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Electrostatic Discharge Precautions

Make sure you ground yourself before handling the mainboard or other system components. Static electricity can easily damage the components. Note that you must take s[ecoa; precautions when handling the mainboard in dry or air-conditioned environments.

Abide by the following precautions to protect your equipment from static electricity.

- Do not remove the antistatic packaging until you are ready to install the mainboard and other system components. '
- Ground yourself before removing cnv system component from its protective antistatic packaging You can ground yourself by grasping the expansion slot covers or other unpainted portions of the system chassis.
- Frequently ground yourself wbde working or use a grounding strap.
- . Handle the mainboard by the edges and avoid touching the components.

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Introduction

The VESA 4S6 mainboard is a highly integrated system board designed to accommodate any member of the 486 family of CPUs, and features a lngb-perform.ante secondary cache memory arckitecture of up to256kb in size The mainboard also features an Industry Standard bus architecture combined With two VESA local bus expansion slots which provide a high-speed 32-bit interface to adapter cards that conform to VL-bus specifications. The combination of flexible CPU support, a large secondary cache memory size, and an advanced VL-bus architecture make this mainboard ideal for building powerful systems that must met the demanding requirements of today' s graphical user interfaces and advanced operating systems

1.1 Key Features

The advanced features of the VESA 4S6 mainboard include

- support for an 486SX, 4S7SX, 4s6DX, 486DX, P24T or Overdrive CPU running at a clock speed of 25, 33, 40, or 50MHz
- six 16-bit and one S-bit ISA expansion slots
- two 32-bit VESA local bus master expansion slots
- support for 64kb, 128kb or 256kb of secondary cache memory
- flexible memory support from lMB up to 32MB using 256kb, lMB, or 4MB SIMMs
- shadow RAM support for the system and video BIOS
- fast GateA20 and reset support
- 4 layer design, two-thirds baby-AT board size
- support ALL Cyrix CPUs. Cx 486S/S2, Cx 486DX/DX2 CPU running at a clock speed of 33/40/50 MHz.
- support ALL AMD 486 CPUs

1.2 Mainboard Description

The key components of the VESA 486 mainboard are illustrated and described below. Please take a moment to become familiar with the design.

Figure 1 Mainboard *Layout and Key Components*
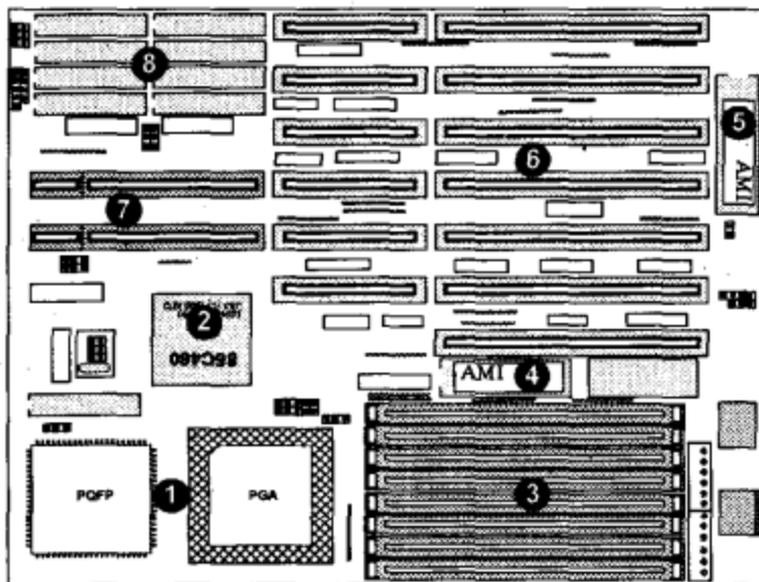
1. System Microprocessor

Tbe VESA 486 mainboard can accept any member of the 486 family of high performance 32-bit microprocessors, m either PQFP or PGA packaging. The mainboard is designed to run at a clock speed of 25, 33, 40, or 50MHz, and features a socketed oscillator or optional clock. generator to facilitate easy field upgrades. The 486 series of microprocessors are backwardly compatible with operating systems and application software designed to run on 8088, 286 and 386 microprocessor-based platforms.

2. Single Chip ASIC

The VESA 486 mainboard is designed around a highly integrated ASIC, which combines core logic for memory and secondary cache controlled, direct memory access control, buffers, timing, and AT-bus related logic into a single chip

3. **Memory Architecture**

The VESA 4S6 mainboard features 8 SIMM (single in-line memory module) sockets, organized into two banks, which allow flexible memory configuration and expansion. Possible memory sizes include 1MB, 4MB, 8MB and up to a maximum of 32MB, without resort to a separate memory expansion board

4. **System 810S**

The VESA 4S6 mainboard ships with a licensed AMI ROM BIOS, specifically designed to maximize the performance potential of the mainboard The BIOS permits easy and flexible, yet powerful configuration and performance optimization of the mainboard and system

5. **Keyboerd Controller**

The VESA 486 mainboard includes an 8042 single chip keyboard interface cotroller, which works m conjunction with the system BIOS

6. **ISA Expansion Slots**

The VESA 486 mainboard features six 16-bit and one 8-bit ISA expansion slots, which can accommodate countless third-party expansion boards and allows enormous flexibility in designing custom platforms

7. **VESA 32-Bit Local Bus Expansion Slots**

The VESA 486 mainboard also features two Video Electronics Standards Association (VESA) local bus master slot extensions, which can accommodate the growing number of high speed local but graphics boards and other peripheral controllers The VESA local bus architecture boosts performance by providing peripherals access to the CPU's 32-bit bus running at full clock speeds of up to 50MHz

8. **Secondary Cache Architecture**

The VESA 4S6 mainboard features a secondary cache memory architecture, which compliments the 8-kb set-associative cache designed into the 486 family of CPUs. SRAM sockets are provided for support of a 64kb, 12Skb or 256kb cache memory size

1.3 Unpacking and Handling Precautions

The VESA 486 mainboard comes packed in a sturdy cardboard shipping carton, which includes the mainboard and this User's Manual.

Caution!

Keep the mainboard stored in the anti-static tug until you are ready to install it.

The VESA 486 mainboard is easily damaged by static electricity. Observe the following precautions while unpacking and handling the mainboard:

- Before handling the mainboard or other systems components, discharge static electricity from your body by touching an unpainted area of the system's metal chassis. While installing the mainboard, ground yourself frequently to discharge any static electricity that may accumulate in your body.

- After removing the mainboard from the anti-static bag, place it on a grounded surface with the components facing up

- Check the mainboard for damage. If any socketed component appears losse, press firmly brrt carefully to seat the chip irr its socket. Otherwise, avoid touching the components on the mainboard Handle the mainboard and other system components by the edges.

Chapter 2:
Hardware Configuration

Before you install VESA 486 mainboard into the system chassis, you may tind it convenient to first configure the mainboard jumpers and install memory If an 4Sd microprocessor was not included with, snd installed on the mainboard, you will also want to insert a supported microprocessor at this time. After confirming the mainboard, you can instll the mainboard in the system chassis, attach system peripherals, and connect any case controls to the mainboard's connectors.

Important!

Turn off all power to the mainboard, system chassis, and *peripheral* devices before performing any work on the *mainboard* system.

Hardware options on the VESA 486 mainboard are configured by setting jumpers: rows of small pins on the mainboard which are set by using a jumper cap. When a jumper cap is installed, the pins it covers are said to be "closed" or "shorted"; if a jumper cap is not installed, the jumper pins are said to be "pen" .In the case of 2-pin jumpers, a jumper cap may be either "n" or "ff". Most VESA 4S6 jumpers are clearly labelled on the board itself, with pin if marked as such Note thst some jumpers are factory preset and should not be changed from their default settings VESA 4S6 mainboard connectors snd jumpers are illustrated in Figure 2 on the **following** page.

2.1 Jumpers

Jumpers on the VESA 4S6 mainboard are listed and described below. CPU type, cache memory configuration, and VESA bus jumper settings are described separately in sections 2.2, 2.3   2.4 below.

Figure 2 *VESA* 486 *Mainboard Layout*

Figure 2 *VESA* 486 *Mainboard Layout*
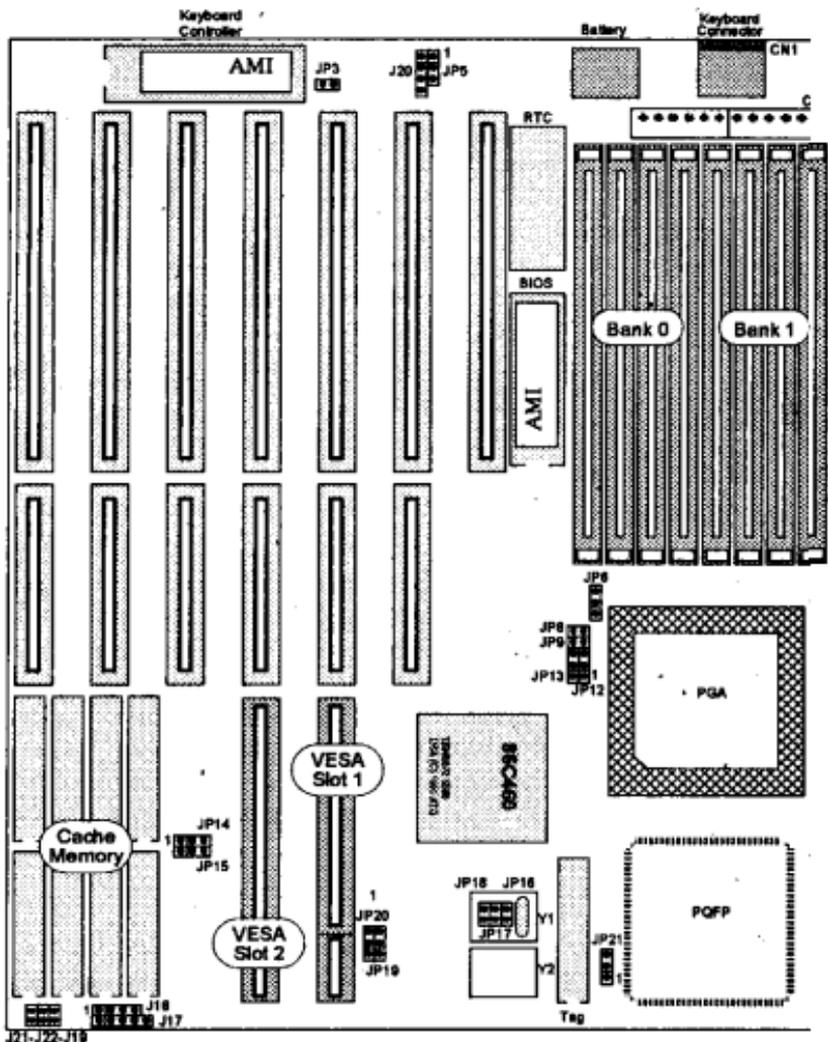
Display Type Jumper JP3

JP3 is 2-pm jumper which configures the mainboard for use with either a color or monochrome graphics adapter Refer to Figure 2 for the loca-

tion of JP3 The table below lists the correct jumper settings for monochrome and color display types, respectively.

Table 1. Display Type Jumper

Display Type	JP3
Monochrome (default)	●● 1 2
Color/EGA/VGA	▭ 1 2

CMOS Reset Jumper: JP5

JP5 is a 3-pm jumper which allows you to discharge CMOS memory in the event that you forget your password or encounter a BIOS Setup problem. Before you install the mainboard check to ensure that JP5 is set to retain CMOS memory Refer to Figure 2 for the location of JF5 The table below lists the correct jumper settings for retaining and discharging CMOS memory.

Table 2. CMOS Reset Jumper

CMOS Setting	JP5
Retain CMOS Data	▭● 1 2 3
Discharge CMOS	●▭ 1 2 3

Reserved Jumpers

Jumpers listed in the table below are factory preset and should not be changed from their default settings

Table 3 Reserved Jumpers

Reserved Jumper	Default Setting
JP6	●▭ 1 2 3

2.2 CPU Type Configuration

The VESA 486 mainboard can accept any member of the 486 series of microprcessors or P24T, running at clock speeds of 25,33,40, or 50MHz. If you are installing or upgrading the CPU on the VESA 486 mainbusrd, ' you must set the CPU type jumpers correctly, and either configure the clock generator or install an appropriately rated oscillator to match the speed rating of the microprocessor.

Warning!

Do not use an oscillator or generate a clock frequency above the rated speed of the micropressor. Doing so can result in permanent damage to the micropressor and void your warranty

CPU Type Jumpers

Jumpers JP8–JP9 endJP12-JP13 together configure the mainboard for use with different member% of the 486 series of microprocessors. Refer to Figure 2 for the location of these jumpers. The table below summarizes the proper jumpers settings for different microprocessors.

Table 4 *CPU Type Configuration*

CPU Type	JP8	JP9	JP12	JP13	JP24
486SX (PQFP)	1 2	1 2	1 2 3	1 2	1 2
486SX Cx486S (PGA)	1 2	1 2	1 2 3	1 2	1 2
487SX Overdrive	1 2	1 2	1 2 3	1 2	1 2
486DX/DX Cx486DX CX486S + Cx487S	1 2	1 2	1 2 3	1 2	1 2
Cx486S2	1 2	1 2	1 2 3	1 2	1 2
Cx486DX2	1 2	1 2	1 2 3	1 2	1 2

CPU Clock Frequency Configuration

The VESA 486 mainboard features either a socketed oscillator or optional clock generator. On mainboards featuring a clock generator, jumpers JP16, JP17 and JP18 are 2-pin jumpers which together determine the clock frequency. Refer to Figure 2 for the location of JP16-18.

The table below lists the proper jumpers settings to generate a 25, 33, 40 and 50MHz clock frequency.

Table 5 *Clock Frequency Generation*

Clock Frequency	25MHz	33MHz	40MHZ	50MHz
JP16	▣ 1 2	●● 1 2	▣ 1 2	●● 1 2
JP17	●● 1 2	▣ 1 2	●● 1 2	▣ 1 2
JP18	▣ 1 2	▣ 1 2	●● 1 2	●● 1 2

On mainboards featuring a socketed oscillator, you must install an appropriately rated oscillator m socket Y2 Refer to Figure 2 for the location of socket Y2. The table below lists the different members of the 486 series of microprocessors and their corresponding oscillator frequencies

Table 6 *Oscilator Configuration*

CPU Type	Oscilator Description
486SX-25 487SX-25 Overdrive-25 Cx486S2-50 Cx486DX2-50	Insert a 25MHz oscillator m socket W.
486SX-33 487SX-33 Overdrive-33 486DX-33/40 486DX2-66 Cx486DX2-66 Cx486S-33/40 Cx486DX-33/40	Insert a 33/40MHz oscillator in socket Y2
486 DX-50 Cx486 S-50 Cx486DX-50	Insert a 50MHz oscillator m socket Y2

The illustrations below depict the correct CPU type and clock generation jumper settings for **different members of the** 486 series of sors.

Figure 3. 486SX-25/33 *PQFP CPU Jumper Settings.*

486SX-33

JP16
JP17
JP18

486SX-25

JP16
JP17
JP18

JP24   JP8

JP12

JP13

JP9
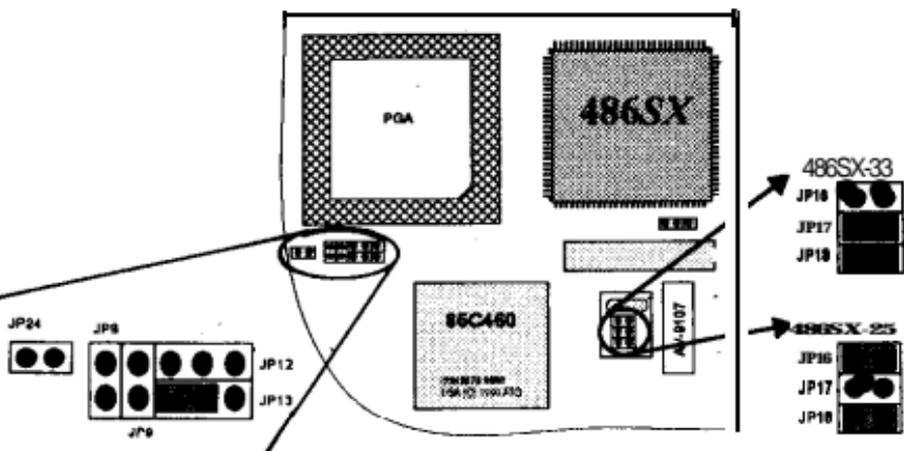
Figure 4 486SX-25/33 Cx486S-33/40/50 Cx486S2-50 *PGA CPU Jumper Setting*

486SX-33
Cx486S-33

JP16
JP17
JP18

486SX-25
Cx486S2-5O

JP16
JP17
JP18

486SX
Cx486S

JP24   JP8

JP12

JP13

JP9

Cx486S-40

JP16
JP17
JP18

Cx486S-50

JP16
JP17
JP18

Cx486S2

JP24   JP8

JP12

JP13

JP9

487SX Overdrive   PQFP

487SX-33
Overdrive-33
JP16
JP17
JP18

487SX-25
Overdrive-25
JP16
JP17
JP18

JP24   JP8
JP12
JP13
JP9

88C460
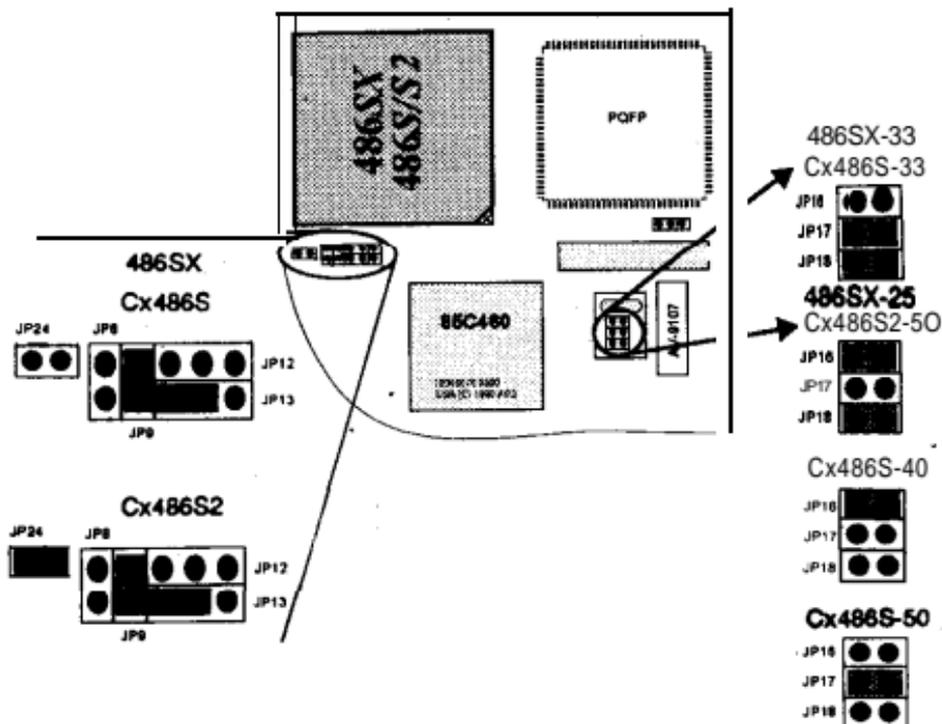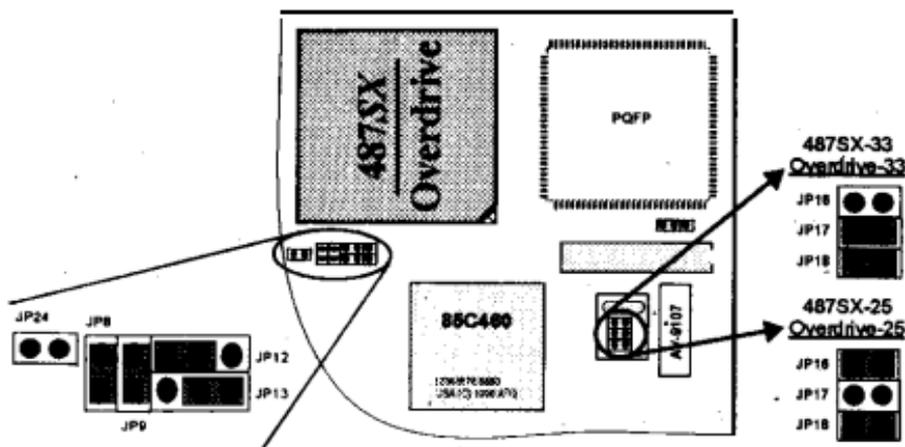
Figure 6 486DX-33/40/50 DX2 50/66, Cx486DX-33/40/50, Cx486DX2-50/66
CPU Jumper Setting

486DX
486DX/2   PQFP

486DX-50
JP16
JP17
JP18

4.% DX-33
486DX2-66
JP16
JP17
JP18

486DX/DX2
Cx486S + Cx487S
JP8
JP12
JP13
JP9

88C460

486DX2-50
JP16
JP17
JP18

JP24   JP8

Cx486DX2
JP12
JP13
JP9

486DX2-40
JP16
JP17
JP18
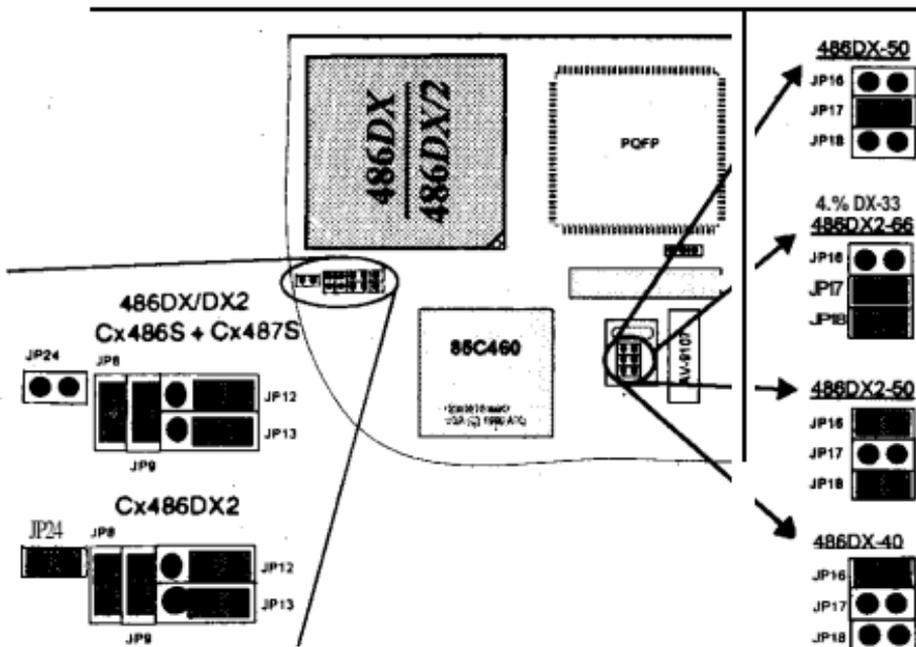
PGA CPU Installation

The VESA 486 mainboard features a large 168-pin PGA (pin grid array) socket which can accommodate any member of the 486 series of microprocessors or P24T in PGA packaging. To install or upgrade the CPU follow the steps below.

Winning!

Incorrect installation can result in permanent damage to the microprocessor. If installation appears too difficult refer the task to a qualified service technician

- Review the unpacking and handling precautions in Chapter 1.
- Carefully remove the **microprocessor from its antistatic packaging, being careful not to touch or bend any** of the pins.
- Examine the **microprocessor to identify the positioning** notch in the lower left corner of the CPU, and carefully straightened any bent pins.
- Locate the PGA socket on the mainboard and identify the notched corner of the socket, which is marked with a dot and Welled at pin coordinates 1-A
- Position the notched corner of the microprocessor over the notched corner of the PGA socket and align the pins on the CPU over the socket
- Carefully insert the microprocessor into the socket Press firmly to seat the microprocessor all the way in the socket
- Examine the installed CPU to ensure it is installed in the correct direction and that the pins are properly aligned.
- After ensuring that the microprocessor is installed correctly, refer to the sections m this chapter on CPU type Jumper settings **and** clock generator or oscillator configuration

Figure 7. PGA CPU Installation
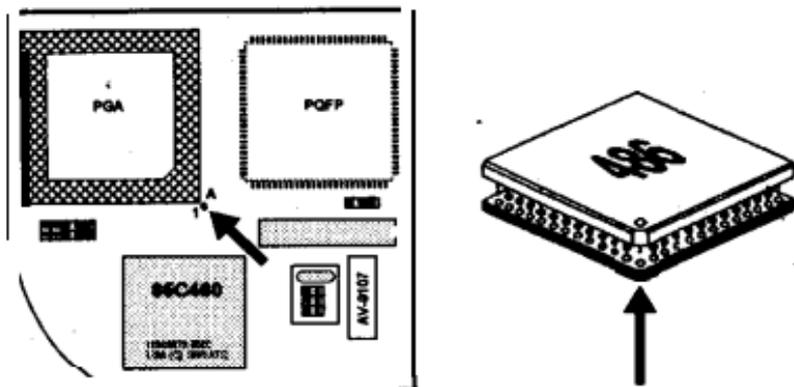
Note!

*If you are inatalling or upgrading to a microprocessor that runs at an internal clock frequency of over 33MHz (e.g. the 486DX2-50, 486DX2-66, or 486DX-40/50, it is highly recommended that a **CPU** cooling fan be attached to the microprocessor to ensure system stability.*

2.3 Cache Memory Configuration

The VESA 486 mainboard can support secondary cache memory sizes of 64kb, 128kb or 256kb Data cache memory is organized into two banks, with four SRAM sockets assigned to each bank, a single SRAM socket is provided for the tag bit If you are installing or upgrading cache memory on the mainboard, you must set the cache size and type selection Jumpers correctly, and install acceptably rated 20ns SRAM chips in the appropriate sockets The table below describes the SRAM chip type and socket locations for each supported cache configuration

Table 7 Cache Configuration Summary

Cache Size	Data SRAM - Sockets	Tag SRAM - Socket	Cacheable Range
64kb	8k x 8 U37~U40, U29~U32	8k x 8 U41	16MB
128kb	32k x 8 U37-U4C	8k x 8 [3] U41	/ MB
256kb	32k x8 U37-U40, U29-U32	32kx8 U41	64MB

NB Use 20ns. SRAMS for all configurations

Jumpers JP14, JP15 and JP21 are 3-pin jumpers which configure the mainboard for different cache sizes and types of SRAM Refer to the table and illustrations below for the location of the data cache bank and tag SRAM sockets The SRAM configurations for 64kb, 128kb and 256kb cache memory sizes areas follows

Table 8 Cache Size Jumper Settings

Cache size	64kb	128kb	256kb
JP14	▣ ▪ 1 2 3	▪ ▣ 1 2 3	▪ ▣ 1 2 3
JP15	▣▣▣ 1 2 3	▣▣ 1 2 3	▪ ▣ 1 2 3
JP21	▣ ▪ 1 2 3	▪ ▣ 1 2 3	▣▣ 1 2 3

Figure 8. 64kb Cache Configuration
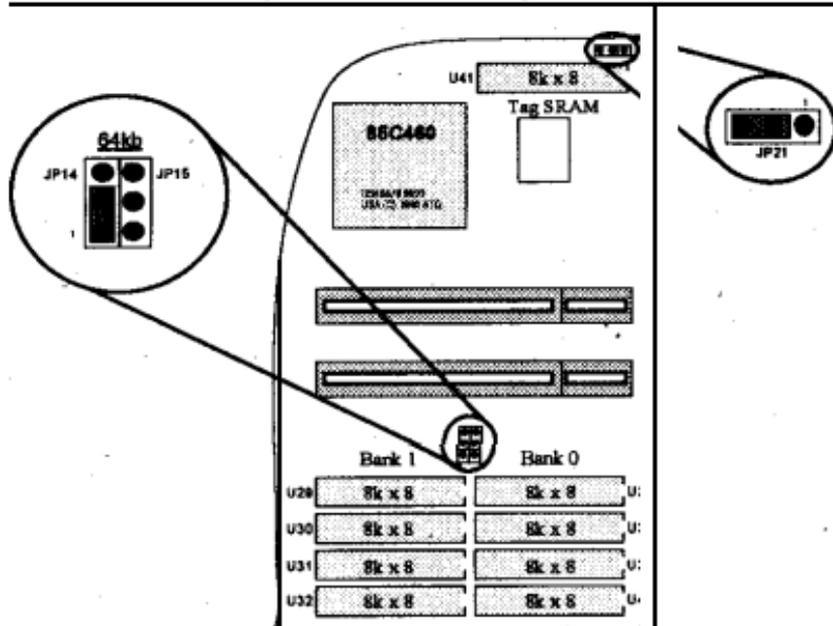
Figure 9. 128kb Cache Configuration

Figure 10. 256kb Cache configuration
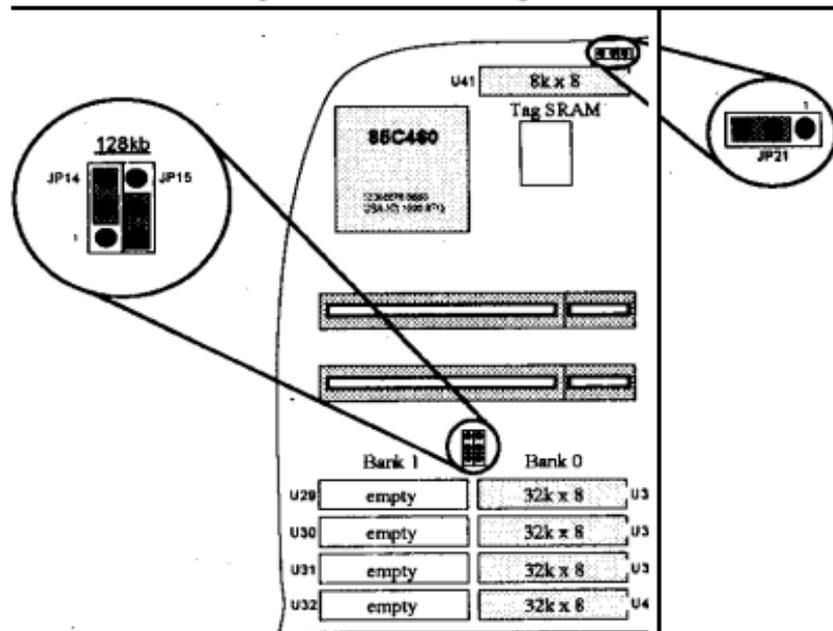
Figure 10. 256kb Cache configuration
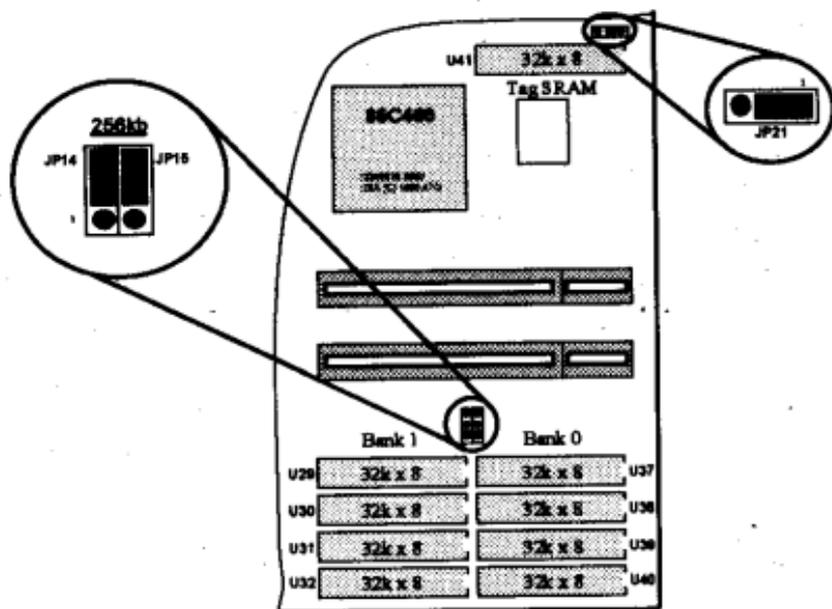
2.4 VESA Local Bus Configuration

The VESA 4S6 mainboard features two local bus master slot extensions, which can be configured for optimal performance and compatibly with a wide range of VESA local bus adapters at different system clock speeds.

Jumper JP19 is a 3-pin jumper which allows you to configure the 10CSJ bus for system clock speeds above 33MH2 (the default). Jumper JP20 is a 3-pin jumper which allows you to optionally insert 1-wait-state on the local bus (the default). Refer to Figure 2 for the location of jumpers JP1 9 and JP20 and the VESA local bus slot extensions. The tables be

low lists the correct jumper settings for loud bus clock and wait-state Configurations

Table 9. VESA Local Bus Clock Configuration

CPU Clock Speed	JP19
Less than or equal to 33MHz	▭▪ 1 2 3
Greater than 33MHz (default)	▪▭ 1 2 3

Table 10. VESA Wait-State Configuration

Local Bus Wait-States	JP20
0-wait-state	▭▪ 1 2 3
I-wd-state (default)	▪▭ 1 2 3

2.5 Memory Configuration

The VESA 4sd mainboard allows you to install and expand system memory via on-board SIMM (single in-line memory module) sockets, The mainboard supports two banks of 256kb, lMB or 4MB fast-page mode' DRAM SIMM modules, and achieves its best performance when both banks are filled. The mainboard requires DRAM with a minimum 80ns RAS (row address strob access ime.

On board memory is organized mto two banks, with four SIMM socket assigned to each bank Refer to Figure 2 for the location of banks o and 1 Bank O must be filled before bank 1, and all four SIMM modules m each bank must be of the same (capacity (256kb, lMB or 4MB). The table

below lists the memory configurations which are supported by the main-
board

Table 11. On-board *Memory Configuration*

Memory Size	Bank 0	Bank 1
1MB	256kb	
2UB	256kb	256kb
4MB	1MB	
8MB	1MB	1MB
16MB	4MB	
20MB	1MB	4MB
32MB	4MB	4MB

NB Use minimum 80ns. DRAM for all configurations

SIMM Installation

To install or upgrade memory follow the steps and refer to the illustration
below

- Review the unpacking and handling precautions m Chapter 1
- Remove the SIMM from its anti-static wrapping.
- Hold the SIMM so that the chips are towards you and the edge
  connector is pointed towards the mainboard.
- Insert the SIMM connectors mto the socket at a 60-degree angle and
  gently move the SIMM back and forth until it is firmly seated
- Slowly move the SIMM to a vertical position until the locking tabs
  snap mto the holes at each end of the module
- Repeat the procedure until all bank sockets are filled
- Run the BIOS Setup program to register the memory you have
  Installed

Figure 11 SIMM Istallation
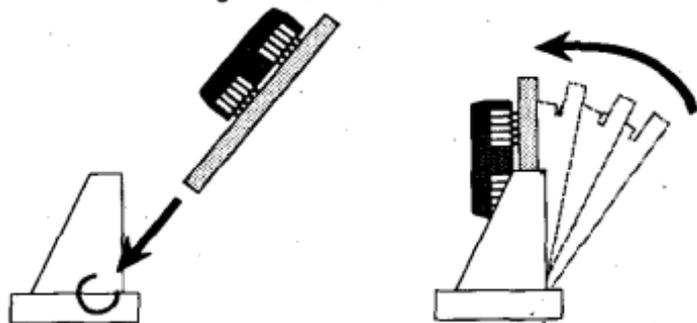
2.6 Case and Power Connectors

After installing the VESA 4S6 mainboard m the system chassis, you can attach system components to the mainboard VESA 4S6 maminboard connectors are listed and described below. Many are marked on the mainboard itself for easy reference

Power Connectors: CN2

CN2 consists of two 6-pm male header connectors to which you attach the dual connectors from the system power supply, as illustrated below Refer to Figure 2 for the *location* of CN2.

Figure 12. *Power Supply Connections*
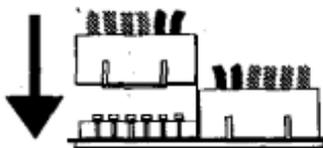
🖐️ *Warning!*

> **Reversing the male header connectors can result in damage to the mainboard. Make sure that the black leads from your power supply are centered before powering on the system for the first time.**

Keyboard Connector: CN1

CN1 is a standard S-pm female DIN connector to winch you attach your keyboard Refer to Figure 2 for the location of CN1

Keyboard Lock and Power LED: J17

J17 is a 5-pin connector to which You can attach your case' skeyboard lock and power LED imitator. If your case uses separate connectors for these two functions, attach the power LED indicator to pins 1-2, and the keyboard lock to pins 4-5. Refer to Figure 2 for the location of J17.

Speaker Connector: J18

J18 is a 4-pin connector to which you can attach your case' s speaker. Refer to Figure 2 for the location of J18

Hardware Reset Switch: J19

J19 is a 2-pin connector to which you can attach your case's system reset switch. Refer to Figure 2 for the location of J19.

External Battery: J20

J20 is a 4-pm connector to which you can attach an external battery. Pin 1 of J20 is positive (+) and pin 4 is *negative (-).* Refer to Figure 2 for the location of J20.

Turbo Switch Connector: J21

J21 is a 2-pin connector to which you can attach your case turbo switch. When J21 is closed by the switch or a jumper cap, turbo operation is **enabled** Refer to Figure 2 for the location of J22.

Turbo LED Connector: J22

J22 is a 2-pin connector to which you can attach your case' sturbo LED indicator. When the turbo switchatJ211s closed the turbo LED indicator lights. Refer to Figure 2 for the location of J22.

Chaptar3:
AMI BIOS Setup

3.1 About CMOS Setup

Once the mainboard hss been integrated into a system, you must run the mamboed's SAM I BIOS Setup program to record and/or change configuration information: such as the current date snd time and your hard disk drive type. The Setup program is stored in read-only memory (ROM), and can onfy be accessed when you turn on or reset the system.

The settings you specify with the Setup program rerecorded in a special area of memory called CMOS RAM. This memory is backed up by a battery so thst it will not be erased when you turn off or reset the system. Whenever you tum on the power, the system reads the settings stored in CMOS RAM end compares them to the equipment check conducted during the power on self-test (POST). If an error message occurs, an error message will be displayed on screen, and you will be prompted to run the Setup program.

The AMI BIOS Setup program is accessed through a menu which allows you to easiy configure your system. standard CMOS Setup allows yOU to record basic system information regarding date snd tune, video type and installed drives. Advanced CMOS Setup gives you access to the advanced features supported by your system's SAMI BIOS and mainboard chip set.

3.2 Entering CMOS Setup

- After powering on the system and in the course of the system POST, you have the option of entering CMOS Setup.

  To enter the Setup program at this time, Press the **Del** key. This wilf display the **first** page of the AMI BIOS Setup menu, which is illustrated on the next page

- If you do not press these keys at the correct time snd the system boots, press the **Ctrl** **Alt** **Del** keys to restart the system and try again

- If you do not press the key at the correct tune and the system fails to boot, an error message will be displayed (such as keyboard error) and you will again be asked to run the Setup program.

  This is normal. Press the **Ctrl** **Alt** **Del** keys at this tune to restart the system and then enter Setup by pressing the@ key. After you

enter Setup, You wdl be presented with the main menu of the AMI Setup program, which is pictured below

Figure 13 BIOS Setup Main Menu


```
         AMIBIOS  SETUP PROGRAM  AMI BIOS  SETUP  UTILITIES
        ©1992  American  megatrends Inc. All  Right  Reserved


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



        Standard CMOS Setup for Changing Time, Date, Hard Disk Type, etc.
        ═══════ ESC:Exit ↓↑→:Select F2/F3:Color F10:Save ═══════
```

. Select *Standard CMOS Setup* to access the Standard CMOS Setup menu, which is discussed m section 35 below

● Select *Advanced CMOS Setup* to access the Advanced CMOS Setup menu, which is discussed in section *36* below

● Select Auto Configuration with BIOS Defaults to load the default *system values You will* be prompted for confirmation, and notified that the values have been loaded

● Select *Auto Configuration with Power-On Defaults* to load the default power-on values, which Disable all performance options This option serves a useful diagnostic function m the event of a compatibility problem You will be prompted for confirmation, and notified that the values have been loaded

● Select *Change Password to access the* password security menu, which is discussed m section *37* below

● Select *Auto Detect Hard Disk* to attempt to automatically determine the correct hard disk drive type, which is discussed m section 38 below

● Select *Hard Disk Utility* to access the hard disk utility menu, which is discussed m *section 39* below

● Select Write to *CMOS and Exit* to save your configuration and exit the Setup program You will be prompted for confirmation before the changes are written to CMOS and the system reboots

22   **AMI BIOS Setup**

. *Select Do No/ Write to CMOS and Exit* to cancel any changes to your configuration and exit the Setup program You will be prompted for con firmation before the system reboots

• A warning message, which is pictured below, appears each time you select the Standard or *Advanced CMOS Setup menus.*

Figure 14 .9/0S *Setup Warning infomation*

```
              AMIBI Os  SETUP PROGRAM - WARNING INFORMATION
              (C)1 982    American Megatrends Inc All Rights Reserved


              Improper Use of Setup may Cu.. Problems ¶!

 If System Hange, Reboot System and Enter Setupby      Pressing the <ESC> key

 Do           ●    ny of the following After Entering Setup
                        Alter i) Options  to  ake System Work
                   (ii) Load BIOS Setup Defaults
                   (iii)Load Power-On De faults

         Hit  <ESC > to Stop  . . . . Any ather Key to Continue
```
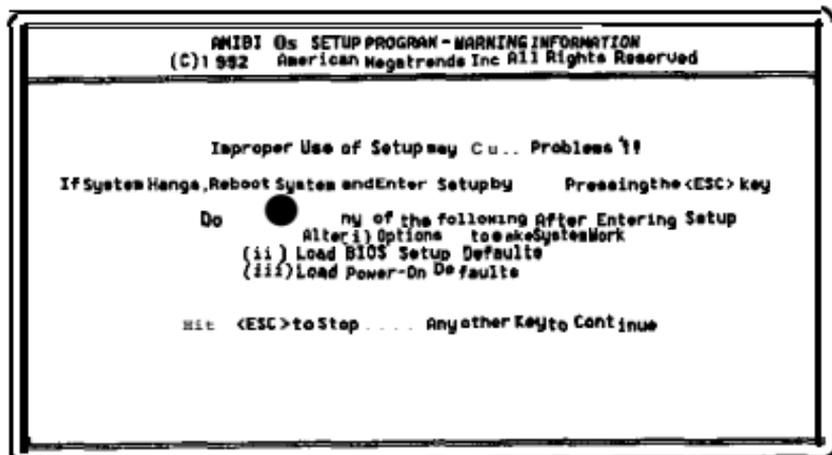
3.3 Getting Help

• Help screens are automatically displayed for each option in the *Stabdard CMOS setup* menu, and can be accessed in the *Advanced CMOS Setup menu* by pressing (F1) A "POPUP" window will appear, similar to the one pictured below, listing the available selections for that option To exit the Help window, press any key

• If you have trouble reading the Setup *menu,* toggle the menu colors by pressing (F2) for background color and (F3) for foreground color

Figure 15. *B / 0 5 Setup Help -*

```
              AMIBIOS SETUP PROGRAM - ADVANCED CMOS SETUP
              (C)1992 American Megatrends Inc., All Rights Reserved
  ┌──────────────────────────────────────┬──────────────────────────────────────┐
  │ Typematic Rate Programming : Disabled │ Adaptor ROM Shadow E000,32K: Disabled │
  │ Typematic Rate Delay (msec): 500      │ Adaptor ROM Shadow E800,32K: Disabled │
  │ Typematic Rate (Char/Sec)  : 15       │ AUTO Config Function      : Enabled   │
  │ Above 1 MB Memory Test     : Enabled  │ DRAM Speed Option         : Slowest   │
  │ Memory Test Tick Sound     : Enabled  │ DRAM Write CAS Pulse      : 2T        │
  │ Memory Parity Error Check  : Enabled  ├──────────────────────────────────────┤
  │ Hard Disk Type 47 RAM Area : 0:300    │ Cache                                 │
  │ Wait For <F1> If Any Error : Enabled  │ Bus Cl ┌────────────────────────────┐ │
  │ Numeric Processor Test     : Enabled  │ Video  │   System Boot Up Sequence  │ │
  │ Weitek Processor           : Absent   │        │                            │ │
  │ System Boot Up Sequence    : A:, C:   │        │ Available Options are :-   │ │
  │ External Cache Memory      : Enabled  │        │ C:, A:                     │ │
  │ Internal Cache Memory      : Enabled  │        │ A:, C:                     │ │
  │ Password Checking Option   : Setup    │        │ Press any key to continue  │ │
  │ Video  ROM Shadow C000,32K: Enabled   │        └────────────────────────────┘ │
  │ Adapter ROM Shadow C800,32K: Disabled │                                       │
  │ Adapter ROM Shadow D000,32K: Disabled │                                       │
  │ Adapter ROM Shadow D800,32K: Disabled │                                       │
  ├──────────────────────────────────────┴──────────────────────────────────────┤
  │ ESC:Exit  ↓↑→:Sel  <Ctrl>Pu/Pd:Modify  F1:Help F2/F3:Color                    │
  │ F5:Old Value  F6:BIOS Setup Defaults   F7:Power-On Defaults                    │
  └──────────────────────────────────────────────────────────────────────────────┘
```

3.4 using Setup

The following keys snd key combinations are used to maneuver among Setup options and to change values.

● To move the highlight bar from one option to another, use the cursor (or arrow) keys, with the (Num Lock) key turned off.

● Press (PgUp) or (PgDn) to change the value of an option

● Press the (Esc) key to exit back to the AMI Setup program's resin menu

. Press (F5) to restore the values thst were resided when the Setup program was entered

3.5 Standard CMOS Setup

The Standard CMOS Setup menu, which is illustrated below, allows you to specify the following system configuration information

Figure 16. Standard CMOS SetUp Menu

```
              AMIBIOS  SETUP PROGRAM ■ STANDARD CMOS SETUP
             (C) 1992 American Megatrends Inc. All Rights Reserved

 Date (mm/date/year)  Thu  :  Jan  3:-19:2        Base memory     648 KB
 Time ( hour/min/sec) 15   :  23                  Ext. memory    3326KB
                                           Culn Head WPcoe LZone  sect size
 Hard disk   c  type 47   USER TYPE 1314  7  1314  1314  17  76  MB
 Hard disk   D       type Not Installed
 Floppy drive A:            1.2  MB, 4¼"
 Floppy drive B: Not  Installed
 Primary    display   UGA/PGA/EGA
 Keyboard            Installed

  ┌─────────────────────────┐
  │ Month : Jan, Feb,.....Dec │
  │ Date : 01, 02, 03,....31  │
  │ Year : 1901, 1902,...2099 │
  └─────────────────────────┘

 ESC: Exit ↓•↑→;   Select F2/F3: color PU/PEx Modify
```

- **Date and** time Enter the date and tune, respectively.

- **Hard disk c: and D type.** The BIOS supports 47 fixed disk drive types, 46 of which are predestined in the ROM-resident table. If your hard disk type is not directly supported, you may need to manually inter the correct parameters (heads, cylinders sectors, write precompensation, and landing zone) under type 47, or select the *Auto Detect Hard Disk* option from the main Setup menu. If no hard drive is installed, select Not *Installed.*

. *Floppy drive A* **and B:.** Enter the diskette configuration your system is equipped with If no floppy drive is installed, select Not *Installed.*

- *Primary display.* Enter the type of video display adapter you have connected to your system The AMI BIOS will usually autodetect the correct type.

- **Keyboard.** Choose *Installed or Not Installed(e.g* for a file server), as appropriate.

3.6 Advanced CMOS Setup

The Advanced CMOS Setup menu allows you to set various BIOS and chipset options, as illustrated and described below.

Figure 17. Advanced CMOS Setup Menu and Default Settings

```
                       AMIBIOS SETUP PROGRAM - ADVANCED CMOS SETUP
                  (C)1992 American Megatrends Inc., All Rights Reserved

  Typematic Rate Programming : Disabled    Adapter ROM Shadow E800,32K: Disabled
  Typematic Rate Delay (msec): 500         Adapter ROM Shadow E800,32K: Disabled
  Typematic Rate (Char/Sec)  : 15          AUTO Config Function       : Enabled
  Above 1 MB Memory Test     : Enabled     DRAM Speed Option          : Slowest
  Memory Test Tick Sound     : Enabled     DRAM Write CAS Pulse       : 2T
  Memory Parity Error Check  : Enabled     Cache Write Cycle Option   : 3T
  Hard Disk Type 47 RAM Area : 0:300       Cache Read Cycle Option    : 2T
  Wait for (F1) If Any Error : Enabled     Bus Clock Frequency Select : 7.15 MHz
  Numeric Processor Test     : Enabled     Video Cacheable Option     : Disabled
  Weitek Processor           : Absent
  System Boot Up Sequence    : A:, C:
  External Cache Memory      : Enabled
  Internal Cache Memory      : Enabled
  Password Checking Option   : Setup
  Video   ROM Shadow C000,32K: Enabled
  Adapter ROM Shadow C800,32K: Enabled
  Adapter ROM Shadow C000,32K: Disabled
  Adapter ROM Shadow D000,32K: Disabled

  ESC:Exit  ↑↓→←:Sel  <Ctrl>Pu/Pd:Modify  F1:Help  F2/F3:Color
  F5:Old Values  F6:BIOS Setup Defaults  F7:Power-On Defaults
```

- **Typematic Rate Programming.** This option enables or disables Programming of the keystroke repeat rate, which is adjusted by means of the next two options.

- **Typematic Rate Delay (msecs).** If Typematic Rate programming is *Enabled, this* optinn allows you to specify the delay betweem holding down a kcy and when the character begins repeating

- **Typematic Rate (Chu/See).** If *Typematic Rate Programming is Enabled, this* option allows you to specify the rate at which a character keeps repeating.

- **Above 1 MS Memory Test.** When *Enabled this option causes* memory above 1 MB to be checked dining the POST. If *Disabled, only the* first 1 MB is checked during the POST.

- **Memory Test Tick Smmd.** This option enables or disables an audible sound during the POST memory trot.

- **Memory Parity Error Check.** Tbia option enables or disables BIOS memory parity error chinking routines

- **Hard Disk Type 47 RAM Area.** Select 0:300 unless your system is running a network operating system which uses the 0300 address for *system operations*

- **Waft for <F1> If Any Error.** Disable this option to eliminate the need for any user response to a non-fatal error condition during the POST.
- *Numeric* **Processor Test.** This option enables or disables a BIOS test of the numeric processor internal to the 486 DX/DX2, 487SX, P24T and Overdrive series of CPUS during the POST. This option is *Enabled by* default.
- **Weitek Processor.** The VESA 4S6 mainboard does not support a Weitek processor, this option is therefore set to *Absent*
- **System Boot Up Sequence.** As a general guideline, select A then C (*A:, C.*) if you will normally boot the operating system from a floppy disk Select C then A (*C:,* A.) if you will normally boot the operating system from the hard disk drive
- **External Cache Memory.** This option enables or disables the secondary external cache on the mainboad You should leave this option *Enabled* for optimal performance
- **Internal Cache Memory.** This option enables or disables the CPUs internal set-associative cache You should leave this option *Enabled* for optimal performance
- **Password Checking Option** This allows you to optionally limit access to the system or to the Setup program alone If you enable security by selecting *Always* or *Setup*, access to the system and/or the Setup program is resticted to valid password entry
- **Video ROM Shadow.** This option allows you to shadow the video BIOS address region from C000h to C7FFh. Shadow RAM is a technique that copies slower 8- or 16-bit ROM BIOS extensions to faster 32-bit RAM system memory Unless you encounter a compatibility problem, you should enable video ROM shadowing to improve performance
- **Adapter ROM Shadow. These** options allow you to shadow 32kb ROM BIOS address ranges from C800h to C7FFh. Shadow RAM is a technique that copies slower 8- or 16-bit ROM BIOS extensions to faster 32-bit RAM system memory If your system includes an adapter With a BIOS extension which supports shadowing, you may obtain improved performance by shadowing the address range assigned to the adapter.
- **AUTO Config Function. When this** *option is Enabled,* the BIOS automatically configures DRAM, cache and I/O bus clock settings based on detection of the CPU clock speed set this option to

Disabled to manually set DRAM, cache and I/0 bus clock operating parameters.

Note!

> *It is highly recommended that the AUTO Config Function be Enabled. If this function is enabled, then you must start the system in Turbo mode so that the BIOS correctly detects the system clock speed.*

- **DRAM Speed Option.** This option allows you to select among four DRAM read settings. The optimal setting depends on CPU clock speed and the rated access tune of installed DRAM, but as a general guideline select *Fastest* for clock speeds of *25MHz or* lower, *Faster* for 33MHz, Slower for 40MHz, and Slowest for 50MHz speeds.

- **DRAM Write CAS Pulse.** This option allows you to select between two CAS (column address strobe) delay settings during DRAM write cycles, to ensure compatibility with slower DRAM at higher CPU clock speeds. As a general guideline select *1T* for clock speeds of 33MHz or lower, select 2Tfor clock speeds above 33MHz.

- **Cache Write Cycle Option.** This option allows you to select between two cache write settings. The optimal setting depends on CPU clock speed, the speed rating of the SRAM, and the size of the cache, but es a general guideline select 2T for clock speeds of 33 MHz or lower, *select 3T* for clock speeds above 33MHz

- **Cache Read Cycle Option.** This option allows you to select between two cache burst read settings. Again, the optimal setting depends on CPU clock speed, the speed rating of the SRAM, and the size of the cache, but as a general guideline select 1 T for clock speeds of 33MHz or lower, select 2T for clock speeds above 33MHz. For 128-kb cache memory configurations, you may need to select 2' 2' for clock speeds below 33MHz because only one bank of data cache memory is filled

- **Bus Clock Frequency Select.** This option allows you to select among eight I/0 bus clock speed settings. Possible settings are derived from, and vary according to, CPU clock speeds so that, for example, at a CPU clock speed of 33MHz selecting 1/3 CLK would result in a bus clock speed of 11 MHz. The optimal setting depends on CPU clock speed and the speed ratings of installed adapter cards, but as a general guideline select 7.15 MHz or a setting which will yield a bus clock speed of 5MHz to ensure compatibility with older adapter cards.

- **Video Cacheable option.** This option puts the most frequently called video BIOS routines in cache to improve video efficiency. This option is *Disabled by* default, but if no compatibility problems arise

you may obtain improved performance by setting this option to **Enabled.**

The table below summarizes the manufacturer's recommended Advanced CMOS settings for various CPU types end cache memory sizes supported by your mainboard.

Table 12 *Recommended* **Advanced CMOS Settings**

CPU	486/7SX-25 486DX2-50 P24T-50 Cx486S2-40/50 Cx486DX2-50				486DX-40 486DS-40 Cx486DX-40	486DX-50 Cx486DX-50
Cache Size	128kb	64kb 266kb	128kb	64kb 266kb	64kb/128kb/256kb	
DRAM Speed Option	Fastest	Fastest	Slower	Slower	Slower	slowest (default)
DRAM Write CAS Pulse	IT	IT	IT	IT	2T	2T (default)
Cache Write cycle Option	2T	2T	2T	2T	3T	3T (default)
Cache Read Cycle Option	IT	IT	IT	IT	2T	2T (default)
Bus Clock Frequency Select	I/3 CLK	I/3 CLK	I/4 CLK	I/4 CLK	I/5 CLK	I/6 CLK
OSC/clock generator	25 MHz	25 MHz	33 MHz	33 MHz	40 MHz	50 MHz

3.7 Changing the Password

If the *Password Checking Option* under the *Advanced CMOS Setup* menu is set to either *Always* or *Setup,* password entry is required every time the system boots or an attempt is made to enter the Setup program, respectively The *Change Password menu* allows you to change the current password, as illustrated below

Figure 18. *BIOS Password Setup Screen*

```
          AMIBIOS  SETUP  PROGRAM - CHANGE  PASSWORD
       (C)1992 American Negatrends Inc., All Rights Reserved




                  ┌──────────────────────────┐
                  │  Enter CURRENT Password:  │
                  └──────────────────────────┘





    "     : Maximum 6 ASCII Characters, ESC: Exit
```
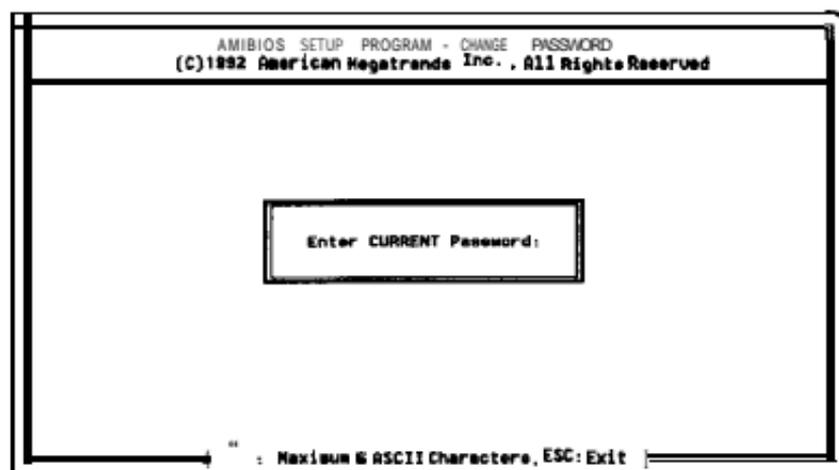
- To change the current password, select the Change Password menu option from the Setup main menu You wdl be prompted to enter the old password before gaining access

- After entering the correct current password, you will be prompted to enter a new password The password can be no longer than 6 characters After entering the new password, you will be prompted to enter it a second tune for confirmation If the second entry matches the first, you will be notified that the new password has been installed

> **Note!**
>
> *If you forget or lose your password, the only way to access the system and/or Setup program is to discharge the CMOS battery by temporarily changing the jumper setting of JP510* discharge *CMOS.*

3.8 Auto Detect Hard Disk

If the Auto Detect Hard Diskmenu is selected from the Setup mainmenu, the AMI BIOS will attempt to automatically determine the appropriate drive type and relevant parameters of installed hard disks. The BIOS can generally obtain the correct drive parameters of an IDE drive by issuing an " DE Identify Drive" command However, some IDE drives either do not respond correctly to the " DE Identify Drive" command, or respond with the physical parameters, rather than the manufactures recommended translating parameters. In such cases, you should consult your hard disk manual for the manufactures recommended drive type and parameters.

3.9 Hard Disk Utility

If the **Hard Disk Utility menu is** selected from the Setup main menu, you will be presented with three options: **Hard Disk Format,** **Auto Interleave,** and **Media Analysis.**

Backup!

> *Performing any of these operations will destroy all data on the hard disk, so be swe to backup your data before selecting any of these options.*

● Hard Disk Format. This option performs a low-level format of the hard disk. Note that many hard drives are factory low-level formatted, and should nnt be reformatted. Check with your hard disk **manufacturer** before selecting this option

Winning!

> *IDE and SCSI hard drives should not normally be low-level formatted. Refer to your hard disk dealer or manufacturer before wing & AMI HardDisk Utility.*

● **Auto Interleave This** option determines the optimum interleave factor prior to a low-level format of the hard disk.

● Media Analysis. This option analyzes each track on the hard disk to determine if it is usable If it is unusable, the track is marked as "bad" so that the system will not write data to it. Many manufacturers provide a list of bad tracks so that this step may not be necessary.

The Hard Disk Utility **Media Format screen is** pictured below

Figure 19 BIOS Hand *Disk Utility* Screen

```
           AMIBIOS SETUP PROGRAM - HARD DISK UTILITY
           (C)1992 American Megatrends Inc All Rights Reserved

                                 Cyln  Head  WPcom LZone Sect  Size (MB)
Hard disk C: type : 47 + USER TYPE 1314   7    1314  1314   17    78
Hard disk D: type : Not Installed

   ┌─── Hard Disk Format ────┐   ┌── Bad Track Edit Menu ─┐  ┌─ Bad Track # 0 ─┐
   │                         │   │                        │  │ No.  Cyln. Head │
   │ Disk Drive (C/D)   ? C  │   │ Add an Entry           │  │                 │
   │ Disk Drive Type    ? 47 │   │ Revise an Entry        │  │                 │
   │ Interleave (1-16)  ? 3  │   │ Delete an Entry        │  │                 │
   │ Mark Bad Tracks (Y/N) ? Y│  │ Clear Bad Trk List     │  │                 │
   │ Proceed (Y/N)      ?    │   └────────────────────────┘  │                 │
   └─────────────────────────┘                               │                 │
                    ┌───────────────────────┐                └─────────────────┘
                    │ Enter Cylinder # : 0  │
                    │ Enter Head #  :       │
                    └───────────────────────┘

              ┤ ESC:Exit    ↓�→↑←:Select ├
```

3.10 Exiting Setup

● To exit Setup, **press@ to return to the Setup main menu**

● **To save your changes and exit Setup, select** *Write to CMOS and Exit*

● **To exit Setup without saving your** changes, select **Do Not Write to**
   CMOS and Exit