAS Pulse Width:            3 CLK2      │                               │
│ RAS Precharge Time:         6 CLK2      │                               │
│ RAS to CAS Delay:           2 SYSCLK    │                               │
│ Non-Cacheable Block-0 Size:768   KB     │                               │
│ Non-Cacheable Block-0 Size:32    KB     │                               │
│ Non-Cacheable Block-1 Size:960   KB     │                               │
│ Non-Cacheable Block-1 Size:64    KB     │                               │
│ Non-Cacheable Block-2 Size:16384 KB     │                               │
├─────────────────────────────────────────┴───────────────────────────────┤
│     ESC=Exit  ↓→↑←=Sel  (CTRL) Pu/Pd=Modify  F1=Help  F2/F3=Color         │
│     F5=Old Values  F6=BIOS Setup Defaults  F7=Power-on Defaults           │
└─────────────────────────────────────────────────────────────────────────┘
```

Options:

BUS Clock Selection	:	CLIKIN/4 /CLKIN/3 /CLKIN/3 /CLKIN/5
Extended I/O Decode	:	Disabled/Enabled
Concurrent Refresh	:	Disabled/Enabled
Relocated 256KB Cacheable	:	NO/YES
256KB Memory Relocation	:	Enabled/Disabled
DRAM Write Wait State	:	1 W/S /2 W/S /0 W/S
DRAM Read Wait State	:	3 W/S /0 W/S /1 W/S /2 W/S/4 W/S
RAS* Timeout Conter	:	Disabled/Enabled
Page Mode	:	Enabled/Disabled
DRAM State Machine Select	:	Cache/No cache
CAS Pulse Width	:	3 CLK2/2 CLK2
RAS Precharge Time	:	6 CLK2/4 VLK2
RAS to CAS Delay	:	2 SYSCLK/1 SYSCLK
Non-Cacheable Block-0 Size	:	768 KB
Non-Cacheable Block-0 Size	:	32 KB
Non-Cacheable Block-1 Size	:	960 KB
Non-Cacheable Block-1 Size	:	64 KB
Non-Cacheable Block-2 Size	:	64 MB
Non-Cacheable Block-3 Base	:	0 KB
Non-Cacheable Block-3 Size	:	Disabled/Enabled

4.1.11. The Chipset Configuration Utility

The AMI BIOS Chipset Configuration Utility comes with the BIOS already preset to the PCA-6136's factory default settings.

This utility provides the following user definable options:

* Page Mode, Enable or Disable
* Concurrent (Hidden) Refresh or Standard Refresh
* Memory Read/Write Wait State
* I/O Bus Speed (CPU /2,/3,/4, or /5)

NOTE: As stated before, these options are already defaulted to the factory settings. You may set these settings to suit your application needs at any time. But, it is recommended that you keep these options set to their factory default settings.

The following sections give a quick synopsis of the AMI BIOS Chipset Configuration Utility options.

Page Mode

Default: Enabled

Optioned: Disabled

NOTE: The Page Mode option sets and identifies the PCA-6136's shadow RAM page interleave. The AMI BIOS will detect a non-interleave without any penalty, even though the Page Mode is set to Enabled.

Memory Refresh Mode

Default: Concurrent Mode (Enabled)

Optioned: Standard Mode (Disabled)

In order to alleviate refresh penalty, PCA-6136 supports "Concurrent Refresh" in addition to normal PC Refresh. Traditional PC Refresh will sent a "HOLD" to stop the CPU, after receiving HLDA from the CPU, refresh will begin.

Concurrent Refresh can execute the refresh cycle concurrently with the CPU as long as there is no DRAM conflict. (i.e. We enhance performance by allowing refresh to work on the DRAM and the CPU to work on the cache RAM at the same time.)

Memory Read/Write Wait States

Default: Relocated 256KB Cacheable : NO
            256KB Memory Relocation   : Enabled
            DRAM Write Wait State   : 1 W/S
            DRAM Read Wait State   : 3 W/S
            RAS* Timeout Conter   : Disabled
            CAS Pulse Width   : 3 CLK2
            RAS Precharge Time   : 6 CLK2
            RAS to CAS Delay   : 2 SYSCLK

Optioned: Relocated 256KB Cacheable : YES
            256KB Memory Relocation   : Disabled
            DRAM Write Wait State   : 0 or 2 W/S
            DRAM Read Wait State   : 0,1,2,4 W/S
            RAS* Timeout Conter   : Enabled
            CAS Pulse Width   : 2 CLK2
            RAS Precharge Time   : 4 CLK2
            RAS to CAS Delay   : 1 SYSCLK

4.1.12. Bus Speed

Default: Bus clock selection   : CLKIN/4
            Bus clock = 8.25 MHz (for 33 MHz CPU system, 33/4)

Optioned: Bus clock selection = CLKIN/2
            Bus clock selection = CLKIN/3
            Bus clock selection = CLKIN/5

```
┌─────────────────────────────────────────────────────────────┐
│         BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES         │
│      (C)1990 American Megatrends Inc., All Rights Reserved    │
├─────────────────────────────────────────────────────────────┤
│                                                               │
│                    STANDARD CMOS SETUP                        │
│                    ADVANCED CMOS SETUP                        │
│                    ADVANCED CHIPSET SETUP                     │
│              AUTO CONFIGURATION WITH BIOS DEFAULTS            │
│              AUTO CONFIGURATION WITH POWER-ON DEFAULTS        │
│                       CHANGE PASSWORD                         │
│                      HARD DISK UTILITY                        │
│                    WRITE TO CMOS AND EXIT                     │
│                  DO NOT WRITE TO CMOS AND EXIT               │
│                                                               │
│                                                               │
│                                                               │
│                                                               │
│   Load BIOS Setup Default Values for Advanced CMOS and Advanced│
│   CHIPSET Setup                                               │
│                                                               │
│                                                               │
│  ════ ESC=Exit   ↓→↑←=Sel   F2/F3=Color   F10=Save & Exit ════│
└─────────────────────────────────────────────────────────────┘
```

This menu is used for loading the original BIOS Setup Default value in
Advanced CMOS and Advanced CHIPSET setup. You may select "Y" to
automatically load, or "N", to perform the setup by yourself. If you do not
clearly know the value of the Advanced CMOS Setup & Advanced chipset
setup, you may use this function to setup the Advanced CMOS Setup &
Advanced chipset setup.

```
┌─────────────────────────────────────────────────────────────┐
│         BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES         │
│      (C)1990 American Megatrends Inc., All Rights Reserved    │
├─────────────────────────────────────────────────────────────┤
│                                                               │
│                    STANDARD CMOS SETUP                        │
│                    ADVANCED CMOS SETUP                        │
│                    ADVANCED CHIPSET SETUP                     │
│              AUTO CONFIGURATION WITH BIOS DEFAULTS            │
│              AUTO CONFIGURATION WITH POWER-ON DEFAULTS        │
│    ┌──────────────────────────────────────────────────────┐  │
│    │                                                      │  │
│    │  Load BIOS Setup Default Values from ROM Table (Y/N)? Y│  │
│    │                                                      │  │
│    └──────────────────────────────────────────────────────┘  │
│                                                               │
│                                                               │
│                                                               │
│   Load BIOS Setup Default Values for Advanced CMOS and Advanced│
│   CHIPSET Setup                                               │
│                                                               │
│  ════ ESC=Exit   ↓→↑←=Sel   F2/F3=Color   F10=Save & Exit ════│
└─────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────┐
│        BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES              │
│      (C)1990 American Megatrends Inc., All Rights Reserved        │
├─────────────────────────────────────────────────────────────────┤
│                                                                   │
│                    STANDARD CMOS SETUP                            │
│                    ADVANCED CMOS SETUP                            │
│                    ADVANCED CHIPSET SETUP                         │
│            AUTO CONFIGURATION WITH BIOS DEFAULTS                  │
│          AUTO CONFIGURATION WITH POWER-ON DEFAULTS                │
│                      CHANGE PASSWORD                              │
│                      HARD DISK UTILITY                            │
│                    WRITE TO CMOS AND EXIT                         │
│                  DO NOT WRITE TO CMOS AND EXIT                    │
│                                                                   │
│                                                                   │
│                                                                   │
│  Load Power-On Default Values for Advanced CMOS and Advanced      │
│  CHIPSET Setup                                                    │
│                                                                   │
│    ═══ ESC=Exit   ↓→↑←=Sel   F2/F3=Color   F10=Save & Exit ═══    │
└─────────────────────────────────────────────────────────────────┘
```

This menu is used for loading the original Power-On setup value in the Advanced CMOS and Advanced CHIPSET setup. You may select"Y" to automatically load, or "N" to perform the setup by yourself.

```
┌─────────────────────────────────────────────────────────────────┐
│        BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES              │
│      (C)1990 American Megatrends Inc., All Rights Reserved        │
├─────────────────────────────────────────────────────────────────┤
│                    STANDARD CMOS SETUP                            │
│                    ADVANCED CMOS SETUP                            │
│                    ADVANCED CHIPSET SETUP                         │
│            AUTO CONFIGURATION WITH BIOS DEFAULTS                  │
│            AUTO CONFIGURATION WITH POWER-ON DEFAULTS              │
│         ┌───────────────────────────────────────────────┐        │
│         │  Load Power-On Default Values from ROM Table   │        │
│         │  (Y/N)? Y                                      │        │
│         └───────────────────────────────────────────────┘        │
│                                                                   │
│                                                                   │
│  Load Power-On Default Values for Advanced CMOS and Advanced      │
│  CHIPSET Setup                                                    │
│                                                                   │
│    ═══ ESC=Exit   ↓→↑←=Sel   F2/F3=Color   F10=Save & Exit ═══    │
└─────────────────────────────────────────────────────────────────┘
```

```
        BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES
      (C)1990 American Megatrends Inc., All Rights Reserved

                    STANDARD CMOS SETUP
                    ADVANCED CMOS SETUP
                    ADVANCED CHIPSET SETUP
            AUTO CONFIGURATION WITH BIOS DEFAULTS
          AUTO CONFIGURATION WITH POWER-ON DEFAULTS
                    CHANGE PASSWORD
                    HARD DISK UTILITY
                    WRITE TO CMOS AND EXIT
                 DO NOT WRITE TO CMOS AND EXIT




            Change the User Password stored in the CMOS


     ESC=Exit   ↓→↑←=Sel   F2/F3=Color   F10=Save & Exit
```

Before you change the password, you should enable the security feature (please
review the security utility in the Advanced CMOS Setup), then you can change
your password.

First, you should enter your current password, then enter a new password.
After you have enter your password, a prompt will appear asking you to key
in the same password again, ensuring that no typographical errors were made.

```
┌──────────────────────────────────────────────────────────────────────┐
│                BIOS SETUP PROGRAM - CHANGE PASSWORD                     │
│          (C)1990 American Megatrends Inc., All Rights Reserved          │
│ ┌──────────────────────────────────────────────────────────────────┐  │
│ │                                                                    │  │
│ │                                                                    │  │
│ │                                                                    │  │
│ │            ┌──────────────────────────────────────┐               │  │
│ │            │       ENTER CURRENT Password          │               │  │
│ │            │                                        │               │  │
│ │            └──────────────────────────────────────┘               │  │
│ │                                                                    │  │
│ │                                                                    │  │
│ │          Use Maximum 6 ASCII Characters, ESC:Exit                  │  │
│ └──────────────────────────────────────────────────────────────────┘  │
└──────────────────────────────────────────────────────────────────────┘
```

```
┌──────────────────────────────────────────────────────────────────────┐
│             BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES               │
│          (C)1990 American Megatrends Inc., All Rights Reserved          │
│ ┌──────────────────────────────────────────────────────────────────┐  │
│ │                      STANDARD CMOS SETUP                            │  │
│ │                      ADVANCED CMOS SETUP                            │  │
│ │                      ADVANCED CHIPSET SETUP                         │  │
│ │               AUTO CONFIGURATION WITH BIOS DEFAULTS                 │  │
│ │               AUTO CONFIGURATION WITH POWER-ON DEFAULTS             │  │
│ │                      CHANGE PASSWORD                                │  │
│ │                      HARD DISK UTILITY                              │  │
│ │                      WRITE TO CMOS AND EXIT                         │  │
│ │                      DO NOT WRITE TO CMOS AND EXIT                  │  │
│ │                                                                    │  │
│ │                                                                    │  │
│ │  Foramt the Hard Disk, Auto Interleave Detection and Media Analysis│  │
│ │                                                                    │  │
│ │    ESC=Exit   ↓→↑←=Sel   F2/F3=Color   F10=Save & Exit            │  │
│ └──────────────────────────────────────────────────────────────────┘  │
└──────────────────────────────────────────────────────────────────────┘
```

This menu is used to select your C and D hard disk drive's configuration.

```
         BIOS SETUP PROGRAM - HARD DISK UTILITIES
       (C)1990 American Megatrends Inc., All Rights Reserved

                        Cyln  Head  WPcom  LZcon  Sect  Size (MB)
Hard Disk C: Type: 35   1024  9     65535  1024   17    77

Hard Disk D: Type: Not Installed

Hard Disk Type can be changed from the STANDARD CMOS SETUP option in
Main Menu




                         Hard Disk Format
                         Auto Intterleave
                         Media Analysis


======= ESC=Exit   ↓→↑←=Sel   F2/F3=Color   F10=Save & Exit ======
```

```
         BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES
       (C)1990 American Megatrends Inc., All Rights Reserved

                      STANDARD CMOS SETUP
                      ADVANCED CMOS SETUP
                      ADVANCED CHIPSET SETUP
                  AUTO CONFIGURATION WITH BIOS DEFAULTS
                 AUTO CONFIGURATION WITH POWER-ON DEFAULTS
                         CHANGE PASSWORD
                         HARD DISK UTILITY
                      WRITE TO CMOS AND EXIT
                      DO NOT WRITE TO CMOS AND EXIT




               Write the settings to the CMOS and Exit


======= ESC=Exit   ↓→↑←=Sel   F2/F3=Color   F10=Save & Exit ======
```

After completing all the setup procedures, please type "Y" to reboot the system otherwise, please type "N" to repeat the setup procedure.

```
┌──────────────────────────────────────────────────────────────────┐
│            BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES           │
│         (C)1990 American Megatrends Inc., All Rights Reserved      │
│ ┌────────────────────────────────────────────────────────────────┐│
│ │                   STANDARD CMOS SETUP                           ││
│ │                   ADVANCED CMOS SETUP                           ││
│ │                   ADVANCED CHIPSET SETUP                        ││
│ │             AUTO CONFIGURATION WITH BIOS DEFAULTS               ││
│ │   ┌──────────────────────────────────────────────────────┐     ││
│ │   │                                                      │     ││
│ │   │        Write to CMOS and Exit (Y/N) ? Y             │     ││
│ │   │                                                      │     ││
│ │   └──────────────────────────────────────────────────────┘     ││
│ │                                                                ││
│ │                                                                ││
│ │                                                                ││
│ │                                                                ││
│ │              Write the settings to the CMOS and Exit           ││
│ │                                                                ││
│ │                                                                ││
│ └════ ESC=Exit    ↓→↑←=Sel    F2/F3=Color    F10=Save & Exit ════┘│
└──────────────────────────────────────────────────────────────────┘
```

```
┌──────────────────────────────────────────────────────────────────┐
│            BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES           │
│         (C)1990 American Megatrends Inc., All Rights Reserved      │
│ ┌────────────────────────────────────────────────────────────────┐│
│ │                   STANDARD CMOS SETUP                           ││
│ │                   ADVANCED CMOS SETUP                           ││
│ │                   ADVANCED CHIPSET SETUP                        ││
│ │             AUTO CONFIGURATION WITH BIOS DEFAULTS               ││
│ │          AUTO CONFIGURATION WITH POWER-ON DEFAULTS              ││
│ │                   CHANGE PASSWORD                               ││
│ │                   HARD DISK UTILITY                             ││
│ │                WRITE TO CMOS AND EXIT                           ││
│ │              **DO NOT WRITE TO CMOS AND EXIT**                  ││
│ │                                                                ││
│ │                                                                ││
│ │          Do not write the settings to the CMOS and Exit        ││
│ │                                                                ││
│ │   .                                                            ││
│ └════ ESC=Exit    ↓→↑←=Sel    F2/F3=Color    F10=Save & Exit ════┘│
└──────────────────────────────────────────────────────────────────┘
```

If you are not satisfied with your setup values, quite the setup procedure without saving. Your system will reboot, and the original setup values will be restered.

```
BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES
(C)1990 American Megatrends Inc., All Rights Reserved

                    STANDARD CMOS SETUP
                    ADVANCED CMOS SETUP
                    ADVANCED CHIPSET SETUP
            AUTO CONFIGURATION WITH BIOS DEFAULTS

        Want to Quit Without Saving (Y/N)? N




            DO not Write the settings to the CMOS and Exit

        ESC=Exit   ↓→↑←=Sel   F2/F3=Color   F10=Save & Exit
```

```
                    STANDARD CMOS SETUP
                    ADVANCED CMOS SETUP
                    ADVANCED CHIPSET SETUP
            AUTO CONFIGURATION WITH BIOS DEFAULTS

        Want to Quit Without Saving (Y/N)? N




            DO not Write the settings to the CMOS and Exit

        ESC=Exit   ↓→↑←=Sel   F2/F3=Color   F10=Save & Exit
```

4.2. AMI BIOS Hard Disk Drive Table

Type	Cylns.	Heads	WPcomp	LZone	Sects	Capacity
1	306	4	128	305	17	10 MB
2	615	4	300	615	17	20 MB
3	615	6	300	615	17	31 MB
4	940	8	512	940	17	62 MB
5	940	6	512	940	17	47 MB
6	615	4	65535	615	17	20 MB
7	462	8	256	511	17	31 MB
8	733	5	65535	733	17	30 MB
9	900	15	65535	901	17	112 MB
10	820	3	65535	820	17	20 MB
11	855	5	65535	855	17	35 MB
12	855	7	65535	855	17	50 MB
13	306	8	128	319	17	20 MB
14	733	7	65535	733	17	43 MB
15	000	0	000	000	17	00 MB
16	612	4	0	663	17	20 MB
17	977	5	300	977	17	41 MB
18	977	7	65535	977	17	57 MB
19	1024	7	512	1023	17	60 MB
20	733	5	300	732	17	30 MB
21	733	7	300	732	17	43 MB
22	733	5	300	733	17	30 MB
23	306	4	0	336	17	10 MB
24	925	7	0	925	17	54 MB
25	925	9	65535	925	17	69 MB
26	754	7	754	754	17	44 MB
27	754	11	65535	754	17	69 MB
28	699	7	256	699	17	41 MB
29	823	10	65535	823	17	68 MB
30	918	7	918	918	17	53 MB
31	1024	11	65535	1024	17	94 MB
32	1024	15	65535	1024	17	128 MB
33	1024	5	1024	1024	17	43 MB
34	612	2	128	612	17	10 MB
35	1024	9	65535	1024	17	77 MB
36	1024	8	512	1024	17	68 MB
37	615	8	128	615	17	41 MB
38	987	3	987	987	17	25 MB
39	987	7	987	987	17	57 MB
40	820	6	820	820	17	41 MB
41	977	5	977	977	17	41 MB
42	981	5	981	981	17	41 MB
43	830	7	512	930	17	48 MB
44	830	10	65535	830	17	69 MB
45	917	15	65535	918	17	114 MB
46	1024	15	65535	000	17	152 MB
47	user type					

4.3. AMI BIOS Error Messages

When the PCA-6136 is turned on, a Power-On-Self-Test (POST) is performed by the BIOS. This test is tightly interwoven with the system initialization porcess performed by the BIOS. The POST begins when power is applied to the system and is followed by the system boot, which loads the operating system from the disk.

In general, if the POST detect a system board failure, the system halts and generated an audible alarm.

If a non-system board failure is detected, such as a monitor, keyboard, or option board failure, an error message will be displayed on the screen.

The tables porvides information about the POST messages, including error messages and information messages, as well run-time message. Run-time messages are displayed when an error occurs after the boot procedure has been completed.

The POST messages are divided into four tables and are listed as follows:

1. Error messages   - these indicate a failure in the hardware, software or firmware. Refer to Table 4-1.

2. Information messages   - these provide important information about the power-on and boot porcess, such as memory status. Refer to Table 4-2.

3. Run time messages   - these are messages that will be delayed when something failes while you are running system or application software. Refer to Table 4-3.

4. Beep sound error message - these are error messages that come in the form of beeps on the system speaker.

NOTE: The following error messages are drived from AMI BIOS technical information. Some of this informations will differ slightly from other BIOS.

Table 4-1. Error Messages

MESSAGE	PROBABLE CAUSE	SOLUTION
CHANNEL-2 TIMER NOT FUNCTIONAL	THE TIMER CHIP (82C206) HAS FAILED	CHECK THE TIMER CHIP (82C206) ON THE SYSTEM BOARD
KEYBOARD CONTROLLER ERROR SYSTEM HALTED	KEYBOARD CONTROLLER FIRMWARE ERROR	CHECK THE KEYBOARD CONTROLLER
CMOS BATTERY STATE LOW	BATTERY DEAD OR IT HAS LOST POWER	REPLACE BATTERIES. CHECK THE JP6
CMOS CHECKSUM FAILURE	THE DATA ON THE CMOS RAM WAS DESTROYED, EITHER BY SOFTWARE (USER'S PROGRAM) OR HARDWARE.	1. RUN SETUP UTILITY 2. CHECK SOFTWARE 3. REPLACE BATTERIES
CMOS OPTIONS NOT SET	SOME OPTIONS HAVE NOT YET BEEN SET.	RUN SETUP UTILITY TO SET OPTIONS CORRECTLY.
CMOS INVALID SYSTEM HALTED	CMOS RAM R/W ERROR	CHECK THE RT/CMOS CHIP(82C206) ON THE SYSTEM BOARD.
CMOS DISPLAY CONFIGURATION MISMATCH	CMOS SETTING NOT CORRECT	RUN SETUP UTILITY
INTERRUPT CONTROLLER #2 FUNCTIONAL	INTERRUPT CONTROLLER IS DEFECTIVE	REPLACE THE PIC #2(82C206) ON THE SYSTEM BOARD.
STRAY INTERRUPT SENSED CONTROLLER #1	UNEXPECTED INTERRUPT OCCURED	REPLACE THE PIC #1(82C206) ON THE SYSTEM BOARD.
KEYBOARD ERROR	A. KEYBOARD CANNOT BE RESET. B. KEYBOARD SELF TEST ERROR	1. MARK SURE THE KEYBOARD CABLE IS CONNECTED PROPERLY 2. MAKE SURE ON KDY NOT JAMMED
KEYBOARD/INTERFACE ERROR	INTERFACE TEST ERROR A. KEYBOARD CLOCK LINE FAILURE B. KEYBOARD DATA LINE FAILURE	1. CHECK THE KEYBOARD CONTROLLER 2. CHECK THE KEYBOARD CABLE CONNECTOR
FLOPPY DISK CONTROLLER FAILURE	THE DISKETTE ADAPTER HAS FAILER	REPLACE THE CONTROLLER BOARD.

HARD DISK CONTROLLER FAILURE	THE CONTROLLER CARD HAS FAILED	REPLACE THE CONTROLLER CARD
DISPLAY SWITCH SETTING NOT PORPER	DISPLAY JUMPER SETTING CONFLICTS WITH ACTUAL DISPLAY ADAPTER	CHANGE THE JUMPER SETTING ON THE SYSTEM BOARD
8742 GATE 20 ERROR SYSTEM HALTED	PROTECTED MODE CAN NOT BE ENABLED	CHECK THE CPU CARD
FAILURE SYSTEM HALTED	ASSOCIATED CIRCUITY HAS FAILED	1. MEMORY DATA LINE 2. MEMORY ADDR. LINE 3. MEMORY CHIPS 4. CHANGE BAD PART
DMA CONTROLLER ERROR SYSTEM HALTED	A. PAGE REGISTERS R/W ERROR F/F B. LATCH F/F ERROR	CHECK THE SYSTEM BOARD AND REPLACE IF NECESSARY
DMA UNIT #1 ERROR SYSTEM HALTED	CHANNEL REGISTERS R/W ERROR	REPLACE THE DMA #1 (82C206) ON THE SYSTEM BOARD
DMA UNIT #2 ERROR SYSTEM HALTED	CHANNEL REGISTTERS R/W ERROR	REPOACE THE DAM #2 (82C206) ON THE SYSTEM BOARD
INTERRUPT CONTROLLER #1 ERROR SYSTEM HALTED	INTERRUPT CONTROLLER IS DEFECTIVE	REPLACE THE PIC #1 982C206) ON THE SYSTEM BOARD
HARD DISK UNIT 0 FAILURE	1. THE HARD DISK UNIT 0 HAS FAILED 2. MAYBE HARD DISK TYPE ERROR 3. MAYBE HARD DISK WAS NOT INITIATED	1. REBOOT. IF THAT DOES NOT WORK, REPLACE THE HARD DISK 2. RUN FSETUP.EXE TO CHECK IF HARD DISK TYPE IS OK 3. RUN HDFORMT.COM TO INITIATE HARD DISK NOTE:ALL DATA WILL BE DESTROYED.
HARD DISK UNIT 0 ERROR	1. THE HARD DISK UNIT 0 IS DEFECTIVE. 2. MAYBE HARD DISK TYPE ERROR. 3. MAYBE HARRD DISK WAS NOT INITIATED.	
HARRD DISK UNIT 1 FAILURE	1. THE HARD DISK UNIT 1 HAS FAILED. 2. MAYBE HARD DISK TYPE ERROR. 3. MAYBE HARD DISK WAS NO INITIATED	

HARD DISK UNIT 1 ERROR	1. THE HARD DISK UNIT 1 IS DEFECTIVE. 2. MAYBE HARDKDISK TYPE ERROR. 3. MAYBE HARD DISK WAS NOT INITIATED.	
CMOS SYSTEM TIME & ATE NOT SET	THE TIME OR DATE IS OUT OF RANGE.	RUN FSETUP.EXE AND RESET THE TIME OR DATE.
CMOS MEMORY SIZE MISMATCH	EITHER BASE OR EXTENSION MEMORY SIZE SETTING CONFLICT WITH ACTUAL MEMORY SIZE.	REN STANDARD CMOSE SETUP AND RESET. REPLACE THE MEMOORYY CHIP IN THE SYSTEM OBARD OR ON THE PERIPHERAL CARD.
KEYBOARD IS LOCKED UNLOCK IT	THE KEYBOARD LOCK ON THE FRONT OF THE COMPUTER IS ACTIVATED	UNLOCK THE KEYBOARD
HARD DISK UNIT 1 TYPE UNDEFINED IN CMOS	UNIT 1 EXISTS, BUT IS NOT DEFINED IN THE CMOS RAM.	RUN STANDARD CMOS SETUP AND DEFINE THE TYPE NO.
DISKETTE BOOT FAILURE INSERT BOOT DISKETTE IN DRIVE A.	A. DJISKETTE READ ERROR. B. DRIVE ERROR.	REPLACE THE SYSTEM DISKETTE. REBOOT OR CLEAN THE R/W HEAD IN DEIVE A.
INVALID BOOT DISKETTE INSERT BOOT DISKETTE IN DEIVE A.	NOT A BOOTABLE SYSTEM DISKETTE	REPLACE WITH A SYSTEM DISKETTE. REBOOT.
DRIVE NOT READY ERROR. INSERT BOOT DISKETTE IN DEIVE A.	THERE IS NO DISKETTE IN DEIVE A	PLACE A SYSTEM DISK IN DEIVE A AND TRY AGAIN.

Table 4-2 POST Information Messages

MESSAGE	MEANING
ROM BIOS (C) 1990 AMERICAN MEGATRENDS INC.,	THIS MESSAGE IS DISPLAYED ON THE SCREEN AFTER A BOOT AND INDICATED.
XXXXX KB OK	INDICATES THAT THE MEMORY SIZE AGREES WITH THE CMOS RAM.(INCLUDES BASE MEMORY AND EXTENDED MEMORY.
PRESS (ESC) KEY TO BYPASS MEMORY TEST.	THE MEMORY TEST IS TIME CONSUMING. YOU CAN SKIP IT BY PRESSING (ESC)
RUN SETUP UTILITY PRESS (F1) KEY TO RESUME	1. ERROR(S) WERE FOUND WHILE RUNNING THE POST. PRESSING THE F1 KEY ALLOW THE SUSTEM TO CONTINUE, 2. RUN THE SETUP PROGRAM AND TRY AGAIN.

Table 4-3 Run Time error Messages:

FROM:	PARTITION SECTOR	AND BOOT SECTOR
INVALID PARTITION TABLE	INVALID PARTITION TABLE IN HARD DISK UNIT 0.	1. RUN FDISK.COM ON YOUR DOS DISK TO BUILD A VALID PARTITION TABLE.
ERROR LOADING OPERATING SYSTEM	BOOT SECTOR READ ERROR. HARD DISK UNIT 0 IS DEFECTIVE.	1. RUN FORMAT.EXE TO VERIFY HARD DISK. NOTE: ALL DATA WILL BE DESTROYED.
MISSING OPERATING SYSTEM	INVALID BOOT SECTOR ON THE ACTIVE PARTITION.	1. RUN SYS.COM TO RECREATE DOS. 2. RUN RECREATE DOS SYSTEM PARTITION. NOTE: ALL DATA WILL BE DESTROYED.
NON-SYSTEM DISK OR DISK ERROR REPLACE AND STRIKE ANY KEY WHEN READY	WHEN YOU BOOTED, THE DISK IN DRIVE A. WAS NOT A SYSTEM DISK	REPLACE THE DISK IN DRIVE A. WHTH A SYSTEM DISK AND REBOOT
DISK BOOT FAILURE	INVALID BOOT SECTOR OR DISKETTE ERROR.	REPLACE THE DISK IN DRIVE A. WITH A SYSTEM DISK AND REBOOT.
BAD OR MISSING COMMAND INTERPRETER	COMMAND.COM IS MISSING FROM THE DEFAULT DRIVE.	INSERT THE ARC DOS IN DRIVE A. AND REBOOT THE SYSTEM.

Errors Reported by AMI-BIOS

AMI-BIOS performs various diagnostic tests at the time the system is powered up. Whenever an error is encountered during these tests, either you hear a few short beeps or see an error display on your monitor. If the error occurs before the display device is initialized the system reports the error by giving a number of short beeps.

4	System Timer failure.
5	Processor failure.
6	Keyboard controller - Gate A20 error.
7	Virtual Mode Exception error.
8	Display Memory R/W Test failure. (*)
9	ROM-BIOS Checksum failure.

(*) Non-Fatal Error.

Error Messages
1. Channel - 2 of timer not functional.
2. Stray interrupt sensed in controller.
3. Interrupt controller #2 not functional

Non-Fatal Errors
1. Keyboard error.
2. Keyboard/Interface error.
3. CMOS battery state low.

4. CMOS system options not set.

5. CMOS checksum failure.

6. CMOS memlry size mismatch.

7. CMOS system time and date not set.

8. CMOS display configuration mismatch.

9. Display setting not proper.

10. Keyboard is locked...Unlock it.

11. Floppy disk controller failure.

12. Hard disk unit 0 error.

13. Hard disk unit 1 error.

14. Hard disk unit 0 failure.

15. Hard disk unit 1 failure.

16. Hard disk unit 1 is not define in CMOS.

4.4. AMI BIOS Checkpoint Codes

```
                              POST Error Codes

  01    NMI disabled & 286 reg. test about to start
  02    286 register test over
  03    ROM checksum OK
  04    8259 initialization OK
  05    CMOS pending interrupt disabled
  06    Video disabled & system timer counting OK
  07    8253 CH-2 test OK
  08    CH-2 delta count test OK
  09    CH-1 delta count test OK
  0A    CH-0 delta count test OK
  0B    Parity status cleared
  0C    Refresh and system timer OK
  0D    Refresh line toggling OK
  0E    Refresh periods ON/OFF 50% OK
  0D    Confirmed refresh On & about to start 64 KB memory
  11    Address line test OK
  12    64 KB memory base test OK
  13    Interrupt vectors initialized
  14    8042 keyboard controller test OK
  15    CMOS read/write test OK
  16    CMOS checksum/battery check OK
  17    Monochrome mode set OK
  18    Color mode set OK
  19    About to look for optional video ROM
  1A    Optional video ROM control OK
  1B    Display memory R/W test OK
  1C    Display memory R/W test for alternate display OK
  1D    Video retrace check OK
  1E    Global equipment byte set to video OK
  1F    Mode set call for Mono/Color OK
  20    Video test OK
  21    Video display OK
  22    Power on message display OK
  30    Virtual memory mode test about to begin
```

POST Error Codes (Cont.)	
31	Virtual memory mode test started
32	Processor in virtual mode
33	Memory address line test in progress
34	Memory address line test in progress
35	Memory below 1 MB calculated
36	Memory size computation OK
37	Memory test in progress
38	Memory initialization over (below 1 MB)
39	Memory initialization over (above 1 MB)
3A	Display memory size
3B	About to start below 1 MB memory test
3C	Memory test below 1 MB OK
3D	Memory test above 1 MB OK
3E	About to go to real mode shutdown
3F	Shutdown successful and enter into real mode
40	About to disable gate A-20 address line
41	Gate A-20 line successfully disabled
42	About to start DMA controller test
4E	Address line test OK
4F	Processor in real mode after shutdown
50	DMA page register test OK
51	DMA unit-1 base register test about to start
52	DMA unit-1 channel OK, about to begin CH-2
53	DMA CH-2 base register test OK
54	About to test f/f latch for unit
55	f/f latch test for both units OK
56	DMA unit 1 & 2 programmed OK
57	8259 initialization over
58	8259 mask register check OK
59	Master 8259 mask register OK, about to start slave
5A	About to check timer and keyboard interface level
5B	Timer interrupt OK
5C	About to test keyboard interrupt
5D	ERROR! timer/keyboard interface not in proper level
5E	8259 interrupt controller error
5F	8259 interrupt controller test OK
70	Start keyboard test
71	Keyboard BAT test OK
72	Keyboard test OK
73	Keyboard global data initialization OK
74	Floppy disk drive setup about to start
75	Floppy disk drive setup OK
76	Hard disk drive setup about to start
77	Hard disk drive setup OK
79	About to initialize timer data area
7A	Verify CMOS battery power
7B	CMOS battery verification done
7D	About to analyze diagnostics test results for memory
7E	CMOS memory size update OK
7F	About to check optional ROM C000:0

POST Error Codes (Cont.)
80	Keyboard sensed to enable SETUP
81	Optional ROM control OK
82	Printer global data initialization OK
83	RS-232 global data initialization OK
84	80287 check/test OK
85	About to display soft error message
86	About to give control to system ROM E000:0
87	System ROM E000:0 check over
00	Control given to int-19, boot loader

CHAPTER 5. WATCHDOG TIMER

The PCA-6136 is equipped with a watchdog timer that resets the system if processing comes to a standstill, caused by electromagnetic interference (EMI), software bugs or whatever reasons. This feature ensures system reliability in industrial stand-alone and unmanned environments.

Refer to section 2.1.6. for instructions on enabling and disabling the watchdog timer.

5.1. Programming the Watchdog Timer Initial Inspection

If you selected the user programmable (enable/disable) mode for the watchdog timer in Section 2.1.6., you must write a program containing one of the following two instructions.

READ I/O PORT 443(hex) : Enable and refresh the watchdog timer
READ I/O PORT 043(hex) : Disable the watchdog timer

To enable the watchdog timer, you must program an instruction that will read I/O port address 443 that will periodically refresh and initialize the watchdog timer. Refreshing and initializing the watchdog prevents it from resetting the system every time its timed interval occurs.

If the system does come to a standstill, because of EMI or a software bug, signals sent from I/O port address 443 to the watchdog timer will be interrupted. If this happens the watchdog will automatically reset the system (depending on the timed interval you have selected), and data processing will continue normally.

When programming an instruction that periodically refreshes the watchdog timer, you must write the program so that it reads I/O port address 443 at an interval shorter than the watchdog's preset timed interval. (Keep in mind that the watchdog's timed intervals have a tolerance of $\pm 30\%$ due to the uncertainty of the system's time requirements.) So, if you set the watchdog timer at a 15 second interval, program an instruction that will repeatedly refresh it within 10 seconds. For example your program could be written as:

```
10 REM EXAMPLE PROGRAM
20 X=INP(&H443) REM ENABLE AND REFRESH THE WATCH DOG
30 GOSUB 1000 REM   TASK #1, 2 SEC
40 GOSUB 2000 REM   TASK #2, 3 SEC
50 GOSUB 5000 REM   TASK #3, 4 SEC
60 GOTO 20
70 END


1000 REM SUBROUTINE #1, TAKE 2 SEC TO COMPLETE
  .
  .
  .
1070 RETURN


2000 REM SUBROUTINE #2, TAKE 3 SEC TO COMPLETE
  .
  .
  .
2090 RETURN


5000 REM SUBROUTINE #3, TAKE 4 SEC TO COMPLETE
  .
  .
  .
5080 RETURN
```
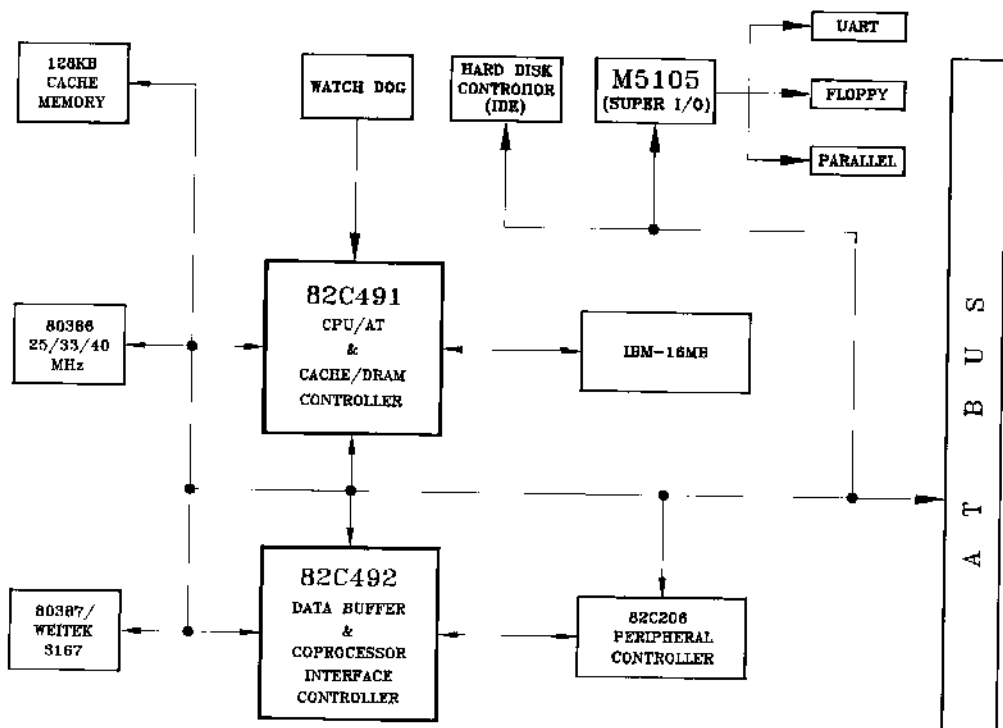
NOTE: To disable the watchdog timer, you should program a similar instruction that will read I/O port, address 043.

CHAPTER 6. SYSTEM INFORMATION

6.1. Block Diagram

6.2. I/O Address Map

Hex Range	Device
000-01F	DMA controller 1
020-021	Interrupt controller 1
022-023	Chipset Address
040-04F	Timer 1
043	Watchdog Timer Enable/Disable, trigger
050-05F	Timer 2
060-06F	8042 keyboard/controller
070-07F	Real-time clock (RTC), Non-maskable Interrupt (NMI) mask
080-09F	DMA page registers
0A0-0BF	Interrupt controller 2
0F0	Clear Math Co-processor
0F1	Reset Math Co-processor
0F8-0FF	Math Co-processor
1F0-1F8	Fixed Disk
278-27F	Parallel printer port (LPT3)
2F8-2FF	Serial port 2
300-31F	Prototype card/Streaming Tape Adapter
378-37F	Parallel printer port (LPT2)
380-38F	SDLC, bisynchronous 2
3A0-3AF	Bisynchronous 1
3B0-3BF	Monochrome display and printer adapter(LPT1)
3C0-3CF	EGA adapter
3D0-3DF	Color/Graphics Monitor Adapter
3F0-3F7	Diskette controller
3F8-3FF	Serial port 1
443	Watchdog Timer Enable/Disable, trigger

6.3. Bus Connectors

Side A		
I/O Pin	Signal Name	Input/Output
A1	-I/O CH CK	Input
A2	SD7	Input/Output
A3	SD6	Input/Output
A4	SD5	Input/Output
A5	SD4	Input/Output
A6	SD3	Input/Output
A7	SD2	Input/Output
A8	SD1	Input/Output
A9	SD0	Input/Output
A10	-I/O CH CK	Input
A11	AEN	Output
A12	SA19	Input/Output
A13	SA18	Input/Output
A14	SA17	Input/Output
A15	SA16	Input/Output
A16	SA15	Input/Output
A17	SA14	Input/Output
A18	SA13	Input/Output
A19	SA12	Input/Output
A20	SA11	Input/Output
A21	SA10	Input/Output
A22	SA9	Input/Output
A23	SA8	Input/Output
A24	SA7	Input/Output
A25	SA6	Input/Output
A26	SA5	Input/Output
A27	SA4	Input/Output
A28	SA3	Input/Output
A29	SA2	Input/Output
A30	SA1	Input/Output
A31	SA0	Input/Output

Side B		
I/O Pin	Signal Name	Input/Output
B1	GND	Ground
B2	RESET DRV	Output
B3	+5Vdc	Power
B4	IRQ9	Input
B5	-5Vdc	Power
B6	DRQ2	Input
B7	-12Vdc	Power
B8	0WS	Input
B9	+12Vdc	Power
B10	GND	Ground
B11	-SMEMW	Output
B12	-SMSMR	Output
B13	-IOW	Input/Output
B14	-IOR	Input/Output
B15	-DRACK3	Output
B16	DRQ3	Input
B17	-DRACK1	Output
B18	DRQ1	Input
B19	-REFRESH	Input/Output
B20	CLK	Output
B21	IRQ7	Input
B22	IRQ6	Input
B23	IRQ5	Input
B24	IRQ4	Input
B25	IRQ3	Input
B26	-DACK2	Output
B27	T/C	Output
B28	BALE	Output
B29	+5Vdc	Power
B30	OSC	Output
B31	GND	Ground

Side C		
I/O Pin	Signal Name	Input/Output
C1	SBHE	Input/Output
C2	LA23	Input/Output
C3	LA22	Input/Output
C4	LA21	Input/Output
C5	LA20	Input/Output
C6	LA19	Input/Output
C7	LA18	Input/Output
C8	LA17	Input/Output
C9	-MEMR	Input/Output
C10	-MEMW	Input/Output
C11	SD08	Input/Output
C12	SD09	Input/Output
C13	SD10	Input/Output
C14	SD11	Input/Output
C15	SD12	Input/Output
C16	SD13	Input/Output
C17	SD14	Input/Output
C18	SD15	Input/Output

Side D		
I/O Pin	Signal Name	Input/Output
D1	-MEM CS16	Input
D2	-I/O CS16	Input
D3	IRQ10	Input
D4	IRQ11	Input
D5	IRQ12	Input
D6	IRQ15	Input
D7	IRQ14	Input
D8	-DACK0	Output
D9	DRQ0	Input
D10	-DACK5	Output
D11	DRQ5	Input
D12	-DACK6	Output
D13	DRQ6	Input
D14	-DACK7	Output
D15	DRQ7	Input
D16	+5Vdc	Power
D17	-MASTER	Input
D18	GND	Ground

6.4. CMOS RAM Index Register Address Map

Address	Description
00-0D	* Real-time clock information
0E	* Diagnostic status byte
0F	* Shutdown status byte
10	Diskette drive type byte, drives A and B
11	Reserved
12	Fixed disk type byte, drives C and D
13	Reserved
14	Equipment byte
15	Low base memory byte
16	High base memory byte
17	Low expansion memory byte
18	High expansion memory byte
19-2D	Reserved
2E-2F	2-byte CMOS checksum
30	* Low expansion memory byte
31	* High expansion memory byte
32	* Date century byte
33	* Information flags (set during power on)
34-3F	Reserved

6.5. Real-time Clock Information (Index Address 00-0D)

Byte	Function	Address
0	Seconds	00
1	Second alarm	01
2	Minutes	02
3	Minute alarm	03
4	Hours	04
5	Hours alarm	05
6	Day of week	06
7	Date of month	07
8	Month	08
9	Year	09
10	Status register A	0A
11	Status register B	0B
12	Status register C	0C
13	Status register D	0D

6.6. DMA, Interrupt, and Timer

Channel	Function
0	Spare (8-bit transfer)
1	SDLC (8-bit transfer)
2	Floppy disk (8-bit transfer)
3	Spare (8-bit transfer)
4	Cascade for DMA controller 1
5	Spare (16-bit transfer
6	Spare (16-bit transfer)
7	Spare (16-bit transfer)

DMA Controller Registers	
Hex Address	**Command Codes**
0C0	CH0 base and current address
0C2	CH0 base and current word count
0C4	CH1 base and current address
0C6	CH1 base and current word count
0C8	CH2 base and current address
0CA	CH2 base and current word count
0CC	CH3 base and current address
0CE	CH3 base and current word count
0D0	Read status register/Write command register
0D2	Write mode register
0D4	Read temporary register/Write command register
0D6	Write mode register
0D8	Clear byte pointer flop-flop
0DA	Read status register/Write command register
0DC	Write mode register
0DE	Write all mask register bus

Page Address	
Page Register	I/O Address
DMA Channel 0	0087
DMA Channel 1	0083
DMA Channel 2	0081
DMA Channel 3	0082
DMA Channel 5	008B
DMA Channel 6	0089
DMA Channel 7	008A
Refresh	008F

Interrupts		
Priority	Interrupt #	Interrupt Source
1	NMI	Parity error detected.
2	IRQ 0	Interval timer, counter 0 output.
3	IRQ 1	Keyboard.
-	IRQ 2	Interrupt from controller 2 (cascade).
4	IRQ 8	Real-time clock.
5	IRQ 9	Cascaded to INT 0AH (IRQ 2).
6	IRQ 10	Reserved.
7	IRQ 11	Reserved.
8	IRQ 12	Reserved.
9	IRQ 13	INT from Math co-processor.
10	IRQ 14	Fixed disk controller.
11	IRQ 15	Reserved
12	IRQ 3	Serial communication port 2.
13	IRQ 4	Serial communication port 1.
14	IRQ 5	Parallel port 2 (Bus mouse).
15	IRQ 6	Diskette controller (FDC).
16	IRQ 7	Parallel port 1 (Print port).

Timer	
Channel	Function
0	System timer
2	Refresh request generator
3	Tone generation for speaker

6.7. Memory Address Map

Address (Hex)	Size	Function
0000000 - 009FFFF	640 KB	System board memory
00A0000 - 00BFFFF	128 KB	Video RAM display buffer
00C0000 - 00DFFFF	128 KB	Reserved for add-on cards ROM BIOS, i.e. VGA/EGA
00E0000 - 00EFFFF	64 KB	System ROM BIOS expansion
00F0000 - 0FFFFFF	64 KB	System ROM BIOS
0100000 - 0FDFFFF	15232 KB	Extended memory
0FE0000 - 0FEFFFF	64 KB	Duplicates system ROM BIOS expansion at 0E0000 - 0EFFFF
0FF0000 - 0FFFFFF	64 KB	Duplicates system ROM BIOS at 0F0000 - 0FFFFF