PCI/I-486SP3G

PCI Bus Mainboard
With On Board PCI SCSI Controller and Super Multi-I/O

/ISUS

Copyright

Doc. No : AS9408B, PCI/I-486SP3G User's Manual Rev 1.2
Related Mainboard : PCI/I-486SP3G P.C.B. Rev 1.8 and up
Related BIOS : #401A0-0301 or up (Shown as Power On Boot up Screen Top-Left Corner)
Date : 1994 August, ASUSTek COMPUTER INC.

Table of Contents

Feature Guide

This manual explains how to use this system mainboard and install upgrades. It provides an overview of the design and features of the board and gives 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

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 mainboard upgrades. It also explains what to do if a system upgrade affects the mainboard.

Chapter 3 Explains the Award BIOS Setup Utility program you use to create the system configuration record, as well as the other programs that help set up your system.

Chapter 4 lists the settings and specifications for the mainboard and explains the 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 the 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. Be certain that opening up and working on the system yourself won't violate your system warranty. Most system vendors 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 PCI/I-486SP3G has many performance and system features integrated onto the mainboard, including the following:

- Mulitple CPU upgrade options. This mainboard can use any Intel 486 or compatible CPU or Pentium OverDrive (P24T) running at 25 or 33MHz externally. You must have an Intel SL Enhanced or Intel DX4 CPU to use the Green features.

- "Green" features that meet Energy Star requirements, including BIOS-level power management features and a connector for a system Suspend switch.

- High-performance Write-Through or Write-Back "Level 2" external static RAM cache in three size options: 128KB, 256KB and 512KB.

- Four socket high-speed 32-bit or 36-bit DRAM design that uses 72-pin DRAM modules in a wide variety of memory configurations up to 128MB for flexible and economical upgrades.

- Dual-bus design with 4 ISA and 3 PCI expansion slots. The PCI bus runs at the CPU's external clock speed and all slots have bus-master capability.

- Flexible ISA/PCI bus IRQ assignments in both hardware and firmware allow the use of both Level- and Edge-triggered PCI expansion cards.

- On-board 'Multi-I/O' connections: 2 serial ports, 1 parallel port, configurable as primary or secondary COM and LPT ports; an IDE hard disk drive interface connector and a floppy disk drive controller and connector.

- On-board SCSI BIOS with an (optional) on-board PCI SCSI controller and a PCI-bus SCSI peripheral connector.

- Model options of PS/2 keyboard and/or mouse connector.

- On-board multi-year battery support to maintain system configuration information.
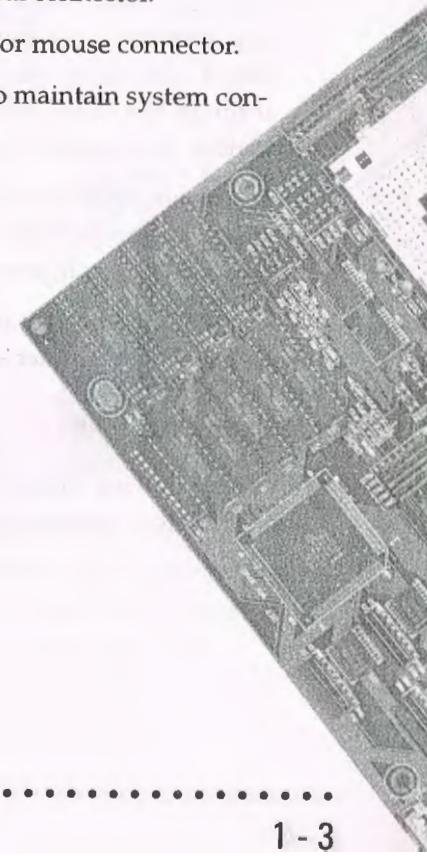
Static Electricity Precautions

Under the right conditions, static electricity will build up in your body. 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 dry and cold 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 following diagram shows the location of ports, connectors and subsystems you can upgrade on the mainboard.

Mainboard Layout
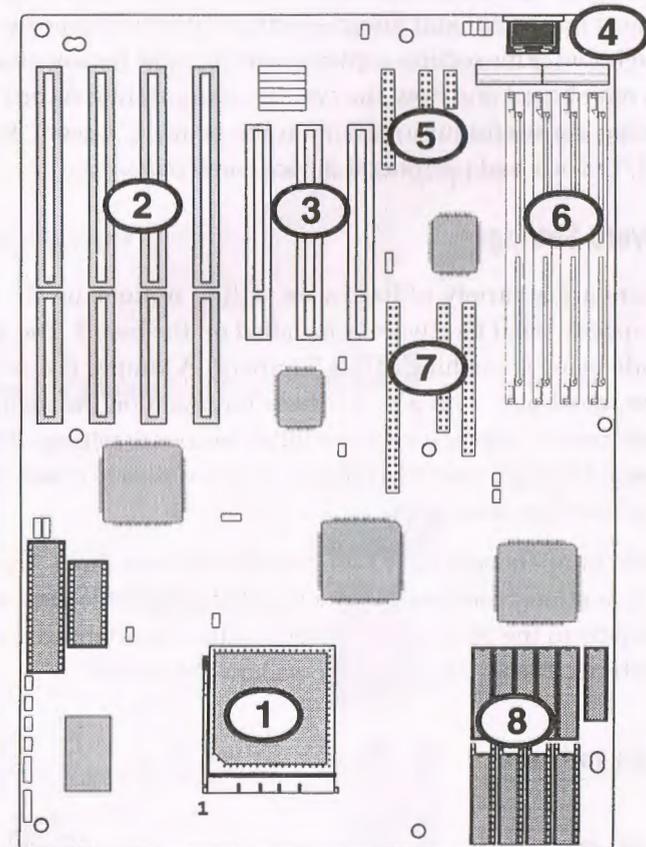
1. ZIF socket & CPU
2. ISA Bus expansion slots
3. PCI Bus expansion slots
4. Keyboard & power connectors
5. Parallel & Serial connectors
6. Memory module sockets
7. SCSI, Floppy & IDE connectors
8. L2 cache sockets

Using Your Mainboard

In addition to the operating instructions in your system manual, there are a few additional things specific to the mainboard you may need to know. This section explains how to make hardware settings on the mainboard and how the system configuration record works. Following are useful information on the board's "Green" features, IRQs, I/O ports and peripheral device connectors.

Hardware Settings

There are a variety of hardware setting options on the board. These specify what hardware is installed on the board. The settings are made using something called 'jumpers'. A jumper is a set of two or more metal pins with a plastic base mounted on the mainboard. A plastic jumper 'cap' is used to establish hardware settings. This cap has a metal contact inside which fits over two pins to create an electrical contact between them.

Some jumpers only have two pins, others have three. The jumpers are sometimes combined into sets called jumper blocks, where all the jumpers in the block must be set together to establish the hardware setting. The figure below shows how this looks.

Jumpers and caps
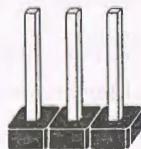
Jumper cap   **3-pin jumper**   **2-pin jumper**   **Jumper block**
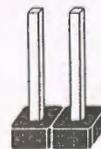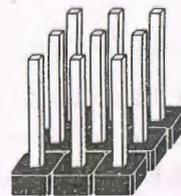
On the mainboard, the settings for each jumper are printed on the board with a stylized bird's-eye view. For example, if a jumper has three pins, connecting, or 'shorting', the first and second pins creates one setting and shorting the second and third pins creates another. The same type of diagram is 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 figures below show what the manual diagrams look like and what they represent.

Jumper diagrams

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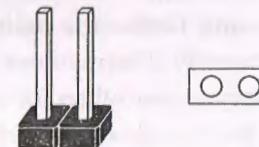
Jumper caps like this
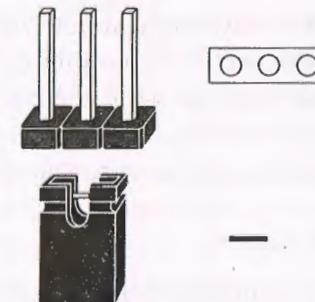
Jumper settings like this
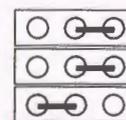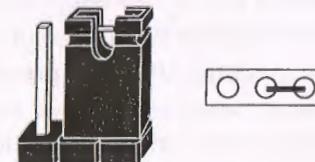
Jumpers in a 'block'

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 Software) 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 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. It will be optimized for your computer hardware and may vary from the Setup 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 by pressing the Del key when you turn the computer on and re-enter your configuration from your written record. When you restart the computer, it will work normally.

Green Features

This mainboard incorporates a number of features that when used together with other electricity-saving components in a system design function together to significantly reduce the amount of electricity needed to operate the system. This saving both reduces your computers operating cost and contributes to world-wide efforts at environmental protection. The design specifications for this are defined by the Energy Star program being promoted by the Environmental Protection Agency in the United States.

Your mainboard can contribute to this effort in two ways. It can use a low-voltage SL Enhanced or DX4 486 CPU that requires less power and allows you to use the Power Management features built into the BIOS Setup Utility. These features let you set up your computer so that it will enter one of several low or minium power consumption modes after a certain time. The power management scheme includes two pre-defined schemes, Minimum and Maximum, and one you can define yourself.

Power Management also provides three power saving modes, Doze, Standby and Suspend whose activation delays you can define. In addition, there is also a connector for a case-mounted system Suspend button that lets you put the system into Suspend mode whenever you like.

The section on Power Management Configuration in Chapter 3 explains how to set up power management. Fully configured for Green operation, your system will be able to cut its electricity consumption to a fraction of the wattage it uses in full power mode.

On Board Multi I/O

Your mainboard has Multi-I/O functions built onto the board. In your configured system you will access these as ports at the rear of your computer and by using the peripherals attached to the controller interfaces in use. Several of the ports and interfaces on your board are high-performance versions the standard ones:

- Serial Ports

  The serial ports use high perfromance 16550 UART chips that allow the use of much higher transfer speeds.

- Parallel Port

  The parallel port supports two high performance modes, EPP and ECP, which substantially enhance the performance and capabilities of the port. If your printer and printer driver (or other device) are compatible with either of these modes, you can set up your system up to use these enhancements.

- IDE ISA Interface

  The IDE interface on the mainboard is part of the ISA expansion bus. You can connect up to two IDE hard disk drives to the interface connector. Use the Setup utility described in Chapter 3 to automatically enter the drive specifications.

- SCSI PCI Interface

  The SCSI ("Scuzzy") interface on the mainboard is part of the PCI expansion bus. This makes it very fast because, like anything else running on the PCI bus, it runs at the CPU's external clock speed, which will be either 25MHz or 33MHz. If your system isn't currently set up to use the SCSI interface, you can refer to Chapters 3 and 4 for information on how to set it up.

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.

You can also set the IRQ used by the IDE hard disk interface, the optional PS/2 mouse and the SCSI controller/interface by using the BIOS Setup Utility as explained in Chapter 3.

The SCSI Controller

As mentioned above, this mainboard has an on-board SCSI interface. The interface is controlled by an NCR 53C810 PCI Fast SCSI-2 controller and the NCR SCSI firmware recorded in the BIOS flash ROM chip. The SCSI controller is a full 32-bit PCI DMA bus master and supports the ASPI and CAM standards.

You can connect a chain of up to seven devices to the SCSI interface. The standard version of the interface is for "internal" devices installed in your system case. The number of internal devices you can connect is therefore likely to be limited by the space limitations of your case. The standard cable provided with the mainboard is for two internal devices.

You can also obtain an optional PCI bus SC200 SCSI interface card that provides both internal and external connectors. With this card you can connect both internal and external SCSI devices to your system. Theare details on this card in Chapter 4.

Two floppy disks with support drivers for the SCSI firmware and controller come with your mainboard. There is detailed information about the drivers in "ReadMe" files on the disks. There is more information about these disks in the section on "SCSI BIOS & Drivers" in Chapter 3.
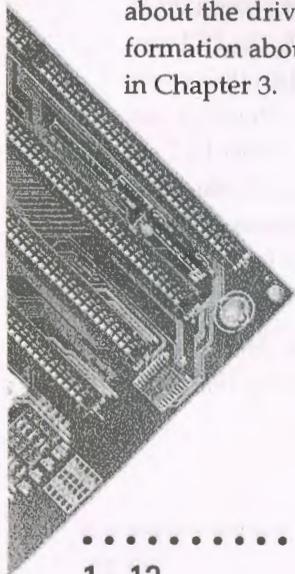
Upgrade Guide

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 or SCSI hard disks and other SCSI peripherals.

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 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 both ISA and PCI cards. The components on ISA 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 3 and ISA Slot 1 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 as well as 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
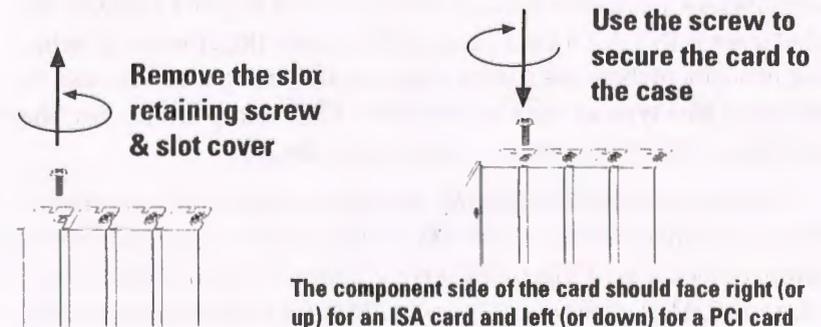
Assigning System IRQs

Both the ISA and PCI buses may need to use IRQs. You must configure any 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 available. In an ISA design, some of them are already in use by standard parts of the system such as the keyboard or mouse. Drawing from the unused group of System IRQs, you can assign an IRQ to either bus. Since both bus designs use IRQs, we differentiate them by referring to the IRQs assigned to the ISA bus as ISA IRQs and to the PCI bus as PCI IRQs. There is an IRQ reference chart in Chapter 4.

The two bus designs deal with IRQs differently. In the ISA bus, the IRQs are available to every slot and you define which IRQ is in use by configuring the IRQ number on the expansion card you want to install. You can then install the card in any available slot.

In the PCI design you assign an IRQ to a PCI slot rather than doing it on a card. For PCI cards, you only need to 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 INT A. 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. See the section on PCI SLot Configuration in Chapter 3.

Some very few PCI cards use an edge-triggered IRQ design. For these you have to assign the PCI Slot IRQ by also setting a jumper in jumper block JP1-10. 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 bus or 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 assign a System IRQ to a PCI slot in the Setup Utility, the unused IRQS are available to the ISA bus.

Selecting IRQ Settings for Edge-Triggered Cards

Set the IRQ for edge-triggered cards both in the Setup Utility and on the board using the JP1-10 jumper block. The chart below shows the setting options and the figure below it the defaults. Don't use the SCSI settings.

System IRQ	Default setting	PCI Bus edge trigger IRQ settings			
		PCI 1	PCI 2	PCI 3	NCR SCSI
IRQ 5	JP1&6 2-3	JP1 1-2	JP1 3-4	JP6 1-2	JP6 3-4
IRQ 9	JP2&7 2-3	JP2 1-2	JP2 3-4	JP7 1-2	JP7 3-4
IRQ 11	JP3&8 2-3	JP3 1-2	JP3 3-4	JP8 1-2	JP8 3-4
IRQ 14	JP4&9 2-3	JP4 1-2	JP4 3-4	JP9 1-2	JP9 3-4
IRQ 15	JP5&10 2-3	JP5 1-2	JP5 3-4	JP10 1-2	JP10 3-4

Note: You can only select one option for each IRQ.
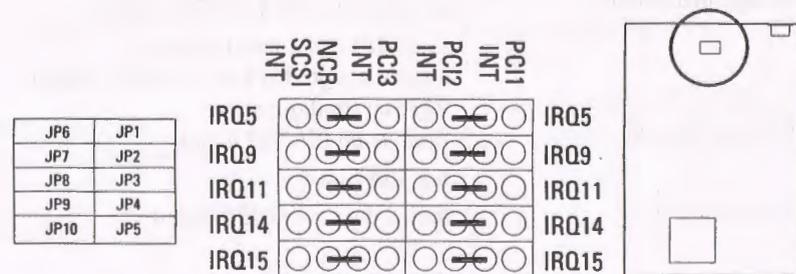
Default settings leave the IRQs listed available for level-triggered or ISA bus expansion cards.

Installing Expansion Cards That Use An IRQ

Example PCI installation procedure:

Choose slot

Assign IRQ to PCI slot

Select trigger method

Configure & install card
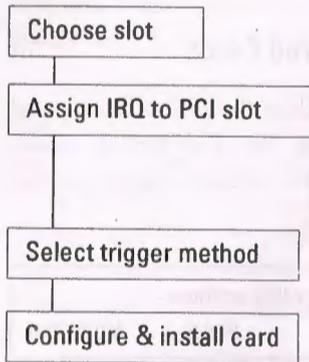
1. Choose a slot to use -
   e.g. PCI Slot 1 - fixed INT A#
2. Assign a System IRQ to Slot 1-
   e.g. use default IRQ 14

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 installation procedure:

Configure card

Assign IRQ setting

Choose ISA slot
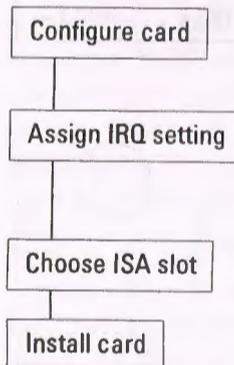
Install card

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 JP1 & 6 default settings
   - don't assign IRQ 5 to PCI slot in Setup
   PCI Slot Configuration
3. Choose an ISA slot to use -
   e.g. ISA Slot 4
4. Install the card in ISA Slot 4

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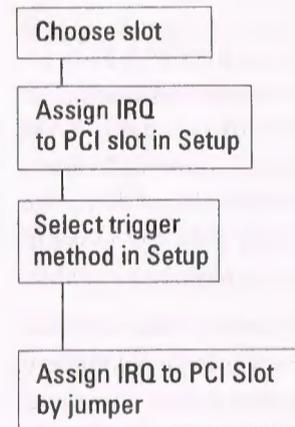
1. Choose a slot to use -
   e.g. PCI Slot 2 - fixed INT A#
2. Assign a System IRQ to Slot 2
   e.g. default IRQ11

3. Select trigger method:
   "Edge(BY JP1-5)"

4. Set JP3 to 'IRQ 11' (short pins 3-4)

PCI Level-Triggered IRQ Assignment

Choose slot

Assign IRQ
to PCI slot

Select trigger method
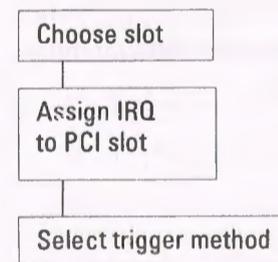
1. Choose a slot to use -
   e.g. PCI Slot 1 - fixed INT A#
2. Assign a System IRQ to Slot 1
   e.g. default IRQ 10
   - JP4 default setting, pins 2&3 shorted
3. Select trigger method: "Level (Auto)"

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). The PCI/I-486SP3G 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 4MB and 128MB. The 32–bit modules used for this board come with memory chips on either one or both sides of the module.
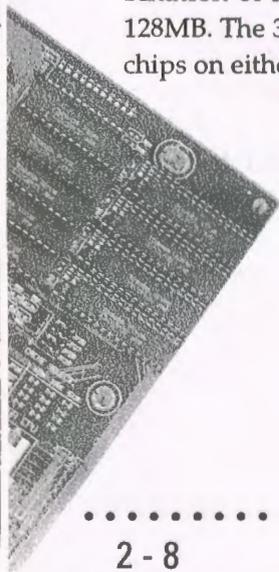
Configuring System Memory

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 memory of the PCI/I-486SP3G in a variety of ways, using different combinations of SIMM modules. You can configure the mainboard's 4 SIMM sockets in 48 combinations using 1MB, 4MB, and 16MB SIMMs with chips on only one side of the SIMM, and 2MB, 8MB, or 32MB SIMMs with chips on both sides.

The chart on the next two pages shows the possible combinations. Under "Type", SIMMs with chips on one side are listed as "Single"; those with chips on both sides are listed as "Double".

The only restrictions are:

- **You must use 2 sockets at a time, in sequence, e.g. SIMM1 and SIMM 2, SIMM 3 and SIMM 4, or all four sockets at once.**

- **Each pair of modules must be the same size and speed.**

- **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

Supported Memory Configurations

SIMM Sockets 1 & 2		SIMM Sockets 3 & 4		Total
Size	Type	Size	Type	Memory
1MB	Single	empty		2MB*
1MB	Single	1MB	Single	4MB
1MB	Single	2MB	Double	6MB
1MB	Single	4MB	Single	10MB
1MB	Single	8MB	Double	18MB
1MB	Single	16MB	Single	34MB
1MB	Single	32MB	Double	66MB
2MB	Double	empty		4MB*
2MB	Double	1MB	Single	6MB
2MB	Double	2MB	Double	8MB
2MB	Double	4MB	Single	12MB
2MB	Double	8MB	Double	20MB
2MB	Double	16MB	Single	36MB
2MB	Double	32MB	Double	68MB
4MB	Single	empty		8MB*
4MB	Single	1MB	Single	10MB
4MB	Single	2MB	Double	12MB
4MB	Single	4MB	Single	16MB
4MB	Single	8MB	Double	24MB
4MB	Single	16MB	Single	40MB
4MB	Single	32MB	Double	72MB

Type: Single = Chips on 1 side; Double = Chips on 2 sides

SIMM Sockets 1 & 2		SIMM Sockets 3 & 4		Total
Size	Type	Size	Type	Memory
8MB	Double	empty		16MB*
8MB	Double	1MB	Single	18MB
8MB	Double	2MB	Double	20MB
8MB	Double	4MB	Single	24MB
8MB	Double	8MB	Double	32MB
8MB	Double	16MB	Single	48MB
8MB	Double	32MB	Double	80MB
16MB	Single	empty		32MB*
16MB	Single	1MB	Single	34MB
16MB	Single	2MB	Double	36MB
16MB	Single	4MB	Single	40MB
16MB	Single	8MB	Double	48MB
16MB	Single	16MB	Single	64MB
16MB	Single	32MB	Double	96MB
32MB	Double	empty		64MB*
32MB	Double	1MB	Single	66MB
32MB	Double	2MB	Double	68MB
32MB	Double	4MB	Single	72MB
32MB	Double	8MB	Double	80MB
32MB	Double	16MB	Single	96MB
32MB	Double	32MB	Double	128MB

* These can be reversed, i.e. Sockets 1/2 empty and Sockets 3/4 installed

Installing Memory Modules

This section explains how to install SIMMs. The sockets used at the time of manufacture may vary from those illustrated here, but they are still functionally the same.

Additional Safety Precautions

In addition to static electricity precautions noted in the first chapter, you should also be concerned about physical damage to your memory modules. It is important not to touch the edge connectors with your fingers while installing the SIMMs. The oil on your fingers can cause corrosion to form on the connectors. The best way to prevent this is to be careful not to touch the connector surfaces.

Installation Procedure

Make sure you have everything you need. Check all your safety and anti-static precautions. As you follow the procedure, remove the modules from their anti-static protection one at a time.

1. One-sided modules should face to the left. The modules will insert in one orientation only. The Pin 1 cut-out on the module prevents you from inserting it the wrong way.

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

3. After you fully insert the module edge connector in the socket, press it forward toward the vertical posts, so the alignment pins at the top of each post fit 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 over the edge of the module to secure it in place.

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 into the retaining clips.

The installed SIMM should be at 90° to the mainboard.

Module cut–out at this end.

SIMM3   SIMM1

Pin 1

SIMMs have a cut–out at one end to indicate the Pin 1 end of the module.

One-sided modules face to the left.

SIMM4   SIMM2
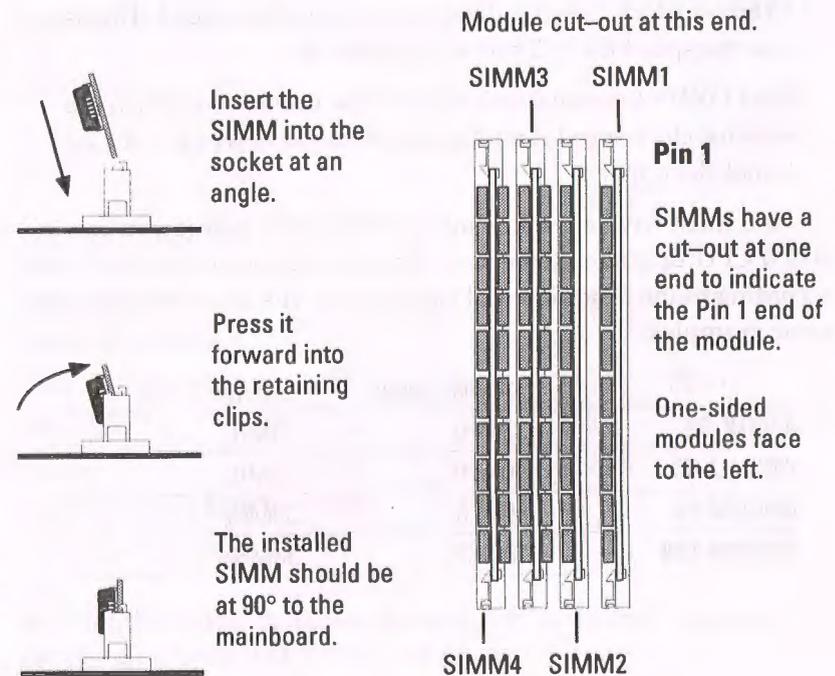
Installing A CPU Upgrade

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 four specifications:

CPU Type – the kind of CPU is installed

Norm/SL – if it is an SL Enhanced Intel486™ CPU or not

External Clock Speed – the external operation speed. This is also the speed the 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:

	Internal Speed	External Speed
486DX-33	33MHz	33MHz
486DX2-50	50MHz	25MHz
486DX2-66	66MHz	33MHz
486DX4-100	100MHz	33MHz

CPU External Clock Selection

Speed	JP18	JP20
25MHz	2&3	2&3
33MHz	1&2 2&3	1&2
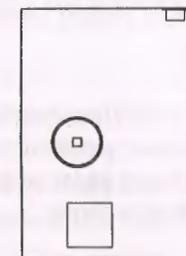
Norm/SL CPU Selection

Type	JP30	JP31	JP32
Non-SL CPU	2&3	1*	1*
SL CPU	1&2	1&2	1&2

*One cap shorts between Pin 1 of JP31 & JP32

Intel 486DX4™ Internal Clock Multiple

Multiple	JP33
x 2	2&3
x 3	open
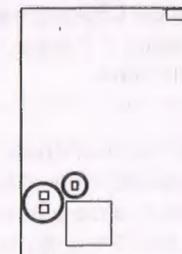
CPU Type Selection

CPU Type	JP34	JP35	JP36	JP38
486DX/DX2/DX4				
487SX/ODP*	2&3	1&2	2&3	Open
486SX/SX2	1&2	1&2	2&3	Open
P24D	2&3	2&3	1&2,4&5	Short
P24T (Pentium ODP*)	2&3	2&3	1&2,4&5	Open

*ODP = OverDrive Processor

IMPORTANT NOTE: You must also set JP40 to the Cyrix setting if you install a Cyrix DX2-V CPU. See Chapter 4.

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
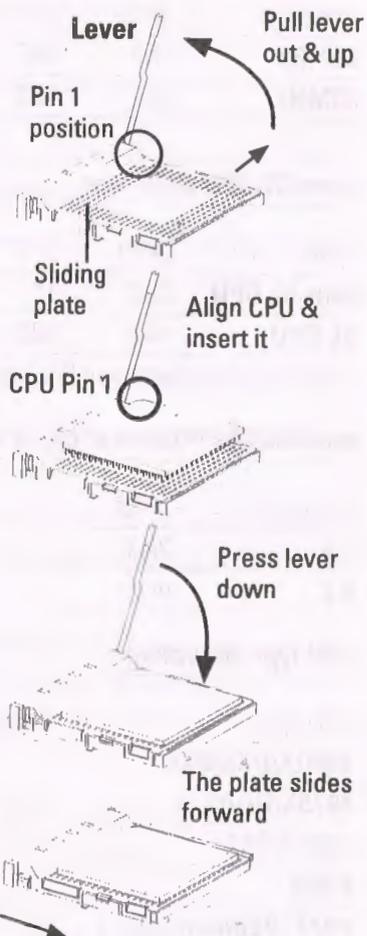
Installing a SCSI Hard Disk or Other SCSI Device

The procedure to install internal SCSI devices is the same whether the device is a hard disk drive or something else. This mainboard comes with a cable to install two internal SCSI devices. To connect external SCSI devices you need the optional SC200 card described at the end of Chapter 4. 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 controller counts as a device in the chain and uses ID #7. Check your device manual for how 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 mainboard has terminators built onto it. The terminators are controlled by jumper JP16. If one end of the chain ends at the mainboard, the terminators must be enabled. The only way that the mainboard can be one end of the chain is if you have only internal or only external devices installed. Since the mainboard ships with a cable for internal devices, the default setting leaves JP16 open and termination Enabled. If you get the optional SC200 card and connect both external and external devices, you must Disable the terminators on the mainboard. There is more information about this in the section on the SC200 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 the SCSI ribbon cable to the device and the other to the SCSI connector on the mainboard (see Chapter 4). The colored edge of the cable should be at the Pin 1 side of the connector on the device and the mainboard.

3. Connect the device LED connector, if it has one, to the JP15 LED connector on the board.

4. Reassemble the system, turn it on.

5. If the device is a hard disk drive, run the Setup Utility and set the drive parameters in the Standard CMOS Setup entry for the drive ("Drive C:"or "Drive D:") to "None".

6. Enable "NCR SCSI Firmware" in Chipset Features Setup.

7. In PCI Configuration Setup, use the "NCR Using IRQ" default setting "9".

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.

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:.

Also, if for some reason you do not use the on-board SCSI controller and install a third-party SCSI controller card instead, you must Disable the on-board controller by shorting jumper JP17. **See page 4-3** for more information on this. To avoid potential conflicts, do not mix different types of SCSI controller in the same system.

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 (see Chapter 4). 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 JP14 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 IDE Controller" in Chipset Features Setup.

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

Installing a Second IDE Hard Disk

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

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

See Chapter 3 for an explanation of how to use the hard disk auto-detection feature.
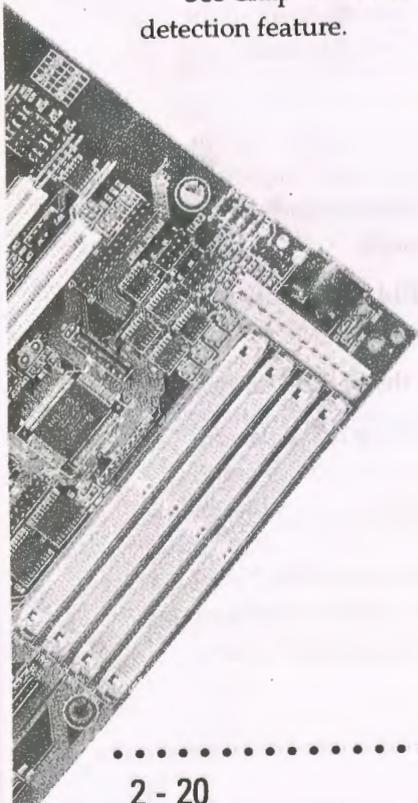
Software Guide

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 Setup

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-SP3G)
                       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 CONFIGURATION SETUP       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.

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 on-board battery that maintains it weakens or fails.

Standard CMOS Setup Screen

```
                      ROM PCI/ISA BIOS(P/I-SP3G)
                        STANDARD CMOS SETUP
                        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" is a screen with a list of entries. Instructions at the bottom of the screen list the controls for this section. 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 will highlight when you select them. If you need help about what changes to make, press the <F1> key. The help menu will then give you information on the highlighted item. The memory display at the lower right functions automatically.

Date & Time

The first two lines on the screen are the date and time settings for the system clock. You can correct them if necessary.

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 must 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. Enter "None" in the drive field. If you have an IDE hard disk installed, a SCSI hard disk can not be the boot drive, so be sure the IDE drive is assigned to "Drive C:". SCSI drives operate using device drivers and are not supported directly by any current PC BIOS. The on-board SCSI BIOS firmware will directly support SCSI hard disk drives. Some devices either require, or provide better performance using a separate device driver. There is more information about this in the section on the SCSI BIOS & Drivers later in this chapter.

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-SP3G)
                        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         : Disabled   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 "Disabled". 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-SP3G)
                    CHIPSET SETUP UTILITY
                     AWARD SOFTWARE, INC.

 DRAM Write Page Mode        : Enabled    Memory Hole Start Address: 1000000H
 DRAM Code Read Page Mode    : Enabled    Memory Hole Size          : Disabled
 DRAM Refresh Mode           : Enabled    NCR SCSI Firmware         : Enabled
 DAM Wait State              : 0 WS       Delay For SCSI/HDD (Secs) :   0

 CPU To DRAM write buffer    : Enabled    Onboard FDC Controller    : Enabled
 CPU To PCI write buffer     : Enabled    Onboard IDE Controller    : Enabled
 PCI To DRAM write buffer    : Enabled    Onboard FDC Swap A: B:    : Disabled
 PCI Memory Burst Write      : Disabled   Onboard Serial Port 1     : COM1
                                          Onboard Serial Port 2     : COM2
 Video BIOS Cacheable        : Disabled   COM3 & COM4 Address       : 3E8H,2E8H
 External Cache Wait State: 0 WS          Onboard LPT Port Address  : 378H/IRQ7
 Cache Update Policy         : Wr-Back    Onboard LPT Port Mode     : Normal
 PCI Posted Write Buffer     : Disabled
 ISA GAT Mode                : Enabled
                                         ESC : Quit          ↑↓→←: Select Item
 DMA Line Buffer Mode        : Enhanced  F1  : Help          PU/Pd/+/- : Modify
 ISA Master Buffer Mode      : Enhanced  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

The default setting for the **"Memory Hole Start Address"** is "1000000H". Only the first three element of the hexadecmial address can be changed. Where:

1 = each 16,384KB(16MB); **0** = each 1024KB(1MB); **0** = each 64KB

The address range is 000 to 7ff (0KByte to 131008KByte).

Note: 131008KBytes = 128MByte - 64KByte

Normally, you can leave the setting on the default. If you need to use a different starting address, highlight the entry and scroll to a different address.

If you set the **"Memory Hole Size"** there are eight size options other than the default setting, "Disabled".

SCSI Controls

The default setting for the **"NCR SCSI Firmware"** is "Enabled". This enables the on-board SCSI BIOS. This firmware supports the on-board NCR 53C810 SCSI controller chip and, if you have the optional SC200 card for connecting external devices, the controller chip on the card. If you use a SCSI controller card that uses its own firmware, you can Disable the on-board SCSI firmware and controller.

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 SC-200 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 seeconds 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.

Controller Settings

The default setting for the **"Onboard FDC Controller"** is "Enabled". This setting allows you to connect your floppy disk drives to the onboard "Floppy" connector instead of a separate controller card. Choose the "Disabled" setting if you want to use a separate controller card.

The default setting for the **"Onboard IDE Controller"** is "Enabled". This setting allows you to connect your IDE hard disk to the onboard "IDE" connector. Choose the "Disabled" setting if you want to use a separate controller card, for example, a PCI IDE controller card that supports two IDE channels and four devices.

The default setting for the **"Onboard FDC Swap A: B:"** is "Disabled". If you want to reverse the drive letter assignments of your floppy disk drives you can enable this. This works separately from the BIOS Features floppy disk swap feature.

Serial Ports

The **"Onboard Serial Port 1"** and **"Onboard Serial Port 2"** lines control the assignments for the mainboard's two onboard serial connectors. They can be assigned as follows:

COM1   address is 3F8H   (Onboard Serial Port 1 default)

COM2   address is 2F8H   (Onboard Serial Port 2 default)

COM3   default address is 3E8H

COM4   default address is 2E8H

Disabled   turns off the on-board port

Make sure both ports have different COM assignments.

The options for the **"COM3 & COM4 Address"** line are:

3E8H, 2E8H   Default setting

2E8H, 2E0H

220H, 228H

338H, 238H

In a normal system configuration, it should be unnecessary to change these defaults.

Parallel Port

The options for **"Onboard LPT Port Address"** are:

378H/IRQ5

3BCH/IRQ7

278H/IRQ5

378H/IRQ7   Default setting

Disabled

This line controls the on-board parallel port connector. If you are using an I/O card with a parallel port, make sure the addresses don't conflict. IBM PC-compatible computers can have three parallel ports.

Parallel Port Mode

The options for **"Onboard LPT Port Mode"** are:

Normal   Default setting

EPP 1.7

EPP 1.9

ECP

If you have a parallel interface peripheral device that uses one of the paralell port enhancements listed, set this line for the enhanced mode your peripheral supports. For example, some printers now support enhanced parallel port features.

Power Management Setup

Power Management Setup controls the mainboard's "green" features. The features work with Intel SL Enhanced 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-SP3G)
                       POWER MANAGEMENT SETUP
                        AWARD SOFTWARE, INC.

 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          │
                                       └──────────────────────────────────┘
```

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.

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 Configuration Setup

This screen configures the PCI Bus slots. All the slots use INTA#.
If you install a card , you should set the card to INTA#.

PCI Configuration Setup Screen

```
            ROM PCI/ISA BIOS (P/I-SP3G)
               PCI CONFIGURATION SETUP
               AWARD SOFTWARE, INC.

SLOT 1 (RIGHT)                        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 (MIDDLE)
  Latency Timer     : 80 PCI Clock   For PCI IDE adapter if you are using
  Using IRQ         : 11             IRQ Paddleboard, please set IRQ = NA
  Trigger Method    : Level (Auto)   Otherwise, please set IRQ = 14
                                     Or 14&15.
SLOT 3 (LEFT)
  Latency Timer     : 80 PCI Clock
  Using IRQ         : NA
  Trigger Method    : Level (Auto)

NCR Latency Timer   : 80 PCI Clock   ESC : Quit        ↑↓←→: Select Item
NCR Using IRQ       : 9              F1  : Help       PU/Pd/+/- : Modify
                                     F5  : Old Values  (SHIFT) F2 : Color
                                     F6  : Load BIOS Defaults
                                     F7  : Load Setup Defaults
```

Each PCI Slot has three option fields:

The first field is the "**Latency Timer**" setting. Do not change the
"80 PCI Clock" setting. The default 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
NCR :   9

You can change the default to another setting. If you do, make
sure that you do not choose an IRQ already in use.

Note:

1. If you install a PCI Enhanced IDE controller card that is set to
use both IDE channels, you must set the IRQ to the "14&15"
option. This does not apply to the on-board PCI IDE controller
which, if enabled, automatically uses these two IRQs. For an
IDE card that only uses one channel , se the IRQ to "14".

2. If you install a PCI IDE controller card that uses an IRQ
'Paddleboard', you must set the IRQ to "NA".

The third field,"**Trigger/Routing**",selects how IRQs are routed
It assigns, or 'routes' the IRQ listed in the previous line to the slot
using one of two 'trigger' methods, Level trigger, or Edge trigger.
Most PCI cards use the Level trigger method. Level triggering is
handled two ways. The default, "Level (Auto)", can detect if an in-
stalled card uses an IRQ,and if not,leaves the selected IRQ free for
other use. The alternative is"Level (Forced)". In some cases,a card
you install may not be completely compliant with the PCI auto-
detection specification that allows "Level (Auto)" to automatically
determine if a PCI expansion card uses an IRQ. If you install a
card and it does not seem to be working properly, try changing this
setting to"Level (Forced)". This will assign the IRQ indicated in the
previous line to the slot, and therefore the card, even if the card's
IRQ use can not be determined. That IRQ is then unavailable for
other use.

If you have a card that uses Edge triggering set this line to use
"Edge (By JPx-x)" and set the relative jumpers correctly.

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-SP3G)
                        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 CONFIGURATION┌──────────────────────────┐ETUP
   LOAD BIOS DEFAUL1│ 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
```

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-SP3G)
                        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 CONFIGURATION┌──────────────────────────┐ETUP
   LOAD BIOS DEFAUL1│ 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-SP3G)
                        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 CONFIGURATION SE____        ____ ____TT 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
```

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-SP3G)
                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.

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.

NCR SCSI BIOS & Drivers

The NCR 53C810 SCSI BIOS is recorded on the same flash memory chip as the system BIOS. The main system BIOS does not directly support SCSI devices, so an auxiliary BIOS is required.

To use the on-board SCSI BIOS, you must set the "NCR SCSI Firmware" line in the Chipset Features Setup screen to "Enabled". The NCR SCSI BIOS 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 mainboard 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' memory 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 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

AWSGxxxx.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 on the mainboard.

The BIOS file on the support disk may be newer than the BIOS on the mainboard, so you may want to update your BIOS. Compare the four numbers after 'AWSG' of the support disk BIOS file to the last four numbers of the code in the upper left-hand corner of your screen while the Power-On Self-Test is going. If the number from the support disk file is bigger, you should reprogram the System BIOS. If they are the same, don't bother.

Before you update the BIOS, you must first do the following:

1. Set jumper JP21 to the correct "Flash" type. The default BIOS EPROM is a 12-volt chip. 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, set JP21 to the +12V (12-volt) setting. When you finish updating the BIOS, set JP21 back to the +5V (5-volt) setting.

2. 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 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 floppy disk with no CONFIG.SYS or AUTOEXEC.BAT files, then run Flash Memory Writer from a backup copy of your support disk.

b. If you are using MS-DOS 6.0, 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 again. 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):
```

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. AWSG0101.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. AFter the new BIOS is installed, exit FMW and turn your system OFF, wait 30 seconds, and turn it ON again.

If your mainboard has a12-volt Flash EPROM (the default chip), you should set jumper JP21 back to the 5-volt setting to write-protect the BIOS before you turn your system back on.

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

ISA/PCI IRQ Assignments: JP1 – JP10

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
IRQ5	JP1, 1&2	JP1, 3&4	JP6, 1&2
IRQ9	JP2, 1&2	JP2, 3&4	JP7, 1&2
IRQ11	JP3, 1&2	JP3, 3&4	JP8, 1&2
IRQ14	JP4, 1&2	JP4, 3&4	JP9, 1&2
IRQ15	JP5, 1&2	JP5, 3&4	JP10, 1&2
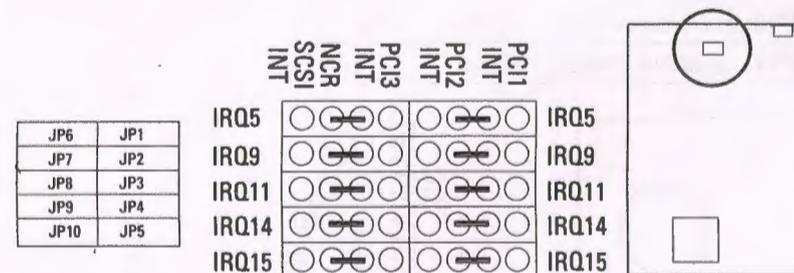
DMA Channel: JP11 – JP12

These select the DMA channel for the on-board ECP (Extended Capabilities Parallel Port). The default is DMA 3.

	JP11	JP12
DMA 1	1&2	1&2
DMA 3	2&3	2&3
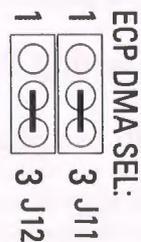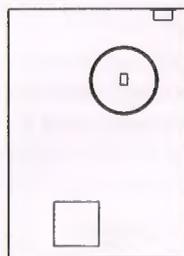
On-board SCSI Control: JP16 – JP17

JP16 controls the on-board SCSI terminators. Terminators must be enabled if the on-board controller is in use. JP17 controls the on-board SCSI controller. Disable the NCR controller if you install an alternate SCSI controller card.

	Enable	Disable
JP16: *SCSI Termination*	Open	1&2
JP17: *On-board controller*	Open	1&2
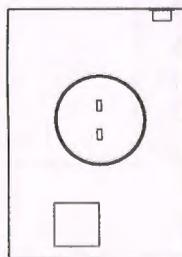
CPU External Clock Selector: JP18 & JP20

Set this according to the *external* clock speed of the installed CPU.

	JP18	JP20
25MHz	2&3	2&3
33MHz	1&2	1&2
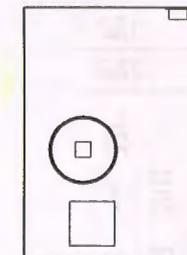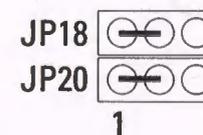
BIOS Flash Memory Voltage Selector: JP21

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

	JP21
12V	1&2
5V	2&3
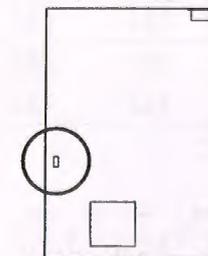
PS/2 Mouse Interrupt: JP22 (IRQ12)

If the PS/2 mouse option is present and in use, you must enable this.

JP22	
Disable	1&2
Enable	2&3
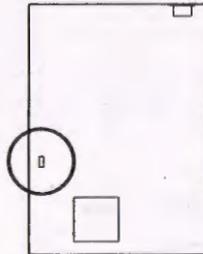
Level 2 Cache Size: JP26 – JP29

These are set based on the size of the cache installed.

	JP26	JP27	JP28	JP29
128K	2&3	1&2	2&3	2&3
256K	1&2	2&3	1&2	2&3
512K	1&2	1&2	1&2	1&2
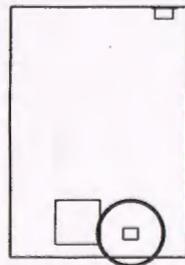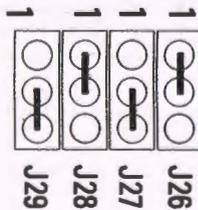
CPU SL Selector: JP30 – JP32

Set according to the installed CPU type.

Note:
The Intel 486DX4™ is an SL-Enhanced CPU

	JP30	JP31	JP32
Non-SL CPU	2&3	1*	1*
SL CPU	1&2	1&2	1&2
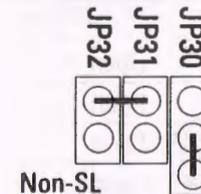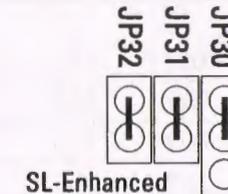
Non-SL   SL-Enhanced
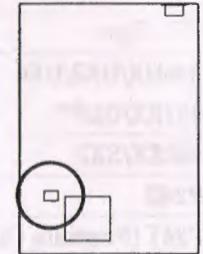
CPU Internal Clock Selector: JP33

Set this according to the internal clock speed of the Intel 486DX4™ CPU installed. 75MHz uses x3. 100MHz uses x3. For SX, DX and DX2 CPUs keep this open. Future CPUs of the Intel 486DX4™ type will also use this jumper.

JP33	
x 2	2&3
x 2.5	1&2
x 3	open
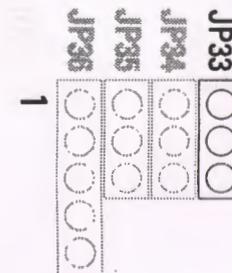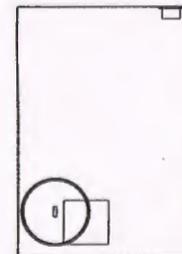
## CPU Type Selectors: JP34 – JP36, JP38

These jumpers indicate the type of CPU installed. Note that there is more than one kind of OverDrive Processor (ODP). The jumpers will be set for the CPU currently installed on the mainboard. If you install a CPU upgrade, make sure to use the setting for the new CPU as noted here .

CPU Type	JP34	JP35	JP36	JP38
486DX/DX2/DX4				
487SX/ODP*	2&3	1&2	2&3	Open
486SX/SX2	1&2	1&2	2&3	Open
P24D	2&3	2&3	1&2,4&5	Short
P24T (Pentium ODP*)	2&3	2&3	1&2,4&5	Open

*ODP = OverDrive Processor
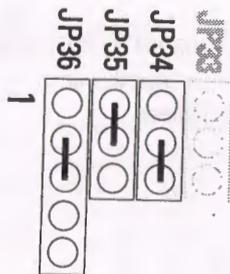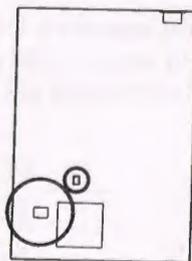
Intel DX4/Cyrix DX2-V Voltage Selection: JP40

This jumper selects the CPU voltage for these two CPUs. The Intel CPU uses 3.45 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 the setting if you do not install a Cyrix DX2-V.
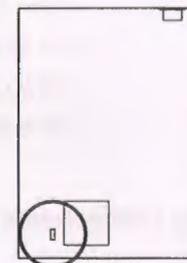
Clock Speed	JP40
Intel DX4 (default)	2&3
Cyrix DX2-V	1&2

Intel DX4, 3.45-volt   Cyrix DX2-V, 3.6-volt

CPU Options

- Any Intel 486 CPU.
- SL CPUs must be Intel.
- Non-SL 486-compatible CPUs from other vendors.

All CPU options must run at an external clock speed of either 25MHz or 33MHz.

Memory Subsystem

DRAM 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
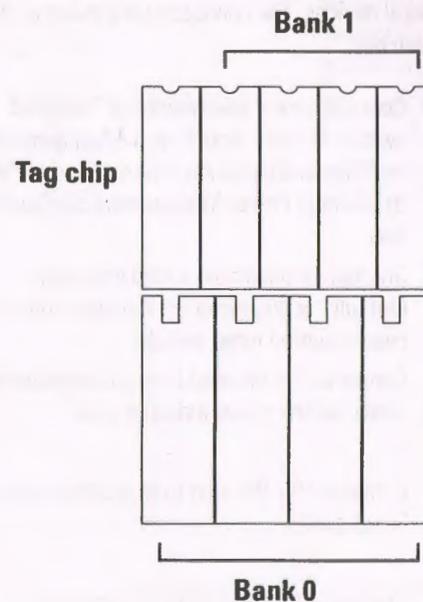*All modules must be the same speed.

Memory Configuration Options
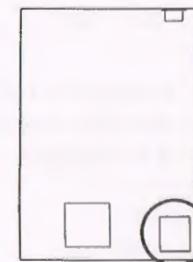
See pages 2-10 and 2-11 for chart.

Level 2 Cache Options

SRAM speed required: 20ns.

Cache Size	Installed SRAM Chips		
	Bank 0	Bank 1	Tag
128KB	Four 32K x 8		One 8Kx8
256KB	Four 32K x 8	Four 32K x 8	One 32Kx8
512KB	Four 128K x 8		One 32Kx8

Level 2 Cache SRAM Sockets

**Bank 1**

Tag chip

Bank 0

Bank 0 is made up of dual sockets that accept the larger cache chips used in the 512KB cache
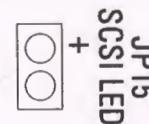
Connectors:

There are several connectors on the board for switches and indicator lights from the system case or installed peripheral devices. The connectors are made of the same components as the jumper switches.

SMI_SW — Connector for a case-mounted "Suspend" switch. To work, both Power Management and Suspend mode must be enabled in the BIOS Setup Power Management configuration.

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 case-mounted Reset switch.

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.
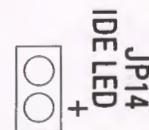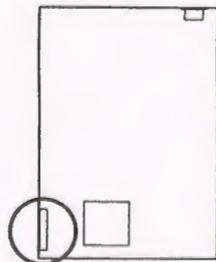
JP14 IDE LED — Connector for an IDE hard disk drive activity light. If you install an IDE hard disk drive, connect the indicator light lead here. The polarity is marked.

JP15 SCSI LED — Connector for a SCSI device activity light. If you install a SCSI device, connect the indicator light lead here. The polarity is marked.
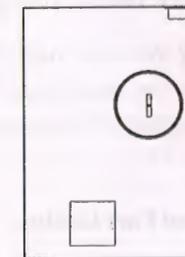
PS/2 Mouse — Optional (at manufacture) 6-pin connector for a cable to an external case-mounted PS/2 mouse port. The connector is an 8-pin block with two pins removed to orient the female connector from the mouse port. If installed, the connector is beside the keyboard connector. Depending on the model you have, there may be a PS/2 mouse port mounted in this position instead. The keyboard connector may be either a standard (larger) DIN connector or a mini-DIN PS/2 keyboard port.
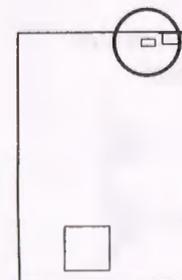
Port & Controller Cables

The mainboard comes with the following cables:

• 2 serial port ribbon cables attached to one mounting bracket

• 1 parallel port ribbon cable with mounting bracket

• 1 IDE hard disk ribbon connector cable

• 1 floppy disk drive ribbon connector cable

• 1 SCSI device ribbon connector cable

Normally you will use at least the I/O ports and floppy controller built onto the mainboard. You can use the IDE hard disk drive interface and the SCSI connection at the same time.
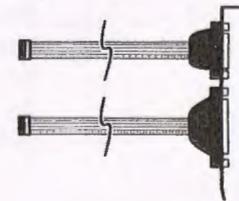
Connector and Port Cables
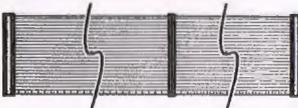
IDE ribbon cable

Parallel ribbon cable

Floppy ribbon cable

**Serial ribbon cables & port bracket**

SCSI ribbon cable

SCSI, FDD, & IDE Interfaces

The mainboard has connectors for ribbon cables to SCSI, FDD, and IDE devices. Each of these connectors is labeled to indicate its Pin 1 location. Remember, the colored edge of the ribbon cable must line up with Pin 1 for that connector.

If you are attaching a ribbon cable for a SCSI device, you should connect the SCSI LED connector to JP15. Connect an IDE HDD LED to JP14 if you are using the IDE HDD interface.

SCSI, Floppy & IDE Connectors
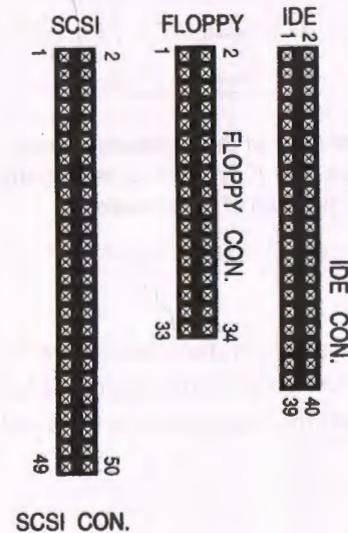
SCSI   FLOPPY   IDE

FLOPPY CON.

33   34

IDE CON.

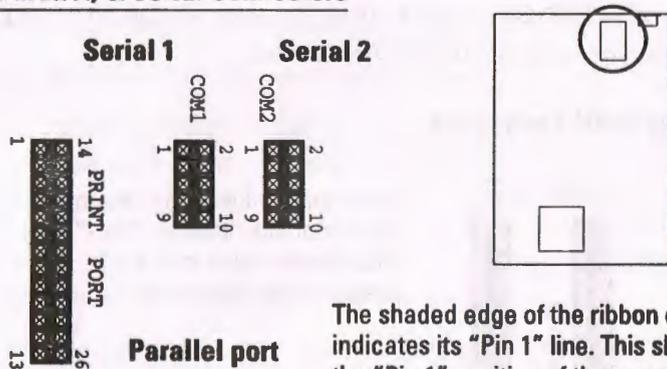39   40

49   50

SCSI CON.

The shaded edge of the ribbon connector indicates its "Pin 1" line. This should match the "Pin 1" position of the connector.
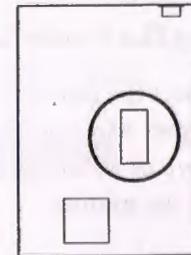
Serial and Parallel Interfaces

The mainboard connectors for the two serial ports and the parallel port are similar to that of the SCSI interface. Each connector's Pin 1 location is also indicated. The colored edge of each connecting cable must be on the Pin 1 side of the connector.

Parallel, & Serial Connectors

Serial 1   **Serial 2**

The shaded edge of the ribbon connector indicates its "Pin 1" line. This should match the "Pin 1" position of the connector.

Connecting The 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
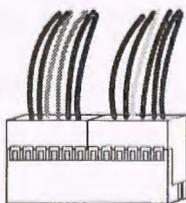
The black wires should be in the middle.

The PCI-SC200 SCSI Interface Card

This mainboard can use an optional SCSI interface card, the PCI-SC200, to connect both internal and external devices to your system. The card works with the SCSI BIOS on the mainboard. The card interface has the same features as the on-board SCSI interface with the addition of the external connector. If you install the PCI-SC200 it will function as a second SCSI bus. This means you can connect devices to both the on-board connector and the card. Alternatively, you can connect all devices to the card only.

To use the PCI-SC200, you must also enable the "NCR SCSI Firmware" option in the Award BIOS Setup Utility program. Refer to the section on Chipset Setup in Chapter 3 for more about this.

To install the PCI-SC200, you need to set it up first. The setup procedure is explained here. The basic card installation procedure is explained in Chapter 2.

The PCI-SC200 SCSI Interface Card

Internal SCSI ribbon cable connector

JP5

External SCSI 2 cable connector

JP1 & 2

PCI edge connector
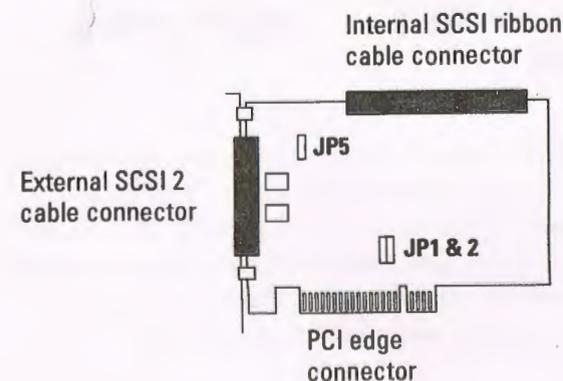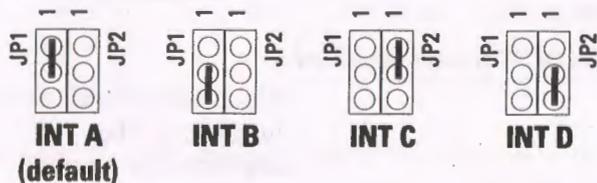
Setting Up the PCI-SC200

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 have PCI INT A assigned to it. On the PCI-SC200, you assign the INT by setting jumper JP1 or JP2. The default setting for the card is INT A. The INT assignment must be the same as the INT assigned to the PCI slot you install the card in, which for this mainboard is INT A.

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

JP1 & 2: Interrupt settings

INT A
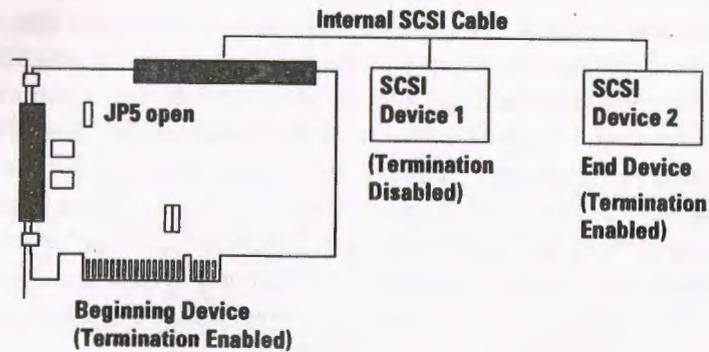**(default)**   **INT B**   **INT C**   **INT D**

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. Many SCSI devices use a set of three 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 two settings, terminated and unterminated, are shown below.

JP5: Terminator setting

Termination
Enabled (default)   **Termination**
Disabled
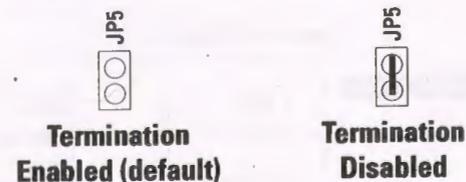
Decide whether you need to terminate the PCI-SC200 based on its position in the SCSI chain. Only the devices at each end of the chain need to be terminated. If you have *only* internal or *only* external devices connected to the PCI-SC200, then you *must* terminate the PCI-SC200. If you have *both* internal and external devices connected, you *must not* terminate the card. The figures opposite 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)

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)

(Termination Disabled)

External SCSI Cable

SCSI Device 2
(Termination Disabled)

SCSI Device 1
Beginning Device
(Termination Enabled)
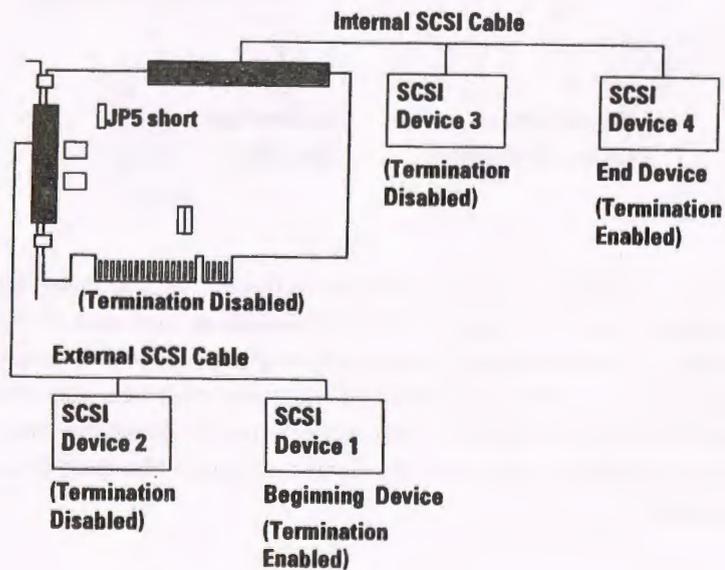
```
                          The Content of PCI/I-SP3G Supporting Diskette


                          << DOS DRIVER >>
                        ┌ Directory of B:\DOS
                        | README
                        | SCSIFMT.EXE
                        | ASPICAM.SYS
                        | CDROM.SYS
                        | DOSCAM.SYS      *
                        | SCSIDISK.SYS
                        | MINICAM.SYS
                        |
                        | << FLASH >>
                        ├ Directory of B:\FLASH
                        | FLASH.EXE
                        | README
                        | P_I4SP3G     <DIR>
                        |
                        | << SCO_UNIX >>
        PCI/I-486SP3G   ├ Directory of B:\SCO_UNIX
        Diskette        | README
        Rev 1.2         |
                        | << OS2 >>
                        ├ Directory of B:\OS2
                        | OS2CAM.ADD
                        | OS2CAM.DDP
                        | README
                        |
                        | << WINDOWS NT >>
                        ├ Directory of B:\WINNT
                        | README
                        | NCRSDMS.TAG
                        | TXTSETUP.OEM
                        | NCRSDMS.SYS
                        | OEMSETUP.INF
                        |
                        | << Netware 3.x >>
                        ├ Directory of B:\NET3X
                        | README
                        | NCRSDMS3.DSK
                        | NCRSDMS3.DDI
                        | ASPICAM3.NLM
                        |
                        | << Netware 4.x >>
                        ├ Directory of B:\NET4X
                        | README
                        | NCRSDMS4.DSK
                        | NCRSDMS4.DDI
                        └ ASPICAM4.NLM
```
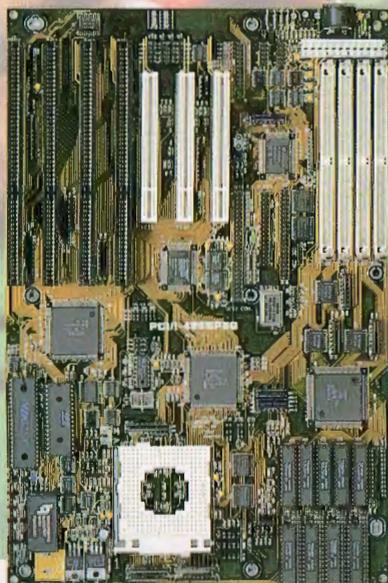
PCI/I-486SP3G
User's Manual