

80486

486VESA Green Mainboard
User's Guide &
Technical Reference

Electrostatic Discharge Precautions

Make sure you ground yourself before handling the mainboard or other system components. Electrostatic discharge can easily damage the components. Note that you must take special precaution when handling the mainboard in dry or air-conditioned environments.

Abide by the precautions below to protect your equipment from electrostatic discharge:

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

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1 Introduction

The 486 VESA mainboard is a high-performance system board that supports 486DX2/DX/SX/SL Enhanced 486, P24T, P24D, and Cyrix M7 CPUs. The mainboard is fully compatible with industry standards, while incorporating many technical enhancements.

The 486 VESA mainboard offers superior system performance, compatibility, and reliability, and is the ideal choice for a wide variety of system applications.

Key Features

- Fully AT compatible. Supports 486DX2/DX/SX/SL Enhanced 486, P24T, P24D, Cyrix M7 CPUs, AMD CPUs, and UMC CPUs.
- Supports Power Management Mode
 - Supports the SMM and the SMI
 - CPU Stop Clock Function
 - Four Power Saving States (on / doze / standby / inactive)
 - Supports the APM control
 - Supports Suspend Switch control
 - Power Saving also on non-SMI CPU
 - More System Event Monitoring and the Power Saving Control
- Direct map cache controller that supports 256K cache size
- Fast page burst mode DRAM controller
- Memory configurations from 1MB to 128MB using combinations of 80ns 256K, 512K, 1M, 2M, 4M, 8M and 16M SIMM modules.
- Shadow RAM in Increments of 32KB
- Supports LBA mode hard disks
- Hardware turbo switch
- Seven 16-bit ISA slots, three master VESA slots

Unpacking the Mainboard

The mainboard package contains:

- The 486 VESA Mainboard
- This User's Guide

Note: Do not unpack the mainboard until you are ready to install it.

Follow the precautions below while unpacking the mainboard.

1. Before handling the mainboard, ground yourself by grasping an unpainted portion of the system's metal chassis.
2. Remove the mainboard from its anti-static packaging and place it on a grounded surface, component side up.
3. Check the mainboard for damage. If any chip appears loose, press carefully to seat it firmly in its socket.

Do not apply power if the mainboard appears damaged. If there is damage to the board contact your dealer immediately.

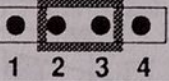


2 Hardware Setup 7

This chapter explains how to configure the mainboard's hardware. After you install the mainboard, you can set jumpers install memory and a coprocessor on the mainboard and make case connections. Refer to this chapter whenever you upgrade or reconfigure your system.

CAUTION: Turn off power to the mainboard, system chassis, and peripheral devices before performing any work on the mainboard or system.

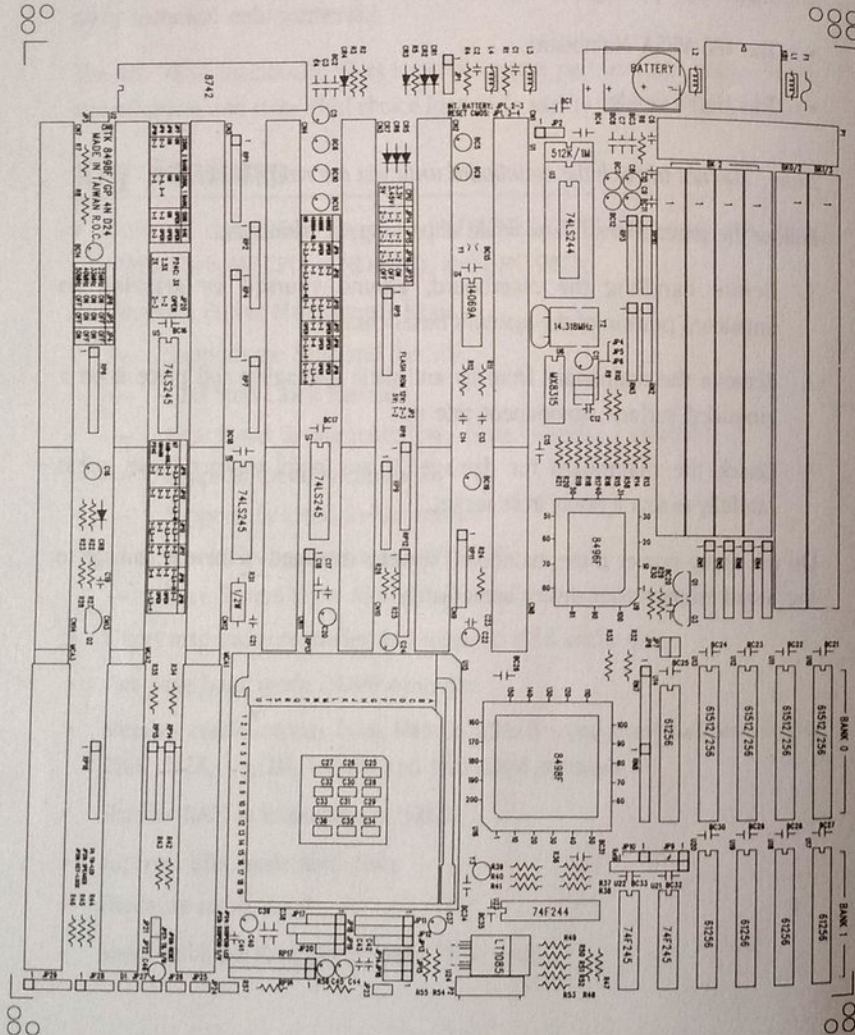
JP1 : CMOS Reset Jumper

JP1 lets you discharge CMOS memory in the event you forget your password or encounter a BIOS Setup problem. Before you install the mainboard make sure that JP1 is set to retain CMOS memory.

CMOS Setting	JP1
Retain CMOS Data (Default)	 1 2 3 4
Discharge CMOS	 1 2 3 4
External Battery (pins 1 and 4)	 1 2 3 4

JP25: Suspend Switch Connector

Attach the suspend switch to connector JP25. The connector is open for normal operation, closed for Green operation (power saving).



CPU Type Configuration

Configure the 486 VESA mainboard's CPU by inserting the specified CPU and setting jumpers as described in the diagrams that follow.

Intel/AMD CPU Jumper Settings

Intel

486SX-25/33 Settings

486SX-33

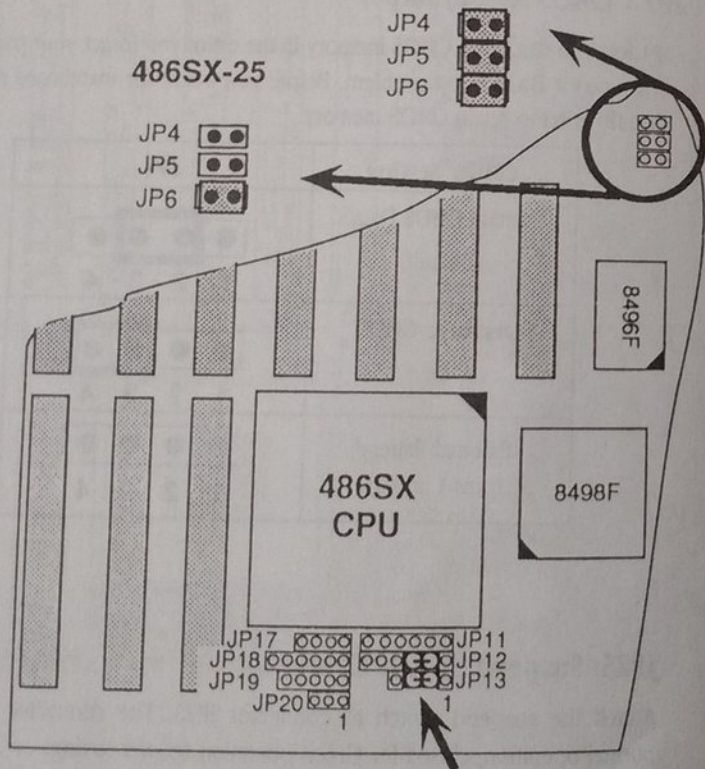


Figure 2-1. 486SX-25/33 Jumper Settings

Intel/AMD

486DX- 25/33/40*/50* & DX2-50*/66* Settings

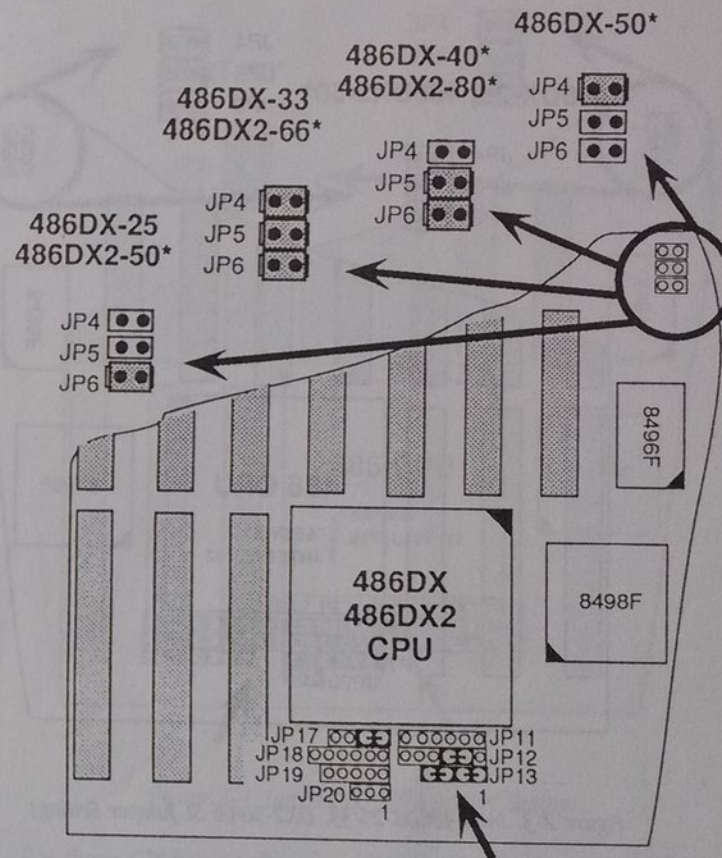


Figure 2-2. 486DX-25/33/40/50, 486DX2-50/66 Jumper Settings

* For these CPUs a cooling fan is necessary for system stability.

**Intel
486DX-25/33SL, DX2-50/66 SL Settings
(Green CPU)** 486DX-33, 486DX2-66*

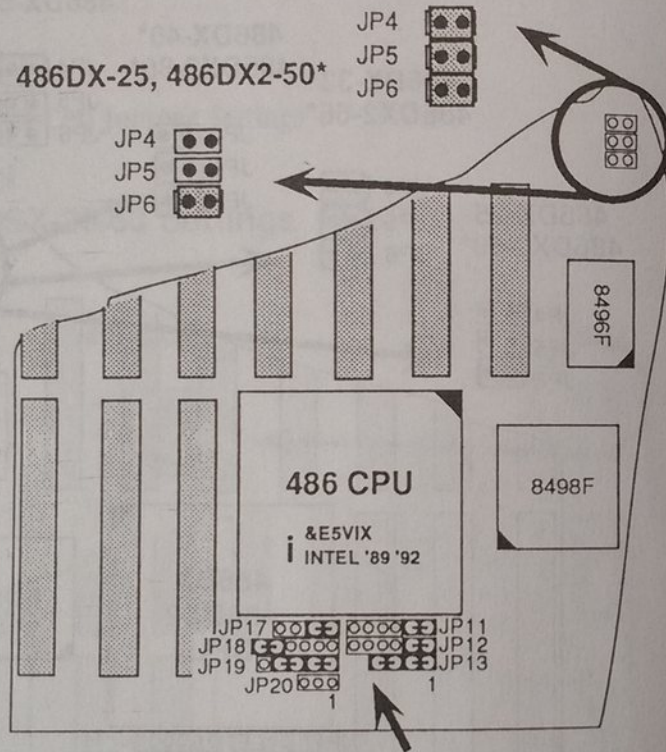


Figure 2-3. Intel 486DX-25/33, DX2-50/66 SL Jumper Settings

* For these CPUs a cooling fan is necessary for system stability.

**Intel
P24T-50*/66* Settings
(Green CPU)** P24T-66*

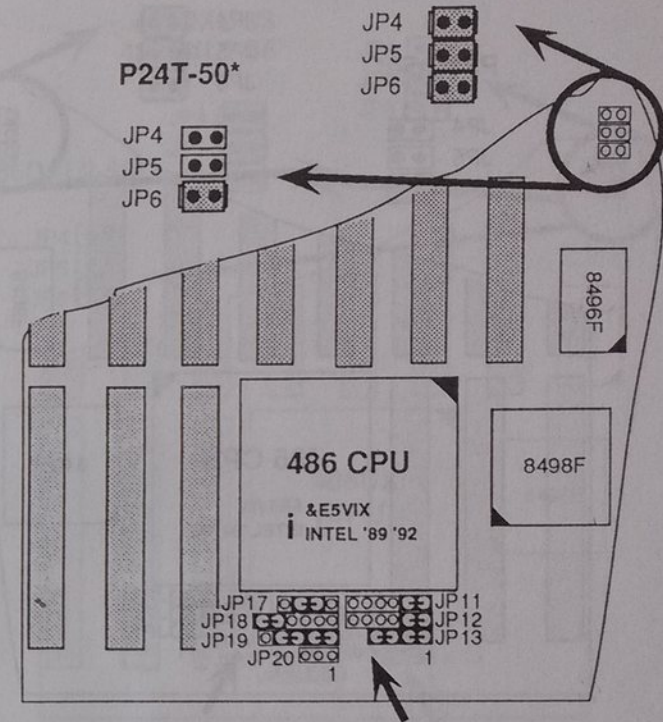


Figure 2-4. Intel P24T-50/66 Jumper Settings

* For these CPUs a cooling fan is necessary for system stability.

**Intel
P24D-50*/66* Settings
(Green CPU)**

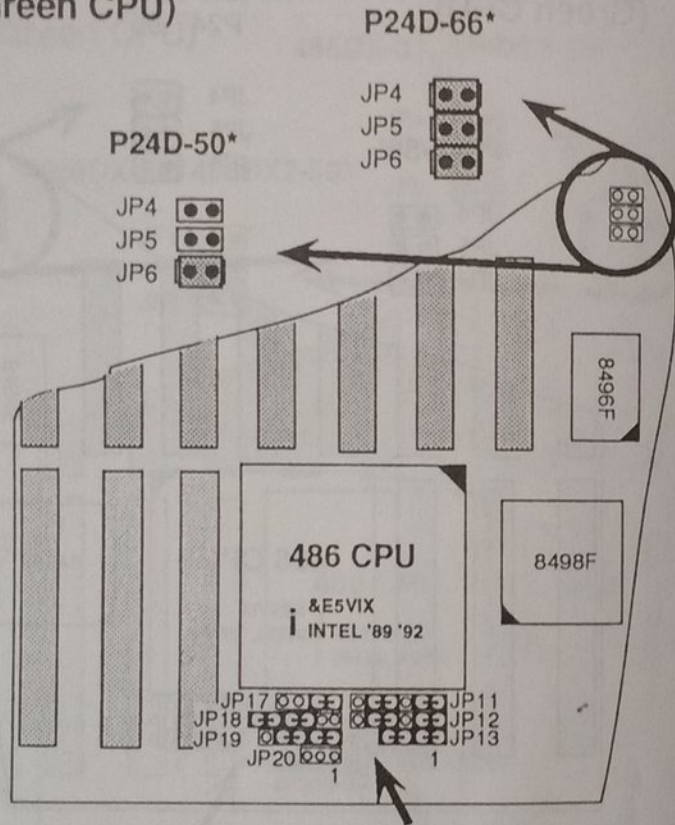


Figure 2-5. Intel P24D-50/66 Jumper Settings

* For these CPUs a cooling fan is necessary for system stability.

**AMD
486DXL-33/40*, 486DXL2-50*/66*/80* Settings
(Green CPU)**

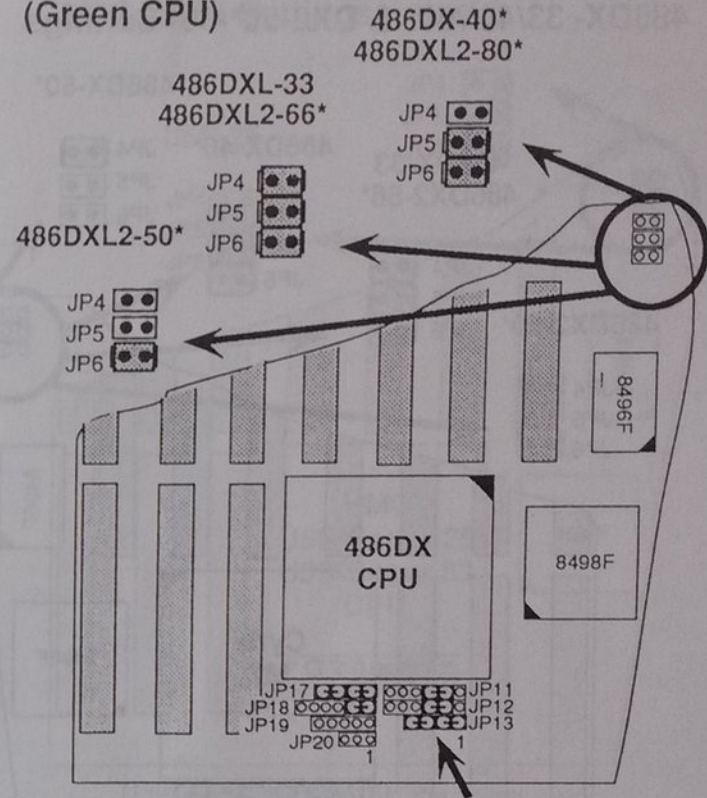


Figure 2-6. AMD 486DXL-66 Jumper Settings

* For these CPUs a cooling fan is necessary for system stability.

Cyrux CPU Jumper Settings

Cyrux (M7)
486DX- 33/40*/50* & DX2-50*/66* Settings

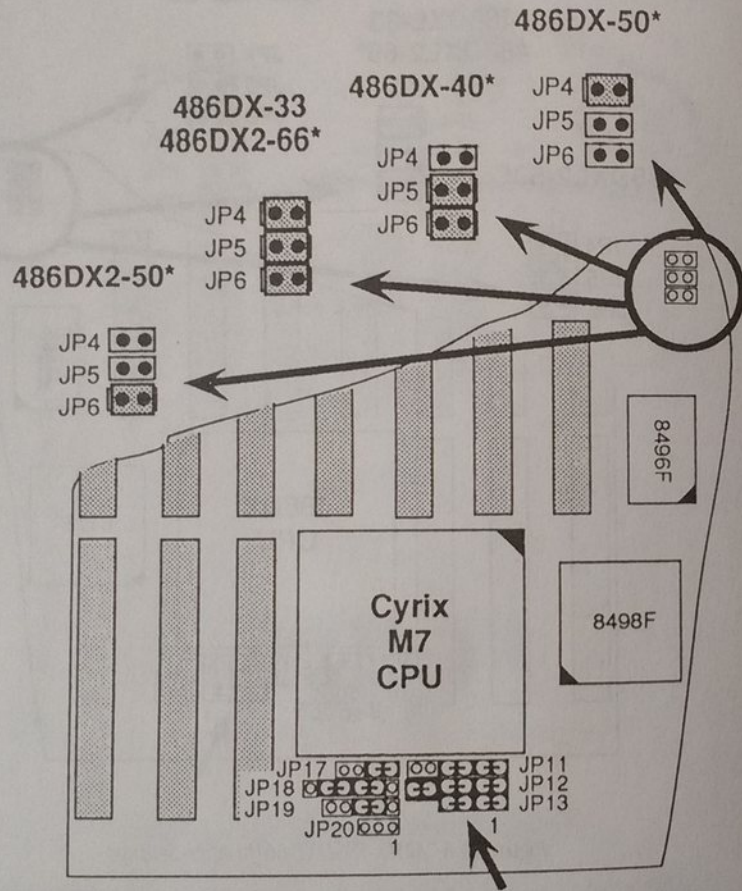


Figure 2-7. Cyrux 486DX/DX2 (M7) Jumper Settings

* For these CPUs a cooling fan is necessary for system stability.

UMC CPU Jumper Settings

UMC
U5S-25/33 Settings U5S-33

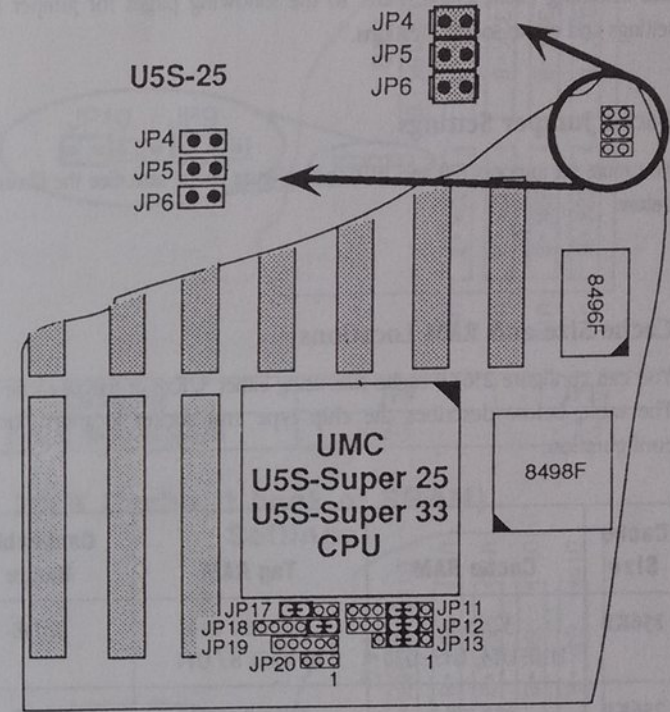


Figure 2-8. UMC 486SX Jumper Settings

Note: If you use a CPU not listed in this manual, please contact your dealer to determine the correct CPU settings.

Cache Configuration

The 486 VESA mainboard has a write-back caching scheme. You can configure the mainboard's external cache for 256KB by setting jumper switches and installing cache chips. Refer to the following pages for jumper switch settings and cache socket locations.

Cache Jumper Settings

You must set jumpers JP9 and JP10 to configure cache size. See the illustrations below.

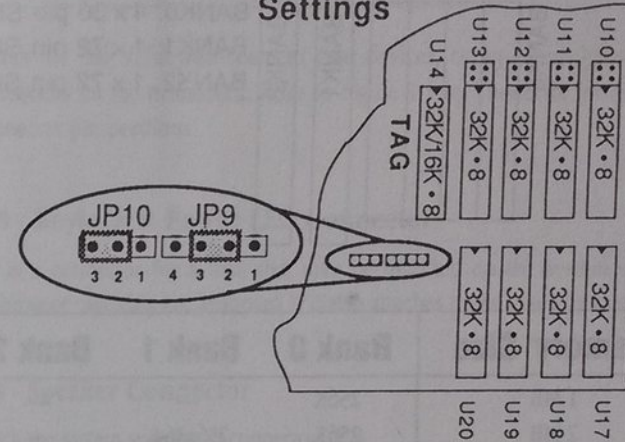
Cache Size and RAM Locations

You can configure 256KB cache size using either 32Kx8 or 64Kx8 cache chips. The table below describes the chip type and socket locations for each configuration.

Cache Size	Cache RAM	Tag RAM	Cacheable Range
256KB	32K x 8 / U10~U13, U17~U20	32K x 8 / U14 or 16K x 8 / U14	32 MB
256KB	64K x 8 / U10~U13	32K x 8 / U14 or 16K x 8 / U14	32 MB

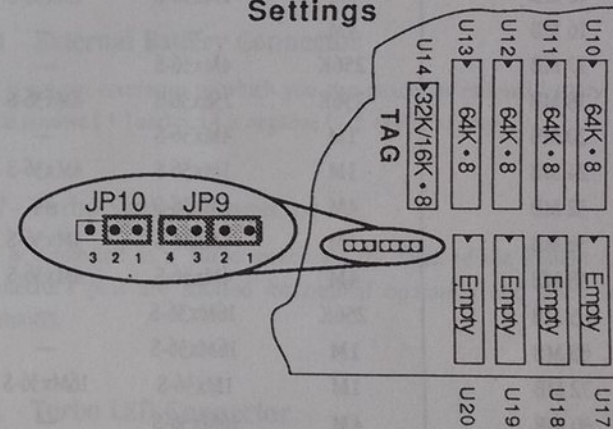
Note: Tag and Data RAM use 20ns for all conditions.

256K Cache (2 banks of SRAM) Settings



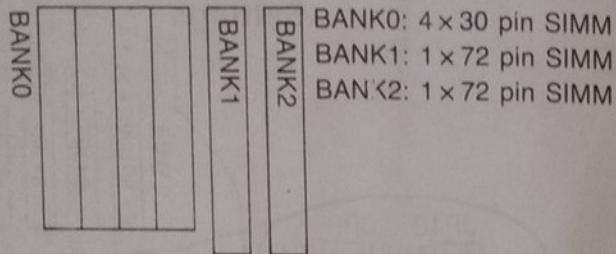
Cache Size	JP9	JP10
256K (2 Banks of SRAM)	2-3	2-3

256K Cache (1 bank of SRAM) Settings



Cache Size	JP9	JP10
256K (1 Bank of SRAM)	1-2, 3-4	1-2

Memory Configuration



Memory Size	Bank 0	Bank 1	Bank 2
1 MB	256K	—	—
2 MB	256K	256x36-S	—
4 MB	1M	—	—
5 MB	256K	1Mx36-S	—
6 MB	256K	256x36-S	1Mx36-S
8 MB	1M	1Mx36-S	—
12 MB	1M	1Mx36-S	1Mx36-S
16 MB	4M	—	—
17 MB	256K	4Mx36-S	—
18 MB	256K	256x36-S	4Mx36-S
20 MB	1M	4Mx36-S	—
24 MB	1M	1Mx36-S	4Mx36-S
32 MB	4M	4Mx36-S	—
36 MB	1M	4Mx36-S	4Mx36-S
48 MB	4M	4Mx36-S	4Mx36-S
65 MB	256K	16Mx36-S	—
68 MB	1M	16Mx36-S	—
72 MB	1M	1Mx36-S	16Mx36-S
80 MB	4M	16Mx36-S	—
96 MB	4M	4Mx36-S	16Mx36-S

Connectors

Attach the 486 VESA mainboard to case devices, or an external battery, via connectors on the mainboard. Refer to Figure 1-1 for connector locations and connector pin positions.

JP29 - Keylock & Power LED Connector

JP29 is a connector for a lock that may be installed on the system case for enabling or disabling the keyboard. JP29 also attaches to the case's Power LED.

JP28 - Speaker Connector

Attach the system speaker to connector JP28

JP26 - Hardware Reset Control

Attach the Reset switch to JP26. Closing the Reset switch restarts the system.

JP1 - External Battery Connector

JP1 is a 4-pin connector to which you can attach an external battery. Pin 1 of JP1 is positive (+) and pin 4 is negative (-). (Refer to Page 4.)

JP27 - Turbo Switch Connector

JP27 is connected to a Turbo switch on the front of the system case. The connector's pins are shorted for normal operation and open for turbo operation.

D1 - Turbo LED Connector

D1 connects to a Turbo LED on the case control panel and works with the Turbo Switch. If the mainboard is in Turbo mode, the Turbo LED lights.

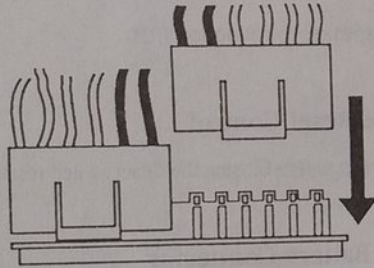
KB1 - Keyboard Connector

A five-pin female DIN keyboard connector is located at the rear of the board. Plug the keyboard jack into this connector.

P1 - Power Supply Connectors

The mainboard requires a power supply with at least 200 watts and a "power good" signal. P1 has two six-pin male header connectors.

Plug the dual connectors from the power directly onto the board connector while making sure the black leads are in the center.



3 BIOS Setup

The mainboard's BIOS setup program is the ROM ISA BIOS from Award Software Inc. Enter the Award BIOS program's Main Menu as follows:

1. Turn on or reboot the system. After a series of diagnostic checks, you are asked to press DEL to enter Setup.
2. Press the key to enter the Award BIOS program and the main screen appears:

ROM ISA BIOS CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP	PASSWORD SETTING
BIOS FEATURES SETUP	IDE HDD AUTO DETECTION
CHIPSET FEATURES SETUP	SAVE & EXIT SETUP
POWER MANAGEMENT SETUP	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	
Esc : Quit F10 : Save & Exit Setup	
↑ ↓ → ← : Select Item (Shift) F2 : Change Color	
Time, Date, Hard Disk Type...	

3. Choose an option and press <Enter>. Modify the system parameters to reflect the options installed in the system. (See the following sections.)
4. Press <ESC> at anytime to return to the Main Menu.
5. In the Main Menu, choose "SAVE AND EXIT SETUP" to save your changes and reboot the system. Choosing "EXIT WITHOUT SAVING" ignores your changes and exits the program.

The Main Menu options of the Award BIOS are described in the sections that follow.

Standard CMOS Setup

Run the Standard CMOS Setup as follows.

1. Choose "STANDARD CMOS SETUP" from the Main Menu. A screen appears.

```

ROM ISA BIOS
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

Date (mm:dd:yy) : Sat, Jan 1 1994
Time (hh:mm:ss) : 7 : 30 : 33

Drive C : User ( 773Mb)  1572  16  65535  1571  63  NORMAL
Drive D : None (  0Mb)    0    0    0    0    0  ----

Drive A : 1.44M, 3.5 in.
Drive B : None

Video : EGA/VGA

Halt On : All Errors

Base Memory:  640K
Extended Memory: 64512K
Other Memory:  384K
-----
Total Memory: 16384K

Esc : Quit      ↑ ↓ → ← : Select Item  PU/PD/+/- : Modify
F11 : Help     (Shift) F2 : Change Color  F3 : Toggle Calendar
  
```

2. Use arrow keys to move between items and select values. Modify selected fields using PgUp/PgDn/+/- keys. Some fields let you key in values directly.

Date (mm/dd/yy) Type the current date.

Time (hh:mm:ss) Type the current time.

Drive C & D Choose from the standard hard disk types 1 to 46. Type 47 is user definable. If a hard disk is not installed choose "Not installed." (default)

Drive A & B Choose 360KB, 5 1/4",
1.2MB, 5 1/4"
720KB, 3 1/2"
1.4M, 3 1/2" (default),
2.88 MB, 3 1/2" or
Not installed

Video Choose Monochrome,
Color 40x25,
VGA/EGA (default)
Color 80x25

3. When you finish, press the <ESC> key to return to the Main Menu.

BIOS Features Setup

Run the BIOS Features Setup as follows.

1. Choose "BIOS FEATURES SETUP" from the Main Menu and a screen with a list of items appears. (The screen below shows the BIOS default settings.)

```

ROM ISA BIOS
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.

CPU Internal Cache : Enabled
External Cache : Enabled
Quick Power On Self Test : Enabled
Boot Sequence : A,C
Swap Floppy Drive : Disabled
Boot Up NumLock Status : On
IDE HDD Block Mode : Enabled
Gate A20 Option : Fast
Memory Parity Check : Disabled
Typematic Rate Setting : Disabled
Typematic Rate (Chars/Sec) : 6
Typematic Delay (Msec) : 250
Security Option : Setup

Video BIOS Shdow : Enabled
C8000-CBFFF Shadow : Disabled
CC000-CFFFF Shadow : Disabled
D0000-D3FFF Shadow : Disabled
D4000-D7FFF Shadow : Disabled
D8000-DBFFF Shadow : Disabled
DC000-DFFFF Shadow : Disabled
E0000-E3FFF Shadow : Disabled
E4000-E7FFF Shadow : Disabled
E8000-EBFFF Shadow : Disabled
EC000-EFFFF Shadow : Disabled

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

2. Use the arrow keys to move between items and to select values. Modify the selected fields using the PgUp/PgDn/+/- keys. <F> keys are explained below:

<F1>: "Help" gives options available for each item.

Shift <F2>: Change color.

<F5>: Get the old values. These values are the values with which the user started the current session.

<F6>: Load all options with the BIOS Setup default values.

<F7>: Load all options with the Setup default values.

A short description of screen items follows:

CPU Internal Cache	This option enables/disables the CPU's internal cache. (The Default setting is Enabled.)
External Cache	This option enables/disables the external cache memory. (The Default setting is Enabled.)
Quick Power On Self Test	Enabled provides a fast POST at boot-up.
Boot Sequence	The default setting attempts to first boot from drive A: and then from hard disk C:. You can reverse this sequence with "C: A:", but then drive A: cannot boot directly.
Swap Floppy Drive	Enabled changes the sequence of the A: and B: drives. (The Default setting is Disabled.)
Boot Up Num Lock Status	Choose On or Off. On puts numeric keypad in Num Lock mode at boot-up. Off puts this keypad in arrow key mode at boot-up.
IDE HDD Block Mode	This option enables/disables the IDE HDD Block Mode function. Not all HDDs support this function.
Gate A20 Option	Choose Fast or Normal. Fast allows RAM accesses above 1MB using the fast gate A20 line.
Memory Parity Check	This option enables/disables the memory parity check function. (The Default setting is Disabled.)
Typematic Rate Setting	Enable this option to adjust the keystroke repeat rate.
Typematic Rate (Chars/Sec)	Choose the rate a character keeps repeating.
Typematic Delay (Msec)	Choose how long after you press a key that a character begins repeating.

Security Option Choose Setup or System. Use this feature to prevent unauthorized system boot-up or use of BIOS Setup.

"System" – Each time the system is booted the password prompt appears.

"Setup" – If a password is set, the password prompt only appears if you attempt to enter the Setup program.

Video or Adaptor BIOS Shadow

BIOS shadow copies BIOS code from slower ROM to faster RAM. BIOS can then execute from RAM. These 32K segments can be shadowed from ROM to RAM. BIOS is shadowed in a 32K segment if it is enabled and it has BIOS present.

- After you have finished with the BIOS Features Setup program, press the <ESC> key and follow the screen instructions to save or disregard your settings.

Chipset Features Setup

The Chipset Features Setup option changes the values of the chipset registers. These registers control system options in the computer.

Note: Change these settings only if you are familiar with the Chipset.

Run the Chipset Features Setup as follows.

1. Choose "CHIPSET FEATURES SETUP" from the Main Menu and the following screen appears. (The screen below shows default settings.)

ROM ISA BIOS CHIPSET FEATURES SETUP AWARD SOFTWARE, INC.	
Auto Configuration : Enabled	
DRAM Wait State Select : 2 WS	Non_Cacheable Block 0 : Disable
DRAM Page Mode : Normal	Non_Cacheable Block0 Size: 1MB
L2 Cache Read Wait State : 3-2-2-2	Non_Cacheable Block0 Base: 1000000H
L2 Cache Write Wait State: 0 WS	Non_Cacheable Block 1 : Disable
System BIOS Cacheable : Disabled	Non_Cacheable Block1 Size: 1MB
Video BIOS Cacheable : Disabled	Non_Cacheable Block1 Base: 0000000H
Keyboard Controller Clock: 9.5Mhz	
ISA Bus Clock Option : CLKI/4	
Local Ready Delay Setting: Delay 1T	
Signal LDEV# Sample Time : In T2	
ESC : Quit ↑ ↓ → ← : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift)F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults	

2. Use the arrow keys to move between items and select values. Modify selected fields using the PgUp/PgDn/+/- keys.
3. After you have finished with the Chipset Features Setup, press the <ESC> key and follow the screen instructions to save or disregard your settings.

Power Management Setup

The Power Management Setup option sets the system's power saving functions.

Run the Power Management Setup as follows.

1. Choose "POWER MANAGEMENT SETUP" from the Main Menu and a screen with a list of items appears.

ROM ISA BIOS POWER MANAGEMENT SETUP AWARD SOFTWARE, INC.	
Power Management : Disabled	* Monitor Event in Inactive Mode
Video Off Method : /H SYNC+Blank	IRQ 1 Event Monitor : Enabled
HDD Standby Timer : Disabled	IRQ 3 Event Monitor : Enabled
Doze Timer Select : 512 Min	IRQ 4 Event Monitor : Enabled
Standby Timer Select : 512 Min	IRQ 5 Event Monitor : Enabled
Inactive Timer Select : 512 Min	IRQ 6 Event Monitor : Enabled
	IRQ 7 Event Monitor : Enabled
	IRQ 9 Event Monitor : Enabled
	IRQ 10 Event Monitor : Enabled
	IRQ 11 Event Monitor : Enabled
	IRQ 12 Event Monitor : Enabled
	IRQ 14 Event Monitor : Enabled
	IRQ 15 Event Monitor : Enabled
	Master Device Monitor : Enabled
* Monitor Event in Full On Mode	
VESA Slave Activity : Enabled	
LPT Port Activity : Enabled	
COM Port Activity : Enabled	
ISA Master Activity : Enabled	
IDE Activity : Enabled	
Floppy Activity : Enabled	
VGA Activity : Disabled	
Keyboard Activity : Enabled	
ESC : Quit ↑ ↓ → ← : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift)F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults	

2. Use the arrow keys to move between items and to select values. Modify the selected fields using the PgUp/PgDn/+/- keys.

A short description of selected screen items follows:

Power Management Options are as follows:

User Define Let's you define the HDD and system power down times.

Disabled Disables the Green PC Features.

Min Saving Doze timer = 512 Min
Sleep timer = 512 Min
Inactive timer = 512 Min

Max Saving Doze timer = 0.5 Min
Sleep timer = 2 Min
Inactive timer = 2 Min

Optimize Doze timer = 8 Min
Standby timer = 8 Min
Inactive timer = 8 Min

Video Off Method

When Suspend mode occurs, the monitor screen shuts off. If any IRQ event occurs, the screen comes back on.

HDD Standby Timer

When the set time has elapsed, the BIOS sends a command to the HDD to enter standby (sleep) mode, which turns off the motor. Time is adjustable from 1 to 15 minutes. The default setting is Disabled. Some older model HDDs may not support this advanced function.

Doze Standby Timer

When the set time has elapsed, the BIOS sends a command to the system to enter doze mode (system clock drops to 8MHz). Time is adjustable from 0.5 to 512 minutes.

Standby Timer Select

The default is Disabled. Time is adjustable from 2 minutes to 512 minutes.

Inactive Timer Select

The default is Disabled. Only an SL-Enhanced (or SMI) CPU can enter this mode. Time is adjustable from 2 minutes to 512 minutes. Under inactive mode, the CPU stops completely (no instructions are executed).

Monitor Event in Full On Mode

The BIOS monitors these items for activity while the system is in the ON mode. If activity occurs from the Enabled item the system will not enter Green mode (power saving).

Monitor Event in Inactive Mode

The BIOS monitors these items for activity while the system is in the ON mode or the Inactive mode.

- After you have finished with the Power Management Setup, press the <ESC> key to return to the Main Menu.

Load Setup Defaults

This item loads the system values you have previously saved. Choose this item and the following message appears:

"Load SETUP Defaults (Y/N)? N"

To use the SETUP defaults, change the prompt to "Y" and press <Enter>.

Password Setting

This Main Menu item lets you configure the system so that a password is required every time the system boots or an attempt is made to enter the Setup program. Change the password as follows:

- Choose "PASSWORD SETTING" in the Main Menu and press <Enter>. The following message appears:

"Enter Password:"

- Enter a password and press <Enter>.

(If you do not wish to use the password function, you can just press <Enter> and a "Password disabled" message appears.)

- After you enter your password, the following message appears prompting you to confirm the new password:

"Confirm Password:"

- Re-enter your password and then Press <ESC> to exit to the Main Menu.

Important: If you forget or lose the password, the only way to access the system is to set jumper J20 to clear the CMOS RAM. All setup information is lost and you must run the BIOS setup program again.

IDE HDD Auto Detection

This Main Menu item automatically detects the hard disk type and configures the STANDARD CMOS SETUP accordingly.

Note: This function is only valid for IDE hard disks.

ROM 12A BIOS CMOS SETUP UTILITY AWARD SOFTWARE, INC.						
		CYLS.	HEADS	PRECOMP	LANDZONE	SECTORS
Drive C : User (49Mb)	790	15	65535	789	57
Drive D : User (0Mb)	0	0	0	0	0
Do you accept this drive C (Y/N)? N						
ESC : skip						

Printed in Taiwan R.O.C.