PVI-486AP4

PCI Bus and VL Bus Mainboard
With PCI IDE Controller

USER'S MANUAL

PVI-486AP4 User's Manual

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PVI-486AP4 User's Manual

Feature Guide

This manual explains how to use this system mainboard and install upgrades. It has an overview of the design and features of the board and provides useful information if you want to change the configuration of the board, or a system it is installed in.

How The Manual Is Organized

This manual is divided into four chapters:

Feature Guide – an overview of the board features

Upgrade Guide – upgrades for the board or system

Software Guide – the Setup Utility and other software & firmware

Technical Summary – technical reference

The manual assumes that your mainboard is already installed in a computer system, so we've organized the contents to reflect this. The first chapter introduces the mainboard's features and shows where things are on the board in case you want to install an upgrade.

Chapter 2 explains how to install upgrades.

Chapter 3 explains the Award BIOS Setup Utility, SCSI BIOS and the Flash Memory Writer BIOS update utility.

Chapter 4 lists settings and specifications and has instructions for adding cache memory and the optional SCSI interface card.

Since we are assuming that your mainboard is already installed in a system, it was most likely set up by your system dealer according to the design specifications of your computer. This could mean that your mainboard's current settings are not the same as the defaults shown in this manual. Your system manual may have additional information on how the mainboard should be set up.

If you want to change the existing configuration, consult all of your system documentation. Also be certain that opening up and working on the system yourself won't violate your system warranty. Most system vendors do allow you to open the system to install expansion cards or additional peripheral equipment.

This manual provides all the information you need to upgrade or change the setup of the board. If you don't feel confident of your ability to work on the computer yourself, ask your dealer or a qualified technician to do it for you.

Main Features

The PVI-486AP4 has many performance and system features integrated onto the mainboard, including the following:

- Supports most 486-type CPUs including Pentium OverDrive CPUs and SL Enhanced versions, both 5-volt and 3.3-volt, from Intel and compatible vendors. Uses a 'Socket 3' ZIF (Zero Insertion Force) socket for easy installation. Revision 1.6 supports additional CPUs from AMD and the Cyrix 3.6-volt DX2-V.

- Uses SL Enhanced CPU power management features with Power Management control built into the Setup Utility.

- Compatibility with EPA "Energy-Star" specifications and power management utilities (e.g. Microsoft APM).

- Uses 72-pin DRAM modules in multiple configurations up to 128MB, for flexible and economical upgrades.

- High-performance write-through/write-back "Level 2" external static RAM cache in three size options: 128KB, 256KB and 512KB, uing 32K8, 64K8 and 128K8 SRAM chips.

- Triple bus design with 3 ISA, 1 ISA/VL-Bus and 4 PCI expansion slots, some with Bus Master capability.

- Updatable system BIOS stored in 'Flash ROM' can be updated using the Flash Memory Writer Utility.

- On board 32-bit PCI IDE hard disk drive controller that supports Enhanced IDE features for two IDE devices including faster data transfer rates and direct support for IDE devices such as Tape Backup and CD-ROM drives.

- System BIOS support for Enhanced IDE including up to four IDE hard disks or other IDE devices and support for hard disks larger than 528MB and up to 8.4GB. When used with a separate IDE controller card that supports Enhanced IDE, support for four IDE devices in two channels, faster data transfer rates and direct support for IDE devices such as Tape Backup and CD-ROM drives.

- Auto detection of installed IDE hard disk drives with an auto-detection utility built into the system BIOS.

- On-board NCR SCSI BIOS firmware supports the optional PCI SC-200 SCSI controller card to connect up to seven internal or external SCSI devices.

- Support floppy disk with Flash Memory Writer update utility.

- Switch connector for a manual suspend button mounted on a system case.

Static Electricity Precautions

Under the right conditions, static electricity will build up. If you touch the mainboard or other sensitive components, the build-up will discharge into the components and circuitry. Computer components are sensitive to damage from static electric discharge. They can be damaged or destroyed if the discharge is powerful enough. Static build-up is most likely to occur in dryer and cooler conditions, but it is always important to be cautious.

To protect the mainboard and other components against damage from static electric discharge, you should follow some basic precautions whenever you handle them:

1. Use a grounding wrist strap. The strap will have an 'alligator' clip at the end of a shielded wire lead. Clip it to a grounded object. Any static electricity will then harmlessly discharge through the strap. Put on and connect the strap *before* you handle the components.

2. Use an anti-static pad. Put any components on the pad whenever you work on them outside the computer. If you don't have a pad, put the components on the anti-static bag they came in.

Both the wrist strap and pad are inexpensive and are generally available from computer supply companies.

Mainboard Layout

The diagram on the next page shows the location of important components on the mainboard. There are other small diagrams later in the manual that point out the location of the topic being explained.

Rev 1.6 adds jumper settings for AMD CPUs and voltage selection for the Cyrix Cx486DX2-V. See Chapter 4 for more information.

PVI-486AP4 Layout (Rev 1.3)
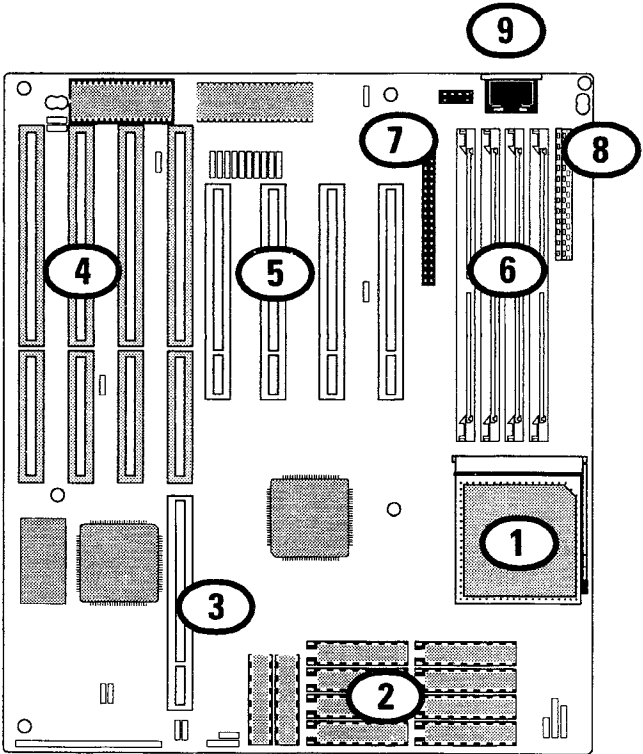
1. **PGA CPU**
2. **Level 2 cache**
3. **ISA/VL-Bus slot**
4. **ISA slots**
5. **PCI slots**
6. **SIMM sockets**
7. **IDE hard disk connector**
8. **Power supply connector**
9. **Keyboard connector**

Using Your Mainboard

In addition to the operating instructions in your system manual, there are a few additional things specific to the mainboard you will need to know. These have to do with the hardware settings on the mainboard and the system configuration record.

Hardware Settings

There are a number of hardware settings on the board. They specify configuration options for various features. The settings are made using something called a 'jumper'. A jumper is a set of two or more metal pins in a plastic base attached to the mainboard. A plastic jumper 'cap' with a metal plate inside fits over two pins to create an electrical contact between them. The contact establishes a hardware setting.

Some jumpers have two pins, others have three or more. The jumpers are sometimes combined into sets called jumper 'blocks', where all the jumpers in the block must be set together to establish a hardware setting. The next figures show how this looks.

Jumpers and caps
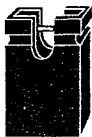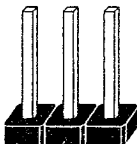
Jumper cap   **3-pin jumper**   **2-pin jumper**   **Jumper block**
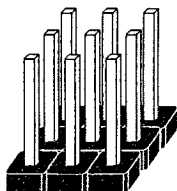
Setting options for most jumpers are printed on the board in a stylized bird's-eye view, with which pins to connect for each setting marked by a bar connecting two pins. For example, if a jumper has three pins, connecting, or 'shorting', the first and second pins creates one setting and shorting the second and third pins creates another. The same type of diagrams are used in this manual. The jumpers are always shown from the same point of view as shown in the whole-board diagram in this chapter. The next figures show what the manual diagrams look like and what they represent.

Jumper diagrams

Jumpers are shown like this
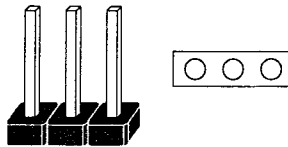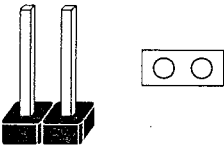
Jumper caps like this   Jumper settings like this
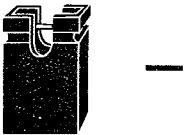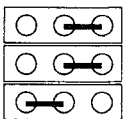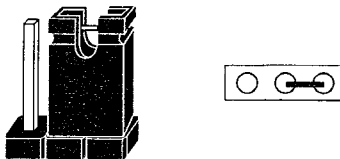
 Jumpers in a 'block'

 Some jumpers are oriented vertically; if the pin position needs to be shown, Pin 1 is marked.

The System Configuration Record

All personal computers use a BIOS (Basic Input Output System) as the basic software that tells the computer how to function. In order for the BIOS to function, there has to be a record of the computer's hardware and configuration settings for it to refer to. This record is created by using a software program that is permanently stored in the BIOS ROM chip on the mainboard. The program is called the CMOS Setup Utility.

The system configuration record the utility creates is also stored on the mainboard. Unlike the utility program, the record is not recorded permanently. The memory it gets stored in must be maintained by battery power when the computer is turned off. If battery support fails, the record will be lost and you will have to recreate it.

When you buy your computer, the system configuration record will already be set. The settings will be optimized for your computer hardware and may vary from the basic defaults. You should run the Setup Utility when you first use your computer. Write down the settings. There is an explanation of how to run the Setup Utility in Chapter 3.

Important:

In some circumstances it is possible the configuration record may be corrupted or lost. If this happens, your computer will not work properly the next time you turn it on. This is not a serious problem. To fix it, run the Setup Utility and re-enter your configuration from your written record. When you restart the computer, it will work normally.

Feature Guide

Power Conservation

This mainboard incorporates the latest power conservation technology, and meets the USA Environmental Protection Agency's (EPA) "Energy Star" specifications. The BIOS Setup Utility controls the board's power management system. For more information see the section on Power Management Setup in Chapter 3. To take advantage of its energy saving capabilities, the mainboard must have an SL Enhanced or compatible CPU installed.

The power management system provides several power saving modes and includes a connector for a manual Suspend Mode switch that mounts on the system case. If your case has one of these, you can Suspend the system at anytime by pressing the button.

Expansion Slots

There three types of expansion slot on this mainboard. Three of the slots are industry-standard ISA slots in which you can use any ISA expansion card. There is a fourth ISA slot that is the upper part of the one VL-Bus local bus slot. The VL-Bus slot shares a slot position with Slot 4 of the four PCI local bus slots.

The VL-Bus and PCi loval bus slots are either bus Master or Slave as listed below:

VL-Bus Slot – Slave only, Bus Master cards will not work correctly.

PCI Slot 1 – always Bus Master-capable

PCI Slot 2 – Master whenVL slot is not used, Slave when used

PCi Slot 3 & Slot 4 – always Slave

System IRQs

Later in the manual you'll see something called an "IRQ" mentioned several times. If you're not familiar with these, this is a short explanation of what they are and why you may need to know about them if you upgrade your system.

An IRQ, or interrupt request, is the process whereby an input or output device tells the CPU to temporarily interrupt whatever it is doing and immediately process something from the source of the interrupt. When finished the CPU goes back to what it was already processing. This happens very quickly. There are 16 IRQs, IRQ 0 through IRQ 15, in the ISA bus design. Devices that need an IRQ line to operate generally must have the use of that line exclusively.

Many expansion cards require the use of an IRQ line to operate, for example, network interface cards and sound cards. When you install a card that uses an IRQ, it will have a default IRQ setting that you might need to change if that IRQ is already in use. There are different ways of setting an IRQ assignment, with jumpers being the most common.

Both the ISA bus and the PCI bus use the same set of system IRQs. For the PCI bus there is an additional consideration. On the PCI bus, you must assign an IRQ to the PCI slot you will install an IRQ-using card in. There are two methods of generating an IRQ on the PCI bus, level-triggering (level-sensitive) and edge-triggering. Most PCI expansion cards use the level-triggered design. Some very few cards may use the edge-triggered design instead. The mainboard design therefore provides the means to set the IRQ assignment for a PCI slot for either type of card. This is explained in detail in Chapters 2 & 3.

Enhanced IDE Features

This mainboard has several feature enhancements for IDE hard disk drives and support for other IDE devices.

The original IDE implementation was limited to two hard disk drives with relatively slower data transfer rates. While this solution is simple and reliable, it has some limitations that have become more significant as the performance level of other system components and overall system performance have increased dramatically with the advent of new microprocessor, expansion bus and operating system technologies.

In response to these demands, the IDE specification has been updated to increase its capabilities and provide improved performance. Together these are referred to as 'Enhanced IDE'. Enhanced IDE features comprise the following:

- Support for IDE hard disk drives larger than the former 528MB limit imposed by various technical factors.

- Support for IDE devices other than hard disk drives, including IDE Tape Backup and CD-ROM drives.

- Support for two IDE channels with two devices per channel, allowing the use of four IDE devices in one system.

- Support for faster data transfer rates, particularly with IDE controller cards that have a PCI local bus interface.

This mainboard either directly supports or allows the use of these new features. The features also depend on your having an IDE controller card that supports Enhanced IDE. If you use a controller that does not have this support these features will not be available.

Large IDE Hard Disks

For IDE hard disk drives, the BIOS provides three modes to support both normal IDE hard disks and also drives larger than 528MB:

Normal – for IDE drives smaller than 528MB

Large – for drives larger than 528MB that do not use LBA. These can only be used with the MS-DOS operating system.

LBA – for drives larger than 528MB and up to 8.4 GB (GigaBytes) that use Logic Block Addressing mode.

Other IDE Devices

Enhanced IDE allows the use of IDE devices other than hard disks. Two devices that previously required non-standard or adapted interfaces and are now available as standard IDE devices are Tape Backup and CD-ROM drives. These will now be able to take adavantage of the ease of installation, lower cost and in some cases superior performance of Enhanced IDE, putting an end to the system configuration complications created by their earlier interfaces.

To use IDE devices other than hard disks with this mainboard you may need to install a device driver in your system software configuration. Refer to the documentation that comes with any device you will install for instructions about this and any otther installation requirements.

Dual IDE Channel Support

If you have a controller card with the support and interface connectors for it, you can connect up to four IDE peripheral devices to your system. With the Enhanced IDE features you can select two devices to each connector. All devices are categorized the same way IDE hard disks have been, with one device set as the "Master" device and the second as the "Slave" device.

Faster Data Transfer

Enhanced IDE includes a scheme to support a significant increase in the rate of data transfer from the IDE device to the rest of the system compared to the previous standard. One aspect of this scheme is support for the Mode 3 timing scheme. If you use both a controller and hard disks that support Mode 3 operation with this mainboard you can increase the data transfer rate up to as much as 11MB per second.
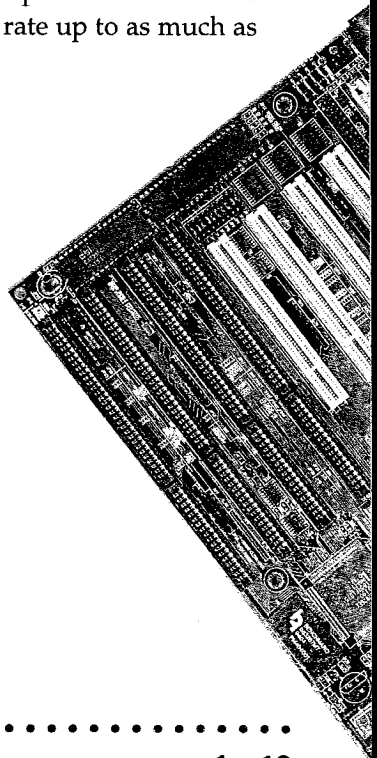
Upgrade Guide

This section explains how to install options on your mainboard. It covers the most likely and technically accessible upgrades you might want to do, including adding expansion cards, increasing system memory, changing the CPU chip and adding IDE hard disks.

Installing upgrades will either improve the performance of your computer, or add some additional capabilities to it. You can install upgrades yourself, or have your dealer or a qualified computer technician do it for you.

It is also possible to increase the size of the Level 2 cache, but since this is a much more technically demanding upgrade that you are both less likely to undertake and in most cases would probably require at least partially disassembling your system, the technical reference information about it is in Chapter 4. It is probably best to have a qualified technician perform the upgrade for you if you want to upgrade the cache.
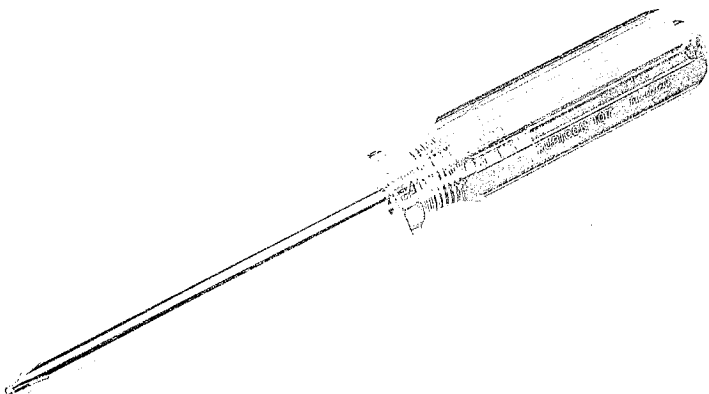
Installing Expansion Cards

There many ISA, VL-Bus and PCI expansion cards you can install in your system to expand its capabilities. Any card you get will come with instructions on how to configure and install it. For your reference, we have included a brief decsription here of how to install a card in your system case. This is followed by an explanation of this mainboard's requirements for installing expansion cards that use an interrupt request line (IRQ). Please review the IRQ information carefully if you are installing this type of card. If you're more familiar with this topic, there is a chart-based synopsis of the required procedures at the end of this section.

Installation Procedure

Expansion cards often require pre-installation configuration and sometimes post-installation software setup. Check your card documentation for instructions on this. Once you have configured an expansion card you want to install, the installation procedure is fairly simple. Your system manual should have instructions for installing expansion cards specific to the design of your system case. The procedure here covers the basics for your reference.

Before you start, always make sure the computer is turned off. You should also make sure to observe standard static electricity discharge precautions. You can damage your expansion card, the mainboard, or both by not being careful about this.

The basic procedure for installing expansion cards is the same for all three types. The components on ISA and VL-Bus cards will face to the right as you view the computer from the front. PCI card components face to the left. Please note that PCI Slot 4 and the combined ISA/VL-Bus slot share the same mounting bracket position, so you can only use one of these slots, not both.

The basic procedure is as follows:

1. Open the system case to gain access to the expansion slots.

2. Remove the slot-cover corresponding to the slot you want plan to use. Put the slot-cover retaining screw aside and store the slot cover in case you need it later.

3. Remove the card from its protective packaging if you haven't already.

4. Align the card's slot connectors to the slot. Keep the card at a 90° angle to the mainboard. Insert the card into the slot by pressing it firmly downward. If there is a lot of resistance, make sure the slot connectors are lined up correctly. PCI cards require very little pressure to insert.

5. Attach the card's mounting bracket to the case using the slot cover screw you put aside in Step 2.

6. Close the case, turn on the computer and check to see if the card is working properly, and do any software set up required.

Remove the slot retaining screw & slot cover

Use the screw to secure the card to the case
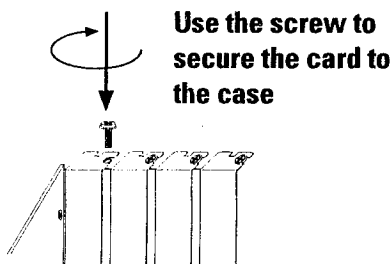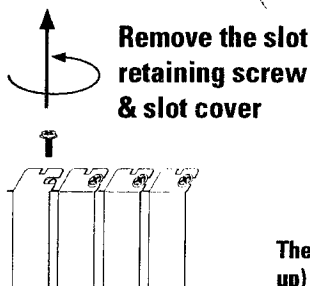
The component side of the card should face right (or up) for an ISA card and left (or down) for a PCI card

Assigning System IRQs

All three buses make use of the same set of System IRQs. If you install any expansion cards that needs to use an IRQ, you must configure the system IRQ assignments so that the system can know which bus is using a particular IRQ. You must assign IRQs correctly, or the mainboard will not work properly.

As mentioned in Chapter 1, there are 16 IRQs in total, only some of which are not already in use. In the basic ISA design upon which all boards like this are based, some IRQs are used by standard parts of the system such as the keyboard, mouse, parallel printer and serial ports. Drawing from the unused group of system IRQs, you can assign an IRQ to any card that needs to use one. For covenience, all unused IRQs are already set to be available to the ISA and VL-Bus slots by default.

For the ISA and VL-Bus, the IRQs are available to every slot and you use an IRQ by configuring an IRQ number on the expansion card you want to install and then installing the card in any empty slot.

In the PCI design you assign an IRQ to a PCI slot rather than doing it on a card. Instead, on PCI cards, you set something called the "INT" assignment. Since all the PCI slots on this mainboard use "INTA#", you only need to make sure that any PCI card you install is set to INTA#. Of the PCI cards that use an IRQ, the overwhelming majority of them use a "Level-Triggered" IRQ design. You can assign IRQs for this type of card by using the BIOS Setup Utility, and there are already default IRQs assigned for PCI Slot 1 and 2. See the section on PCI SLot Configuration in Chapter 3.

A few PCI cards, e.g. some IDE cards, use an "Edge-triggered" IRQ design. For these you have to assign the PCI IRQ by also setting a jumper in jumper block JP2-11.

The block sets the assignments for IRQs 5, 9, 11, 14, and 15. These jumpers only assign IRQs for edge-triggered cards. Their default settings leave the five IRQs unassigned and available to either the ISA and VL-Bus or to level-triggered PCI cards.

You do not need to assign a system IRQ to a PCI slot unless you install a card in it that needs an IRQ. If you don't need to use a system IRQ for a PCI slot in the Setup Utility, you can set it to "NA" so that the unused default IRQ is available to the other buses.

Selecting IRQ Settings for Edge-Triggered Cards

Set the IRQ for edge-triggered cards using the same setting both in the Setup Utility and on the board using the JP2-11 jumpers. The chart below shows the options and the figure below it the defaults.

System IRQ	Default settings	PCI Bus edge trigger IRQ settings PCI1	PCI2	PCI3	PCI4
IRQ 5	JP2&11 2-3	JP2 1-2	JP2 3-4	JP11 1-2	JP11 3-4
IRQ 9	JP3&10 2-3	JP3 1-2	JP3 3-4	JP10 1-2	JP10 3-4
IRQ 11	JP4&9 2-3	JP4 1-2	JP4 3-4	JP9 1-2	JP9 3-4
IRQ 14	JP5&8 2-3	JP5 1-2	JP5 3-4	JP8 1-2	JP8 3-4
IRQ 15	JP6&7 2-3	JP6 1-2	JP6 3-4	JP7 1-2	JP7 3-4

Note: You can only select one option for each IRQ.

Pin 1

JP11 JP10 JP9 JP8 JP7 JP6 JP5 JP4 JP3 JP2
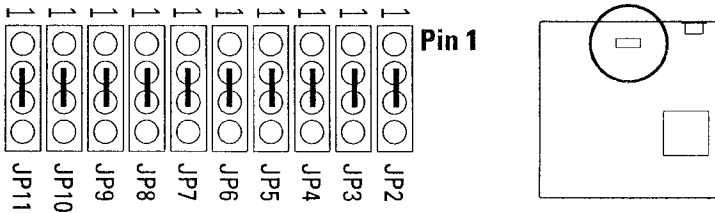
Defaults leave IRQs available for PCI level-triggered or ISA & VL-Bus bus cards. Do not change a default setting if you aren't installing an edge-triggered card that needs to use an IRQ.

Installing Expansion Cards That Use An IRQ
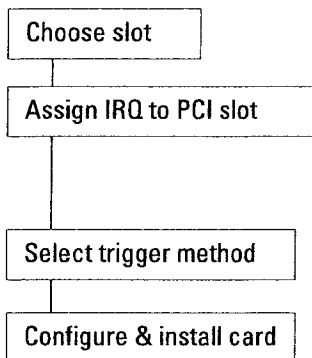
Example PCI installation procedure:

| Choose slot |

| Assign IRQ to PCI slot |

1. Choose a slot to use -
   e.g. PCI Slot 1 - fixed INT A#
2. Assign a System IRQ to Slot 1-
   e.g. use default IRQ 10

| Select trigger method |

| Configure & install card |

3. Select level- or edge-trigger
   (see next page)
4. Configure the card you will install in
   PCI Slot 1 to use INT A and install it
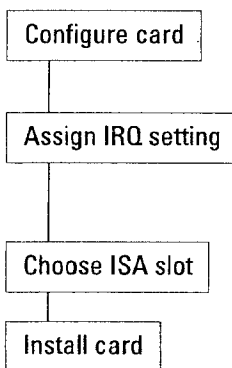
Example ISA or VL-Bus procedure:

| Configure card |

| Assign IRQ setting |

1. Configure the expansion card and select
   the ISA IRQ it will use
   e.g. IRQ 5
2. Use System IRQ 5 ISA Bus default -
   - use JP2 & 11 default settings
   - don't assign IRQ 5 to PCI slot in Setup
   PCI Slot Configuration

| Choose ISA slot |

| Install card |

3. Choose an ISA slot to use -
   e.g. ISA Slot 4
4. Install the card in ISA Slot 4

Upgrade Guide

PCI Edge-Triggered IRQ Assignment

| Choose slot |

| Assign IRQ to PCI slot in Setup |

| Select trigger method in Setup |

| Assign IRQ to PCI Slot by jumper |
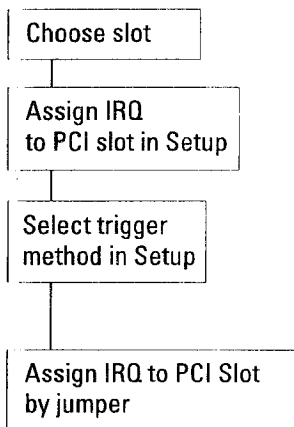
1. Choose a slot to use -
   e.g. PCI Slot 2 - fixed INT A#
2. Assign a System IRQ to Slot 2
   e.g. default IRQ11

3. Select trigger method:
   "Edge(BY JP2-6)"

4. Set JP4 to 'IRQ 11' (short pins 3-4)

PCI Level-Triggered IRQ Assignment
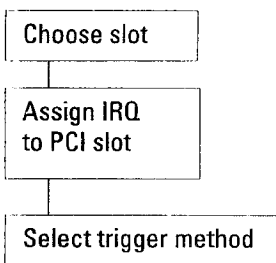
| Choose slot |

| Assign IRQ to PCI slot |

| Select trigger method |

1. Choose a slot to use -
   e.g. PCI Slot 1 - fixed INT A#
2. Assign a System IRQ to Slot 1
   e.g. use default IRQ 10

3. Select trigger method:
   use default "Level (Auto)"

Note: If you use the Level (Auto) setting for IRQ 5, 9, 11, 14 or 15 DO NOT change the default setting in jumper block JP2-11.

Upgrading System Memory

This section explains how to install more system memory. There are instructions on how to configure and install memory and an explanation of the technical specifications required.

System DRAM is the main source of data for the CPU. Data remains stored in DRAM as long as the system is turned on, and is lost when you turn it off. The Level 2 cache memory is Static RAM (SRAM), which is faster than DRAM memory. When the CPU looks for data, it first searches the cache. If the information is not there, the search continues in the DRAM. With this design, the CPU looks in the fastest source of data first, which lets it operate as fast as possible.

The DRAM subsystem uses memory chips permanently mounted on small circuit boards to form "SIMMs" (Single In-line Memory Modules). The memory chips have a speed rating that is measured in nanoseconds (ns). This mainboard requires fast page mode DRAM with a speed of at least 70ns.

This mainboard can use 72-pin SIMMs in six sizes of 1MB, 2MB, 4MB, 8MB, 16MB, and 32MB (megabytes). Depending on the combination of modules you use, you can install between 1MB and 128MB. The 32–bit modules used for this board come with memory chips on either one or both sides of the module.

Upgrade Guide

Configuring System Memory

If you want to add system memory, you must use the configuration options and specifications shown in this section.

Memory Combinations

You can configure the system memory in a variety of ways, using different combinations of SIMM modules. Using the 4 SIMM sockets there are 90 possible combinations.

The tables on the next two pages explain the configuration requirements and show possible combinations.

The only restrictions are:

- **You must use either 1, 2 or 4 sockets at a time, i.e. SIMM 1 or SIMM 3, SIMM1 and SIMM 2, SIMM 1 and SIMM 3, SIMM 3 and SIMM 4, or all four at once.**

- **Each pair of modules in a Bank, i.e. SIMMs 1&2 or 3&4, must be the same size and speed.**

- **If you use only one module per pair of sockets it must be either SIMM 1 or SIMM 3.**

- **Required Memory Specifications:**

  Module Size: 1MB, 2MB, 4MB, 8MB, 16MB, or 32MB

  DRAM Mode: Fast Page Mode

  DRAM Speed: 70ns (or faster)

  RAS access time [Trac]: 60ns - 70ns

  CAS access time [Tcac]: 10ns - 25ns

  Parity: Either parity or non-parity
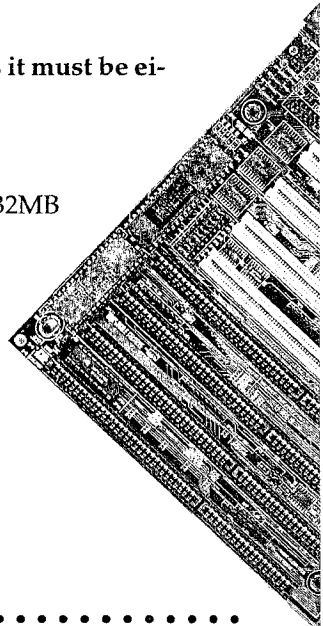
Example Memory Configurations

| Bank 1 | | Bank 2 | | |
SIMM 1	SIMM 2	SIMM 3	SIMM 4	Total
A				A
A	B			A + B
		C		C
		C	D	C + D
A		C		A + C
A	B	C	D	A + B + C + D

You can mix and match SIMMs of any size as long as you:

- Make sure any SIMMs in the same Bank are the same size
- You use either *one*, *two* or *four* SIMMs at a time
- You CAN install SIMMS in the SIMM3 and SIMM4 sockets without installing anything in SIMM1 and SIMM2.
- You CAN NOT install only three SIMMs.
- You can use either 1-sided or 2-sided SIMMs.
- Both SIMMs in a bank MUST be the same. Same size, same number of sides,
- All SIMMs should be the same speed.

NOTE: THESE TABLES READ IN NORMAL SEQUENCE LEFT TO RIGHT, I.E. 1, 2, 3, 4; BUT THE SIMM SOCKETS ARE NUMBERED IN REVERSE SEQUENCE STARTING FROM THE RIGHT, I.E. 4, 3, 2, 1. REFER TO THE ILLUSTRATION THAT SHOWS THE SEQUENCE ON PAGE 2-13.

EXAMPLES:

| Bank 1 | | Bank 2 | | |
SIMM 1	SIMM 2	SIMM 3	SIMM 4	Total
2MB				2MB
2MB	2MB			4MB
4MB				4MB
4MB	4MB			8MB
4MB		2MB		6MB
2MB	2MB	4MB	4MB	12MB
4MB	4MB	4MB	4MB	16MB
8MB				8MB
8MB	8MB			16MB
16MB				16MB
16MB	16MB			32MB
16MB		8MB		24MB
8MB	8MB	16MB	16MB	48MB
16MB	16MB	16MB	16MB	64MB
32MB				32MB
32MB	32MB			64MB
32MB		16MB		48MB
32MB	32MB	16MB	16MB	96MB
32MB	32MB	32MB	32MB	128MB

Installing SIMMs

To install SIMMs follow these instructions:

1. The modules will only insert in a socket in one orientation. An orientation cut-out will prevent you from inserting them the wrong way. See the figures at right.

2. Press the module edge connector into the socket at a moderate angle to the board. See the figures below.

3. Press the module forward onto the socket's vertical posts, so that the alignment pins at the top of each post go into the circular holes at each end of the module.

4. The module should click into place, as the retaining clips at each end of the socket snap behind the module to secure it.

5. Repeat this procedure for each module you install.

Installing a Memory Module
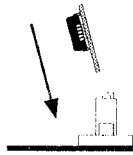
Insert the SIMM into the socket at an angle.
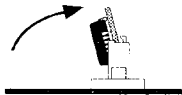
Press it forward onto the positioning pins.

The retaining clips should fit over the edge and hold the SIMM in place.

Module Sockets & Orientation
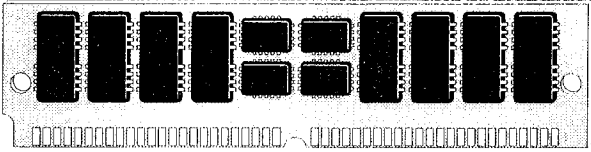
Cut-out

SIMMs have a cut-out at one end that matches an
extension on one of the vertical posts of each socket.

Put orientation cut-out at this end.

SIMM#   4   3   2   1

OR
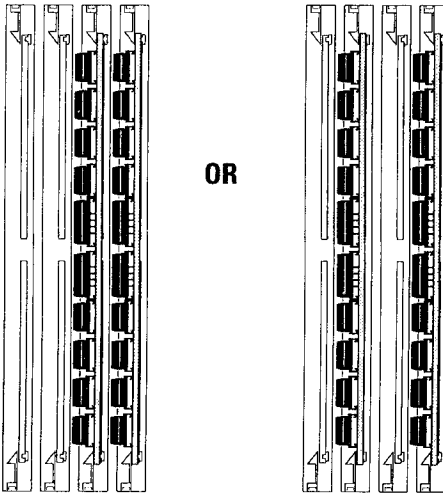
Install modules starting with the SIMM1 socket on the
right-hand side. Modules may have chips on one or
both sides.

Updating the Flash BIOS

This mainboard has two BIOS ROM chip options. It can use either of two programmable 'flash' EPROM chips, 5-volt or 12-volt, either of which you can update when BIOS upgrades are available.

Jumper JP12 enables programming for the type of BIOS ROM chip installed. There are two settings. The default setting, which shorts pins 2&3, is for a 5-volt flash chip. The other setting, which shorts pins 1&2, is for a 12-volt flash chip.

Note: The default 5-volt setting also functions to write-protect a 12-volt flash chip. If you have the 12-volt chip, the only time you should change the JP12 setting from the default to the 12-volt setting is when you are programming the chip. When you finish programming, always set JP12 back to the default 5-volt setting.

Jumper JP13 provides a second protection against accidental writing to the BIOS ROM or other corruption of it. The default setting prevents writing to either voltage flash ROM chip.

JP12: Flash Programming Settings
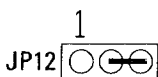
1
JP12 $\boxed{\bigcirc\,\ominus\!\!-\!\!\bullet}$

1
JP12 $\boxed{\bullet\!\!-\!\!\ominus\,\bigcirc}$

**5 Volt flash
programming &
12 Volt write-protection
(default setting)**
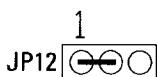
**12 Volt flash
programming**
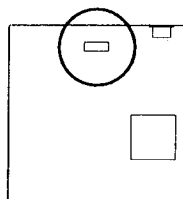
JP13: Flash Programming Settings

1

JP13 |○ ⊖⊖|

1
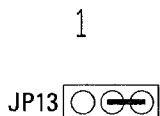
JP13 |⊖⊖ ○|

Write-protection
(default setting)
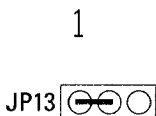
Write-enable
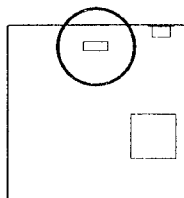
The following example illustrates this procedure for the standard BIOS chip for this mainboard, a 12-volt flash chip.

BIOS Update Procedure

Check the default setting

Short JP12 pins 1&2;
JP13 pins 1&2

Use FMW to update BIOS

Set JP12 to short pins
2&3; JP13 pins 2&3

1. JP12 should be set to the 5-Volt Flash setting, JP13 to Write-protection.

2. Set JP12 to the 12-volt setting and JP13 to Write-enable to enable programming.

3. Refer to Chapter 3 for instructions on using the Flash Memory Writer Utility to install a new BIOS file in the flash ROM chip.

4. When you have successfully installed a new BIOS, set JP12 & 13 back to the original settings.

Installing A CPU Upgrade

If you want to improve your system performance, you can install an upgrade CPU in the ZIF socket. You must first remove the existing CPU, and then set the CPU selection jumpers for the new CPU. Be sure to follow static electricity precautions very carefully. The CPU is one of the most expensive parts of your system and can be damaged or destroyed by static electric discharge.

There are several jumpers you need to set when changing the CPU. The jumpers settings define these specifications:

CPU Type – the kind of CPU is installed

External Clock Speed – the external operation speed. This is also the speed the VL and PCI bus will operate at.

Intel DX4™ Internal Clock Speed – the number by which the external clock speed is multiplied, the result of which is the internal clock speed.

You must have all of this information ready before you can install a CPU upgrade. Remember that the chip speed will be listed according to the faster internal clock speed. The chart below shows some examples:

CPU	Internal Speed	External Speed
486DX-33 (or SX)	33MHz	33MHz
486DX2-50 (or SX2)	50MHz	25MHz
486DX2-66	66MHz	33MHz
486DX4-75	75MHz	25MHz
486DX4-100	100MHz	33MHz

Upgrade Guide 2

To check what jumper settings are required to upgrade the CPU, refer to the Jumper Setting Summary in Chapter 4. Make sure to take full precautions against static electric discharge before you work on the board. To install an upgrade CPU first do as follows:

1. Identify the existing external clock speed setting on the board.

   The external clock speed is set by jumpers JP25 and JP26, the options are 25MHz or 33MHz.

2. Identify the external clock speed of the CPU you will install.

   If the external clock speed is the same as the mainboard's existing setting, proceed. If it is different, change the JP25/26 setting to the required speed.

3. Identify the CPU type and check what the required jumper settings for JP18 and JP19 are for that type. If you are installing any 486DX4 or Pentium OverDrive CPU you may also need to set JP17.

4. For Rev 1.6 of this mainboard, if you install a Cyrix "SL" type CPU you MUST set jumpers JP30 and 31 to the "Cyrix" setting so that the voltage regulator is set for that type of CPU. The default settings for these jumpers are "Intel" so you don't need to change the settings unless you install a Cyrix SL CPU.

5. Once you have made any required jumper settings, you can install the CPU chip in the Socket 3 ZIF socket. Refer to the next page for instructions on this if you're not familiar with how to use the Zero Insertion Force socket.

Installing a CPU in the ZIF Socket

1. Make sure the ZIF socket lever is up. To raise the lever, pull it out to the side a little and raise it as far as it will go. Pin 1 is at the arm corner.

2. Align the CPU and socket Pin 1 corners. The pins on the bottom should align with the inner 3 rings of holes in the socket — unless you are installing Pentium technology.

3. Place the CPU in the socket. It should insert easily. If it doesn't, pull the lever up a little more.

4. Press the lever down. The plate will slide forward. You will feel some resistance as the pressure starts to secure the CPU in the socket. This is normal and won't damage the CPU. When the CPU is installed, the lever should snap into place at the side of the socket.

Note: To remove a CPU, pull the lever out to the side a little and raise it as far as it will go. Lift out the CPU chip.

Lever — Pull lever out & up

Pin 1 position

Sliding plate — Align CPU & insert it

CPU Pin 1

Press lever down

The plate slides forward

Upgrade Guide 2
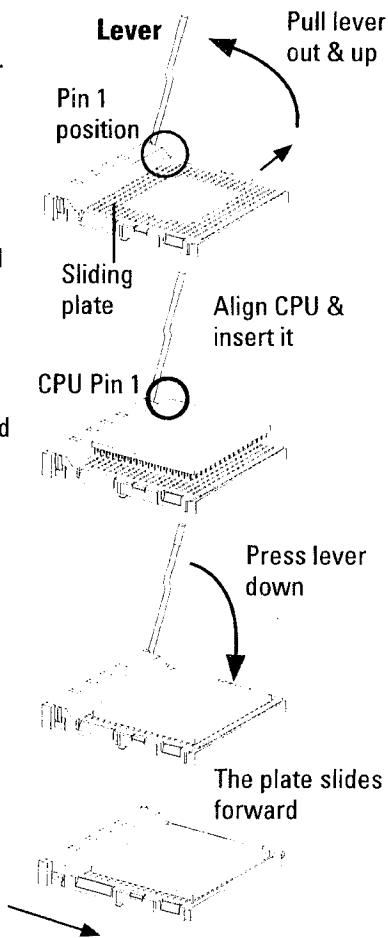
Installing IDE Hard Disks

This section explains how to install IDE hard disk drives. You can connect up two IDE hard disks to the on-board connector. The point of this section is to explain the information specific to this mainboard, not the basic procedure for how to install a hard disk in your system case. Your system manual should have instructions specific to installing deivices in your case.

If you already have a SCSI hard disk and you decide you want to install an IDE drive also, the IDE drive must be Drive C:.

Installing a Primary IDE Hard Disk

To install a first IDE hard disk do the following:

1. Follow the instructions in your computer system manual for installing a hard drive in an empty drive bay and connecting a power cable.

2. Connect one end of the IDE ribbon cable to the drive and the other to the IDE connector on the mainboard. The colored edge of the cable should be at the Pin 1 side of the connector on the hard disk and the mainboard.

3. Connect the drive LED connector to the HD LED connector on the board.

4. Reassemble the system, turn it on and run the Setup Utility.

5. Use IDE HDD AUTO DETECTION to detect the drive parameters and enter them for "Drive C:".

6. Enable "Onboard Local Bus IDE" in Chipset Features Setup.

7. In Power Management Setup, set the "HDD Adapter IRQ" to "14" and set the "IDE Ports Accessed" option in System Events to "ON" if you will use the power management feature.

Installing Additional IDE Hard Disks

If you have space in your system case, you can install another IDE hard disk or other IDE device using the procedure on the previous page. Install the drive in an empty drive bay and connect the drive to the unused *middle* connector of the IDE ribbon cable. Note that a all IDE devices except the first must be set to function as a "slave" device, because the first IDE device functions as the "master"device. The device manual should tell you how to do this. Many IDE devices use jumpers to make this setting.

Once you have installed the device, you will need to use the BIOS Setup Utility again to configure and record the presence of the second drive as Drive D: in Standard CMOS Setup.

See Chapter 3 for an explanation of how to use the hard disk auto-detection feature to automatically detect the parameters of IDE hard disks and enter them in the Standard CMOS Setup.

Upgrade Guide
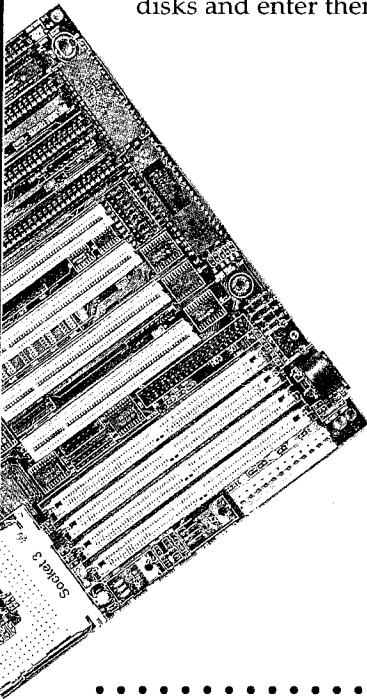
Installing a SCSI Hard Disk or Other SCSI Device

The procedure to install internal SCSI devices is the same whether the device is a hard disk drive or some other device. To connect SCSI devices you will need the optional SC-200 controller card described at the end of Chapter 4. To set up or install a SCSI device follow the installation intructions that come with the device.

SCSI ID Numbers & Termination

SCSI devices differ from other peripherals you may be familiar with in two important ways. Because up to seven SCSI devices can be linked together in a chain, each device must have an identification number so that the controller can tell them apart. In addition, the chain must be terminated with a resistor at each end.

When you install a SCSI device, you must set its ID number and make sure that no other device is using that number. You can use numbers 0 through 6. The SC-200 controller card counts as a device in the chain and uses ID #7. Check your device manual for instructions on how to set the SCSI ID number.

However many devices you have in a SCSI chain, the first and last device must be terminated. The only way that the SC-200 controller card can be one end of the chain is if you have only internal or only external devices installed. If you connect both internal and external devices, you must Disable the terminators on the card. There is more information about this in the section on the SC-200 card at the end of Chapter 4.

SCSI Installation Procedure

In general, to install an internal SCSI device do as follows:

1. Follow the instructions in your computer system manual for installing a device in an empty drive bay and connecting a power cable to it.

2. Connect one end of a SCSI ribbon cable to an internal device, or SCSI-2 cable to an external device, and the other end to the appropriate SCSI connector on the SC-200 (see Chapter 4). The colored edge of a ribbon cable should be at the Pin 1 side of the connector on the device and the SC-200 card.

3. Connect the device LED connector, if it has one, to the LED connector on the SC-200 card.

4. Reassemble the system, turn it on.

5. If the device is the only hard disk drive in the system, run the Setup Utility and set the drive parameters in the Standard CMOS Setup entry for the Drive C: to "None".

   Note: If you have both IDE and SCSI hard disks in your system, the IDE hard disk must be the boot drive, i.e. , Drive C:.

6. Set the "Delay for SCSI/HDD" in Chipset Features Setup to the number of seconds needed if you know you have a SCSI device that needs time to warm up before being accessed.

7. If you use Power Management, set the system to wake up on activity from on the IRQ the SC-200 card is using.

If the SCSI device is not a hard disk, it may require other software setup. Refer to the manual for the device for more information. The SC-200 card comes with drivers for many SCSI devices and optimized drivers for SCSI hard disks.

Software Guide

This chapter explains the Setup Utility for the Award BIOS, the SCSI BIOS and drivers, and the system BIOS flash memory update utility.

Award BIOS

All computer mainboards of this type have a 'Setup' utility program stored in the BIOS ROM that is used to create a record of the system configuration and settings. If you received your mainboard installed as part of a system, the proper entries have probably already been made. If so, you might want to call up the Setup Utility, as described later, to take a look at them, and perhaps record them for future reference, particularly the hard disk specifications.

If you are installing the board or reconfiguring your system, you'll need to enter new setup information. This section explains how to use the program and make the appropriate entries.

The Setup Utility is stored in the BIOS ROM. When you turn the computer on, a screen message appears to give you an opportunity to call up the Setup Utility. It displays during the POST (Power On Self Test). If you don't have a chance to respond, reset the system by simultaneously typing the <Ctrl>, <Alt> and <Delete> keys, or by pushing the 'Reset' button on the system cabinet. You can also restart by turning the system OFF then ON.

This message will then reappear:

TO ENTER SETUP BEFORE BOOT PRESS CTRL – ALT – ESC OR DEL KEY

After you press the <Del> key the main program screen will appear, displaying the following choices.

Main Program Screen

```
                      ROM PCI/ISA BIOS(P/I-AP4G)
                          CMOS SETUP UTILITY
                        AWARD SOFTWARE,INC.

   STANDARD CMOS SETUP              SUPERVISOR PASSWORD

   BIOS FEATURES SETUP             USER PASSWORD

   CHIPSET FEATURES SETUP          IDE HDD AUTO DETECTION

   POWER MANAGEMENT SETUP          HDD LOW LEVEL FORMAT

   PCI SLOT CONFIGURATION          SAVE & EXIT SETUP

   LOAD BIOS DEFAULTS              EXIT WITHOUT SAVING

   LOAD SETUP DEFAULTS


   ESC   : Quit                 ↑↓→←   : Select Item
   F10   : Save & Exit Setup    (SHIFT)F2 : Change Color

                  Time, Date, Hard Disk Type...
```

This screen provides access to the utility's various functions.

Note: The 'BIOS Defaults' are minimized settings for troubleshooting. Use the 'Setup Defaults' to load optimized defaults for regular use. If you choose defaults at this level, it modifies all applicable settings.

A section at the bottom of the screen explains the controls for this screen. Use the arrow keys to move between items, <Shift>+<F2> to change the color scheme of the display and <Esc> to exit the utility. If you want to save changes, press the <F10> key to save the changes you made and exit the utility. Another section at the bottom of the screen displays a brief explanation of the item highlighted in the list.

Software Guide

Standard CMOS Setup

"STANDARD CMOS SETUP" records some basic system hardware information and sets the system clock and error handling. If your mainboard is already installed in a working system you will not need to do this. If the configuration record which gets stored in the CMOS memory on the board is lost or corrupted, or if you change your system hardware configuration, you will need to recreate the record. The configuration record can be lost or corrupted if the onboard battery that maintains it weakens or fails.

Standard CMOS Setup Screen

```
                       ROM PCI/ISA BIOS(P/I-AP4G)
                            CMOS SETUP UTILITY
                          AWARD SOFTWARE, INC.

   Date  (mm:dd:yy) : Mon, Jul 4  1994
   Time  (hh:mm:ss) :  10:  00: 00

                          CYLS.   HEADS   PRECOMP   LANDZONE   SECTORS    MODE
   Drive C  :  User ( 307MB)     790     15      65535       790        57    NORMAL
   Drive D  :  None (   0MB)       0      0          0         0         0    ------
   Drive E  :  None (   0MB)       0      0          0         0         0    ------
   Drive F  :  None (   0MB)       0      0          0         0         0    ------

   Drive A  :  1.2M , 5.25 in.
   Drive B  :  1.44M, 3.5 in.                    Base Memory:    640K
                                            Extended Memory:   3328K
   Video       :  EGA/VGA                     Other Memory:   3328K

   Halt On  :  All Errors                      Total Memory:   3328K

 ESC : Quit                    ↑↓→←      : Select Item     PU/PD/+/- : Modify
 F1  : Help                  (SHIFT)F2 : Change Color
```

"STANDARD CMOS SETUP" displays a screen with a list of entries. Follow the on-screen instructions to move around the screen. Instructions at the bottom of the screen list the controls for this screen. Use the arrow keys to move between fields, and the <Page Up> ('PU'), <Page Down> ('PD') or plus and minus keys to change the option shown in the selected field. Pressing <Shift>+<F2> changes the color scheme of the display, and <Esc> exits this level and returns to the main screen.

Modifiable fields appear in a different color. If you need information about what changes to make, press the <F1> key. The help menu will then give you information on the item highlighted. The display of available memory at the lower right-hand side of the screen functions automatically.

Date & Time

The first two lines on the screen are the date and time settings for the system clock.

Hard Drive Type

You must enter the specifications of certain types of hard disk drive if they are installed in your system. MFM, ESDI and IDE hard disks all need to have their specifications recorded here.

If you have one or more SCSI hard disks installed in your system, you do not need to enter their specifications here. SCSI drives operate using device drivers and are not supported directly by any current PC BIOS. If your mainboard has the SCSI controller card option, and you will use it, see the SCSI instructions that follow later in this section. If you have some other SCSI controller, follow the instructions that came with it on how to install any required SCSI driver.

Software Guide

The are four hard disks listed "**Drive C:**", "**Drive D:**" "**Drive E:**" and "**Drive F:**". Note that these letters refer to the physical drive (think of them as 'Drive 1' and 'Drive 2' etc.), not to any logical drives or partitions you might create under an operating system such as MS-DOS. You can install only two MFM or ESDI hard disks as Drive C: and D:. With the on-board IDE controller, you can install two IDE hard disk drives as Drive C: and D:. If, however, you disable the on-board controller and install an IDE controller that supports Enhanced IDE features for four drives, you can use all the drive letters.

To enter the specifications for an MFM or ESDI hard disk drive, you must first select a 'type'. You can select the "User" option and enter the specifications yourself manually or there are 46 pre-defined drive specifications which you can look through to see if the specifications for your drive are assigned a type number. Do this by using the <Page Up> or <Page Down> key to change the option listed after the drive letter.

For an IDE hard drive, you should use the auto-detection utility described later to enter the drive specifications automatically. If you want to do this, leave the drive set to "None". You can enter the specifications yourself manually by using the User option if you want to.

There are six categories of information you must enter: "Cyls." (number of cylinders), "Heads" (number of read/write heads), "Precomp" (write precompensation), "LandZone" (landing zone), "Sectors" (number of sectors) and "Mode". The size entry is automatically determined by the other entries. The hard disk vendor's or system manufacturer's documentation should provide you with the drive specifications. If you have an IDE drive, unless your drive is already formatted with specifications different from those detected by the auto-detection utility, the easiest thing to do is use auto-detection to enter the drive specifications.

Mode Setting For Hard Disk Drives Larger Than 528MB

The last of the specification entries, Mode, requires additional explanation. The Mode settings are for IDE hard disks only. You can ignore this item for MFM and ESDI drives. There are three entries you can select from in the Mode field, "Normal", "Large" and "LBA".

Set Mode to the Normal setting for IDE hard disk drives smaller than 528MB. Use the LBA setting for drives over 528MB that use Logical Block Addressing mode to allow larger IDE hard disks. The Large setting is for drives over 528MB that do not use the LBA mode. This type of drive can only be used with MS-DOS and is uncommon. The majority of IDE drives over 528MB use the LBA mode.

Note: Entering incorrect drive specifications will result in a hard disk drive functioning improperly or not at all.

Novell Netware 286 Users: You must shadow the system BIOS if you will use a user-defined hard disk type.

Floppy Disk Drives

The next two lines record the types of floppy disk drive present. The five options for drives A and B are:

360KB, 5.25 in.

1.2MB, 5.25 in.

720KB, 3.5 in.

1.44MB, 3.5 in.

2.88MB, 3.5 in.

None

Highlight the listing after each drive name and select the appropriate entry.

Video Display Types

"**Video**" refers to the type of video display card your system has. The five options are:

EGA/VGA

Mono (for Hercules or MDA)

CGA 40

CGA 80

You should select the setting that matches your video display card. If you have a VGA or any higher resolution card, choose the EGA/VGA setting.

Error Handling

The last line "**Halt On**" controls whether the system stops in case of an error. The options are:

All Errors

No Errors

All, But Keyboard

All, But Diskette

All, But Disk/Key

For most purposes, we suggest that you leave the setting on the default, "**All Errors**", unless you know why you want to use a different setting.

When you have made your selections, exit to the main program screen by pressing the <Esc> key.

BIOS Features Setup

"BIOS FEATURES SETUP" is a list of system configuration options. Some entries are defaults required by the mainboard's design. Others will improve your system's performance if enabled, or let you set up some system features according to your preference.

BIOS Features Setup Screen

```
                        ROM PCI/ISA BIOS(P/I-AP4G)
                           BIOS FEATURES SETUP
                          AWARD SOFTWARE,INC.

Virus Warning              :Disabled │ System BIOS Shadow   :Enabled
CPU Internal Cache         :Enabled  │ Video  BIOS Shadow   :Enabled
External Cache             :Enabled  │ C8000-CBFFF Shadow   :Disabled
Quick Power On Self Test   :Enabled  │ CC000-CFFFF Shadow   :Disabled
Boot Sequence              :C,A      │ D0000-D3FFF Shadow   :Disabled
Swap Floppy Drive          :Disabled │ D4000-D7FFF Shadow   :Disabled
Boot Up Floppy seek        :Disabled │ D8000-DBFFF Shadow   :Disabled
Boot Up NumLock Status     :On       │ DC000-DFFFF Shadow   :Disabled
Boot Up System Speed       :High     │ E0000-E3FFF Shadow   :Disabled
IDE HDD Block Mode         :Enabled  │ E4000-E7FFF Shadow   :Disabled
Typematic Rate Setting     :Disabled │ E8000-EBFFF Shadow   :Disabled
Typematic Rate (Chars/Sec) :6
Typematic Delay(Msec)      :250
Security Option      :System         ├──────────────────────────────
                                     │ ESC : Quit      ↑↓→← :Select Item
                                     │ F1  : Help         PU/PD/+/-  : Modify
                                     │ F5  : Old Values  (SHIFT)F2   : Color
                                     │ F6  : Load BIOS Defaults
                                     │ F7  : Load Setup Defaults
```

A section at the lower right of the screen explains how to navigate and make changes. The controls are the same as for the Standard CMOS Setup.

If you need information about what changes to make, highlight an entry and press the <F1> key. A pop-up help menu will display information about the highlighted item. Press the <F5> key to recall the last set of values saved for this page. Pressing the <F6> key loads the BIOS default values for this page and <F7> loads the Setup default values.

The following explains the options for each entry and indicates the default settings (Setup Defaults) for this screen.

Virus Protection

The "**Virus Warning**" default setting is "Disabled". This feature protects the boot sector and partition table of your hard disk. Any attempt to write to them will halt the system and cause a warning message to appear. If this happens, you can either allow the operation to continue or stop it and use an anti-virus utility on a virus-free bootable floppy disk to reboot and investigate your system.

Cache Controls

The "**CPU Internal Cache**" default setting is "Enabled". This setting enables the internal CPU cache. Turning the cache off will slow down the system. The BIOS default settings will disable it. Leave it enabled unless you are troubleshooting a problem.

The "**External Cache**" default setting is "Enabled". This setting enables the secondary cache. The BIOS default settings will disable it. Leave it enabled unless you are troubleshooting a problem.

Boot Up Features

The "**Quick Power On Self Test**" default setting is "Enabled". This speeds up the Power On Self Test (POST) by skipping some items that are normally checked during the full POST. If your system is functioning normally, you can use this feature to speed the boot up process.

The "**Boot Sequence**" default setting is "C:, A:"; the other option is "A:, C:". The setting determines where the computer looks first for an operating system, the hard disk or the floppy drive.

The "**Swap Floppy Drive**" default setting is "Disabled". If you enable this feature, the system will swap the floppy drive assignments so that Drive A will function as Drive B: and Drive B: will function as Drive A:.

The "**Boot Up Floppy Seek**" default setting is "Disabled". When enabled, the BIOS will check if there is a 360KB floppy disk drive installed. Don't change the default setting unless your system has a 360KB floppy disk drive.

"**Boot Up NumLock Status**" is a convenience feature. When the computer boots, this setting defines which function, the numeric values, or the cursor controls, will function on the numeric keypad of IBM-compatible keyboards. The extended keyboards supplied with most compatible systems have separate cursor control keys. It is therefore unnecessary to use the numeric keypad to control the cursor. The default setting is "On".

"**Boot Up System Speed**" sets the CPU speed at boot up. The default setting is "High".

IDE HDD Block Mode

The "**IDE HDD Block Mode**" default setting is "Enabled". This feature enhances hard disk performance by making multi-sector transfers instead of one sector per transfer. Most IDE drives, except very early designs, can use this feature.

Keyboard Interface

The "**Typematic Rate Setting**" default setting is "Disabled". If enabled, you can set the typematic controls that follow.

The "**Typematic Rate (Char/Sec)**" controls the speed at which the system registers repeated keystrokes. The choices range from 6 to 30 characters per second (default is 6).

The "**Typematic Delay (Msec)**" controls the time between the display of the first and second characters. There are four delay rate choices: 250ms, 500ms, 750ms and 1000ms (default is 250ms).

Password Control

The "**Security Option**" controls the Password Setting in the main screen. The default setting is "System", uses the User Password feature every time you boot up. The other setting is "Setup". This will allow the system to boot, and use the Supervisor Password *only* to protect the Setup Utility settings from being tampered with. You create a password by using the Supervisor or User Password command from the main screen as explained later in this section.

Shadow Controls

The default setting for "**System BIOS Shadow**" is "Enabled". This will copy the system BIOS into the system DRAM to improve performance.

The default setting for the "**Video BIOS Shadow**" is "Enabled". This copies the video display card BIOS into system DRAM to improve performance.

The next ten lines, "**C8000-CBFFF Shadow**" to "**E8000-EBFFF Shadow**" are for shadowing other expansion card ROMs. The default setting for these areas is "Disabled". If you have other expansion cards with ROMs on them, you will need to know which addresses the ROMs use to shadow them specifically. If you don't know and cannot find out, you can enable all of the ROM shadow settings. This ensures that any ROMs present will be shadowed. It will also reduce the memory available between 640KB and 1024KB.

After you have made your selections in the BIOS FEATURES SETUP press the <Esc> key to go back to the main screen. The next item is CHIPSET FEATURES SETUP.

Chipset Features Setup

This screen controls the settings for the board's chip set. The controls for this screen are the same as for the previous screen.

Chipset Features Screen

```
                        ROM PCI/ISA BIOS(P/I-AP4G)
                           CHIPSET SETUP UTILITY
                           AWARD SOFTWARE,INC.

  PCI Posted Write Buffer  : Enabled      Memory Hole Size On 16M  : Disabled
  CPU To PCI Bursting      : Enabled
  CPU To PCI Byte Merging  : Disabled     8-bit I/O Recovery time   : 1 SYSCLKs
                                          16-bit I/O Recovery time : 1 SYSCLKs
  Fast Page Code Read      : Enabled
  Fast Page Data Read      : Enabled      Onboard Local Bus IDE     : Enabled
  Fast Page Write          : Enabled      Onboard IDE Timing        : Fast
  Pipelined CAS            : Disabled     Delay For SCSI/HDD (Secs) : 0
  DRAM Timing/Margin       : 70ns/Max

  SRAM Timing              : Normal
  Cache Update Scheme      : Wr-Back
  Video BIOS Cacheable     : Disabled

  VL Bus Slave Device      : Disabled    ESC : Quit          ↑↓→← :Select Item
  VL Bus LDEV              : Fast        F1  : Help          PU/PD/+/-   : Modify
  VL Bus LRDY              : Slow        F5  : Old Values  (SHIFT)F2    : Color
                                         F6  : Load BIOS Defaults
                                         F7  : Load Setup Defaults
```

All the entries on the left side of the screen are optimal settings for this mainboard and you should not change them.

Memory Hole Size

The "**Memory Hole Size**" options are "1MB", "2MB", "4MB", "8MB" and "Disabled". The default setting is "Disabled". This feature is not used by MS-DOS or compatible operating systems. Some other operating systems use this feature. Check your OS manuals for instructions on how to use it if required.

Recovery Times

These are fixed. Use the Setup Defaults as indicated.

Onboard Local Bus IDE

This enables or disables the on board IDE controller and connector. The default is "Enabled". The controller use IRQ 14. Disable this feature if you are not using it to free up IRQ 14 or allow for the use of an IDE controller card that supports Enhanced IDE for four devices with two connectors on the card rather than the one on the board.

Onboard IDE Timing

You should use the Setup Default is for this is, which is "Fast". This setting will not affect the timing of an IDE controller card if the on board IDE option is disabled.

SCSI Startup Delay

The "Delay for SCSI/HDD (Secs)" default setting is "0 ". This feature allows time, measured in seconds, for SCSI devices to come on-line and be detected by the BIOS. If you have internal SCSI devices, and are using the on board SCSI BIOS and optional PCI-SC200 controller card, you must choose a delay, which can be up to 30 seconds. If you're not sure how long a delay a device needs, 10 seconds should be enough for most devices. If you are only using external SCSI devices and they're already completely powered up and ready *before* you boot-up, you can use the default setting.

Power Management Setup

Power Management Setup controls the mainboard's "green" features. The features work with Intel SL Enhanced 486 CPUs. If you don't have an Intel SL Enhanced 486 CPU, the settings on this screen will have no effect, and you can ignore them.

The Power Management Setup Screen

```
                       ROM PCI/ISA BIOS (P/I-AP4G)
                           CMOS SETUP UTILITY
                        POWER MANAGEMENT SETUP

 Power Management     : User Define    System Events:
 VGA Adaptor Type     : V/H SYNC+Blank
                                       COM Ports Accessed    : ON
 Doze Mode            : Disable        IDE Ports Accessed    : ON
 Standby Mode         : Disable        LPT Ports Accessed    : OFF
 Suspend Mode         : Disable
 HDD Power Down       : Disable        HDD Adapter IRQ       : NA
                                       Bus(PS/2) Mouse IRQ   : NA
 IRQ3  (Wake-Up Event) : ON
 IRQ4  (Wake-Up Event) : ON
 IRQ8  (Wake-Up Event) : OFF
 IRQ12 (Wake-Up Event) : ON



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

```

Software Guide

Power Management

"**Power Management**" is the master control for the four power saving modes, Doze, Standby and Suspend Mode and HDD Power Down that together form the hardware power conservation scheme. There are four options:

Max Saving   Sets the four power conservation options to maximize power saving by putting the system into a progression of power saving modes after a brief period of system inactivity.

Min Saving   Another set of power saving mode assignments which activate each mode after a moderate period of system inactivity.

Disable   Turns off all power saving mode time-outs

User Defined   Allows you to set the power saving mode time-outs yourself. [Default Setting]

Note: To use an operating system's power management features, this feature must be enabled.

Max Saving

The "Max Saving" defaults are are all "1 Min".

Min Saving

The "Min Saving" defaults are "10Min", "10 Min", "10 Min" and "20 Min" respectively.

VGA Adaptor Type

The "**VGA Adaptor Type**" default is "V/H SYNC+Blank". If your video display adaptor supports "green" features you can use the default setting. If not, set this line to the "Blank Only" setting. When power management blanks the monitor screen, the default setting saves more power by turning off the CRT's vertical and horizontal scanning. With non-green monitors it blanks the screen but doesn't stop CRT scanning.

Power Conservation Mode Controls

The next four lines control the core features of the Power Management scheme. There are three power conservation modes and a hard disk control. The settings here are for the period of system activity after which the feature will activate. The power conservation modes activate in sequence. The sequence in which these features work is the same as their order on the screen. If one feature is disabled, the system progresses to the next one.

The features work by progressively shutting down more and more of the system. The system automatically recovers when there is system activity, as, for example, when you type any key, or there is an IRQ wake-up event including moving the mouse.

The time settings for Doze, Standby and Suspend mode range from "1 Min" to "4 Hour" and you can Disable each feature.

"**Doze Mode**" puts the CPU into 80% Sleep/20% Work mode.

"**Standby Mode**" puts the CPU into 92% Sleep/8% Work mode and suspends the video signal, and if your display adaptor supports green features, the CRT's vertical and horizontal scanning. This activates the power saving features on your monitor (if it has them) causing the screen to go blank and the monitor to switch to its minimum power consumption state.

"**Suspend Mode**" puts the CPU into 99% Sleep/1% Work mode, suspends the video signal, and shuts down any IDE hard disk drives connected to the system. If your system case supports a dedicated Suspend switch, you can put the system into Suspend Mode at any time by pressing the Suspend button.

"**HDD Power Down**" shuts down any IDE hard disk drives in the system if they are not accessed for the specified period. The time settings range from "1 Min" to "20 Min", or "Disable".

This feature can activate at the same time as the Doze and Standby modes. For example, if you use the Max Saving defaults, both Doze Mode and HDD Power Down will activate at the same time. Suspend mode already includes the function of this feature.

HDD Power Down does not affect SCSI hard disks.
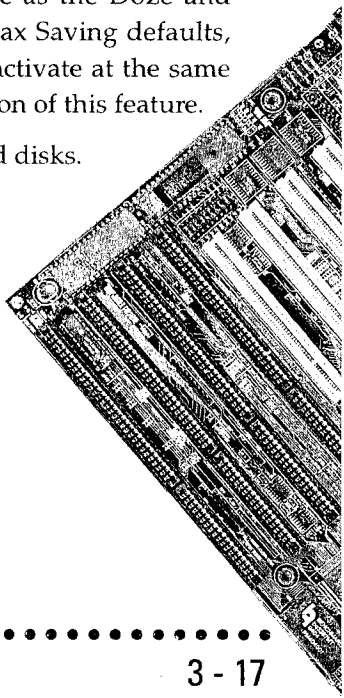
Individual IRQ Wake-up Events

The settings in this group determine if a System IRQ is monitored for activity so as to wake up the system if an interrupt request is generated by a device using it. If an IRQ is not in use, there is no effect.

The "**IRQ3 (Wake-up Event)**" default setting is "On".

The "**IRQ4 (Wake-up Event)**" default setting is "On".

The "**IRQ8 (Wake-up Event)**" default setting is "Off".

The "**IRQ12 (Wake-up Event)**" default setting is "On".

Note: Normally, a Microsoft serial mouse or compatible will use either COM1 (IRQ4) or COM2 (IRQ3) and a PS/2-type mouse will use IRQ12. If you know which IRQ your mouse is using, you can make sure the Wake-up Event for that IRQ is turned on here and the system will wake up when you move the mouse or click a button.

System Events – I/O Port Settings

These three lines let you set the system to wake up from a power conservation mode if one of the I/O ports listed is accessed by a device connected to it.

The "**COM Ports Accessed**" default setting is "On".

The "**IDE Ports Accessed**" default setting is "On".

The "**LPT Ports Accessed**" default setting is "Off".

Hard Disk & PS/2 Mouse IRQs

The "**HDD Adapter IRQ**" default setting is "NA".

The "**Bus(PS/2) Mouse IRQ**" default setting is "NA".

You can change the Not Assigned defaults and enter the IRQ setting used by the system hard disk controller and a PS/2 or Bus mouse if you want the system to wake up when either one is active.

The hard disk setting affects all hard disk controllers including SCSI controllers. The on-board IDE uses IRQ 14 by default and any IDE port activity is already set to wake up the system by default in the System Events section. For non-IDE hard disk controllers you can set the IRQ used by the controller.

The mouse entry is for a mouse that connects to a PS/2 Bus mouse card. If your system uses the on-board PS/2 mouse connector, it uses IRQ 12, which is already set to wake up the system by default, so you do not need to use the mouse entry here.

When you are done here, press the <Esc> key to go back to the main screen.

PCI Slot Configuration

This screen configures the PCI Bus slots, Master/Slave status is noted on screen. All the slots use INTA#. If you install a card that uses an INT setting, you should set the card to INTA#.

PCI Slot Configuration Screen

```
                        ROM PCI/ISA BIOS(P/I-AP4G)
                          PCI SLOT CONFIGURATION
                            AWARD SOFTWARE, INC.

  SLOT 1(RIGHT)-- Master              NOTE:
     Latency Timer      : 80 PCI Clock
     Using IRQ          : 10          All of PCI adapters should use INTA#.
     Trigger Method     : Level (Auto) BIOS will route each INTA# to
                                       corresponding IRQ automatically.
  SLOT 2 -- Master if VL disabled
     Latency Timer      : 80 PCI Clock
     Using IRQ          : 11
     Trigger Method     : Level (Auto)

  SLOT 3 -- Slave
     Latency Timer      : 80 PCI Clock
     Using IRQ          : NA
     Trigger Method     : BY JP7-11
                                       ESC : Quit        ↑↓→← :Select Item
  SLOT 3 -- Slave                      F1  : Help        PU/PD/+/-   : Modify
     Latency Timer      : 80 PCI Clock F5  : Old Values  (SHIFT)F2  : Color
     Using IRQ          : NA           F6  : Load BIOS Defaults
     Trigger Method     : BY JP7-11    F7  : Load Setup Defaults
```

Each PCI Slot has three option fields:

The first field is the **"Latency Timer"** setting. Although you can alter it, do not change the "80 PCI Clock" setting. The default setting enables maximum performance.

The **"Using IRQ"** field assigns a system IRQ to a PCI slot. An "NA" (Not Assigned) setting means no IRQ is assigned to that slot. The default IRQ settings are:

Slot 1:	10
Slot 2:	11
Slot 3:	NA
Slot 4:	NA

You can change the default to another setting. If you do, make sure that you do not choose an IRQ already in use. The 'trigger' method of an expansion card using an IRQ, described below, affects how you set the IRQ in these fields. If the card you install uses the default 'Level' trigger method, you only make the IRQ selection here. If you install a card that uses the 'Edge' trigger method, you must also set the slot IRQ using the JP2-11 jumper block described in Chapter 2. Slots 1 and 2 are controlled by jumpers JP2 to 6 and Slots 3 and 4 by jumpers JP7 to 11. Note that the jumpers only allow you to select IRQs 5, 9, 11, 14 and 15, while the "Using IRQ" field has more options. Make sure the IRQ you set here is the same as the one you set with the jumper block.

The third field, **"Trigger Method"**, selects between Level trigger, the default, and Edge trigger. You only need to change this if you have a card that uses the Edge trigger method of generating an interrupt request. Most PCI cards use the Level method. Many IDE controller cards use Edge triggering. When you select this method, the jumpers used to set the IRQ are noted in parentheses, e.g. "Edge (By JP2-6)" for Slots 1 and 2. See Chapter 2 for an explanation of how to make the required jumper settings.

When you're finished making settings for this screen, press the <Esc> key to go back to the main screen.

Load BIOS Defaults

"**LOAD BIOS DEFAULTS**" loads the troubleshooting default values permanently recorded in the BIOS ROM. These settings are non-optimal and turn off all high performance features.

The Standard CMOS Setup screen is not affected. To use this feature, highlight it on the main screen and press <Enter>. A line will appear asking if you want to load the BIOS default values. Press the <Y> key and then <Enter>. The default settings will load. Press <N> if you don't want to proceed.

Load BIOS Defaults Screen

```
                    ROM PCI/ISA BIOS(P/I-AP4G)
                        CMOS SETUP UTILITY
                        AWARD SOFTWARE,INC.

   STANDARD CMOS SETUP              SUPERVISOR PASSWORD

   BIOS FEATURES SETUP              USER PASSWORD

   CHIPSET FEATURES SETUP           IDE HDD AUTO DETECTION

   POWER MANAGEMENT SETUP           HDD LOW LEVEL FORMAT

   PCI SLOT CONFIGUF┌─────────────────────────┐:ETUP

   LOAD BIOS DEFAULT│  Load BIOS Defaults (Y/N)? N │ SAVING

   LOAD SETUP DEFAUL└─────────────────────────┘

   ESC  : Quit                    ↑↓→←   : Select Item
   F10  : Save & Exit Setup       (SHIFT)F2 : Change Color

           Load BIOS Defaults except Standard CMOS SETUP
```

Software Guide

Load Setup Defaults

The "**LOAD SETUP DEFAULTS**" option loads optimized settings from the BIOS ROM. Use this option to load default settings for normal use.

The Setup Defaults default settings do not affect the Standard CMOS Setup screen. To use the Setup Defaults, highlight the entry on the main screen and press <Enter>. A line will appear asking if you want to load the Setup default values. Press the <Y> key and then press <Enter>. The Setup Defaults will load. Press <N> if you don't want to proceed.

Load Setup Defaults Screen

```
                    ROM PCI/ISA BIOS(P/I-AP4G)
                       CMOS SETUP UTILITY
                       AWARD SOFTWARE,INC.

   STANDARD CMOS SETUP              SUPERVISOR PASSWORD

   BIOS FEATURES SETUP              USER PASSWORD

   CHIPSET FEATURES SETUP            IDE HDD AUTO DETECTION

   POWER MANAGEMENT SETUP           HDD LOW LEVEL FORMAT

   PCI SLOT CONFIGUR┌──────────────────────────────┐ETUP

   LOAD BIOS DEFAULT│  Load SETUP Defaults (Y/N)? N │ SAVING

   LOAD SETUP DEFAUL└──────────────────────────────┘

 ESC   : Quit                   ↑↓→←:  Select Item
 F10   : Save & Exit Setup          (SHIFT)F2 : Change Color

              Load SETUP Defaults except Standard CMOS SETUP
```

Setting Supervisor & User Passwords

The "**SUPERVISOR PASSWORD**" and "**USER PASSWORD**" options set passwords. The Supervisor Password is for system and Setup Utility access. The User Password is for the system only. The mainboard ships with no passwords. To create a password, highlight the type you want and press the <Enter> key. At the prompt, type your password. The password is case sensitive, and can be up to 8 alphanumeric characters. Press <Enter> after you have finished typing in the password. At the next prompt, confirm the new password by re-typing it and pressing <Enter> again. When you're done, the screen automatically reverts to the main screen. Remember, when you use this feature, the "Security Option" line in BIOS FEATURES SETUP will determine when entering the password will be required.

To disable either password, press the <Enter> key instead of entering a new password when the "Enter Password" dialog box appears. A message confirms the password has been disabled.

Password Setting

```
                    ROM PCI/ISA BIOS(P/I-AP4G)
                        CMOS SETUP UTILITY
                       AWARD SOFTWARE, INC.

   STANDARD CMOS SETUP            SUPERVISOR PASSWORD

   BIOS FEATURES SETUP           USER PASSWORD

   CHIPSET FEATURES SETUP        IDE HDD AUTO DETECTION

   POWER MANAGEMENT SETUP        HDD LOW LEVEL FORMAT

   PCI SLOT CONFIGURATI͡          ͡   ͡   ͡   ͡ T SETUP

   LOAD BIOS DEFAULTS   Enter Password:    *****    UT SAVING

   LOAD SETUP DEFAULTS


   ESC  : Quit                   ↑↓→←   : Select Item
   F10  : Save & Exit Setup      (SHIFT)F2 : Change Color

                    Change/Set/Disable Password
```

Software Guide   3

IDE HDD Auto Detection

If your system has an IDE hard drive, you can use this utility to detect its parameters and enter them into the Standard CMOS Setup automatically.

This utility will detect as many as four IDE drives if your system configuration supports that many. In sequence, a set of parameters for each drive will appear in the box. To accept the entries displayed press the Y key, to skip to the next drive, press the N key. If you accept the values, the parameters will appear listed beside the drive letter on the screen and the next letter, without parameters will appear and the program will attempt to detect parameters for the next drive. If you press the N key to skip rather than accept a set of parameters, zeros are entered after that drive letter.

Remember, if your IDE controller does not have Enhanced IDE support for four devices, you can only install two IDE hard disk drives. Your IDE controller must support Enhanced IDE features in order to use Drive E: and Drive F:. The on-board IDE controller has a connector for two IDE hard disks. If you want to use another controller that supports four drives you must disable the on-board controller in the Chipset Features Setup screen.

When you are finished, any entries you accepted are automatically entered on the line for that drive in the Standard CMOS Setup. Any entries you skipped are ignored and nothing is entered for that drive in Standard CMOS Setup.

Note: If you are setting up a hard disk that supports LBA mode, three lines will appear in the parameter box. Choose the line that lists LBA for an LBA drive. Do not choose Large or Normal.

IDE HDD Auto Detection Screen

```
                        ROM PCI/ISA BIOS(P/I-AP4G)
                           CMOS SETUP UTILITY
                           AWARD SOFTWARE,INC.



                        CYLS.  HEADS  PRECOMP  LANDZONE  SECTORS   MODE
    Drive C  :       (    MB)



                    Select Drive C Option (N=Skip)? N

      OPTIONS  SIZE       CYLS.   HEADS   PRECOMP   LANDZONE   SECTORS    MODE

        1(Y)    307       790.     15     65535        790        57    NORMAL
```

Important!: This utility will only detect one set of parameters for an IDE hard drive. Some IDE drives can use more than one set. This is not a problem if the drive is new and there is nothing on it. If the hard disk drive is already fully formatted when you install it, and different parameters than those detected here were used, you will have to enter them manually.

If the parameters listed don't match the ones used when the drive was formatted, the drive won't be readable. If the auto-detected parameters displayed do not match the ones that should be used for your drive, do not accept them. Press the <N> key to reject the values and enter the correct ones manually from the Standard CMOS Setup screen.

Software Guide

HDD Low Level Format

The last utility on the main screen is for performing a "Low-level" format on a hard disk drive. A low-level format is not the same as partitioning and formatting a hard disk for an Operating System. A drive must already be low-level formatted before you can use an operating system program like MS-DOS FDISK. This low-level formatting is always performed by the hard disk manufacturer at the factory as part of the manufacturing process. When you get a new hard disk drive, it will always already have been low-level formatted and you should not use this utility on a new drive.

Sometimes, after extended use, or possibly physical trauma, a hard disk drive can develop sufficient problems that it may be a good idea to low-level format it again. You can use this utility to do that, though with some important limitations.

You can use this utility on MFM or ESDI hard disks if you feel the drive really needs it. Be aware, however, that there are many measures you can and should exhaust before you decide to do a low-level format. Most hard disk problems can be solved by other means including disk maintenance utilities and re-partitioning and formatting. Using this utility should be your last resort.

IDE Hard Disk Warning

Generally this utility is not suitable for use with IDE hard disk drives. Many manufacturers prohibit low-level formatting by the End User and doing so may void your drive warranty. In addition, one reason they do this is that they use proprietary low-level formatting that is not compatible with the results this utility produces. If you use this utility on a drive like that it will be unusable until sent back to the factory to be re-formatted by the manuafacturer. In short, don't use this utility on IDE hard disks unless you are absolutely certain you know what you are doing.

Save And Exit Setup

The next selection on the Utilities menu is **"SAVE AND EXIT SETUP"**. If you select this and press the <Enter> key the values entered during the current session will be recorded in the CMOS memory on the mainboard. The system will check it every time you turn your system on and compare it to what it finds as it checks the system. This record is required for the system to operate.

Exit Without Saving

The last selection on the main screen is **"EXIT WITHOUT SAVING"**. Selecting this option and pressing the <Enter> key lets you exit the Setup Utility without recording any new values or changing old ones. If you want to save a new configuration, do not use this option. If you use it, any new setting information will be lost.

You can now use your system without further reference to this utility unless you change the system hardware configuration. Remember, if the system configuration information stored in CMOS memory gets corrupted, you will have to reenter it.

Software Guide 〔3〕

NCR SCSI BIOS & Drivers

The NCR 53C810 SCSI BIOS is recorded on the same flash memory chip as the system BIOS. To use the on-board NCR SCSI BIOS, the optional SC-200 SCSI controller card must be installed in your system.

All SCSI devices you connect to your system require driver software. The NCR SCSI BIOS directly supports SCSI hard disks under DOS, Windows and OS/2. It also uses device drivers that are on the DOS-format support floppy disk that comes with the SC-200 controller card to support hard disks and other SCSI devices used with DOS, Windows, Windows NT, Novell NetWare and OS/2. These drivers provide higher performance than the direct BIOS support. To use these device drivers you must install them on your system hard disk drive and add them to your system configuration files. There is also driver support for SCSI devices used with SCO Unix. A second, SCO Unix-format, support floppy disk has the Unix drivers on it.

See the "Readme" files that come with the drivers for instructions on what they are and how to use them. You can print out the Readme files with any text editor.

Award Flash Memory Writer Utility

Your mainboard comes with a utility to upgrade the BIOS. The BIOS is stored on a 'flash' EPROM BIOS ROM chip on the mainboard that can be erased and reprogrammed. This is what the Flash Memory Writer (FMW) utility does. The utility is in the "Flash" directory on the DOS-formatted support floppy disk that comes with the mainboard. You will find three files in the directory:

flash.exe	-	the Flash Memory Writer utility
readme	-	a text file of instructions
AWAIxxxx.bin	-	a BIOS file

(xxxx = a 4-digit version number)

Flash Memory Writer records (or "programs") a new BIOS file onto the flash memory chip. The BIOS file on the support disk may be newer than the BIOS on the mainboard, so you may want to update your BIOS right away. Compare the four numbers after "AWAI" in the new BIOS file name to the last four numbers of the code that displays in the upper left-hand corner of your screen while the Power-On Self-Test is running. If the number from the support disk file is larger, then you should reprogram the System BIOS. If they are the same, don't bother. To reprogram the System BIOS, you must first do the following:

1. Set jumper JP12 to the correct "Flash" type for programming. The 5-volt default setting protects the BIOS on a 12-volt chip from being corrupted by signal interference. To update the BIOS on a 12-volt chip, short pins 1&2. When you finish updating the BIOS, set JP12 back to the 5-volt setting by shorting pins 2&3. If you have a 5-volt flash chip you don't need to change the JP12 default setting. The 5-volt flash chip uses a design that is not subject to corruption from signal interference.

Note: If you're not sure what voltage flash chip you have, you can check by trying to run FMW with the default JP12 setting. If you have a 12-volt flash chip, which is the most likely configuration, FMW won't program the chip with the default jumper setting and you'll get an error message. You can then change the setting and try again.

2. Set JP13 to short Pins 1&2 to write-enable the Flash ROM.

When done, short Pins 2&3 to write-protect the ROM.

3. Make sure the CPU is running in 'real mode'.

FMW will not run if the CPU is operating in protected or virtual mode. This means that you can not run it with Windows running or with any memory manager software. You must disable any memory manager software first. The easiest way to do this is to:

a. Boot your system from a bootable floppy disk with no config.sys or autoexec.bat files and then run Flash Memory Writer from a backup copy of your support disk. You can make your back-up floppy bootable when you format it, and use one disk for both purposes.

b. If you are using MS-DOS 6.x, you can use the feature that allows you to confirm or abort each line of the config.sys file. You do this by pressing <F8> while the "Starting MS-DOS..." line is on the screen.

There are other ways to accomplish the same result. The main point is to make sure no memory managers are running. If you aren't sure, try running FMW. If it runs, you've succeeded. If it displays a warning message about the CPU mode, you'll have to try again.

Once you've satisfied the two requirements mentioned above, you can run FMW. You can copy the contents of the "Flash" directory to your hard disk drive, or you can run the utility from a backup of the support floppy disk. Make sure the new BIOS file is in the same directory as the FMW utility. To run FMW, switch to the "Flash" directory if you're not already in it. Type 'FLASH' at the DOS command line and press the <Enter> key. The following screen will appear:

The Flash Memory Writer Utility Screen

```
                        FLASH MEMORY WRITER V3.5
                 Copyright (C) 1992, AWARD Software Inc.,


                           Flash Type - 28F010


                    1.   SAVE BIOS

                    2.   PROGRAM BIOS

                    3.   CLEAR SYSTEM CMOS

                    4.   EXIT TO DOS




    Message:   Choose Function (1-4):
```

Software Guide

There are four command options which you invoke by typing the number of the command:

1. SAVE BIOS
This command reads the system BIOS already installed on the mainboard and writes a copy of it to a file in the 'Flash' directory. This leaves you with a backup of your original BIOS in case you need to re-install it. This option is highly recommended.

2. PROGRAM BIOS
This will erase the existing system BIOS and program the new BIOS file you select into the flash memory on the mainboard.

3. CLEAR SYSTEM CMOS

Selecting this option will erase the system configuration record created by the BIOS setup program and recorded in the CMOS mem-ory on the mainboard. You don't need to use this feature to upgrade the BIOS since the old settings will be used by the new BIOS.

4. EXIT TO DOS
When you're finished, use this command to return to DOS. A message will display reminding you to turn the system off and on again to start using the new BIOS.
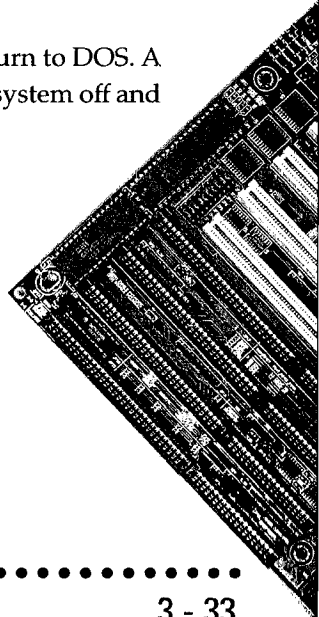
Follow this procedure to update the system BIOS:

1. Back up your existing system BIOS by using the SAVE BIOS command.

    Flash Memory Writer will write a file containing the current system BIOS to the directory you are running FMW from.

2. Install the new BIOS with the PROGRAM BIOS command.

    When you type this command a second screen will pop up instructing you to type in the name of the new BIOS file. Type in the whole file name, e.g. AWAI0110.BIN and confirm that you want to program the BIOS. The utility will then 'Blank', 'Erase' and then 'Program' the flash memory on the mainboard with the new BIOS file.

    DO NOT TURN OFF THE SYSTEM IF THERE IS A PROBLEM!

    If you have a problem 'flashing' (installing) the new BIOS, choose the PROGRAM BIOS command again and try again. If you can not successfully program the new BIOS file for whatever reason, re-install your original BIOS from the backup file by substituting the backup file name for the name of the new BIOS file name in this setup.

3. Once you have successfully installed a new BIOS, exit FMW and turn your system OFF, wait 30 seconds, and turn it ON again.

If your mainboard has the 12 volt Flash EPROM (the default chip), you should set jumper J12 back on pins 1&2, before you turn your system back on. Also, you must set jumper JP13 to short Pins 1&2 to enable write-protection for the Flash ROM.

The system will now start using the new BIOS.

Warning: If you do not successfully install a complete BIOS file in the flash memory on the mainboard your system may not be able to boot. If this happens it will require service by your system vendor. Follow the requirements and instructions in this section precisely to avoid this inconvenience.

Technical Summary

The first part of this section summarizes the mainboard's specifications. The second part explains how to set up the optional PCI-SC200 SCSI Interface card.

Jumper Setting Summary

This section lists all the jumper settings on the mainboard. They are listed in numerical order for convenience. Where jumpers are associated with each other they are listed together. The small schematic diagrams of the mainboard indicate the positions of of jumpers on the board.

Video Display Type: JP1

The default setting is for all display systems (monitor & video card) except CGA.

	JP1
Mono/VGA (default)	1&2
CGA	2&3
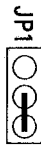
Mono/VGA
(default)   CGA
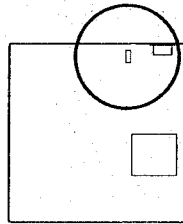
ISA/PCI IRQ Assignments: JP2 – JP11

These assign IRQs to either the ISA slots (default) or to PCI slots with edge-triggered cards installed. Don't use these for level-triggered cards. Use the PCI Slot Configuration section in the BIOS Setup program for level-triggered cards.

	PCI1	PCI2	PCI3	PCI4
IRQ5	JP2, 1&2	JP2, 3&4	JP11, 1&2	JP11, 3&4
IRQ9	JP3, 1&2	JP3, 3&4	JP10, 1&2	JP10, 3&4
IRQ11	JP4, 1&2	JP4, 3&4	JP9, 1&2	JP9, 3&4
IRQ14	JP5, 1&2	JP5, 3&4	JP8, 1&2	JP8, 3&4
IRQ15	JP6, 1&2	JP6, 3&4	JP7, 1&2	JP7, 3&4

Technical Summary
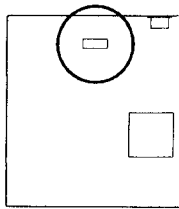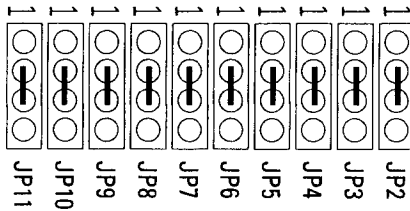
Flash Memory Voltage & Write Protection: JP12

This is factory-set to the 5V setting. See the FMW section in Chapter 3 for more information on this.

JP12	
5V (default)	2&3
12V	1&2
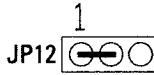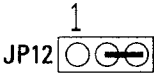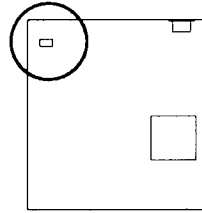
1
JP12 ⌷○⊖⊕⌷

1
JP12 ⌷⊖⊕○⌷

5 Volt flash programming
& 12 Volt write-protection
(default setting)

12 Volt flash
programming

BIOS Flash Memory Write Protecttion: JP13

JP13 controls write-protection for the Flash ROM.

JP13	
Write Protect (default)	2&3
Write Enable	1&2

1
JP13 ⌷○⊖⊕⌷

1
JP13 ⌷⊖⊕○⌷
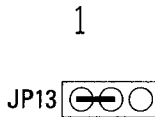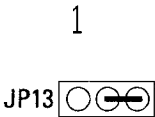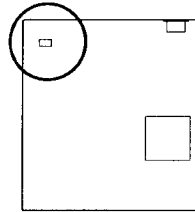
Write Prottect
(default)

WriteEnable

Rev 1.3 CPU Type Selection: JP17 & 18-19

These three jumpers set the CPU type. JP18 & 19 set the type and JP17 specifies additional information for the 486DX4 and P24 series Pentium OverDrive chips.

CPU	JP18	JP19
SL Enhanced 486DX & ODP, DX2 & ODP; 486DX4	2&3, 4&5	1&2
486DX & ODP, DX2 & ODP, 487SX; Cx486DX & DX2	1&2, 4&5	1&2
SL Enhanced 486SX & SX2, Cx486s	2&3, 4&5	2&3
486SX & SX2	1&2, 4&5	2&3
Pentium OverDrive, P24T, P24CT, P24D	2&3, 5&6	1&2

Note: ODP = OverDrive Processor

DX4 Int. Clk.	JP17		P24DL1 Cache Type	JP17
Ext. Clk. x 2	4&5		**Write-through**	Open
Ext. Clk. x 2.5	3&4		**Write-back**	1&2
Ext. Clk. x 3	Open			

Note: JP17's effect depends on which CPU is installed

| 3x | 2.5x | 2x | Write Through | Write Back |

JP18
JP19 1 — 1

SL Enhanced
486DX & ODP
DX2 & ODP
486DX4

JP18
JP19 1 — 1

486DX & ODP
DX2 & ODP
487SX
Cx486DX & DX2

JP18
JP19 1 — 1

SL Enhanced
486SX & SX2
Cx486s

JP18
JP19 1 — 1

486SX & SX2

JP18
JP19 1 — 1

Pentium
OverDrive
P24T, P24CT,
P24D

Rev 1.6 CPU Type Selection: JP17 & 18-19

These three jumpers set the CPU type. JP18 & 19 set the type and JP17 specifies additional information for the 486DX4 and P24 series Pentium OverDrive chips.

CPU	JP18	JP19
SL Enhanced 486DX & ODP, DX2 & ODP; 486DX4	2&3, 4&5	1&2, 3&4
486DX & ODP, DX2 & ODP, 487SX; Cx486DX, DX2 & DX2-V	1&2, 4&5	1&2, 3&4
SL Enhanced 486SX & SX2, Cx486s	2&3, 4&5	1&2, 4&5
486SX & SX2	1&2, 4&5	1&2, 4&5
Pentium OverDrive, P24T, P24CT, P24D	2&3, 5&6	1&2, 3&4
AMD486DX & DX2	1&2, 4&5	3&4
AMD486SX & SX2	1&2, 4&5	4&5

Note: ODP = OverDrive Processor

DX4 Int. Clk.	JP17	P24DL1 Cache Type	JP17
Ext. Clk. x 2	4&5	Write-through	Open
Ext. Clk. x 2.5	3&4	Write-back	1&2
Ext. Clk. x 3	Open		

Note: JP17's effect depends on which CPU is installed

3x   2.5x   2x   Write Through   Write Back
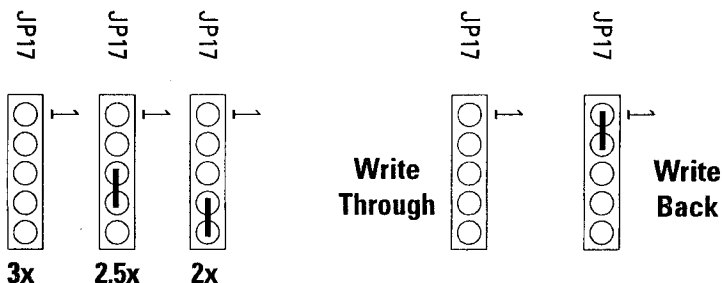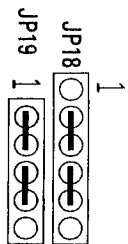
SL Enhanced
486DX & ODP
DX2 & ODP
486DX4
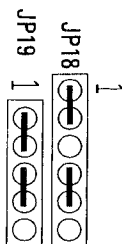
486DX & ODP
DX2 & ODP
487SX
Cx486DX, DX2
& DX2-V
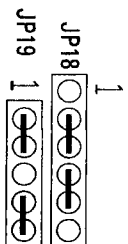
SL Enhanced
486SX & SX2
Cx486s
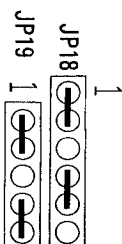
486SX & SX2
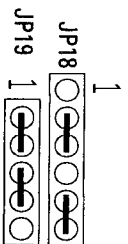
Pentium
OverDrive
P24T, P24CT,
P24D
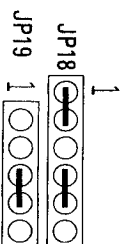
AMD486DXL
AMD486DX2L
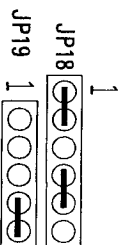
AMD486SXL
AMD486SX2L
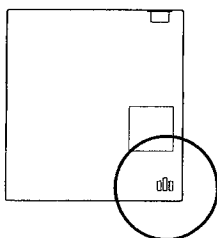
Level 2 Cache Size: JP20 – JP21

Set these based on the size of the installed cache and chip configuration used.

Cache Size (Config#)	JP20	JP21
128KB (1)	1&2	1&2
256KB (2)	1&2	2&3
256KB (3)	1&2	1&2, 3&4
512KB (4)	2&3	2&3, 4&5
512KB (5)	2&3	1&2, 3&4

Level 2 Cache Configuration Options

128KB Cache
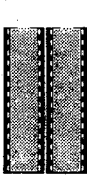
Two 8K8, 20ns

Four 32K8, 20ns

Pin 1

JP20

JP21

Pin 1
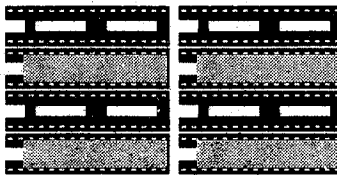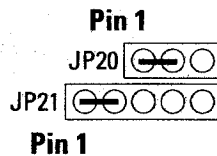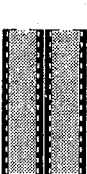
256KB Cache

Two 32K8, 15ns

Eight 32K8, 20ns

JP20

JP21
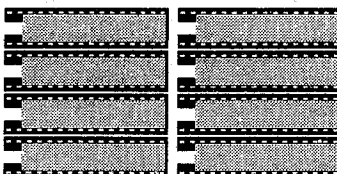
256KB Cache
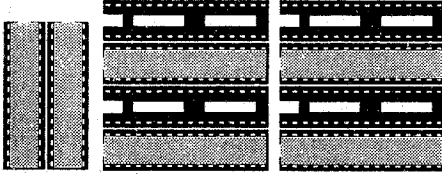
Two 32K8, 15ns   Four 64K8, 20ns

JP20
JP21
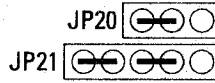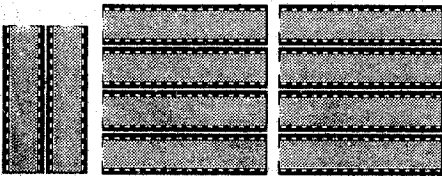
512KB Cache

Two 32K8, 15ns   Eight 64K8, 20ns

JP20
JP21
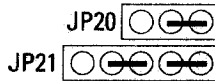
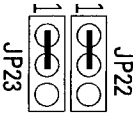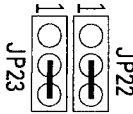## 512KB Cache
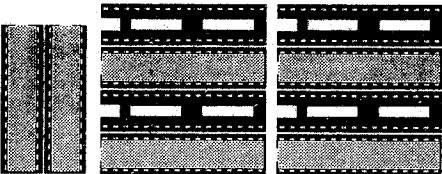
Two 32K8, 15ns   Four 128K8, 20ns

JP20
JP21
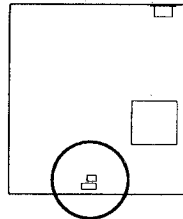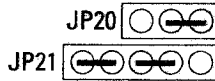
VL-Bus Clock & Wait State Selection: JP22 – JP23

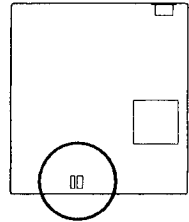These jumpers set the VL-Bus clock and wait state.

| VL-Bus Clock	JP22	Wait State	JP23
≤ 33MHz	1&2	0 Wait State	1&2
> 33MHz	2&3	1 Wait State	2&3

≤33MHz, 0WS   **>33MHz, 1WS**

CPU External Clock Speed Selection: JP25 – JP26

This pair of jumpers selects the CPU external clock speed. For DX CPUs this is the same as the internal speed. For DX2 CPUs it is one-half the internal speed. For a DX4, it should be 25MHz for the 75Mhz and 33MHz for the 100Mhz CPU.
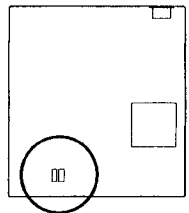
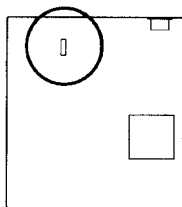| Clock Speed	JP25	JP26
25MHz	2&3	1&2
33MHz	1&2	2&3
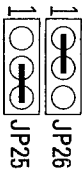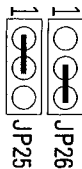
25MHz   **33MHz**

On-board PS/2 Mouse Lead Connector: JP28

This jumper Enables/Disables the PS/2 mouse connector on the board for a lead
to a case-mounted mouse port.

	JP28
Enable (default)	2&3
Disable	1&2

Enable   **Disable**

IDE Controller IRQ Selection: JP29

This jumper selects the IRQ used by the on-board IDE controller.

|	JP29
IRQ14 (default)	1&2
IRQ15	2&3
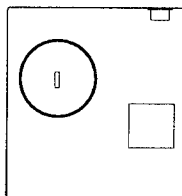
IRQ 14   **IRQ 15**
Primary   **Secondary**

Rev 1.6 Intel DX4/Cyrix DX2-V Voltage Selection: JP30 – JP31

This pair of jumpers selects the CPU voltage for these two CPUs. The Intel CPU uses 3.3 volts and the Cyrix CPU uses 3.6 volts, so you must make sure that these jumpers are set correctly. The default setting is for the Intel CPU, so you do not need to change these settings if you do not install a Cyrix DX2-V.

Clock Speed	JP30	JP31
Intel DX4 (default)	1&2	2&3
Cyrix DX2-V	2&3	1&2

Intel DX4 3.3 volt

Cyrix DX2-V 3.6 volt

Technical Summary 4
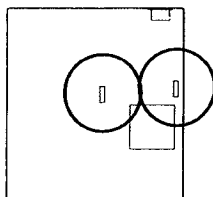
Memory Subsystem

DRAM Specifications:

See pages 2-9

Memory Configurations

See pages 2-10 and 2-11 for chart.
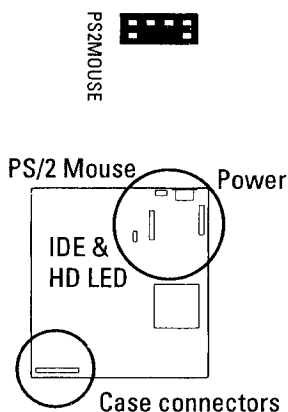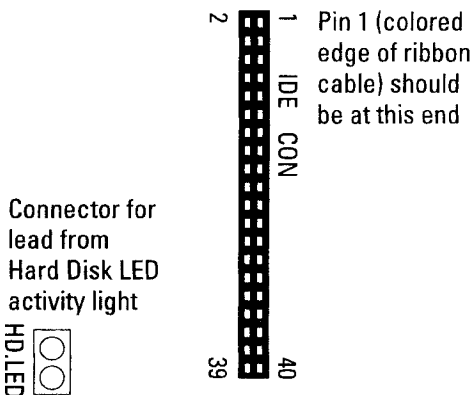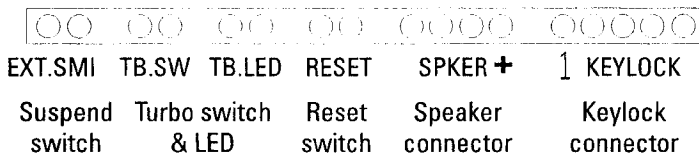
Level 2 Cache Options

See jumper section for settings,chip speeds & size configurations..

Connectors

There are several connectors on the board for switches and indicator lights from the system case. The connectors are made of the same components as the jumper switches. There is also a double connector for the leads from a system power supply and the connector for the on-board IDE controller:

|	
SMI Switch	Connector for the lead from a Case-mounted Suspend switch.
Turbo Switch	Shorted for maximum speed operation (default), or connector for the lead from a case-mounted Turbo Switch.
Turbo LED	Connector for the lead from a case-mounted Turbo Switch status indicator LED.
Reset Switch	Connector for the lead from a Reset switch mounted on the system case.
Speaker	Connector for the lead from a speaker mounted inside the system case.
KeyLock	Connector for both a case-mounted keyboard lock and a Power-On LED. Pin 1 is live, pins 3 & 5 are grounds.
PS/2 Mouse	Connector for a lead from a case-mounted PS/2 mouse port.
IDE	Connector for a standard 40-pin IDE ribbon cable to connect two internal IDE hard disk drives.

System Case Connectors & IDE/HD LED Connectors

EXT.SMI   TB.SW   TB.LED   RESET   SPKER ✚   1 KEYLOCK

Suspend   Turbo switch   Reset   Speaker   Keylock
switch   & LED   switch   connector   connector

Pin 1 (colored
edge of ribbon
cable) should
be at this end

IDE CON

PS2MOUSE

PS/2 Mouse   Power

IDE &
HD LED

Connector for
lead from
Hard Disk LED
activity light

HD.LED

Case connectors

Connecting A Power Supply

To connect the leads from the power supply, first make sure the it is unplugged.
Most power supplies have two leads. Each lead has six wires, two of which are
black. Orient the connectors so the black wires are in the middle.

Power supply connectors
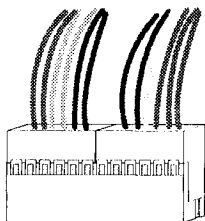
The black wires should
be in the middle.

Technical Summary 4

The PCI-SC200 SCSI Interface Card

Your mainboard may have come with an optional SCSI (Small Computer System Interface) controller card, the PCI-SC200. This card works with the SCSI BIOS on the mainboard. Together, they provide a complete PCI Fast SCSI-2 interface. With the card installed in your system you can connect SCSI devices installed in your system case to the internal connector on the card. You also have the additional option of connecting external SCSI devices to the external SCSI-2 connector on the card.

To use the PCI-SC200 you must enable the SCSI BIOS option in the Award BIOS Setup Utility program. If the card was installed in your system when you got it then the BIOS setting should already be correct. Refer to the section on Chipset Setup in Chapter 3 if you need to know more about this.

If you get the PCI-SC200 later on as an option, you will need to install it yourself. The setup procedure is explained here. The basic card installation procedure is explained at the end of Chapter 2.

The PCI-SC200 SCSI Interface Card

Internal SCSI ribbon
cable connector

[] JP5

External SCSI 2
cable connector

[] JP1 & 2

PCI edge
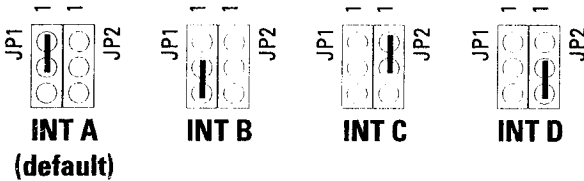connector
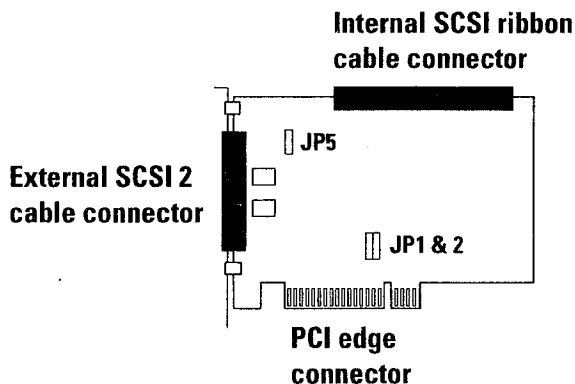
Setting Up the PCI-SC200

There are two jumper settings you may need to make on the card to set it up. One setting assigns the PCI INT interrupt, the other sets the card's termination.

Setting the INT Assignment

As explained in Chapter 2, any PCI card you install must use PCI INT A. On the PCI-SC200, you assign the INT by setting jumper JP1 or JP2. The default setting for the card already is INT A, so you do not need to change the setting to use the SC-200 with this mainboard.

The INT assignment jumper settings are illustrated below. The settings are printed on the card for your convenience.

JP1 & 2: Interrupt settings

INT A (default)   INT B   INT C   INT D

Technical Summary   4

Terminator Settings

SCSI devices are connected together in a "chain" by cables. Internal devices connect to the PCI-SC200 with a fifty-pin flat ribbon cable. External devices connect to the external port with a SCSI-2 cable. If there is more than one internal or external device, additional devices are connected with cables to form a "daisy chain". The SCSI chain must be "terminated" at both ends, or the devices in the chain will not work properly.
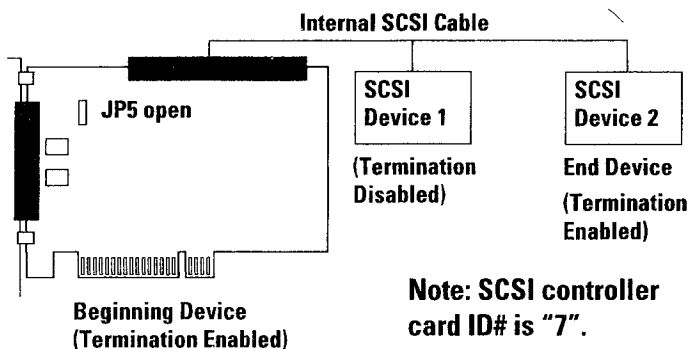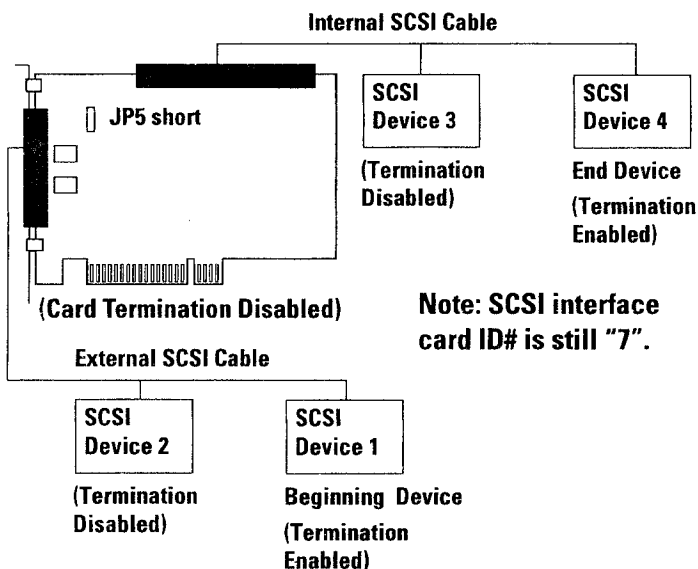
JP5: Terminator setting

Termination   JP5   JP5   **Termination**
Enabled   **Disabled**
(default)   █

Many SCSI devices use a set of terminating resistors to terminate the device. The PCI-SC200 has "active" termination that you set using jumper JP5. If you need to terminate the PCI-SC200, you do it by setting the jumper. The are two settings, terminated and unterminated, as shown below.

Decide whether or not you need to terminate the PCI-SC200 based on its position in the SCSI chain. Only the devices at each end of the chain need to be terminated. If you have *only* internal or *only* external devices connected to the PCI-SC200, then you *must* terminate the PCI-SC200. If you have *both* internal and external devices connected, you *must not* terminate the card. The figures on the next page illustrate these requirements.

Example 1: Only internal or only external devices connected

Internal SCSI Cable

[] JP5 open

SCSI Device 1

(Termination Disabled)

SCSI Device 2

End Device (Termination Enabled)

Beginning Device (Termination Enabled)

Note: SCSI controller card ID# is "7".

Example 2: Both internal and external devices connected

Internal SCSI Cable

[] JP5 short

SCSI Device 3

(Termination Disabled)

SCSI Device 4

End Device (Termination Enabled)

(Card Termination Disabled)

External SCSI Cable

Note: SCSI interface card ID# is still "7".

SCSI Device 2

(Termination Disabled)

SCSI Device 1

Beginning Device (Termination Enabled)
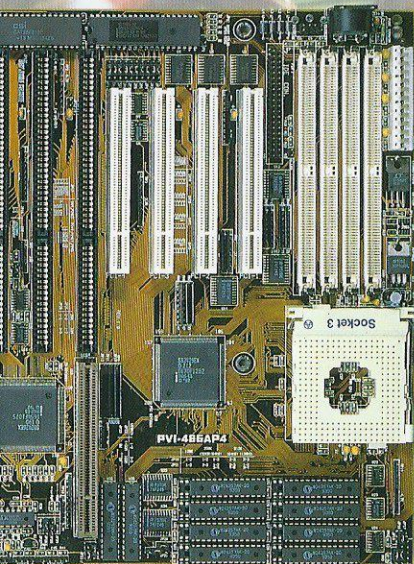
Technical Summary 4

SCSI ID Numbers

All SCSI devices, including the PCI-SC200 interface card must have a SCSI identification number that is not in use by any other SCSI device. There are eight possible ID numbers, 0 through 7. The PCI-SC200 has a fixed SCSI ID of 7.

You can connect up to seven SCSI devices to the interface card. You must set a SCSI ID number for each device. SCSI devices vary in how they set the ID number. Some use jumpers, others have some kind of selector switch. Refer to the manual for any device you install for details on how to set its ID number.

PVI-486AP4

PCI Bus and VL Bus Mainboard
With PCI IDE Controller

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