Apollo VPX/97 PCIset

EP-51VPXC

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 check your package which should include all items listed below. If you find any item damaged or any missing item, please contact your supplier.

- One motherboard
- One manual
- One IDE ribbon cable
- One floppy ribbon cable

Contents

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 will corrupt.

```
┌─────────────────────────────────────────────────────────────────┐
│                      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  CONFIGURA┌──────────────────────────┐ETUP             │
│                     │ Load SETUP Default (Y/N)? Y│                │
│   INTEGRATED PERIPH └──────────────────────────┘AVING            │
│                                                                   │
│  ▐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

This mainboard is a high performance system hardware based on Intel Pentium processor and is equipped with three PCI slots, two standard ISA slots, Super Multi-I/O controller and dual port PCI-IDE connectors for the future expansion. The hardware dimension is 243mm x 190mm micro ATX form factor with a four-layer-design technology.

Specification

- VIA Apollo VPX/97 PCIset chipset.

- Intel **Pentium**®Processor, AMD K5/K6 , Cyrix 6x86L/6x86MX & idt C6 operating at **120 ~ 333 MHz** and **P55C** with **321 ZIF socket 7** and scalability to accept faster Processors in the future.

- Supports up to 256 MegaBytes of DRAM (a minimum of 8 MB) on board (168-pin DIMM x 2). BIOS will autometically detect and configure FP/EDO and Synchronous DRAM.

- Supports 512KB Onboard Pipelined Burst (synchronous) L2 **Cache**.

- Supports two 16 bit ISA slots and three 32 bit PCI slots and provides two independent high performance PCI IDE interfaces capable of supporting **PIO Mode 3/4 and Ultra-DMA33** devices. This mainboard supports four PCI Bus Masters and a jumperless PCI INT# control scheme which reduces configuration confusion when plugging in PCI I/O controller card(s).

- Supports **ATAPI** (e.g. **CD-ROM**) devices on both IDE interfaces.

- Supports 1 floppy port, 1 parallel port (EPP,ECP port), 2 serial ports (16550 Fast UART compatible) and dual USB ports .

- Supports a **PS/2** style mouse and keyboard connectors.

- Supports Award Plug & Play BIOS . The BIOS is stored in Flash EPROM form. It provides better upgradeability for the system.

- Supports CPU Hardware sleep and SMM (System Management Mode).

- **This mainboard** utilizes Lithium battery which provides environmental protection and longer battery life.

- Supports an ATX power connector for a Remote On/Off, a Phone Ring Power On and Wake-up On LAN function.

Chapter 2
Hardware design

2-1 Mainboard Layout

This mainboard is designed with VIA Apollo VPX/97 PCIset chipset which is developed by VIA Corporation to fully support Pentium®Processor PCI/ISA system. 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 Winbond W83877TF Super I/O controller provides the standard PC I/O function: one floppy interface, two 16 Byte FIFO serial ports and one EPP/ECP capable parallel port. This mainboard layout is shown in the next page for user's reference. **Care must be taken** when inserting memory modules, CPUs or even plugging PCI card into associated slots to avoid damaging any circuits or sockets on board. A cooling fan is strongly recommended when installing Pentium/Pentium MMX/K5/K6/6x86L/ 6x86MX/C6 processor due to possible overheat.

This mainboard supports a minimum of 8MB and a maximum of 256MB of System Memory while Onboard 512KB cache to increase system performance.

This mainboard supports standard Fast Page, EDO (Extended Data Out or Hyper Page Mode) or synchronous DRAM. **This mainboard** provides two 168-pin DIMM sites for memory expansion. The sockets support 1M x 64(8MB), 2M x 64 (16MB), 4M x 64(32MB), and 8M x 64(64MB) single-sided or double-sided memory modules. The memory timing requires 70 ns Fast page devices or 60 ns EDO DRAM. (DRAM Modules may be parity [x 36] or non-parity [x 32].

This mainboard supports **two Onboard PCI IDE** connectors, and automatically detects IDE harddisk type by BIOS utility automatic.

This mainboard supports Award Plug & Play BIOS for the ISA and PCI cards. The BIOS can be located in Flash EPROM which can replace BIOS code easily if necessary.

EP-51VPXC Layout
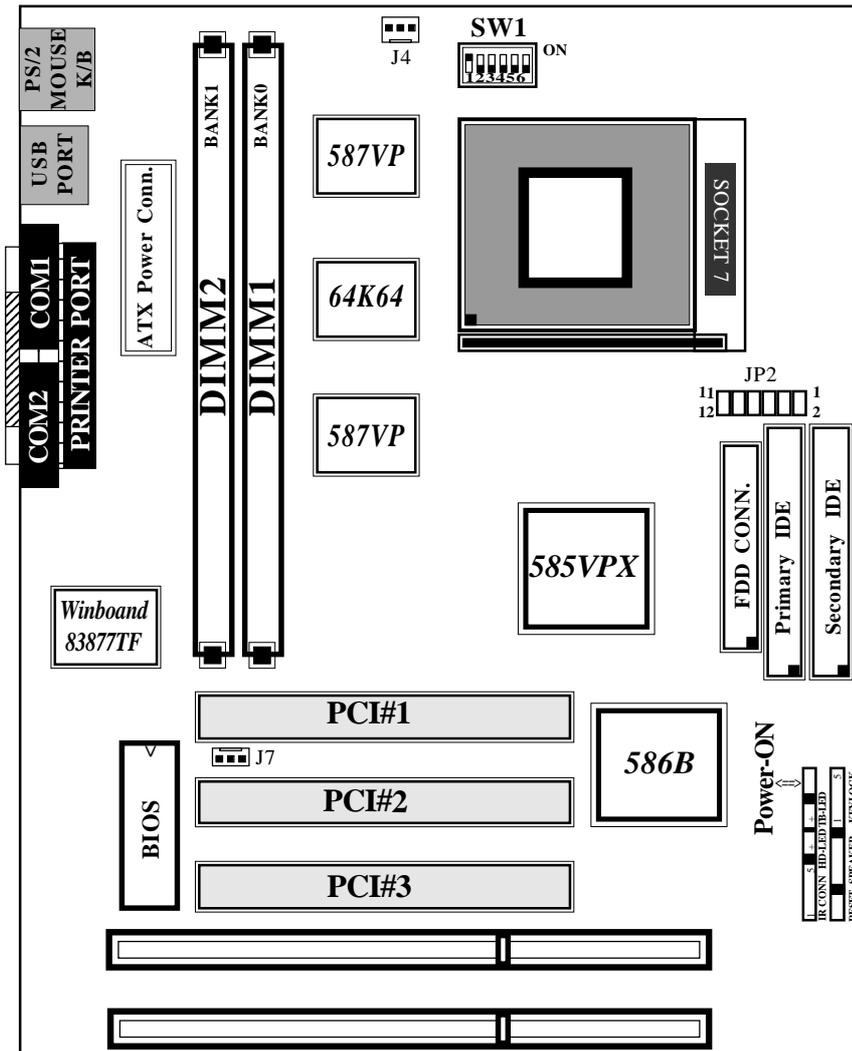
Figure 2-1

Note : SW1 setting
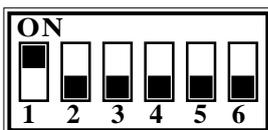
2-2 Connectors and Jumpers

This section describes the connectors, jumpers and switch equipped in the mainboard. Please refer to **Figure 2-1** for the location of each connector and jumper.

SW1 : CPU Selection						idt C6 PentiumMMX AMD K5 / K6	Bus Freqency x Multiplier	Cyrix & IBM 6x86(L) / 6x86MX
1	2	3	4	5	6			
ON	OFF	OFF	ON	OFF	OFF	120MHz	60MHz x 2	6x86L-PR150
			OFF	OFF	OFF	133MHz	66MHz x 2	6x86/L/MX-PR166
			OFF	ON	ON		75MHz x 2	6x86/L/MX-PR200
			ON	OFF	ON		83MHz x 2	
ON	ON	OFF	ON	OFF	OFF	150MHz	60MHz x 2.5	6x86MX-PR166
			OFF	OFF	OFF	166MHz	66MHz x 2.5	6x86MX-PR200
			OFF	ON	ON	188MHz	75MHz x 2.5	6x86MX-PR233
			ON	OFF	ON		83MHz x 2.5	
OFF	ON	OFF	ON	OFF	OFF	180MHz	60MHz x 3	
			OFF	OFF	OFF	200MHz	66MHz x 3	✱ 6x86MX-PR233
			OFF	ON	ON	225MHz	75MHz x 3	✱ 6x86MX-PR266
OFF	OFF	OFF	OFF	OFF	OFF	233MHz	66MHz x 3.5	✱ 6x86MX-PR266
ON	OFF	ON				✱ 266MHz	66MHz x 4	
ON	ON	ON				✱ 300MHz	66MHz x 4.5	
OFF	ON	ON				✱ 333MHz	66MHz x 5	

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

**JP2 : CPU Vcore voltage selection :**

11-12 : 3.5V for Pentium, AMD K5, Cyrix 6x86 and *idt* C6

9-10 : 3.2V for AMD K6-PR2-233

7-8 : 2.9V for AMD K6-PR2-166/200 and Cyrix 6x86MX

5-6 : 2.8V for Pentium MMX and Cyrix 6x86L

3-4 : 2.2V for AMD K6 3D CPUs

1-2 : 2.1V Reserved

J2

KeyLock - Keyboard lock switch & Power LED connector.

5 5. GND
4. Key-Lock
3. GND
2. N/C
1 1. Power LED(+)
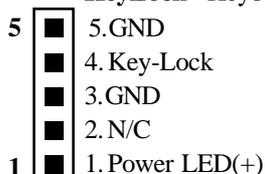
Speaker - connect to the system's speaker for beeping.

4 4. VCC
3. GND
2. N/C
1 1. Speaker
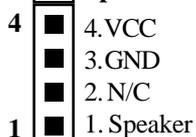
Reset Switch - Closed to restart system.

J3

Power-ON-Push the button to turn on the system.
　　　　-Pressing less than 4 seconds to enter the suspend mode
　　　　-Pressing more than 4 seconds to turn off the system

Turbo LED indicator - LED ON when higher speed is selected.
+ # There is no deturbo function so that the turbo LED is always ON.

IDE LED indicator - LED ON when harddisks activate.

+

IrDA/ASK IR CONNECTOR

5 5. IRTX
4. GND
3. IRRX
2. N/C
1. VCC
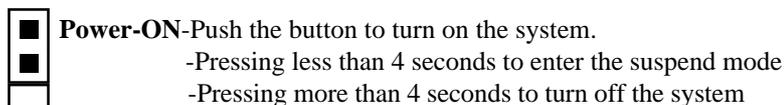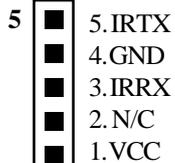
J4 **CPU FAN Connector**

**J7** **WOL(Wake-up On Lan) Connector**

2-3 System Memory Configuration

This mainboard supports different type of settings for the system memory. The following figures and table provides all possible memory combinations.

| DIMM2 | > BANK 1 |
| DIMM1 | > BANK 0 |

DIMM 1(BANK 0)	DIMM 2(BANK 1)	TOTAL MEMORY SIZE
8MB 16MB 32MB x 1 64MB 128MB	8MB 16MB 32MB x 1 64MB 128MB	MAX.= 256MB

NOTE 1 :   The KEY ZONE of the DIMM socket is 3.3V / Unbuffered.

DRAM chip

LEFT KEY ZONE
(Unbuffered DRAM)

CENTER KEY ZONE
(3.3V DRAM)
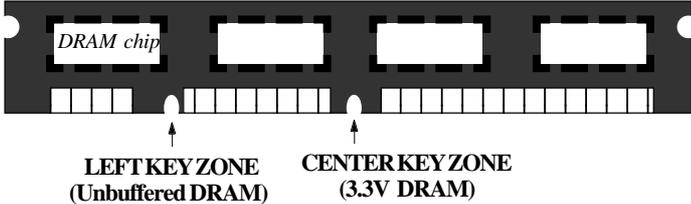
2-4 Integrated PCI Bridge

The **EP-51VPXC** utilizes **VIA Apollo VPX/97 PCIset** chipset to support Intel Pentium Processor PCI/ISA system. The VIA Apollo VPX/97 PCIset chipset consists of the 82C585VPX AT system controller (TSC), and one 82C586B PCI ISA/ IDE Accelerator bridge chip. It provides an interface which translates CPU cycle into PCI bus cycle, and PCI burst read/write capability. In addition, it provides high performance PCI arbitor to support four PCI Masters, Rotating Priority Mechanism, and Hidden Arbitration Scheme Minimizes Arbitration Overhead.

There are four interrupts in each PCI slot : INTA#, INTB#, INTC#, and INTD#. Since this mainboard 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 paramaters. 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 interrupt used by ISA add-in cards in the BIOS Setup utility.

However, if a "Legacy card" (such as plugging a paddle card and cable into an ISA slot) is plugged in the system, modification in the **ROM SETUP UTILITY** becomes necessary. First of all, you must enter **PCI CONFIGURATION SETUP** utility from the **ROM SETUP UTILITY** main menu to set "ISA" for the "**PCI IDE IRQ MAP TO**

Secondly, you must enter the **CHIPSET FEATURES SETUP UTILITY** from the **ROM SETUP UTILITY** main menu and set "Disabled" for the "**Onboard Primary PCI IDE** and the **Onboard Secondary PCI IDE**. When you plug PCI/ISA IDE cards into the system, You should select "Disabled" for the **Onboard Primary and Secondary PCI IDE** from the **CHIPSET FEATURES SETUP UTILITY** too.

You can set the system interrupt request (IRQ) on some "Legacy cards" which have on paddle card and cable. (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 second slot (marked PCI#2) because the Secondary INT signal takes INTB from the slot (refer to Page 3-12 for circuit diagram). The user then enters the **PCI CONFIGURATION SETUP** utility from the **ROM SETUP UTILITY** main menu and set "PCI-Slot 1" for the "**PCI IDE IRQ MAP TO** (This depends on the slot # where the Legacy card is plugged).

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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 stays unchanged unless there is a configuration change in the system, such as a hard drive replacement or a new device installation.

If this does happen you will need to reconfigure your configuration parameter.

To Enter Setup Propgram

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

```
┌─────────────────────────────────────────────────────────────┐
│             ROM PCI/ISA BIOS (2A5LDPAB)                      │
│                  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       │  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 CMOS SETUP UTILITY

The menu displays all major selection items. Select the item you need to reconfigure. The selection is made by moving cursor (press any direction key) to the item and press the 'Enter' key. An on-line help message is displayed at the bottom of the screen as the cursor is moving to various items which provides a 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.

3-1 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 the current date and time, type of hard disk drive installed, floppy drive type, and display type. Memory size is auto-detected by the BIOS and displayed for your reference. When a field is highlighted (use 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(2A5LDPAB)
                      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     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  :  1.44M,3.5 in.
 Drive B  :  None                      Base Memory      :    640K
 Floppy 3 mode Support : Disable        Extended Memory  :  15360K
 Video    :  EGA/VGA                    Other Memory     :    384K
 Halt On  :  All Errors
                                         Total Memory  :  16384K

 ESC : Quit               ↑ ↓ → ←  : Select Item        PU/PD/+/- :  Modify
 F1  : Help               (Shift) F2  :  Change Color
```

Figure 3-2 STANDARD CMOS SETUP

NOTE: If the hard disk Primary Master/Slave and the Secondary Master/Slave are set as "Auto", then the hard disk size and model will be auto-detected.

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

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 this mainboard. 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(2A5LDPAB)
                      BIOS FEATURES SETUP
                     AWARD SOFTWARE, INC.

 Virus Warning              : Disabled   Video BIOS    Shadow      : Enabled
 CPU Internal Cache         : Enabled    C8000-CBFFF   Shadow      : Disabled
 External Cache             : Enabled    CC000-CFFFF   Shadow      : Disabled
 Quick Power On Self Test   : Enabled    D0000-D3FFF   Shadow      : Disabled
 Boot Sequence              : A, C       D4000-D7FFF   Shadow      : Disabled
 Swap Floppy Drive          : Disabled   D8000-DBFFF   Shadow      : Disabled
 Boot Up Floppy Seek        : Enabled    DC000-DFFFF   Shadow      : Disabled
 Boot Up NumLock Status     : On
 Boot Up System Speed       : High
 Gate A20 Option            : Fast
 Typematic Rate Setting     : Disabled
 Typematic Rate (Chars/Sec)   : 6
 Type matic Delay (Msec)    : 250
 Security Option            : Setup      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
                                         F7  : Load Setup Defaults
```

Figure 3-3 BIOS FEATURES SETUP

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

● **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 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 any attempt to access the boot sector or
hard disk partition table.

*Disabled***:** No warning message to appear when any attempt 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 Enabled. If your CPU is without Internal Cache then this item "CPU Internal Cache" will not be shown.

*Enabled***:** Enable cache.

Disable **:** Disable cache.

- **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 checking items during POST.
  Enabled **:** Enable quick POST.
  *Disabled***:** Normal POST.

- **Boot Sequence:**This category determines which drive is searched first for the O/S(Operating System).The default value is A,C.
  A,C **:**The system will search for floppy disk drive first then hard disk drive.
  C,A **:**The system will search for hard disk drive first then floppy disk drive.

- **Swap Floppy Drive:** This will swap your physical drive letters A&B if you are using two floppy disks. The default value is Disabled.
  Enabled **:** Floppy A & B will be swapped under the O/S.
  Disabled **:** Floppy A & B will be not swapped.

- **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 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 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:** The default value is On.
  On **:** Keypad is number keys.
  Off **:** Keypad is arrow keys.

- **Boot UP System Speed**: Select default system speed. The system will run at the selected speed after the system boots.
  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 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 2 items and the default is controlled by
  the   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):** This detecmines the time between the first and second
  character displayed, when holding a key.
  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 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 correct
  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 the ISA card connects to VGA monitor and uses the RAMDAC of
  PCI card, the PCI/VGA Palette Snoop is enabled.
  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.

- **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 perunit and the size depends on the 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 the following menu.

```
ROM PCI/ISA BIOS(2A5LDPAB)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.

DRAM Auto Configuration       : 60 ns
DRAM Timing Control           : Auto
Video BIOS Cacheable          : Enabled
System BIOS Cacheable         : Disabled
Memory Hole At 15Mb Addr.     : Disabled
Fast DRAM Decoding            : Disabled
Sustained 3T Write            : Enabled
2 Bank PBSRAM                 :  3-1-1-1
Read Pipeline                 : Enabled
Write  Pipeline               : Enabled
Cache Timing                  : Fast
Linear Burst                  : Disabled
SDRAM Cycle Length            : 2
SDRAM Bank Interleave         : Disabled    Esc : Quit              ↑ ↓ → ←:Select Item
                                            F1  : Help          PU/PD/+/- : Modify
                                            F5  : Old Values        (Shift)F2 : Color
                                            F7  : Load Setup Defaults
```

Figure 3-4 CHIPSET FEATURES SETUP

Note: When you insert slower memery modules in the system and set a faster timing, maybe the system will 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.

- **Video BIOS Cacheable:** The default value is Enabled.
  Enabled **:** Enabled the Video BIOS Cacheable to speed up the VGA Performance.
  *Disabled***:** Disabled the Video BIOS Cacheable function.

- **Memory Hole at 15M-16M:** The default value is Disabled.
  *Disabled***:** Normal Setting.
  Enabled : This field enableds the main memory (15~16MB) remap to ISA BUS.

3-4 POWER MANAGEMENT SETUP

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

```
                        ROM  PCI/ISA  BIOS
                     POWER MANAGEMENT SETUP
                       AWARD SOFTWARE, INC.

Power Management      : User Define   ** Power Down & Resume Events  **
PM Control by APM     : Yes           IRQ5    (LPT  2)          : Primary
Video off Option      : Suspend -> Off IRQ6   (Floppy Disk)    : Disabled
Video off Method      : V/H SYNC+Blank IRQ7   (LPT  1)         : Primary
 Conserve Mode        : Disabled      IRQ8    (RTC Alarm)      : Disabled
Modem Use IRO         : 3             IRQ9    (IRQ2 Redir)     : Primary
     ** PM Timers **                  IRQ10   (Reserved)       : Primary
HDD Power Down        : Disable       IRQ11   (Reserved)       : Primary
Doze Mode             : Disable       IRQ12   (PS/2 Mouse)     : Primary
Suspend Mode          : Disable       IRQ13   (Coprocessor)    : Primary
                                      IRQ14   (Hard Disk)      : Primary
     ** PM Events **                  IRQ15   (Reserved)       : Disabled
VGA                   : OFF
LPT & COM             : LPT /COM
HDD & FDD             : OFF
DMA /master           : OFF           Esc : Quit        ↑ ↓ → ← : Select Item
Primary INTR          : ON            F1  : Help        PU/PD/+/- : Modify
IRQ3  (COM 2)         : Primary       F5  : Old Values      (Shift)F2 : Color
IRQ4  (COM 1)         : Primary       F7  : Load Setup Defaults
```

Figure 3-5 POWER MANAGEMENT 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**'.

3-4-1 The Description of the Power Management

A. Power Management mode selection :

Disabled **:** The system operates in NORMAL conditions (Non-GREEN) and the Power Management function is disabled.

Max. saving: This mode will maximize the power saving capability.

Min. saving: This mode will minimize the power saving capability.

User define: Allow user to define time-out parameters to control power saving mode. Refer to item B shown below.

B. Time-out parameters :

HDD Standby

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

System Doze

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

System Suspend

This function works only when the Pentium Procssor is installed. The timer starts
to count when "System Standby" mode timer is timed out and no "PM Events"
occurred. Valid range is from 1 minute up to 1 hour.

3-4-2 Description of the Green Functions

This mainboard supports HDD Power Down, Doze and Suspend power saving functions.
In addition, the hardware suspend function is supported when the J3-Power_On (Refer
to Figure2-1) is closed to enter the Suspend function.
The detailed description of these functions is provided in the next page.

HDD Standby Mode

When system stops reading or wiriting 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 wirte to HDD command is executed again.

Doze Mode

The system hardware will drop down CPU clock from nomal working speed
when Doze mode time-out occurs.

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 15 PM Events in the power management mode (Doze & suspend). The user can initialize any PM Events to be "Enable" or "Disable". When the system detects all of the enabled events, do not have any activity. It will start the system Doze timer first if the "Power Management" is not "Disabled". Once the system Doze timer is timed out, it will process doze power saving procedure by starting 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 occurrs.

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 can't pick out the rescouces.

```
          ROM PCI/ISA BIOS(2A5LDPAB)
           PNP/PCI CONFIGURATION
             AWARD SOFTWARE, INC.

PNP Installed           : No       CPU to PCI Write Buffer   : Enabled
Resources Controlled By : Manual   PCI Dynamic Bursting      : Enabled
Reset Configuration Data: Disabled PCI Master 0 WS Write     : Enabled
                                   PCI Peer Concurrency      : Enabled
IRQ-3   assigned to : Legacy ISA   PCI Delay Transaction     : Disabled
IRQ-4   assigned to : Legacy ISA
IRQ-5   assigned to : PCI/ISA PnP  PCI IRQ Actived By        : Level
IRQ-7   assigned to : Legacy ISA   PCI IDE IRQ Map To        : PCI-AUTO
IRQ-9   assigned to : PCI/ISA PnP  Primary    IDE INT#       : A
IRQ-10  assigned to : PCI/ISA PnP  Secondary  IDE INT#       : B
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  : No Change   (Shift) F2 : Color
DMA-6   assigned to : PCI/ISA PnP  F7  : Load Setup Defaults
DMA-7   assigned to : PCI/ISA PnP
```

Figure 3-6 PCI CONFIGURATION SETUP

- **Resource Controlled By:** The default value is Manual.
  Manual: The field defines that the PNP Card's resource is controlled by manual. You can set whether IRQ-X or DMA-X is assigned to PCI/ISA PNP or Legacy ISA Cards.
  Auto: If your ISA card and PCI card are all PNP cards. Set this field Auto. The BIOS will assign the interrupt resource automatically.

- **Reset Configuration Data:** The default value is Disabled.
  Disabled: Normal Setting
  Enabled: If you plug some Legacuy cards in the system and record into ESCD (Extended System Configuration Data). You can set this field to be Enabled and to clear ESCD at one time, when some Legacy cards are removed.

- **PCI IDE 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 any thing here in the **SETUP** program. However, if you do not know whether you are using a true PCI card, please refer to your PCI card user's manual for the details.

  When you have a Legacy card (described in section 2-5) to plug into the system, a proper setting is extremely important or it may cause the system hung up. The diagram shown below tells you how the Rotating Priority Mechanism is designed.
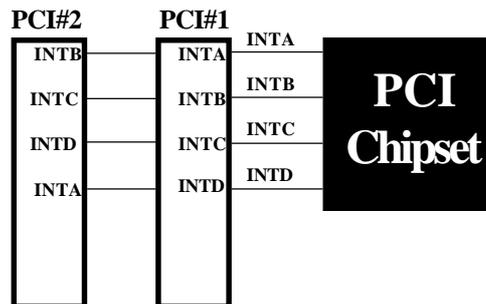
Figure 3-7 The Combination of PCI INT# lines

3-6   INTEGRATED PERIPHERALS

```
ROM   PCI/ISA   BIOS(2A5LDPAB)
INTEGRATED PERIPHERALS
WARD   SOFTWARE, INC.

Onboard Primary PCI IDE          : Enabled       Onboard Parallel Port              : 378/IRQ7
Onboard Secondary PCI IDE : Enabled        Onboard Parallel Mode             : ECP / EPP
IDE Prefetch Mode         : Enabled       ECP Mode Use DMA                  : 3
IDE HDD Block Mode               : Enabled          Parallel Port EPP Type         : EPP1.9
IDE primary Master PIO           : Auto
IDE Primary Slave PIO            : Auto           Onboard USB Controller         : Disabled
IDE Secondary Master PIO         : Auto
IDE Secondary Slave PIO          : Auto
IDE Primary Master UDMA   : Auto
IDE Primary Slave UDMA           : Auto
IDE Secondary Master UDMA        : Auto
IDE Secondary Slave UDMA : Auto
PCI IDE Secondary Channel : Enabled
Onboard FDC Controller           : Enabled
UART 2 Mode                      : Standard       ESC  : Quit          ↑ ↓ → ←  Select Item
                                                  F1   : Help          PU/PD/+/-  : Modify
                                                  F5   : No Change     (Shift) F2  : Color
                                                  F7    : Load Setup Defaults
```

Note: **If you don't use the Onboard IDE connector, then use On-card
(PCI or ISA card) IDE connector. You have to set Onboard Primary
PCI IDE: Disabled and Onboard Secondary PCI 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
  Disable.
  Disabled: Disable IDE HDD Block Mode.

- **PCI Slot IDE 2nd Channel:** The default value is Enabled.
  Enabled : Enable secondary IDE port and BIOS will assign IRQ15 for this port.
  Disabled : Disable secondary IDE port and IRQ15 is available for other device.

- **Onboard Primary PCI IDE:** The default value is Enabled.
  Enabled : Enable Onboard 1st channel IDE port.
  Disabled : Disable Onboard 1st channel IDE port. When use On-card (PCI or ISA
  card) IDE connector.

- **Onboard Secondary PCI IDE:** The default value is Enabled.
  Enabled : Enable Onboard 2nd channel IDE port.
  Disabled : Disable Onboard 2nd channel IDE port When use On-card (PCI or ISA
  card) IDE connector.

- **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 floppy drive interface controller.
  - *Disabled*   **:** Disable the Onboard floppy drive interface controller,
    When using On-card ISA FDC's controller.

- **Onboard UART 1:** This field allows the user to sellect 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 Serial port 1.

- **Onboard UART 2:** This field allows the user to sellect 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 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 format.
  ASKIR: Support a Sharp Serial Infrared Interface format.

- **Onboard Parallel port:** This field allows the user to sellect 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 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 sellect 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 Capability Port mode.
  EPP+ECP   : ECP Mode & EPP Mode.

  ECP Mode USE DMA: This field allows the user to sellect DMA1 or DMA3 for the ECP mode. The default value is DMA3.
  DMA1   : The filed selects the routing of DMA1 for the ECP mode.
  DMA3   : The filed selects the routing of DMA3 for the ECP mode.

3-7   LOAD SETUP DEFAULTS

The "**LOAD SETUP DEFAULTS**" 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.

```
┌─────────────────────────────────────────────────────────────┐
│              ROM PCI/ISA BIOS(2A5LDPAB)                       │
│                  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 CONFIGURA┌──────────────────────────┐ETUP          │
│   INTEGRATED PERIPH│ Load SETUP Default (Y/N)? Y│AVING        │
│   LOAD SETUP DEFAULTS└──────────────────────────┘            │
├─────────────────────────────┴───────────────────────────────┤
│ ESC: QUIT                      ↑↓→← :SELECT ITEM             │
│ F10:Save & Exit Setup          (Shift)F2 :Change Color       │
├─────────────────────────────────────────────────────────────┤
│        Load Setup Defaults Except Standard COMS SETUP        │
└─────────────────────────────────────────────────────────────┘
```

Figure 3-8 LOAD SETUP DEFAULT

3-8   CHANGE SUPERVISOR or USER PASSWORD

To change the password, choose the "**SUPERVISOR PASSWORD or USER PASS-WORD**" 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 3-3 for the details).

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

> Enter Password:

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

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

> Confirm Password:

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

3-9 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 do not need the "IDE HDD AUTO DETECTION" utility. The BIOS will Auto-detect the hard disk size and model on display during POST.

```
               ROM PCI/ISA BIOS(2A5LDPAB)
                   CMOS SETUP UTILITY
                  AWARD SOFTWARE, INC.


  HARD DISKS      TYPE  SIZE  CYLS  HEADS  PRECOMP  LANDZONE  SECTORS  MODE

  Primary Master   :          343   665    16      65535       664      63    NORMAL
  Primary Slave    :
  Secondary Master :
  Secondary Slave  :

          Select Secondary Slave Option (N=Skip) : N

     OPTIONS   SIZE   CYLS   HEAD   PRECOMP   LANDZ   SECTOR   MODE

      1 (Y)     0      0      0        0        0       0    NORMAL


                      ESC : Skip
```
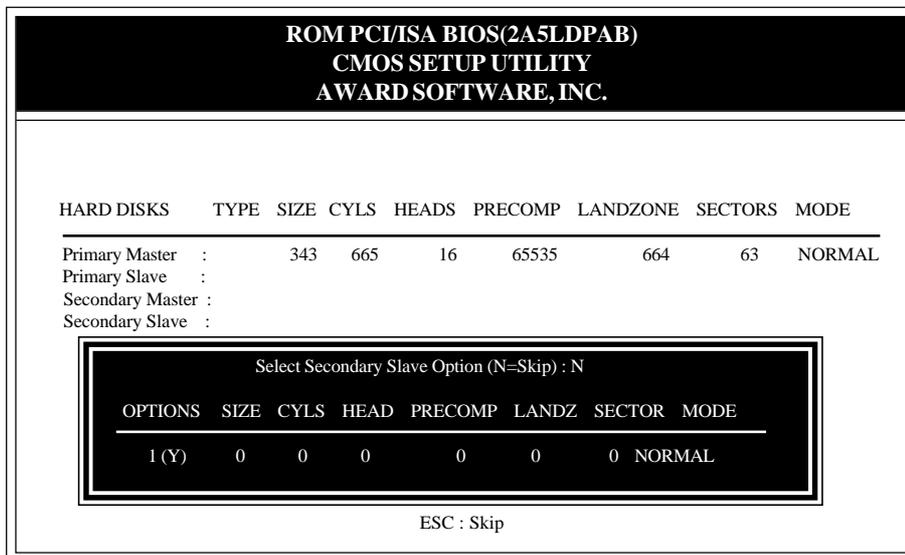
Figure 3-9 IDE HDD AUTO DETECTION

NOTE: HDD Modes

The Award BIOS supports 3 HDD modes : NORMAL, LBA and LARGE NORMAL mode.

Generic access mode that is neither the BIOS nor the IDE controller will make transformations during accessing.

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

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

If user sets his 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: This is 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 the 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:

```
        no. Cyclinder      (1024)
    x  no. Head          ( 255)
    x  no. Sector         (  63)
    x  bytes per secttor  ( 512)
            8.4 Gigabytes
```

LARGE mode: This is an extended HDD access mode supported by Award Software.

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

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

 Maximum HDD size:

```
        no. Cyclinder      (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 softwares are located in the Award HDD Service Routine (1NT 13h). It may fail to access a HDD with LBA (LARGE) mode selected if you are running under on Operating System which replaces the whole 1NT 13h. UNIX operating systems do not support either LBA or LARGE and must utilize the Standard mode. UNIX can support drives larger than 528MB.

3-10 HDD LOW LEVEL FORMAT

Interleave

Select the interleave number of the hard disk drive that you wish to perform a low level format on. You may select from 1 to 8. Check the documentation that came with the drive for the correct interleave number, or select 0 for 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 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 old data in the CMOS will not be destroyed.

Chapter 4
Technical Information

4-1 I/O & MEMORY MAP

MEMORYMAP

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 adaptor
[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

TIMEMAP: TIMER Channel 0System timer interrupt.
                 TIMER Channel 1DRAM REFRESH request.
                 TIMER Channel 2SPEAKER 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 ectension memory low bytw.
	31	Reserved for extension memory high byte.
	32	DATE CENTURY byte.
	33	INFORMATION FLAG.
	34-3F	Reserve.
	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 Interval 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-FFFFF 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:ON - 40:FF)

0D   1. Program some of the Chipset's value according to Setup. (Early Setup Value
                   Program)
                2. Measure CPU speed for display & decide the system clock speed.
                3. Video initialization including Monochromc, CGA, EGA/VGA. If no display
                   device found, the speaker will beep.

0E   1. Test video RAM. (If Monochromc display device found)
                2. Show messages including.
                       -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, exccute EISA initialization. (EISA BIOS only)

1F-29   Reserved.

30   Detect Base Memory & Extended Memory Size.

31   1. Test Base Memory from 256K to 640K.
                2. Test Extended Memory from 1M to the top of memory.

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 PS2 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 & 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 & 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 Initialzations. (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 & paralled 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 pass 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: CONNECTORS

ATX Power Supply Connector:
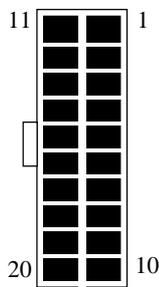
Signal Name	Pin	Pin	Signal Name
3.3V	11	1	3.3V
-12.0V	12	2	3.3V
GND	13	3	GND
PS-ON	14	4	5.0V
GND	15	5	GND
GND	16	6	5.0V
GND	17	7	GND
-5.0V	18	8	PW-OK
5.0V	19	9	5VSB
5.0V	20	10	12.0V

I/O back pannel connector:
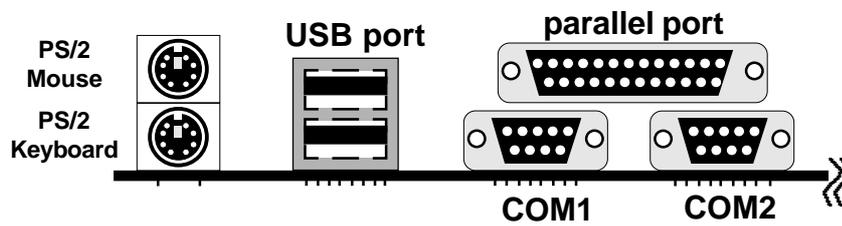
PS/2 KEYBOARD & MOUSE CONNECTOR:
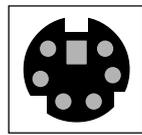
Pin	Signal Name
1	Data
2	Clock
3	GND
4	NC
5	VCC

COM1,COM2 : Serial Ports Connector
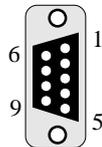
Signal Name	Pin	Pin	Signal Name
DCD	1	6	DSR
SIN	2	7	RTS
SOUT	3	8	CTS
DTR	4	9	RI
GND	5		

LPT1 : Parallel Port Connector
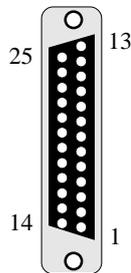
Signal Name	Pin	Pin	Signal Name
STROBE-	1	14	AUTO FEED-
Data Bit 0	2	15	ERROR-
Data Bit 1	3	16	INIT-
Data Bit 2	4	17	SLCT IN-
Data Bit 3	5	18	Ground
Data Bit 4	6	19	Ground
Data Bit 5	7	20	Ground
Data Bit 6	8	21	Ground
Data Bit 7	9	22	Ground
ACJ-	10	23	Ground
BUSY	11	24	Ground
PE	12	25	Ground
SLCT	13		

FDD1 : Floppy Disk Connector
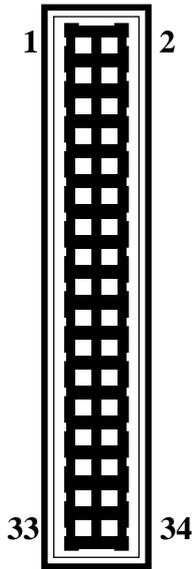
Signal Name	Pin	Pin	Signal Name
Ground	1	2	FDHDIN
Ground	3	4	Reserved
Ground	5	6	FDEDIN
Ground	7	8	Index-
Ground	Motor	Enable	
Ground	11	12	Drive Select B-
Ground	13	14	Drive Select A-
Ground	15	16	Motor Enable
Ground	17	18	DIR-
Ground	19	20	STEP-
Ground	21	22	Write Data
Ground	23	24	Write Gate
Ground	25	26	Track 00-
Ground	27	28	Write Protect-
Ground	29	30	Read Data-
Ground	31	32	SIDE 1 SELECT-
Ground	33	34	Diskette

9   10

IDE1,IDE2 : Primary, Secondray IDE Connector
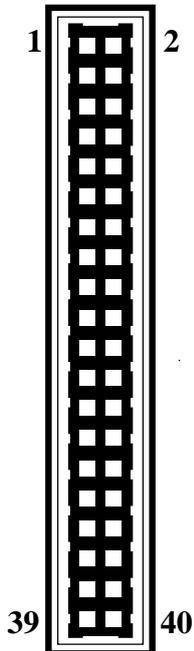
Signal Name	Pin	Pin	Signal Name
Reset IDE	1	2	Ground
Host Data 7	3	4	Host Data 8
Host Data 6	5	6	Host Data 9
Host Data 5	7	8	Host Data 10
Host Data 4	9	10	Host Data 11
Host Data 3	11	12	Host Data 12
Host Data 2	13	14	Host Data 13
Host Data 1	15	16	Host Data 14
Host Data 0	17	18	Host Data 15
Ground	19	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	32	Addr 2
Chip Select 0-	37	38	Chip Select 1-
Activity	39	40	Ground