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Chapter 1

Features of This Motherboard

This main board is designed for the PC user who wants a great many features in a small package. This motherboard:

- **Easy Installation:** Is equipped with BIOS supports auto detection of hard drives and plug and play to make setup of hard drives and expansion cards virtually automatic.

- **SiS Chipset:** SiS 5571 PCI Chipset with I/O subsystems.

- **Multi-Speed Support:** Support one of 75~300MHz CPU on a ZIF Socket 7, such as Intel Pentium® processor/Intel Pentium® processor with MMX™ technology; AMD-K5™/AMD-K6™; Cyrix 6X86™/6X86MX™ CPU.

- **DIP Switch:** Single switch for CPU External Clock Frequency and Bus/Core Ratio selected, make it is easy and simple for user to install CPU.

- **L2 Cache:** Provides on board 512KB Pipelined Burst SRAM.

- **DRAM Memory Support:** Supports 2x72-pin SIMMs and 2x168-pin DIMMs (3.3V) of 4MB, 8MB, 16MB, 32MB, or 64MB to from a memory size between 8MB to 256MB. Support both Fast Page Mode and Extended Data Output (EDO) SIMMs. This main board also supports Synchronous DRAM module (DIMM).

- **ISA and PCI Expansion Slots:** Provides four 16-bit ISA slots, three 32-bit PCI slots.

- **Super Multi-I/O:** Provides two high-Speed UART compatible serial ports and one parallel port with EPP and ECP capabilities. UART2 can also be directed to the Infrared Module for wireless connections. Two floppy drives of either 5.25" or 3.5" (1.44MB or 2.88MB) are also supported without an external card.

- **PCI Bus Master IDE Controller and ULTRA DMA 33:** On-board PCI Bus Master IDE controller with two connectors that supports four IDE devices in two channels, provides faster date transfer rates, and supports Enhanced IDE devices such as Tape Backup, CD-ROM drives and LS-120. This controller also supports PIO Modes 3 and 4 and Bus Master IDE DMA 33 detect.

- **Optional IrDA and PS/2:** This motherboard supports an optional infrared port module for wireless interface and PS/2 mouse cable set.

- **Optional USB Port Connector:** This motherboard supports two USB port connectors for USB devices.

- **CPU Fan:** CPU fan can be auto-stopping when system in the suspend mode.

- **Baby AT Form Factor:** Dimensions 22cm x 22cm.

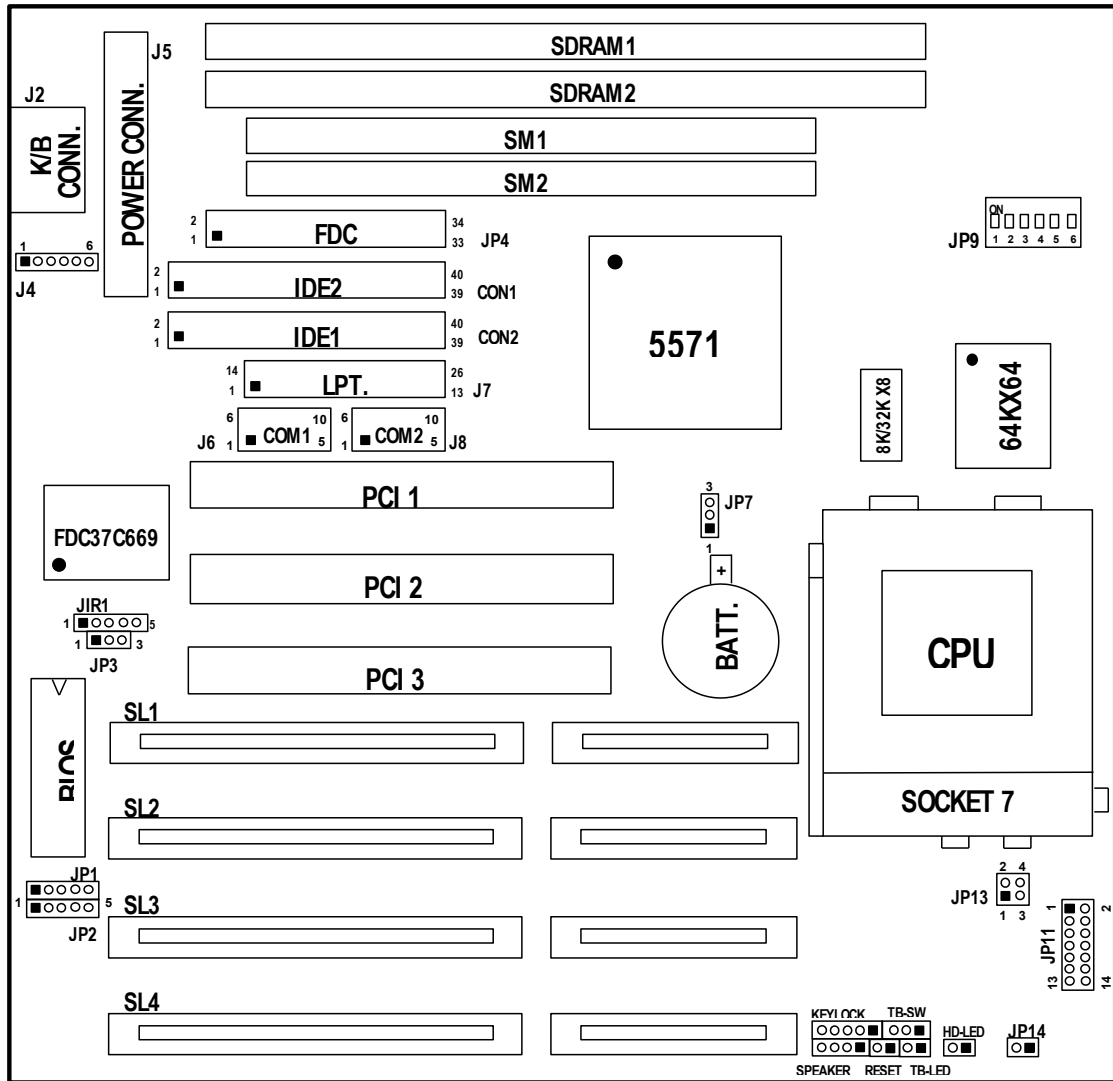# Chapter 2
Installation

2-1 Map of the Motherboard

Figure 2-1

Jumpers

Connectors

Expansion Slots

2-2 Installation Steps

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

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

2-2-1 Jumper Settings

1. **Flash ROM Voltage Selection: JP3 (Yellow color selector)**
    These jumpers set the voltage supplied to the Flash ROM. It depend on Flash ROM Brand.

Programming	**JP3**	
+12V	2-3	(Intel, MXIC)
+5V	1-2	(SST, Winbond, Atmel)

    Flash ROM Voltage Selection
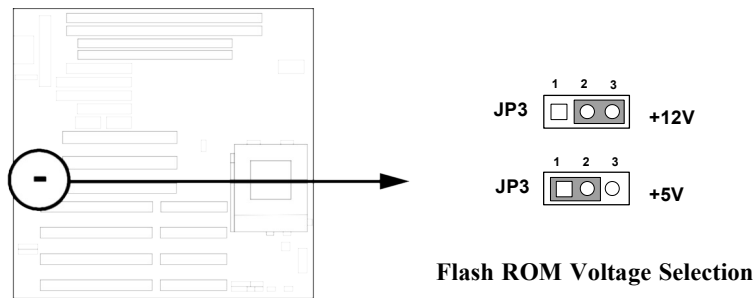
2. **CPU Voltage Selection: JP11 (Yellow color selector)**
    This jumper is using for adjusting CPU working voltage, for this main board design it can auto detect the single voltage CPU or dual voltage CPU.

    The table of JP11 CPU voltage selection (O: open, S: short)

CPU TYPE	Voltage	1-2	3-4	5-6	7-8	9-10	11-12	13-14
Intel Pentium processor Voltage P54VRE AMD single Voltage K5 Cyrix/IBM single Voltage 6X86 IDT-C6 150/180/200	3.52V	S	O	O	O	O	O	O
Intel Pentium processor Voltage P54STD	3.45V	O	S	O	O	O	O	O
AMD K6-PR233 Dual Voltage K6-PR233	3.2V	O	O	O	S	O	O	O
AMD K6-PR166 Dual Voltage K6-PR166/200 Cyrix/IBM 6X86MX -166, -200 Dual Voltage (MX 166/200)	2.9V	O	O	O	O	S	O	O
Cyrix/IBM 6X86L 166+, 200+ Dual Voltage 6X86L 166+/200+ Intel Pentium processor with MMX technology Dual Voltage (166/200/233)	2.8V	O	O	O	O	O	S	O

CPU Voltage Selection

JP11 panels: 2.1V, 2.8V, 2.9V, 3.2V (top row); 3.3V, 3.45V, 3.52V (bottom row)
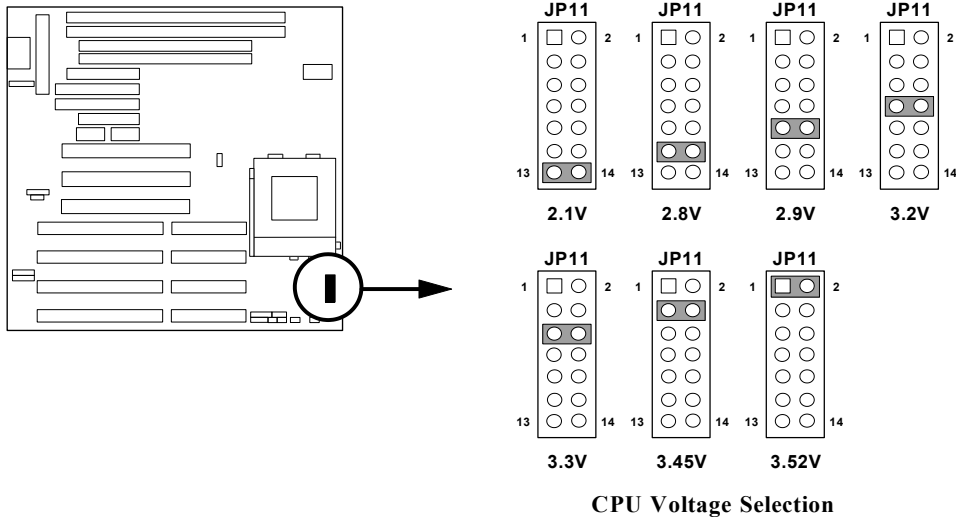
3. CPU Type selection: (JP9: 6-Pins DIP Switch)

This main board design use 6-pins DIP switch to select the CPU, external clock frequency & Bus frequency ratio, to select the CPU Type & frequency as the table below:
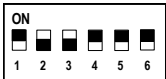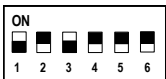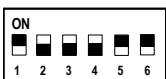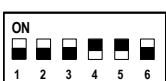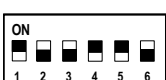
Table for CPU external clock frequency
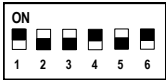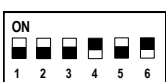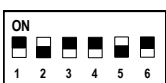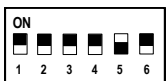
dip switch 4	dip switch 5	dip switch 6	external clock frequency
ON	ON	ON	50MHz
OFF	ON	ON	55MHz
ON	ON	OFF	60MHz
ON	OFF	ON	66MHz
OFF	ON	OFF	75MHz

Table for Bus frequency Clock Ratio

dip switch 1	dip switch 2	dip switch 3	Clock Ratio
OFF	OFF	OFF	1.5
ON	OFF	OFF	2
ON	ON	OFF	2.5
OFF	ON	OFF	3
OFF	OFF	OFF	3.5
ON	OFF	ON	4
ON	ON	ON	4.5

Table for CPU Type selection (■: ON, ■: OFF)

CPU Type	DIP Switch Setting	DIP Switch (1,2,3) Clock Ratio	DIP Switch (4,5,6) external clock frequency	External clock frequency X Ratio CPU frequency
75MHz Pentium processor AMD K5-75MHz	ON [1 2 3 4 5 6]	1.5	50MHz	75MHz
Cyrix/IBM 6X86-120+	ON [1 2 3 4 5 6]	2	50MHz	100MHz
C6-150MHz	ON [1 2 3 4 5 6]	3	50MHz	150MHz
Cyrix/IBM 6X86-133+	ON [1 2 3 4 5 6]	2	55MHz	110MHz
90MHz Pentium processor AMD K5-PR90	ON [1 2 3 4 5 6]	1.5	60MHz	90MHz
120MHz Pentium processor	ON [1 2 3 4 5 6]	2	60MHz	120MHz
Cyrix/IBM 6X86-150+	ON [1 2 3 4 5 6]	2	60MHz	120MHz
150MHz Pentium processor Cyrix/IBM 6X86MX-PR166	ON [1 2 3 4 5 6]	2.5	60MHz	150MHz
C6-180MHz	ON [1 2 3 4 5 6]	3	60MHz	180MHz
100MHz Pentium processor AMD K5-PR100 AMD K5-PR133	ON [1 2 3 4 5 6]	1.5	66MHz	100MHz

CPU Type	DIP Switch Setting	DIP Switch (1,2,3) Clock Ratio	DIP Switch (4,5,6) external clock frequency	External clock frequency X Ratio CPU frequency
133MHz Pentium processor Cyrix/IBM 6X86-166⁺ Cyrix/IBM 6X86MX-PR166		2	66MHz	133MHz
166MHz Pentium processor 166MHz Pentium processor with MMX technology Cyrix 6X86MX-PR200 AMD K5-PR166 AMD K6-PR166		2.5	66MHz	166MHz
200MHz Pentium processor 200MHz Pentium processor with MMX technology Cyrix 6X86MX-PR233 AMD K6-PR200 C6-200MHz		3	66MHz	200MHz
233MHz Pentium processor with MMX technology AMD K6-PR2-233		3.5	66MHz	233MHz
AMD K6-PR2-266		4	66MHz	266MHz
AMD K6-PR2-300		4.5	66MHz	300MHz

JP9
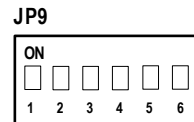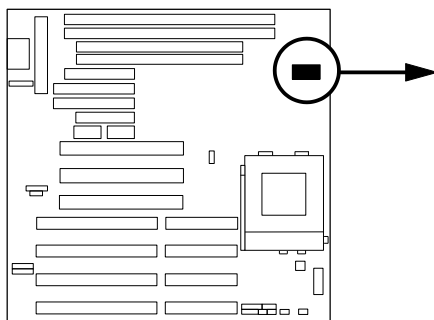
DIP Switch for CPU Type

NOTE: ① *Before install the CPU, Please check the CPU Frequency and Clock Ratio from your supplier.*

② *For Cyrix 6X86MX series, please double check the CPU's Frequency and Clock Ratio.*

③ *75MHz/83MHz CPU's Bus Frequency is not in the reqular specification, therefore, we are not recommend to use it.*

4. CMOS RAM: JP7 (Yellow color selector)

> *WARNING: Make sure your computer is POWER OFF when you are CLEAR CMOS.*

Connect a jumper Cap over this jumper for a few seconds, will clears information stored in the CMOS RAM Chip that input by user, such as hard disk information and passwords. After CLEAR CMOS, you must enter the BIOS setup (by holding down <DEL> during power-up) to re-enter BIOS information (see BIOS SETUP).

Selections	JP7	
Normal	1-2	(Default)
Clear CMOS	2-3	(momentarily)

CMOS RAM (Normal / Clear CMOS Data)
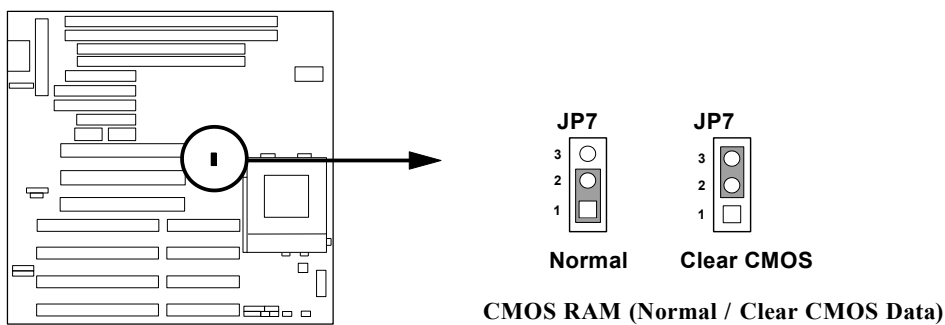
5. CPU I/O Voltage selector: JP13

Selections	JP13	
3.3V	1-2	(Default)
3.45V	3-4	
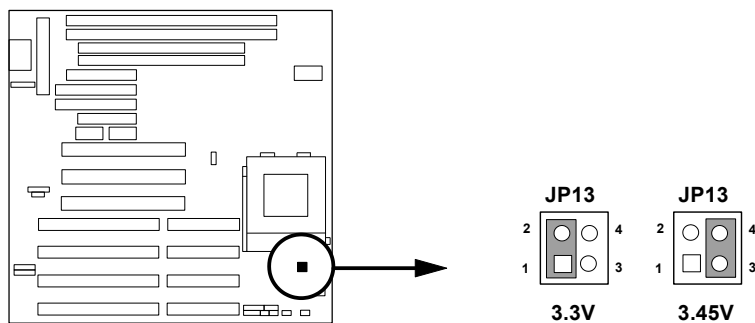
2-2-2 System Memory (DRAM)

This main board can be installed with 72 pin SIMM module DRAM, or 168 pins DIMM module synchronous DRAM. The DRAM memory system on main board consists of BANK 0 & BANK 1, for 72 pin SIMM socket (SM1 & SM2) was defined to be BANK 0, and SDRAM1 & SDRAM2 to be BANK 0 & BANK 1.

Because of the 72-pins SIMM module is 32 bits width using 2 pcs which can match a 64 bits pentium system.

Install DRAM on this main board please reference the table below.

SDRAM1 BANK 0	SDRAM2 BANK 1	SM1, SM2 BANK 0	System can be Accept or not
×	×	72 Pin FPM or EDO SIMM	Accept
168 Pin S-DRAM DIMM	×	×	Accept
168 Pin S-DRAM DIMM	168 Pin S-DRAM DIMM	×	Accept
168 Pin S-DRAM DIMM	×	72 Pin FPM or EDO SIMM	Not allow
×	168 Pin S-DRAM DIMM	×	Accept
×	168 Pin S-DRAM DIMM	72 Pin FPM or EDO SIMM	Accept

2-3 Central Processing Unit (CPU)

The motherboard provides a 321-pins ZIF Socket 7. The CPU on mother board must have a fan attached to prevent overheating.

WARNING: *Without a fan, the CPU will be overheat and cause damage to both the CPU and the motherboard.*

To install a CPU, first turn off your system and remove its cover. Locate the ZIF socket and open it by first pulling the lever sideways away from the socket then upwards to a 90-degree right angle. Insert the CPU with the white dot as your guide. The white dot should point towards the end of the level. The CPU has a corner pin for three of the four corners, the CPU will only fit in the one orientation as shown as follow. With the added weight of the CPU fan, no force is required to insert the CPU. Once completely inserted, hold down on the fan and close the socket's lever.

IMPORTANT: *You must set jumpers JP9 "DIP Switch for CPU Type" on* *page 5* *and jumper JP11 "CPU I/O Voltage Selection" on* *page 4* *depending on the CPU that you install.*

CPU ZIF Socket 7
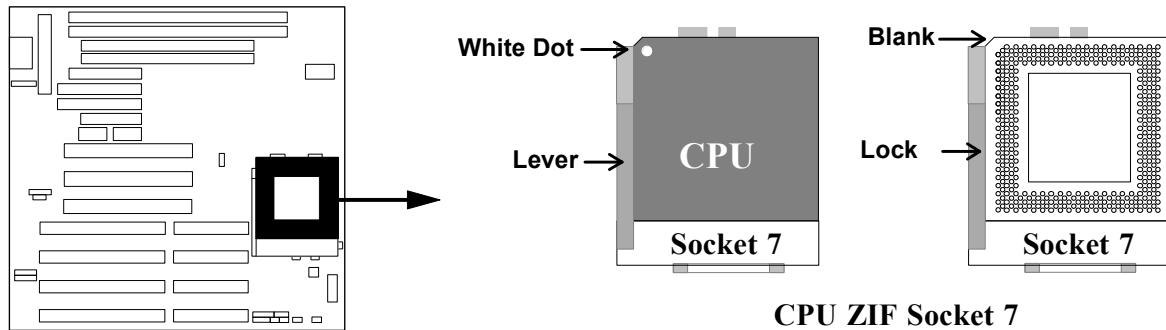
2-4 Expansion Cards

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

Installation Procedure:

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

Assigning IRQs for Expansion Cards
Some expansion cards may require an IRQ to operate. Generally an IRQ must be exclusively assigned to only one device. In an standard design there are 16 IRQs available but most of them are occupied by the system and leaves 6 free for expansion cards.

Either ISA or PCI expansion cards may require an IRQs. System IRQs are available to cards installed in the ISA expansion first, and any remaining IRQs can be used by PCI cards. Currently, there are two types of ISA cards. An original ISA expansion card design, know as "Legacy" ISA cards, they request configure

the card's jumpers manually and then install it in any available slot on the ISA bus, and other know as Plug and Play. You may use Microsoft's Diagnostic (MSD.EXE) utility included in the DOS directory to see a map of your used and any free IRQs. For Windows 95 users, the "Control Panel" icon in "My Computer", contains a "System" icon which gives you "Device Manager" tab. Double clicking on a specific device give you "Resources" tab which shows the Interrupt number and address. Make sure that no any two of devices use the same IRQs, or your computer will experience problems when those two devices are in use at the same time.

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

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

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

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

2-5   External Connectors

1.   Power connector: AT Power Connector (12-pins block): J5

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

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

Power Plugs from Power Supply   **Power Connector on Motherboard**
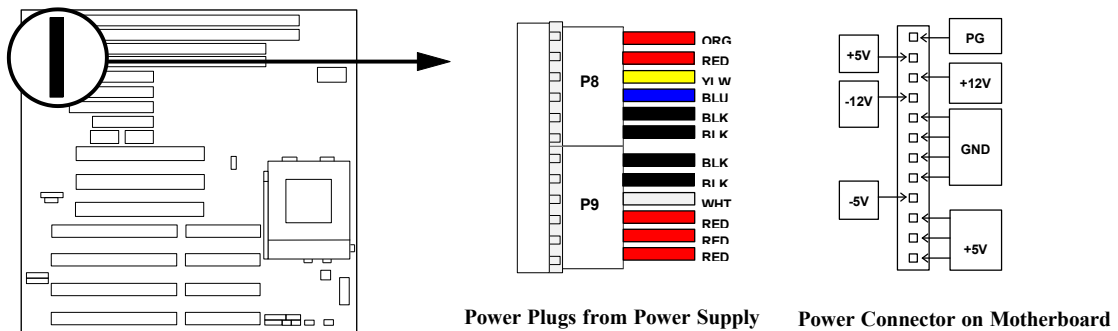
2. Keyboard Connector (5-pins female): J2

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

Keyboard Connector (5-pin female)

Connector Plug from Keyboard
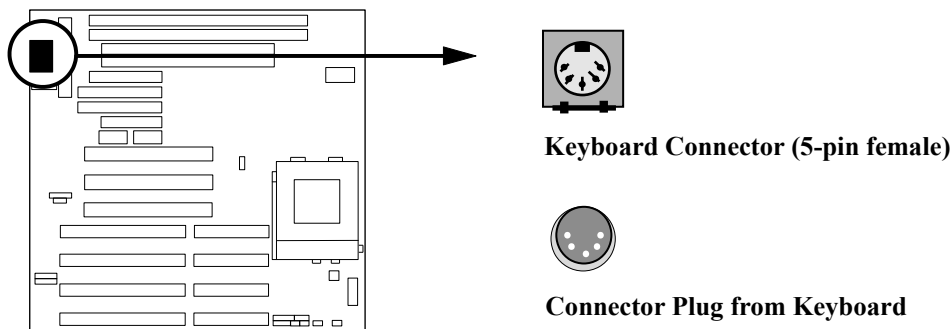
3. PS/2 Mouse Connector (6-pins block): J4

If you are using a PS/2 mouse, you must purchase an optional PS/2 mouse set which connects to the 6-pins block and mounts to an open slot on your computer's case.

PS/2 Mouse Module Connector
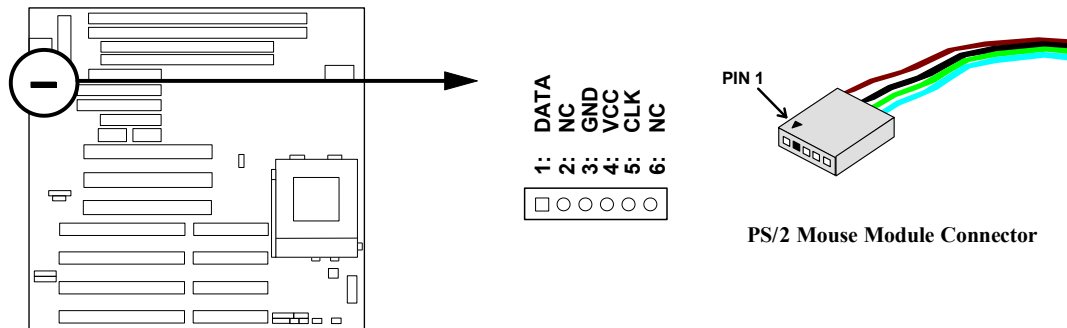
4. Parallel Printer Connector (26-pins Block): LPT (J7)

Connection for the included parallel port ribbon cable with mounting bracket. Connect the ribbon cable to this connection and mount the bracket to the case on an open slot. It will then be available for a parallel printer cable.

Note: Serial printers must be connected to the serial port. You can enable the parallel port and choose the IRQ through BIOS Setup on "Onboard Parallel Port".

Parallel Printer Connector
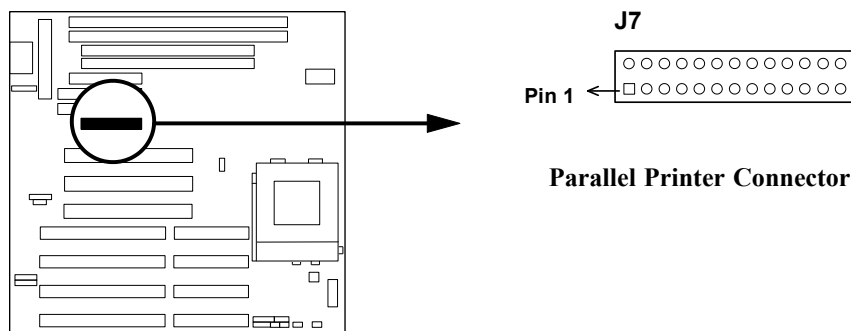
5. Serial port COMA and COMB Connector (Two 10-pins blocks): COM1 (J6), COM2 (J8)

These connectors support the provided serial port ribbon cables with mounting bracket. Connect the ribbon cables to these connectors and mount the bracket to the case on an open slot. The two serial ports on the mounting bracket will then be used for pointing devices or other serial devices. See page 30 for BIOS configuration of "Onboard Serial Port"

COM 1 **COM 2**

Pin 1   Pin 1

Serial port COM1 and COM2 Connector
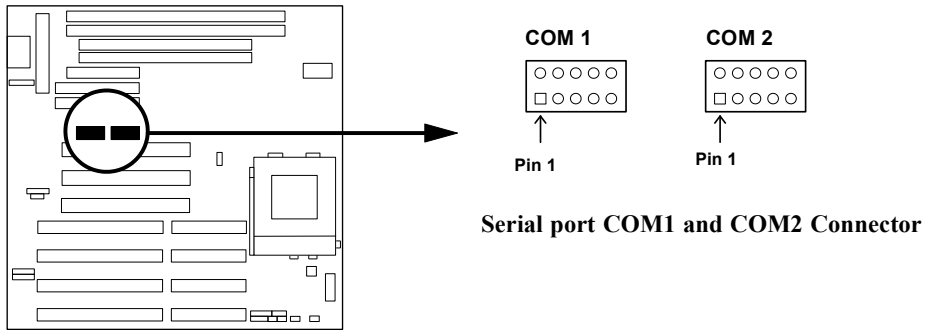
6. Floppy drive Connector (34-pins block): FDC (JP4)

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

Pin 1

Floppy Drive Connector
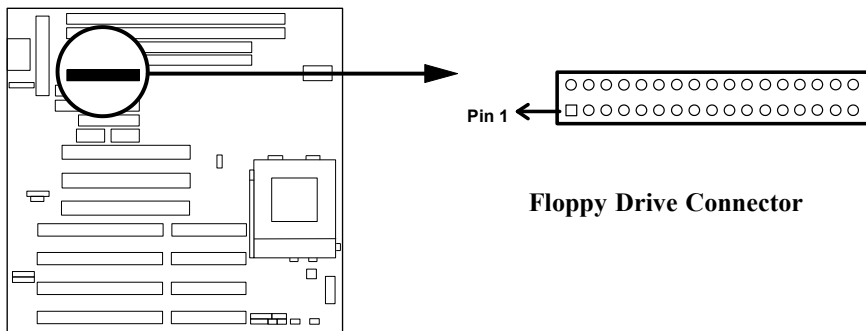
7. Primary IDE Connector (40-pins block): IDE1

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

Pin 1

Primary IDE Connector
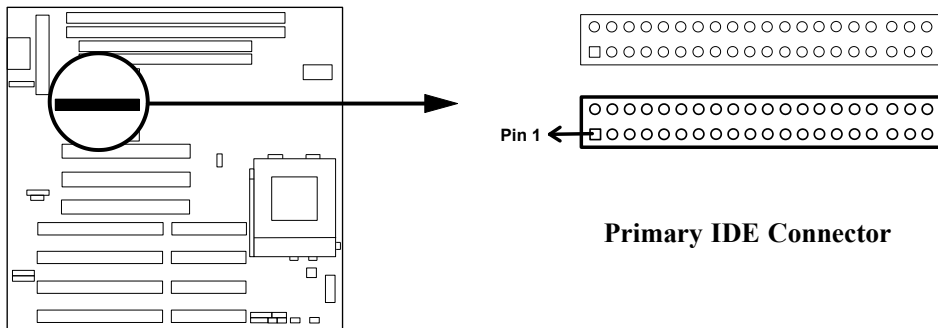
8. Secondary IDE Connector (40-pin block): IDE2

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

Secondary IDE Connector

Pin 1
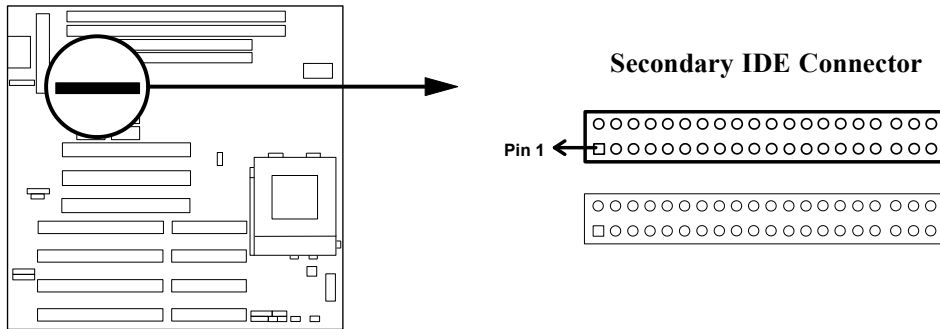
9. **SMI suspend switch lead & Turbo function: TB-SW**

This allows the user to manually place the system into a suspend mode or "Green" mode where system activity will be instantly decreased to save electricity and expand the life of certain components when the system is not in use. This 3-pins connector (see the figure below) connects to the case-mounted suspend switch. If you do not have a switch for the connector, you may use the "Turbo Switch" since it does not have a function. SMI is activated when it detects a *short to open* moment and therefore leaving it shorted will not cause any problems. May require one or two pushes depending on the position of the switch. Wake-up can be controlled by settings in the BIOS but the keyboard will always allow wake-up (the SMI lead cannot wake-up the system). If you want to use this connector, "Suspend Switch" in the POWER MANAGEMENT SETUP of the BIOS software should be on the default setting of *Enable* (see page 25).

Selections	TB-SW
SMI suspend mode switch	1-2
Turbo switch	2-3

TB-SW   3 2 1   **SMI suspend mode switch**

TB-SW   3 2 1   **Turbo switch**

SMI suspend switch lead & Turbo function
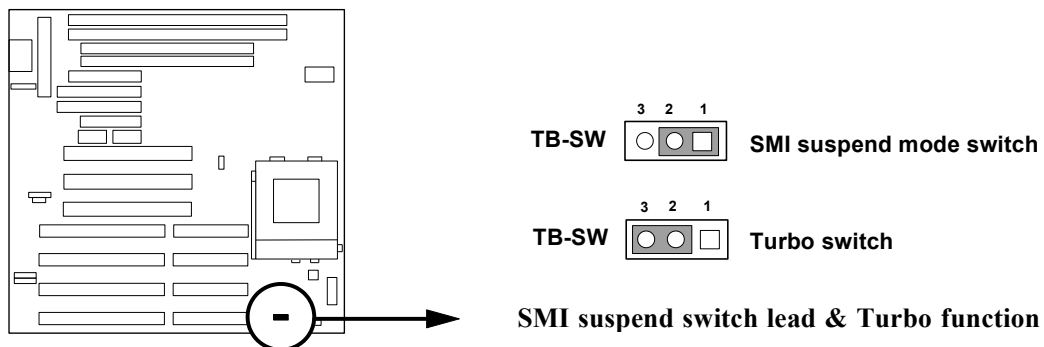
10. Turbo LED switch: TB-LED

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

11. Reset switch lead: RESET

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

12. Keyboard lock switch lead: KEYLOCK

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

13. Speaker connector: SPEAKER

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

14. IDE activity LED: HD-LED

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

IDE (Hard Drive) LED
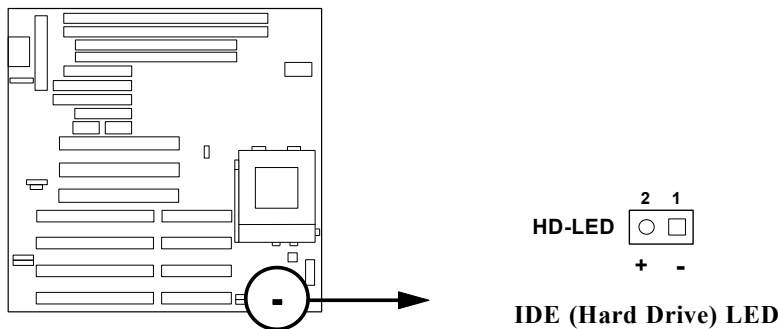
15. IR infrared module connector: JIR1

This connector supports the optional wireless transmitting and receiving infrared module. This module mounts to small opening on system cases that support this feature you must also configure the setting through BIOS setup. Use the four pins as shown on the Back View and connect a ribbon cable from the module to the motherboard according to the pin definitions.

Infrared Module Connector
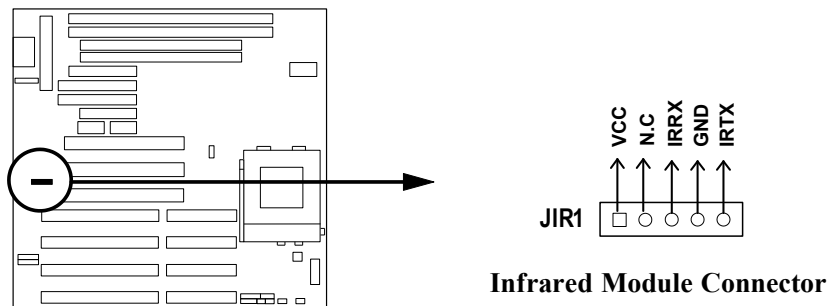
16. USB Port connector (Two 5-pins block): JP1, JP2

These connectors support the provided twist pairs cables with mounting bracket **(Optional)**. The two USB ports on the mounting bracket will be used for connect USB devices.

	1	5
JP1	□ ○ ○ ○ ○	
JP2	□ ○ ○ ○ ○	

USB Port connector

17. CPU FAN: JP14

JP14 2 1 ○ □

GND
+12V
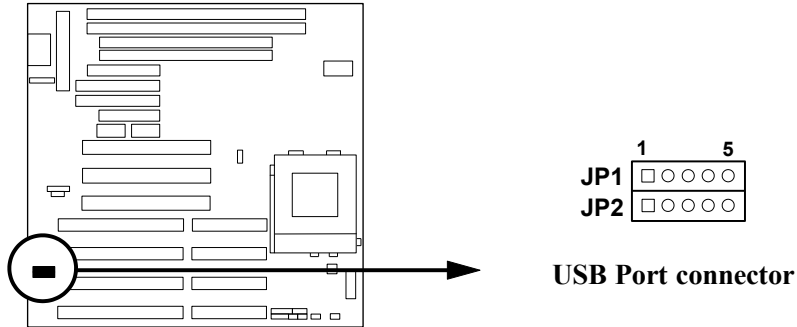
CPU FAN
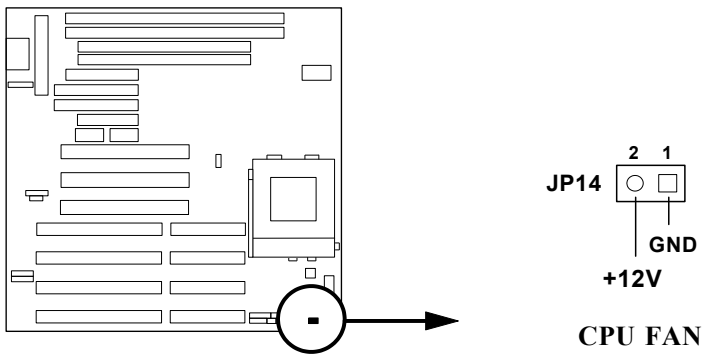
Chapter 3

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 here 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 Program

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

ROM PCI/ISA BIOS (2A5IHJ19)

CMOS SETUP UTILITY

AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT SETUP	IDE HDD AUTO DETECTION
PNP/PCI CONFIGURATION	SAVE & EXIT SETUP
LOAD BIOS DEFAULTS	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	

Esc : QUIT   ↑↓→← : Select Item
F10 : Save & Exit Setup   (Shift) F2 : Change Color

Time, Date, Hard Disk Type...

Figure 3-1

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 (Figure 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.

ROM PCI/ISA BIOS (2A5IHJ19)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

```
Date (mm:dd:yy) : Thu, Jul, 17  1997
Time (hh:mm:ss) : 10 : 44 : 16

HARD DISKS      TYPE SIZE CYLS HEAD PRECOMP LANDZ SECTOR MODE
Primary Master  : Auto   0   0   0     0     0     0 Auto
Primary Slave   : Auto   0   0   0     0     0     0 Auto
Secondary Master : Auto   0   0   0     0     0     0 Auto
Secondary Slave  : Auto   0   0   0     0     0     0 Auto

Drive A : 1.2M , 5.25 in.              Base  Memory :  640K
Drive B : None                     Extended  Memory : 7168K
                                      Other  Memory :  384K
Video  : EGA/VGA                   ─────────────────────────
Halt On : All Errors                Total Memory :  8192K

Esc : Quit         ↑↓→← : Select Item     Pu/Pd/+/- : Modify

F1  : Help        (Shift)F2: Change Color
```

Figure 3-2

> *NOTE:* *If hard disk Primary Master/Slave and Secondary Master/Slave were used Auto, than the hard disk size and model will be auto-detect on display during POST.*
>
> *NOTE:* *The "Halt On:" field is to determine when to halt the system by the BIOS is 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 this motherboard. Again, user can move the cursor by pressing direction keys and <PgDn> of <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 provides the system a capability to recover from any possible error.

```
          ROM PCI/ISA BIOS (2A69HJ1B)
                 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** : **Dsiabled**
Quick Power On Self Test : **Disabled**	**D0000-D3FFF Shadow** : **Disabled**
Boot Sequence : **A,C,SCSI**	**D4000-D7FFF Shadow** : **Disabled**
Swap Floppy Drive : **Disabled**	**D8000-DBFFF Shadow** : **Disabled**
Boot Up Floppy Seek : **Enabled**	**DC000-DFFFF Shadow** : **Dsiabled**
Boot Up Numlock Status : **On**	
Gate A20 Option : **Fast**	
Memory Parity Check : **Disable**	
Typematic Rate Setting : **Disabled**	
Typematic Rate (Chars/Sec) : **6**	
Typematic Delay (Msec) : **250**	
Security Option : **Setup**	
PS/2 mouse function control: Disabled	**Esc: Quit** ↑↓→← : **Select Item**
PCI/VGA Palette Snoop : **Disabled**	**F1 : Help** **Pu/Pd/+/-:Modify**
OS Select For DRAM > 64MB : **Non-OS2**	**F5 : Old Values (Shift)F2 : Color**
	F6 : Load BIOS Defaults
	F7 : Load Setup Defaults

Figure 3-3

> *Note:* **The Security Option contains "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.**

- **Virus Warning:** This category flashes on the screen. During and after the system boots up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system and the following error message will

appear, in the mean time, you can run an anti-virus program to locate the problem. Default value is Disabled.

*Enabled***:**   Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.

*Disabled***:**   No warning message to appear when anything attempts to access the boot sector or hard disk partition table.

- **CPU Internal Cache / External Cache:**   These two categories speed up memory access. However, it depends on CPU/chipset design. The default value is Enable.   If your CPU without Internal Cache then this item "CPU Internal Cache" will not be show.

  Enabled: Enable this category speeds up Power On Self Test.
       (POST) after you power on the computer.

  Disabled: Disable cache

- **Quick Power On Self Test:** If it is set to Enable, BIOS will shorten or skip some check items during POST.

  *Enabled***:**   Enable quick POST

  *Disabled***:**   Normal POST

- **Boot Sequence:**   This category determines which drive computer searches first for the DOS (Disk Operating System). Default value is A,C,SCSI.
  System will first search for floppy disk drive, then hard disk drive and then SCSI device. The options are: C, A, SCSI; C, CDROM, A; CDROM, C, A; D, A, SCSI; E, A, SCSI; F, A, SCSI; SCSI, A, C; SCSI, C, A; C only; LS/ZIP, C.

- **Swap Floppy Drive:** The swap floppy drive. Default value is Disabled.

  *Enabled***:**   Floppy A & B will be swapped under the DOS

  *Disabled***:**   Floppy A & B will be not swap

- **Boot Up Floppy Seek:**   During POST, 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. The default value is Enabled.

  Enabled: BIOS searches for floppy disk drive to determine if it is 40 or 80 tracks.
              Note that BIOS can not tell from 720K, 1.2M or 1.44M drive type as they are all 80 tracks.

  Disabled: BIOS will not search for the type of floppy disk drive by track number.

Note that there will not be any warning message if the drive installed is 360K.

- **Boot Up NumLock Status:** The default value is On.

    On: Keypad is number keys.
    Off: Keypad is arrow keys.

- **Boot UP System Speed:** It selects the default system speed-the speed that the system will run at immediately after power up.

    High: Set the speed to high.
    Low: Set the speed to low.

NOTE: The board default value is LOW in the field. Boot the system to controller turbo or De-turbo by Onboard (Turbo Switch).

- **Gate A20 Option:** The default value is Fast.

    Normal: The A20 signal is controlled by keyboard controller or chipset hardware.
    Fast: Default: Fast. The A20 signal is controlled by Port 92 or chipset specific method.

- **Memory Parity Check:** The default setting is Disable.

    Enable: Allows system to check memory's parity.

- **Typematic Rate Setting:** This determines the typematic rate.

    Enabled: Enable typematic rate and typematic delay programming.
    Disabled: Disable typematic rate and typematic delay programming. The system BIOS will use default value of this 2 items and the default is controlled by keyboard.

- **Typematic Rate (Chars/Sec):**

6 : 6 characters per second	8 : 8 characters per second
10 : 10 characters per second	12 : 12 characters per second
15 : 15 characters per second	20 : 20 characters per second
24 : 24 characters per second	30 : 30 characters per second

- **Typematic Delay (Msec):** When holding a key, the time between the first and second character displayed.

    250 : 250 msec
    500 : 500 msec
    750 : 750 msec

1000 : 1000 msec

- **Security Option:** This category allows you to limit access to the system and Setup, or just to Setup. The default value is Setup.

  System: The system will not boot and access to Setup utility if the correct password is not entered at the prompt.

  Setup: The system will boot, but access to Setup utility if the incorrect password is entered at the prompt.

> *NOTE: To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. Do not type anything and just press <Enter>, it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.*

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

- **OS Select For DRAM > 64MB:** When using OS2 operating systems with installed DRAM of greater than 64MB, you need to *OS2* this option otherwise leave this on the setup default of **Non-OS2**.

- **Video BIOS Shadow:** It determines whether video BIOS will be copied to RAM, however, it is optional from chipset design. Video Shadow will increase the video speed.
  Enabled: Video shadow is enabled
  Disabled: Video shadow is disabled

- C8000 - CBFFF Shadow:
    CC000 - CFFFF Shadow:
    D0000 - D3FFF Shadow:
    D4000 - D7FFF Shadow:
    D8000 - DBFFF Shadow:
    DC000 - DFFFF Shadow:

  These categories determine whether optional ROM will be copied to RAM by 16K byte or 32K byte per/unit and the size depends on chipset.

  Enabled: Optional shadow is enabled.
  Disabled: Optional shadow is disabled.

3-3 CHIPSET FEATURES SETUP

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

ROM PCI/ISA BIOS (2A5IHJ19)

CHIPSET FEATURES SETUP

AWARD SOFTWARE, INC.

Auto Configuration : Enabled	MDLE Delay (ns) : 1
	DRAM Loading > 32 pieces: Yes
Aggressive Mode : Disabled	System BIOS Cacheable : Enabled
	Video BIOS Cacheable : Enabled
L2 (WB) Tag Bit Length : 8bits	Memory Hole At 15M-16M : Disabled
SRAM Back-to-Back : Enabled	
NA# Enable : Disabled	
DRAM RD Leadoff Time : 5T	
Refresh Cycle Time(us) : 62.4	
RAS Pulse Width Refresh : 5T	
RAS Precharge Time : 4T	
RAS to CAS Delay : 4T	
CAS# Pulse Width (FP) : 2T	
CAS# Pulse Width (EDO) : 1T	
RAMW# Assertion Timing : Normal	
EDO Back-to-Back Timing : 2T	
SDRAM CAS Latency : 2T	
SDRAM WR Retire Rate : x-2-2-2	
Read Prefetch Memory RD : Enabled	
CPU to PCI Post Write : 3T	
CPU to PCI Burst Mem. WR : Disabled	
ISA Bus Clock Frequency : PCICLK/4	
	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

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.

ROM PCI/ISA BIOS (2A5IHJ19)

POWER MANAGEMENT SETUP

AWARD SOFTWARE, INC.

Power Management : Disabled	IRQ3 (COM 2) : Enabled
PM Control by APM : Yes	IRQ4 (COM 1) : Enabled
Video Off Option : Susp,Stby ->Off	IRQ5 (LPT 2) : Enabled
Video Off Method : V/H SYNC+Blank	IRQ6 (Floppy Disk) : Enabled

```
┌─────────────────────────────────┬─────────────────────────────────┐
│                                 │ IRQ7 (LPT 1)       : Enabled    │
│ Switch Function Break/Wake      │ IRQ8 (RTC Alarm)    : Disabled  │
│ Doze Speed (div by) : 2         │ IRQ9 (IRQ2 Redir)   : Enabled   │
│ Stdby Speed (div by): 3         │ IRQ10 (Reserved)    : Enabled   │
│ MODEM Use IRQ     : 3           │ IRQ11 (Reserved)    : Enabled   │
│                                 │ IRQ12 (PS/2 Mouse)  : Enabled   │
│           ** PM Timers **       │ IRQ13 (Coprocessor) : Enabled   │
│ HDD Off Affer     : Disabled    │ IRQ14 (Hard Disk)   : Enabled   │
│ Doze Mode       : Disabled      │ IRQ15 (Reserved)    : Enabled   │
│ Standby Mode      : Disabled    │                                 │
│ Suspend Mode      : Disabled    │                                 │
│                                 │                                 │
│           ** PM Events **       │                                 │
│ COM Ports Activity  : Enabled   │                                 │
│ LPT Ports Activity  : Enabled   │                                 │
│ HDD Ports Activity  : Enabled   │                                 │
│ VGA Activity        : Disabled  │                                 │
│                                 ├─────────────────────────────────┤
│                                 │ Esc: Quit      ↑↓→←: Select Item│
│                                 │ F1 : Help        Pu/Pd/+/-: Modify│
│                                 │ F5 : Old Values   (Shift)F2 : Color│
│                                 │ F6 : Load BIOS Defaults         │
│                                 │ F7 : Load Setup Defaults        │
└─────────────────────────────────┴─────────────────────────────────┘
```

Figure 3-5

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

This motherboard supports HDD Power Down, Doze and standby power saving functions when Intel Pentium Processor CPU is installed. The suspend function is also supported when the SMI switch is short (ref.). The detail description of these functions are provided as following:

- **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 time-out parameters to control power saving. Refer item shown below:

- **Time-out parameters:**

HDD Off After

HDD Off After timer can be set from 1 to 15 minute(s). When system stop reading or writing 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 write to HDD command is executed again.

Doze Mode
The "System Doze" mode timer starts to count when there is no "PM events" occurred. The valid timeout setting is from 1 minute up to 1 hour. The system hardware will drop down CPU clock from normal working speed when Doze mode time-out occurred.

Standby Mode
The "Standby" mode timer starts to count when "System Doze" mode timer timed out and no "PM events" occurred. Valid range is from 1 minute up to 1 hour. 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
This function works only when the Pentium CPU is installed. The timer starts to count when "System Standby" mode timer timed out and no "PM Events" occurred. Valid range is from 1 minute up to 1 hour. When the system suspend timer time out, the system will enter the suspend mode and the chipset will stop CPU clock immediately. The power consumption in Suspend Mode is lower than in standby mode. The screen is also blanked out.

- **Video Off Method**

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

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

PM Events:
AWARD BIOS defines 15 PM Events in the power management mode (Doze, standby & suspend). The user can initial any PM Events to be "ON" or "OFF". When the system detects all of the ON events do not have any activity, it will start the system Doze timer first, if the "Power Management" isn't "OFF". 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 "ON" 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 "ON" event occurred.

- **IRQ3 to IRQ15**

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

3-5 PNP/PCI CONFIGURATION SETUP

This "**PNP/PCI configuration**" option configures the PCI bus slots. All PCI bus slots on the system use INTA#, thus all installed PCI cards must be set to this value.

ROM PCI/ISA BIOS (2A5IHJ19)
PNP/PCI CONFIGURATION
AWARD SOFTWARE, INC.

Resources Controlled By : Manual	**PCI IRQ Actived By : Level**
Reset Configuration Data: Disabled	**PCI IDE 2nd Channel : Enabled**
	PCI IDE IRQ Map To : PCI-AUTO
IRQ-3 assigned to : Legacy ISA	**Primary IDE INT# : A**
IRQ-4 assigned to : Legacy ISA	**Secondary IDE INT# : B**
IRQ-5 assigned to : PCI/ISA PnP	
IRQ-7 assigned to : Legacy ISA	
IRQ-9 assigned to : PCI/ISA PnP	
IRQ-10 assigned to : PCI/ISA PnP	
IRQ-11 assigned to : PCI/ISA PnP	
IRQ-12 assigned to : PCI/ISA PnP	
IRQ-14 assigned to : Legacy ISA	
IRQ-15 assigned to : Legacy ISA	
DMA-0 assigned to : PCI/ISA PnP	
DMA-1 assigned to : PCI/ISA PnP	**Esc: Quit ↑↓→←: Select Item**
DMA-3 assigned to : PCI/ISA PnP	**F1 : Help Pu/Pd/+/-:Modify**
DMA-5 assigned to : PCI/ISA PnP	**F5 : Old Values (Shift)F2 : Color**
DMA-6 assigned to : PCI/ISA PnP	**F6 : Load BIOS Defaults**
DMA-7 assigned to : PCI/ISA PnP	**F7 : Load Setup Defaults**

Figure 3-6

IRQxx assigned to

These fields indicate whether or not the displayed IRQ for each field is being used by a Legacy (non-PnP) ISA card. Two options are available: "PCI/ISA PnP" and "Legacy ISA". The first option the default value, indicates either that the displayed IRQ is not used or an PCI/ISA PnP is being used to determine if an ISA card is using that IRQ. Second option is for Legacy ISA card that requires a unique IRQ, and you are not using an PCI/ISA PnP, you must set the field for that IRQ to Legacy ISA.

For example: If you install a Legacy ISA card that requires IRQ10 lets say, then set "IRQ10 assigned to Legacy ISA".

DMAxx assigned to

These fields indicate whether or not the displayed DMA channel for each field is being used by a Legacy (non-PnP) ISA card. Available options include: "PCI/ISA PnP" and "Legacy ISA". When is option "PCI/ISA PnP" indicates either that the displayed DMA channel is not used or an PCI/ISA PnP being used to determine if an ISA card is using that channel. If you install a Legacy ISA card that requires a unique DMA channel, and you are not using an PCI/ISA PnP, you must set the field for that channel to "Legacy ISA".

3-6 LOAD BIOS DEFAULTS

The "**LOAD BIOS 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.

ROM PCI/ISA BIOS (2A5IHJ19)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT	**Load BIOS Default (Y/N)? Y**
PNP/PCI CONFIGUR	
LOAD BIOS DEFAULTS	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	

Esc : QUIT	↑↓→← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color

Time, Date, Hard Disk Type...

Figure 3-7

3-7 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.

ROM PCI/ISA BIOS (2A5IHJ19)
CMOS SETUP UTILITY

AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT	ETECTION
PNP/PCI CONFIGUR	Load SETUP Default (Y/N)? Y
LOAD BIOS DEFAULTS	G
LOAD SETUP DEFAULTS	

Esc : QUIT	↑↓→← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Time, Date, Hard Disk Type...	

Figure 3-8

3-8   INTEGRATED PERIPHERALS SETUP

ROM PCI/ISA BIOS (2A5IHJ19)

INTEGRATED PERIPHERALS
AWARD SOFTWARE, INC.

Internal PCI/IDE : Both	USB Controller : Enabled
IDE Primary Master PIO : Auto	USB Keyboard Support : Disabled
IDE Primary Salve PIO : Auto	
IDE Secondary Master PIO : Auto	
IDE Secondary Slave PIO : Auto	
IDE Burst Mode : Disabled	
IDE Data Port Post Write : Enabled	
IDE HDD Block Mode : Enabled	
Onboard FDC Controller : Enabled	
Onboard UART1 : Auto	
Onboard UART2 : Auto	Esc: Quit ↑↓→←: Select Item
Onboard UART 2 Mode : Standard	F1 : Help Pu/Pd/+/-: Modify
	F5 : Old Values (Shift)F2 : Color
Onboard Parallel Port : 378/IRQ7	F6 : Load BIOS Defaults
Parallel Port Mode : Normal	F7 : Load Setup Defaults

Figure 3-9

NOTE: If you don't use the Onboard IDE connector, than use On-card (PCI or ISA card) IDE connector. You will set Onboard Primary IDE: Disabled an Onboard Secondary IDE: Disabled from CHIPSET FEATURES SETUP UTILITY.
The Onboard PCI IDE cable should be equal to or less than 18 inches (45 cm).

- **IDE HDD Block Mode:** The default value is Enabled.
    Enabled: Enabled IDE HDD Block Mode. The HDD transfer rate is better than Disabled.
    Disabled: Disable IDE HDD Block Mode.

- **IDE Primary Master PIO:** The default value is Auto.

> **Auto:** BIOS will automatically detect the Onboard Primary Master PCI IDE HDD Accessing mode.
>
> **Mode0~4:** Manually set the IDE Accessing mode.

- **IDE Primary Slave PIO:** The default value is Auto.

> **Auto:** BIOS will automatically detect the Onboard Primary Slave PCI IDE HDD Accessing mode.
>
> **Mode0~4:** Manually set the IDE Accessing mode.

- **IDE Secondary Master PIO:** The default value is Auto.

> **Auto:** BIOS will automatically detect the Onboard Secondary Master PCI IDE HDD Accessing mode.
>
> **Mode0~4:** Manually set the IDE Accessing mode.

- **IDE Secondary Slave PIO:** The default value is

> **Auto:** BIOS will automatically detect the Onboard Secondary Slave PCI IDE HDD Accessing mode.
>
> **Mode0~4:** Manually set the IDE Accessing mode.

- **Onboard FDC Controller:** The default value Enabled.

> **Enabled:** Enable the Onboard floppy drive interface controller.
>
> **Disabled:** Disable the Onboard floppy drive interface controller. When use On-card ISA FDC's controller.

- **Onboard UART1:** This field allows the user to select the serial port. The default value is COM1.

> **COM1:** Enable Onboard Serial port 1 and address is 3F8H.
> **COM2:** Enable Onboard Serial port 1 and address is 2F8H.
> **COM3:** Enable Onboard Serial port 1 and address is 3E8H.
> **COM4:** Enable Onboard Serial port 1 and address is 2E8H.
> **Disabled:** Disable Onboard CHIP's Serial port 1.

- **Onboard UART2:** This field allows the user to select the serial port. The default value is COM2.

> **COM1:** Enable Onboard Serial port 2 and address is 3F8H.
> **COM2:** Enable Onboard Serial port 2 and address is 2F8H.
> **COM3:** Enable Onboard Serial port 2 and address is 3E8H.
> **COM4:** Enable Onboard Serial port 2 and address is 2E8H.
> **Disabled:** Disable Onboard CHIP's Serial port 2.

- **Onboard UART 2 Mode:** The default setting is Standard.

> **HPIR:** HP standard mode IR.
> **ASKIR:** ASK standard mode IR.

- **IR function duplex:**
  Half: Half duplex IR transfer mode in Half Duplex.
  Full: Full duplex IR transfer mode in Full Duplex.

- **RxD, TxD Active:** Select RxD & TxD active signal level.

- **Onboard Parallel port:** This field allows the user to select the LPT port. The default value is 378H.
  378H: Enable Onboard LPT port and address is 378H.
  278H: Enable Onboard LPT port and address is 278H.
  3BCH: Enable Onboard LPT port and address is 3BCH.
  Disabled: Disable Onboard CHIP's LPT port.

> *NOTE:* *Parallel Port address is 378H/3BCH that selects the routing of IRQ7 for LPT1.*
> *Parallel Port address is 278H that selects the routing of IRQ5 LPT1.*

- **Parallel port Mode:** This field allows the user to select the parallel port mode. The default value is ECP + EPP (Normal).
  Normal: Standard mode. IBM PC/AT Compatible bidirectional parallel port.
  EPP: Enhanced Parallel Port mode.
  ECP: Extended Capabilities Port mode.
  EPP+ECP: ECP Mode & EPP Mode.

3-9 SUPERVISOR/USER PASSWORD

This item lets you configure the system so that a password is required each time the system boots or an attempt is made to enter the Setup program (Refer to Figure 3-3 for the details). Supervisor Password allows you to change all CMOS settings but the User Password setting doesn't have this function. The way to set up the passwords for both Supervisor and User are as follow:

1. Choose either Supervisor Password or User Password in the Main Menu and press <Enter>. The following message appears:
   "**Enter Password:**"

2. The first time you run this option, enter your password up to only 8 characters and press <Enter>. The screen does not display the entered characters. For no password just press <Enter>.

3. After you enter the password, the following message appears prompting you to confirm the password:
"**Confirm Password:**"

4. Enter exact the same password you just typed again to confirm the password and press <Enter>.

5. Move the cursor to Save & Exit Setup to save the password.

6. If you need to delete the password you entered before, choose the Supervisor Password and Press <Enter>. It will delete the password that you bad before.

7. Move the cursor to Save & Exit Setup to save the option you did, otherwise the old password will still be there when you turn on your machine next time.

3-10 IDE HDD AUTO DETECTION

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 and install in the system automatically. Also you can set HARD DISK TYPE to "Auto" in the STANDARD CMOS SETUP to have same result. The BIOS will Auto-detect the hard disk size and model on display during POST.

ROM PCI/ISA BIOS (2A5IHJ19)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE
Primary Master :								
Primary Slave :								
Secondary Master :								
Se								

Select Secondary Slave Option (N=Skip):N

OPTIONS	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE
1 (Y)	0	0	0	0	0	0	NORMAL

Figure 3-10

NOTE: HDD Modes
The Award BIOS supports 3 HDD modes : NORMAL, LBA & LARGE

NORMAL mode

Generic access mode in which neither the BIOS nor the IDE controller will make any transformations during accessing.

The maximum number of cylinders, head & sectors for NORMAL mode are 1024, 16 & 63.

$$
\begin{array}{lll}
& \text{no.} \quad \text{Cylinder} & (1024) \\
\text{x} & \text{no.} \quad \text{Head} & (\ \ 16) \\
\text{x} & \text{no.} \quad \text{Sector} & (\ \ 63) \\
\text{x} & \text{no.} \quad \text{per sector} & (\ 512) \\
\hline
& 528 \text{ Megabytes}
\end{array}
$$

If user set this HDD to NORMAL mode, the maximum accessible HDD size will be 528 Megabytes even though its physical size may be greater than that!

LBA (Logical Block Addressing) mode

A new HDD accessing method to overcome the 528 Megabyte bottleneck. The number of cylinders, heads & sectors shown in setup may not be the number physically contained in the HDD.

During HDD accessing, the IDE controller will transform the logical address described by sector, head & cylinder into its own physical address inside the HDD.

The maximum HDD size supported by LBA mode is 8.4 Gigabytes which is obtained by the following formula:

$$
\begin{array}{lll}
& \text{no.} \quad \text{Cylinder} & (1024) \\
\text{x} & \text{no.} \quad \text{Head} & (\ 255) \\
\text{x} & \text{no.} \quad \text{Sector} & (\ \ 63) \\
\text{x} & \text{bytes per sector} & (\ 512) \\
\hline
& 8.4 \text{ Gigabytes}
\end{array}
$$

LARGE mode

Extended HDD access mode supported by Award Software.

Some IDE HDDs contain more than 1024 cylinder without LBA support (in some cases, user do not want LBA). The Award BIOS provides another alternative to support these kinds of LARGE mode:

CYLS.	HEAD	SECTOR	MODE
1120	16	59	NORMAL
560	32	59	LARGE

BIOS tricks DOS (or other OS) that the number of cylinders is less than 1024 by dividing it by 2. At the same time, the number of heads is multiply by 2. Reverse transformation process will be made inside INT 12h in order to access the right HDD address the right HDD address!

Maximum HDD size:

```
      no.  Cylinder      (1024)
  x   no.  Head       (  32)
  x   no.  Sector       (  63)
  x   bytes per sector    (  512)
              1 Gigabytes
```

NOTE: *To support LBA or LARGE mode of HDDs, there must be some softwares involved. All these softwares are located in the Award HDD Service Routine (1NT 13h). It may be failed to access a HDD with LBA (LARGE) mode selected if you are running under a Operating System which replaces the whole INT 13h.*
UNIX operating systems do not support either LBA or LARGE and must utility the Standard mode. UNIX can support drives larger than 528MB.

3-11 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.

3-12 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.

3-13 I/O & MEMORY MAP

MEMORY MAP

Address Range	Size	Description
00000-7FFFF	512K	Conventional memory
80000-9FBFF	127K	Extended Conventional memory
9FC00-9FFFF	1K	Extended BIOS data area if PS/2 mouse is installed
A0000-C7FFF	160K	Available for Hi DOS memory
C8000-DFFFF	96K	Available for Hi DOS memory and adapter ROMs
E0000-EEFFF	60K	Available for UMB
EF000-EFFFF	4K	Video service routine for Monochrome & CGA adapter
F0000-F7FFF	32K	BIOS CMOS setup utility
F8000-FCFFF	20K	BIOS runtime service routine (2)
FD000-FDFFF	4K	Plug and Play ESCD data area
FE000-FFFFF	8K	BIOS runtime service routine (1)

I/O MAP

000-01F	DMA controller (Master)
020-021	INTERRUPT CONTROLLER (Master)
022-023	CHIPSET control registers. I/O ports
040-05F	TIMER control registers
060-06F	KEYBOARD interface controller (8042)
070-07F	RTC ports & CMOS I/O ports
080-09F	DMA register

0A0-0BF	INTERRUPT controller (Slave)
0C0-0DF	DMA controller (Slave)
0F0-0FF	MATH COPROCESSOR
1F0-1F8	HARD DISK controller
278-27F	PARALLEL port 2
2B0-2DF	GRAPHICS adapter controller
2F8-2FF	SERIAL port 2
360-36F	NETWORK ports
378-37F	PARALLEL port 1
3B0-3BF	MONOCHROME & PARALLEL port adapter
3C0-3CF	EGA adapter
3D0-CDF	CGA adapter
3F0-3F7	FLOPPY DISK controller
3F8-3FF	SERIAL port-1

3-14 TIME & DMA CHANNELS MAP

TIME MAP: TIMER Channel 0 System timer interrupt
                  TIMER Channel 1 DRAM REFRESH request
                  TIMER Channel 2 SPEAKER tone generator

DMA CHANNELS: DMA Channel 0 Available
                  DMA Channel 1 Onboard ECP (Option)
                  DMA Channel 2 FLOPPY DISK (SMC CHIP)
                  DMA Channel 3 Onboard ECP (default)
                  DMA Channel 4 Cascade for DMA controller 1

DMA Channel 5 Available
DMA Channel 6 Available
DMA Channel 7 Available

3-15 INTERRUPT MAP

NMI: Parity check error

IRQ (H/W):   0 System TIMER interrupt from TIMER 0
                  1 KEYBOARD output buffer full
                  2 Cascade for IRQ 8-15
                  3 SERIAL port 2
                  4 SERIAL port 1
                  5 PARALLEL port 2
                  6 FLOPPY DISK (SMC CHIP)
                  7 PARALLEL port 1
                  8 RTC clock
                  9 Available
                10 Available
                11 Available
                12 PS/2 Mouse
                13 MATH coprocessor
                14 Onboard HARD DISK (IDE1) channel
                15 Onboard HARD DISK (IDE2) channel

3-16 RTC & CMOS RAM MAP

RTC & CMOS: 00   Seconds
                   01   Second alarm
                   02   Minutes
                   03   Minutes alarm
                   04   Hours
                   05   Hours alarm
                   06   Day of week
                   07   Day of month
                   08   Month

09   Year
0A   Status register A
0B   Status register B
0C   Status register C
0D   Status register D
0E   Diagnostic status byte
0F   Shutdown byte
10   FLOPPY DISK drive type byte
11   Reserve
12   HARD DISK type byte
13   Reserve
14   Equipment type
15   Base memory low byte
16   Base memory high byte
17   Extension memory low byte
18   Extension memory high byte
19-2d
2E-2F
30   Reserved for extension memory low byte
31   Reserved for extension memory high byte
32   DATE CENTURY byte
33   INFORMATION FLAG
34-3F Reserve
40-7F Reserved for CHIPSET SETTING DATA

3-17   BIOS REFERENCE-POST CODES

ISA PORT codes are typically output to port address 80h.

Post	Name	Description
CO	Turn Off Chipset Cache	OEM Specific-Cache controller.
1	Processor Test 1	Processor Status (1 FLAGS) Verification. Tests the following processor status flags carry, zero, sign, overflow.

		The BIOS will set each of these flags, verify the are set, then turn each flag off and verify it is off.
2	Processor Test 2	Read/ Write/ Verify all CPU registers except SS, SP, and BP with data pattern FF and OO.
3	Initialize Chips	Disable NMI, PIE, AIE, UEI, SOWV. Disable video, parity checking, DMA. Reset math coprocessor. Clear all page registers, CMOS shutdown byte. Initialize timer 0, 1, and 2, including set EISA timer to a known state. Initialize DMA Controllers 0 and 1. Initialize interrupt controllers 0 and 1. Initialize EISA extended registers.
4	Test Memory Refresh Toggle	RAM must be periodically refreshed inorder to keep the memory from decaying. This function assures that the memory refresh function is working properly.
5	Blank video, Initialize keyboard	Keyboard controller initialization.
6	Reserved	
7	Test CMOS Interface and Battery Status	Verifies CMOS is working correctly, detects bad battery.
BE	Chipset Default Initialization	Program chipset registers with power on BIOS defaults.
C1	Memory presence test	OEM Specific-Test to size on-board memory.
C5	Early Shadow	OEM Specific-Early Shadow enable for fast boot.
C6	Cache presence test	External cache size detection.

8	Setup low memory	Early chip set initialization. Memory presence test. OEM chip set routines. Clear low 64K of memory. Test first 64K memory.
9	Early Cache Initialization	Cyrix CPU initialization. Cache initialization.
A	Setup Interrupt Vector Table	Initialization first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh

		according to INT_TBL
B	Test CMOS RAM Checksum	Test CMOS RAM Checksum, if bad, or insert key pressed, load defaults.
C	Initialize keyboard	Detect type of keyboard controller (optional) Set NUM_LOCK status.
D	Initialize Video Interface	Detect CPU clock. Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
E	Test Video Memory	Test video memory, write sign-on message to screen. Setup shadow RAM.Enable shadow according to Setup.
F	Test DMA Controller 0	BIOS checksum test. Keyboard detect and initialization.
10	Test DMA Controller 1	
11	Test DMA Page Registers	Test DMA Page Registers.
12-13	Reserved	
14	Test Timer Counter 2	Test 8254 Timer 0 Counter 2.
15	Test 8259-1 Mask Bits	Verify 8259 Channel 1 masked interrupts by alternately turning off and on the interrupt lines.
16	Test 8259-2 Mask Bits	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.

17	Test Stuck 8259's Interrupt Bits	Turn off interrupts then verify no interrupt mask register is on.
18	Test 8259 Interrupt Functionality	Force an interrupt and verify the interrupt occurred.
19	Test Stuck NMI Bits (Parity I/O Check)	Verity NMI can be cleared.
1A		Display CPU clock.
1B-1E	Reserved	
1F	Set EISA Mode	If EISA non-volatile memory checksum is good, execute EISA initialization. If not, execute ISA tests an clear EISA mode flag.

		Test EISA Configuration Memory Integrity (checksum & communication interface).
20	Enable Slot 0	Initialization slot 0 (System Board).
21-2F	Enable Slot 1-15	Initialize slot 1 through 15.
30	Size Base and Extended Memory	Size base memory from 256K to 640K and extended memory above 1MB.
31	Test Base and Extended Memory	Test base memory from 256K to 640K and extended memory above 1MB using various patterns. NOTE: This will be skipped in EISA mode and can be "skipped" with ESC key in ISA mode.
32	Test EISA Extended Memory	If EISA Mode flag is set then test EISA memory found in slots initialization. NOTE: This will be skipped in ISA mode and can be "skipped" with ESC key in EISA mode.
33-3B	Reserved	
3C	Setup Enabled	
3D	Initialize & install Mouse	Detect if mouse is present, initialize mouse, install interrupt vectors.
3E	Setup Cache Controller	Initialize cache controller.
3F	Reserved	
BF	Chipset Initialization	Program chipset registers with Setup values
40		Display virus protest disable or enable.
41	Initialize Floppy Drive & Controller	Initialize floppy disk drive controller and drives.
42	Initialize Hard Drive & controller	Initialize hard drive controller and any drives.

43	Detect & Initialize Serial/Parallel Ports	Initialize any serial and parallel ports (also game port).
44	Reserved	
45	Detect & Initialize Math Coprocessor	Initialize math coprocessor.
46	Reserved	
47	Reserved	
48-4D	Reserved	
4E	Manufacturing POST Loop or Display Messages	Reboot if Manufacturing POST Loop pin is set. Otherwise display any messages (i.e., any non-fatal

		errors that were detected during POST) and enter Setup.
4F	Security Check	Ask password security (optional).
50	Write CMOS	Write all CMOS values back to RAM and clear screen.
51	Pre-boot Enable	Enable parity checker. Enable NMI, Enable cache before boot.
52	Initialize Option ROMs	Initialize any option ROMs present from C8OOOh to EFFFFh. NOTE: When FSCAN option is enabled, will initialize from C8OOOh to F7FFFh.
53	Initialize Time Value	Initialize time value in 40h:BIOS area.
60	Setup Virus Protect	Setup virus protect according to Setup.
61	Set Boot Speed	Set system speed for boot.
62	Setup Num Lock	Setup Num Lock status according to Setup.
63	Boot Attempt	Set low stack. Boot via INT 19h.
B0	Spurious	If interrupt occurs in protected mode.
B1	Unclaimed NMI	If unmasked NMI occurs, display. Press F1 to disable NMI, F2 reboot.
E1-EF	Setup Pages	E1-Page 1, E2-Page 2, etc.
FF	Boot	