# 486PH

486 PCI/VL/ISA System Board

## USER'S MANUAL

Revision 1.00

# PREFACE

Thank you for purchasing the 486PH system board. This document will aid you to configure and to install this system board properly. The document is prepared with our best knowledge; however, we make no representation or warranty concerning the contents or use of this manual, and specifically disclaim any expressly implied warranties or merchant ability or fitness of any particular purpose. The information in this document is subject to change without notice.

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# CHAPTER 1:  INTRODUCTION

## PRODUCT OVERVIEW

The 486PH system board adds to our product line a highly integrated and cost effective solution, without compromising performance or quality.  Intel, AMD, & Cyrix 486 CPUs are supported on the 486PH system board.  With top CPU speed at 100MHz and integrated Write-Back cache, the 486PH dramatically boosts system throughput for even the most demanding applications.

## Features

### CPU Support

- Supports Intel, AMD, Cyrix CPUs.

### Cache Memory

- Supports 128K, 256K, and 512K Fast External Write-back Cache memory.

### System Memory DRAM

- 4 Banks of Memory that support 256Kx36, 512Kx36, 1Mx36, 2Mx36, 4Mx36, & 8Mx36 72-pin SIMMs.
- Up to 64MBytes on-board memory.

### System BIOS

- AMI BIOS with Built-in Window Standard CMOS, Advanced CMOS, Advanced Chipset, Configuration Utilities, Password, Power Management Setup Menus.
- Optional Flash BIOS supports ISA Plug & Play feature.

## System Chipset

- Intel ARIES EPA Green 82420EX PCI Level 2 Chipset.
- Sophisticated System Power Management.
- Supports Level 1 Write-Back CPU.

## Bus Slots

- Three 32-bit PCI Bus Mastering slots (One is sharing slot).
- Two 32-bit VL-Bus Mastering slots.
- Five ISA slots.

## On-Board IDE Port

- 32-bit PCI IDE supports Mode 3 Timing.
- Support Logical Block Address to configure more than 528MB HDD.
- Auto-configuring.

## Real Time Clock

- Real Time Clock with built-in Battery to provide accurate timer clock.

## Board Form Factor

- Standard PC/XT (or PC/AT) form factor and mounting holes.

# Product Specifications

## Electrical

Typical Power:    +5V Tolerance 5%, current 4.5A.
+12V   Tolerance 10%, current 100mA.
-5V Tolerance 5%, current 150mA.
-12V Tolerance 10%, current 100mA.

## Environmental

Operating temperature (ambient):    $O^0C/32^0F$ to $55^0C/131^0F$

Storage temperature    $-20^0C/-4^0F$ to $70^0C/158^0F$

Operating Humidity:    10% to 90%
(non-condensing)

Storage Humidity:    5% to 95%
(non-condensing)

## Dimensions

Width:    8.7 inches (221.0 mm)

Length:    10.8125 inches (274.5 mm)

# CHAPTER 2: BOARD'S JUMPERS & CONNECTORS

**When working with the 486PH, it is extremely important that you avoid Electrical Static Discharge (ESD). Always ground yourself by wearing a grounded wristband or ankle strap.**

Figure 1 on the next page shows the component layout of the 486PH system board with locations of the system board jumpers and connectors. Note that most of the jumpers and connectors on the system board are labeled with proper names with pin 1 marked as '**1**'. To avoid damaging the board and to ensure proper operation, caution should be taken when connecting these jumpers and connectors.

## JUMPER DESCRIPTIONS

Jumpers are used to select between various operating modes. A jumper switch consists of two, three, or four gold pins projecting from the system board. Placing the plastic jumper cap over two pins connects those pins and makes a particular selection. Using the jumper cap to cover two pins in this way is referred to as shorting those pins. If the cap is not placed on any pins at all or placed on only one pin, this is referred to as leaving the pins open.

Note: When you open a jumper, leave the plastic jumper cap attached to one of the pins so you don't lose it.
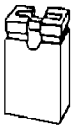
OPEN        SHORTED        **1 2 3**        PINS 1-2 SHORTED
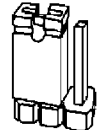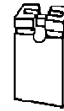
2-pin jumper        3-pin jumper

# Figure 1: 486PH Component Layout

Holes for Plastic mountings or screws

Monitor Selection Jumper: JP2

CMOS Discharge Jumper JP1

Keyboard Controlle

JP2

Keyboard Connector

JP14 JP1

Power Connectors

Three 32-bit PCI local bus mastering slots

BIOS

12C887A

SIMM 4

SIMM 3

SIMM 2

SIMM 1

Four 72-Pin SIMM socket support up to 64 Mbytes

Five 16-bit ISA slots

Two 32-bit VESA standard local bus mastering slots

JP3

JP6

Intel Aries S82426EX

IDE

Intel Aries S82425EX

Cache Size Jumpers: JP8, JP9, JP11 & JP12

CPU Clock Speed Selection Jumpers JP6, JP19, JP20, & JP21

JP11 JP1

JP8 JP9

CPU

JP20

JP19

JP21

JP1

TURBO

HDLE D

TBLE 1

1

RESE

JP10

JP23 JP24

JP25

SPKR

KLOC K

CPU Type Selection Jumpers: JP10, JP16, JP23, JP24, JP25

Cache Memory up to 512 KB

*Remark:*            *The sample jumper setting shown above is set at 486DX-33MHz, 256K Cache Size.*

# CPU Jumpers

## CPU Type Selection Jumpers

| CPU Type | JP10 | JP16 | JP23 | JP24 | JP25 |
|---|---|---|---|---|---|
| Intel 486SX | Short | Open | Open | 2-3 | 1-2 |
| *Intel 486DX, DX2, DX4 (Default)* | *Short* | *Open* | *Open* | *1-2* | *1-2* |
| AMD 486DX, DX4* | Short | Open | Short | 1-2 | 2-3 |
| AMD 486DX2* | Short | Open | Open | 1-2 | 2-3 |
| Cyrix 3.3-Volt 486DX, DX2 | Short | Short | Short | 1-2 | 2-3 |
| Cyrix 5-Volt 486DX, DX2 | Short | Open | Short | 1-2 | 2-3 |

\* Chipset auto detects AMD 3.3-Volt and 5-Volt CPUs, no special jumper setting is required.

## CPU Clock Frequency Selection Jumpers

If you are installing an 486DX or 486SX CPU, the internal CPU clock speed is the same as the external CPU clock speed. This is different for 486DX2 CPU where the external speed is one-half of the internal speed. For example, a 486DX2-66 has an external clock speed of 33MHz.

| Clock Frequency | CPU supported | JP6 | JP19 | JP20 | JP21 |
|---|---|---|---|---|---|
| 33 MHz | 486SX-33 487SX-33 486DX-33 486DX2-66 486DX4-100 P24T | 1-2 | Open | Short | Short |
| 25MHz | 486SX-25 487SX-25 486DX-25 486DX2-50 486DX4-75 | 2-3 | Short | Open | Open |

# Cache Memory Jumpers

## Cache Memory Size Jumpers

Three cache memory sizes are supported.  The jumpers are set according to the size of Cache Memory installed.

| Cache Size | JP8 | JP9 | JP11 | JP12 |
|---|---|---|---|---|
| 128KB | Short | Open | Open | Open |
| 256KB | Open | Short | Short | Open |
| 256KB* | Short | Open | Short | Open |
| 512KB | Short | Open | Short | Short |

## Cache Installation Table

| Cache Size | U23, U26, U29, U31 | U24, U27, U30, U32 | U13 & U16 |
|---|---|---|---|
| 128KB | 32Kx8 | None | 32Kx8 |
| 256KB | 32Kx8 | 32Kx8 | 32Kx8 |
| 256KB* | 64Kx8 | None | 32Kx8 |
| 512KB | 128Kx8 | None | 32Kx8 |

* If 256KB with 64Kx8 SRAM type is installed, in the BIOS CMOS Chipset Setup menu, L2 Cache Configuration must set to N-Leaved.

# System Board Standard Jumpers

## CMOS Discharge Jumper

The jumper JP1 is used to clear all information, including password that are currently stored in the CMOS RAM. (ODIN OEC12C887A on 486PH board.). It is typically used when you forget the password that you selected previously and you cannot get into CMOS setup menu.

| Function | JP1 |
|---|---|
| *Normal Operation (Default)* | *1-2* |
| Clear CMOS Data | 2-3 |

## Monitor Type Select Jumper

This is PC/AT compatible jumper to inform the system BIOS that the graphic card installed is CGA type or EGA, VGA, and Monochrome type. Thus, the jumper should be set accordingly to the type of graphic card installed in the system.

| Display Type | JP2 |
|---|---|
| *VGA, EGA, or Monochrome (Default)* | *Open* |
| CGA | Short |

## TURBO Jumper

| Function | TURBO |
|---|---|
| *Enable TURBO mode (Default)* | *Short* |
| Disable TURBO mode. | Open |

## Manufacturer Reserved Jumper

The jumper setting show below are factory installed. Manufacturer has reserved these jumpers. No modification is allowed.

| Jumper | Setting |
|--------|---------|
| JP3    | 1-2     |
| JP14   | 1-2     |

# CONNECTOR DESCRIPTIONS

Following is the list of 486PH system board connectors required to be installed for proper system operation. For detailed descriptions of these components, please refer to the next section. To avoid damaging the board and to have proper operation, caution should be taken when connecting these components.

- Power supply connectors (PS1 and PS2)
- Keyboard connector (CN1)

- Reset connector (RESET)
- Power LED and keyboard lock connector (KLOCK)
- Speaker connector (SPKR)
- Turbo Switch connector (TURBO)
- Turbo LED connector (TBLED)
- Hard Disk Activity LED connector (HDLED)

- IDE Interface connector (IDE1)

# PC/AT Standard Connectors

### Power Supply Connectors (PS1 and PS2)

The two Power Supply connectors (PS1 and PS2) are 6-pin AT standard power connectors. Most power supplies have two six-wire connectors, two of the wires on each connector are black. Align the two six-wire connectors so that the two black wires on each connector are in the middle as shown below.

| Pin | Connector PS2 | Connector PS1 |
|:---:|:---:|:---:|
| 1 | Power Good | Ground (Black) |
| 2 | +5 VDC | Ground (Black) |
| 3 | +12 VDC | -5 VDC |
| 4 | -12 VDC | +5 VDC |
| 5 | Ground (Black) | +5 VDC |
| 6 | Ground (Black) | +5 VDC |

Black
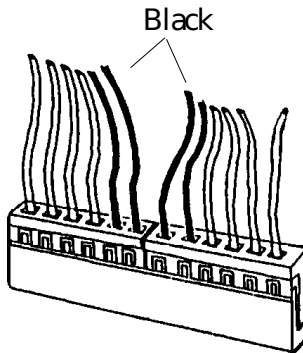
## Keyboard Connector

The keyboard connector (CN1) is a 5-pin, circular-type DIN socket. It is used to connect the system board keyboard interface to any standard AT-compatible keyboard. (84 or 101 - key type keyboards). The pin assignments are listed below:

| Pin | Description |
|:---:|:---:|
| 1 | Keyboard Clock Signal |
| 2 | Keyboard Data Signal |
| 3 | Not Used |
| 4 | Ground |
| 5 | +5V Fused VDC |

## Reset Connector

The system RESET connector (RESET) is a 2-pin BERG strip. It is used to connect the push button reset switch located on the front panel to the system board. System reset can be done by shorting pin 1 to pin 2 with the same effect as turning the power off and then on again.

| Pin | Description |
|:---:|:---:|
| 1 | Ground |
| 2 | Reset Input |

## Power LED and Keyboard Lock Connector

The Power LED and Keyboard Lock connector (KLOCK) is 5-pin keyed BERG strip.  It is used to connect +5 VDC power to the power indicator LED at the front panel and connect security keyboard lock to the keyboard controller.  This allows you to switch off the keyboard and so provide limited security against casual intruders.  The pin assignments are indicated below:

| Pin | Description |
|-----|-------------|
| 1 | Power LED |
| 2 | Key (No Connection) |
| 3 | Ground |
| 4 | Keyboard Lock |
| 5 | Ground |

## Speaker Connector

The Speaker connector (SPKR) is a 4-pin keyed BERG strip.  It is used to connect an external 2-inch, 8-ohm speaker to the system board to provide sound capability.  The pin assignments are defined below:

| Pin | Description |
|-----|-------------|
| 1 | Speaker Data Out |
| 2 | Key (No Connection) |
| 3 | Ground |
| 4 | +5 VDC |



Speaker Connection
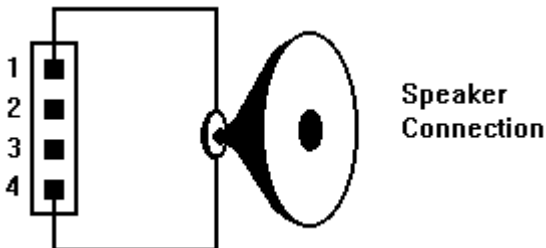
## Turbo Switch Connector

The Turbo switch (TURBO) is a 2-pin BERG strip. It is used to connect the front panel 2-position push switch to the system board speed switching circuitry. The Turbo mode is set as default on the 486PH.

| Function | TURBO |
|---|---|
| *Enable TURBO Mode (Default)* | *Short* |
| Disable TURBO Mode | Open |

## Turbo LED Connector

The Turbo LED connector (TBLED) is a 2-pin BERG strip. It is used to connect a CPU operating frequency indicator LED from the front panel to the system board. The pin assignments are indicated below:

| Pin | Description |
|---|---|
| 1 | LED Cathode ( - ) |
| 2 | LED Anode (+) |

## Hard Disk Activity LED Connector

The hard disk activity LED connector (label as HDLED) is a 2-pin keyed BERG strip. The LED will be on whenever there is data transfer activity on on-board IDE bus. The connector should be connected to the case's front panel hard disk LED.

| Pin | Description |
|---|---|
| 1 | LED Anode (+) |
| 2 | LED Cathode (-) |

# Peripheral Connectors

### IDE Interface Connectors

The on-board 32-bit PCI IDE Interface connector (IDE1) is a 2x20-pin male header. This interface supports up to two hard disk drives on the system.  Pin assignment of IDE is as follow:

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 2 | Ground | 1 | IDE Reset/ |
| 4 | Data 8 | 3 | Data 7 |
| 6 | Data 9 | 5 | Data 6 |
| 8 | Data 10 | 7 | Data 5 |
| 10 | Data 11 | 9 | Data 4 |
| 12 | Data 12 | 11 | Data 3 |
| 14 | Data 13 | 13 | Data 2 |
| 16 | Data 14 | 15 | Data 1 |
| 18 | Data 15 | 17 | Data 0 |
| 20 | No Connection | 19 | Ground |
| 22 | Ground | 21 | No Connection |
| 24 | Ground | 23 | I/O Write/ |
| 26 | Ground | 25 | I/O Read/ |
| 28 | ALE | 27 | No Connection |
| 30 | Ground | 29 | No Connection |
| 32 | IOCS16/ | 31 | IDE IRQ 14 |
| 34 | No Connection | 33 | Address A1 |
| 36 | Address A2 | 35 | Address A0 |
| 38 | IDE Chip Select 1/ | 37 | IDE Chip Select 0/ |
| 40 | Ground | 39 | IDE Active/ |

# CHAPTER 3:  HARDWARE INSTALLATION

## BUILDING A HIGH PERFORMANCE SYSTEM

The dimensions of the 486PH system board are designed to fit perfectly in a PC/XT (or PC/AT) standard case. To build a complete high performance system based on the 486PH system board, the following equipment are needed:

1. A chassis with dimensions similar to PC/XT/AT standard chassis. The chassis should have a front panel with connectors for Reset, Power, Keylock, Turbo switch, Turbo LED, Speaker. AC power cable should be included with the chassis. A standard AT 230W power supply should be capable of providing a continuous power within a +4.75 VDC to +5.25 VDC range. A power line filter may be needed for areas with noisy transmission.
2. One or two floppy drives (360K/1.2M/1.44M/2.88M).
3. SCSI Hard disk drive or IDE hard disk drive with a hard disk controller.
4. Video card (Monochrome, CGA, EGA, VGA).
5. A video display monitor.
6. An AT-compatible keyboard (84 or 101 Keyboard).
7. The following additional peripherals will be useful to enhance the system:
   - A bus or serial mouse.
   - A tape back up drive.
   - A CD-ROM drive.
8. Cables
   - A set of flat cables for floppy drive and hard disk drive.
   - AC Power cable (Usually Comes with power supply in case)
9. Tools
   - Set of Screw drivers, Cutter, Pliers

# CPU INSTALLATION

Care should be taken when installing the CPU into the Zero Insertion Force (ZIF) socket on the system board. Lift the handle of ZIF socket up. Place the Processor into the ZIF socket. No force should be required to insert the CPU. On the processor's pin 1 is with the square base and it goes to particular hole on the socket. Match the hole and pin one first and then easily insert the processor into the socket. Press the handle gently down.

Pin 1

Pin No. 1

CPU
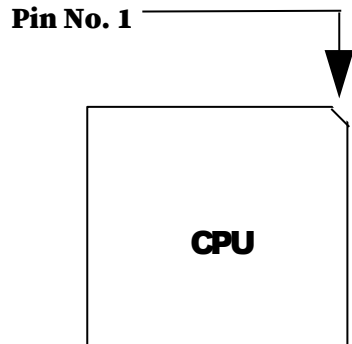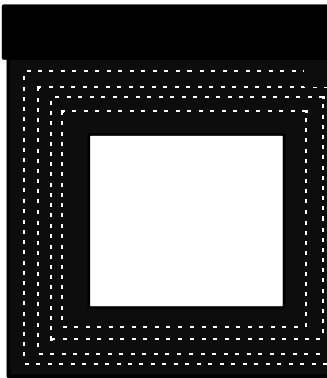
**‼ Important ‼**

## Cooling fan installation

Mount the cooling kit with fan on top of the CPU. Connect power to fan from power supply. Make sure the cooling kit's bottom surface makes proper contact with top surface of CPU.

## !! Warning !!

Manufacturer of the board or CPU is not responsible for damage to CPU because of improper handling during installation or cooling kit with fan is not used.

## INSTALLING DRAM SIMMS



*When working with DRAM SIMMs, it is extremely important that you avoid Electrical Static Discharge (ESD). Always ground yourself by wearing a grounded wristband or ankle strap.*

1. Power must be off while installing SIMMs.
2. The SIMM module should face to the right with pin 72 next to the power supply connectors.
3. Insert the SIMM at a 45 degree angle, tilted towards ISA slots.
4. Gently push the SIMM to an upright position until it "snaps" into place.
5. Repeat above steps until the entire bank is filled.
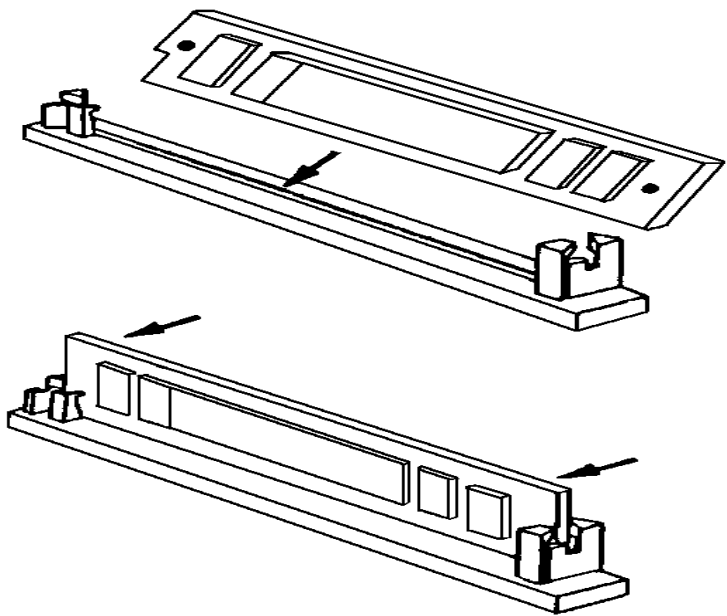
## DRAM SIMMs Configuration

The on-board DRAM memory sub-system has four module mounting sockets which are divided into "banks" of one socket each. They support 256Kx36, 512Kx36, 1Mx36, 2Mx36, 4Mx36, and 8Mx36 DRAM SIMMs. DRAM speed must be 70ns or faster. You can configure the memory of the 486PH in a variety of ways as follows.

| SIMM1 | SIMM2 | SIMM3 | SIMM4 |
|:---:|:---:|:---:|:---:|
| 1Mx36 | 1Mx36<br>4Mx36 | None | None |
| 1Mx36 | 1Mx36<br>4Mx36 | 1Mx36<br>4Mx36 | None |
| 1Mx36 | 1Mx36<br>4Mx36 | 1Mx36<br>4Mx36 | 1Mx36<br>4Mx36 |
| 2Mx36 | None | None | None |
| 2Mx36 | 2Mx36<br>8Mx36 | None | None |
| 2Mx36 | 2Mx36<br>8Mx36 | None | 1Mx36<br>4Mx36 |
| 2Mx36 | 1Mx36<br>4Mx36 | None | None |
| 2Mx36 | 1Mx36<br>4Mx36 | None | 1Mx36<br>4Mx36 |
| 4Mx36 | 4Mx36 | None | None |
| 4Mx36 | 4Mx36 | 4Mx36 | None |
| 4Mx36 | 4Mx36 | 4Mx36 | 4Mx36 |
| 8Mx36 | None | None | None |
| 8Mx36 | 8Mx36 | None | None |
| 8Mx36 | 1Mx36<br>4Mx36 | None | None |
| 8Mx36 | 1Mx36<br>4Mx36 | None | 1Mx36<br>4Mx36 |

# Peripheral Device Connection

### IDE Hard Disk Drives Connection

The 486PH supports up to 2 IDE hard disk drives on the system. The IDE ribbon-cable is provided with the system board.  Use the cable to connect the IDE drives into 40-pin double-row connector IDE on the board. Make sure the colored stripe on the cable (indicating the location of pin 1) matches Pin 1 of the connector on the mother board, as well as the Pin 1 of the Hard drives.

## Peripheral Add-on Card installation

The 486PH support both PCI slots and VESA VL bus slots. You can install the corresponding add-on cards into any of these slots.  Make sure these add-on cards' interrupts or DMA channels are not conflicted with each other. The best way to remember is to writing down the information of all the installed cards into the back of this manual for later reference.

Please refer to the manuals shipped with the add-on cards for more information.  Care should be taken when inserting the cards into the slots to make sure the connectors slots are not damaged.

# CHAPTER 4:  SYSTEM SETUP

## SYSTEM CMOS

You need to setup the system CMOS every time:

- You start a new and un-configured system

- You receive a start-up error message indicating the configuration information stored in the non-volatile CMOS RAM has somehow become corrupted.

- You add, remove, or change peripherals from your system.

- You add, remove, or change DRAM from your system.

The first time you power up the system, the configuration information stored in the battery-backed CMOS RAM may not be correct.  The BIOS detects this condition and prompts the user to go through the SETUP section.  This chapter explains how to use the BIOS SETUP program and make the appropriate entries.

**STOP**

**Some of the parameters are already factory preset and do not need to be changed.  Please read the instructions carefully and only change the settings if necessary.**

## Entering  CMOS Setup

AMIBIOS provides a Built-in Setup utility that can be  accessed by pressing < Del > key at the appropriate time during system boot up. Configuration data is stored in system CMOS RAM.

Following windows will appear in the AMIBIOS Setup main screen. Details of the setup options in each window is given in the following sections.

```
┌─────────────────────────────────────────────────────────────┐
│ ■                                                           │
│        ┌───────────────────────────────────────┐            │
│        │           AMIBIOS Setup               │            │
│        │   (C) 1994, American Megatrends, Inc.  │            │
│        └───────────────────────────────────────┘            │
│                                                             │
│   ┌──── Setup ────────────┐   ┌──── Utility ──────────┐    │
│   │ ■                     │   │ ■                     │    │
│   │  ┌────┐ ┌────┐ ┌────┐ │   │  ┌────┐      ┌────┐   │    │
│   │  │████│ │    │ │    │ │   │  │    │      │    │   │    │
│   │  └────┘ └────┘ └────┘ │   │  └────┘      └────┘   │    │
│   │ Standard Advance Chipset│  │ DetectMaster DetectSlave│  │
│   │          d             │   │                        │    │
│   │  ┌────┐               │   │       ┌────┐            │    │
│   │  │    │               │   │       │    │            │    │
│   │  └────┘               │   │       └────┘            │    │
│   │  Power                │   │      Color Set          │    │
│   │  Mgmt                 │   │                         │    │
│   └───────────────────────┘   └─────────────────────────┘   │
│                                                             │
│   ┌──── Security ─────────┐   ┌──── Default ─────────────┐  │
│   │ ■                     │   │ ■                        │  │
│   │  ┌────┐   ┌────┐      │   │ ┌────┐  ┌────┐  ┌────┐   │  │
│   │  │    │   │    │      │   │ │    │  │    │  │    │   │  │
│   │  └────┘   └────┘      │   │ └────┘  └────┘  └────┘   │  │
│   │ Password Anti-Virus   │   │ Original Optimal Fail-safe│ │
│   └───────────────────────┘   └──────────────────────────┘  │
└─────────────────────────────────────────────────────────────┘
```
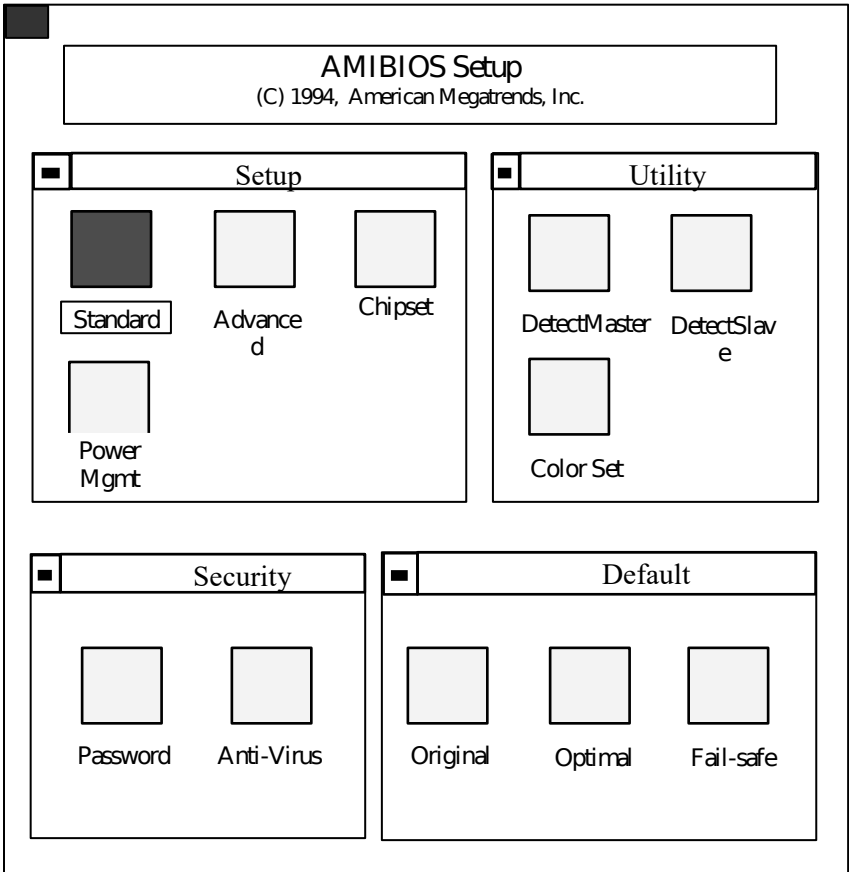
## Setup Window

| Types of Setup | Description |
|---|---|
| Standard Setup | Sets time, date, hard disk type, types of floppy drives, display type, and if Keyboard is installed. |
| Advanced Setup | System Boot Up Numlock, System Boot Up Sequence, Internal & External Cache Memory, Adapter Shadow Cacheable, and many others. |
| Chipset Setup | Sets chipse-specific options and features. |
| Power Management Setup | Control power conservation options. |

## Standard Setup

Standard Setup is selected from the Setup window in the main screen. Standard setup options described in this section are selected by choosing the appropriate high-level icon from the Standard Setup screen.   All displayed icons are described in this section, although the screen display is often all you need to understand how to set the option.

### Date, Day and Time Configuration

Select the Standard option. Select the Date and Time icon. The current values for each category are displayed. Enter new values through the keyboard.

### Master Hard Disk:

### Slave Hard Disk:

Select one of these hard disk drive icons to configure the drive named in the option.  A scrollable screen that lists all valid disk drive types is displayed.  Select the correct type and press < Enter >. Note that a hard drive will not work properly if you enter incorrect drive parameter.  If the hard disk drive is an IDE type, select *Detect C: or Detect D:* from the Utility section of the BIOS Setup main menu to automatically detect the IDE drive parameters and report them to this screen.

You can also manually enter the hard disk drive parameters. The drive parameters are:

| Parameter | Description |
| --- | --- |
| Type | The number for a drive with certain identification parameters. |
| Cylinders | The number of cylinders in the disk drive. |
| Heads | The number of heads. |
| Write Precompensation | The size of a sector gets progressively smaller as the track diameter diminishes. Yet each sector must sill hold 512 bytes. Write precompensation circuitry on the hard disk compensates for the physical difference in sector size by boosting the write current for |

| Parameter | Description |
|---|---|
| | sectors on inner tracks.  This parameter is the track number where write precompensation begins. |
| Landing Zone | This number is the cylinder location where the heads will normally park when the system is shut down. |
| Sectors | The number of sectors per track. MFM drives have 17 sectors per track.  RLL drives have 26 sectors per track.  ESDI drives have 34 sectors per track. SCSI and IDE drive may have even more sectors per track. |
| Capacity | The formatted capacity of the drive is (Number Of heads) x (Number of cylinders) x (Number of sectors per track) x (512 bytes per sector) |

**Floppy Drive A:**

**Floppy Drive B:**

Move the cursor to these fields and press <Enter> then select the floppy type.  The settings are 360 KB 5.25", 1.2 MB 5.25", 720 KB 3.5", 1.44 MB  3.5", or 2.88 MB  3.5". "Not Installed" could be used as an option for diskless workstation.

### Primary Display

Select the type of display monitor and Display controller card. The VGA/EGA, CGA 40x25, CGA 80x25, or Monochrome are supported. 'Absent' option could be used if the system does not have display card installed or for display cards that use TSR files instead of BIOS firmware. The Optimal & Fail-Safe default setting are *VGA/EGA*..

### System Boot Up Num Lock

When the computer boots up, BIOS can either select Numeric value or Cursor control functions for the numeric keypad of IBM compatible keyboards. Most extended compatible keyboards have separate cursor control keys. Therefore, the default setting should be "On" to select Numeric value function for the numeric keypad.

### Floppy Drive Seek at Boot

This option allows the system BIOS to look for the floppy diskette in the floppy drives during boot up process. This is often set to disabled for systems which do not have floppy drives. The default setting is *Disabled*..

### Floppy Drive Swapping

This option allows the system to swap between two floppy drives, drive A to drive B or vice versa, without physically changing the cable setup. When Enabled is selected, floppy drive A will become B, and floppy drive B will become A The Optimal and Fail-Safe settings for this option are *Disabled.*

## System Boot Up Sequence

System can either boot up from floppy drive or from hard disk drive. Selecting option A:, C: will force the BIOS to look  for bootable operating system files from floppy drive A: first before look for files from drive C:.  Reverse this sequence by selecting C:, A:. The Optimal & Fail-Safe default setting is *A:,C:*.

## External Cache Memory

This option enables secondary (external) on-board cache memory. The Optimal default setting is *Enabled*.  The Fail-Safe default setting is *Disabled*.

## Internal Cache Memory

This option enables internal (on the microprocessor) cache memory. The Optimal and Fail-Safe default setting are *Enabled.*

## Password Checking

If the "Always" option is chosen at Setup, each time the system is turned on, the prompt request for user password will appear.

If the "Setup" option is chosen at Setup, the Password prompt will not appear when the system is turned on, but will appear if the user attempts to enter the Setup program.

The board is shipped with the Password Checking option disabled. To enable this option, you have to select your password by select the Password icon in the Security window of the main menu screen.

If you want to 'disable the Password Checking option, go to the Security Menu and select Password icon to change to new password.  You will be asked to enter the old password before you can enter the new password.  However, do not enter any character when you are asked to enter new password, simply press <Enter> key two times.  The message to indicate that the Password Checking is disabled will appear.

## Video Shadow C000 & C400, 16K

When this option is set to *Enabled*, the video ROM code, that normally mapped into memory address space from C0000h - C7FFFh is copied (shadowed) from ROM to the system DRAM for faster execution. This will significantly improve the display performance of the system. The settings are Absent, No Shadow, or Shadow. The Optimal default setting is *Enabled*. The Fail-Safe default setting is *Disabled*.

## Shadow C800, 16K
## Shadow CC00, 16K
## Shadow D000, 16K
## Shadow D400, 16K
## Shadow D800, 16K
## Shadow DC00, 16K

These options are to selectively shadow the ROM code on the add-on cards, that mapped into the corresponding memory address space, into the respectively system DRAM address space, for faster execution. However, since some of add-on cards may not work properly if their ROM code are shadowed, care should be taken when select these option. The Optimal and Fail-Safe default setting are *Disabled*.

## Palette Snooping

This option should be Enabled when running with a Multimedia Video Processor Card. Once enabled, the address space of PCI VGA Palette can be snooped, so Multimedia card may obtain the color information from the Video Processor and overlay. The Optimal and Fail-Safe default settings are *Disabled*.

## IDE Block Mode

Select *Enabled to support* some latest IDE hard disks that supporting multiple sector data transfer for faster performance. In Auto mode, the BIOS will detect if the IDE drives can handle fast data transfer mode and then programs the controller accordingly. The Optimal default setting is *Auto.* The Fail-Safe default setting is *Disabled*.

## 32-bit Xfer Primary Controller

This option is used to support the first IDE controller that can support 32-bit data transfer by moving two consecutive words per cycle, for better performance. Select Enabled if the controller can support this mode, otherwise, set it to Disabled. The Optimal and Fail-Safe settings are *Disabled*.

## Set LBA Primary Controller

Most of early IDE hard drives' size are less than 528MB because of the limitation from PC/AT standard specification. In order to support more than 528MB, the Logical Block Access (LBA) mapping mode must be used. When Primary IDE controller card is installed, Select *Enabled* for Master IDE hard disk that supports LBA mode for larger than 528MB capacity. The Optimal and Fail-Safe default setting are *Disabled*.

## Secondary Controller Setup

This option supports Second IDE controller present in the bus or some IDE controllers that support dual IDE ports. The Optimal and Fail-Safe default setting are *None*.

## Chipset Setup

The BIOS Setup options described in this section are selected by choosing the option from the Chipset Setup screen. Chipset Setup is selected from the Setup section on the BIOS Setup main menu.

### CPU to PCI Bursting

This option enables/disables PCI burst cycles for CPU-PCI write cycles where back-to-back sequential CPU memory writes are sent out on the PCI bus as a burst cycle. This option may help to improve Video performance significantly. The Optimal default setting is *Enabled*. The Fail-Safe default setting is *Disabled*.

### CPU to PCI Byte Merge

Byte merging permits the motherboard controller to merge the data of consecutive CPU-to-PCI byte/word writes within the same double-word address, into the posted write buffer location. The merged collection of bytes then sent over the PCI bus as a single double-word. Byte merging is performed in the compatible VGA range only (0A0000-0BFFFFh) to improve video performance. The Optimal default setting is *Enabled*. The Fail-Safe default setting is *Disabled*.

### Cache Write Wait State

Select "Normal" for 1 waitstate cache write cycles. Select "Fast" for 0-waitstate cache write cycle. The Optimal and Fail-Safe default setting are *Normal*.

### L2 Cache Configuration

This option is reserved for Manufacturer use only. Select *Non-Interleaved* for 256KB cache with 64Kx8 SRAM type installed into the system. Normally select *Interleaved*.

### Set IRQ Priority

Three availiable interrupt requests (IRQ) 9, 10, and 11. Their priorities can be interchanged for PCI Bus adapters. For example, if you select "9,10,11" then IRQ9 will be assigned to the first PCI adapter then IRQ10 will be assigned for the second PCI adapter if it is needed. The Optimal and Fail-Safe default setting are *9,10,11*.

## Power Management Setup

The 486PH supports Green or Energy saving features. With the Power Management option enabled, the system BIOS will automatically disable or will stop the operation of the system peripheral devices as well as system CPU when the system is in idle mode for a certain period of time. This will save energy that is consumed by these devices.

### Advanced Power Management

This option enables system power management. The Optimal and Fail-Safe default setting are *Disabled.*

### IDE Drive Power Down

Once this option is Enabled, the IDE hard drive will stop spinning and the system goes into the power saving mode. The Optimal and Fail-Safe default setting are *Disabled*.

### VESA Video Power Down

This option enables the Video screen will go off to save power after a number of preset minutes (Timeout Value) of no access. The Optimal and Fail-Safe default setting are *Disabled*.

**Timeout Value**

This option determines the time delay before the system goes into the power saving mode from the idle states.  The Optimal & Fail-Safe default setting, when Advanced Power Management option is enabled, are *5 Min.*.

## Utility Window

### Detect Master Drive

This utility detects parameters for IDE hard drive configured as first drive (master) in dual drive system or the only drive in system. The parameter detected will be automatically transfer into Standard setup menu. This utility will work with most of later IDE hard drives. However, some old IDE hard drives may not be detected correctly. If this is the case, you should enter the parameters of the hard drives manually.

### Detect Slave Drive

This option is to detect the parameter of the secondary drive.

### Color Set

This utility allows you to select the comfortable color sets for the CMOS Setup and Utility screens.

## Security Setup Window

### Password

Allows to set password user will be asked to enter before entering into AMIBIOS setup

### Anti-Virus

When Virus Protection is enabled, the system BIOS will display a warning message every time any program tries to write into the disk boot sectors.

## Default Setup Window

The Default Setup windows has following options. Every option in BIOS Setup contains two default values: a Fail-Safe default and the Optimal default value.

### Original Defaults

Restores old values of setup if user decides to abandon changes.

### Optimal Defaults

The Optimal default values provide optimum performance settings for all devices and system features.  If onboard SCSI, floppy controller, I/O controller are used in the system, the Optimal default setting should be loaded to simplify the CMOS setup process.

### Fail-Safe Defaults

The Fail-Safe default settings consist of the safest set of parameters.  Use them if the system is behaving erratically. They should always work but do not provide optimal system performance characteristics.
Once this option is loaded, user should go back to the first selection setup menu to manually select other options.

# SYSTEM BOARD CONFIGURATION

## Programming Flash BIOS

To support FLASH BIOS, component at location U4 must be FLASH EPROM. Follow these steps to reprogram FLASH BIOS:

1. Turn the system power ON.
2. During boot up, press "Del" key to go to CMOS setup.
3. In CMOS setup, go to "Advanced Setup" to set the "External Cache Memory" to DISABLED.
4. Save the setup and reboot the system to A: or C: drive.
5. Run AMIFLASH.COM Program from the Utility Diskette to load the new BIOS code into the FLASH EPROM.
6. After programming is completed, shut the system off.
7. Turn the system power ON again and repeat the above steps 2 to 4 to set the "External Cache Memory" back to ENABLED.
8. Reboot the system.

# APPENDIX A: KEYBOARD HOT KEYS

## SYSTEM SPEED

System speed can also be changed through keyboard.  There are two available speeds as shown below:

**Turbo speed**: Cache memory and 32-bit DRAM transfer mode are ON.  Set by pressing <**+**> key once while holding <**Ctrl**>, <**Alt**>, and <**Shift**> keys.

$$\boxed{\text{Ctrl}} + \boxed{\text{Alt}} + \boxed{\text{Shift}} + \boxed{+}$$
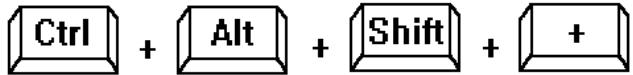
**Slow speed**: Cache memory and 32-bit DRAM transfer mode are OFF.  Set by pressing <**-**> key once while holding <**Ctrl**>, <**Alt**>, and <**Shift**> keys.

$$\boxed{\text{Ctrl}} + \boxed{\text{Alt}} + \boxed{\text{Shift}} + \boxed{-}$$

# APPENDIX B  AMI BIOS HARD DISK TYPE

| Type | Cylinder | Heads | Write Precomp | Landing Zone | Sectors | Size |
|------|----------|-------|---------------|--------------|---------|------|
| 1 | 306 | 4 | 128 | 305 | 17 | 10MB |
| 2 | 615 | 4 | 300 | 615 | 17 | 20MB |
| 3 | 615 | 6 | 300 | 615 | 17 | 31MB |
| 4 | 940 | 8 | 512 | 940 | 17 | 62MB |
| 5 | 940 | 6 | 512 | 940 | 17 | 47MB |
| 6 | 615 | 4 | 65535 | 615 | 17 | 20MB |
| 7 | 462 | 8 | 256 | 511 | 17 | 31MB |
| 8 | 733 | 5 | 65535 | 733 | 17 | 30MB |
| 9 | 900 | 15 | 65535 | 901 | 17 | 112MB |
| 10 | 820 | 3 | 65535 | 820 | 17 | 20MB |
| 11 | 855 | 5 | 65535 | 855 | 17 | 35MB |
| 12 | 855 | 7 | 65535 | 855 | 17 | 50MB |
| 13 | 306 | 8 | 128 | 319 | 17 | 20MB |
| 14 | 733 | 7 | 65535 | 733 | 17 | 43MB |
| 16 | 612 | 4 | 0 | 663 | 17 | 20MB |
| 17 | 977 | 5 | 300 | 977 | 17 | 41MB |
| 18 | 977 | 7 | 65535 | 977 | 17 | 57MB |
| 19 | 1024 | 7 | 512 | 1023 | 17 | 60MB |
| 20 | 733 | 5 | 300 | 732 | 17 | 30MB |
| 21 | 733 | 7 | 300 | 732 | 17 | 43MB |
| 22 | 733 | 5 | 300 | 733 | 17 | 30MB |
| 23 | 306 | 4 | 0 | 336 | 17 | 10MB |
| 24 | 925 | 7 | 0 | 925 | 17 | 54MB |
| 25 | 925 | 9 | 65535 | 925 | 17 | 69MB |
| 26 | 754 | 7 | 754 | 754 | 17 | 44MB |
| 27 | 754 | 11 | 65535 | 754 | 17 | 69MB |
| 28 | 699 | 7 | 256 | 699 | 17 | 41MB |
| 29 | 823 | 10 | 65535 | 823 | 17 | 68MB |
| 30 | 918 | 7 | 918 | 918 | 17 | 53MB |

| Type | Cylinder | Heads | Write Precomp | Landing Zone | Sectors | Size |
|------|----------|-------|---------------|--------------|---------|------|
| 31 | 1024 | 11 | 65535 | 1024 | 17 | 94MB |
| 32 | 1024 | 15 | 65535 | 1024 | 17 | 128MB |
| 33 | 1024 | 5 | 1024 | 1024 | 17 | 43MB |
| 34 | 612 | 2 | 128 | 612 | 17 | 10MB |
| 35 | 1024 | 9 | 65535 | 1024 | 17 | 77MB |
| 36 | 1024 | 8 | 512 | 1024 | 17 | 68MB |
| 37 | 615 | 8 | 128 | 615 | 17 | 41MB |
| 38 | 987 | 3 | 987 | 987 | 17 | 25MB |
| 39 | 987 | 7 | 987 | 987 | 17 | 57MB |
| 40 | 820 | 6 | 820 | 820 | 17 | 41MB |
| 41 | 977 | 5 | 977 | 977 | 17 | 41MB |
| 42 | 981 | 5 | 981 | 981 | 17 | 41MB |
| 43 | 830 | 7 | 512 | 830 | 17 | 48MB |
| 44 | 830 | 10 | 65535 | 830 | 17 | 69MB |
| 45 | 917 | 15 | 65535 | 918 | 17 | 114MB |
| 46 | 1224 | 15 | 65535 | 1223 | 17 | 152MB |
| 47 | USER'S | TYPE | | | | |

# APPENDIX C:  ISA I/O ADDRESS MAP

| I/O ADDRESS (HEX) | I/O DEVICE |
|---|---|
| 000 - 01F | DMA Controller 1, 8237A-5 |
| 020 - 03F | Interrupt Controller 1, 8259A |
| 040 - 05F | System Timer, 8254-2 |
| 060 - 06F | 8742 Keyboard Controller |
| 070 - 07F | Real-Time Clock/CMOS and NMI Mask |
| 080 - 09F | DMA Page Register, 74LS612 |
| 0A0 - 0BF | Interrupt Controller 2, 8259A |
| 0C0 - 0DF | DMA Controller 2, 8237A-5 |
| 0F0 - 0FF | i486 Math Coprocessor |
| 1F0 - 1F8 | Fixed Disk Drive Adapter |
| 200 - 207 | Game I/O |
| 20C - 20D | Reserved |
| 21F | Reserved |
| 278 - 27F | Parallel Printer Port 2 |
| 2B0 - 2DF | Alternate Enhanced Graphic Adapter |
| 2E1 | GPIB Adapter 0 |
| 2E2 - 2E3 | Data Acquisition Adapter 0 |
| 2F8 - 2FF | Serial Port 2 (RS-232-C) |
| 300 - 31F | Prototype Card |
| 360 - 363 | PC Network (Low Address) |
| 364 - 367 | Reserved |
| 368 - 36B | PC Network (High Address) |
| 36C - 36F | Reserved |
| 378 - 37F | Parallel Printer Port 1 |
| 380 - 38F | SDLC, Bisynchronous 2 |
| 390 - 393 | Cluster |
| 3A0 - 3AF | Bisynchronous 1 |
| 3B0 - 3BF | Monochrome Display and Printer Adapter |
| 3C0 - 3CF | Enhanced Graphics Adapter |
| 3D0 - 3DF | Color/Graphics Monitor Adapter |

| I/O ADDRESS (HEX) | I/O DEVICE |
|---|---|
| 3F0 - 3F7 | Diskette Drive Controller |
| 3F8 - 3FF | Serial Port 1 (RS-232-C) |
| 6E2 - 6E3 | Data Acquisition Adapter 1 |
| 790 - 793 | Cluster Adapter 1 |
| AE2 - AE3 | Data Acquisition Adapter 2 |
| B90 - B93 | Cluster Adapter 2 |
| EE2 - EE3 | Data Acquisition Adapter 3 |
| 1390 - 1393 | Cluster Adapter 3 |
| 22E1 | GPIB Adapter 1 |
| 2390 - 2393 | Cluster Adapter 4 |
| 42E1 | GPIB Adapter 2 |
| 62E1 | GPIB Adapter 3 |
| 82E1 | GPIB Adapter 4 |
| A2E1 | GPIB Adapter 5 |
| C2E1 | GPIB Adapter 6 |
| E2E1 | GPIB Adapter 7 |

# APPENDIX D:  MEMORY MAPPING

| Address (hex) | Function | Comments |
|---|---|---|
| 00000000-0007FFFF | 512K System RAM | Cached |
| 00080000-0009FFFF | 128K System RAM | Cached |
| 000A0000-000BFFFF | 128K Video RAM | Not Cached |
| 000C0000-000C7FFF | 32K Video BIOS | Not Cached |
| 000C8000-000CFFFF | 32K I/O ROM | Not Cached |
| 000D0000-000DFFFF | 64K I/O ROM | Not Cached |
| 000E0000-000EFFFF | 64K Extended BIOS | Not Cached |
| 000F0000-000FFFFF | 64K On-Board BIOS ROM | Cached |
| 00100000-00BFFFFF | System Memory (RAM) | Cached |
| 00C00000-00FFFFFF | System Memory (RAM) | Cached |
| 01000000-BFFFFFFF | System Memory (RAM) | Cached |
| C0000000-C1FFFFFF | System Memory (RAM) | Cached |
| C2000000-FFFDFFFF | System Memory | Cached |
| FFFE0000-FFFFFFFF | 128K On-Board BIOS ROM | Not cached |

# APPENDIX E:  INTERRUPT LEVEL ASSIGNMENTS

| LEVEL on SYSTEM | TYPICAL INTERRUPT SOURCE |
|---|---|
| NMI | Parity, AT Channel Check, Bus Time Out, Fail Safe Timer Timeout |
| IRQ0 | Interval Timer 1, Counter 0 Out |
| IRQ1 | Keyboard Controller |
| IRQ2 | Cascade Interrupts from IRQ8 to IRQ15 |
| IRQ3 | Serial Port 2 |
| IRQ4 | Serial Port 1 |
| IRQ5 | Parallel Port 2 |
| IRQ6 | Diskette Controller |
| IRQ7 | Parallel Port 1 |
| IRQ8 | Real Time Clock |
| IRQ9 | Expansion Bus Pin |
| IRQ10 | Expansion Bus Pin |
| IRQ11 | Expansion Bus Pin |
| IRQ12 | Expansion Bus Pin |
| IRQ13 | Coprocessor Error, DMA Chaining |
| IRQ14 | Fixed Disk Drive Controller Expansion Bus Pin |
| IRQ15 | Expansion Bus Pin |

# PRODUCT INFORMATION RECORD

Record all the above information as you received the product and provide to your supplier in writing to obtain technical support assistance.  This will help to speed up the response and get your problem solved.

## System Board

Date Purchased or Received: _____

Purchased From: _____

Product Name: _____PCB Ver:_____ Rev: ___

Serial Number: _____

CPU Processor Speed: _____Memory Size: _____

BIOS Version: _____ Software Driver Rel #: _____

## PCI Add-on Cards:

Model #_____        Interrupt:_____ Slot #:_____

Model #_____        Interrupt:_____ Slot #:_____

Model #_____        Interrupt:_____ Slot #:_____

## VESA / ISA Add-on Cards:

Model #_____Interrupt:____ DMA: ____ Slot #:_____

Model #_____Interrupt:____ DMA: ____ Slot #:_____

Model #_____Interrupt:____ DMA: ____ Slot #:_____

Model #_____Interrupt:____ DMA: ____ Slot #:_____

# For More Information .