

ASUS[®] P/I-P55T2P4
Pentium[®] Motherboard

USER'S MANUAL

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| |
|---|
| Product Name: P/I-P55T2P4 |
| Product Rev: 2.1 |
| Manual Rev: 2.0 |
| BIOS Version: #401A0-0101 (Displayed on top left during boot-up) |
| Release Date: April 1996 |



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FCC & DOC COMPLIANCE

Federal Communications Commission Statement

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING: The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

I. INTRODUCTION

How this manual is organized

This manual is divided into five sections as follows:

1. **Introduction:** Manual information and checklist
2. **Features:** Information and specifications concerning this product
3. **Installation:** Instructions on setting up the motherboard.
4. **BIOS Setup:** BIOS software setup information.
5. **PCI-SC200:** Installation of an optional SCSI card.

Item Checklist

Please check that your package is complete. If you discover damaged or missing items, please contact your retailer.

- The P/I-P55T2P4 motherboard
- 2 serial port ribbon cables attached to a mounting bracket
- 1 parallel ribbon cable with mounting bracket
- 1 IDE ribbon cable
- 1 floppy ribbon cable
- 1 diskette containing support software as follows:
 - Flash Memory Writer utility to update the FLASH BIOS
 - Binary file containing BIOS information
 - Desktop Management Interface (DMI) software
 - Readme files gives instructions on use of the files
- This user's manual
- Optional PS/2 mouse cable with mounting bracket
- Optional infrared module
- Optional ASUS pipelined burst cache module
- Optional PCI-SC200 SCSI card

II. FEATURES

Features of This Motherboard

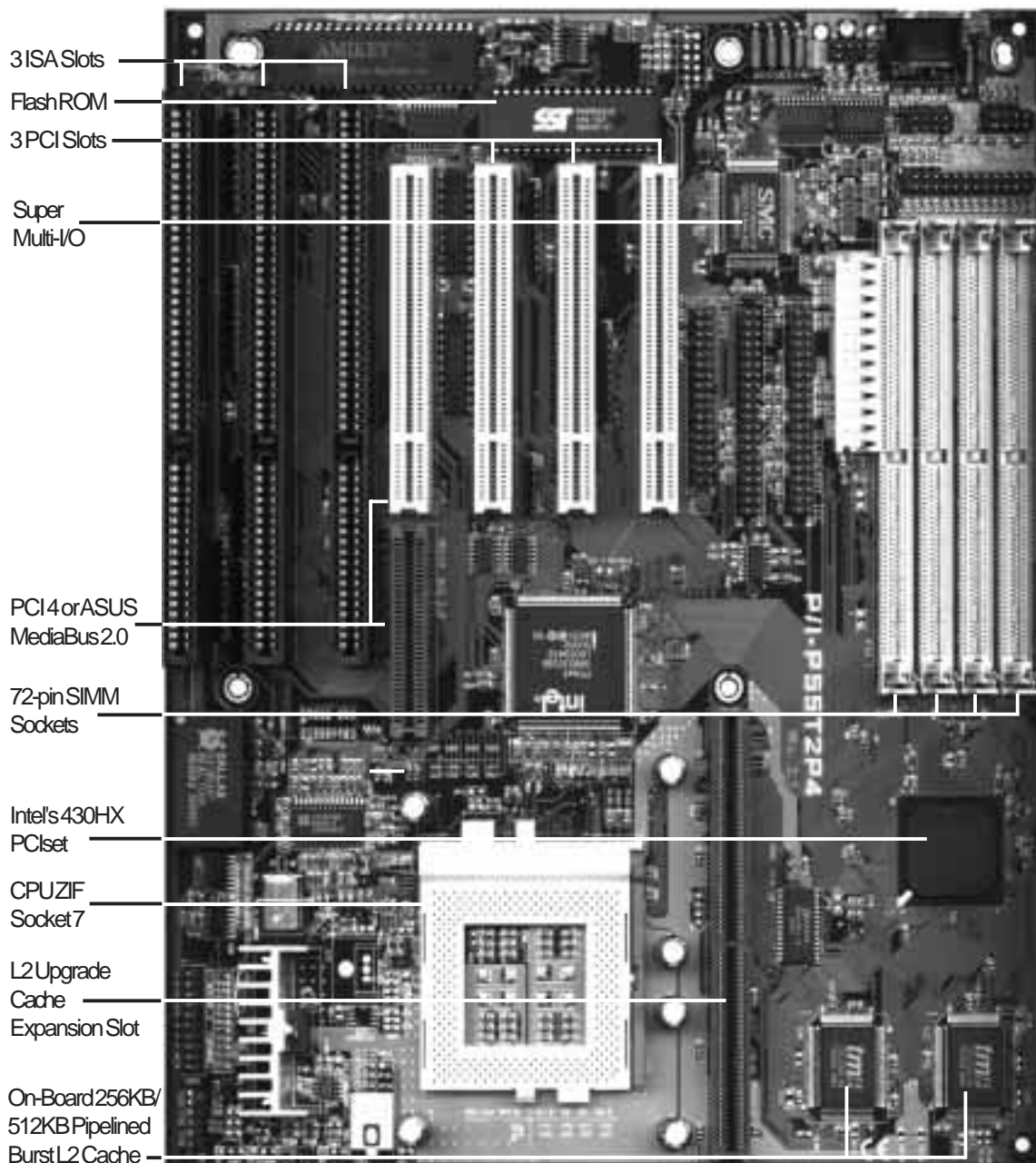
The P/I-P55T2P4 is carefully designed for the demanding PC user who wants a great many features in a small package. This motherboard:

- **Easy Installation:** Is equipped with BIOS supports auto detection of hard drives and Plug and Play to make setup of hard drives and expansion cards virtually automatic.
- **Multi-Speed Support:** Supports one 75-166MHz Pentium CPU on a ZIF Socket 7.
- **Intel Chipset:** Features Intel's 430HX PCiset with I/O subsystems.
- **Error Checking and Correcting (ECC):** Using Intel's 430HX PCiset and parity DRAM modules can detect and correct 1 bit memory errors.
- **Destop Management Interface (DMI):** Includes Intel's 430HX PCiset which supports DMI which allows hardware to communicate within a standard protocol creating a higher level of compatibility. (Requires DMI-enabled components. Please view the ReadMe file for details.)
- **L2 Cache:** Provides the option of 0KB upgradeable to 256KB or 512KB, on-board 256KB upgradeable to 512KB, or on-board 512KB Pipelined Burst SRAM. Upgrades are made through a **Synchronous SIMM** cache module. (See page 14 for compatible cache modules.)
- **Versatile DRAM Memory Support:** Supports 72-pin SIMMs of 4MB, 8MB, 16MB, 32MB, or 64MB to form a memory size between 8MB to 256MB. Supports both Fast Page Mode and Extended Data Output (EDO) SIMMs.
- **ISA and PCI Expansion Slots:** Provides three 16-bit ISA slots, three 32-bit PCI slots, and one PCI/MediaBus 2.0 which allows the use of either an standard PCI card or the ASUS MediaBus Card.
- **ASUS MediaBus Rev 2.0:** Features an expansion slot extension shared with PCI Slot 4 for an optional multifunctional expansion card which facilitates building of multimedia systems. (For revision compatibility information, please refer to page 18.)
- **Super Multi-I/O:** Provides two high-speed UART compatible serial ports and one parallel port with EPP and ECP capabilities. UART2 can also be directed to the Infrared Module for wireless connections. Two floppy drives of either 5.25" or 3.5" (1.44MB or 2.88MB) are also supported without an external card. **The Japanese "Floppy 3 mode" (3.5" 1.2MB) floppy standard is also supported.**

II. FEATURES

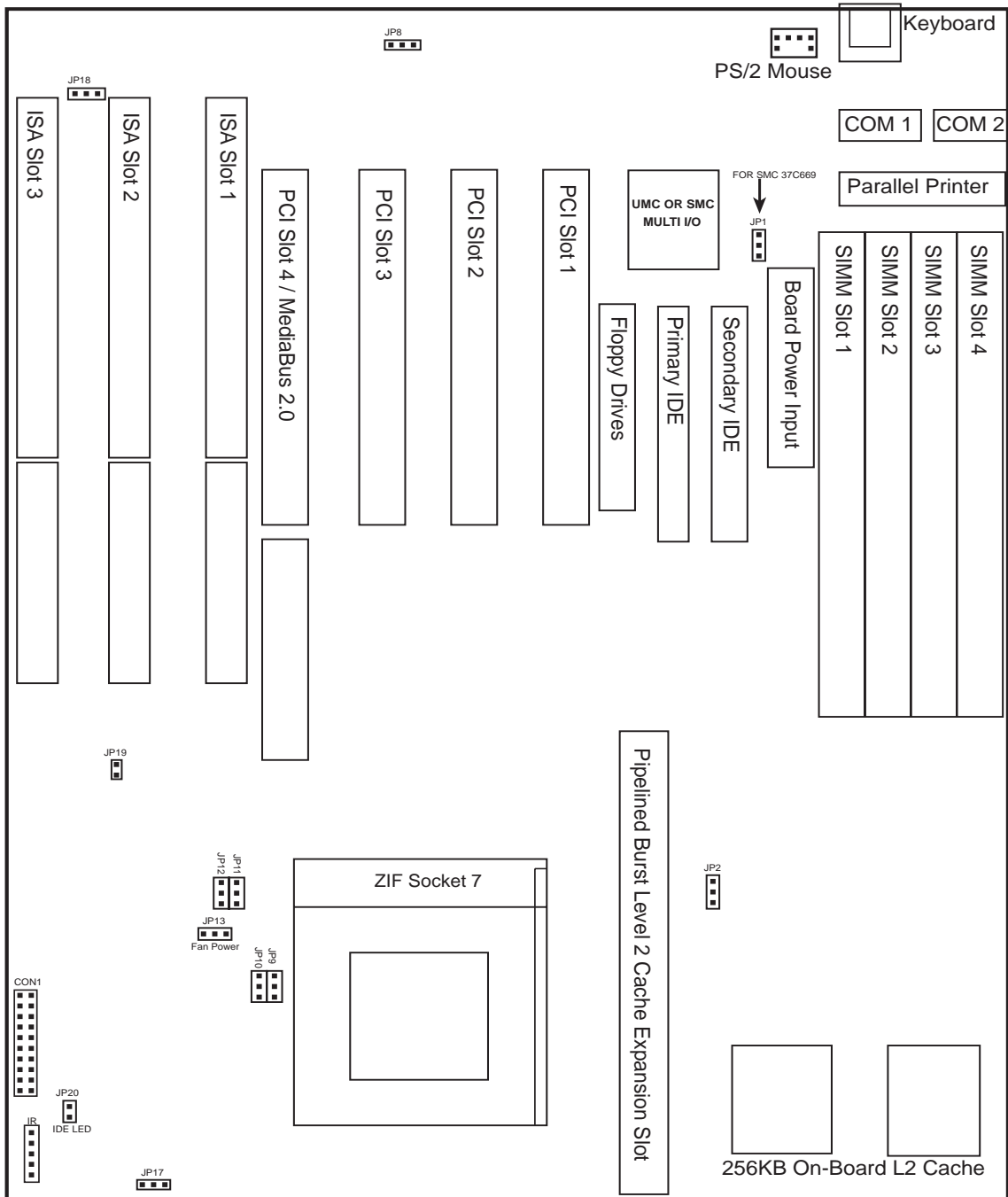
- **PCI Bus Master IDE Controller:** Comes with an on-board PCI Bus Master IDE controller with two connectors that supports four IDE devices in two channels, provides faster data transfer rates, and supports Enhanced IDE devices such as Tape Backup and CD-ROM drives. This controller supports PIO Modes 3 and 4 and Bus Master IDE DMA Mode 2. **BIOS supports IDE CD-ROM boot-up.**
- **Optional IrDA and PS/2:** This motherboard supports an optional infrared port module for wireless interface and a PS/2 mouse cable set.
- **NCR SCSI BIOS:** This motherboard has firmware that supports the optional ASUS PCI-SC200 SCSI controller cards.

Parts of the Motherboard



III. INSTALLATION

Map of the Motherboard



III. INSTALLATION
(Map of Board)

III. INSTALLATION

Jumpers

- | | | |
|---------------------|-------|---|
| 1) JP1 (SMC 37C669) | p. 8 | Multi-I/O Selection (Enable/Disable) |
| 2) JP8 | p. 8 | Flash ROM Boot Block Program (Enable/Disable) |
| 3) JP2 | p. 9 | Total Level 2 Cache Size Setting |
| 4) JP17 | p. 9 | Voltage Regulator Output Selection |
| 5) JP11, JP12 | p. 10 | CPU External Clock (BUS) Frequency Selection |
| 6) JP9, JP10 | p. 10 | CPU:BUS Frequency Ratio |
| 7) JP18 | p. 11 | PS/2 Mouse on IRQ12 (Enable/Disable) |
| 8) JP19 | p. 11 | CMOS RAM (Operation/Clear CMOS Data) |

Expansion Slots

- | | | |
|---------------------|-------|--|
| 1) SIMM Slots | p. 12 | DRAM Memory Expansion slots |
| 2) Cache Expansion | p. 14 | Socket for Pipelined Burst SRAM Cache Module |
| 3) ZIF Socket 7 | p. 15 | Socket for Central Processing Unit (CPU) |
| 4) ISA Slots 1,2,3 | p. 16 | 16-bit ISA Bus Expansion slots |
| 5) PCI Slots 1,2,3 | p. 16 | 32-bit PCI Bus Expansion slots |
| 6) PCI 4 / MediaBus | p. 18 | 32-bit PCI Bus Slot and MediaBus |

Connectors

- | | | |
|-------------------------|-------|--|
| 1) Keyboard | p. 19 | Keyboard connector (5-pin Female) |
| 2) PS/2 Mouse | p. 19 | PS/2 Mouse connector (6-pin Block) |
| 3) Parallel Port | p. 20 | Parallel Port connector (26-pin Block) |
| 4) Serial Port | p. 20 | Serial Port COM1 & COM2 (10-pin Blocks) |
| 5) Floppy Drive | p. 21 | Floppy Drive connector (34-pin Block) |
| 6) Power Input | p. 21 | Motherboard Power connector (12-pin Block) |
| 7) Primary IDE | p. 22 | Primary IDE connector (40-pin Block) |
| 8) Secondary IDE | p. 22 | Secondary IDE connector (40-pin Block) |
| 9) Turbo/Power (CON1) | p. 23 | Turbo LED/Power LED (2-pins) |
| 10) SMI Switch (CON1) | p. 23 | SMI Switch lead (2-pins) |
| 11) Reset Switch (CON1) | p. 23 | Reset Switch lead (2-pins) |
| 12) Key Lock (CON1) | p. 23 | Keyboard Lock Switch lead (5-pins) |
| 13) Speaker (CON1) | p. 23 | Speaker connector (4-pins) |
| 14) JP20 | p. 24 | IDE LED activity light |
| 15) JP13 | p. 24 | CPU 12V Cooling Fan connector |
| 16) IR | p. 25 | Infrared Port Module connector |







III. INSTALLATION

Installation Steps

Before using your computer, you must follow the six steps as follows:

1. **Set Jumpers on the Motherboard**
2. **Install DRAM Modules**
3. **Install the CPU**
4. **Install Expansion Cards**
5. **Connect Cables, Wires, and Power Supply**
6. **Setup the BIOS Software**

1. Jumpers

Several hardware settings are made through the use of jumper caps to connect jumper pins (JP) on the motherboard. See "Map of the Motherboard" on page 4 for locations of jumpers. The jumper settings will be described numerically such as [----], [1-2], [2-3] for no connection, connect pins 1&2, and connect pins 2&3 respectively. Pin 1 for our motherboards is always on top  or on the left  when holding the motherboard with the keyboard connector away from yourself. A "1" is written besides pin 1 on jumpers with three pins. The jumpers will also be shown graphically such as  to connect pins 1&2 and  to connect pins 2&3. Jumpers with two pins will be shown as  for short and  for open. For manufacturing simplicity, the jumpers may be sharing pins from other groups. Use the diagrams in this manual instead of following the pin layout on the board. Settings with two jumper numbers require that both jumpers be moved together. To connect the pins, simply place a plastic jumper cap over the two pins as diagramed.

III. INSTALLATION

WARNING: Some pins are used for connectors or power sources. These are clearly separated from jumpers in "Map of the Motherboard" on page 4. Placing jumper caps over these will cause damage to your motherboard.

WARNING: Computer motherboards and components contain very delicate Integrated Circuit (IC) chips. To protect the motherboard and other components against damage from static electricity, you should follow some precautions whenever you work on your computer.

1. Unplug your computer when working on the inside.
2. Hold components by the edges and try not to touch the IC chips.
3. Use a grounded wrist strap before handling computer components.
4. Place components on a grounded antistatic pad or on the bag that came with the component whenever you work on lay down components.

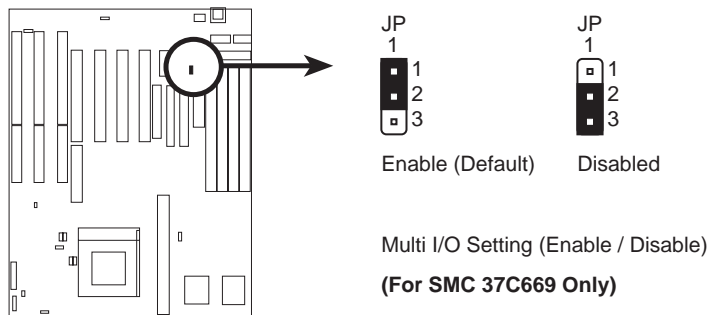
III. INSTALLATION

Jumper Settings

1. On-Board Multi-I/O Selection (JP1) (For SMC SMC37C669 Only)

For SMC Multi-I/O SMC37C669, you can selectively disable each on-board Multi-I/O item (floppy, serial, parallel, and IrDA) through BIOS (see page 35) *or* disable all Multi-I/O items at once with the following jumper in order to use your own Multi-I/O card. If your motherboard does not use the above SMC Multi-I/O, the following jumper will not be available and you can only disabled each item through BIOS.

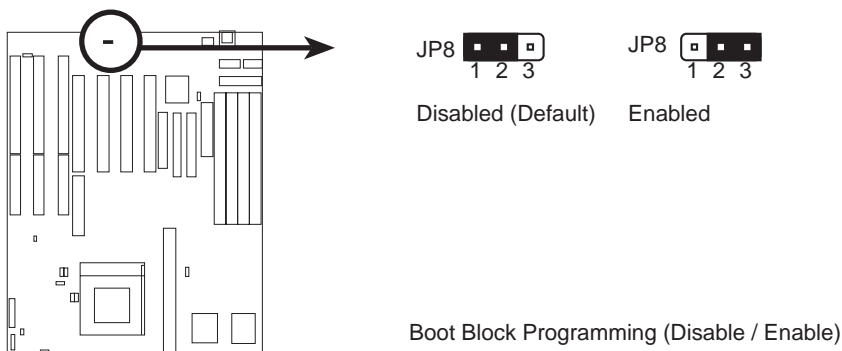
| <u>Selections</u> | <u>JP1</u> |
|-------------------|-----------------|
| Enable | [1-2] (Default) |
| Disable | [2-3] |



2. Flash ROM Boot Block Programming (JP8)

This sets the operation mode of the boot block area of the BIOS Flash ROM to allow programming in the *Enabled* position.

| <u>Programming</u> | <u>JP8</u> |
|--------------------|-----------------|
| Disabled | [1-2] (Default) |
| Enabled | [2-3] |

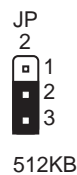
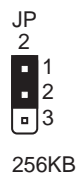
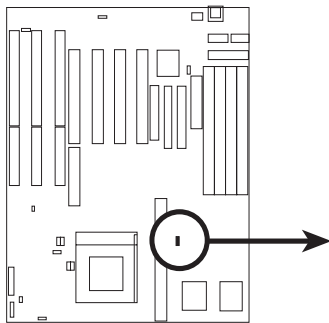


III. INSTALLATION

3. Total Level 2 Cache Size Setting (JP2)

This jumper sets the total amount of L2 cache that is present. If you have two cache chips on-board (see "Map of Motherboard" for locations), then you have either 256KB or 512KB. An "ASUS" or "COAST" cache module can be used to upgrade the 256KB version to 512KB. If there is no on-board cache, you must install a cache module of either 256KB or 512KB. **IMPORTANT: See page 14 "SRAM Cache" for installation procedures.** Regardless of your cache combination, set the following jumpers according to the **total** amount of L2 cache that is present on-board and installed as a module.

| <u>Selections</u> | <u>JP2</u> |
|-------------------|------------|
| 256KB | [1-2] |
| 512KB | [2-3] |

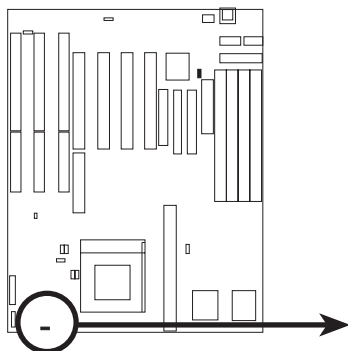


Total L2 Cache Size Setting (256KB / 512KB)

4. Voltage Regulator Output Selection (JP17)

These jumpers set the voltage supplied to the CPU.

| <u>Selections</u> | <u>JP17</u> |
|-------------------|-----------------|
| STD 3.3V-3.465V | [2-3] (Default) |
| VRE 3.4V-3.6V | [1-2] |



Voltage Regulator Output Selection (STD / VRE)

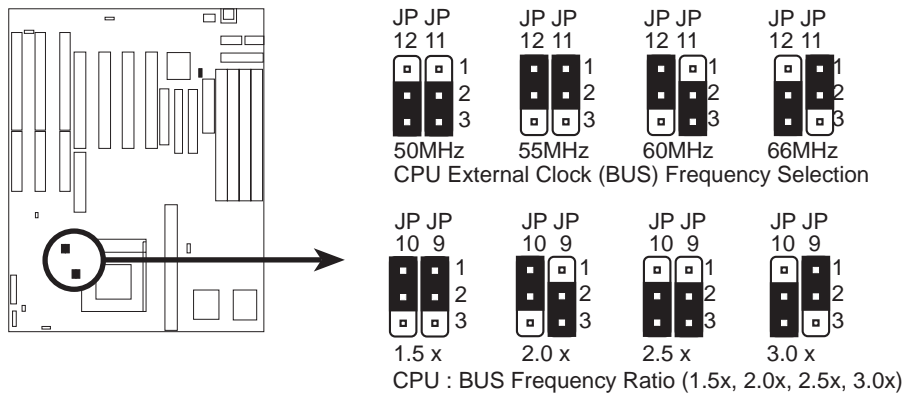
III. INSTALLATION

5. CPU External (BUS) Frequency Selection (JP11, JP12)

These jumpers tells the clock generator what frequency to send to the CPU. These allow the selection of the CPU's *External* frequency (or *BUS Clock*). The BUS Clock times the BUS Ratio equals the CPU's *Internal* frequency (the advertised CPU speed).

6. CPU to BUS Frequency Ratio (JP9, JP10)

These jumpers set the frequency ratio between the *Internal* frequency of the CPU and the *External* frequency (called the *BUS Clock*) within the CPU. These must be set together with the above jumpers *CPU External (BUS) Frequency Selection (JP11, JP12)*.



Set the jumpers by the Internal speed of the Intel CPU as follows:

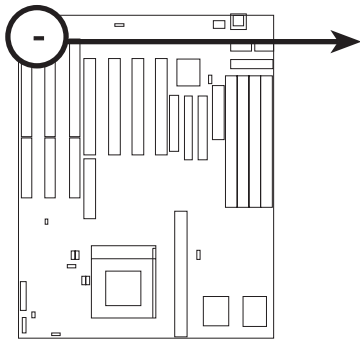
| <u>Internal</u> | <u>Ratio</u> | <u>External</u> | <u>JP12</u> | <u>JP11</u> | <u>JP10</u> | <u>JP9</u> |
|-----------------|--------------|-----------------|-------------|-------------|-------------|------------|
| 166MHz | 2.5x | 66MHz | [2-3] | [1-2] | [2-3] | [2-3] |
| 150MHz | 2.5x | 60MHz | [1-2] | [2-3] | [2-3] | [2-3] |
| 133MHz | 2.0x | 66MHz | [2-3] | [1-2] | [1-2] | [2-3] |
| 120MHz | 2.0x | 60MHz | [1-2] | [2-3] | [1-2] | [2-3] |
| 100MHz | 1.5x | 66MHz | [2-3] | [1-2] | [1-2] | [1-2] |
| 90MHz | 1.5x | 60MHz | [1-2] | [2-3] | [1-2] | [1-2] |
| 75MHz | 1.5x | 50MHz | [2-3] | [2-3] | [1-2] | [1-2] |

III. INSTALLATION

7. PS/2 Mouse on IRQ12 Setting (JP18)

JP7 enables or disables the on-board PS/2 mouse lead connector. When *Enabled*, the port becomes active and uses IRQ12. See Page 19 for the "PS/2 Mouse connector."

| <u>Selections</u> | <u>JP18</u> |
|-------------------|-----------------|
| Disable | [2-3] (Default) |
| Enable | [1-2] |

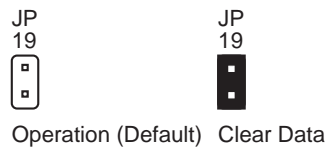
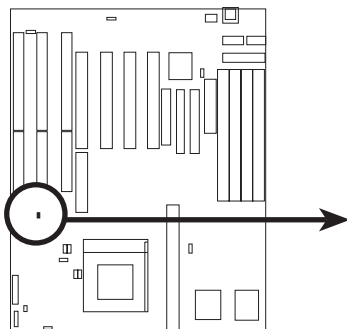


PS/2 Mouse on IRQ 12 (Disable / Enable)

8. CMOS RAM (JP19)

This clears the user-entered information stored in the Dallas DS12887A Chip such as hard disk information and passwords. Simply connect a jumper cap over this jumper for a few seconds then remove. **Make sure that your computer is turned off.** You must enter the BIOS setup (by holding down during power-up) after this is done to re-enter BIOS information (see BIOS SETUP).

| <u>Selections</u> | <u>JP19</u> |
|-------------------|-----------------------|
| Normal | [open] (Default) |
| Clear CMOS | [short] (momentarily) |



CMOS RAM (Operation / Clear CMOS Data)

Note: Dallas DS12B887 chips and Benchmarq BQ3287A chips require that you power on with the jumper shorted as in the following procedures:
(1) Short Jumper (while the computer is off), (2) Power on, (3) Power off,
(4) Open Jumper, (5) Power on, (6) Setup BIOS (hold down)

III. INSTALLATION

2. System Memory (DRAM & SRAM)

This motherboard supports four 72-pin SIMMs of 4MB, 8MB, 16MB, 32MB, or 64MB to form a memory size between 8MB to 256MB. The DRAM can be either 60ns or 70ns Fast Page Mode (Asymmetric or Symmetric) or EDO. To support ECC, you must use *true* (opposed to phantom parity generated by TTL chips) 36-bit parity-type DRAM (e.g. 8 chips + 4 parity chips) in pairs for all modules. Mixing 32-bit non-parity DRAM (e.g. 8 chips) and 36-bit DRAM (e.g. 12 chips) will work minus the ECC feature. **IMPORTANT: Memory setup is required in BIOS Chipset Setup "Auto Configuration" on page 35.**

Install two memory modules each time as shown in the chart below.

| Bank 0 Slots 1 & 2 | Bank 1 Slots 3 & 4 | Total Memory Combination |
|-----------------------|-----------------------|-----------------------------|
| 4MB x 2 | None | 8MB |
| 8MB x 2 | None | 16MB |
| 16MB x 2 | None | 32MB |
| 32MB x 2 | None | 64MB |
| 64MB x 2 | None | 128MB |
| 4MB x 2 | 4MB x 2 | 16MB |
| 4MB x 2 | 8MB x 2 | 24MB |
| 4MB x 2 | 16MB x 2 | 40MB |
| 4MB x 2 | 32MB x 2 | 72MB |
| 4MB x 2 | 64MB x 2 | 136MB |
| 8MB x 2 | 4MB x 2 | 24MB |
| 8MB x 2 | 8MB x 2 | 32MB |
| 8MB x 2 | 16MB x 2 | 48MB |
| 8MB x 2 | 32MB x 2 | 80MB |
| 8MB x 2 | 64MB x 2 | 144MB |
| 16MB x 2 | 4MB x 2 | 40MB |
| 16MB x 2 | 8MB x 2 | 48MB |
| 16MB x 2 | 16MB x 2 | 64MB |
| 16MB x 2 | 32MB x 2 | 96MB |
| 16MB x 2 | 64MB x 2 | 160MB |
| 32MB x 2 | 4MB x 2 | 72MB |
| 32MB x 2 | 8MB x 2 | 80MB |
| 32MB x 2 | 16MB x 2 | 96MB |
| 32MB x 2 | 32MB x 2 | 128MB |
| 32MB x 2 | 64MB x 2 | 192MB |
| 64MB x 2 | 4MB x 2 | 136MB |
| 64MB x 2 | 8MB x 2 | 144MB |
| 64MB x 2 | 16MB x 2 | 160MB |
| 64MB x 2 | 32MB x 2 | 192MB |
| 64MB x 2 | 64MB x 2 | 256MB |

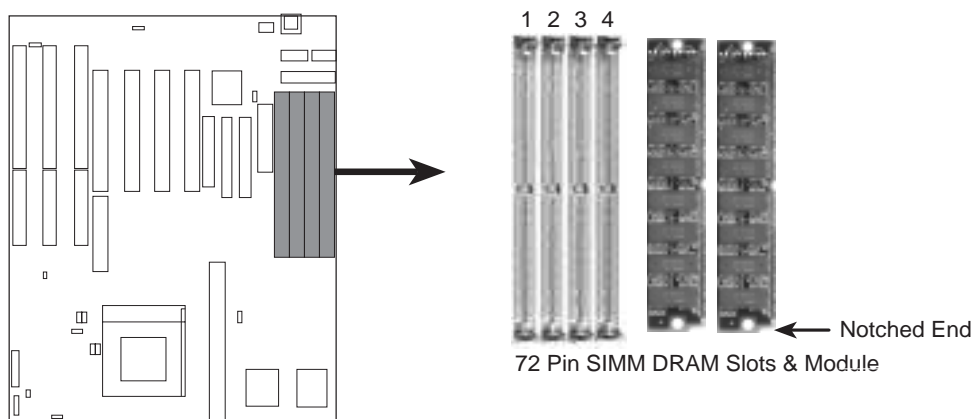
III. INSTALLATION

IMPORTANT: Do not use memory modules with more than 24 chips per module. Modules with more than 24 chips exceed the design specifications of the memory subsystem and will cause unreliable operation.

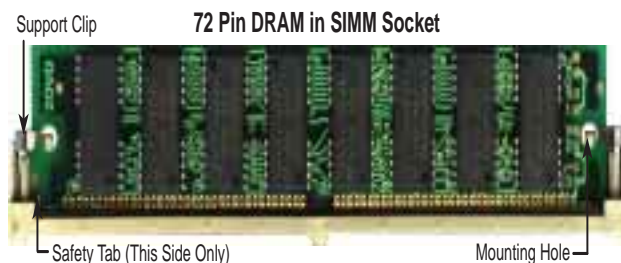
IMPORTANT: Do not use SIMM Modules that use an extra TTL chip to convert the memory module from asymmetric to symmetric.

DRAM Memory Installation Procedures:

1. The SIMM memory modules will only fit in one orientation as shown because of a "Plastic Safety Tab" on one end of the SIMM slots which requires the "Notched End" of the SIMM memory modules.



2. Press the memory module firmly into place starting from a 45 degree angle making sure that all the contacts are aligned with the slot.
3. With your finger tips, rock the memory module into a vertical position so that it clicks into place.



4. The plastic guides should go through the two "Mounting Holes" on the sides and the "Metal Clips" should snap on the other side.
5. To release the memory module, squeeze both "Metal Clips" outwards and rock the module out of the "Metal Clips".

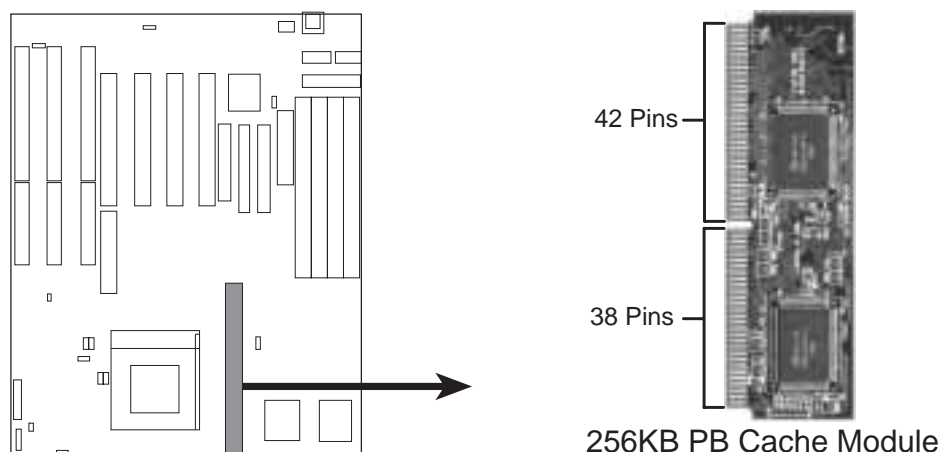
III. INSTALLATION

Level 2 External Static RAM (SRAM) Cache

The motherboard you may purchase may have either 0KB, 256KB, or 512KB on-board. If you have two cache chips on-board (see "Map of Motherboard" for locations), then you have either 256KB or 512KB pipelined bust SRAM cache. An "ASUS" or "COAST" cache module can be used to upgrade the 256KB version to 512KB. The 512KB version cannot be upgraded any further. If there is no on-board cache, you may install a SIMM cache module of either 256KB or 512KB.

IMPORTANT: You must set jumper 2 "Total Level 2 Cache Size Setting" on page 9 when changes are made to your cache size.

III. INSTALLATION (SRAM/Cache)



Insert the module as shown. Because the number of pins are different on either side of the break, the module will only fit in the orientation as shown.

Compatible Cache Modules for this Motherboard

| SIMM Cache Module | 256KB | 0KB |
|--------------------------|--------------|------------|
| ASUS CM1 Rev 1.0 | No | No |
| ASUS CM1 Rev 1.3 | No | No |
| ASUS CM4 Rev 1.5 | No | No |
| ASUS CM1 Rev 1.6 | Yes | No |
| COAST 1.1 | No | No |
| COAST 1.2 | No | No |
| COAST 1.3 | No | No |
| COAST 2.0 | Yes | Yes |
| COAST 2.1 | Yes | Yes |

III. INSTALLATION

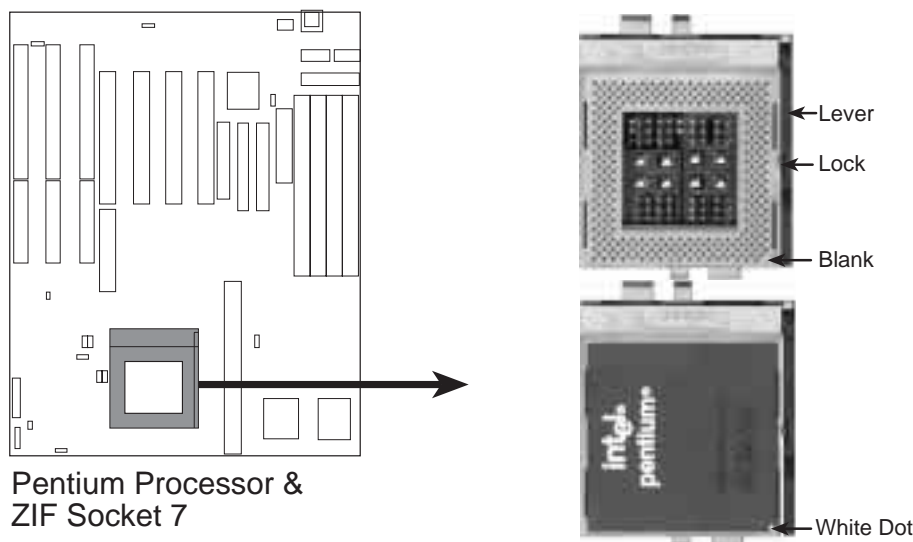
3. Central Processing Unit (CPU)

The motherboard provides a 321-pin ZIF Socket 7 that is backwards compatible with ZIF Socket 5 processors. The CPU that came with the motherboard should have a fan attached to it to prevent overheating. If this is not the case then purchase a fan before you turn on your system. Apply thermal jelly to the CPU top and then install the fan onto the CPU.

WARNING: Without a fan, the CPU can overheat and cause damage to both the CPU and the motherboard. (See page 24 "CPU Cooling Fan Connector).

To install a CPU, first turn off your system and remove its cover. Locate the ZIF socket and open it by first pulling the lever sideways away from the socket then upwards to a 90-degree right angle. Insert the CPU with the correct orientation as shown. Use the notched corner of the CPU with the white dot as your guide. The white dot should point towards the end the of the lever. Notice that there is a blank area where one hole is missing from that corner of the square array of pin holes and a "1" printed on the motherboard next to that corner. Because the CPU has a corner pin for three of the four corners, the CPU will only fit in the one orientation as shown. The picture is for reference only; you should have a CPU fan that will cover the face of the CPU. With the added weight of the CPU fan, no force is required to insert the CPU. Once completely inserted, hold down on the fan and close the socket's lever.

IMPORTANT: You must set jumpers for "CPU to BUS Frequency Ratio" and jumpers for "BUS Frequency Selection" on page 10 depending on the CPU that you install.



III. INSTALLATION

4. Expansion Cards

First read your expansion card documentation on any hardware and software settings that may be required to setup your specific card.

NOTE: PCI Slot 4 has a MediaBus extension 2.0 (see page 18) which allows the installation of a PCI card or a MediaBus card (optional multi-functional card) but not both.

Expansion Card Installation Procedure:

1. Read the documentation for your expansion card.
2. Set any necessary jumpers on your expansion card.
3. Remove your computer's cover.
4. Remove the bracket on the slot you intend to use. Keep the bracket for possible future use.
5. Carefully align the card's connectors and press firmly.
6. Secure the card on the slot with the screw you removed in step 4.
7. Replace the computer's cover.
8. Setup the BIOS if necessary.
9. Install the necessary software drivers for your expansion card.

Assigning IRQs for Expansion Cards

Some expansion cards need to use an IRQ to operate. Generally an IRQ must be exclusively assigned to one use. In a standard design there are 16 IRQs available but most of them are already in use by parts of the system which leaves 6 free for expansion cards.

Both ISA and PCI expansion cards may need to use IRQs. System IRQs are available to cards installed in the ISA expansion bus first, and any remaining IRQs are then used by PCI cards. Currently, there are two types of ISA cards. The original ISA expansion card design, now referred to as "Legacy" ISA cards, requires that you configure the card's jumpers manually and then install it in any available slot on the ISA bus. You may use Microsoft's Diagnostic (MSD.EXE) utility included in the Windows directory to see a map of your used and free IRQs. For Windows 95 users, the "Control Panel" icon in "My Computer," contains a "System" icon which gives you a "Device Manager" tab. Double clicking on a specific device give you "Resources" tab which shows the Interrupt number and address. Make sure that no two devices use the same IRQs or your computer will experience problems when those two devices are in use at the same time.

III. INSTALLATION

To simplify this process this motherboard has complied with the Plug and Play (PNP) specification which was developed to allow automatic system configuration whenever a PNP-compliant card is added to the system. For PNP cards, IRQs are assigned automatically from those available.

If the system has both Legacy and PNP ISA cards installed, IRQs are assigned to PNP cards from those not used by Legacy cards. The PCI and PNP configuration of the BIOS setup utility can be used to indicate which IRQs are being used by Legacy cards. For older Legacy cards that does not work with the BIOS, you can contact your vendor for an ISA Configuration Utility.

An IRQ number is automatically assigned to PCI expansion cards after those used by Legacy and PNP ISA cards. In the PCI bus design, the BIOS automatically assigns an IRQ to a PCI slot that has a card in it that requires an IRQ. To install a PCI card, you need to set something called the INT (interrupt) assignment. Since all the PCI slots on this motherboard use an INTA #, be sure that the jumpers on your PCI cards are set to INT A.

Assigning DMA Channels for ISA Cards

Some ISA cards, both Legacy and PNP may also need to use a DMA (Direct Memory Access) channel. DMA assignments for this motherboard are handled the same way as the IRQ assignment process described above. You can select a DMA channel in the PCI and PNP configuration section of the BIOS Setup utility. In the BIOS setup, you should choose "Yes" for those IRQ's and DMA's you wish to reserve for Legacy cards.

III. INSTALLATION

ASUS MediaBus Card

MediaBus allows a cost-efficient solution to a complete multimedia system. The advantages of using one add-on card is to reduce the slot requirements and compatibility problems in order to maximize the Plug and Play advantages. The add-on card inserts into the shared PCI 4/MediaBus 2.0 Slot.

NOTE: This motherboard uses MediaBus Rev. 2.0. The previous MediaBus cards designed for MediaBus Rev. 1.2 will not fit into the MediaBus Rev 2.0 that is on this motherboard.

The difference between Rev. 1.2 and Rev. 2.0 is that the later revision has 72 pins instead of 68 so it does not have to use any PCI slot signals reserved for PCI cards, therefore the motherboard's PCI Slot 4 can meet standard specifications. The gap between the MediaBus extension and the PCI Slot 4 has been increased from 0.32" to 0.40" in order to prevent Rev. 1.2 MediaBus cards from being installed into the new motherboards and vice versa.

The following are MediaBus cards designed for **MediaBus 2.0** that *can* be used on this motherboard:

- PCI-AS2940UW Ultra Fast/Wide SCSI & Audio MediaBus Card
- PCI-AV264CT-N PCI Audio & Video MediaBus Card
- PCI-AV264VT PCI Audio & Video MediaBus Card

The following are MediaBus cards designed for **MediaBus 1.2** and therefore *cannot* be used on this motherboard:

- PCI-AS7870 Fast/Wide SCSI & Audio MediaBus Card
- PCI-AV264CT PCI Audio & Video MediaBus Card
- PCI-AV868 PCI Audio & Video MediaBus Card

* All the above Audio features Creative Technology, Ltd.

* All the above Video features ATI, Inc.

* All the above SCSI features Adaptec, Inc.

III. INSTALLATION

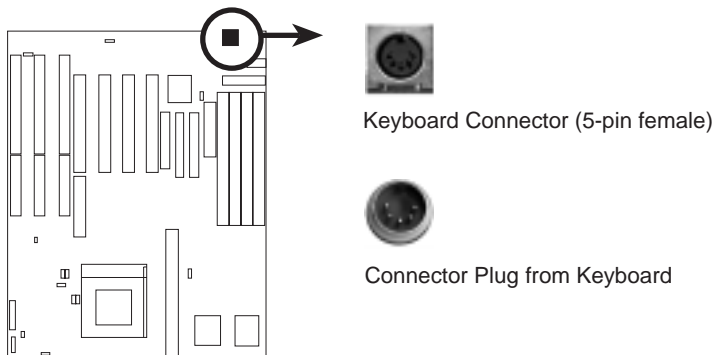
5. External Connectors

NOTE: IDE ribbon cable must be less than 18in. (46cm), with the second drive connector no more than 6in. (15cm) from the first connector.

IMPORTANT: Ribbon cables should always be connected with the red stripe on the Pin 1 side of the connector. The four corners of the connectors are labeled on the motherboard. Pin 1 is the side closest to the power connector on hard drives and floppy drives.

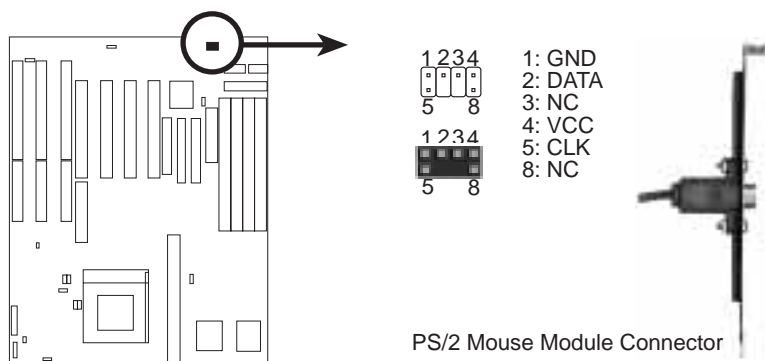
1. Keyboard Connector (5-pin female)

This connection is for a standard IBM-compatible keyboard. May also be known as a 101 enhanced keyboard.



2. PS/2 Mouse Connector (6-pin block)

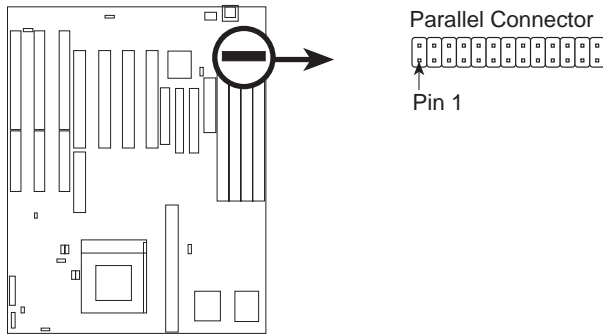
If you are using a PS/2 mouse, you must purchase an optional PS/2 mouse set which connects to the 6 pin block and mounts to an open slot on your computer's case. You must also set "PS/2 Mouse Selection" on page 11 to enable the PS/2 Mouse.



III. INSTALLATION

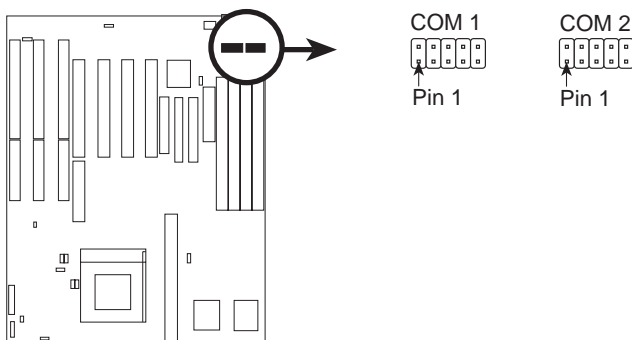
3. Parallel Printer Connector (26 Pin Block)

Connection for the included parallel port ribbon cable with mounting bracket. Connect the ribbon cable to this connection and mount the bracket to the case on an open slot. It will then be available for a parallel printer cable. **Note:** Serial printers must be connected to the serial port. You can enable the parallel port and choose the IRQ through BIOS Setup on page 37 "Onboard Parallel Port."



4. Serial port COM1 and COM2 connectors (Two 10-pin blocks)

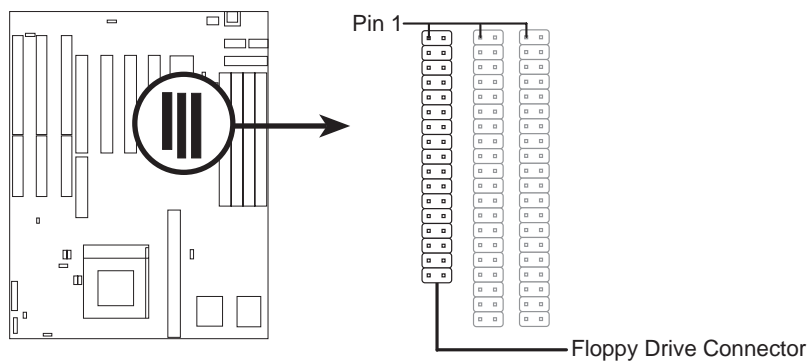
These connectors support the provided serial port ribbon cables with mounting bracket. Connect the ribbon cables to these connectors and mount the bracket to the case on an open slot. The two serial ports on the mounting bracket will then be used for pointing devices or other serial devices. See page 36 for BIOS configuration of "Onboard Serial Port"



III. INSTALLATION

5. Floppy drive connector (34-pin block)

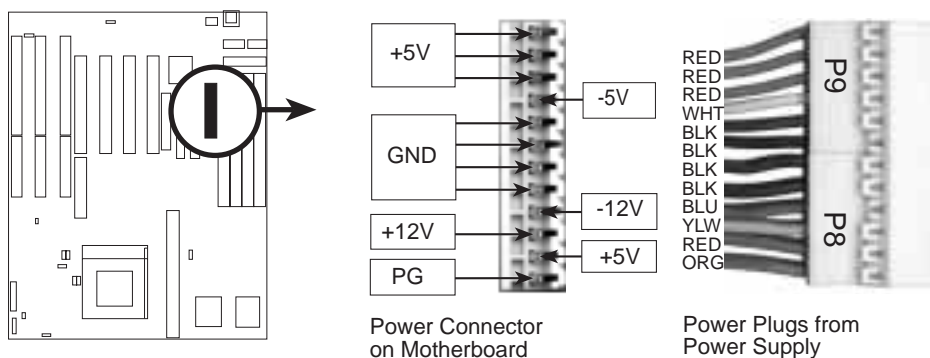
This connector supports the provided floppy drive ribbon cable. After connecting the single end to the board, connect the two plugs on the other end to the floppy drives.



6. Power connector (12-pin block)

This connector connects to a standard 5 Volt power supply. To connect the leads from the power supply, ensure first that the power supply is not plugged. Most power supplies provide two plugs (P8 and P9), each containing six wires, two of which are black. Orient the connectors so that the black wires are located in the middle.

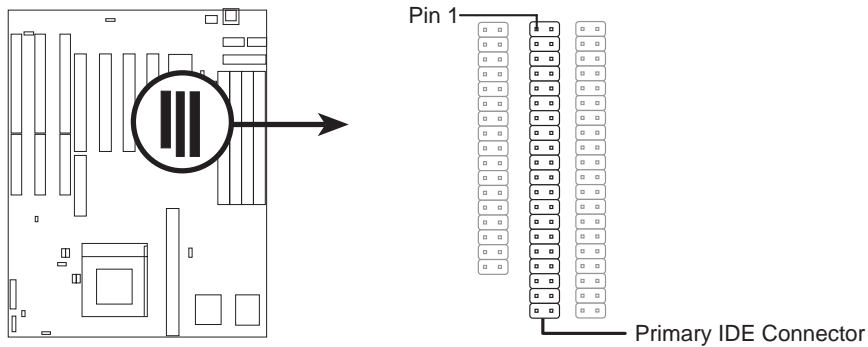
Using a slight angle, align the plastic guide pins on the lead to their receptacles on the connector. Once aligned, press the lead onto the connector until the lead locks into place.



III. INSTALLATION

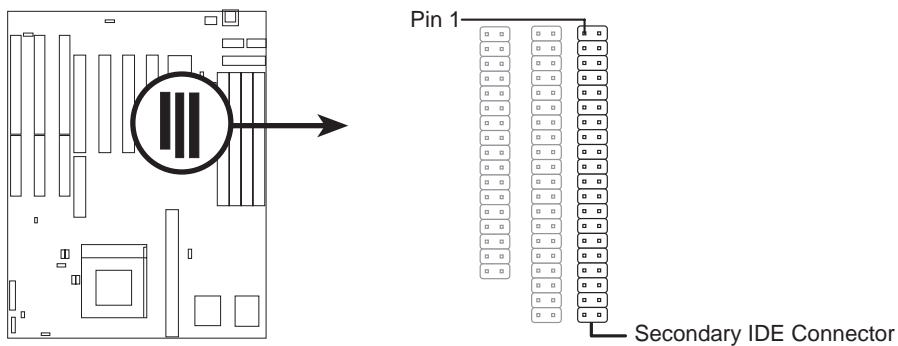
7. Primary IDE connector (40-pin Block)

This connector supports the provided IDE hard disk ribbon cable. After connecting the single end to the board, connect the two plugs at the other end to your hard disk(s). If you install two hard disks, you must configure the second drive to Slave mode by setting its jumpers accordingly. Please refer to the documentation of your hard disk for the jumper settings. See the figure below.



8. Secondary IDE connector (40-pin block)

This connector connects to the next set of Master and Slave hard disks. Follow the same procedure described for the primary IDE connector. You may also configure two hard disks to be both Masters using one ribbon cable on the primary IDE connector and another ribbon cable on the secondary IDE connector.



III. INSTALLATION

9. Turbo LED switch (CON1)

The motherboard's turbo function is always on. The turbo LED connection is labeled here but the LED will remain constantly lit while the system power is on. You may wish to connect the Power LED from the system case to this lead. See the figure below.

10. SMI suspend switch lead (CON1)

This allows the user to manually place the system into a suspend mode or "Green" mode where system activity will be instantly decreased to save electricity and expand the life of certain components when the system is not in use. This 2-pin connector (see the figure below) connects to the case-mounted suspend switch. If you do not have a switch for the connector, you may use the "Turbo Switch" since it does not have a function. SMI is activated when it detects a *short to open* moment and therefore leaving it shorted will not cause any problems. May require one or two pushes depending on the position of the switch. Wake-up can be controlled by settings in the BIOS but the keyboard will always allow wake-up (the SMI lead cannot wake-up the system). If you want to use this connector, "Suspend Switch" in the POWER MANAGEMENT SETUP of the BIOS software should be on the default setting of *Enable* (see page 39).

11. Reset switch lead (CON1)

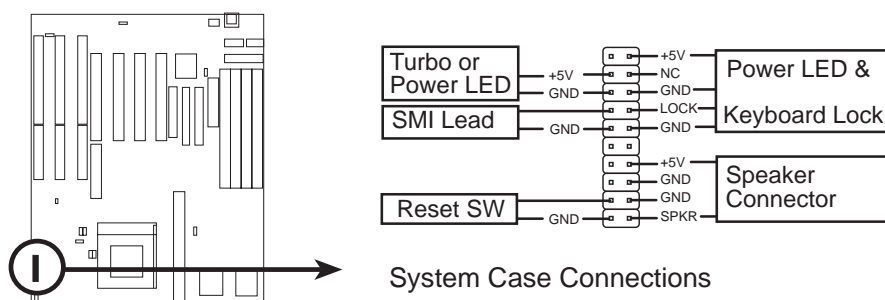
This 2-pin connector connects to the case-mounted reset switch for rebooting your computer without having to turn off your power switch. This is a preferred method of rebooting in order to prolong the life of the system's power supply. See the figure below.

12. Keyboard lock switch lead (CON1)

This 5-pin connector connects to the case-mounted key switch for locking the keyboard for security purposes. See the figure below.

13. Speaker connector (CON1)

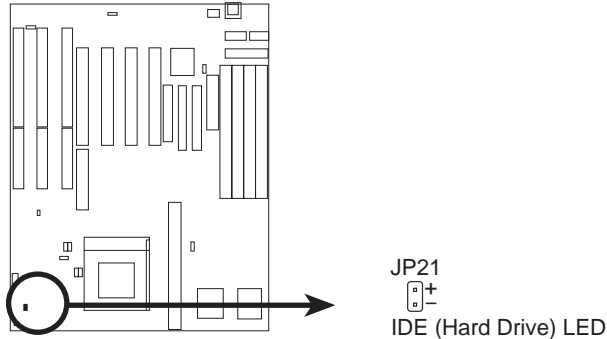
This 4-pin connector connects to the case-mounted speaker.



III. INSTALLATION

14. IDE activity LED (JP20)

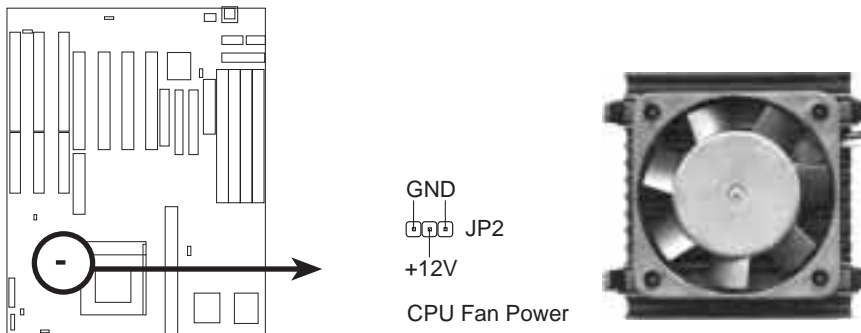
This connector connects to the hard disk activity indicator light on the case.



15. CPU cooling fan connector (JP13)

This connector supports a CPU cooling fan of 500mAMP (6WATT) or less. Depending on the fan manufacturer, the wiring may be different. The red wire should be positive, while the black should be ground. Connect the fan to the board taking into consideration the polarity of the connector.

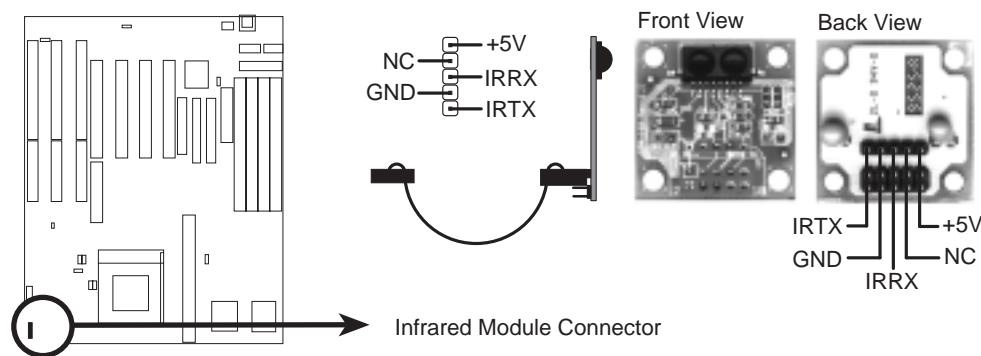
WARNING: Damage may occur to the motherboard and/or the CPU fan if these pins are incorrectly used.



III. INSTALLATION

16. IrDA-compliant infrared module connector (IR)

This connector supports the optional wireless transmitting and receiving infrared module. This module mounts to a small opening on system cases that support this feature. You must also configure the setting through BIOS setup on page 37 to select whether UART2 is directed for use with COM2 or IrDA. Use the five pins (as defined by Intel) as shown on the Back View and connect a ribbon cable from the module to the motherboard according to the pin definitions. The ribbon cable that may be supplied may either have five or ten pins (for other standards). If using a ten-pin ribbon cable, use only the top five row of the ribbon cable plug.



Final Power Connection Procedures

1. After all jumpers and connections are made, close the system case cover.
2. Make sure that all switches are in the off position as marked by \bigcirc .
3. Connect the power supply cord into the power supply located on the back of your system case as instructed by your system user's manual.
4. Connect the power cord into an power outlet that is equipped by a surge protector.
5. You may then turn on your devices in the following order:
 - a. Your monitor
 - b. External SCSI devices (starting with the last device on the chain)
 - c. Your system power
6. The power LED on the front panel of the system case will light and the monitor LED as well. The system will then run power-on tests. While the tests are running, additional messages will appear on the screen. If you do not see anything within 30 seconds from the time you turn on the power, the system may have failed a power-on test. Recheck your jumper settings and connections or call your authorized dealer for assistance.
7. During power-on, hold down the <Delete> key to enter BIOS setup. Follow the next section "BIOS SOFTWARE" for instructions.

IV. BIOS SOFTWARE

6. BIOS Setup

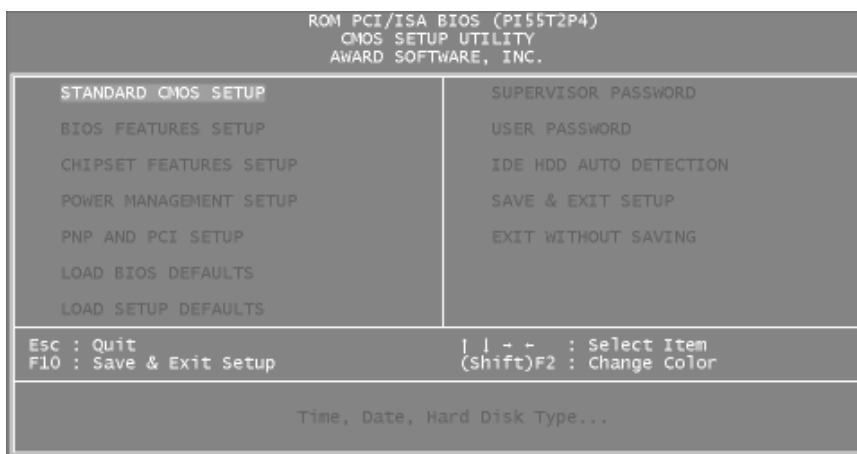
The motherboard supports two programmable Flash ROM chips: 5 Volt and 12 Volt. Either of these memory chips can be updated when BIOS upgrades are released. Use the Flash Memory Writer utility to download the new BIOS file into the ROM chip as described in detail on page 47.

All computer motherboards provide a Setup utility program for specifying the system configuration and settings. If your motherboard came in a computer system, the proper configuration entries may have already been made. If so, invoke the Setup utility, as described later, and take note of the configuration settings for future reference; in particular, the hard disk specifications.

If you are installing the motherboard, reconfiguring your system or you receive a Run Setup message, you will need to enter new setup information. This section describes how to configure your system using this utility.

The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the system provides you with the opportunity to run this program. This appears during the Power-On Self Test (POST). Press the <Delete> key to call up the Setup utility. If you are a little bit late pressing the mentioned key(s), POST will continue with its test routines, thus preventing you from calling up Setup. If you still need to call Setup, reset the system by simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys, or by pushing the Reset button on the system case. You can also restart by turning the system off and then back on again.

When you invoke Setup, the main program screen will appear with the following options:



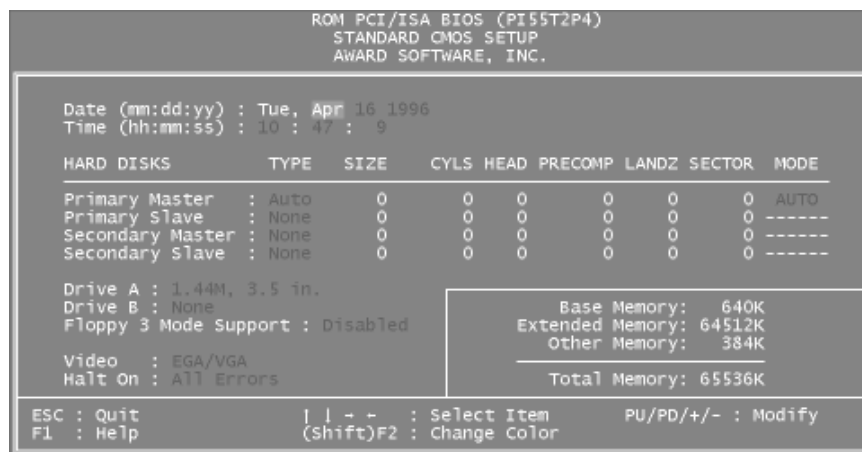
IV. BIOS SOFTWARE

NOTE: The “Load BIOS Defaults” option loads the minimized settings for troubleshooting. “Load Setup Defaults”, on the other hand, is for loading optimized defaults for regular use. Choosing defaults at this level, will modify all applicable settings.

A section at the bottom of the above screen displays the control keys for this screen. Take note of these keys and their respective uses. Another section just below the control keys section displays information on the currently highlighted item in the list.

Standard CMOS Setup

This “Standard CMOS Setup” option allows you to record some basic system hardware configuration and set the system clock and error handling. If the motherboard is already installed in a working system, you will not need to select this option anymore. However, if the configuration stored in the CMOS memory on the board gets lost or damaged, or if you change your system hardware configuration, you will need to respecify the configuration values. The configuration values usually get lost or corrupted when the power of the on-board CMOS battery weakens.



The above screen provides you with a list of options. At the bottom of this screen are the control keys for use on this screen. Take note of these keys and their respective uses.

User-configurable fields appear in a different color. If you need information on the selected field, press the <F1> key. The help menu will then appear to provide you with the information you need. The memory display at the lower right-hand side of the screen is read-only and automatically adjusts accordingly.

IV. BIOS SOFTWARE

Details of Standard CMOS Setup:

Date

To set the date, highlight the “Date” field and then press the page up/page down or +/- keys to set the current date. Follow the month, day and year format. Valid values for month, day and year are:

| | |
|---------------|-------------------|
| Month: | 1 to 12 |
| Day: | 1 to 31 |
| Year: | up to 2099 |

Time

To set the time, highlight the “Time” field and then press the page up/page down or +/- keys to set the current time. Follow the hour, minute and second format. Valid values for hour, minute and second are:

| | |
|----------------|-----------------|
| Hour: | 00 to 23 |
| Minute: | 00 to 59 |
| Second: | 00 to 59 |

You can bypass the date and time prompts by creating an AUTOEXEC.BAT file. For information on how to create this file, please refer to the MS-DOS manual.

Hard Disks

This field records the specifications for all non-SCSI hard disk drives installed in your system. The on-board PCI IDE connectors provide Primary and Secondary channels for connecting up to four IDE hard disks or other IDE devices. Each channel can support up to two hard disks; the first of which is the “master” and the second is the “slave”.

Specifications for SCSI hard disks need not to be entered here since they operate using device drivers and are not supported by any the BIOS. If you install the optional PCI-SC200 SCSI controller card into the motherboard (see page 52 for instructions). If you install other vendor’s SCSI controller card, please refer to their respective documentations on how to install the required SCSI drivers.

IV. BIOS SOFTWARE

To enter specifications for a hard disk drive, you must select first a “type”. You can select “User” and specify the specifications yourself manually, or you can select from the provided predefined drive specifications. To select, simply press the <Page Up> or <Page Down> key to change the option listed after the drive letter.

For an IDE hard disk drives, you can:

- Use the *Auto* setting for detection during boot-up (see page 29)
- Use the IDE HDD AUTO DETECTION in the main menu to automatically enter the drive specifications, or you can:
- Enter the specifications yourself manually by using the “User” option

The entries for specifying the hard disk type include **CYLS** (number of cylinders), **HEAD** (number of read/write heads), **PRECOMP** (write precompensation), **LANDZ** (landing zone), **SECTOR** (number of sectors) and **MODE**. The **SIZE** field automatically adjusts according to the configuration you specify. The documentation that comes with your hard disk should provide you with the information regarding the drive specifications.

The **MODE** entry is for IDE hard disks only, and can be ignored for MFM and ESDI drives. This entry provides three options: *Normal*, *Large*, *LBA*, or *Auto* (see page 29). Set **MODE** to the *Normal* for IDE hard disk drives smaller than 528MB; set it to *LBA* for drives over 528MB that support Logical Block Addressing (LBA) to allow larger IDE hard disks; set it to *Large* for drives over 528MB that do not support LBA. *Large* type of drive can only be used with MS-DOS and is very uncommon. Most IDE drives over 528MB support the *LBA* mode.

Auto detection of hard disks on boot-up (New Feature)

For each field: Primary Master, Primary Slave, Secondary Master, and Secondary Slave, you can select *Auto* under the TYPE and MODE fields. This will enable auto detection of your IDE drives during boot-up. This will allow you to change your hard drives (with the power off) and then power on without having to reconfigure your hard drive type. If you use older hard drives which do not support this feature, then you must configure the hard drive in the standard method as described on page 30.

IV. BIOS SOFTWARE

Drive A, Drive B

These fields record the types of floppy disk drives installed in your system. The available 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

To enter the configuration value for a particular drive, highlight its corresponding field and then select the drive type using the left- or right-arrow key.

Floppy 3 Mode Support

This is the Japanese standard floppy drive. The standard stores 1.2MB in a 3.5" diskette. This is normally disabled but you may choose from either:

Drive A
Drive B
Both
Disabled (Default)

Video

Set this field to the type of video display card installed in your system. The options are:

EGA/VGA (Default)
Mono (for Hercules or MDA)
CGA 40
CGA 80

If you are using a VGA or any higher resolution card, choose the “EGA/VGA” option.

Halt On

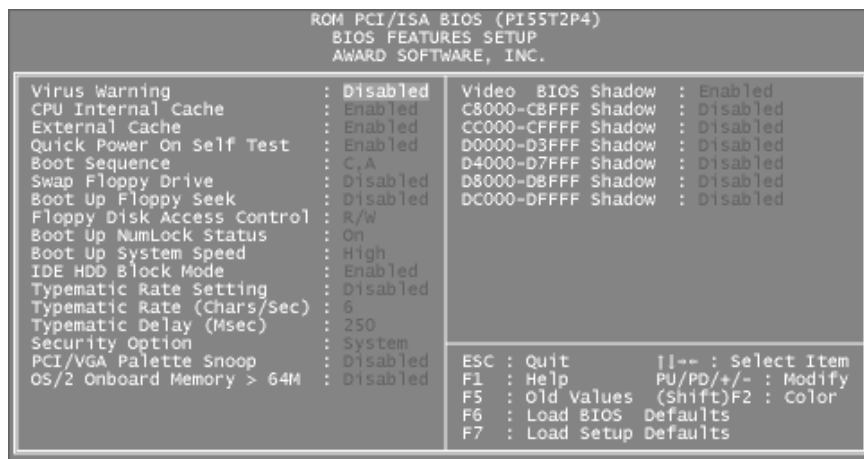
This field determines which types of errors will cause the system to halt.

All Errors (Default)
No Errors
All, But Keyboard
All, But Diskette
All, But Disk/Key

IV. BIOS SOFTWARE

BIOS Features Setup

This “BIOS Features Setup” option consists of configuration entries that allow you to improve your system performance, or let you set up some system features according to your preference. Some entries here are required by the motherboard’s design to remain in their default settings.



A section at the lower right of the screen displays the control keys you can use. Take note of these keys and their respective uses. If you need information on a particular entry, highlight it and then press the <F1> key. A pop-up help menu will appear to provide you with the information you need. To load the last set values, press the <F5> key. <F6> and <F7> load the BIOS default values and Setup default values, respectively.

Details of BIOS Features Setup:

Virus Warning

This field protects the boot sector and partition table of your hard disk against accidental modifications. Any attempt to write to them will cause the system to halt and display a warning message. If this occurs, you can either allow the operation to continue or use a bootable virus-free floppy disk to reboot and investigate your system. The default setting is “Disabled”. This setting is recommended because conflicts with new operating systems. Installation of new operating systems require that you disable this to prevent write errors.

IV. BIOS SOFTWARE

CPU Internal Cache / External Cache

These fields allow you to *Enable* or *Disable* the CPU's "Level 1" built-in cache and the "Level 2" secondary cache. By default, these fields are enabled. With Setup Defaults, the L2 cache is *Disabled*.

Quick Power On Self Test

This field speeds up the Power-On Self Test (POST) routine by skipping retesting a second, third, and fourth time. Setup default setting for this field is *Enabled*. A complete test of the system is done on each test.

Boot Sequence

This field determines where the system looks first for an operating system. Options are *C,CDROM,A*; *CDROM,C,A*; *A,C*; *C,A*. The setup default setting is to check first the hard disk and then the floppy drive; that is, *C, A*.

Swap Floppy Drive

When enabled, the BIOS swaps floppy drive assignments so that Drive A becomes Drive B, and Drive B becomes Drive A under DOS. By setup default, this field is set to *Disabled*.

Boot Up Floppy Seek

When enabled, the BIOS will seek the floppy "A" drive one time. By setup default, this field is set to *Disabled*.

Floppy Disk Access Control

This allows protection of files from the computer system to be copied to floppy drives by allowing the setting of *Read Only* to only allow reads from the floppy but not writes. The setup default *R/W* allows both reads and writes.

Boot Up NumLock Status

This field enables users to activate the Num Lock function upon system boot. The setup default setting for this field is *On*.

Boot Up System Speed

This has no function and should be left at the setup default of *High*.

IDE HDD Block Mode

This field enhances hard disk performance by making multi-sector transfers instead of one sector per transfer. Most IDE drives, except older versions, can utilize this feature. By setup default, this field is set to *Enabled*.

Typematic Rate Setting

When enabled, you can set the two typematic controls listed next. Setup default setting is *Disabled*.

IV. BIOS SOFTWARE

Typematic Rate (Char/Sec)

This field controls the speed at which the system registers repeated key-strokes. Options range from 6 to 30 characters per second. Setup default setting is **6**.

Typematic Delay (Msec)

This field sets the time interval for displaying the first and second characters. Four delay rate options are available: 250ms, 500ms, 750ms and 1000ms. Setup default value is **250ms**.

Security Option

This field determines when the system prompts for the password. The default setting is **System**, where the system prompts for the User Password every time you boot up. The other option is **Setup**, where the system always boots up, and prompts for the Supervisor Password only when the Setup utility is called up. You can specify a password by using the *Supervisor Password* or *User Password* option from the main screen as explained later in this section.

PCI/VGA Palette Snoop

Some display cards that are non-standard VGA such as graphics accelerators or MPEG Video Cards may not show colors properly. The setting **Enabled** should correct this problem. Otherwise leave this on the setup default setting of **Disabled**.

OS/2 Onboard Memory > 64M

When using OS/2 operating systems with installed DRAM of greater than 64MB, you need to **Enable** this option otherwise leave this on the setup default of **Disabled**.

Video BIOS Shadow

This field allows you to change the video BIOS location from ROM to RAM. Relocating to RAM enhances system performance, as information access is faster than the ROM. Setup default setting is **Enabled**.

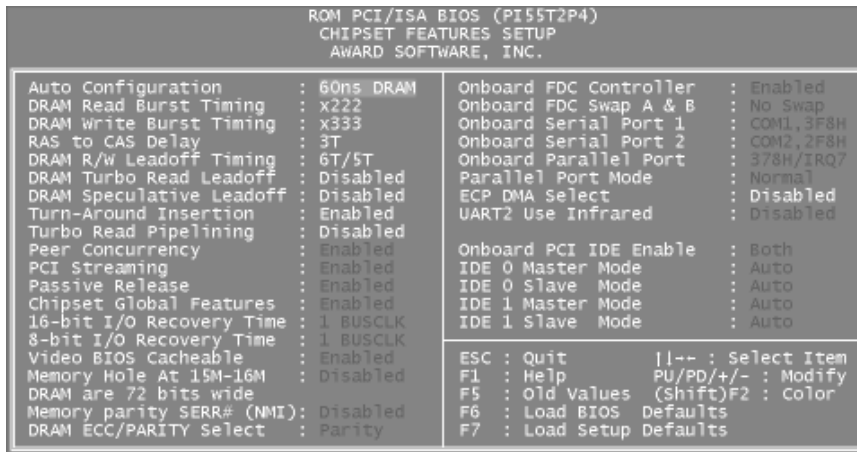
C8000-CBFFF to DC000-DFFFF

These fields are used for shadowing other expansion card ROMs. If you install other expansion cards with ROMs on them, you will need to know which addresses the ROMs use to shadow them specifically. Shadowing a ROM reduces the memory available between 640KB and 1024KB by the amount used for this purpose.

IV. BIOS SOFTWARE

Chipset Features Setup

This “Chipset Features Setup” option controls the configuration of the board’s chipset. Control keys for this screen are the same as for the previous screen.



Auto Configuration

The default setting of **60ns DRAM** sets the optimal timings for items 2 through 10 for 60ns DRAM modules. If you are using 70ns DRAM modules, you must change this item to **70ns DRAM**. See pages 12-13 for DRAM installation information.

Peer Concurrency (leave on default setting)

16-bit I/O Recovery Time

Timing for 16-bit ISA cards (leave on default setting)

8-bit I/O Recovery Time

Timing for 8-bit ISA cards (leave on default setting)

Video BIOS Cacheable

Allows the Video BIOS to be cached to allow faster execution. (leave on default setting)

Memory Hole at 15M - 16M

Enabling this features reserves 15MB to 16MB memory address space to ISA expansion cards that specifically require this setting. This makes the memory from 15MB and up unavailable to the system. Expansion cards can only access memory up to 16MB. The default is Disabled.

IV. BIOS SOFTWARE

DRAM and ECC

If all your DRAM modules have parity chips (e.g. 8 chips + 4 parity chips), they are considered 36bits. This motherboard sums the memory per bank and therefore two modules will give 72bits and the following will be displayed:

DRAM are 72 bits wide

Memory parity SERR# (NMI):

DRAM ECC/PARITY Select:

If your DRAM modules do not have parity chips (e.g. 8 chips), they are considered 32bits and the following will be displayed instead:

DRAM are 64 (not 72) bits wide

Memory parity SERR# (NMI):

The default of *Disabled* for **Memory parity SERR# (NMI)** will not show memory errors on your monitor. When using parity DRAM modules, you can select from the default of *Parity* or *ECC* (Error Checking and Correcting) to correct 1 bit memory errors that may occur in the memory. (See pages 12-13 for more information on DRAM memory modules.)

Onboard FDC Controller

When enabled, this field allows you to connect your floppy disk drives to the on-board floppy drive connector instead of a separate controller card. If you want to use a different controller card to connect the floppy drives, set this field to “Disabled”. Default setting is “Enabled”.

Onboard FDC Swap A: B:

This field reverses the drive letter assignments of your floppy disk drives. Two options are available: “No Swap” and “Swap AB”. “No Swap” is the default setting. If you want to switch drive letter assignments, set this field to “Swap AB”, and the swap will be controlled in hardware. This works separately from the BIOS Features floppy disk swap feature. It is functionally the same as physically interchanging the connectors of the floppy disk drives.

Onboard Serial Port 1 / Onboard Serial Port 2

These fields control the assignments for the motherboard’s two on-board serial connectors. The following lists the available options:

COM1, 3F8H (Onboard Serial Port 1 default)

COM2, 2F8H (Onboard Serial Port 2 default)

COM3, 3E8H

COM4, 2E8H

Disabled (Disables the on-board serial ports)

IV. BIOS SOFTWARE

Onboard Parallel Port

This field sets the address of the on-board parallel port connector. You can select either: *3BCH / IRQ 7*, *378H / IRQ 7* (default), *278H / IRQ 5*, *Disabled*. If you install an I/O card with a parallel port, ensure that there is no conflict in the address assignments. The PC can support up to three parallel ports as long as there are no conflicts for each port.

Parallel Port Mode

This field allows you to set the operation mode of the parallel port. The default setting *Normal*, allows normal-speed operation but in one direction only; *EPP* allows bidirectional parallel port operation at maximum speed; *ECP* allows the parallel port to operate in bidirectional mode and at a speed faster than the maximum data transfer rate; *ECP+EPP* allows normal speed operation in a two-way mode.

ECP DMA Select

This selection is available only if you select *ECP* or *ECP+EPP* in the **Parallel Port Mode**. Select either DMA Channel *1*, *3*, or *Disable*. The setup default is DMA Channel *3*.

UART2 Use Infrared

When enabled, this field activates the on-board infrared feature and sets the second serial UART to support the infrared module connector on the motherboard. If your system already has a second serial port connected to the on-board COM2 connector, it will no longer work if you enable the infrared feature. By default, this field is set to *Disabled*, which leaves the second serial port UART to support the COM2 serial port connector. See page 25 for the Infrared Connector. **IMPORTANT: For SMC37C665IR chipset, you must also physically set jumpers as well as change the the chipset setting.**

Onboard PCI IDE Enable

You can select to enable the *primary* IDE channel, *secondary* IDE channel, *both* (default), or *disable* both channels (for systems with only SCSI hard drives).

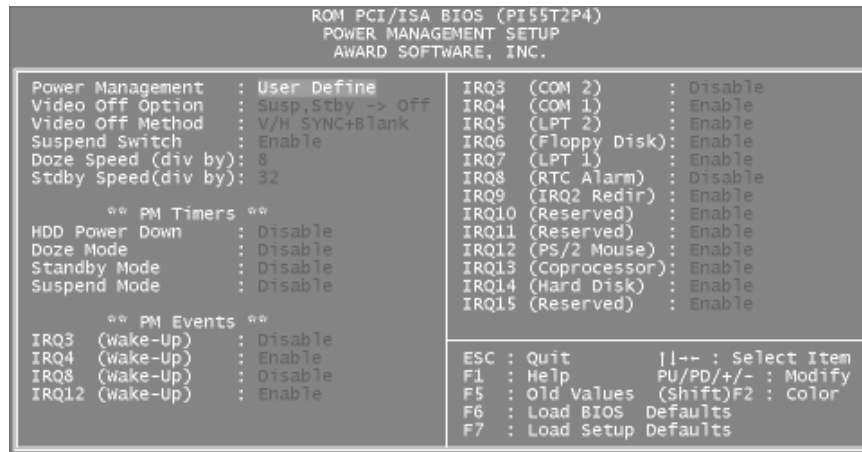
IDE 0 Master/Slave Mode, IDE 1 Master/Slave Mode

Each channel (0 and 1) has both a master and a slave making four IDE devices possible. Because each IDE device may have a different Mode timing (*0*, *1*, *2*, *3*, *4*), it is necessary for these to be independent. The default setting of *Auto* will allow auto-detection to ensure the optimal performance.

IV. BIOS SOFTWARE

Power Management Setup

This “Power Management Setup” option allows you to reduce power consumption. This feature turns off the video display and shuts down the hard disk after a period of inactivity.



Details of Power Management Setup:

Power Management

This field acts as the master control for the power management modes. There are four options: “Max Saving”, “Min Saving”, “Disabled” and “User Defined”. “Max Saving” puts the system into power saving mode after a brief period of system inactivity; “Min Saving” is almost the same as “Max Saving” except that this time the system inactivity period is longer; “Disabled” disables the power saving features; “User Defined” allows you to set power saving options according to your preference.

IMPORTANT: Advanced Power Management (APM) should be installed to keep the system time updated when the computer enters suspend mode activated by the BIOS Power Management. For DOS environments, you need to add `DEVICE=C:\DOS\POWER.EXE` in you `CONFIG.SYS`. For Windows 3.1x and Windows 95, you need to install Windows including the APM feature. A battery and power cord icon labeled "Power" will appear in the "Control Panel." Choose "Advanced" in the Power Management Field.

Video Off Option

This field determines when to activate the video off feature. The settings are "Susp, Stby-> Off", "suspend -> off", "always on", and "all modes -> off." The default setting is “Susp, Stby-> Off”.

IV. BIOS SOFTWARE

Video Off Method

This field defines the video off features. Three options are available: “V/H SYNC + Blank”, “DPMS” and “Blank Only”. The first option, which is the default setting, blanks the screen and turns off vertical and horizontal scanning; “DPMS” (acronym for Display Power Management System) allows the BIOS to control the video display card if it supports the DPMS feature; “Blank Only” only blanks the screen. Use the latter for monitors that do not support the “Green” feature.

Take note that a screen saver software does not work with this feature. While the monitor is shut off, this software cannot display.

Suspend Switch

This field enables or disables the SMI connector on the motherboard. This connector connects to the lead from the Suspend switch mounted on the system case. Default setting for this field is “Enabled”.

Doze Speed, Stdby Speed

These two fields set the CPU speed during each mode. The number indicates what the normal CPU speed is divided by.

PM Timers

This section controls the time-out settings for the Power Management scheme. The fields included in this section are “HDD Power Down”, which places the hard disk into its lowest power consumption mode, and the Doze, Standby and Suspend system inactivation modes.

The system automatically “wakes up” from any power saving mode when there is system activity such as when a key is pressed from the keyboard, or when there is activity detected from the enabled IRQ channels.

“HDD Power Down” shuts down any IDE hard disk drives in the system after a period of inactivity. This time period is user-configurable to “1-15 Mins or “Disable.” This feature does not affect SCSI hard drives.

The “Doze Mode”, “Standby Mode” and “Suspend Mode” fields set the period of time after which each of these modes activate. At “Max Saving”, these modes activate sequentially (in the given order) after one minute; at “Min Saving” after one hour.

IV. BIOS SOFTWARE

PM Events

This section sets the wake-up call of the system. If activity is detected from any enabled IRQ channels in the left-hand group, the system wakes up from suspended mode. You can enable power management for IRQs 3 ~ 15 individually in the list at the right of the screen. The power management feature will work on the enabled IRQ channels.

Take note that a Microsoft serial mouse or compatible will use either COM1 (IRQ4) or COM2 (IRQ3), and a PS/2 mouse will use IRQ12. If you know which IRQ your mouse is using, you can enable the Wake-up Event for that IRQ here and the system will wake up when you move the mouse or click its button.

IRQ3 to IRQ15

You can set IRQs 3 ~ 15 individually. Activity detected from any enabled IRQ channel will wake up the system.

PNP and PCI Setup

This “PNP and PCI Setup” option configures the PCI bus slots. All PCI bus slots on the system use INTA#, thus all installed PCI cards must be set to this value.

```
ROM PCI/ISA BIOS (PI55T2P4)
PNP AND PCI SETUP
AWARD SOFTWARE, INC.

Slot 1 (RIGHT) IRQ : AUTO
Slot 2 IRQ        : AUTO
Slot 3 IRQ        : AUTO
Slot 4 (LEFT)  IRQ : AUTO
PCI Latency Timer : 32 PCI Clock

DMA 1 Used By ISA : No/ICU
DMA 3 Used By ISA : No/ICU
DMA 5 Used By ISA : No/ICU
ISA MEM Block BASE : No/ICU

IRQ 3 Used By ISA : No/ICU
IRQ 4 Used By ISA : No/ICU
IRQ 5 Used By ISA : No/ICU
IRQ 9 Used By ISA : No/ICU
IRQ 10 Used By ISA : No/ICU
IRQ 11 Used By ISA : No/ICU
IRQ 15 Used By ISA : No/ICU

ESC : Quit      | |++ : Select Item
F1  : Help      | PU/PD/+/- : Modify
F5  : Old Values (Shift)F2 : Color
F6  : Load BIOS Defaults
F7  : Load Setup Defaults
```

The first four fields on the screen set how IRQ use is determined for each PCI slot. The default setting for each field is “Auto”, which uses auto-routing to determine IRQ use. The other options are manual settings of “14” or “15” for each slot.

IV. BIOS SOFTWARE

The next field is the “PCI Latency Timer”. Do not change the default setting of “32 PCI Clock” since this enables maximum PCI performance for this motherboard. The following describes the other user-configurable fields on this screen:

IRQ xx Used By ISA

These fields indicate whether or not the displayed IRQ for each field is being used by a Legacy (non-PnP) ISA card. Two options are available: “No/ICU” and “Yes”. The first option, the default value, indicates either that the displayed IRQ is not used or an ISA Configuration Utility (ICU) is being used to determine if an ISA card is using that IRQ. If you install a Legacy ISA card that requires a unique IRQ, and you are not using an ICU, you must set the field for that IRQ to “Yes”.

For example: If you install a Legacy ISA card that requires IRQ 10 lets say, then set “IRQ10 Used By ISA” to “Yes”.

DMA x Used By ISA

These fields indicate whether or not the displayed DMA channel for each field is being used by a Legacy (non-PnP) ISA card. Available options include: “No/ICU” and “Yes”. The first option, the default setting, indicates either that the displayed DMA channel is not used or an ICU is being used to determine if an ISA card is using that channel. If you install a Legacy ISA card that requires a unique DMA channel, and you are not using an ICU, you must set the field for that channel to “Yes”.

ISA MEM Block BASE

This field allows you to set the base address and block size of a Legacy ISA card that uses any memory segment within the C800H and DFFFH address range. If you have such a card, and you are not using an ICU to specify its address range, select a base address from the six available options; the “ISA MEM Block SIZE” field will then appear for selecting the block size. If you have more than one Legacy ISA card in your system that requires to use this address range, you can increase the block size to either 8K, 16K, 36K, or 64K.

If you are using an ICU to accomplish this task, leave “ISA MEM Block BASE” to its default setting of “No/ICU”.

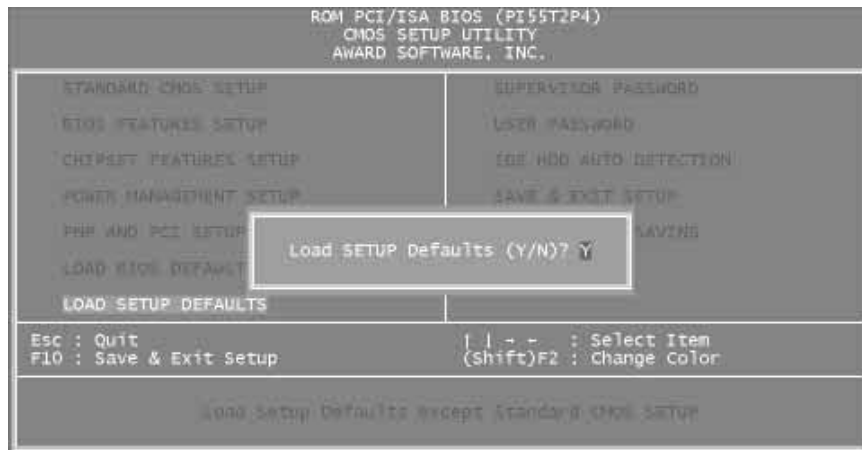
IV. BIOS SOFTWARE

Load BIOS Defaults

This “Load BIOS Defaults” option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optimal and disable all high performance features. To load these default settings, highlight “Load BIOS Defaults” on the main screen and then press the <Enter> key. The system displays a confirmation message on the screen. Press the <Y> key and then the <Enter> key to confirm. Press the <N> key and then the <Enter> key to abort. This feature does not affect the fields on the Standard CMOS Setup screen.

Load Setup Defaults

This “Load Setup Defaults” option allows you to load the default values to the system configuration fields. These default values are the optimized configuration settings for the system. To load these default values, highlight “Load Setup Defaults” on the main screen and then press the <Enter> key. The system displays a confirmation message on the screen. Press the <Y> key and then the <Enter> key to confirm. Press the <N> key and then the <Enter> key to abort. This feature does not affect the fields on the Standard CMOS Setup screen.

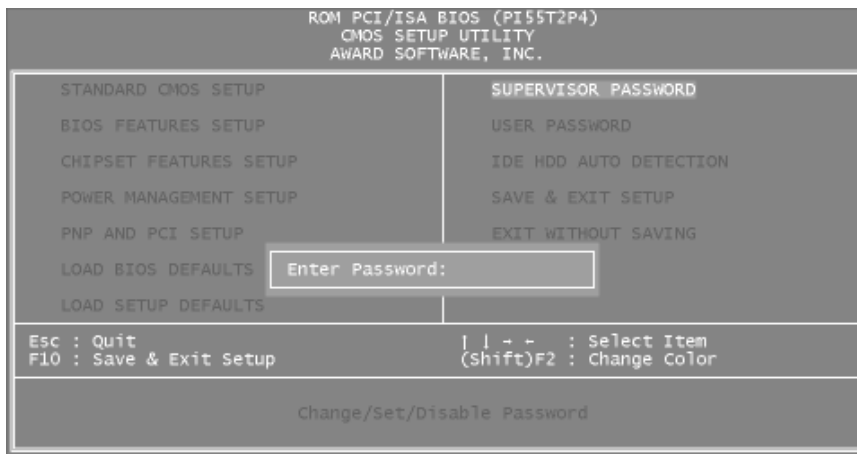


IV. BIOS
(Load Defaults)

IV. BIOS SOFTWARE

Supervisor Password and User Password

These two options set the system passwords. “Supervisor Password” sets a password that will be used to protect the system and the Setup utility; “User Password” sets a password that will be used exclusively on the system. By default, the system comes without any passwords. To specify a password, highlight the type you want and then press the <Enter> key. A password prompt appears on the screen. Taking note that the password is case sensitive, and can be up to 8 alphanumeric characters long, type in your password and then press the <Enter> key. The system confirms your password by asking you to type it again. After setting a password, the screen automatically reverts to the main screen.



To implement the password protection, specify in the “Security Option” field of the BIOS Features Setup screen when the system will prompt for the password. If you want to disable either password, press the <Enter> key instead of entering a new password when the “Enter Password” prompt appears. A message confirms the password has been disabled.

NOTE: If you forget the password, see page 11 for procedures on clearing the CMOS.

IV. BIOS SOFTWARE

IDE HDD Auto Detection

This “IDE HDD Auto Detection” option detects the parameters of an IDE hard disk drive, and automatically enters them into the Standard CMOS Setup screen.

| ROM PCI/ISA BIOS(PI55T2P4) CMOS SETUP UTILITY AWARD SOFTWARE, INC. | | | | | | | | |
|--|------|------|------|---------|---------|--------|--------|------|
| HARD DISKS | TYPE | SIZE | CYLS | HEAD | PRECOMP | LANDZ | SECTOR | MODE |
| Primary Master : | | | | | | | | |
| Select Primary Master Option (N=Skip) : N | | | | | | | | |
| OPTIONS | SIZE | CYLS | HEAD | PRECOMP | LANDZ | SECTOR | MODE | |
| 2(Y) | 849 | 823 | 32 | 0 | 1646 | 63 | LBA | |
| 1 | 849 | 1647 | 16 | 65535 | 1646 | 63 | NORMAL | |
| 3 | 849 | 823 | 32 | 65535 | 1646 | 63 | LARGE | |
| Note: Some Oses (like SCO-UNIX) must use "NORMAL" for installation | | | | | | | | |
| ESC : Skip | | | | | | | | |

Up to four IDE drives can be detected, with parameters for each listed inside the box. To accept the optimal entries, press the <Y> key or else select from the numbers displayed under the OPTIONS field (2, 1, 3 in this case); 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. The process then proceeds to the next drive letter. Pressing the <N> key to skip rather than to accept a set of parameters causes the program to enter zeros after that drive letter.

Remember that if you are using another IDE controller that does not feature Enhanced IDE support for four devices, you can only install two IDE hard disk drives. Your IDE controller must support the Enhanced IDE features in order to use Drive E and Drive F. The on-board PCI IDE controller supports Enhanced IDE, with two connectors for connecting up to four IDE devices. If you want to use another controller that supports four drives, you must disable the on-board IDE controller in the Chipset Features Setup screen.

When auto-detection is completed, the program automatically enters all entries you accepted on the field for that drive in the Standard CMOS Setup screen. Skipped entries are ignored and are not entered in the screen.

If you are auto-detecting a hard disk that supports the LBA mode, three lines will appear in the parameter box. Choose the line that lists LBA for an LBA drive. Do not select Large or Normal.

IV. BIOS
(Hard Drive Detect)

IV. BIOS SOFTWARE

If you are auto-detecting a hard disk that supports the LBA mode, three lines will appear in the parameter box. Choose the line that lists LBA for an LBA drive. Do not select Large or Normal.

The auto-detection feature can only detect one set of parameters for a particular 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. However, if the drive is already formatted when you install it and different parameters than those detected were used, you will need to enter them manually yourself.

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

Save and Exit Setup

Select this option to save into the CMOS memory all modifications you specify during the current session. To save the configuration changes, highlight the “Save & Exit Setup” option on the main screen and then press the <Enter> key.



Exit Without Saving

Select this option to exit the Setup utility without saving the modifications you specify during the current session. To exit without saving, highlight the “Exit Without Saving” option on the main screen and then press the <Enter> key.

IV. BIOS SOFTWARE

Flash Memory Writer Utility

The motherboard package includes a Flash Memory Writer utility in the provided DOS floppy disk for use in erasing and reprogramming the on-board Flash EPROM BIOS ROM chip. This utility can be found under the \FLASH directory of the DOS floppy disk. You will find three files under this directory:

PFLASH.EXE

This is the Flash Memory Writer utility.

T25Ixxxx.AWD

A BIOS file for this motherboard. xxxx here is a 4-digit version number; larger values denote newer BIOS versions, while smaller numbers denote older versions.

Readme

A Readme text file containing information about the utility. To access or print out the contents of this file, you can use any text editor program.

The Flash Memory Writer utility updates the contents of the Flash memory chip by downloading a new BIOS file. This BIOS file is included in the provided floppy disk, and may be newer than the BIOS on the motherboard. If this is such the case, then download the new BIOS file into your system to update the older BIOS. To determine whether or not the provided BIOS file is newer than the current system BIOS, compare the numbers after “T25I” in the BIOS file with the last four numbers of the code displayed on the upper left-hand corner of your screen while the Power-On Self Test (POST) is running. If the number in the BIOS file is larger, reprogram the system BIOS. If not, do not bother.

IV. BIOS SOFTWARE

Before reprogramming the system BIOS, you must first do the following:

1. Programming the ROM chip installed in the system requires that you first enable programming as described on page 9 "Boot Block Programming".
2. Make sure the system is running in real mode. This utility will not operate if the system is under protected or virtual mode. This means that you can not reprogram the system BIOS under the Windows environment or with any memory management software, including HIMEM.SYS. If you have any memory management software running, disable them first. The following describes the easiest way to ensure that your system memory is free from these programs:
 - Boot from a floppy disk formatted with the "FORMAT A:/S" command without creating CONFIG.SYS and AUTOEXEC.BAT files.
 - If you are using MS-DOS 6.x, you can bypass the AUTOEXEC.BAT and CONFIG.SYS by pressing <F5> when "Starting MS-DOS . . ." line is displayed on the screen.
 - For Windows 95 users, press <F8> to enter the Microsoft Windows 95 Startup Menu and then choose "Safe mode command prompt only"

Once you have accomplished the above tasks, you can run the Flash Memory Writer utility. You can copy the contents of the \FLASH directory to your hard disk drive or to a backup floppy disk. When copying the files, ensure that the BIOS file is on the same directory as the utility. To run, change to the directory containing PFLASH.EXE and then at the DOS prompt, type:

PFLASH <Enter>

IV. BIOS SOFTWARE

The Flash Memory Writer Utility Screen:

```
ASUSTeK PNP BIOS
FLASH MEMORY WRITER V1.2
Copyright (C) 1995, ASUSTek COMPUTER Inc.

Flash Type -- SST 29EE010

Current BIOS Revision: #401A0-0101

Choose one of the following:

1. Save Current BIOS To File
2. Update BIOS Main Block From File
3. Advanced Features

Enter Choice: [1]

Press ESC To Exit
```

IMPORTANT: Flash Type may also be "INTEL 28F001BXT." If "unknown" is after "Flash type --," then this ROM chip is not programmable or not supported with the PnP BIOS and therefore cannot use the Flash Memory Writer.

This screen provides three command options, which you can invoke by typing the corresponding number of the command and pressing <Enter> key. The following describes each command:

1. Save Current BIOS to File

This option allows you to copy the contents of the Flash memory chip into a file in the \FLASH directory. This gives you a backup copy of the original system BIOS in case you need to re-install it. In such cases where the data on the chip get lost or corrupted, you can reprogram the chip using this backup copy. We strongly recommend that you perform this procedure.

2. Update BIOS Main Block from File

This option updates the BIOS from a file on the disk. This can either be a new file or a backup file created by the "Save Current BIOS to File" option. This will not update the Boot Block if the Boot Block is different. You will be prompted with the following if advanced features if necessary.

**Boot Block of New BIOS is different from old one !!!
Please Use 'Advanced Feature' to flash whole bios !!!**

IV. BIOS SOFTWARE

3. Advanced Features

Selecting this option brings up the Advanced Features screen for clearing the PnP configuration record and updating the system BIOS.

To terminate the program and return to the DOS prompt, press the <Esc> key. Selecting the third option displays the Advanced Features screen.

```
Advanced Features

Flash Type -- SST 29EE010

Current BIOS Revision: #401A0-0101

Choose one of the following:

1. Clear PNP ESCD Parameter Block

2. Update BIOS Including Boot Block and ESCD

Enter Choice: [2]

Press ESC To Exit
```

Details of Advanced Features:

Clear PNP ESCD Parameter Block

This option erases the Plug-and-Play (PnP) configuration record.

Update BIOS Including Boot Block and ESCD

This option updates the Boot Block, the system BIOS and the PnP ESCD Parameter Block from a new BIOS file in the \FLASH directory.

To select an option, type its corresponding number in the provided space and then press the <Enter> key. Follow these procedure to update the PnP system BIOS.

IV. BIOS SOFTWARE

1. For security reasons, back up your existing system BIOS using the “Save Current BIOS to File” option. If anything goes wrong with the updating process, you can still recover the original BIOS. To back up, select the first command option from the Flash Memory Writer screen. Specify a file name such as T25I0102.AWD when prompted and then press the <Enter> key. The program then creates a file in the \FLASH directory containing the current BIOS.
2. Download the new BIOS by selecting the second command option from the Advanced Features screen. The program displays a second screen prompting you for the name of the BIOS file. Type in the complete name of the file, including the file name extension, and then press the <Enter> key. The utility then downloads the new BIOS file. The following message appears:

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

If you encounter problems while downloading the new BIOS, DO NOT turn off your system since this might prevent your system from booting up. Just repeat the process, and if the problem still persists, download the original BIOS file you created in step 1 above.

3. After successfully downloading the new BIOS file, exit the Flash Memory Writer utility and **then turn off your system**. Set JP5 back to its default settings of Programming “Disabled.”
4. Turn on the system and hold down to enter BIOS Setup. You must load "**Setup Default**" as described on page 42 to affect the new BIOS.

WARNING: If the Flash Memory Writer utility was not able to successfully download a complete BIOS file, your system may not be able to boot up. If this happens, your system will require service from your vendor.



V. PCI-SC200 SCSI Card

NCR SCSI BIOS and Drivers

Aside from the system BIOS, the Flash memory chip on the motherboard also contains the NCR SCSI BIOS. This SCSI BIOS works in conjunction with the optional PCI-SC200 SCSI controller card to provide a complete PCI Fast SCSI-2 interface.

All SCSI devices you install to your system require driver software to function. The NCR SCSI BIOS directly supports SCSI hard disks under the DOS, Windows and OS/2 environments. It also uses device drivers from the DOS floppy disk included in the PCI-SC200 controller card package to support hard disks and other SCSI devices working under DOS, Windows, Windows NT, Novell NetWare and OS/2. These drivers provide higher performance than the direct BIOS support. To use these drivers, you must install them into your system and add them to your system configuration files. Driver support for SCSI devices used with SCO UNIX is also provided. These drivers are included in the second SCO UNIX floppy disk. Windows 95 support is also available using the device drivers included within the Windows software. The PCI-SC200 adapter is auto detected as PCI NCRC810 SCSI HOST ADAPTER and uses the NCRC810.MPD driver.

For information about these drivers and their usage, see the Readme files included in the driver packages. You can print out the contents of these files using any text editor program.

The next few pages will instruct you on the installation of the PCI-SC200 Fast SCSI Card.

V. PCI-SC200 SCSI Card

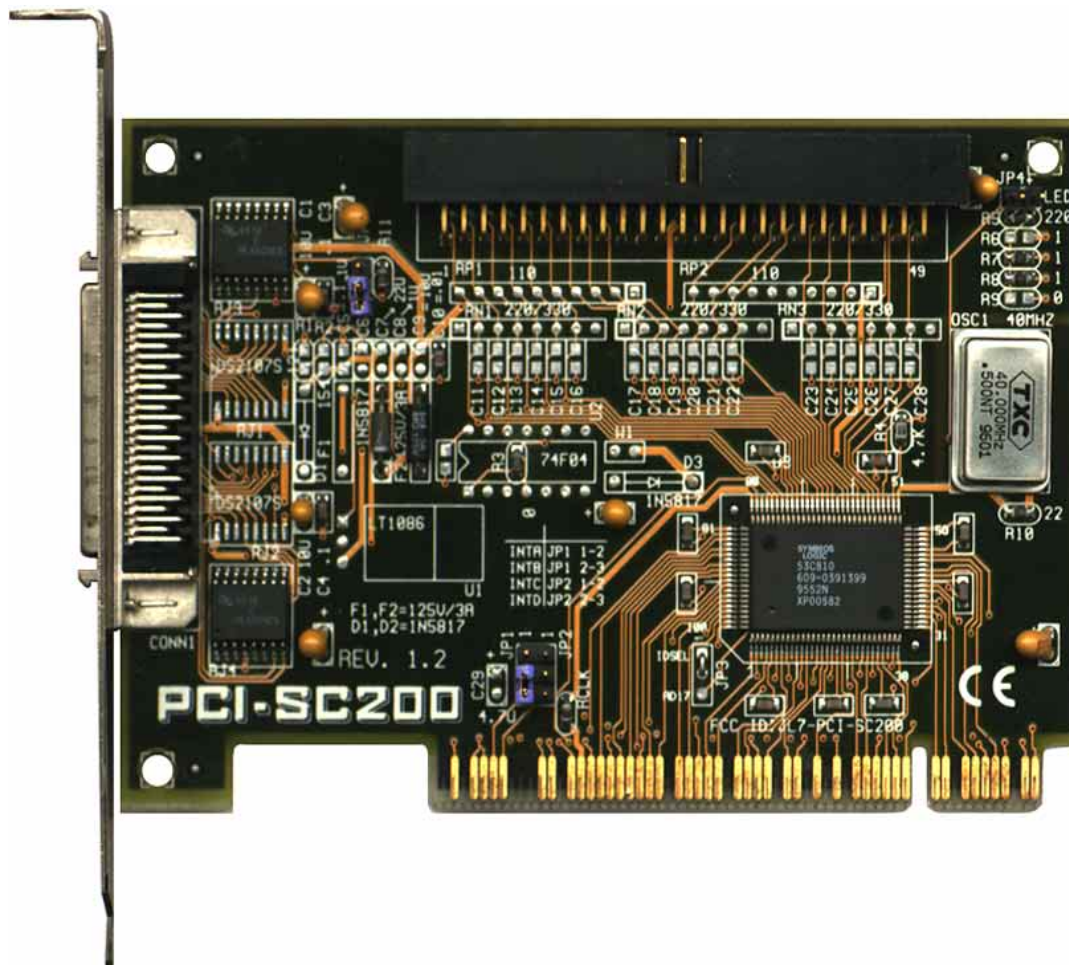
The PCI-SC200 SCSI Interface Card

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

If you get the PCI-SC200 later on as an option, you will need to install it yourself. The setup procedure is explained here.

Setting Up the PCI-SC200

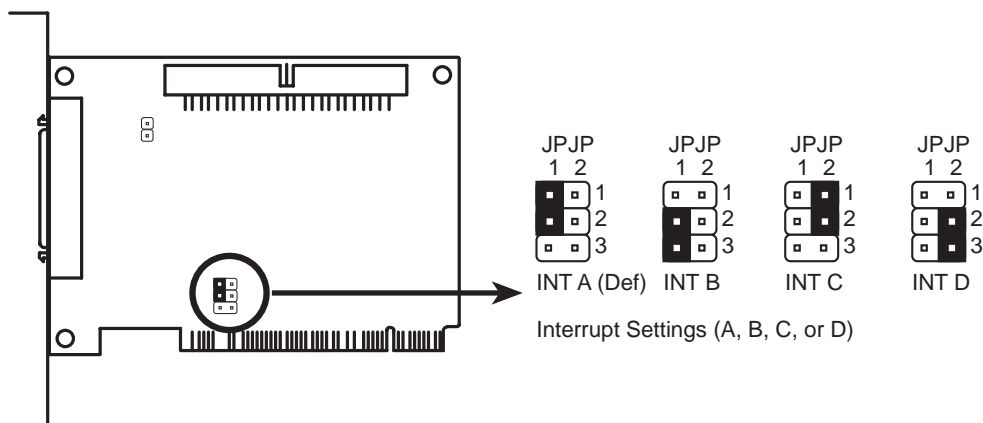
There are two jumper settings you may need to make on the card to set it up. One setting assigns the PCI INT interrupt, the other sets the card's termination.



V. PCI-SC200 SCSI Card

Setting the INT Assignment

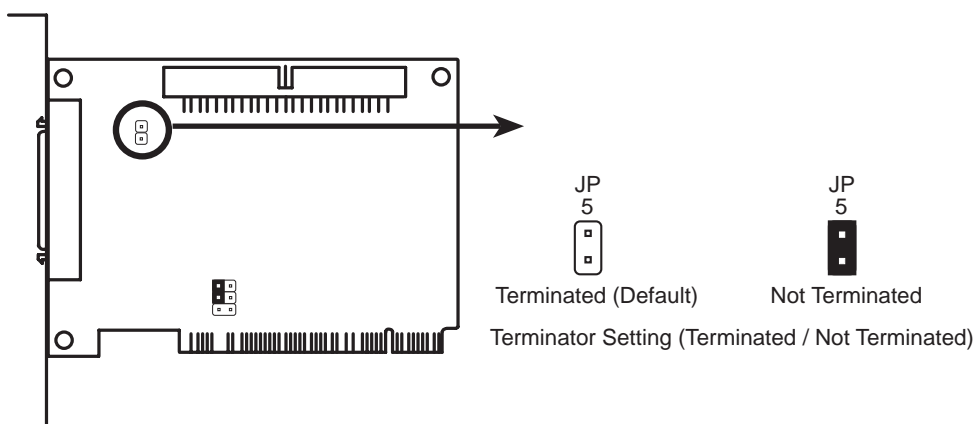
You must use PCI INT A setting in order to properly assign the card's interrupt. On the PCI-SC200, you assign the INT by setting jumper JP1 or JP2. The default setting for the card already is INT A, so you do not need to change the setting to use the PCI-SC200 with this motherboard.



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 are more than one internal or external devices, 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.

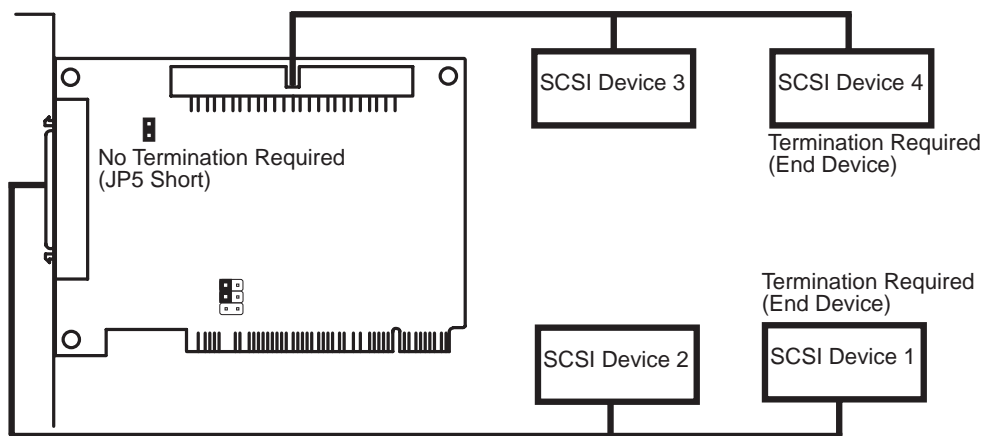
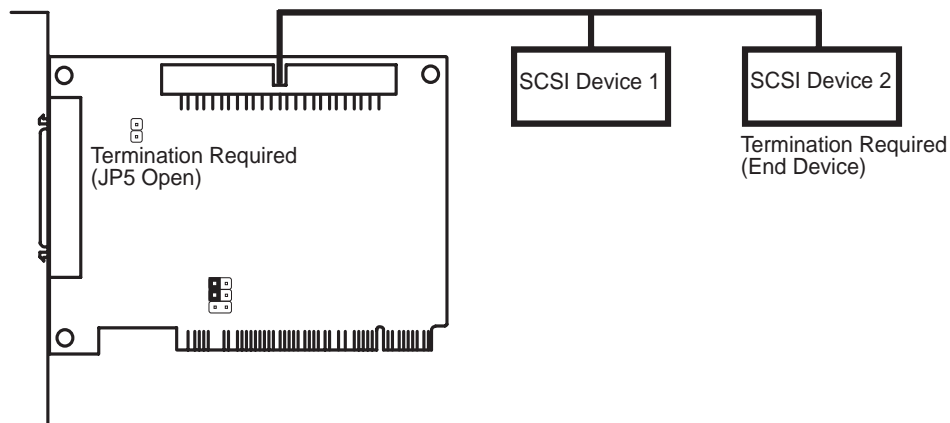
Many SCSI devices use a set of terminating resistors to terminate the device. The PCI-SC200 has “active” termination that you set using jumper JP5. If you need to terminate the PCI-SC200, you do it by setting the jumper. There are two settings, "terminated" and "not terminated," as shown below.



V. PCI-SC200
(Jumpers)

V. PCI-SC200 SCSI Card

Decide whether or not you need to terminate the PCI-SC200 based on its position in the SCSI chain. Only the devices at each end of the chain need to be terminated. If you have **only** internal or **only** external devices connected to the PCI-SC200, then you **must** terminate the PCI-SC200. If you have **both** internal and external devices connected, you **must not** terminate the card. See the following example which illustrates this concept.



SCSI ID Numbers

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

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