

82430TX PCIset

EP-5BTXA-E

ISA PCI MainBoard

with Onboard PCI IDE and Super Multi-I/O.

TRADEMARK

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The specification is subject to change without notice.

V011

Package Checklist

Please make sure your package contains all items listed below before your installation. If you find any damaged items or missing items, please contact your retailer.

- One Mainboard
- One manual
- One IDE ribbon cable
- One floppy ribbon cable
- One parallel port ribbon cable
- Two Serial port ribbon cable

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NOTE :

The "**LOAD SETUP DEFAULTS**" function loads the system default data directly from ROM and initializes the associated hardware properly. This function is necessary when you accept this Mainboard, or the system CMOS data is corrupted.

ROM PCI/ISA BIOS CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP	SUPERVISOR PASSWORD
BIOS FEATURES SETUP	USER PASSWORD
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMENT SETUP	HDD LOW LEVEL FORMAT
PNP/PCI CONFIGURATION	LOAD SETUP Default (Y/N)? Y
INTEGRATED PERIPHERALS	LOAD SETUP SAVING
LOAD SETUP DEFAULTS	
ESC: QUIT	↑↓←→ :SELECT ITEM
F10:Save & Exit Setup	(Shift)F2 :Change Color
Load Setup Defaults Except Standard COMS SETUP	

LOAD SETUP DEFAULT

Chapter 1

Introduction

The **EP-5BTXA-E** mainboard is a high performance system hardware based on Intel Pentium® processor and is equipped with three PCI slots, three standard ISA slots, a PnP Super I/O controller and two dual-port PCI-IDE connectors for the future expansion. The hardware dimension is an AT form-factor that is 220mm x 200mm with a four-layer design technology.

Specification

- Intel 82430TX PCIset chipset.
- Intel **Pentium**® Processor operating at **90 ~ 333 MHz** (Easy CPU CLK Setting JP3 : One Jumper Only) and **P55C** with **321 ZIF socket 7** for scalability to accept faster processors in the future.
- Supports an onboard Switching Voltage Regulator to increase CPU and System's reliability.
- Supports CPU Vcore Voltage 2.0V/12.1V/2.8V/2.9V/3.2V selection.
- Supports up to 256 MegaBytes of DRAM(a minimum of 8 MB) on board (168-Pin DIMM x 2), BIOS auto EDO DRAM and SDRAM configuration.(Refer to Chapter 2-4 System Memory Configuration)
- Supports Onboard Burst/Pipelined burst synchronous L2 **Write Back** Cache. The cache memory is 512KB (64KB*64 SRAM).
- Supports three 16-bit ISA slots and three 32-bit PCI slots and provides two independent high performance PCI IDE interfaces capable of supporting **PIO Mode 3 and Mode 4** devices.
- Supports **ATAPI** (e.g. **CD-ROM**) devices and Ultra DMA 33 for both IDE interface.
- Supports 1 floppy port, 1 parallel port (EPP,ECP port), and 2 serial ports (16550 Fast UART compatible) with PnP Super I/O chip.
- Supports both **PS/2** style mouse Header and AT keyboard connector
- Supports Award Plug & Play BIOS . The BIOS is stored in Flash EPROM form. It provides better upgradeability for the system.
- Supports a CPU Hardware sleep and SMM (System Management Mode) function.
- Supports a USB header
- Utilizes a Lithium battery which provides environmental protection and longer life-time

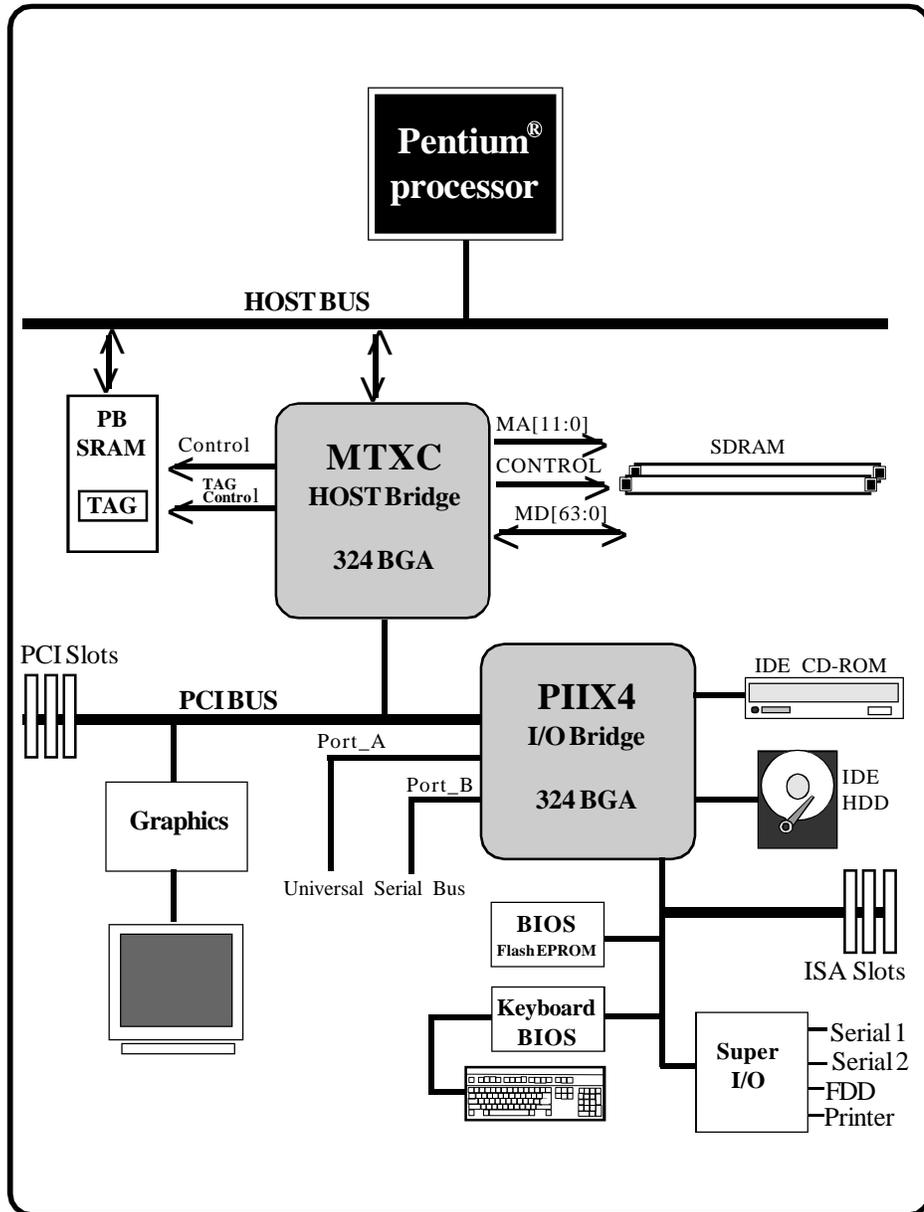


Figure 1-1 System Block Diagram

Chapter 2

Hardware design

2-1 Overview

The EP-5BTXA-E is designed with Intel 82430TX PCIset chipset which is developed by INTEL Corporation to fully support Pentium® Processor PCI/ISA system. The Intel 82430TX PCIset chipset can increase integration and improve performance designs. The chipset provides an integrated IDE controller with two high performance IDE interfaces for up to four IDE devices (hard devices, CD-ROM device, etc). The PnP Super I/O controller provides the standard PC I/O functions: a floppy interface, two 16 Byte FIFO serial ports and an EPP/ECP capable parallel port. The **EP-5BTXA-E** layout is shown in the onet page for user's reference. **Care must be taken** when inserting memory modules, inserting CPU or even plugging PCI card into the associated slots to avoid damaging any circuits or sockets on board. A cooling fan is strongly recommended when installing P54C/P54CTB/P55C (MMX)/K5/K6/6x86 (6x86L) processor due to possible overheat.

The EP-5BTXA-E supports a minimum of 8MB of System Memory and a maximum of 256MB with 512KB synchronous SRAM Onboard to increase system performance.

The EP-5BTXA-E supports synchronous DRAM. **The EP-5BTXA-E** provides two 168-pin DIMM sites for memory expansion. Each socket supports 8MB, 16MB, 32MB, 64MB and 128MB DIMM single-sided or double-sided memory modules. The memory timing requires 83MHz(12ns), 100MHz(10ns) for SDRAM. This mainboard has two 168-pin DIMM sites to support 3.3V (power level) Unbuffered Synchronous DRAMs(SDRAM). **Memory parity generation and checking are not supported.**

The EP-5BTXA-E supports **two Onboard PCIIDE** connectors that can support PIO Mode/Ultra DMA 33 device and detect IDE harddisk type by BIOS utility automatically.

The EP-5BTXA-E supports Award Plug & Play BIOS for the ISA and PCI cards. The BIOS can be located in Flash EPROM. The advantage of having Flash EPROM is much easier to replace BIOS code if necessary.

The EP-5BTXA-E has been designed with AT form-factor power connector. The mainboard layout and system block diagram are shown in Figure 1-1 and Figure 2-1.

EP-5BTXA-E Layout

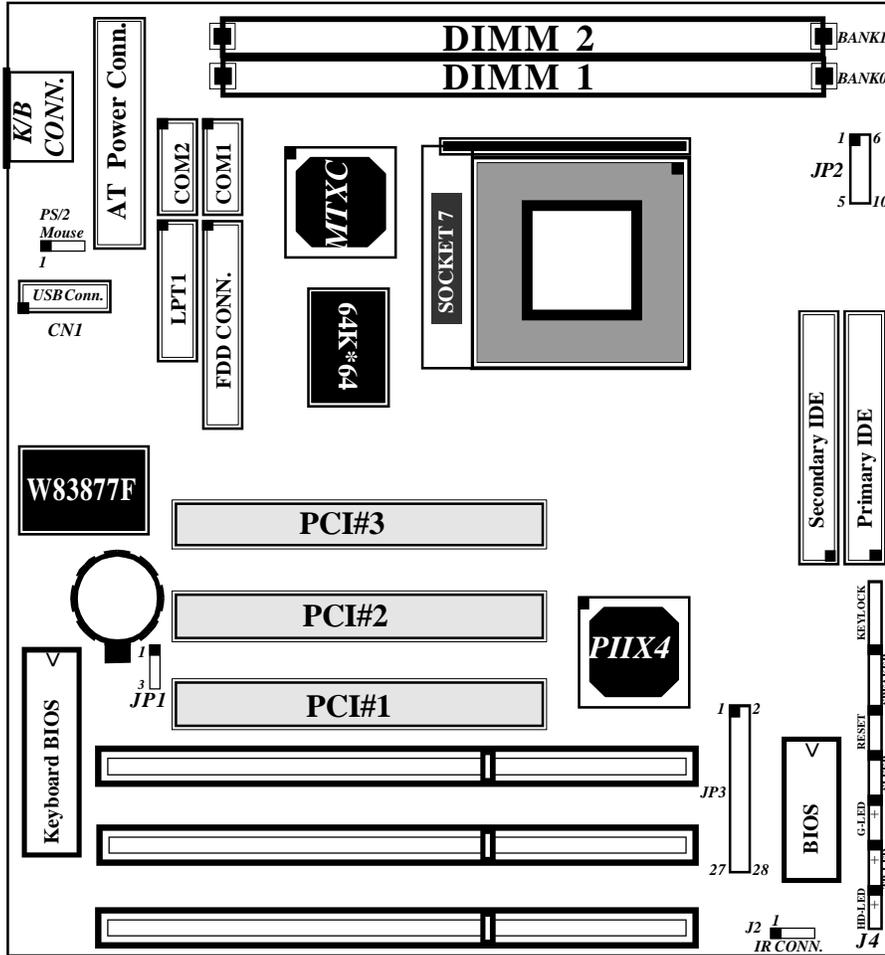
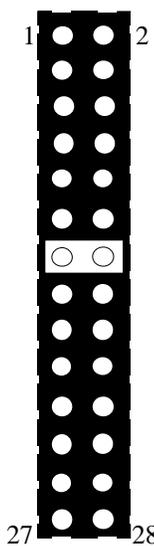


Figure 2-1

2-2 Connectors and Jumpers

This section describes all of the connectors and jumpers equipped in the mainboard. Please refer to **Figure 2-1** for the location of each connector and jumper. The figure  in the following means connecting pin 1&2 and  means connecting pin 2&3. Jumpers with two pins are shown as  for open and  for close.

JP3: CPU Clock Rate Select. (Easy-Setting-Single-Jumper)

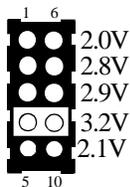


JP3	Pentium Pentium MMX AMD K5 / K6	Bus Frequency x Multiplier	Cyrix 6x86(L) / 6x86MX IBM 6x86(L) / 6x86MX
1-2	90MHz	60MHz x 1.5	
3-4	100MHz	66MHz x 1.5	
5-6	120MHz	60MHz x 2	6x86/L-PR150
7-8	133MHz	66MHz x 2	6x86/L/MX-PR166
9-10		75MHz x 2	* 6x86/L/MX-PR200
11-12	150MHz	60MHz x 2.5	* 6x86MX-PR166
13-14	166MHz	66MHz x 2.5	* 6x86MX-PR200
15-16	188MHz	75MHz x 2.5	* 6x86MX-PR233
17-18	*200MHz	66MHz x 3	6x86MX-PR233
19-20	*225MHz	75MHz x 3	6x86MX-PR266
21-22	*233MHz	66MHz x 3.5	6x86MX-PR266
23-24	266MHz	66MHz x 4	
25-26	300MHz	66MHz x 4.5	
27-28	333MHz	66MHz x 5	

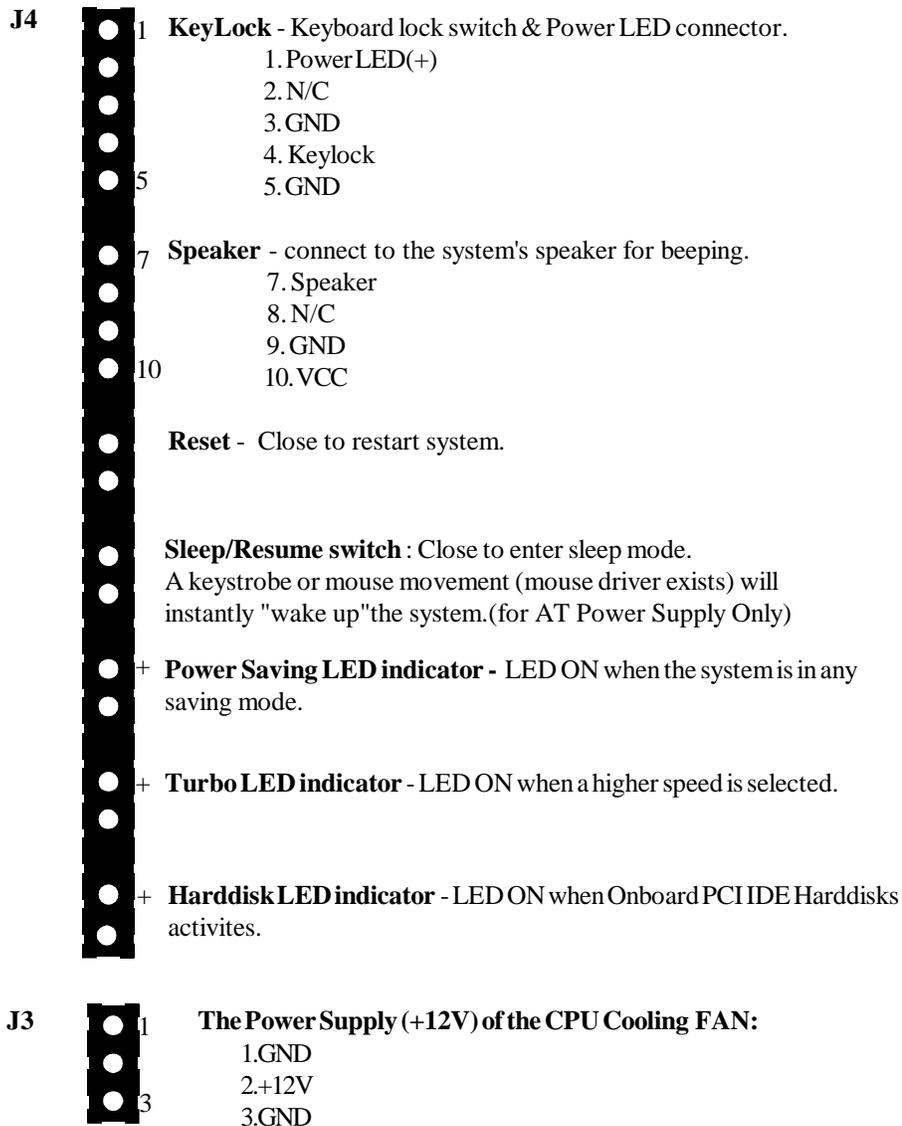
* *These jumper settings are reserved for the future CPU versions. When the future CPU versions are ready and suitable for this mainboard, these jumper settings will be correctly updated.*

JP2

CPU Vcore voltage selection for Pentium MMX / AMD K6 / Cyrix 6x86L or 6x86MX



- 1-6 : 2.0V for AMD K6 fast processor (Reserved)
- 2-7 : 2.8V (Default) for Pentium P55C(MMX)/Cyrix 6X86L(Dual Voltage)
- 3-8 : 2.9V for AMD K6 PR166/PR200 or 6x86MX-PR166/PR200/RP233/PR266(Dual Voltage)
- 4-9 : 3.2V for AMD K6 PR233/PR266(Dual Voltage)
- 5-10 : 2.1V for AMD K6 fast processor (Reserved)



JP1

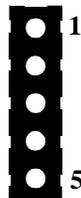


Clear CMOS:

- 1-2 : Normal operation (Default)
- 2-3 : Clear CMOS Values

This setting allows users to clear current CMOS data to back to default by setting the jumper to 2-3 when system is off. This jumper should be brought back to pin 1-2 to restore the normal operation.

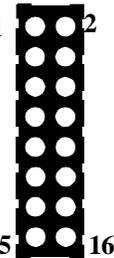
J2



IrDA/ASKIR CONNECTOR:

- 1.VCC
- 2.NC
- 3.IRRX
- 4.GND
- 5.IRTX

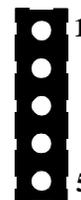
CN1 1



USB CONNECTOR:

Reserved for USB port Adapter
(refer to APPENDIX B: I/O Connectors)

J1



PS/2 MOUSE CONNECTOR:

- 1. Data (Red Wire)
- 2. Clock (Blue Wire)
- 3. GND (Green)
- 4. NC
- 5. VCC (Yellow)

2-3 System Memory Configuration

The EP-5BTXA-E supports two 168-pin DIMM module sockets to extend system memory size. There is not jumper by hardware setting needed for memory configuration. The following figures show all possible memory combinations.



Memory Configuration Table

DIMM (M1) (BANK 0)	DIMM2 (M2) (BANK 1)	TOTAL Memory MAX.=256MB
SDRAM [8MB, 16MB] [32MB, 64MB] x1 [128MB]	SDRAM [8MB, 16MB] [32MB, 64MB] x1 [128MB]	=

NOTE: 1. DIMM module specification is 3.3V / unbuffered Synchronous DRAM

DIMM Module Installation

Figure 2-2 displays the notch marks and what they should look like on your DIMM memory module.

DIMMs have 168-pins and two notches that will match with the onboard DIMM socket. DIMM modules are installed by placing the chip firmly into the socket at a 90 degree angle and pressing straight down (figure 2-3) until it fits tightly into the DIMM socket (figure 2-4).

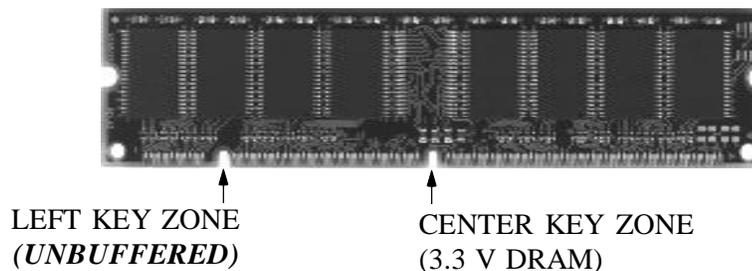


Figure 2-2

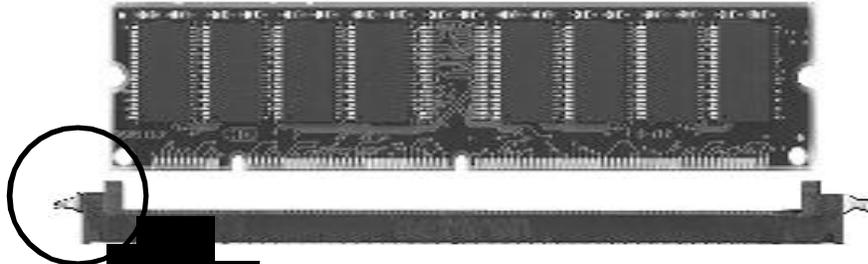


Figure 2-3

DIMM Module clip before installation

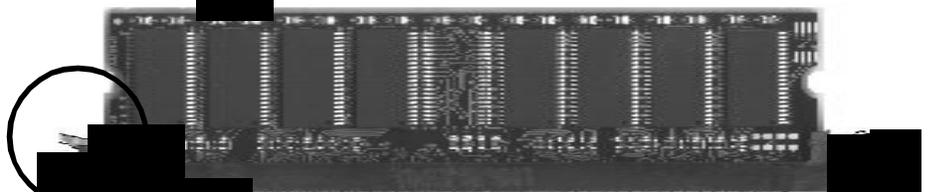


Figure 2-4

DIMM Module clip after installation

To remove the DIMM module simply press down both of the white clips on either side and the module will be released from the socket.

When you have a DIMM module to plug into a 168-pin dual readout connector, you must make sure that the DIMM module is 3.3V/Unbuffered to supports Intel Pentium® Processor System.

* "BANK" = 64Bit = DIMM1 = DIMM2

* DIMM SDRAM may be 83MHz (12ns), 100MHz (10ns) or 120MHz (8ns) bus speed.

2-4 Cache Memory Configuration

The second level (L2) cache is installed in the mainboard to increase the system performance. The **EP-SBTXA-E** supports 512KB pipelined burst synchronous SRAM.

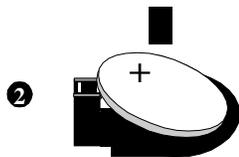
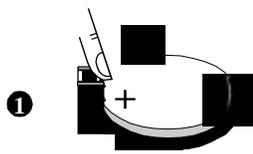


2-8 EP-5BTXA-E

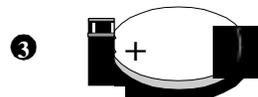
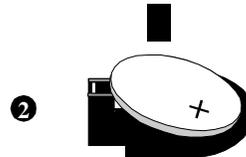
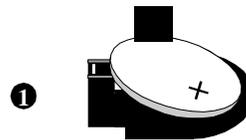
2-5 Real Time Clock Battery Replacement

The battery can be replaced by a Sanyo / Panasonic CR2032, or other equivalent coin lithium battery. Please follow the steps below to replace the battery.

1.Remove



2.Insert



2-6 Integrated PCI Bridge

The **EP-5BTXA-E** utilizes **Intel 430TX PCIset** chipset to support Intel Pentium[®] Processor PCI/ISA system. The Intel 82430TX PCIset chipset consists of one 82439TX system controller (MTXC) and one 82371AB PCI/ISA/IDE Accelerator (PIIX4) bridge chip. It provides an interface which translates CPU cycle into PCI bus cycle and PCI burst read/write capability. In addition, it provides a high performance PCI arbiter and supports four PCI Masters, Rotating Priority Mechanism, and Hidden Arbitration Scheme Minimizes Arbitration Overhead. The 82371AB(PIIX4) supports PCI Specification Revision 2.1 Compliant and contains a Universal Serial Bus interface with both host and hub control functions. EP-5BTXA-E reserves a USB header or to provide two USB ports for serial transfer at 12 or 1.5 Mbit/sec. This supports legacy keyboard and mouse software with USB-Base Keyboard and mouse.

There are four interrupts in each PCI slot : INTA#, INTB#, INTC#, and INTD#, since the **EP-5BTXA-E** adapts the PCI auto-configuration with the system BIOS Setup utility. When the system is turned on after adding a PCI add-in card, the BIOS automatically configure interrupts, DMA channels, I/O space, and other parameters. You do not have to configure jumpers or worry about potential resource conflicts. Because PCI cards use the same interrupt resource as ISA cards, you must specify the interrupts used by ISA add-in cards in the BIOS Setup utility.

If a "Legacy card" (such as plug paddle card and cable for the ISA slot.) is plugged in the system, modification in the **ROMSETUPUTILITY** becomes necessary. First, enter **PCI CONFIGURATION SETUP** utility from **ROMSETUPUTILITY** main menu to set the "**PCI IDE IRQ MAP TO: ISA**".

Second, you must enter **CHIPSET FEATURES SETUP UTILITY** from **ROMSETUP UTILITY** main menu and set the "**Onboard Primary PCI IDE: Disabled** and **Onboard Secondary PCI IDE: Disable**." When you plug the PCI/ISA IDE card into the system, You should **Disabled Onboard Primary and Secondary PCI IDE** from **CHIPSET FEATURES SETUP UTILITY** too.

When no paddle card and cable, you can set the system interrupt request (IRQ) on the "Legacy card" (refer to user's manual of the card) to a proper system IRQ level (In general, card's Primary is assigned to INTA and Secondary is assigned to INTB). If the card is plugged into slot 1 (marked PCI#1), you cannot use the second slot (marked PCI#2) because the Secondary INT signal takes INTB from the slot (refer to Page 3-13 for circuit diagram). The user then enters **PCI CONFIGURATION SETUP** utility from **ROMSETUP UTILITY** main menu and sets the "**PCI IDE IRQ MAP TO: PCI-Slot 1**" (It depends on the slot # where the Legacy card is plugged).

Chapter 3

Award BIOS Setup

Award's ROM BIOS provides a built-in Setup program which allows user to 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 change.

It is possible that the CMOS battery is dead. This will cause data lose in CMOS RAM. If so, it is necessary to re-enter system configuration parameters.

To enter Setup Program

Power on the computer and press key immediately. This will bring you into BIOS CMOSSETUPUTILITY.

ROM PCI/ISA BIOS(2A59IPA9) CMOSSETUPUTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP	SUPERVISOR PASSWORD
BIOS FEATURES SETUP	USER PASSWORD
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMENT SETUP	HDD LOW LEVEL FORMAT
PNP/PCI CONFIGURATION	SAVE & EXIT SETUP
INTEGRATED PERIPHERALS	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 CMOSSETUPUTILITY

The menu displays all the major selection items and allows user to select any shown items. 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 the associated configuration parameters.

3-2 CHAPTER 3

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.

ROM PCI/ISA BIOS(2A59IPA9)									
STANDARD CMOS SETUP									
AWARD SOFTWARE, INC.									
Date (mm:dd:yy) : Wed, Apr 17 1996									
Time (hh:mm:ss) : 14 : 30 : 50									
HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZONE	SECTORS	MODE	
Primary Master	: Auto	0	0	0	0	0	0	0	Auto
Primary Slave	: Auto	0	0	0	0	0	0	0	Auto
Secondary Master	: Auto	0	0	0	0	0	0	0	Auto
Secondary Slave	: Auto	0	0	0	0	0	0	0	Auto
Drive A : 1.44M, 3.5 in.									
Drive B : None									
Floppy 3 Mode Support : Disabled									
Video : EGA/VGA									
Halt On : All Errors									
				Base Memory : 640K					
				Extended Memory : 5360K					
				Other Memory : 384K					
				Total Memory : 16384K					
ESC : Quit		↑ ↓ ← → : Select Item		PU/PD/+/- : Modify					
F1 : Help		(Shift) F2 : Change Color							

Figure 3-2 STANDARD CMOS SETUP

NOTE: If hard disk Primary Master/Slave and Secondary Master/Slave were used Auto, then the hard disk size and model will be auto-detected on display during POST.

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

3-2 BIOS Features Setup

Selecting 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 EP-5BTXA-E. 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 provides 2 convenient 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(2A59IPA9)			
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, SCSI	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	: High		
Gate A20 option	: Fast		
Typematic Rate Setting	: Disabled		
Typematic Rate (Chars/Sec)	: 6		
Type matic Delay (Msec)	: 250		
Security Option	: Setup		
PCI/VGA Palette Snoop	: Disabled		
Assign IRQ For VGA	: Enabled		
OS Select For DRAM > 64MB	: Non-OS2		
		Esc : Quit	↑ ↓ → ← : Select Item
		F1 : Help	PU/PD/+/- : Modify
		F5 : Old Values	(Shift)F2 : Color
		F7 : Load Setup Defaults	

Figure 3-3 BIOSFEATURESETUP

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 attempts to write to the boot sector or partition table of the hard disk drive will halt the system and an error message will appear. You should then run an anti-virus program to locate the virus. Keep in mind that this feature protects only the boot sector, not the entire hard drive. 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.

Disabled : No warning message to appear when anything attempts to access the boot sector.

Note : Many disk diagnostic programs that access the boot sector table can trigger the virus warning message. If you plan to run such a program, we recommend that you first disable the virus warning.
- **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 is without Internal Cache then this item "CPU Internal Cache" will not be shown.

Enabled : Enable cache.

Disable : Disable cache.

3-4 CHAPTER 3

- **Quick Power On Self Test:** This category speeds up Power On Self Test (POST) after you power on the computer. If it is set to Enable, BIOS will shorten or skip some check items during POST. The default is Enabled.
Enabled : Enable quick POST.
Disabled: Normal POST.
- **Boot Sequence:** This category determines which drive is searched first for the O/S (Operating System). Default value is A, C, SCSI. The following is your list of options.
[A, C, SCSI]-[C, A, SCSI]-[C, CDROM, A]-[CDROM, C, A]-[D, A, CDROM]
[E, A, CDROM]-[F, A, CDROM]-[SCSI, A, C]-[SCSIC, A]-[C Only], [LS/ZIP, C]
A, C : System will first search for floppy disk drive then hard disk drive.
C, A : System will first search for hard disk drive then floppy disk drive.
CDROM, C, A: System will first search for the CDROM drive (If the CDROM has a bootable CD title.) and second search hard disk drive then floppy disk drive.
C, CDROM, A: System will first search for the hard disk drive and second search the CDROM drive (If the CDROM has a bootable CD title.) then floppy disk drive.
- **Swap Floppy Drive:** This will swap your physical drive letters A & B if you are using two floppy disks. Default value is Disabled.
Enabled : Floppy A & B are able to swap under DOS.
Disabled: Floppy A & B are not able to swap.
- **Boot Up Floppy Seek:** During Power-On-Self-Test (POST), BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. Only is 360K type 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 cannot 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:** Control the state of the Numlock key when the system boots. The default value is On.
On : Keypad is number keys.
Off : Keypad is arrow keys.
- **Boot UP System Speed:** Select High to boot at the default CPU speed; select Low to boot at the speed of the AT bus.
High: Set the speed to high.
Low : Set the speed to low.
- **Gate A20 Option:** This refers to the way the system addresses memory above 1MB (extended memory). The default value is Fast.
Normal : The A20 signal is controlled by keyboard controller or chipset hardware.
Fast : The A20 signal is controlled by Port 92 or chipset specific method.

- **Typematic Rate Setting:** This determines the keystroke repeat rate.
Enabled : Enable typematic rate and typematic delay programming.
Disabled: Disable typematic rate and typematic delay programming. The rate will be controlled by keyboard controller in your system.
- **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 : 250msec.
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 the access to Setup will be denied if the correct password is not entered at the prompt.
Setup : The system will boot, but the access to Setup will be denied if the incorrect password is not entered at the prompt.
- **PCI/VGA Palette Snoop:** This filed controls the ability of a primary PCI VGA controller to share a common palette(when a snoop write cycles) with an ISA video card. The default value is Disabled.
*Enabled:*If an ISA card connects to a PCI VGA card via the VESA connector and that ISA card connects to VGA monitor and that ISA card uses the RAMDAC of PCI card.
*Disabled:*Disable the VGA card Palette snoop function.
- **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.
- **Assign IRQ For VGA:** The default Value is Enabled.
Enabled : The system was assigned IRQ for VGA card.
Disabled: The system was not assigned IRQ for VGA card.

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

These categories determine whether other expansion card optional ROM will be copied to RAM by 16K byte or 32K byte per unit and the size depends on chipset. If you install other expansion cards with ROMs on them, you will need to know which addresses the ROMs use to shadow themselves specifically.

Enabled : Optional shadow is enabled.

Disabled: Optional shadow is disabled.

3-3 Chipset Features Setup

Choose the "CHIPSETFEATURESETUP" in the CMOSSETUPUTILITY menu to display the following menu.

ROM PCI/ISA BIOS(2A59IPA9) CHIPSET FEATURES SETUP AWARD SOFTWARE, INC.	
Auto Configuration	: Enabled
DRAM Timing	: 60ns
DRAM Leadoff Timing	: 10 / 6 / 3
DRAM Write Burst Timing	: x333
Fast EDO Lead Off	: Enabled
Refresh RAS# Assertion	: 4 Clks
Fast RAS To CAS Delay	: 2
DRAM Page Idel Timer	: 2 Clks
DRAM Enhanced Paging	: Enabled
Fast MA to RAS# Delay	: 2 Clks
SDRAM (CAS Lat/RAS-to-CAS)	: 2/2
SDRAM Speculative Read	: Disabled
System BIOS Cacheable	: Disabled
Video BIOS Cacheable	: Enabled
8 Bit I/O Recovery Time	: 1
16 Bit I/O Recovery Time	: 2
Memory Hole At 15M-16M	: Disabled
PCI 2.1 Compliance	: Disabled

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

Figure3-4 CHIPSETFEATURESETUP

- **Auto Configuration:** Selects predetermined optimal values of chipset parameters. When Disabled, chipset parameters revert to setup information stored in COMS. Many fields in this screen are not available when Auto Configuration is Enabled.

Note: When you insert slow memory modules in the system and set a faster timing, the system may hang up.

- **DRAM Timing:** The default value is 60ns.
60ns : 2 (faster) Burst Wait State, for 60~70ns Fast Page Mode/EDO DRAM.
70ns : 3 (slower) Burst Wait State, for 70ns Fast Page Mode/EDO DRAM.
- **DRAM Leadoff Timing:** The default value is 10/6/3 (Read Leadoff/ Write Leadoff/ RAS# Precharge)
10/6/3 : For EDO / FPM reads and Writes timing.
11/7/3 : For slow EDO / FPM reads and Writes timing.
- **DRAM Writes Burst Timing:** The default value is x222.
x222 : For EDO / FPM of the fast burst mode timings.
x333 : For EDO / FPM of the slow burst mode timings.
- **Fast EDO Lead off:** The default value is Enabled.
Enabled : This field Enables fast timing EDO read cycles.
Disabled : Disables the fast timing EDO read cycles.
- **Refresh RAS# Assertion :** The default value is 4 clks.
4 : This field controls the number of 4 clocks. RAS# is asserted for Refresh.
5 : This field controls the number of 5 clocks. RAS# is asserted for Refresh.
- **Fast RAS To CAS Delay :** The default value is 2.
2 : This field controls a RAS# to CAS# delay is 2.
3 : This field controls a RAS# to CAS# delay is 3.
- **Fast MA to RAS# Delay :** The default value is 2 Clks.
1 Clks : This field controls Memory Address to RAS's timing is 1 HCLKS.
2 Clks : This field controls Memory Address to RAS's timing is 1 HCLKS.
- **SDRAM (CAS Lat / RAS-to-CAS) :** The default value is 2 / 2.
2/2 : This field controls a RAS# to CAS# delay of 2 HCLKS is provided for SDRAM.
3/3 : This field controls a RAS# to CAS# delay of 3 HCLKS is provided for SDRAM.
- **SDRAM Speculative Read :** The default value is Disabled.
Enabled : Enables the SDRAM speculative read logic.
Disabled : Disables the SDRAM speculative read logic.
- **System BIOS Cacheable:**
Enabled : Allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.
Disabled : System BIOS non-cacheable

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- Video BIOS Cacheable:** The default value is enabled.
Enabled : This field Enables the Video BIOS Cacheable to speed up the VGA Performance.
Disabled: Disables the Video BIOS Cacheable function.
- 8/16 Bit I/O Recovery Time:** The default value is 1.
8 Bit I/O Recovery Time: This field defines the recovery time from 1 to 8 for 8-bit I/O.
16 Bit I/O Recovery Time: To define the recovery time from 1 to 4 for 16-bit I/O.
- Memory Hole at 15M-16M:** The default value is disabled.
Disabled: Normal Setting.
Enabled : This field enables the main memory (15~16MB) remap to ISA BUS.
 This feature reserves 15MB to 16MB memory address space to ISA expansion card that specifically require this setting.
- PCI 2.1 Compliance:**The default value is Disabled.
Enabled: This field Enables the PCI 2.1 Compliance timing.
Disabled: Disables the PCI 2.1 timing.

3-4 Power Management Setup

Choose the "POWERMANAGEMENT SETUP" in the CMOSSETUPUTILITY 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 (2A59IPA9)		
POWER MANAGEMENT SETUP		
AWARD SOFTWARE, INC.		
Power Management	: User Define	** Reload Global Timer Events **
PM Control by APM	: Yes	IRQ [3-7, 9-15], NMI : Enabled
Video off Method	: V/H SYNC+Blank	Primary IDE 0 : Disabled
Video off After	: Standby	Primary IDE 1 : Disabled
Doze Mode	: Disable	Secondary IDE 0 : Disabled
Standby Mode	: Disabled	Secondary IDE 1 : Disabled
Suspend Mode	: Disabled	Floppy Disk : Disabled
HDD Power Down	: 15 Min	Serial Port : Disabled
VGA Active Monitor	: Enabled	Parallel Port : Disabled
** Break Event From Suspend **		
IRQ 8 Break Suspend	: Disabled	
		ESC : Quit
		F1 : Help
		F5 : Old Values
		F7 : Load Setup Defaults
		↑ ↓ ← → : Select Item
		PU/PD/+/- : Modify
		(Shift) F2 : Color

Figure3-5 POWERMANAGEMENT SETUP

Again, user can move the cursor by pressing direction keys to the field needed 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'.

Note: When the computer enters suspend mode (setting the suspend mode valid range from 1 minute up to 1 hour) activated by the BIOS power Management. You need to RUN a program POWER.EXE under DOS root, or need to add DEVICE=C:\DOS\POWER.EXE in your CONFIG.SYS. This will keep the system time updated normally when the system wake up from the suspend mode. The suspend mode for Windows[®] 95 or Windows[®] 3.1x has to install windows APM feature. Choose "Advanced Power Management" item from "system device". The "system device" field was from "system" icon in the "controlpanel".

3-3-1 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** : Maximum power savings. Inactivity period is 1 minute in each mode.
- Min. saving** : Minimum power savings. Inactivity period is 1 minute in each mode.
- User Define** : Allows user to define PM Timers parameters to control power saving mode.

B. Time-out parameters :

HDD Standby

The HDD Standby timer can be set from 1 to 15 minute(s).

System Doze

The "System Doze" mode timer starts to count when no "PM event" occurs. The valid time-out setting is from 1 minute up to 1 hour.

System Standby

The "Standby" mode timer starts to count when the "System Doze" mode timer times out and no "PM events" occurred. The valid range is from 1 minute up to 1 hour.

System Suspend

This function works only when the Pentium[®] Processor is installed. The timer starts to count when the "System Standby" mode timer times out and no "PM Event" occurs. The valid range is from 1 minute up to 1 hour.

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3-3-2 Description of the Green Functions

- **PM Control by APM:**
If Advanced Power Management (APM) is installed on your system, selecting *Yes* gives better power savings.
- **Video Off Method:** Determines the manner in which the monitor is blanked.
V/HSYNC+Blank:
System turns off vertical and horizontal synchronization ports and writes blanks to the video buffer.
DPMS Support:
Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards Association (VESA). Use the software supplied for your video subsystem to select video power management values.
Blank Screen:
System only writes blanks to the video buffer.
- **Video off After:** Determines when to activate the video off feature for monitor power management. The settings are Video off after Suspend/standby/Doze/(N/A).

The EP-5BTXA-E supports HDD Power Down, Doze and standby power saving functions when Intel Pentium® Processor is installed. In addition, the suspend function is supported when the J4's sleep (sleep ref. Figure2-1) is closed to enter the green function.

HDD Power Down

When the system stops reading or writing HDD, the timer starts to count. The system will cut off the HDD power when timer runs 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 hardware will drop down CPU clock from normal working speed when Doze mode timeout occurs.

Standby Mode

When the system standby mode timer runs 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 times 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.

PMEvents:

AWARD BIOS defines Reload Global Timer Events in the power management mode (Doze,standby & suspend). The user can initialize any PM Events to be "Enabled" or "Disabled". When the system detects all of the enabled events which 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 is 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 times out, all of the CPU clock will stop by dropping system clock down to zero and remains this way until any one of the "Enabled" event occurs.

3-5 PnP/PCI Configuration

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

WARNING : Any misplacing IRQ could cause system cannot pick up the rescouces.

ROM PCI/ISA BIOS(2A59CPA9) PNP/PCI CONFIGURATION AWARD SOFTWARE, INC.					
PNP OS Installed	:	NO	PCI IDE IRQ Map To	:	PCI-AUTO
Resources Controlled By	:	Manual	Primary IDE INT#	:	A
Reset Configuration Data	:	Disabled	Secondary IDE INT#	:	B
			Used MEM base addr	:	N/A
			Assign IRQ USB	:	Enabled
IRQ-3	assigned to	:	Legacy ISA		
IRQ-4	assigned to	:	Legacy ISA		
IRQ-5	assigned to	:	PCI/ISA PnP		
IRQ-7	assigned to	:	PCI/ISA PnP		
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	:	PCI/ISA PnP		
IRQ-15	assigned to	:	PCI/ISA PnP		
DMA-0	assigned to	:	PCI/ISA PnP		
DMA-1	assigned to	:	PCI/ISA PnP		
DMA-3	assigned to	:	PCI/ISA PnP		
DMA-5	assigned to	:	PCI/ISA PnP		
DMA-6	assigned to	:	PCI/ISA PnP		
DMA-7	assigned to	:	PCI/ISA PnP		
			ESC : Quit	↑ ↓ → ←	Select Item
			F1 : Help	PU/PD/+/-	Modify
			F5 : Old Values	(Shift) F2	Color
			F7 : Load Setup Defaults		

Figure 3-6 PCI CONFIGURATION SETUP

- **PNP OS INSTALLED :** Do you have a PNP OS installed on your system.
The default is NO.
Yes : Select if you are using a PNP OS and using PNP card.
NO : Select if your OS does not support PNP.

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- **Resource Controlled By:** The default value is Manual.
Manual : PNP Card's resources will be controlled manually. You can set which IRQ-X and DMA-X are assigned to PCI/ISA PNP or Legacy ISA Cards.
Auto : If your ISA card and PCI card are all PNP cards, BIOS will assign the interrupt resource automatically.
- **Reset Configuration Data:** The default value is disabled.
Disabled : Normal Setting
Enabled : If you had plugged some Legacy cards in the system and recorded into ESCD(Extended System Configuration Data), you can set this field to enabled to clear ESCD.
- **PCIIDE IRQ Map To:** The default value is PCI-AUTO
When you have true PCI card(s) plugged into the system, you will not need to change anything 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 (described in section 2-6) to be plugged into the system, a proper setting is extremely important or it may cause the system hang. The diagram shown below tells you how the Rotating Priority Mechanism is designed.

- **Used MEM base addr and Used MEM Length : The default value is N/A.**
The Used MEM base addr (CB00, CC00, D000, D400, D800, DC00) and Used MEM Length (8K, 16K, 32K, 64K) support some specific ISA Legacy cards with requested memory space below 1M address. Now with these two functions, users can define where the used memory address is located and its length of the legacy area corresponding. Based on these, BIOS will skip the UMB area that is used by the legacy device to avoid the memory space conflict. For example, if users select "D000" for "Used MEM base addr" and "16K" for "Used MEM Length", that means the address region D000H-D3FFFH is occupied by ISA legacy cards, and thus BIOS will not assign this region for PnP/ISA and PCI cards.
- **Assign IRQ For USB :** The default value is Enabled.
Enabled : The system was assigned IRQ for USB port.
Disabled : The system was not assigned IRQ for USB port.

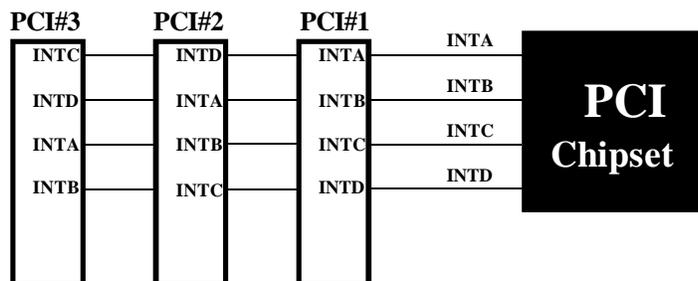


Figure 3-7 The Combination of PCI INT# lines

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- **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.
 - 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 is Enabled.
 - Enabled* : Enable the Onboard SMC CHIP's floppy drive interface controller.
 - Disabled* : Disable the Onboard SMC CHIP's floppy drive interface controller, when using On-card ISA FDC's controller.
- **Onboard UART 1:** This field allows the user to select the serial port. The default value is 3F8H/IRQ4.
 - COM1* : Enable Onboard Serial port 1 and address is 3F8H/IRQ4.
 - COM2* : Enable Onboard Serial port 1 and address is 2F8H/IRQ3.
 - COM3* : Enable Onboard Serial port 1 and address is 3E8H/IRQ4.
 - COM4* : Enable Onboard Serial port 1 and address is 2E8H/IRQ3.
 - Disabled* : Disable Onboard SMC CHIP's Serial port 1.
- **Onboard UART 2:** This field allows the user to select the serial port. The default value is 2F8H/IRQ3.
 - COM1* : Enable Onboard Serial port 2 and address is 3F8H/IRQ4.
 - COM2* : Enable Onboard Serial port 2 and address is 2F8H/IRQ3.
 - COM3* : Enable Onboard Serial port 2 and address is 3E8H/IRQ4.
 - COM4* : Enable Onboard Serial port 2 and address is 2E8H/IRQ3.
 - Disabled* : Disable Onboard SMC CHIP's Serial port 2.

- **Onboard UART 2 Mode:** The default value is standard. This field allows the user to select the COM2 port that can support a serial Infrared Interface.
standard: Support a Serial Infrared Interface IrDA.
HPSIR: Support a HP Serial Infrared Interface formats.
ASKIR: Support a Sharp Serial Infrared Interface formats.
- **Onboard Parallel port:** This field allows the user to select the LPT port. The default value is 378H/IRQ7.
 - 378H** : Enable Onboard LPT port and address is 378H and IRQ7
 - 278H** : Enable Onboard LPT port and address is 278H and IRQ5.
 - 3BCH** : Enable Onboard LPT port and address is 3BCH and IRQ7.
 - Disabled** : Disable Onboard SMC 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 for LPT1.

- **Parallel port Mode:** This field allows the user to select the parallel port mode. The default value is ECP+EPP.
 - 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.

ECP Mode USE DMA: This field allows the user to select DMA1 or DMA3 for the ECP mode. The default value is DMA3.

- DMA1** : The field selects the routing of DMA1 for the ECP mode.
- DMA3** : The field selects the routing of DMA3 for the ECP mode.

3-7 Load Setup Defaults

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

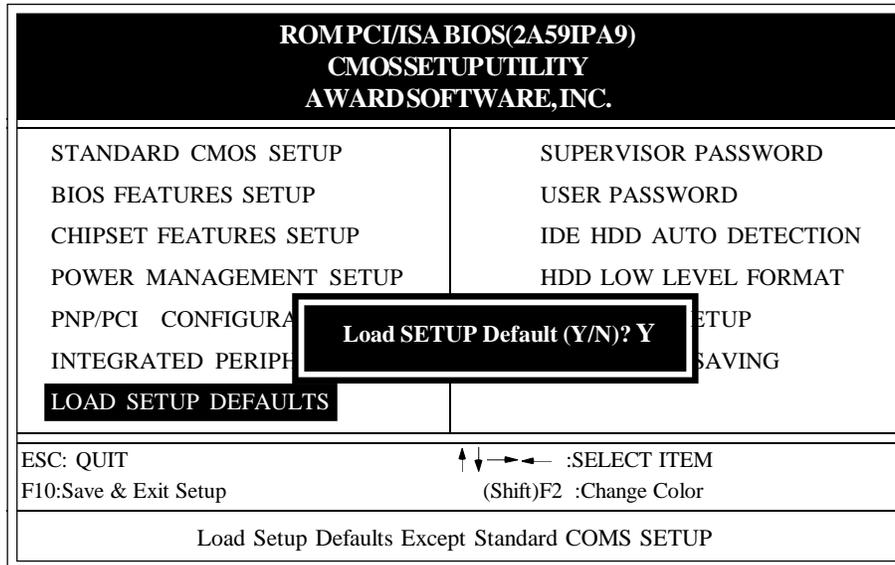


Figure 3-8 LOAD SETUP DEFAULT

3-8 Change Supervisor or User Password

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

NOTE : Either "Setup" or "System" must be selected in the "Security Option" of the BIOS FEATURES SETUP menu (Refer to Figure 4-3 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 the new one in CMOS RAM. A maximum of 8 characters is acceptable.

3-9 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 installed in the system automatically. **But now** you can set **HARD DISK TYPE** to **Auto** in the **STANDARD CMOS SETUP**. You don't need the "IDE HDD AUTO DETECTION" utility. The BIOS will Auto-detect the hard disk size and model on display during POST.

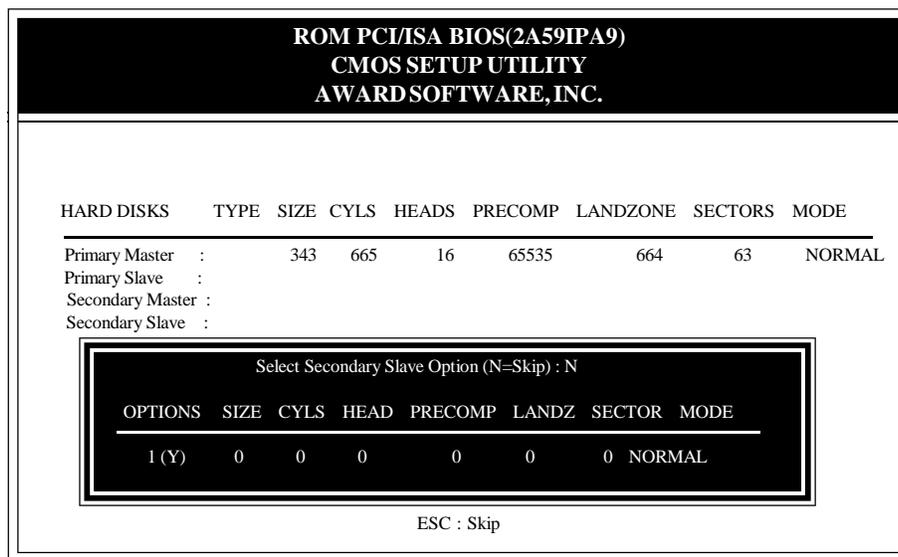


Figure 3-9 IDE HDD AUTO DETECTION

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, heads and sectors for NORMAL mode are 1024, 16 and 63.

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

If users set his HDD to NORMAL mode, the maximum accessible HDD size will be 528 Megabytes even though its physical size may be greater than that.

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LBA (Logical Block Addressing) mode

A new HDD accessing method to overcome the 528 Megabyte bottleneck. The number of cylinders, heads and sectors shown in the 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 and 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:

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

LARGE mode

Extended HDD access mode is supported by Award Software.

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

<u>CYLS.</u>	<u>HEADS</u>	<u>SECTOR</u>	<u>MODE</u>
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 multiplied by 2. A reverse transformation process will be made inside INT 12h in order to access the right HDD address.

Maximum HDD size:

$$\begin{array}{r} \text{no. Cylinder} \quad (1024) \\ \times \text{ no. Head} \quad (32) \\ \times \text{ no. Sector} \quad (63) \\ \hline \times \text{ bytes per sector} \quad (512) \\ \hline 1 \text{ Gigabytes} \end{array}$$

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 1NT 13h. UNIX operating systems do not support either LBA or LARGE and must utilize the Standard mode. However UNIX can support drives larger than 528MB.

3-10 HDD Low Level Format

Interleave

Select the interleave number of the hard disk drive you wish to perform low level format. You may select from 1 to 8. Check the documentation that came with the drive for the correct interleave number, or select 0 for utility automatic detection.

Auto scan bad track

This allows the utility to scan first then format by each track.

Start

Press<Y>to start low level format.

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 updated.

Chapter 4

Technical Information

4-1 I/O & MEMORY MAP

MEMORY MAP

Address Range	Size	Description
[0000-7FFFF]	512K	Conventional memory
[8000-9FBFF]	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.
[3D0-3DF]	CGA adapter.
[3F0-3F7]	FLOPPY DISK controller.
[3F8-3FF]	SERIAL port 1.

4-2 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.

4-3 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.

4-4 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.
	35-3F	Reserved.
	40-7F	Reserved for CHIPSET SETTING DATA.

Appendix A: POST Codes

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

POST(hex)	DESCRIPTION
01-02	Reserved.
C0	Turn off OEM specific cache, shadow.
03	1.Initialize EISA registers (EISA BIOS only). 2.Initialize all the standard devices with default values Standard devices includes. -DMA controller (8237). -Programmable Interrupt Controller (8259). -Programmable Internal Timer (8254). -RTC chip.
04	Reserved
05	1.Keyboard Controller Self-Test. 2.Enable Keyboard Interface.
06	Reserved.
07	Verifies CMOS's basic R/W functionality.
C1	Auto-detection of onboard DRAM & Cache.
C5	Copy the BIOS from ROM into E0000-FFFFFF shadow RAM so that POST will go faster.
08	Test the first 256K DRAM.
09	OEM specific cache initialization(if needed).
0A	1.Initialize the first 32 interrupt vectors with corresponding Interrupt handlers Initialize INT no from 33-120 with Dummy (Suprious) Interrupt Handler. 2.Issue CPUID instruction to identify CPU type. 3.Early Power Management initialization (OEM specific).
0B	1.Verify the RTC time is valid or not. 2.Detect bad battery. 3.Read CMOS data into BIOS stack area. 4.PnP initializations including (PnP BIOS only): -Assign CSN to PnP ISA card. -Create resource map from ESCD. 5.Assign IO & Memory for PCI devices (PCI BIOS only).

POST(hex) DESCRIPTION

0C	Initialization of the BIOS Data Area. (40:00 - 40:FF)
0D	<ol style="list-style-type: none"> 1.Program some of the Chipset's value according to Setup (Early Setup Value Program). 2.Measure CPU speed for display and decide the system clock speed. 3.Video initialization including Monochrome, CGA and EGA/VGA. If no display device found, the speaker will beep up.
0E	<ol style="list-style-type: none"> 1.Test video RAM (If Monochrome display device found). 2.Show messages including: <ul style="list-style-type: none"> -Award Logo, Copyright string, BIOS Data code & Part No. -OEM specific sign on messages. -Energy Star Logo. (Green BIOS ONLY) -CPU brand, type & speed. -Test system BIOS checksum. (Non-Compress Version only)
0F	DMA channel 0 test.
10	DMA channel 1 test.
11	DMA page registers test.
12-13	Reserved.
14	Test 8254 Timer 0 Counter 2.
15	Test 8259 interrupt mask bits for channel 1.
16	Test 8259 interrupt mask bits for channel 2.
17	Reserved.
19	Test 8259 functionality.
1A-1D	Reserved.
1E	If EISA NVM checksum is good, execute EISA initialization. (EISA BIOS only)
1F-29	Reserved.
30	Detect Base Memory & Extended Memory Size.
31	<ol style="list-style-type: none"> 1.Test Base Memory from 256K to 640K. 2.Test Extended Memory from 1M to the top of memory.

4-6 CHAPTER 4

POST(hex)	DESCRIPTION
32	1.Display the Award Plug & Play BIOS Extension message (PnP BIOS only). 2.Program all onboard super I/O chips (if any) including COM ports, LPT ports, FDD port ... according to setup value.
33-3B	Reserved.
3C	Set flag to allow users to enter CMOS Setup Utility.
3D	1.Initialize Keyboard. 2.Install PS/2 mouse.
3E	Try to turn on Level 2 cache. Note : Some chipset may need to turn on the L2 cache in this stage. But usually, the cache is turn on later in POST 61h.
3F-40	Reserved.
BF	1.Program the rest of the Chipset's value according to Setup (Later Setup Value Program). 2.If auto-configuration is enabled, programmed the chipset with pre-defined Values.
41	Initialize floppy disk drive controller.
42	Initialize Hard drive controller.
43	If it is a PnP BIOS, initialize serial and parallel ports.
44	Reserved.
45	Initialize math coprocessor.
46-4D	Reserved.
4E	If there is any error detected (such as video, kb...), show all the error messages on the screen and wait for user to press <F1> key.
4F	1.If password is needed, ask for password. 2.Clear the Energy Star Logo (Green BIOS only).
50	Write all CMOS values currently in the BIOS stack area back into the CMOS.
51	Reserved.

POST(hex) DESCRIPTION

- 52**
 - 1.Initialize all ISA ROMs.
 - 2.Later PCI initializations (PCI BIOS only).
 - Assign IRQ to PCI devices.
 - Initialize all PCI ROMs.
 - 3.PnP Initializations. (PnP BIOS only)
 - Assign IO, Memory, IRQ & DMA to PnP ISA devices.
 - Initialize all PnP ISA ROMs.
 - 4.Program shadows RAM according to Setup settings.
 - 5.Program parity according to Setup setting.
 - 6.Power Management Initialization.
 - Enable/Disable global PM.
 - APM interface initialization.

- 53**
 - 1.If it is NOT a PnP BIOS, initialize serial and parallel ports.
 - 2.Initialize time value in BIOS data area by translate the RTC time value into a timer tick value.

- 60**
 - Setup Virus Protection (Boot Sector Protection) functionality according to Setup setting.

- 61**
 - 1.Try to turn on Level 2 cache.
 - Note : if L2 cache is already turned on in POST 3D, this part will be skipped.
 - 2.Set the boot up speed according to Setup setting.
 - 3.Last chance for Chipset initialization.
 - 4.Last chance for Power Management initialization (Green BIOS only).
 - 5.Show the system configuration table.

- 62**
 - 1.Setup daylight saving according to Setup value.
 - 2.Program the NUM Lock, typematic rate & typematic speed according to Setup setting.

- 63**
 - 1.If there is any changes in the hardware configuration, update the ESCD information (PnP BIOS only).
 - 2.Clear memory that have been used.
 - 3.Boot system via INT 19H.

- FF**
 - System Booting. This means that the BIOS already past the control right to the operating system.

Unexpected Errors:

POST(hex) DESCRIPTION

- B0** If interrupt occurs in protected mode.

- B1** Unclaimed NMI occurs.

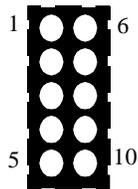
Appendix B: I/O Connectors

J1 : PS/2 Mouse Connector:



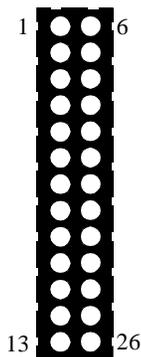
Pin	Signal Name
1	Data (Red Wire)
2	Clock (Blue Wire)
3	GND (Green Wire)
4	NC
5	VCC (Yellow Wire)

COM1, COM2 : Serial Ports Connector



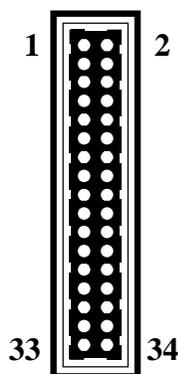
Signal Name	Pin	Pin	Signal Name
DCD	1	6	DSR
SIN	2	7	RTS
SOUT	3	8	CTS
DTR	4	9	RI
GND	5	10	NC

LPT1 : Parallel Port Connector



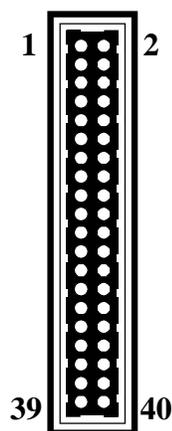
Signal Name	Pin	Pin	Signal Name
STROBE-	1	14	AUTO FEED-
Data Bit 0	2	15	ERROR-
Data Bit 1	3	16	INIT-
Data Bit 2	4	17	SLCT IN-
Data Bit 3	5	18	Ground
Data Bit 4	6	19	Ground
Data Bit 5	7	20	Ground
Data Bit 6	8	21	Ground
Data Bit 7	9	22	Ground
ACJ-	10	23	Ground
BUSY	11	24	Ground
PE	12	25	Ground
SLCT	13	26	NC

FDD1 : Floppy Disk Connector



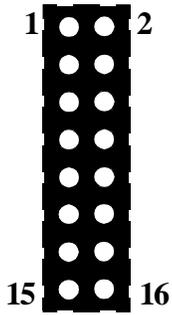
Signal Name	Pin	Pin	Signal Name
Ground	1	2	FDHDIN
Ground	3	4	Reserved
Ground	5	6	FDEDIN
Ground	7	8	Index-
Ground	9	10	Motor Enable
Ground	11	12	Drive Select B-
Ground	13	14	Drive Select A-
Ground	15	16	Motor Enable
Ground	17	18	DIR-
Ground	19	20	STEP-
Ground	21	22	Write Data
Ground	23	24	Write Gate
Ground	25	26	Track 00-
Ground	27	28	Write Protect-
Ground	29	30	Read Data-
Ground	31	32	SIDE 1 SELECT-
Ground	33	34	Diskette

IDE1/IDE2 : Primary, Secondary IDE Connector

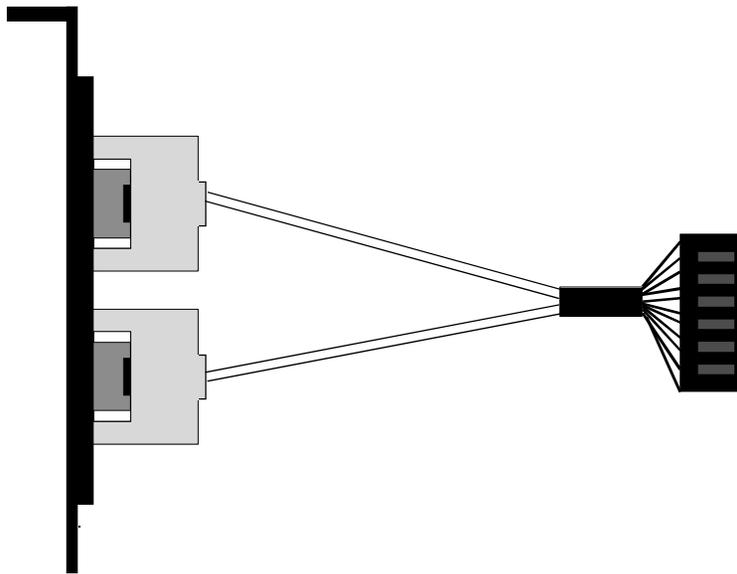


Signal Name	Pin	Pin	Signal Name
Reset IDE	1	2	Ground
Host Data 7	3	4	Host Data 8
Host Data 6	5	6	Host Data 9
Host Data 5	7	8	Host Data 10
Host Data 4	9	10	Host Data 11
Host Data 3	11	12	Host Data 12
Host Data 2	13	14	Host Data 13
Host Data 1	15	16	Host Data 14
Host Data 0	17	18	Host Data 15
Ground	19	20	Key
DRQ3	21	22	Ground
I/O Write-	23	24	Ground
I/O Read-	25	26	Ground
IOCHRDY	27	28	BALE
DACK3-	29	30	Ground
IRQ14	31	32	IOCS16-
Addr 1	33	34	Ground
Addr 0	35	36	Addr 2
Chip Select 0-	37	38	Chip Select 1-
Activity	39	40	Ground

CN1 : USB Header



Signal Name	Pin	Pin	Signal Name
+5V	1	2	GND
USBP0-	3	4	GND
USBP0+	5	6	GND
GND	7	8	GND
+5V	9	10	GND
USBP1-	11	12	GND
USBP1+	12	14	GND
GND	15	16	GND



(Option USB Cable)