

Main Board User's Guide



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Chapter 1

Introduction

CONGRATULATIONS! You have chosen one of the most modern 486 main board on the market today. The manufacturer is confident that this product will provide all the performance and reliability you expect from a high quality 486 main board.

This 486 main board uses advanced design techniques and the most recent technology to provide you with high performance and flexibility. This system board takes full advantage of the 80486's capability to provide you with the processing speed you need for even the most demanding applications.

1-1 About this Manual

This manual is arranged to help you set up and run this 486 main board as soon as possible.

Information is presented in three chapters: In this *Introduction*, we tell you what you should receive in your 486 main board as well as provide information on the features and specifications of the product. The chapter enclosed with a diagram showing the layout of the 486 main board.

Chapter 2, *Main Board Setup*, includes detailed information on how to install and configure your 486 main board.

Chapter 3, *Memory installation*, describes the size and configuration of your system's on-board memory and external cache memory and gives instructions for installing the memory devices on the system board.

When the above steps have all been completed, you will need to adjust the BIOS setup using the software utility described in the *Appendix*.

1-2 The Green PC Function

The Power Management Unit (PMU) of this board strictly controls and dramatically reduces overall system power consumption. This is an accomplishment of the activity monitors which detect the system inactivity timer timeout, and signals the power-saving devices to slow down the clock frequency or remove the power sources from various peripherals.

There are four Power management mode in this board : Normal, Doze, Standby and Suspend mode.

- **NORMAL mode :** This mode is the normal operation mode of the PC system. In this mode, the doze timer start counting if no activity is taking place and the programable time-out period has expired.
- **DOZE mode :** In this mode, CPU frequency is slowed to 1/2 of normal frequency.
- **STANDBY mode :** There are two options in standby mode. One option is to put CPU in the STOPGRANT state, and the other is to scale the CPU and system clock to a lower frequency
- **SUSPEND mode :** In this mode. The PMU will stop the CPU clock (0MHz), slow down the system clock, power down the External Cache and so on.

More detail information refer to A-4.

1-3 Main Board Specifications :

☐ Fully PC/AT Compatible System

☐ Support CPU Type:

- Intel i486SX/SX2/DX2/DX4/SL-Enhanced/OverDrive/P24D CPUs
- AMD Am486 DX/DX2/DXL/DXL2 CPUs
- Cyrix Cx486 DX/DX2 (M7) CPUs
- UMC U5S
- System clock 25/33/40/50MHz
- Optional 239-Pin PGA or 237-Pin ZIF CPU socket.

☐ Memory:

- 30pin SIMM Socket x 4 (256K/1MB/4MB/16MB 8/9bits 70/80-ns SIMM Modules acceptable)
- 72-pin SIMM Socket x 2 (1MB/2MB/4MB/8MB/16MB/32MB 32/36-bit 70/80-ns SIMM Modules acceptable)
- Maximum 64MB on board

☐ Cache memory :

- Support Cache memory size 0/64/128/256/512KB (8Kx8, 32Kx8, 64Kx8 DIP)

☐ Expansion Slots:

- ISA slot 16 bits x 6, 8 bits x1
- VESA slots x 3
- (Master mode x 2, one is in VESA2, another is either in VESA1 or in VESA3, it will auto detect and switch by itself. Users don't need to set any jumper)

☐ Shadow RAM:

- System BIOS, Video BIOS and Other Adapter ROM BIOS

☐ BIOS:

- Award system BIOS

☐ PCB Size : 220mm x 250mm

☐ Software/Hardware turbo speed toggle

☐ Green PC :

- Meet EPA Green PC standard : power consumption under 30W on the Doze, Standby or Suspend mode

1-4 Main Board Layout

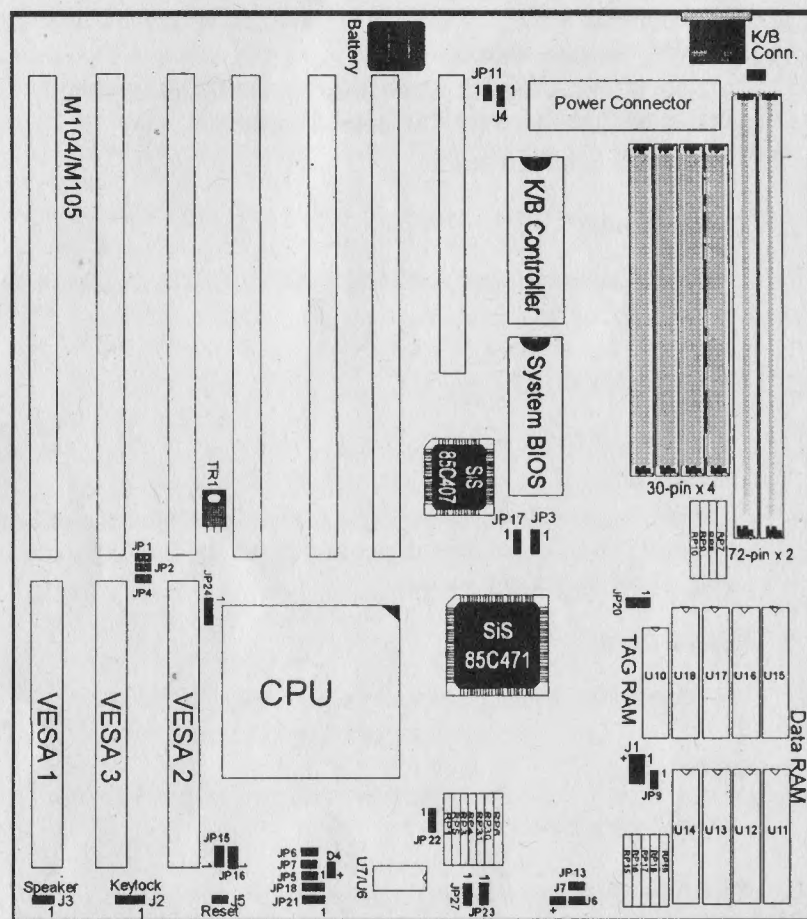


Figure 1. The Main board Layout (PCB Rev. M104/M105).

* Distinct characteristics between PCB Rev.M104 and Rev.M105 :
Rev. M105 add JP24 & JP27 to support new Cyrix 486 DX2V/DX4V (4V) CPU and AMD 486 DX2/DX4 (3.3V) CPU.

Jumper & Connector NO.	FUNCTION	REF. PAGE
J1	Peripheral Power Control Connector	P.17
J2	Keyboard Lock Connector	P.14
J3	Speaker Connector	P.14
J4	External Battery Connector	P.15
J5	Reset Switch Connector	P.15
J6	Turbo Switch Connector	P.16
J7	Turbo LED Connector	P.16
JP1-2,JP4,JP24*	CPU Power Voltage Setting Jumper	P.12
JP3,JP17-18,JP21,JP23, RP3-6,RP30-31	CPU Type Setting Jumper	P.11
JP5-JP7	System Clock Setting Jumper	P.10
JP11	CMOS Data Clear Jumper	P.17
JP13	Power Saving Toggle Switch Connector	P.16
JP15	VL-Bus Wait State Setting Jumper	P.17
JP16	VL-Bus Clock Setting Jumper	P.17
JP22,JP27*	CPU Core Frequency Setting Jumper	P.12
RP7-RP10	Main Memory Installation Jumper	P.20-22
RP15-RP19	Cache Size Setting Jumper	P.21
CN1	Keyboard Connector	P.13
CN2	Power Supply Connector	P.13
TR1	Regulator Socket (for 3.3/4V CPU used)	
D4	Green LED	P.17

* The JP24 and JP25 supported by PCB Rev.M105 only.

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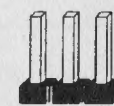
Chapter 2

Main Board Setup

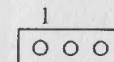
If your main board has already been installed by the dealer, you will still want to refer to this chapter in case you plan to make any changes or upgrade your system.

2-1 How to set Jumper

Jumper switch is used to select between various operating modes. A jumper switch consists of two or three gold pins projecting up from the system board. Placing the plastic jumper cap over two pins connects those pins and makes a particular selection. Using the cap to connect two pins, in this way is commonly referred to as shorting those pins. If the cap is not placed on any pins, this is referred to leave the pins open.



Pins



3 Pin Jumper



Cap



Setting



1-2 : Pin 1 and Pin 2 short together

2-2 CPU Type and System Clock Configuration

The main board can support all 486 serial microprocessors up to DX4 (P24C), running at system clock speed up to 50Mhz. If you are installing or upgrading the CPU on this board, you must set the CPU type (JP3,JP17~18,JP21,JP23,RP3~6,RP30~31) and configure the system clock generator jumper (JP5~JP7) to match the speed rating of the Microprocessor.

System Clock Setting Configuration (JP5~JP7)

System Clock	CPU Type	MX8315 / UM9515 (U7) is on board	IMI SC466 (U6) is on board
25MHz	486SX-25 486SX2-50 486DX-25 OverDrive-25 486DX2-50 486DX4-75		
33MHz	486SX-33 486DX-33 OverDrive-33 486DX2-66 486DX4-100		
40MHz	486SX-40 486DX-40 486DX2-80		
50MHz	486DX-50		

**WARNING!!**

Before you configure JP5~JP7, please make sure which component is used on U6 or U7.

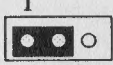


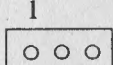


CPU Type Jumper Setting

CPU TYPE	UMC U5 486SX/SX2/SL-Enhanced)	486DX/DX2/DX4/SL-Enhanced	ODPR486 (486OverDrive)	P24D (486DX Write Back)	M7 CYRIX
JP3 & JP17	2-3	2-3	2-3	2-3	1-2
JP18& JP21	1-2	1-2	1-2	1-2	1-2
JP23	1-2	1-2	2-3	1-2	1-2
RP3		short	short		short
RP4				short	
RP5	short				
RP6				short	
RP30					short
RP31	short	short	short		

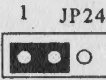
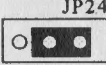
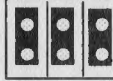
**WARNING!!**

1. If Cyrix CPU is used, you must set CPU Type Jumper and short Pin1-Pin2 of JP22.
2. Using the new Intel, AMD and Cyrix released CPU, you must make sure these jumpers (JP1, JP2, JP4 and JP24) are set correctly.

CPU Core Frequency Select Jumper (JP22, JP27)

JP22		+	JP27		Cyrix CPU is used
JP22					Intel DX4 CPU is used, and set CPU speed to two times system clock.
JP22					Intel DX CPU is used, and set CPU speed to three time system clock.
JP27					AMD DX2 (3.3V) is used
JP27					AMD DX4 (3.3V) is used

CPU Power Voltage Setting Jumper (JP1,JP2,JP4,JP24)

JP1 JP2 JP4	+	JP24		3.3V CPU is used (such as Intel and AMD DX2/DX4)
JP1 JP2 JP4	+	JP24		4V CPU is used (such as Cyrix DX2V/DX4V)
JP1 JP2 JP4				5V CPU is used (default)

* The JP24 and JP27 supported by PCB Rev.M105 Only.

2-3 Connectors and Jumper Setting

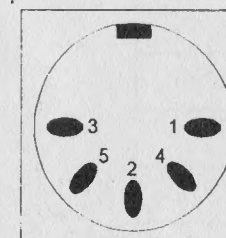
Connectors are used to connect the system board to other parts of the system, including the power supply, the keyboard and the various controllers on the front panel of the system case. When connecting connect-wires to the connectors you should remember that some of them must be aligned in a specific way in order to have proper function.

Power Supply Connector (CN2)

When installing the board, the power supply connector is usually the last connector to be connecting before installing the system peripherals. Before connect the power supply, check that it is not connected to power source.

Most power supplies have two sets of six-wire connectors that must be connected to the system board. Two of the wires on each connector are black. When connect these two connectors to the power supply connector, align them so that the two black wires on each connector are positioned in the middle.

1	■	POWER GOOD	Orange
2	■	+5V	Red
3	■	+12V	Yellow
4	■	-12V	Blue
5	■	GROUND	Black
6	■	GROUND	Black
1	■	GROUND	Black
2	■	GROUND	Black
3	■	-5V	White
4	■	+5V	Red
5	■	+5V	Red
6	■	+5V	Red

Keyboard Connector (CN1)

Pin	Definition
1	Keyboard Clock
2	Keyboard Data
3	(None)
4	Gound
5	+5VDC

Keyboard Connector / Pin Definitions

Keyboard Lock Connector (J2)

When this connector is connected to the keylock on the front panel of the system case, the lock can disable the keyboard, preventing other users to operate your computer. It is important to orient the cable correctly when connecting the keylock to the main board. As clearly labeled on the board, Pin 1 of the keyboard lock connector is counted from the left.

Pin	Definition
1	+5VDC
2	Ground
3	Ground
4	Keylock
5	Ground

*Keyboard Lock Connector / Pin Definitions***Speaker Connector (J3)**

An external speaker mounted inside the case can connect to the main board via this connector.

Pin	Definition
1	Speaker Signal
2	No Connection
3	GND
4	+5VDC

*Speaker connector / Pin Definition***External or Internal Battery Power Connector (J4)**

This connector may be used to connect an external 4.5V to 6V battery to back up or replace the on-board battery. When connecting the external battery, it is very important that the connecting wire be oriented correctly.

Pin	Definition
1	+4.5 - 6V DC
2	No Connection
3	Ground
4	Ground

*Battery Connector / Pin Definitions***System Reset Switch Connector (J5)**

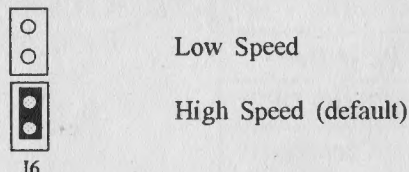
This connector should be connected to the Reset switch on the front panel of the system case. The Reset switch may be used to reset the computer, causing it to perform a cold restart from the power-on self test without turning off the power.

Pin	Definition
1	System Reset
2	GND

Reset Switch Connector / Pin Definitions

Hardware Turbo Switch Connector (J6)

The hardware turbo switch connector is used to connect the board to a hardware turbo switch on the front panel of the system unit. If connected, the hardware turbo switch can be used to toggle the turbo (high speed) mode on or off.



Turbo LED Connector (J7)



The turbo LED connector is connected to a turbo LED on the front panel of the system case. If connected, the turbo LED will light on whenever the system is running in turbo (high speed) mode. Note that when connect the turbo LED wire to the turbo connector, it is important to orient the wire correctly. The "+" terminal of the connector is the right-hand pin.

Power Saving Suspend / Resume Switch Connector (JP13)

There are four power management modes in this board: Normal, Doze, Standby and Suspend mode.

If you have power saving control switch on the front panel of the system case, you can trigger system into Suspend mode directly, system will slow down the CPU clock to zero MHz, power down the external cache and so on, then auto wake up by keyboard, mouse and Suspend / Resume switch ...etc.

JP13 : 1-2 short, force CPU into Suspend mode

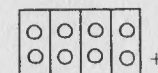
Green LED Connector (D4)



LED On : System running in power saving mode

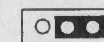
LED Off : System running normal mode.

Peripheral Green Control Connector (J1)



There are two ways to reduce the energy consumption of peripheral devices. One is to put the device on idle or standby state without turning off the power. (Some peripheral devices, such as IDE hard disk drive, have standby or idle mode build in). The other way is to turn off the power supply of the peripheral devices. The later function will be accomplished by these green control I/O connector (J1).

VL-BUS Wait State Setting (JP15)



0 Wait State



1 Wait State

3 2 1

VL-BUS Clock Setting (JP16)



<= 33MHz



> 33MHz

3 2 1

CMOS DATA Clear Jumper (JP11)



Default



Clear CMOS Data

3 2 1

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to take away Quick Reference for use.**

Jumper Setting Quick Reference

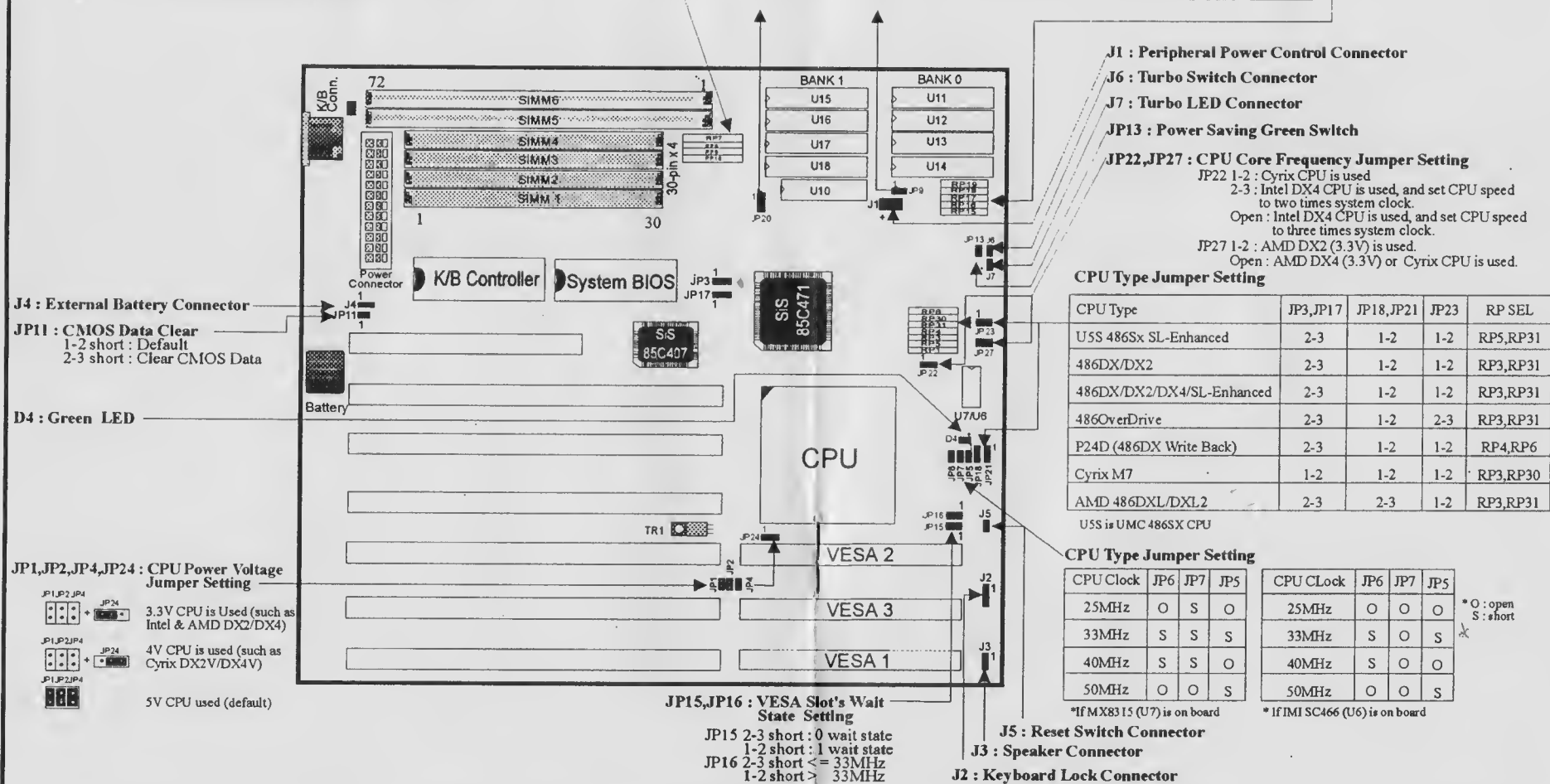
Main Memory Installation

SIMM A	SIMM B		
SIMM 1 -SIMM 4	SIMM 5	SIMM 6	RP SEL
Installed	Not-Installed	Not-Installed	RP10
Not - Installed	S/S Used	S/S Used	RP8
Not - Installed	D/S Used	D/S Used	RP7
Installed	S/S Used	S/S Used	RP10
Installed	D/S Used	S/S Used	RP9

* D/S : Double Side 72-Pin SIMMs are all 2MB/8MB or 32MB Modules.

RP15~RP19 : Cache Size Selection

Cache Memory Size	JP9	JP20	Tag RAM (U10)	Data RAM	RP SEL
64KB	1-2	1-2	8K*8 1PC	8K*8 8PCS (U11~U18)	RP15 short
128KB	2-3	1-2	8K*8 1PC	32K*8 4PCS (U11~U14)	RP16 short
256KB	2-3	1-2	32K*8 or 16K*8 1PC	32K*8 8PCS (U11~U18)	RP17 short
256KB	2-3	1-2	32K*8 or 16K*8 1PC	64K*8 4PCS (U11~U14)	RP18 short
512KB	2-3	2-3	32K*8 1PC	64K*8 8PCS (U11~U18)	RP19 short



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Chapter 3

Memory Installation

This 486 main board can operate from 1MB up to 64MB system memory installed on-board. There is also an external cache memory on the system board that may be installed from 64KB or 512KB in size. This chapter describes the types of memory devices that should be used with the main board and explains how to install the memory.

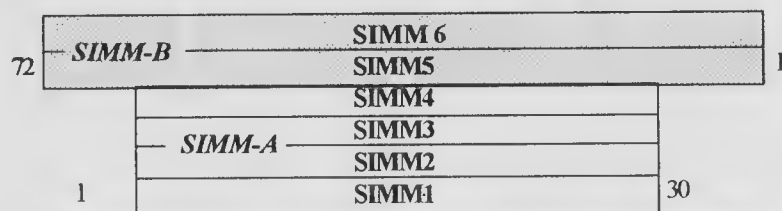
3-1 External Cache Memory Configuration

When you first install the cache memory on your system board or each time you upgrade or modify it, you need to adjust the cache memory size setting for the system. The cache memory size for the system is set by adjusting of JP9,JP20 and RP SEL.

Jumper Switch Settings					
Cache Memory Size	JP9	JP20	RP SEL.	TAG RAM (U10)	Data RAM
64KB	1-2 short	1-2 short	RP15 short	8Kx8 x 1pc	8Kx8 x 8pcs (U11-U18)
128KB	2-3 short	1-2 short	RP16 short	8Kx8 x 1pc	32Kx8 x 4pcs (U11-U14)
256KB	2-3 short	1-2 short	RP17 short	16Kx8 x 1pc	32Kx8 x 8pcs (U11-U18)
				32Kx8 x 1pc	
256KB	2-3 short	1-2 short	RP18 short	16Kx8 x 1pc	64Kx8 x 4pcs (U11-U14)
				32Kx8 x 1pc	
512KB	2-3 short	2-3 short	RP19 short	32Kx8 x 1pc	64Kx8 x 8pcs (U11-U18)

3-2 Main Memory Configuration

This board support any combination of 30-pin and 72-pin SIMMs up to 64MB. All possible memory configuration and jumper setting mapping are listed below for your selection reference.



SIMM-A		SIMM-B		
SIMM1-SIMM4		SIMM5	SIMM6	RP SEL
Installed		---	---	RP10
---		S/S Used	S/S Used	RP8
---		D/S Used	D/S Used	RP7
Installed		S/S Used	S/S Used	RP10
Installed		D/S Used	S/S Used	RP9

* S/S : Single side 72-pin SIMMs are all 1MB, 4MB or 16MB Modules.
 * D/S : Double side 72-pin SIMMs are all 2MB, 8MB or 32MB Modules.
 * "-": Empty

Only SIMM-A is installed with Single Side SIMMs

Size		SIMM-A	SIMM-B	
		SIMM1-SIMM4	SIMM5	SIMM6
1	1MB	256KB x 4	-	-
2	4MB	1MB x 4	-	-
3	16MB	4MB x 4	-	-
4	64MB	16MB x 4	-	-

Only SIMM-B is installed with Single Side SIMMs

Size		SIMM-A	SIMM-B	
		SIMM1-SIMM4	SIMM5	SIMM6
1	1MB	-	1MB x 1	-
2	2MB	-	1MB x 1	1MB x 1
3	4MB	-	4MB x 1	-
4	5MB	-	1MB x 1	4MB x 1
5	8MB	-	4MB x 1	4MB x 1
6	16MB	-	16MB x 1	-
7	20MB	-	4MB x 1	16MB x 1
8	32MB	-	16MB x 1	16MB x 1

Only SIMM-B is installed with Double Side SIMMs

Size		SIMM-A	SIMM-B	
		SIMM1-SIMM4	SIMM5	SIMM6
1	2MB	-	2MB x 1	-
2	8MB	-	8MB x 1	-
3	10MB	-	2MB x 1	8MB x 1
4	16MB	-	8MB x 1	8MB x 1
5	32MB	-	32MB x 1	-
6	40MB	-	8MB x 1	32MB x 1
7	64MB	-	32MB x 1	32MB x 1

SIMM-A & SIMM-B are installed at the same time
and **SIMM-B** is dedicated for **Single Side SIMMs**

RP7
RP8
RP9
RP10

Size		SIMM-A	SIMM-B	
		SIMM1-SIMM4	SIMM5	SIMM6
1	2MB	256KB x 4	1MB x 1	-
2	5MB	256KB x 4	4MB x 1	-
3	6MB	256KB x 4	1MB x 1	4MB x 1
4	18MB	256KB x 4	1MB x 1	16MB x 1
5	8MB	1MB x 4	4MB x 1	-
6	12MB	1MB x 4	4MB x 1	4MB x 1
7	20MB	1MB x 4	16MB x1	-
8	24MB	1MB x 4	4MB x 1	16MB x 1
9	36MB	1MB x 4	16MB x 1	16MB x 1
10	32MB	4MB x 4	16MB x 1	-
11	48MB	4MB x 4	16MB x 1	16MB x 1

SIMM-A & SIMM-B are installed at the same time,
SIMM 5 is dedicated for **Double Side SIMMs**, and **SIMM6**
is dedicated for **single side SIMMs**.

RP7
RP8
RP9
RP10

Size		SIMM-A	SIMM-B	
		SIMM1-SIMM4	SIMM5	SIMM6
1	12MB	1MB x 4	8MB x 1	-
2	16MB	1MB x 4	8MB x 1	4MB x1
3	36MB	1MB x 4	32MB x 1	-
4	48MB	4MB x 4	32MB x 1	-
5	64MB	4MB x 4	32MB x 1	16MB x 1

Appendix

Award BIOS Setup Program

ROM ISA BIOS (2C4I9C31)	
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	↑↓→← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Time, Date, Hard Disk Type...	

Figure 1 Setup Program Initial Screen

Award's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This content of information is stored in CMOS RAM so that the Setup information is retained even the power is turned off.

Entering Setup: Power on the computer and press immediately will allow you to enter Setup program.

A-1 Standard CMOS Setup

Choose the "STANDARD CMOS SETUP" option from the CMOS SETUP UTILITY Menu (Fig. 1) and the below screen is displayed. This standard Setup Menu allows users to configure system components such as date, time, hard disk drive, floppy disk drive, display and memory. Once a field is highlighted, on-line help information is displayed in the left bottom of the Menu screen.

ROM ISA BIOS (2C4I9C31)						
STANDARD CMOS SETUP						
AWARD SOFTWARE, INC.						
Date (mm:dd:yy): Wed, Jan 19 1994						
Time (hh:mm:ss): 8:30:50						
	CYLS.	HEADS	PRECOMP	LANDZONE	SECTORS	MODE
Drive C : None (0Mb)	0	0	0	0	0	----
Drive D : None (0Mb)	0	0	0	0	0	----
Drive A : 1.2M, 5.25 in.						
Drive B : None						
Video : EGA/VGA	Base Memory			640K		
Halt On : All Errors	Extended Memory			7168K		
	Expend Memory			0K		
	Other Memory			384K		
			Total		8192K	
ESC : Quit ↑↓→← : Select Item PU/PD/+/- : Modify F1 : Help (Shift) F2 : Change Color						

Figure 2 Standard CMOS Setup Screen

Except SCSI hard disk, to install hard disk (such as MFM, ESDI or IDE) in your system, all need to have their specifications recorded here. SCSI drives operate using device drivers and are not supported directly by BIOS.

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

Normal - for IDE drives smaller than 528MB.

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

Large - for drives larger than 528MB that do not use LBA function.

These can only be used with the MS-DOS and is uncommon.

A-2 BIOS Features Setup

By choosing the "BIOS FEATURES SETUP" option from the CMOS SETUP UTILITY Menu, the screen below is displayed. This sample screen contains the manufacturer's default values for the mainboard.

ROM ISA BIOS (2C4I9C31)			
BIOS FEATURES SETUP			
AWARD SOFTWARE, INC.			
Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
CPU Internal Cache	: Enabled	C8000-CFFFF Shadow	: Disabled
External Cache	: Enabled	D0000-D7FFF Shadow	: Disabled
		D8000-DFFFF Shadow	: Disabled
Boot Sequence	: A ,C	E0000-E7FFF Shadow	: Disabled
Swap Floppy Drive	: Disabled	E8000-EFFFF Shadow	: Disabled
Boot Up Floppy Seek	: Enabled		
Boot Up NumLock Status	: On		
Boot Up System Speed	: Low		
IDE HDD Block Mode	: Disabled		
Typematic Rate Setting	: Disabled	ESC : Quit ↑↓→← : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift) F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults	
Typematic Rate (Chars/Sec)	: 6		
Typematic Delay (Msec)	: 250		
Security Option	: Setup		

Figure 3 BIOS Feature Setup Screen

A. VIRUS PROTECTION

Virus Warning : ☒ Disabled ☐ Enabled

This feature protect the boot Sector and partition table of your hard disk. Any attempt to write to them will halt the system and cause a warning message to appear. If this happens, you can either allow the operation to continue or stop it.

B. CACHE CONTROL

CPU Internal Cache : ☐ Disabled ☒ Enabled

External Cache : ☐ Disabled ☒ Enabled

C. BOOT UP FEATURES

Boot Sequence : ☒ A : C ☐ C : A

Selects the drive where the system search first for operation system to run with.

Swap Floppy Drive : ☒ Disabled ☐ Enabled

If you enable this feature, the system will swap the floppy drive assignment so that Drive A will function as Drive B, Drive B will function as Drive A.

Boot up Floppy Seek : ☐ Disabled ☒ Enabled

During POST (power on self test), BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360K type is 40 tracks while 760K, 1.2M and 1.44M are all 80 tracks. If you disable this function, there will not be any warning message for 360K floppy drive installed.

Boot up Num Lock Status : ☒ On ☐ Off

On : Keypad is set to number-mode Keys

Off : Keypad is set to arrow-mode Keys

Boot up System Speed : ☒ High ☐ Low

If set to high speed, the system will run at high speed at immediately after power up.

D. IDE HDD BLOCK MODE : ☒ Disabled ☐ Enabled

This feature enhances hard disk performance by making multi-sector transfers instead of one sector per transfer. Most IDE drives, except very early designs, can use this feature.

E. TYPE MATIC RATE SETTING : ☒ Disabled ☐ Enabled

Define the setting of the Keyboard's typematic rate.

Typematic rate (Chars/Sec) : ☐ 2 ☒ 6 ☐ 30

Specifies the Key repeat rate

Typematic Delay (m sec) : ☒ 250 ☐ 500 ☐ 700 ☐ 1000

When holding down a key, the time between the first and second character displayed.

F. PASS WORD CONTROL

Security Option : ☐ System ☒ Set Up

System : the system will not boot and access to setup will be denied if the correct password is not entered at the prompt.

Setup : The system will boot, but access to setup will be denied if the correct password is not entered at the prompt.

G. SYSTEM BIOS SHADOW

Video BIOS Shadow : ☐ Disabled ☒ Enabled

Enables the system shadowing to achieve the best performance of the system .

C8000-CBFFF, CC000-CFFFF, D0000-D3FFF, D4000-D7FFF, D8000-D8FFF, DC000-DFFFF Shadow : ☒ Disabled ☐ Enabled

If you have a shadowing of the BIOS at any of above segment, you may set the appropriate memory cacheable function to "Enabled"

A-3 Chipset Features Setup

By choosing the "CHIPSET FEATURES SETUP" option from the CMOS SETUP UTILITY Menu, the screen below is displayed. This sample screen contains the manufacturer's default values for the mainboard.

By choosing the "Enable" option for "Auto Configuration". The BIOS will automatically detect the CPU speed and will auto-configure the bus frequency, DRAM speed, cache and read/write cycle.

ROM ISA BIOS (2C4I9C31)	
STANDARD CMOS SETUP	
AWARD SOFTWARE, INC.	
Auto Configuration	: Enabled
At Bus Clock	: 1/4 CLKIN
DRAM Speed	: Faster
DRAM Write WS	: 1WS
DRAM Write CAS	: 1T
DRAM Burst Read	: 2T
Cache Write Cycle	: 2T
System Shadow	: Non-Cacheable
Video Shadow	: Non-Cacheable

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

Figure 4 Chipset Features Setup Screen

Above all the entries on the screen are optional settings for this mainboard and you should not change them.

A-4 Power Management Setup

This section provides informations of functioning the Green PC power management features. For enabling the power management function, please select "POWER MANAGEMENT SETUP" option from the "CMOS SETUP UTILITY" Menu. You will be presented with a screen similar to one of the two illustrated screens below. The following two tables show you the screen with the manufacturer's default setting for this mainboard.

ROM ISA BIOS (2C4I9C31)	
POWER MANAGEMENT SETUP	
AWARD SOFTWARE, INC.	
Power Management	: User Define
PM Control by APM	: Yes
Video off option	: Susp/Stby off
IRQ 12/15 for PM	: IRQ 12
PM Timers	
HDD Power Down	: 10 Min
System Doze	: 3 Min
System Standby	: 10 Min
System Suspend	: 10 Min
PM Events	
Local Master	: Enable
Local Device	: Enable
Video Activities	: Enable
DMA Activities	: Enable
IRQ 1 (Keyboard)	: Enable
IRQ 3 (COM 2)	: Enabled
IRQ 4 (COM 1)	: Enabled
IRQ 5 (LPT or LAN)	: Enabled
IRQ 8 (Floppy Disk)	: Enabled
IRQ 7 (LPT or LAN)	: Enabled
IRQ 8 (RTC, OS2)	: Disabled
IRQ 9 (Reserved)	: Enabled
IRQ 10 (Reserved)	: Enabled
IRQ 11 (Reserved)	: Enabled
IRQ 12 (PS2mouse)	: Enabled
IRQ 13 (387)	: Enabled
IRQ 14 (Hard Disk)	: Enabled
IRQ 15 (Reserved)	: Enabled
ESC : Quit	↑ ↓ → ← : Select Item
F1 : Help	PU/PD/+/- : Modify
F5 : Old Values	(Shift) F2 : Color
F6 : Load BIOS Defaults	
F7 : Load Setup Defaults	

Figure 5-1 Power Management Setup for Non-SL-Enhanced CPU Screen

ROM ISA BIOS (2C4I9C31)	
POWER MANAGEMENT SETUP	
AWARD SOFTWARE, INC.	
Power Management	: User Define
PM Control by APM	: Yes
Video off option	: Susp/Stby off
PM Timers	
HDD Power Down	: 10 Min
System Doze	: 3 Min
System Standby	: 10 Min
System Suspend	: 10 Min
PM Events	
Local Master	: Enable
Local Device	: Enable
Video Activities	: Enable
DMA Activities	: Enable
IRQ 1 (Keyboard)	: Enable
IRQ 3 (COM 2)	: Enabled
IRQ 4 (COM 1)	: Enabled
IRQ 5 (LPT or LAN)	: Enabled
IRQ 8 (Floppy Disk)	: Enabled
IRQ 7 (LPT or LAN)	: Enabled
IRQ 8 (RTC, QS2)	: Disabled
IRQ 9 (Reserved)	: Enabled
IRQ 10 (Reserved)	: Enabled
IRQ 11 (Reserved)	: Enabled
IRQ 12 (PS2mouse)	: Enabled
IRQ 13 (387)	: Enabled
IRQ 14 (Hard Disk)	: Enabled
IRQ 15 (Reserved)	: Enabled
ESC : Quit	↑ ↓ → ← : Select Item
F1 : Help	PU/PD/+/- : Modify
F5 : Old Values	(Shift) F2 : Color
F8 : Load BIOS Defaults	
F7 : Load Setup Defaults	

Figure 5-2 Power Management Setup for Intel SL-Enhanced CPU Screen

A1. Selecting "Power Management" Mode:

The four optional power Management Modes could be set by pressing the arrow keys $\uparrow \downarrow \rightarrow \leftarrow$. And the system will enter into the respective "Power Management" modes as you selected, once the keyboard and mouse are detected as in idle.

1.Disabled Mode:

This Mode disabled the power management function, and the system will be in the normal operation (Non-Green) mode.

2.Max. saving Mode:

Select this mode, you will be presented the system defaulted Min. figures of four related timers, (HDD power Down Timer at "1min", system Doze Timer at "10sec", system Standby Timer at "10sec", system Suspend at "10sec") to facilitate the minimized power management function.

3.Min. saving Mode :

Select this mode, you will be presented the system defaulted Max. figures of four related timers, (HDD power Down Timer at "15min", system Doze Timer at "10min", system Standby Timer at "10min", system Suspend at "10min") to facilitate the minimized power management function.

4.User Define Mode:

User could define their own required delay timings of **PM Timers** by setting up the following four related timers:

a. HDD Standby Timer:

The entry period of this flexible standby mode timer is 1~15 min. Once the system stops reading from or writing to HDD, the standby timer at your defined timing starts counting. If there's no any activity and the programmable time-out period expired, the system will shut off the HDD power to enter standby mode. The HDD won't resume its function until the read/write command is executed.

b. Doze Timer select :

The entry period of this flexible standby mode timer is 10sec~3hr.

The option may scale CPU and system clock at the lower frequency (8MHz), and motivate the enabled **PM Events**. By touching the system keyboard or mouse, the CPU and system clock will auto-wake-up to a normal operation.

c. System Standby Timer :

The entry period of this flexible Suspend mode timer is 10sec~3hr.

In this mode, the Inactive timer starts counting. If there's no activity during the programmable period, the system will scale CPU and system clock at the lower frequency (8MHz) and motivate the enabled **PM Events**.

Besides, it will enable the monitor to enter Inactive mode with blank screen. And the monitor won't work again until the system keyboard or mouse is touched.

d. System Suspend Timer :

This timer will be only presented and adjustable / functionable if the system is installed with Intel SL-Enhanced series CPUs.

The entry period of this flexible standby / Suspend mode timer is 10sec~3hr.

If there's no any activity and the programmable time-out period expired, the system will shut off the CPU, HDD and monitor power to enter Suspend mode. The power consumption under this mode is even lower than that of standby mode.

A2. Selection "Monitor Events In Full on Mode"

PM Events include:

Local Master / Local Device / Video Activities

DMA Activities / IRQ1 (Keyboard) / IRQ3(COM2) / IRQ4 (COM1) / IRQ5 (LPT or LAN) / IRQ6 (Floppy Disk) / IRQ7 (LPT or LAN) / IRQ8 (RTC, OS2) / IRQ9 (Reserved) / IRQ10 (Reserved) / IRQ11 (Reserved) / IRQ12 (PS2 mouse) / IRQ13 (387) / IRQ14 (Hard Disk) & IRQ15 (Reserved)

The default setting of **IRQ 8(RTC, OS2)** event is "Disable" in order to make sure the Power Management mode be executed under OS2.

User could define personalized combination of **PM Events** by selecting "Enable" which will be checked whether the related function is still working or not before the respective defined power management mode is asked to be motivated.

B. Selecting "Video Off" option : (APM : Advanced Power Management)

1. YES option :

Selection "Yes" means that the defined Power Management Mode won't be executed until all the application softwares running under OS stop working.

That means, if there is any software still running under OS, the Power Management Mode will be executed only after all the software under OS stop working.

2. No option :

The defined Power Management Mode will be executed once the respective timer(s) is(are) time out.

C. Selecting "Video Off" option :

This option will be only presented and adjustable / functionable.

1. Always On option :

Monitor won't enter any Power Management Mode under any circumstance.

2. All modes → Off option :

Monitor will enter the defined Power Management Mode with blank screen once the respective PM timer is time out.

3. Susp/Stdby → Off option :

Monitor will enter the defined Power Management Mode with blank screen only when the time-out period of standby or suspend timer is expired.

4. Suspend → Off option :

Monitor will become blank screen only when the time-out period of suspend timer is expired.

D. IRQ 12/15 for PM (only for Intel non-SL-Enhanced series CPUs):

The IRQ 12 and IRQ 15 are ready for the function of PM. However, the appropriate selection from the both for this implementation is based on the I/O environment of installed systems, and the match is detailed as follows:

I/O	Appropriate IRQ No.
PS/2 mouse	15
IDE 2 Drive	12

A-5 Load Setup Defaults

"LOAD SETUP DEFAULTS" loads the default system values directly from ROM. If the stored record created by the setup program becomes corrupted (and therefore unusable), these defaults will be loaded automatically when you turn the computer on.

ROM ISA BIOS (2C4I9C31)	
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 MANAG	LOAD SETUP DEFAULT (Y/N)? Y SAVING
LOAD SETUP DEFAULTS	
ESC : Quit	↑↓→← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Time, Date, Hard Disk Type...	

Figure 6 Load Setup Defaults Screen

A-6 Password Setting

To change password, choose the "PASSWORD SETTING" option from the setup main menu and press [Enter]

1. If the CMOS data is not connect or this option has never been used, there is a default password which is stored in the ROM. The screen will display the following messages: **Enter Password**
Press the [Enter] key and continue to change the password
2. If the CMOS data is correct or this option has been used to change the default password, the user is asked for the password stored in the CMOS. The screen will display the following message: **Enter Password**
3. After pressing the [Enter] key (ROM password) or current password (user-defined password), you can change the password stored in the CMOS. The password can be at max. 8 characters in length.

Remember, to enable this feature, you must first select the "Security Option" either "Setup" or "System" in the BIOS FEATURES SETUP (Please refer to Figure 3).

A-7 Auto Detect Hard Disk

"IDE HDD AUTO DETECTION" This utility can **AUTO DETECT IDE HARD DISK TYPE**. If you do not know the **hard disk type**.

	CYKS	Heads	PRECOMP	LANDZONE	SECTORS	MODE
Drive C: (124Mb)	936	16	65535	935	17	normal
Drive D: (0Mb)	0	0	0	0	0	

Select Drive C option (N:skip) : Y							
OPTIONS	SIZE	CYLS	HEAD	PRECOMP	LANDZONE	SECTORS	MODE
1 (Y)	124Mb	936	16	65535	935	17	NORMAL

ESC : Skip

Figure 7 IDE HDD Auto Detection Screen

A-8 Save and Exit Setup

"SAVE & EXIT SETUP". If you select this and press the [enter] key, the values entered in the setup utilities will be recorded in the CMOS memory of the chip set. The microprocessor will check this whenever you turn on your system, and compare this to what it finds as it checks the system. This record is required for the system operation.

A-9 Exit Without Saving

"EXIT WITHOUT SAVING". Selecting this option and pressing the [Enter] key let you exit the Setup program without recording any new values or changing old ones.

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1. The first part of the report is a general statement of the purpose of the study.

2. The second part of the report is a description of the methods used in the study.

3. The third part of the report is a description of the results of the study.

4. The fourth part of the report is a discussion of the results of the study.

5. The fifth part of the report is a conclusion of the study.

6. The sixth part of the report is a list of references.

7. The seventh part of the report is a list of appendices.

8. The eighth part of the report is a list of figures.

9. The ninth part of the report is a list of tables.

10. The tenth part of the report is a list of footnotes.

11. The eleventh part of the report is a list of acknowledgments.

12. The twelfth part of the report is a list of abbreviations.

13. The thirteenth part of the report is a list of symbols.

14. The fourteenth part of the report is a list of units.

15. The fifteenth part of the report is a list of definitions.

16. The sixteenth part of the report is a list of acronyms.

17. The seventeenth part of the report is a list of initialisms.

18. The eighteenth part of the report is a list of abbreviations.

19. The nineteenth part of the report is a list of symbols.

20. The twentieth part of the report is a list of units.