GREEN

GXA486SPM

VESA ISA PCI with super multi-I/O

TRADEMARK

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Contents

Chapter 1
Introduction

The 486SPM motherboard is a high performance system hardware based on 486 processor. It designed with SIS85C496 / 497 VESA/ISA/PCI Chipset and SMC FDC37C665GT super multi I/O controller. The hardware dimension is 220mm * 250mm with four layer design technology.

The 486SPM dectects CPU working voltage automaticlly, and its jumper setting for CPU Selection is very easy.

Specification

- INTEL **80486SX/DX/DX2/DX4/P24D/P24T/SL-Enhanced,**
  AMD **Am486DX/DX2/DX4/SL-Enhanced**,
  Cyrix **M7(Cx486DX/DX2/DX4)/M1SC(Cx5x86),**
  UMC **U5** Processor with 237 pins ZIF socket.
- Supports up to 256 MegaBytes DRAM on board(72 Pins SIMM x 4), and "Table-Free" DRAM configuration.(Refer to Chapter 2-3 System Memory Configuration)
- Supports Secondary level **Write Through** and **Write Back** Cache mode. The cache memory combination could be 128KB/256KB/512KB/1MB (32KB*8, 64KB*8, or 128KB*8 DIP SRAM respectively).
- Support four 16 bits ISA slots, three 32 bits PCI slots, one VL-bus slot(slave), and dual ports Enhanced IDE connector.
  The 486SPM **built-in SMC FDC37C665** Super multi-I/O Controller. It support 1 floppy port **(up to 2.88MB),** 1 parallel port **(EPP,ECP port)** and 2 serial ports **(16550 fast UART compatible).**
- Support Award BIOS . The BIOS is stored either in ROM or in Flash ROM (optional) form. It provides better upgradeability for the user when Flash ROM is installed in the system.
- Supports SL-Enhanced CPU SMM (System Management Mode).
- Supports a **PS/2** Style mouse and standard AT Style keyboard connector.
- The 486SPM utilizes Lithium battery which provides environmental protection and longer life time.

486SPM Layout

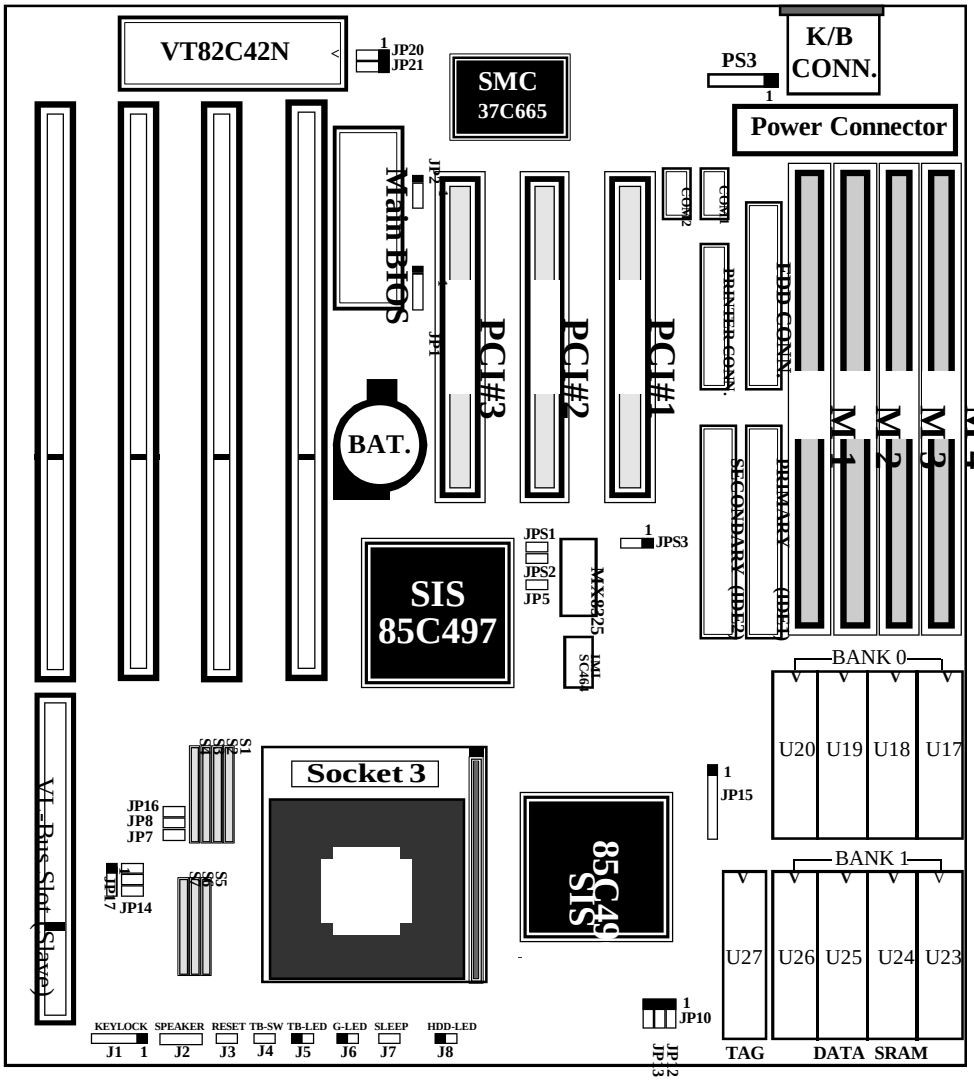


Figure 1-1

Chapter 2
Hardware design

2-1 Motherboard Layout

The 486SPM is designed with SiS85C496/497 PCI/ISA/VESA chipset which is developped by SiS Corporation to fully support 486 PCI/ISA/VESA system. The 486SPM utilize the green functions provided in the chipset to support power saving features when the system is in standby state. The 486SPM layout is shown in previous page (left page) for user's reference. **Care must be taken** when inserting memory modules, inserting 486 processor or even plugging PCI/VESA card into associated slots to avoid damaging any circuits or sockets on board. A cooling fan is strongly recommended when installing processor due to possible overheat.

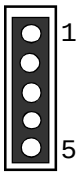
The 486SPM supports minimum of 1MB of System Memory and maximum of 256MB while Cache Memory can be 128KB up to 1MB to increase system performance.

The 486SPM supports dual ports Enhanced IDE connector, and detects IDE harddisk type by BIOS utility automaticlly. It also built-in SMC FDC37C665 Super multi-I/O contrrroller.

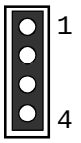
The 486SPM supports Award BIOS. The BIOS can be located in EPROM or Flash ROM. The advantage of having Flash ROM is much easier to replace BIOS code if necessary.

2-2 Connectors and Jumpers

This section describes all of the connectors and jumpers equipped in the motherboard. Please refer to **Figure 1-1** for actual location of each connector and jumper.

J1 

KeyLock - Keyboard lock switch & Power LED connector.
1.Power LED(+)
2.N/C
3.GND
4.Keylock
5.GND

J2 

Speaker - connect to the system's speaker for beeping.
1. Speaker
2. N/C
3. GND
4. GND

J3 

Reset - Close to restart system.

J4 

Turbo Switch : Close for higher speed while Open for slower speed. A BIOS hot key <CTRL><ALT><+> also brings system to a higher speed while <CTRL><ALT><-> set system to a slower speed.

J5 

Turbo LED indicator - LED ON when higher speed is selected.

J6 

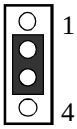
Power Saving LED indicator - LED ON when system is in any Saving mode.

J7 

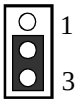
Sleep Switch - Force system to enter the Suspend mode.

J8 

IDE LED indicator - LED ON when IDE Harddisk activity.

JP1 

Battery connector
2-3 : Normal
1-4 : External Battery connector
3-4 : Discharge Battery (Clear CMOS Data)

JP2 

ROM type selection : 1-2 for 12V Flash ROM while 2-3 for 5V Flash ROM or EPROM.

JP5 

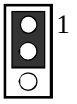
CPU Selection : Open for Intel 80486DX4 while colse for other CPU.

JP7 

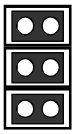
AMD (NV8T) CPU CLKMUL : Open for 3X CLK (80486DX4-100) while Close for 2X CLK(80486DX2-66/80).

JP8 

AMD X5 (5x86) CLKMUL : Open for 3X CLK(X5-150MHz) while Close for 4X CLK(X5-133/160MHz).

JP10 

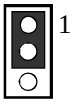
CPU Selection : 2-3 for UMC U5 while 1-2 for other CPU.

JP14 

CPU working voltage selection : 1-2,3-4,5-6 for 5V CPU while Open for 3.3V CPU.(Reserved)

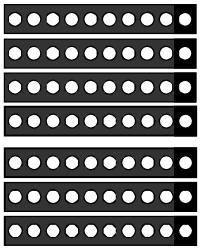
JP16 

CPU Selection : Open for Cyrix Cx486DX2 v80 while Close other CPU.

JP17 

CPU Selection : 1-2 for Intel/AMD/UMC CPU, 2-3 for Cyrix DX2v66/80(3.3V) while open for Cyrix DX/DX2-66/80(5V).

S1,S2,S3,S4,S5,S6,S7 : CPU Selection (Insert the "0 ohm " Resister Pack)



S1 : UMC/AMD(NV8T)
S2 : Intel-SL
S3 : Cyrix M7
S4 : Intel P24D/Cyrix 5X86/AMD(SV8B)/AMD X5
S5 : 486SX/U5S
S6 : 486DX/2/4/Cyrix M7/AMD(NV8T)/Cyrix 5x86
S7 : Intel P24D/AMD(SV8B)/AMD X5

Note :

1. AMD(NV8T) = Standard Am486 = Normal CPU/3.3V/8K Cache/Write Through
2. AMD(SV8B) = Enhanced Am486 = SL-Enhanced/3.3V/8K Cache/Write Back
3. AMD 5x86 = AMD X5
4. Cyrix 5x86 = Cyrix M1SC

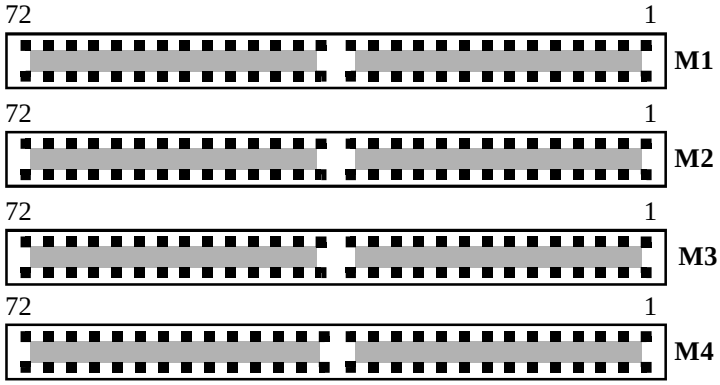
CPU CLOCK Selection : (IMISC464)

JPS1
JPS2
JPS3 1

CPU CLK	JPS1	JPS2	JPS3	CPU TYPE
25 MHz	OPEN	OPEN	1-2	DX2-50/DX4-75
33 MHz	CLOSE	CLOSE	1-2	DX2-66/DX4-100/X5-133
40 MHz	CLOSE	OPEN	1-2	DX2-80/DX4-120/X5-160
50 MHz	OPEN	CLOSE	2-3	DX-50/X5-150

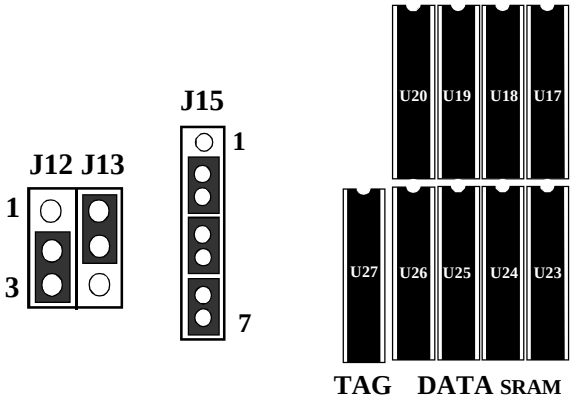
2-3 System Memory Configuration

The 486SPM supports **"Table Free"** DRAM configuration and different type of settings for the system memory. There is no jumper nor connector needed for memory configuration. **You can choice any SIMM socket to insert any type of 72 pins SIMM which you have.**



2-4 Cache Memory Configuration

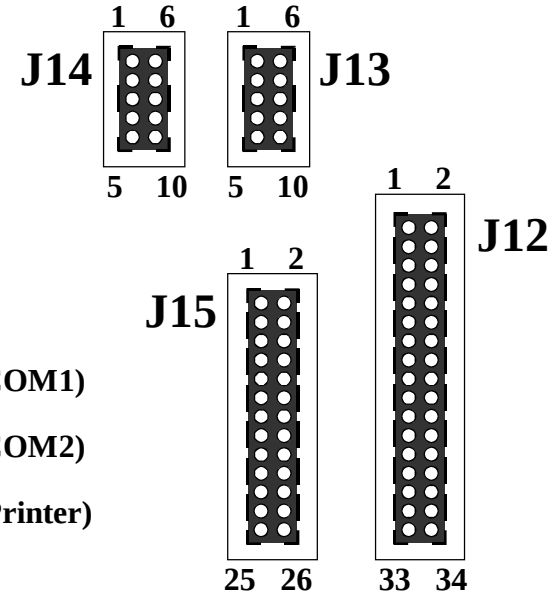
The second level of cache is installed in the motherboard to increase the system performance. The 486SPM supports different type of combinations for the cache installation. Jumper 12,13 and 15 settings are used to differential such combinations. Please refer to following configurations for the details.



CACHE Size	TAG SRAM (U27)	Data SRAM Install	Jumper Setting		
			JP12	JP13	JP15
128KB	8K8 x 1	32K8 x 4 U17,18,19,20	1-2	1-2	1-2,3-4 5-6
256KB	16K8 x 1	32K8 x 8 U17,18,19,20 U23,24,25,26	2-3	1-2	2-3,4-5 6-7
256KB	16K8 x 1	64K8 x 4 U17,18,19,20	2-3	1-2	1-2,3-4 5-6
512KB	32K8 x 1	64K8 x 8 U17,18,19,20 U23,24,25,26	2-3	2-3	2-3,4-5 6-7
512KB	32K8 x 1	128K8 x 4 U17,18,19,20	2-3	2-3	1-2,3-4 5-6
1MB	64K8 x 1	128K8 x 8 U17,18,19,20 U23,24,25,26	2-3	2-3	2-3,4-5 6-7

2-5 Super multi -I/O Controller

The 486SPM built in (SMC FDC37C665GT) super mulit-I/O controller. It supports 1 floppy port (up to 2.88MB), 1 parallel port(EPP/ECP optional) and 2 serial ports (16550 fast UART compatible). And all of the ports can be ENABLE or DISABLE by BIOS Utility.(Please refer to Figure 3-4 CHIPSET FEATURES SETUP)



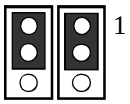
J12 : Floppy Port

J13 : Serial Port 1 (COM1)

J14 : Serial Port 2 (COM2)

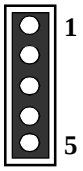
J15 : Parallel Port (Printer)

JP20, JP21



Parallel Port ECP/EPP Mode DMA Channel select : 1-2 for DMA3 while 2-3 for DMA1.

PS3 : PS/2 MOUSE CONNECTOR



1 : DATA (Red Wire)
2 : CLOCK (Blue Wire)
3 : GND (Green Wire)
4 : NC
5 : VCC (Yellow Wire)

CHAPTER 3
AWARD BIOS SETUP

Award's ROM BIOS provides a built-in Setup program which allows user modify the basic system configuration and hardware parameters. The modified data will be stored in a battery-backed CMOS RAM so data will be retained even when the power is turned off. In general, the information saved in the CMOS RAM stay unchanged unless there is configuration change in the system, such as hard drive replacement or new equipment is installed.

It is possible that CMOS had a battery failure which cause data lose in CMOS_RAM. If so, re_enter system configuration parameters become necessary.

To enter Setup Propgram

Power on the computer and press <**Del**> key immediately will bring you into BIOS **CMOS SETUP UTILITY**.

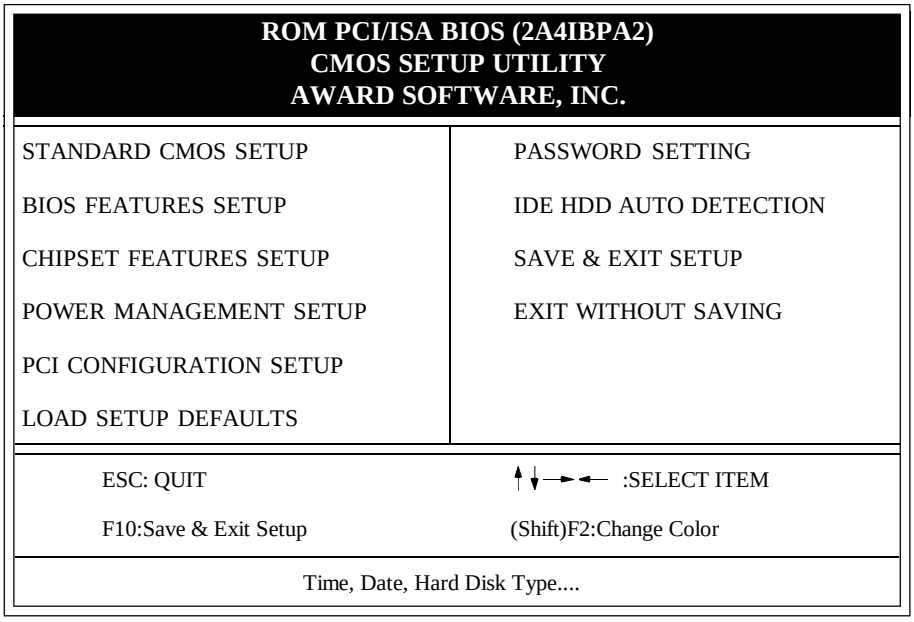


Figure 3-1 CMOS SETUP UTILITY

The menu displays all the major selection items and allow user to select any one of shown item. The selection is made by moving cursor (press any direction key) to the item and press 'Enter' key. An on_line help message is displayed at the bottom of the screen as cursor is moving to various items which provides user better understanding of each function. When a selection is made, the menu of selected item will appear so the user can modify associated configuration parameters.

3-1 STANDARD CMOS SETUP

Choose "**STANDARD CMOS SETUP**" in the **CMOS SETUP UTILITY** Menu (Fig.3-1). The **STANDARD CMOS SETUP** allows user to configure system setting such as current date and time, type of hard disk drive installed in the system, floppy drive type, and the type of display monitor. Memory size is auto_detected by the BIOS and displayed for your reference. When a field is highlighted (direction keys to move cursor and <Enter> key to select), the entries in the field will be changed by pressing <PgDn> or <PgUp> keys or user can enter new data directly from the keyboard.

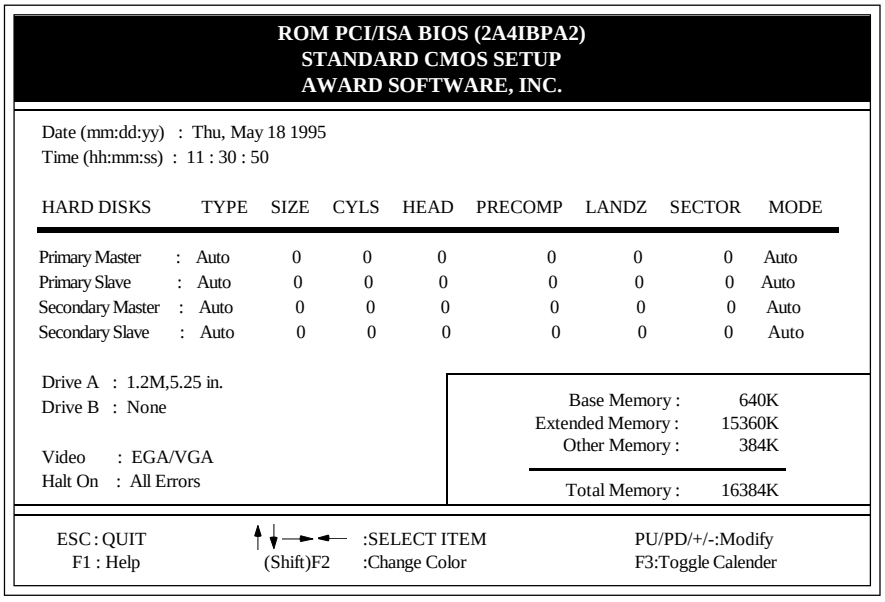


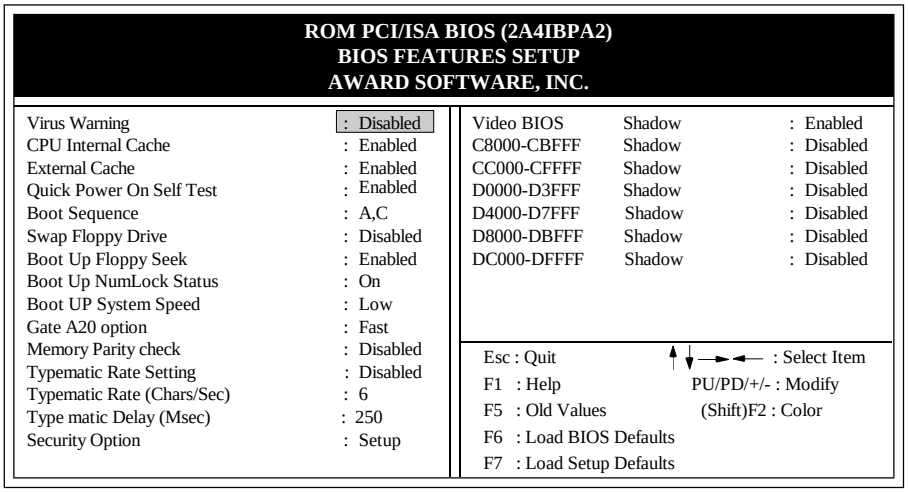
Figure 3-2 STANDARD CMOS SETUP

NOTE : The "**Halt On :**" field is to determine when to halt the system by the BIOS if error occurred during **POST**.

3-2 BIOS FEATURES SETUP

Select the "**BIOS FEATURES SETUP**" option in the **CMOS SETUP UTILITY** menu allows user to change system related parameters in the displayed menu. This menu shows all of the manufacturer's default values of 486SPM. Again, user can move the cursor by pressing direction keys and <PgDn> or <PgUp> keys to modify the parameters. Pressing [F1] key to display help message of the selected item.

This setup program also provide 2 convinent ways to load the default parameter data from BIOS[F6] or CMOS[F7] area if shown data is corrupted. This provide the system a capability to recover from any possible error.



ROM PCI/ISA BIOS (2A4IBPA2)
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.

Virus Warning	: Disabled	Video BIOS	Shadow	: Enabled
CPU Internal Cache	: Enabled	C8000-CBFFF	Shadow	: Disabled
External Cache	: Enabled	CC000-CFFFF	Shadow	: Disabled
Quick Power On Self Test	: Enabled	D0000-D3FFF	Shadow	: Disabled
Boot Sequence	: A,C	D4000-D7FFF	Shadow	: Disabled
Swap Floppy Drive	: Disabled	D8000-DBFFF	Shadow	: Disabled
Boot Up Floppy Seek	: Enabled	DC000-DFFFF	Shadow	: Disabled
Boot Up NumLock Status	: On			
Boot UP System Speed	: Low			
Gate A20 option	: Fast			
Memory Parity check	: Disabled			
Typematic Rate Setting	: Disabled			
Typematic Rate (Chars/Sec)	: 6			
Type matic Delay (Msec)	: 250			
Security Option	: Setup			

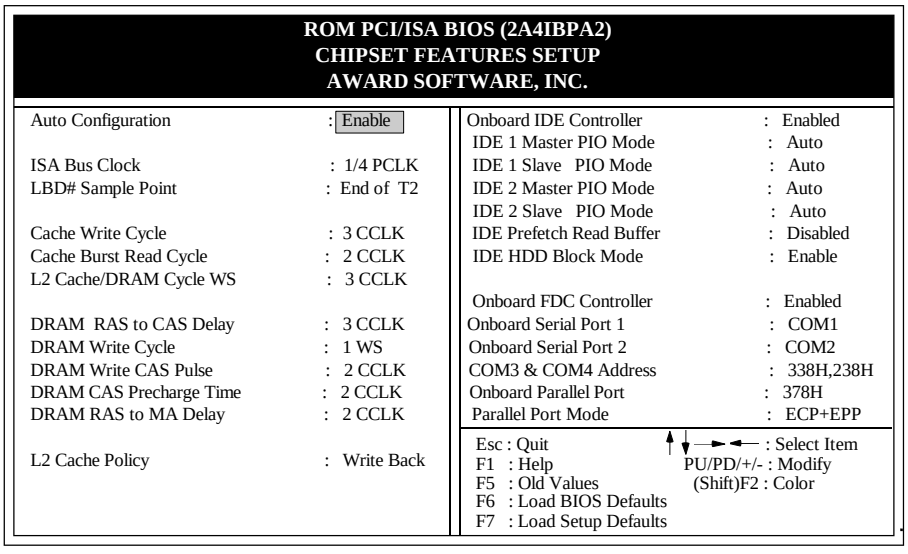
Esc : Quit ↑↓→← : Select Item
F1 : Help PU/PD/+/- : Modify
F5 : Old Values (Shift)F2 : Color
F6 : Load BIOS Defaults
F7 : Load Setup Defaults

Figure 3-3 BIOS FEATURES SETUP

Note: The **Security Option** contians "**setup**" and "**system**". The "**setup**" indicates that the password setting is for CMOS only while the " **system**" indicates the password setting is for both CMOS and system boot up procedure.

3-3 CHIPSET FEATURES SETUP

Choose the "**CHIPSET FEATURES SETUP**" in the **CMOS SETUP UTILITY** menu to display following menu.



ROM PCI/ISA BIOS (2A4IBPA2)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.

Auto Configuration	: Enable	Onboard IDE Controller	: Enabled
		IDE 1 Master PIO Mode	: Auto
ISA Bus Clock	: 1/4 PCLK	IDE 1 Slave PIO Mode	: Auto
LBD# Sample Point	: End of T2	IDE 2 Master PIO Mode	: Auto
		IDE 2 Slave PIO Mode	: Auto
Cache Write Cycle	: 3 CCLK	IDE Prefetch Read Buffer	: Disabled
Cache Burst Read Cycle	: 2 CCLK	IDE HDD Block Mode	: Enable
L2 Cache/DRAM Cycle WS	: 3 CCLK		
		Onboard FDC Controller	: Enabled
DRAM RAS to CAS Delay	: 3 CCLK	Onboard Serial Port 1	: COM1
DRAM Write Cycle	: 1 WS	Onboard Serial Port 2	: COM2
DRAM Write CAS Pulse	: 2 CCLK	COM3 & COM4 Address	: 338H,238H
DRAM CAS Precharge Time	: 2 CCLK	Onboard Parallel Port	: 378H
DRAM RAS to MA Delay	: 2 CCLK	Parallel Port Mode	: ECP+EPP
L2 Cache Policy	: Write Back		

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

Figure 3-4 CHIPSET FEATURES SETUP

Note: When "AUTO Configuration: " option is enabled, the BIOS will automatically detects CPU speed and then configure the bus frequency, DRAM speed, and cache read/write cycle accordingly. Please refer to Figure 3-4 CHIPSET FEATURES SETUP for the detail settings.

3-4 POWER MANAGEMENT SETUP

Choose the "**POWER MANAGEMENT SETUP**" in the **CMOS SETUP UTILITY** to display the following screen. This menu allows user to modify the power management parameters and IRQ signals. In general, these parameters should not be changed unless it's absolutely necessary.

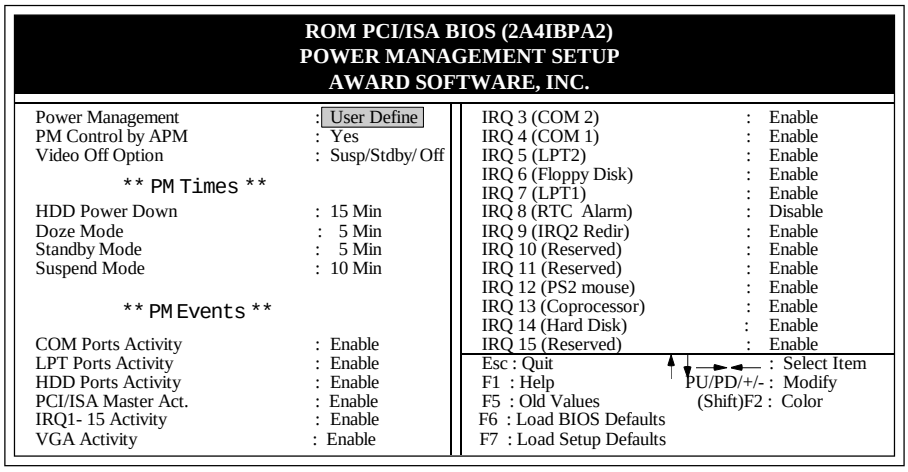


Figure 3-5 POWER MANAGEMENT SETUP

Again, user can move the cursor by pressing direction keys to the field need to be modified and press <PgDn> or <PgUp> to alter item selection. You can only change the content of **Doze Mode**, **Standby Mode**, and **Suspend Mode** when the **Power Management** is set to '**User Define**'.

3-4-1 The Description of the Power Management

A. **Power Management** mode selection :

Disabled	The system operates in NORMAL conditions (Non-GREEN), and the Power Management function is disabled.
Max.saving	This mode will maximize the power saving capability.
Min.saving	This mode will minimize the power saving capability.
User define	Allow user to define timeout parameters to control power saving timing. Refer item B shown below.

B. Timeout parameters :

HDD Power Down
HDD power down timer can be set from 1 to 15 minute(s).

System Doze
The "System Doze" mode timer starts to count when there is no "PM events" occurred. The valid timeout setting is from 10 seconds up to 10 minutes.

System Standby
The "Standby" mode timer starts to count when "System Doze" mode timer timed out and no "PM events" occurred. Valid range is from 10 seconds up to 10 minutes.

System Suspend
This function works only when SL-Enhanced CPU is installed. The timer starts to count when "System Standby" mode timer timed out and no "PM Events" occurred. Valid range is from 10 seconds up to 10 minutes.

3-4-2 Description of the Green Functions

The 486SPM supports HDD Power Down, Doze and standby power saving functions when Non-SL Enhanced CPU is installed. In addition, the suspend function is supported when an SL-Enhanced CPU is installed in the system. The detail description of these functions are provided in next page.

HDD Power Down Mode
When system stop reading or wiriting HDD, the timer starts to count. The system will cut off the HDD power when timer ran out of time. The system will not resume operation until either a read from or a wirte to HDD command is executed again.

Doze Mode
The system hardware will drop down CPU clock from nomal working speed when Doze mode timeout occurred.

Standby Mode
When the system standby mode timer ran out, it will enter the standby mode and retain CPU at slow working speed. The screen will be blanked out.

Suspend Mode
When the system suspend timer time out, the system will enter the suspend mode and the chipset will stop CPU clock immediately. The power consunption in Suspend Mode is lower than in standby mode. The screen is also blanked out.

PM Events:
AWARD BIOS defines 19 PM Events in the power management mode (Doze, standby & suspend). The user can initial any PM Events to be "Enable" or "Disable". When the system detects all of the enabled events do not have any activity, it will start the system Doze timer first if the "Power Management" isn't "Disabled". Once the system Doze timer timed out, it will process doze power saving procedure by starting the system standby timer. When the standby timer ran out and all of the "Enabled" events remains silent, the system will enter the standby mode. By now, the system will not only process the standby power saving procedures but also start the system suspend timer. When the suspend timer time out , all of the CPU clock will be stopped by dropping system clock down to zero and remains this way until any one of the "Enabled" event occurred.

3-5 PCI CONFIGURATION SETUP

The PCI configuration program is for the user to modify the PCI IRQ signals when various PCI cards are inserted in the PCI slots.

WARNING : Any misplacing IRQ could cause system hang up.

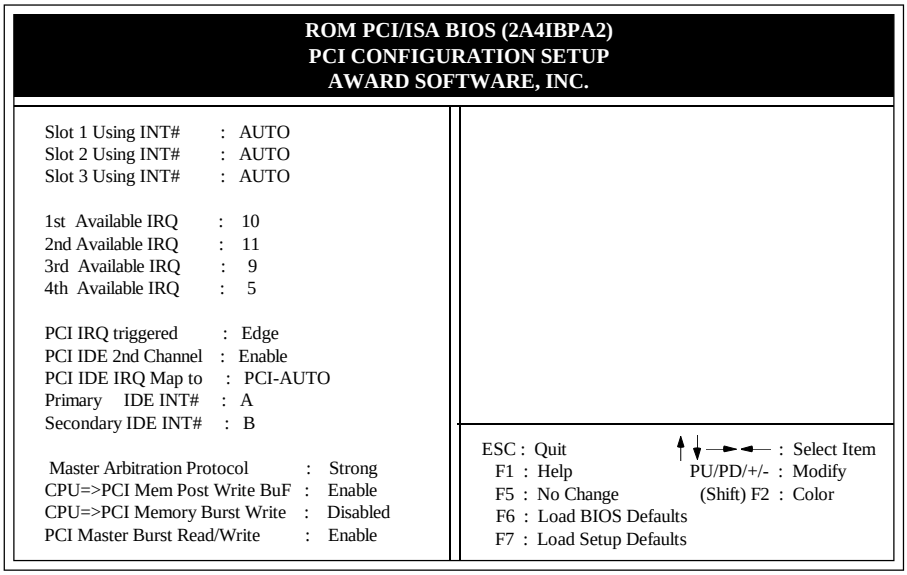


Figure 3-6 PCI CONFIGURATION SETUP

When you have true PCI card(s) plugged into the system, you will not need to change any thing here in the **SETUP** program. However, if you do not know whether you have true PCI card or not, please refer to your PCI card user's manual for the details.

When you have a Legacy card to be plugged into the system,a proper setting is extremely important or it may cause the system hang up. The diagram shown below tells you how the RPM is designed.

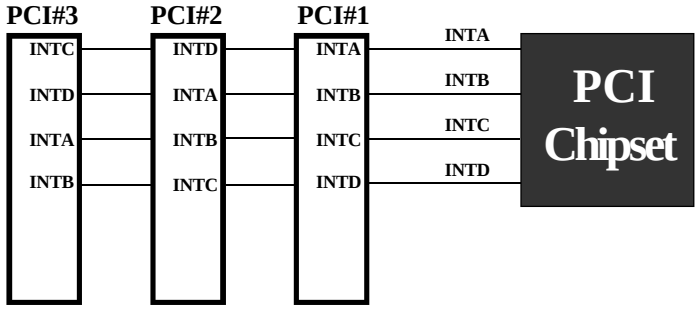


Figure 3-7 The Combination of PCI INT# lines

3-6 LOAD SETUP DEFAULTS

The "**LOAD SETUP DEFAULTS**" function loads the system default data directly from ROM and initialize associated hardware properly. This function will be necessary only when the system CMOS data is corrupted.

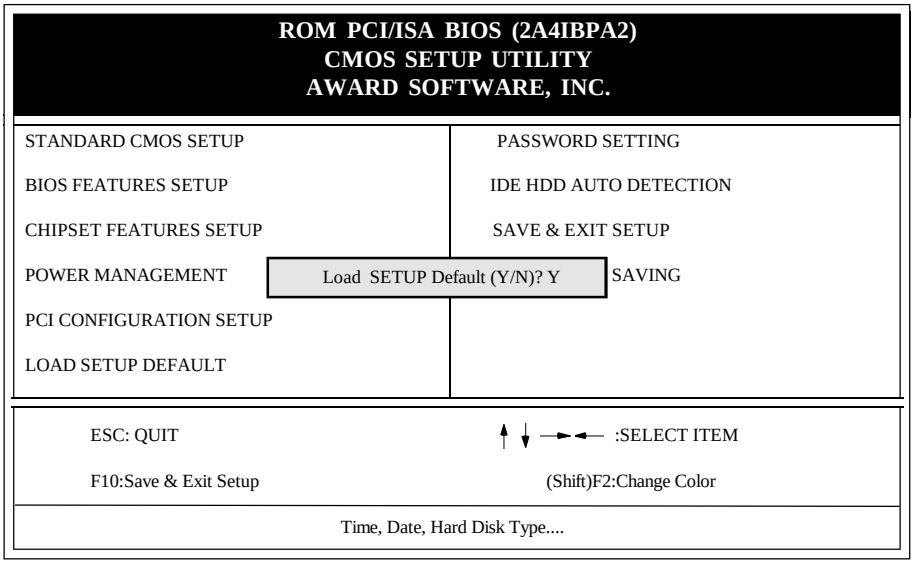


Figure 3-8 LOAD SETUP DEFAULT

3-7 CHANGE PASSWORD

To change the password, choose the "**PASSWORD SETTING**" option from the **CMOS SETUP UTILITY** menu and press [Enter].

NOTE : Either "**Setup**" or "**System**" must be selected in the "**Security Option**" of the **FEATURES SETUP** menu (Refer to Figure 3-3 for the details).

1. If CMOS is corrupted or the option was not used, a default password stored in the ROM will be used. The screen will display the following message:

   Enter Password:

   Press the [Enter] key to continue after proper password is given.

2. If CMOS is corrupted or the option was used earlier and the user wish to change default password, the **SETUP UTILITY** will display a message and ask for a confirmation.

   Confirm Password:

3. After pressing the [Enter] key (ROM password if the option was not used) or current password (user-defined password), the user can change the password and store new one in CMOS RAM. A maximum of 8 characters can be entered.

3-8 IDE HDD AUTO DETECTION and LOW LEVEL FORMAT

The "IDE HDD AUTO DETECTION" utility is a very useful tool especially when you do not know which kind of hard disk type you are using. You can use this utility to detect the correct disk type installed in the system automatically. You can then utilize "HDD LOW LEVEL FORMAT" program your hard disk if the hard disk drive has never been formatted. The low level formatter is to program the disk surface to be sector by sector and track by track such that the system will be able to recognize the area where data to be stored.

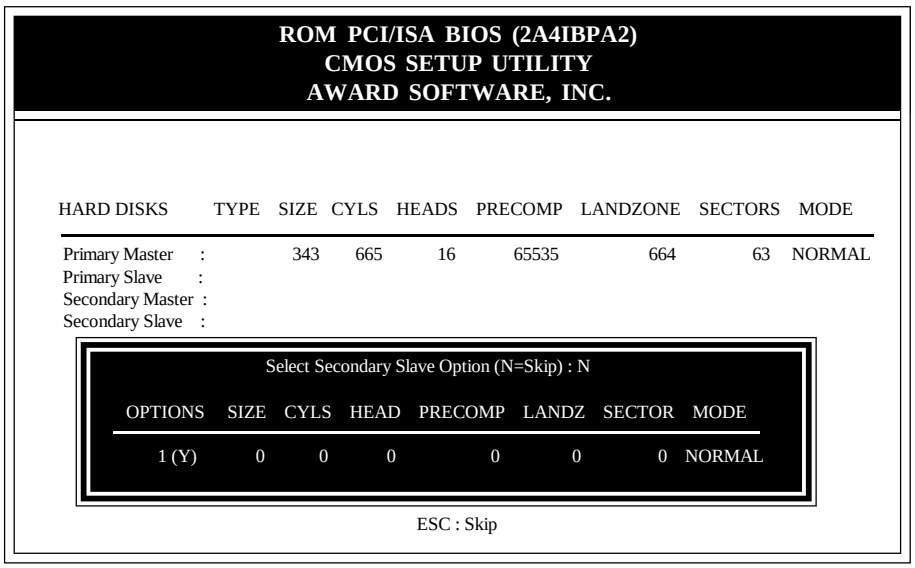


Figure 3-9 IDE HDD AUTO DETECTION

3-9 SAVE & EXIT SETUP

The "**SAVE & EXIT SETUP**" option will bring you back to boot up procedure with all the changes you just made which are recorded in the CMOS RAM.

3-10 EXIT WITHOUT SAVING

The "**EXIT WITHOUT SAVING**" option will bring you back to normal boot up procedure without saving any data into CMOS RAM. All of the old data in the CMOS will not be destroyed.