

# **ADE-6051**

**Intel® Core™ 2 Duo Mobile  
GME965 Mini ITX**

## **User's Manual**

Rev. 1.0  
2007/07/09

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We hope you to get the maximum performance from your products and be willing to help if running into technical difficulties. For the most frequently asked questions, it's easily found answers from the product documentation and usually a lot more detailed, so please take reference to this manual first. If the answer still can not be found, gather all the information or questions applying to the problem, and with the product on hand, contact your distributor, sales representative, or customer service center for technical support. Most problems reported are minor and able to be easily solved over the phone. In addition, free technical support is available and always ready to give advices on application requirements or specific information on the installation and operation of any of our products.

Please have the following information ready before you call:

1. Product name and serial number
2. Description of your peripheral attachments
3. Description of your software (operating system, version, application software, etc.)
4. A complete description of the problem
5. The exact wording of any error messages

### How to Use This Manual

This manual is written for the system integrator, PC technician and knowledgeable PC end user. It describes how to configure your ADE-6051 to meet various operating requirements. The user's manual is divided into four chapters, with each chapter addressing a basic concept and operation of the server board.

**Chapter 1: Introduction** - presents what you have inside the box and gives you an overview of the product specifications and basic system architecture for the ADE-6051 server board.

**Chapter 2: Hardware Configuration Setting** - shows the definitions and locations of Jumpers and Connectors so that you can easily configure your system.

**Chapter 3: System Installation** - describes how to properly mount the CPU, main memory, and M-System Flash disk for a safe installation. It will also introduce and show you the driver installation procedure for the Graphics Controller and Ethernet Controller.

**Chapter 4: BIOS Setup Information** - specifies the meaning of each setup parameter, how to get advanced BIOS performance and update to a new BIOS.

#### Note:

**(1) All DIMMs in a system must be of the same type, the speed in all channels is the speed of the slowest DIMM in the system.**

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**Revision History**

Revision	Date	Comment
Rev.1.0	Jul. 2007	Initial released



## CHAPTER 1

## **1. Introduction**

### **1.1 Description**

ADE-6051, an unique Mini-ITX with 170 x 170 mm embraces Intel® energy-efficient dual-core processing to fit a high performance Intel® Core™ 2 Duo Mobile based in the mPGA478 package with Front Side bus of 800/533 MHz processors and compatible for high-end computing applications with PCI-E bus architecture to satisfy multiple demands, and keep complete compatibility with hardware and software designed. The onboard devices support one PCI slot for flexible expansibility and onboard triple Marvell Gigabit Ethernet controllers. It's profitable to build up a high performance and fast transmission availability system for VARs, or system integrators.

The ADE-6051 supports Intel® Core™ 2 Duo Mobile processors in T series with Socket P via Intel® GME965 and ICH8M chipset integrated GMA X3100 graphics with DVMT 4.0 display memory up to 256 MB for dual display function by VGA/LVDS, VGA/DVI, and DVI/LVDS. The board comes with two DIMMs up to 4 GB SDRAM with dual channel DDR2 533/667, one Parallel ATA IDE and enhanced onboard three SATA high-speed data transferring at up to 300 MB/s, integrated Realtek ALC883 7.1 + 2 CH high definition audio codec. The onboard Super I/O Winbond W83627DHG chipset supports two RS-232 serial port interfaces, Hardware Monitor function, six Hi-speed USB 2.0 ports, and two 6-pin Mini-DIN connectors for PS/2 mouse and keyboard. Besides, one 20-pin standard connector designed to support ATX power function, and a feature of CPU overheat protection will provide user more security and stability.

With all the favorable features in the Mini-ITX form factor, ADE-6051 is undoubtedly the best choice for embedded applications like Network, Point of Sales (POS), automated KIOSKs, security products, medical instruments, and gaming machines.

### 1.2 Packing Check List

The ADE-6051 Series package includes the following basic items accompany with this manual.

- One ADE-6051 Mini ITX
- One Quick Installation Guide for ADE-6051
- One 40-pin IDE cable
- One Serial ATA cable
- One Serial port cable for COM2
- One USB 2.0 cable
- One I/O shield
- One Supporting CD-ROM contains User's Manual and internal VGA display driver and Marvell Gigabit Ethernet network controller driver and on board devices drivers

If any of these items is damaged or missed, please contact your vendor and save all packing materials for future replacement and maintenance.

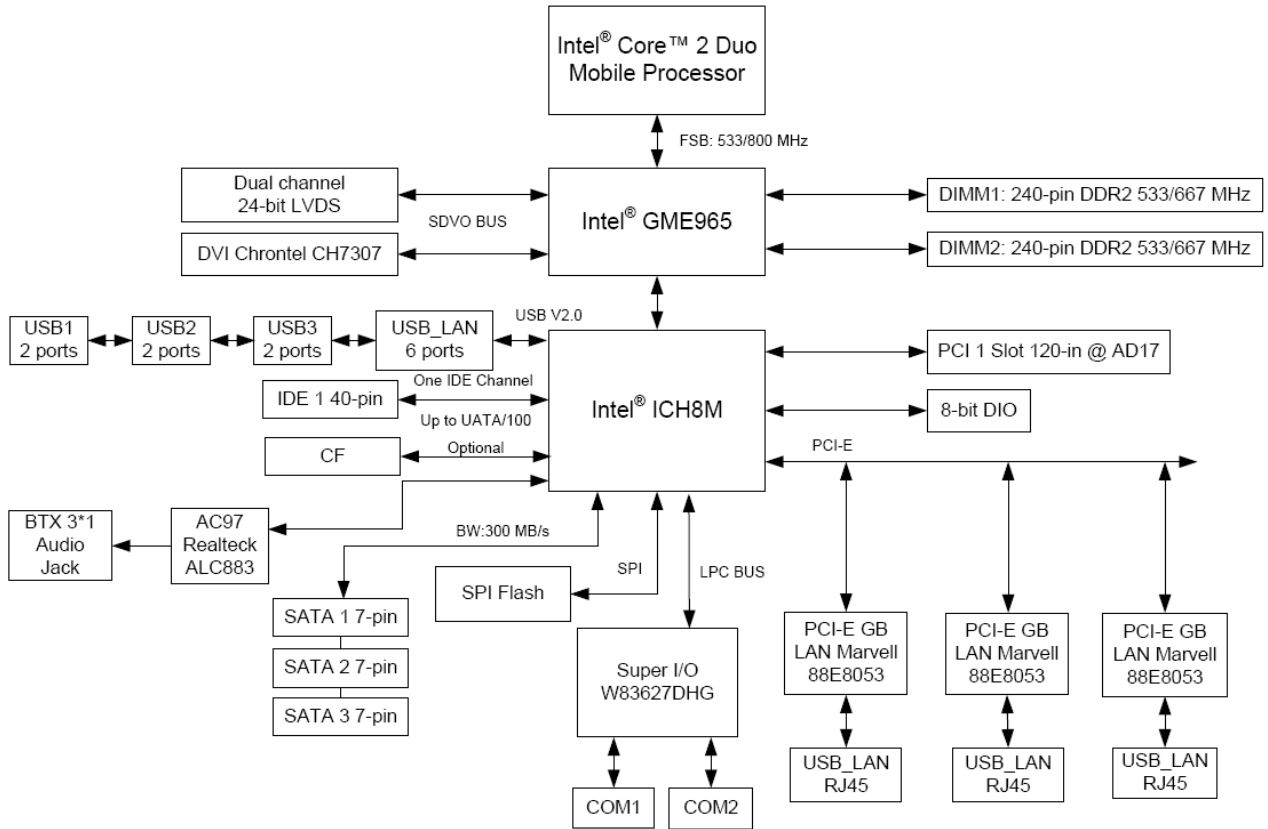
### 1.3 Specifications

<b>System</b>	
CPU	Intel® Core™ 2 Duo Mobile Processor - T series (Merom/Socket P)
FSB	800/533 MHz
BIOS	Award BIOS with 8 Mb SPI Flash EEPROM
System Chipset	Intel® GME965 + ICH8M
I/O Chip	Winbond W83627DHG I/O controller
System Memory	2 x 240-pin DIMM sockets support dual channel DDR2 533/667 SDRAM Max. up to 4 GB memory
Storage	1 x Parallel ATA IDE port with UDMA 33, ATA-66/100 support 3 x Series ATA 300 ports
SSD	Optional 1 x CompactFlash Type I/II socket
Watchdog Timer	Reset: 1 sec.~255 min. and 1 sec. or 1 min./step
H/W Status Monitor	Monitoring system temperature, voltage, and cooling fan status. Auto throttling control when CPU overheats. System automatically restored on recovery of AC power loss.
GPIO	Onboard programmable 8-bit Digital I/O interface
Expansion	1 x PCI slot
<b>MIO</b>	
Internal I/O	1 x RS-232, 4 x USB 2.0
Back Panel I/O	1 x VGA, 1 x Audio jack, 3 x RJ-45, 1 x RS-232, 2 x USB 2.0, 1 x KB, 1 x Mouse
<b>Display</b>	
Chipset	Intel® GME965 GMCH Integrated GMA X3100 graphics
Display Memory	Intel® DVMT 4.0 supports up to 256 MB video memory
Resolution	Analog display : up to 2048 x 1536 @ 75Hz (QXGA) Digital display : up to 1920 x 1200 @ 60 Hz (UXGA)
VGA/LCD Interface	DSUB-15 connector for VGA output
LVDS	Dual channel (2x24-bit) LVDS
DVI	Chrontel CH7307 DVI transmitter
<b>Audio</b>	
HDAC	Realtek ALC883 7.1 + 2 CH 3D audio interface
Audio Interface	Mic in, Line in, Line out

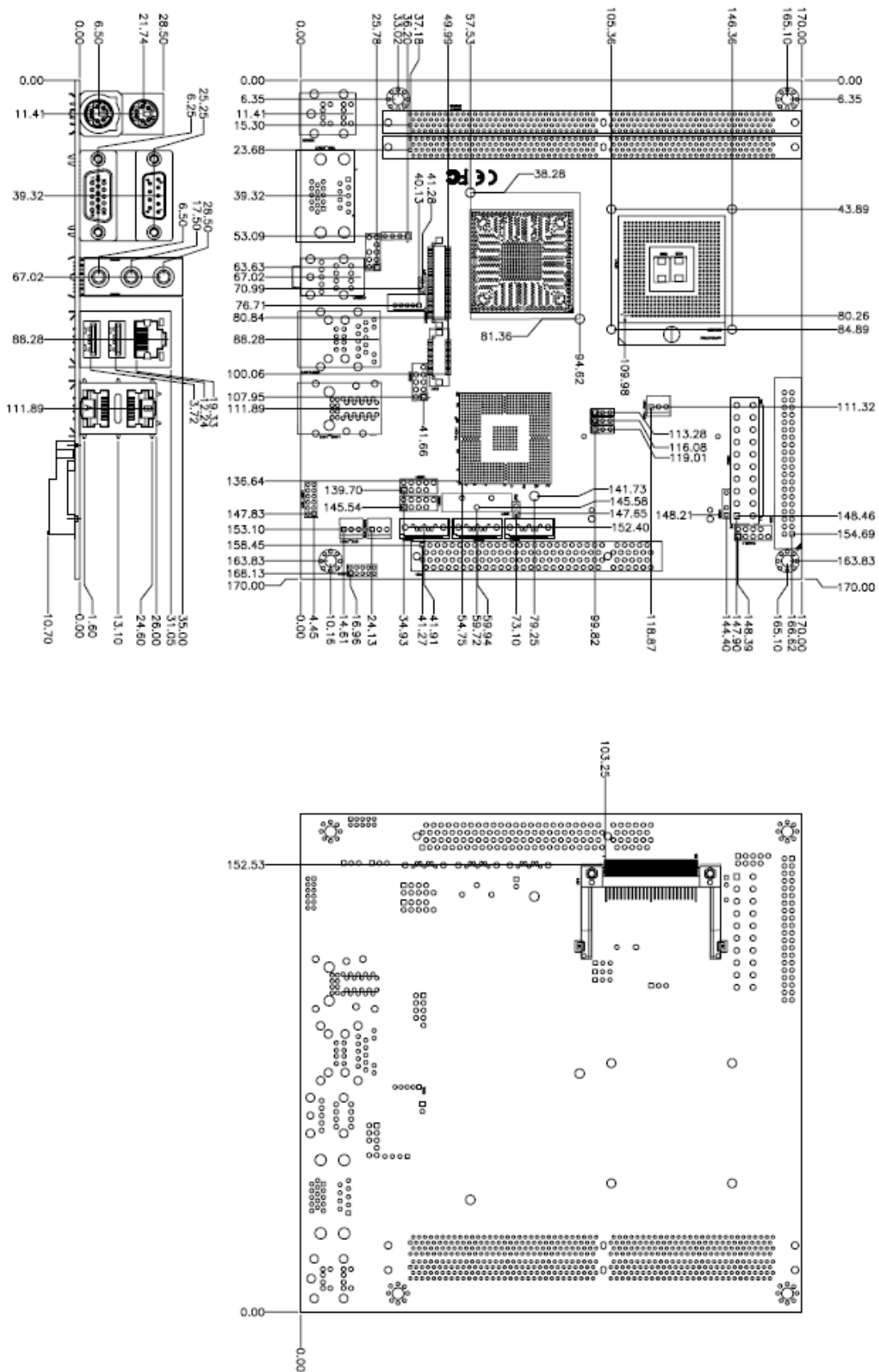
<b>Ethernet</b>	
Chipset	Triple Marvell® 88E8053 PCI Express™ Gigabit Ethernet controllers
Ethernet Interface	IEEE 802.3 10BASE-T/100BASE-TX/1000BASE-T
<b>Mechanical &amp; Environmental</b>	
Power Requirement	+3.3 V @ 2.47 A, +5 V @ 3.09 A, +12 V @ 2.12 A, 5 Vsb @ 21 mA, -12 V @ 30 mA (w/ Intel® Core™ 2 Duo Mobile T7500 2.22 GHz & 2 x 1 GB DDR2 667 MHz SDRAM in Dos mode)
Power Type	20-pin ATX power connector
Operating Temperature	0~60°C (32~140°F)
Operating Humidity	0%~90% relative humidity, non-condensing
Size (L x W)	6.69" x 6.69" (170 mm x 170 mm)
Weight	0.94 lbs (0.43 Kg)

### 1.4 System Architecture

All of details operating relations are shown in ADE-6051 series system block diagram.



### 1.5 Dimensions



Unit: mm



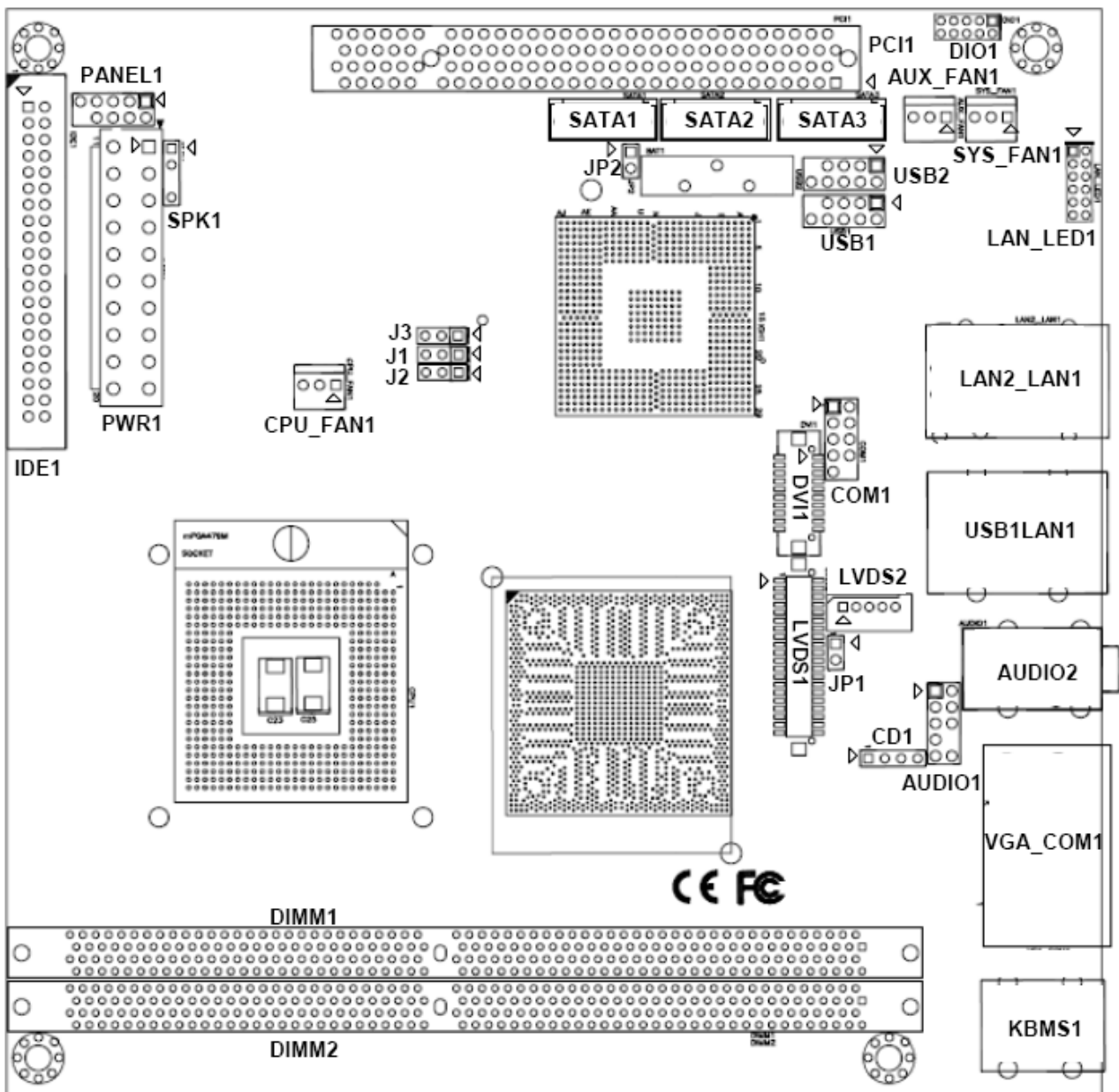
## CHAPTER 2

## 2. Hardware Configuration Setting

This chapter gives the definitions and shows the positions of jumpers, headers and connectors. All of the configuration jumpers on ADE-6051 SERIES are in the proper position. The default settings shipped from factory are marked with an asterisk (★).

In general, jumpers on the Mini ITX are used to select options for certain features. Some of the jumpers are designed to be user-configurable, allowing for system enhancement. The others are for testing purpose only and should not be altered. To select any option, cover the jumper cap over (SHORT) or remove (NC) it from the jumper pins according to the following instructions. Here, NC stands for "Not Connect".

### 2.1 Board Layout



## 2.2 Jumpers & Connectors

<b>JUMPERS</b>	<b>FUNCTION</b>	<b>REMARK</b>
JP2	RTC CMOS clear select	1 x 2 header
J1, J2, J3	CPU frequency select	1 x 3 header

<b>CONNECTORS</b>	<b>FUNCTION</b>	<b>REMARK</b>
AUDIO1	Internal audio for chassis	2 x 5 header
AUDIO2	Audio connector	Audio jack x 3
CD1	CD-In from CD-ROM	1 x 4 wafer
AUX_FAN1	Auxiliary fan connector	1 x 3 wafer
CPU_FAN1	CPU fan connector	1 x 3 wafer
COM1	Serial port 2 connector	2 x 5 header
DIMM1, DIMM2	240-pin DDR2 SDRAM 1 & 2 socket	
DIO1	Digital I/O connector	2 x 5 header
DVI1	DVI connector	HIROSE
IDE1	Primary IDE connector	2 x 20 header
JP1	LCD backlight adjustment connector	1 x 2 header
KBMS1	PS/2 keyboard & mouse connector	
LAN_LED1	LAN LED connector	2 x 6 header
LAN2_LAN1	LAN 2 & LAN 3 connectors	
LVDS1	LCD inverter connector	
LVDS2	LVDS connector	HIROSE
PANEL1	Front side indicators: IDE1 active LED (1-3) System power on LED (2-4) System reset (5-7) System power on switch (6-8)	2 x 5 header
PCI1	PCI slot	
PWR1	20-pin ATX power connector	
SATA1, SATA2, SATA3	Serial ATA 1, 2, & 3 connector	
SPK1	Internal speaker connector	1 x 4 header
SYS_FAN1	System fan connector	1 x 3 wafer
USB1LAN1	USB 0, 1 & LAN 1 connectors	
USB1, USB2	Internal USB 6, 7 & 8, 9 connectors	2 x 5 header
VGA_COM1	D-sub 15-pin VGA & D-sub 9-pin serial port 1 connectors	

## 2.3 Jumpers/Connectors Setting

### 2.3.1 RTC CMOS Clear Select (JP2)

PIN No.	Description
1-2	Clear CMOS
Open	Normal operation ★

### 2.3.2 CPU Frequency Select (J1, J2, J3)

FSB.	J1	J2	J3
533 MHz	2-3	2-3	2-3
800 MHz ★	Open	Open	2-3

### 2.3.3 Internal Audio for Chassis (AUDIO1)

PIN No.	Description
1	MIC2-L
2	Ground
3	MIC2-R
4	Front I/O sense
5	LINE2-R
6	LINE2R sense
7	Front I/O sense
8	NC
9	LINE2-L
10	LINE2L sense

### 2.3.4 Audio Connector (AUDIO2)

PIN No.	Description
1 (Blue)	Line-in
2 (Green)	Speaker out
3 (Red)	MIC-in

### 2.3.5 CD-In from CD-ROM (CD1)

PIN No.	Description
1	CD-L
2	CD-Ground
3	CD-Ground
4	CD-R

### 2.3.6 Chassis/CPU/System Connectors (AUX\_FAN1, CPU\_FAN1, SYS\_FAN1)

PIN No.	Description
1	Ground
2	+12V
3	SENSE

### 2.3.7 COM2 / VGA & COM1 Connector (COM1, VGA\_COM1)

#### COM1 / COM2

PIN No.	Description
1	Data Carrier Detect
2	Received Data
3	Transmit Data
4	Data Terminal Ready
5	Ground
6	Data Set Ready
7	Request To Send
8	Clear To Send
9	Ring Indicator
10	Not used

#### VGA

Description	PIN No.	PIN No.	Description
Green Signal	2	1	Red Signal
NC	4	3	Blue Signal
Ground	6	5	Ground
Ground	8	7	Ground
Ground	10	9	+5V
DCC_DATA	12	11	NC
VSYNC	14	13	HSYNC
		15	DCC_CLK

### 2.3.8 Digital I/O Connector (DIO1)

Description	PIN No.	PIN No.	Description
+3.3V	1	2	GPIO20
GPIO6	3	4	GPIO38
GPIO7	5	6	GPIO39
GPIO17	7	8	GPIO48
GPIO22	9	10	Ground

### 2.3.9 DVI Connector (DVI1)

Description	PIN No.	PIN No.	Description
TDC0#	1	2	+5V
TDC0	3	4	Ground
NC	5	6	NC
NC	7	8	NC
TDC1#	9	10	HPDET
TDC1	11	12	MDVIDATA
NC	13	14	MDVICLK
NC	15	16	Ground
TDC2#	17	18	TLC#
TDC2	19	20	TLC

Signal	Type	Description
TDC0,TDC0#	O	<b>DVI Data Channel 0 Output:</b> These pins provide the DVI differential output for data channel 0 (Blue).
TDC1,TDC1#	O	<b>DVI Data Channel 1 Output:</b> These pins provide the DVI differential output for data channel 1 (Green).
TDC2,TDC2#	O	<b>DVI Data Channel 2 Output:</b> These pins provide the DVI differential output for data channel 2 (Red).
HPDET	I	<b>Hot Plug Detect (internal pull-down):</b> This input determines whether the DVI is connected to a DVI monitor. When terminated, the monitor is required to apply a voltage greater than 2.4 volts. Changes on the status of this pin will be relayed to the graphics controller via the P-OUT/TLDET* or GPIO(1)/TLDET* pin pulling low.
MDVIDATA	I/O	<b>DVI I2C Data:</b> This signal is used as the I2C DOC clock for a digital display connector (i.e. TV-Out Encoder, TMDS transmitter). This signal is tri-stated during a hard reset.
MDVICLK	I/O	<b>DVI DOC Clock:</b> This signal is used as the DOC clock for a digital display connector (i.e. primary digital monitor). This signal is tri-stated during a hard reset.
TLC,TLC#	O	<b>DVI Clock Output:</b> These pins provide the differential clock outputs to the DVI interface corresponding a data on TDC(0:2) outputs.

### 2.3.10 PS/2 Keyboard & Mouse (KBMS1)

PIN No.	Description
1	Keyboard Data
2	NC
3	Ground
4	+5V
5	Keyboard Clock
6	NC
7	Mouse Data
8	NC
9	Ground
10	+5V
11	Mouse Clock
12	NC

### 2.3.11 LCD Backlight Adjustment Connector (JP1)

PIN No.	Description
1	Ground
2	Backlight brightness adjustment

### 2.3.12 LVDS Connector (LVDS1)

Description	PIN No.	PIN No.	Description
+5V	2	1	+3.3V
+5V	4	3	+3.3V
LCTLB_DATA_L	6	5	LCTLA_CLK_L
LDDC_DATA_L	8	7	LDDC_CLK_L
Ground	10	9	Ground
A_CLK+	12	11	B_CLK+
A_CLK-	14	13	B_CLK-
Ground	16	15	Ground
A_DATA0+	18	17	B_DATA0-
A_DATA0-	20	19	B_DATA0+
Ground	22	21	Ground
A_DATA1+	24	23	B_DATA1-
A_DATA1-	26	25	B_DATA1+
Ground	28	27	Ground
A_DATA2+	30	29	B_DATA2-
A_DATA2-	32	31	B_DATA2+
Ground	34	33	Ground
A_DATA3+	36	35	B_DATA3-
A_DATA3-	38	37	B_DATA3+
+12V	40	39	+12V

### 2.3.13 LCD Inverter Connector (LVDS2)

PIN No.	Description
1	+12V
2	Ground
3	Backlight On/Off control
4	Backlight brightness adjustment
5	+5V

Signal	Type	Description
LCTLA_CLK_L	I/O	I <sup>2</sup> C Based control signal (Clock) for External SSC clock chip control
LCTLB_DATA_L	I/O	I <sup>2</sup> C Based control signal (Data) for External SSC clock chip control
LDDC_CLKL	I/O	EDID support for flat panel display
LDDC_DATA_L	I/O	EDID support for flat panel display

### 2.3.14 LAN LED Connector (LAN\_LED1)

PIN No.	Description
1	L1_LED_LINKACT
2	L1_LED_LINK100
3	L1_LED_LINKACT_V
4	L1_LED_LINK1000
5	L2_LED_LINKACT
6	L2_LED_LINK100
7	L2_LED_LINKACT_V
8	L2_LED_LINK1000
9	L3_LED_LINKACT
10	L3_LED_LINK100
11	L3_LED_LINKACT_V
12	L3_LED_LINK1000

### 2.3.15 LAN 1/2/3 & USB 0/1 Connectors (LAN2\_LAN1, USB1LAN1)

#### LAN 1/2/3

PIN No.	Description	PIN No.	Description
1	MDI0+	5	MDI2+
2	MDI0-	6	MDI2-
3	MDI1+	7	MDI3+
4	MDI1-	8	MDI3-

#### USB 0/1

PIN No.	Description	PIN No.	Description
1	+5 V (fused)	5	+5 V (fused)
2	USBP0-	6	USBP1-
3	USBP0+	7	USBP1+
4	Ground	8	Ground

### 2.3.16 Internal USB 6/7/8/9 Connectors (USB1, USB2)

PIN No.	Description
1	5VSB
2	5VSB
3	DATA_6- / DATA_8-
4	DATA_7- / DATA_9-
5	DATA_6+ / DATA_8+
6	DATA_7+ / DATA_9+
7	Ground
8	Ground
9	Key
10	NC

**Note :**

- 1) This mainboard provides 2 USB headers on the board allowing for 4 additional USB ports. To make use of these headers, you must attach a USB bracket/cable with USB ports (some models will come packaged with a USB 4-port bracket-cable). The optionally packaged bracket will have two connectors that you can connect to the headers (USB1, USB2). The other end (bracket containing the USB ports) is attached to the computer casing.
- 2) If you are using a USB 2.0 device with Windows 2000/XP, you will need to install the USB 2.0 driver from the Microsoft® website. If you are using Service pack 1 (or later) for Windows® XP, and using Service pack4 (or later) for Windows® 2000, you will not have to install the driver.

### 2.3.17 Front Side Indicators (PANEL1)

IDE1 Active LED

PIN No.	Signal Description
1	+5V (Pull-up for HDD LED)
3	HDD active# (LED cathode terminal)

System Power On LED

PIN No.	Signal Description
2	+5V (Pull-up for Power LED)
4	Ground

System Reset

PIN No.	Signal Description
5	Ground
7	Reset

System Power On Switch

PIN No.	Signal Description
6	Power button control signal
8	Ground

### 2.3.18 20-pin ATX Power Connector (PWR1)

Description	PIN No.	PIN No.	Description
+3.3V	11	1	+3.3V
-12V	12	2	+3.3V
Ground	13	3	Ground
PS_ON	14	4	+5V
Ground	15	5	Ground
Ground	16	6	+5V
Ground	17	7	Ground
-5V	18	8	PW_OK
+5V	19	9	5VSB
+5V	20	10	+12V

### 2.3.19 Serial ATA 1/2/3 Connectors (SATA1, SATA2, SATA3)

These SATA connectors support Serial ATA 300. Each SATA connector can only support one serial ATA device.

**Note:** With most storage devices, there is a power cable that you need attach to a power source (power supply).

### 2.3.20 Internal Speaker Connector (SPK1)

PIN No.	Description
1	SPK Active#
2	SPK Active#
3	NC
4	+5V



## CHAPTER 3

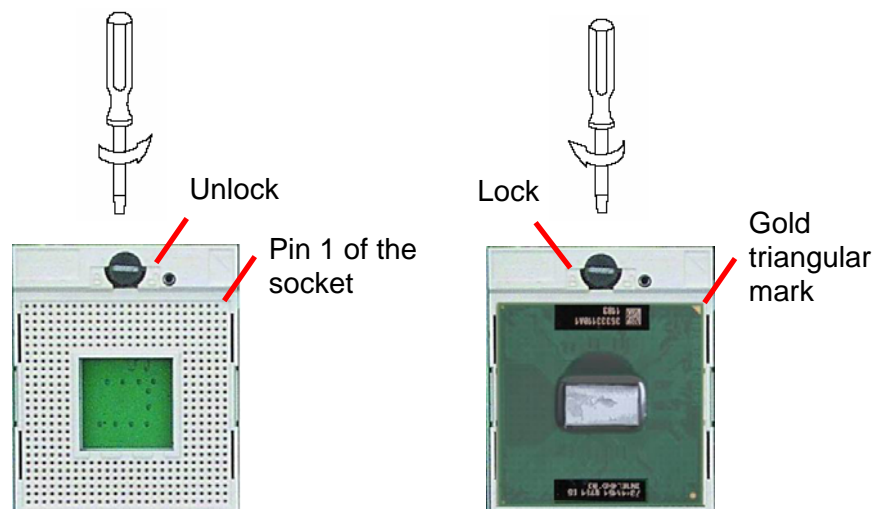
### 3. System Installation

This chapter provides you with instructions on how to setup your system. The additional information shows you how to install CPU/ FAN and memory.

#### 3.1 Socket mPGA479M Processors

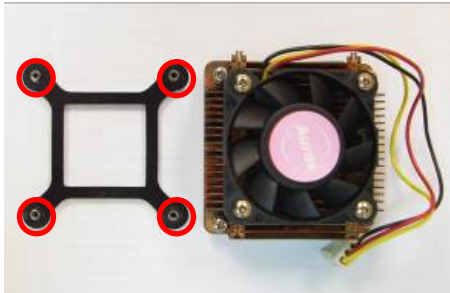
##### 3.1.1 Installing Intel® Core™ 2 Duo Mobile M CPU

- ◆ The processor socket comes with a screw to secure the processor, please unlock the screw first.
- ◆ Position the CPU above the socket and the gold triangular mark on the CPU must align with pin 1 of the CPU socket. Then Insert the CPU gently seated in place.
- ◆ Turn the screw to the lock position.

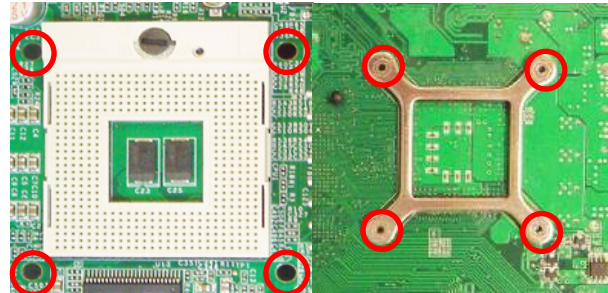


**Note:** Do not force the CPU into the socket. It may bend the pins and damage the CPU.

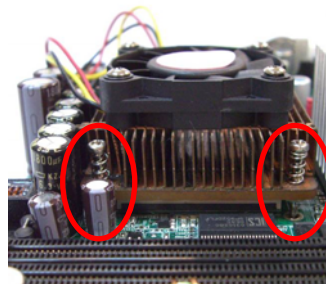
### 3.2 Installing Cooling Fan



1. Each P-M cooler comes with a cooler bracket on which 4 screw holes.



2. Have four screws fitted into the board's CPU cooler holes from the rear side.



3. Place the cooler right above the CPU after spreading the thermal paste, and press the 4 screws down to lock the cooler with bracket. Then, plug the cooler fan connector.

**Warning :** For a safety landing, avoid leaving prongs on hard surface.

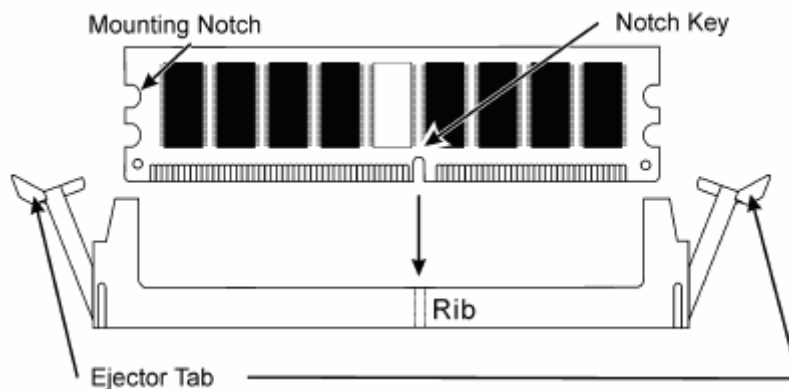
**Instructions :** Smear thermal grease on the top of the CPU. Lower the CPU fan onto the CPU/CPU socket and secure it using the attachments or screws provided on the fan. Finally, attach the fan power cable to the CPUFAN adapter. For more details on this, go to <http://www.intel.com>

### 3.3 Main Memory

ADE-6051 series provide 2 DIMMs (240-pin Dual In-line Memory Module) to support 1.8V DDRAM (Synchronized DRAM) as on-board main memory. The maximum memory size is 256 MB ~ 2 GB with using 256MB/512MB/1GB/2GB technology. Supports up to 2 double sided DIMMs at DDR2 533/667 MHz. The memory architecture adopts 128-bit data interface to support for x8 and x16 DDRAM(DDR2) device width. In addition, it only supports Non-ECC memory.

For system compatibility and stability, don't use memory module without brand. You can also use the single or double-side DIMM .The three DIMMs can be out of order. You can install different size of DDRAM module on DIMM1, DIMM2 or all to boot up system.

Without out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedure to install your DDRAM module into memory socket. Before locking, make sure that the module has been fully inserted into the DIMM slot.



**NOTE:** For maintaining system stability, do not change any of DDR2 memory parameters in BIOS setup to upgrade your system performance without acquiring technical information.

### 3.4 Installing the Mini-ITX

To install your ADE-6051 into standard chassis or proprietary environment, you need to perform the following steps:

1. Check all jumpers setting on proper position
2. Install and configure CPU and memory module on right position
3. Place ADE-6051 series into the dedicated position in your system
4. Attach cables to existing peripheral devices and secure it

**NOTE:** Please refer section 3.4.2 to install display and Ethernet drivers and setup your system.

**WARNING:** Please ensure that your SBC properly inserted and fixed by mechanism. Otherwise, the system might be unstable or do not work from bad contact of golden finger.

#### 3.4.1 Triple Marvell Gigabit Ethernet Controller

Triple Marvell Gigabit Ethernet 10/100/1000BASE-TX controller by PCI Express.

The ADE-6051 series provide three LED indicators on RJ-45 connectors to show LAN interface status. These messages will give you a guide for troubleshooting.

**Yellow LED indicates transmit and receive activity.**

*Blinking:* indicates transmit/receive activity

*On:* indicates no activity but link is valid

*Off:* link is invalid

**Green LED indicates Link speed**

*On:* link speed at 1000Mbps

*On:* link speed at 100Mbps

*Off:* link speed at 10Mbps

#### 3.4.2 Drivers Support

ADE-6051 provide on CD-Title to support on-board VGA and Ethernet device drivers in various operating systems. Before installing the device drivers, please see the reference files in each sub-directory. You cannot install drivers from CD-Title directly.

**Intel GME965 Chipset Integrated Graphics** supports Win2000, XP, Win2003 and 64bit, Vista Windows environment.

**Intel GME965 & ICH8(M) Chipset Driver** supports Win2000, XP, Win2003 and 64bit, Vista Windows environment.

**Three Marvell Gigabit Ethernet Controllers** support Win2000, XP, Win2003, and 64 bit, Vista, Windows environment.



## CHAPTER 4

## 4. BIOS Setup

### 4.1 Entering Setup

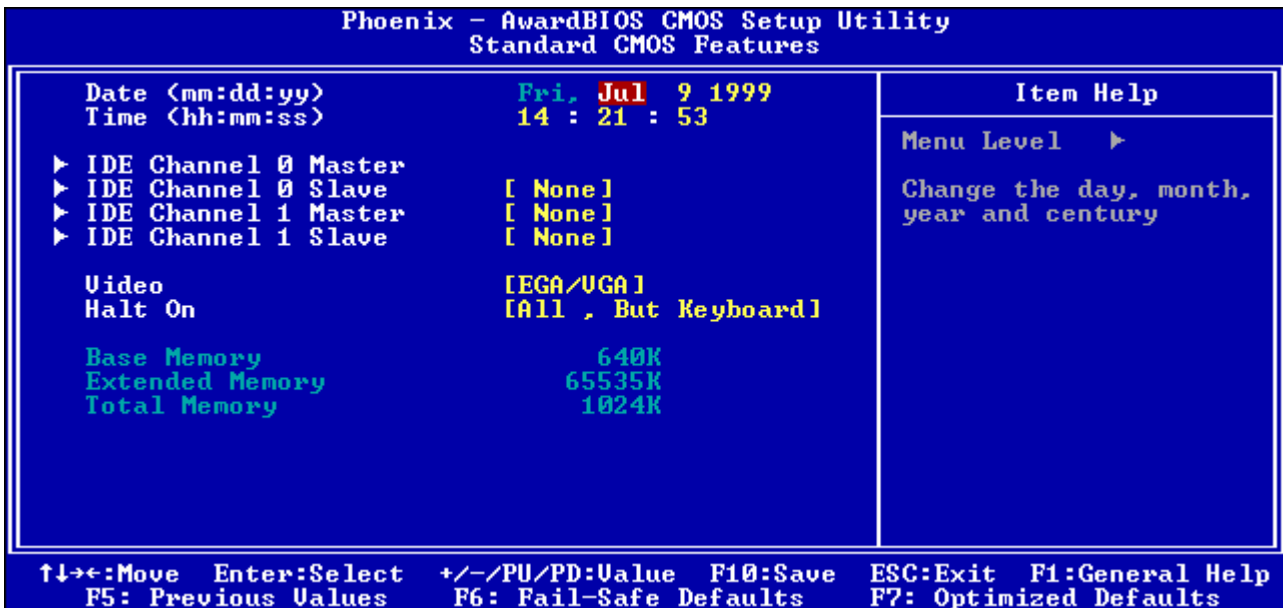
Phoenix-Award BIOS has a built-in setup program that allows users to modify the basic system configuration. This information is stored in CMOS RAM whose power is supplied by a battery so that it can retain the setup information even when the power is turned off. Press Delete when you Power on or Reboot the computer system. (i.e. After the logo appears at the center of the screen, please press Delete to enter the BIOS setup program). In the BIOS, make sure that everything is working fine before you try to optimize it for maximum performance.

### 4.2 Main Menu



When you enter the PHOENIX-AWARD™ CMOS Setup Utility, the **Main** will appear on the screen. The Main allows you to select several configuration options. Use the left/right arrow keys to highlight a particular configuration screen from the top menu bar or use the down arrow key to access and configure the information below.

## 4.2.1 Standard CMOS Features



### 4.2.1.1 Date (mm/date/year) and Time (hh/mm/ss)

Allow you to change the date and time of the system clock. No matter how good the quality of the motherboard, remember that losing (or gaining) several seconds per month is not a surprising thing.

### 4.2.1.2 IDE Channel 0/1 Master/Slave

You can press **Enter** to see the submenus they contain.

### 4.2.1.3 Video

Allows you to select the type of displaying standard you are using. Available options are **EGA/VGA, CGA 40, CGA 80 and MONO**.

### 4.2.1.4 Halt On

Select the situation in which you want the BIOS to stop the POST process and notify you. Available options are **All Errors, No Errors, All, but keyboard, All, but diskette, and All, but disk/key**.

### 4.2.1.5 Base Memory

Displays the amount of conventional memory detected during boot up.

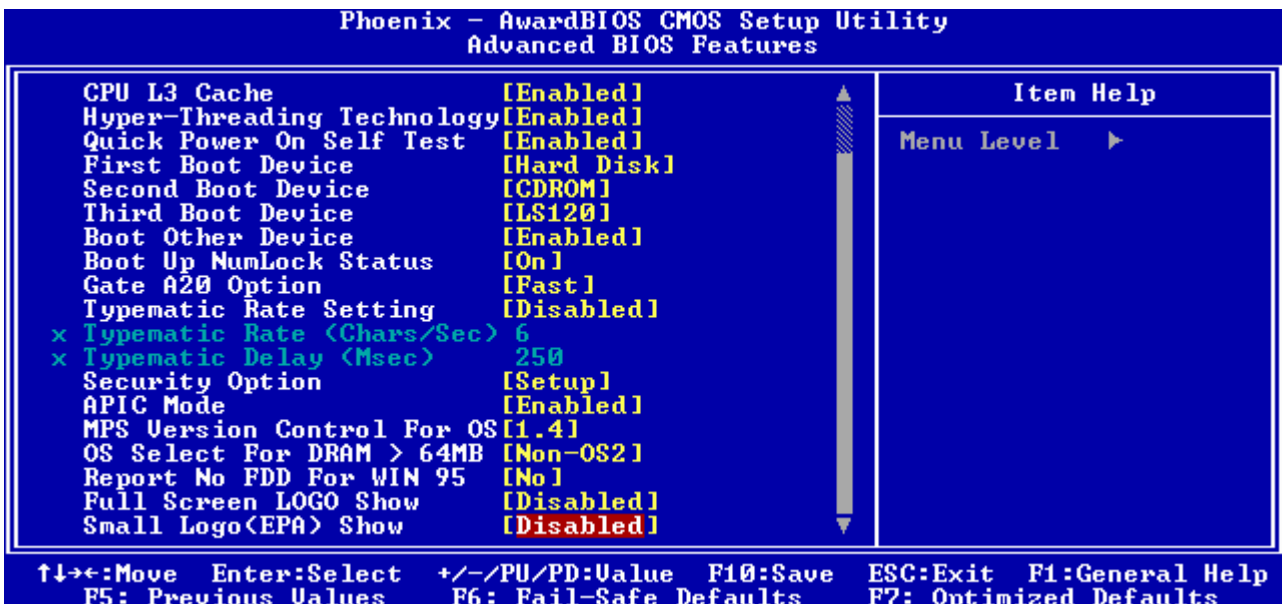
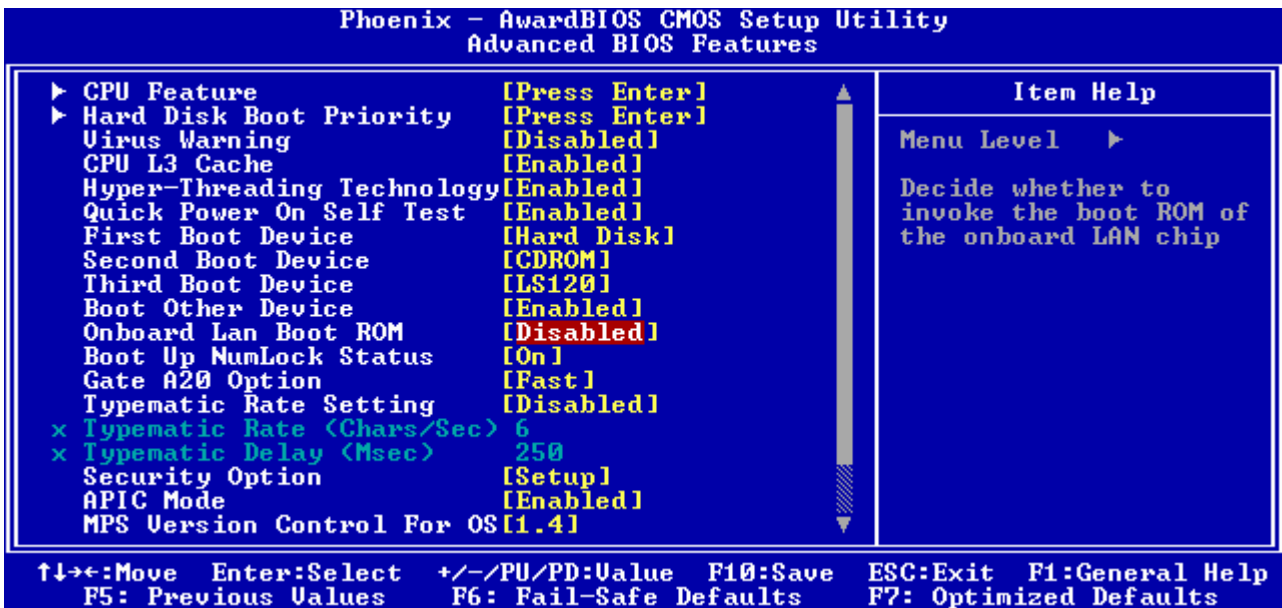
### 4.2.1.6 Extended Memory

Displays the amount of extended memory detected during boot up.

### 4.2.1.7 Total Memory

Displays the total memory available in the system.

### 4.2.2 Advanced BIOS Features



#### 4.2.2.1 Hard Disk Boot Priority

Select removable device priority, such as Pri.Master, Pri.Slave, USBHDD0, USBHDD1, USBHDD2, and Bootable Add-in Cards.

#### 4.2.2.2 Virus Warning

Allows to choose the VIRUS warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempts to write data into this area, BIOS will show a warning message on screen and alarm beep.

#### 4.2.2.3 CPU L3 Cache

Cache memory is much faster than conventional DRAM system memory. These fields allow you to enable or disable the CPUs Level 3 external cache. The setting is left as Enabled to significantly enhance the performance of your computer.

#### **4.2.2.4 Hyper-Threading Technology**

When you install a CPU featuring Hyper-Threading Technology, this item will allow you to enable or disable the Hyper-Threading technology. Options: Disabled · Enabled (default).

#### **4.2.2.5 Quick Power On Self Test**

Enable this function to reduce the amount of time required to run the POST (Power On Self Test). BIOS will save time by skipping certain tests during POST. It is recommended that you disable this setting. Finding a problem during boot up is better than losing data during your work.

#### **4.2.2.6 First/Second/Third/Other Boot Device**

Allow you to select the First, Second, Third, and Other Boot Device. If your computer is newly constructed, the next thing you want to do is load the Operating System from scratch, directly off its CD. Before that, you need to set the First Boot Device to the CDROM. This instructs the BIOS to boot from the CD drive before trying to boot from the hard drive, which is still blank.

#### **4.2.2.7 Onboard LAN Boot ROM**

This item allows you to enable or disable the onboard LAN Boot ROM.

The choice: Enabled, Disabled.

#### **4.2.2.8 Boot Up NumLock Status**

This function defines the keyboard's numberpad as number keys or arrow keys. If it is set at On the number keys will be activated, if it is set at Off the arrow keys will be activated.

#### **4.2.2.9 Gate A20 Option**

Select if chipset or keyboard controller should control GateA20.

Normal: A pin in the keyboard controller controls GateA20. Fast: Lets chipset control GateA20

#### **4.2.2.10 Typematic Rate Setting**

When enabled, you can set the following two-typematic control items. When disabled, the keyboard controller determines keystrokes arbitrarily in your system.

#### **4.2.2.11 Typematic Rate (Chars/Sec)**

The typematic rate sets the rate at which characters on the screen repeat when a key is pressed and held down.

#### **4.2.2.12 Typematic Delay (Msec)**

The typematic delay sets how long after you press a key that a character begins repeating.

#### 4.2.2.13 Security Option

Select whether the password is required every time the system boots or only when you enter setup.

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

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

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

#### 4.2.2.14 APIC Mode

By enabling this option, "MPS version control for OS" can be configured. Disabled is recommended.

#### 4.2.2.15 MPS Version Control for OS

The 1.1 version is the older version that supports 8 more IRQs in the Windows NT environment. Choose the new 1.4 version for Windows 2000 and Windows XP. Options: 1.4 (default) \ 1.1

#### 4.2.2.16 OS Select For DRAM > 64MB

IBM's relic. If your system's DRAM is larger than 64MB and you are running OS/2, select OS/2 as the item value. Otherwise, set the item value to Non-OS/2 for all other operating systems.

#### 4.2.2.17 Report No FDD For WIN95

Whether report no FDD for Win 95 or not.

The choice: Yes, No.

#### 4.2.2.18 Full Screen LOGO Show

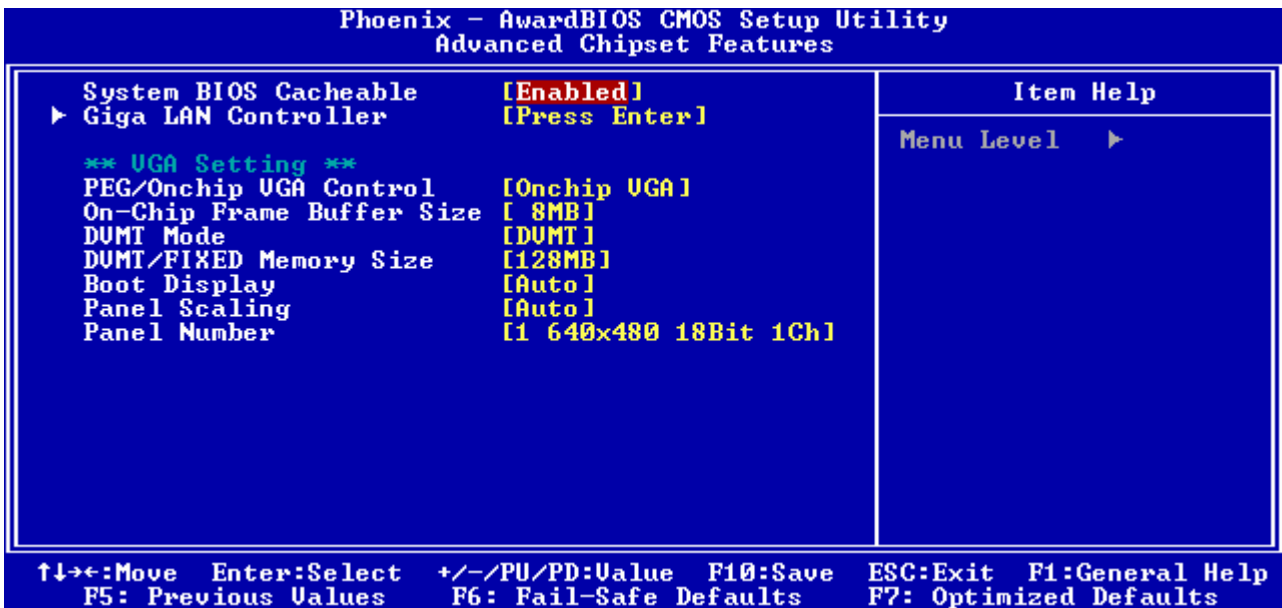
This item allows you to enable or disable the full screen logo display feature.

The choice: Enabled, Disabled.

#### 4.2.2.19 Small Logo<EPA> Show

This item allows you enabled/disabled the small EPA logo show on screen at the POST step.

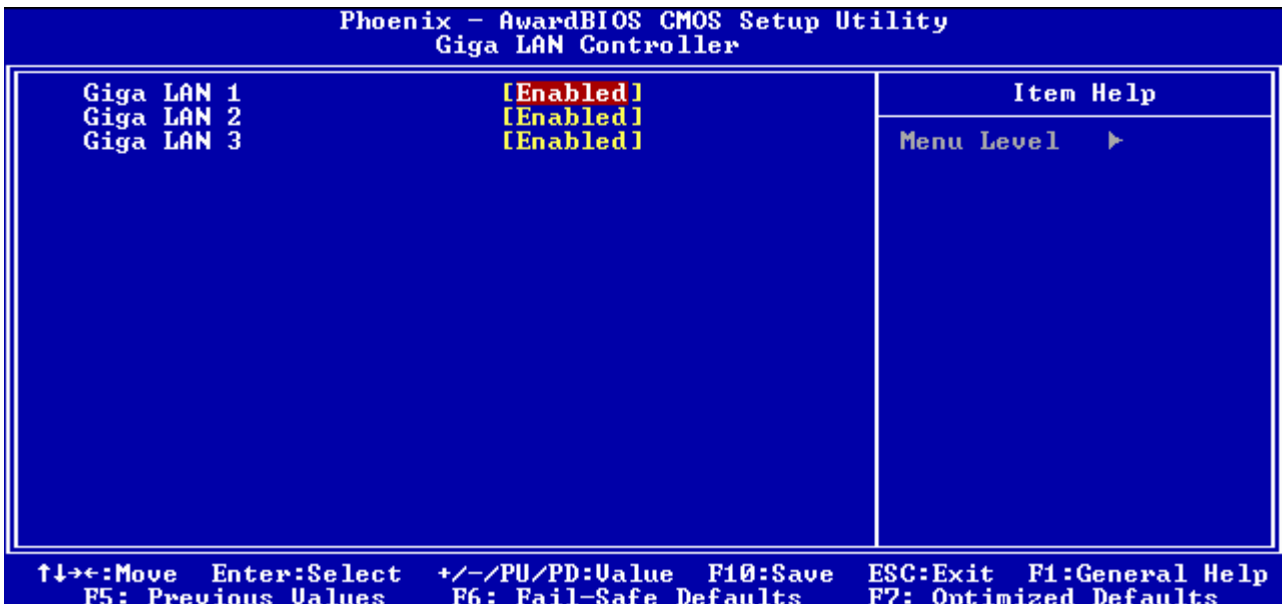
### 4.2.3 Advanced Chipset Features



#### 4.2.3.1 System BIOS Cacheable

Enabling this function allows caching of the system BIOS ROM at F0000h-FFFFFh, which results in better system performance. However, if any program writes to this memory area, a system error may result. It is advisable to leave it in default setting. Caching the system BIOS results in better performance than shadowing the system BIOS.

#### 4.2.3.2 Giga LAN Controller



##### 4.2.3.2.1 Giga LAN 1/2/3

Select "Enabled" if your system has a LAN device installed on the system board and you wish to use it.

The choice: Enabled, Disabled.

#### **4.2.3.3 PEG/Onchip VGA Controller**

Select "Enabled" to allow caching of the video BIOS which may improve performance. If any other program writes to this memory area, a system error may result. Options: Enabled, Disabled (default)

#### **4.2.3.4 On-Chip Frame Buffer Size**

This item allows you to setting the VGA memory form share system. Options: 1M(minimum) · 8M(Maximum default)

#### **4.2.3.5 DVMT Mode**

This item allows you to select the DVMT mode.

The choice: FIXED, DVMT, BOTH.

#### **4.2.3.6 DVMT/FIXED Memory Size**

This item allows you to select the DVMT or FIXED memory size.

#### **4.2.3.7 Boot Display**

This item allows you to select the boot display device.

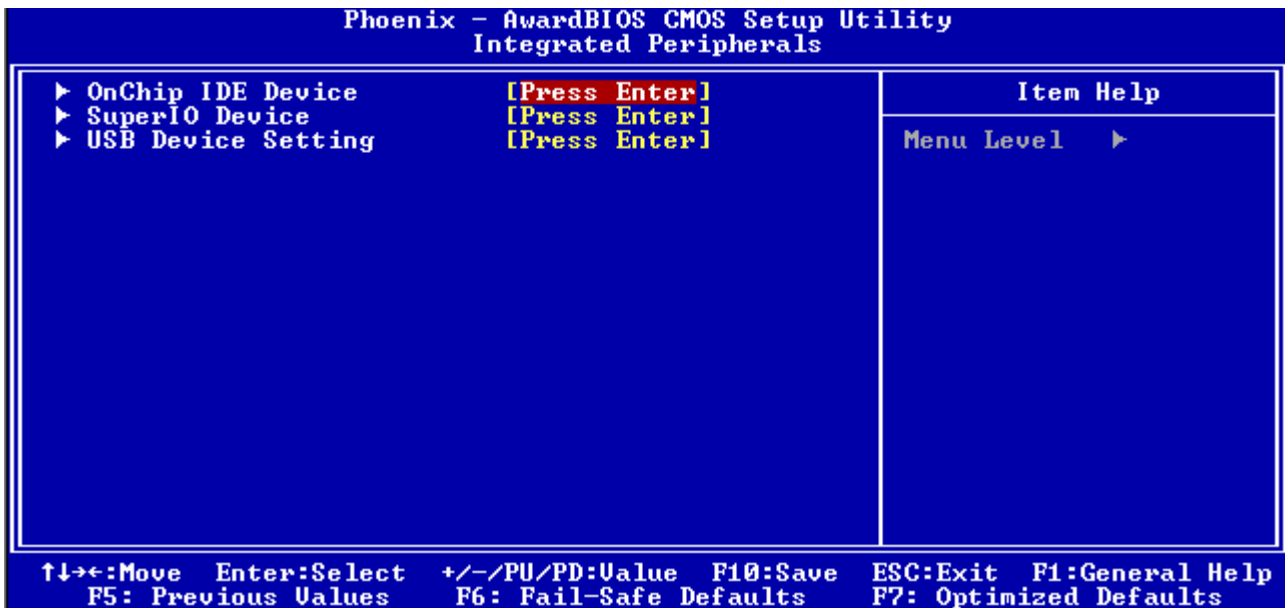
#### **4.2.3.8 Panel Scaling**

This item is for the backlight scaling techniques dynamically dimming the backlight to conserve its power consumption as increasing the panel transmittance to maintain the same luminance. Most displays use either spatial or temporal method to synthesize colors.

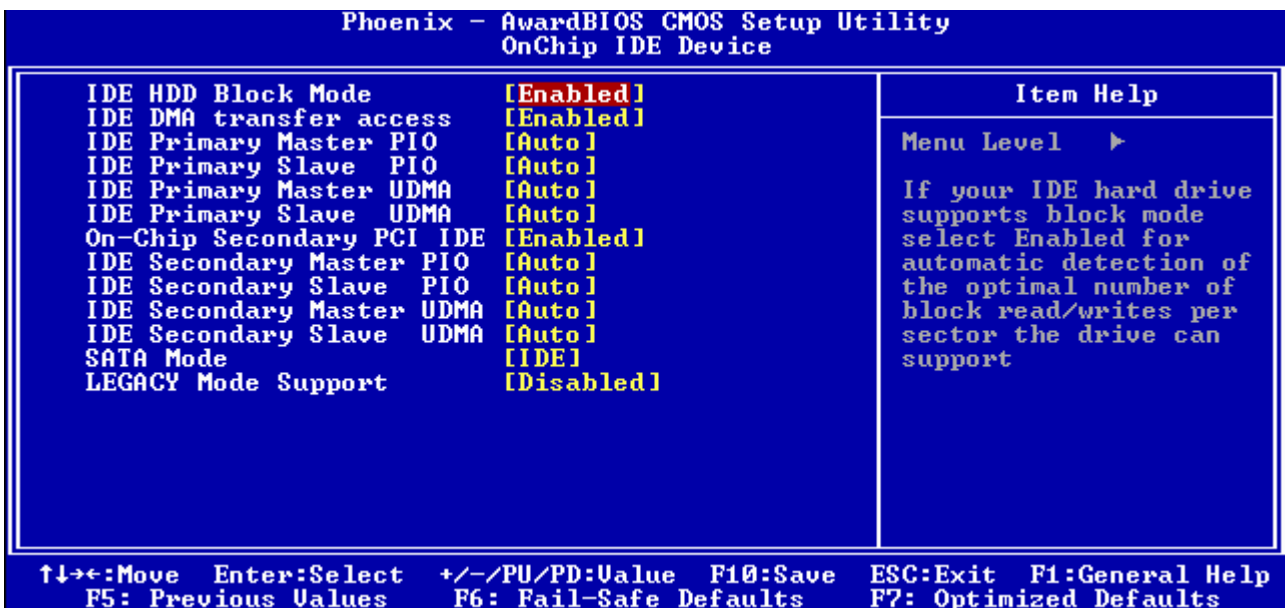
#### **4.2.3.9 Panel Number**

This item allows to select panel resolution that will be displayed depending on the LCD panel (LFP).

#### 4.2.4 Integrated Peripheral



##### 4.2.4.1 Onchip IDE Device



##### 4.2.4.1.1 IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sector read/write. If the IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

##### 4.2.4.1.2 IDE DMA Transfer Access

This item could allows you to enabled/disabled the IDE UDMA transfer function and only use PIO mode

#### **4.2.4.1.3 IDE Primary/Secondary Master/Slave PIO**

The IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

#### **4.2.4.1.4 IDE Primary/Secondary Master/Slave UDMA**

Ultra DMA implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If the hard drive and the system software both support Ultra DMA, select Auto to enable BIOS support.

#### **4.2.4.1.5 On-Chip Secondary PCI IDE**

The chipset contains a PCI IDE interface with support for two IDE channels. Select Enabled to activate the secondary IDE interface. Select Disabled to deactivate this interface.

#### **4.2.4.1.6 SATA Mode**

This BIOS feature controls the SATA controller's operating mode. There are three available modes - IDE, AHCI and RAID.

When set to **SATA** or **AHCI**, the SATA controller *enables* its AHCI features when the computer boots up.

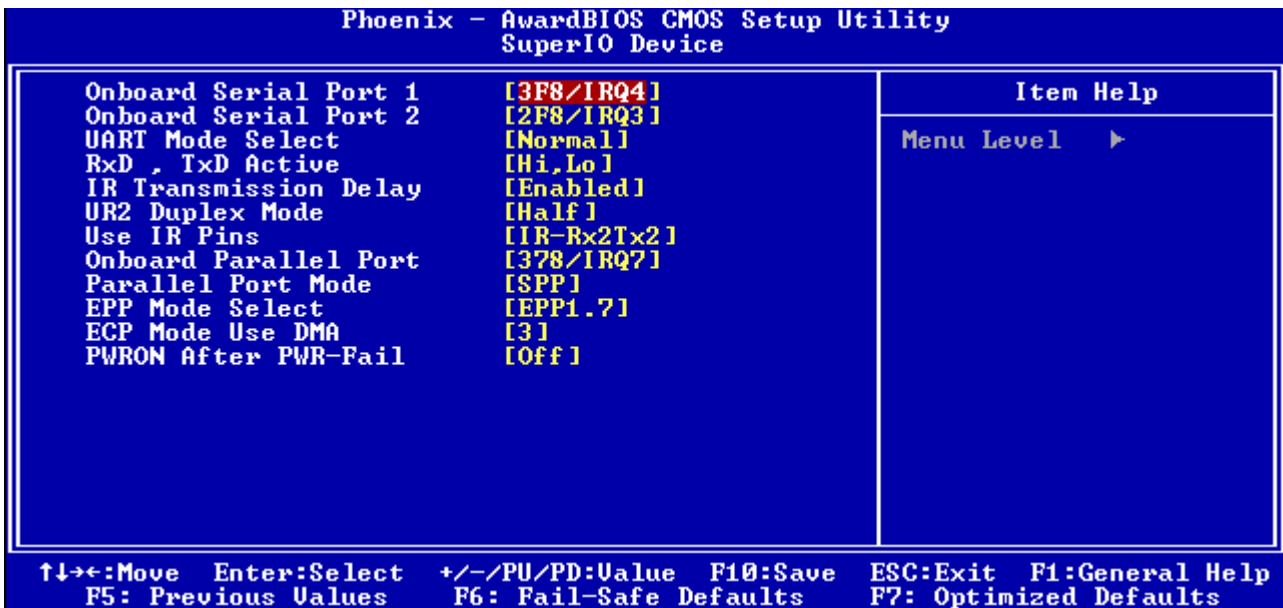
When set to **RAID**, the SATA controller *enables* its RAID and AHCI functions when the computer boots up.

When set to **IDE**, the SATA controller *disables* its RAID and AHCI functions when the computer boots up.

#### **4.2.4.1.7 Legacy Mode Support**

This function allows to select legacy mode.

#### 4.2.4.2 Super IO Device



##### 4.2.4.2.1 Onboard Serial Port 1/2

Select Enabled if your system has a floppy disk controller (FDC) installed on the system board and you wish to use it. If you are not going to use FDC or the system has no floppy drive, select Disabled in this field.

##### 4.2.4.2.2 UART Mode Select

Select an address and corresponding interrupt for the first and second serial ports.

##### 4.2.4.2.3 RxD, TxD Active

This BIOS feature allows to set the infra-red reception (RxD) and transmission (TxD) polarity. There are four options available, based on combinations of Hi and Lo. Please consult the IR peripheral's documentation to determine the correct polarity, or the wrong polarity will prevent a proper IR connection from being established with the IR peripheral.

##### 4.2.4.2.4 IR Transmission Delay

The field enables or disables IR transmission delay function.

##### 4.2.4.2.5 UR2 Duplex Mode

Select the value required by the IR device connected to the IR port. Full-duplex mode permits simultaneous two-direction transmission. Half-duplex mode permits transmission in one direction only at a time.

##### 4.2.4.2.6 Use IR Pins

Select the correct setting of TxD and RxD signals.

#### **4.2.4.2.7 Onboard Parallel Port**

This item allows you to determine access onboard parallel port controller with which I/O address.

The choice: 3BC/IRQ7, 378/IRQ7, 278/IRQ5 and Disabled.

#### **4.2.4.2.8 EPP Mode Select**

Select EPP port type 1.7 or 1.9.

The choice: EPP1.7, 1.9

#### **4.2.4.2.9 ECP Mode Use DMA**

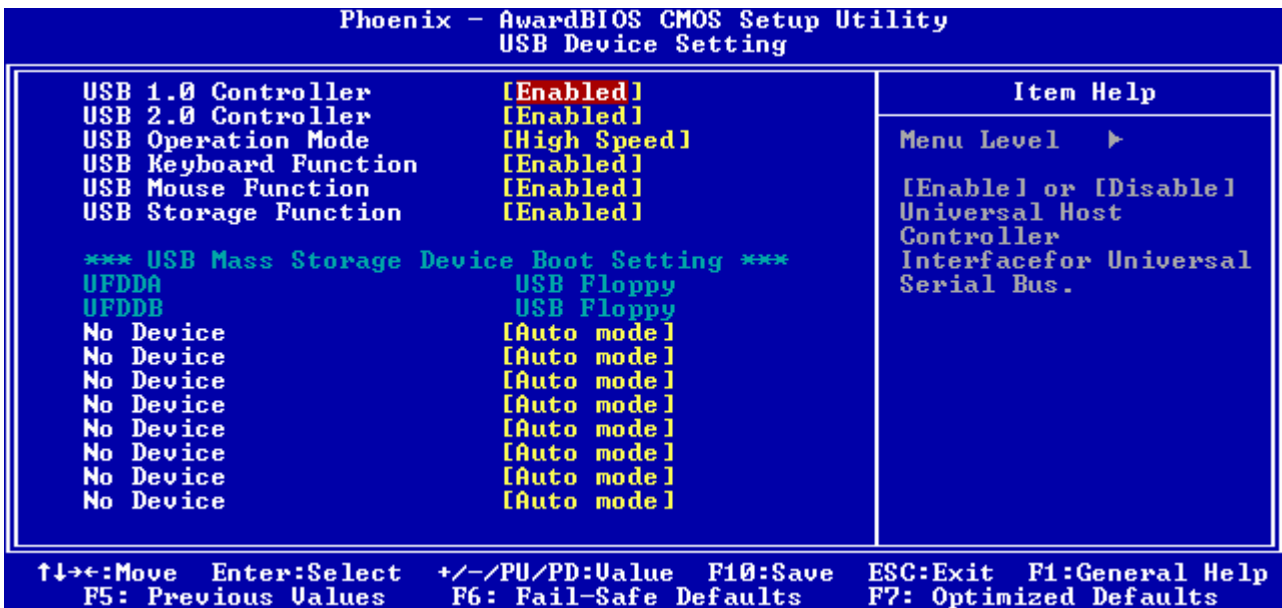
Select a DMA channel for the parallel port for use during ECP mode.

The choice: 3, 1.

#### **4.2.4.2.10 PWRON After PWR-Fail**

This item is to set whether to run Ac Loss Auto Restart or off

### 4.2.4.3 USB Device Setting



#### 4.2.4.2.1 USB 1.0 Controller

This item allows you to set the USB 1.0 Controller.

#### 4.2.4.2.2 USB 2.0 Controller

This item allows you to set the USB 2.0 Controller.

#### 4.2.4.2.3 USB Operation Mode

This item allows you to set the USB operation mode.

#### 4.2.4.2.4 USB Keyboard Function

This item allows you to set the system's USB keyboard to Enabled/Disabled.

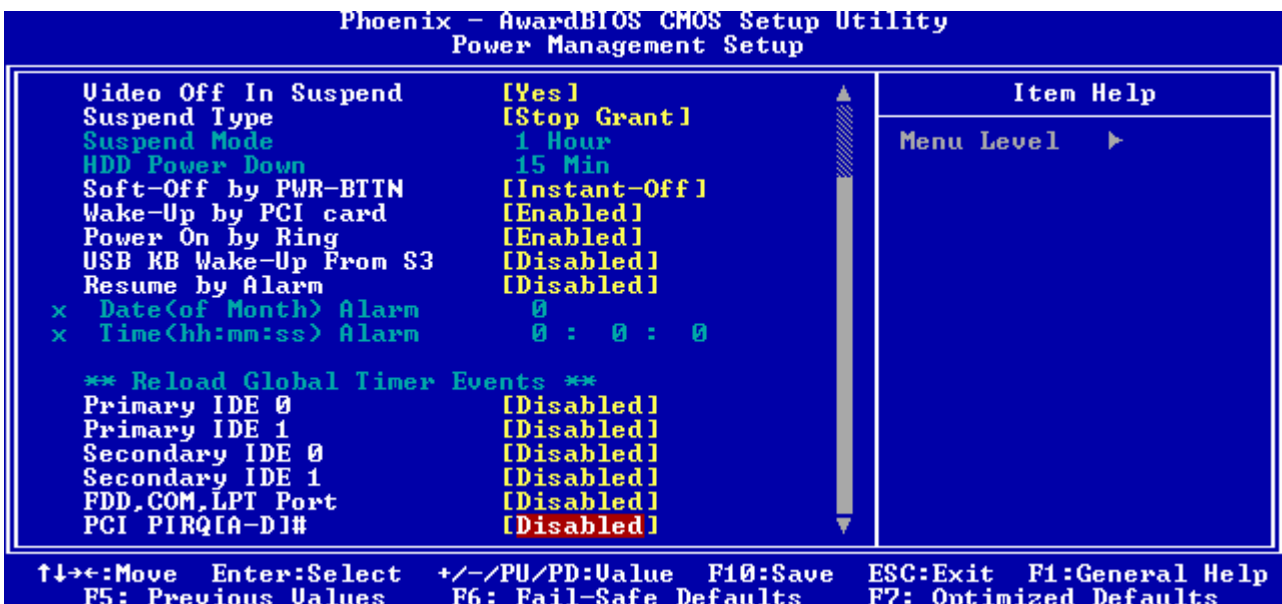
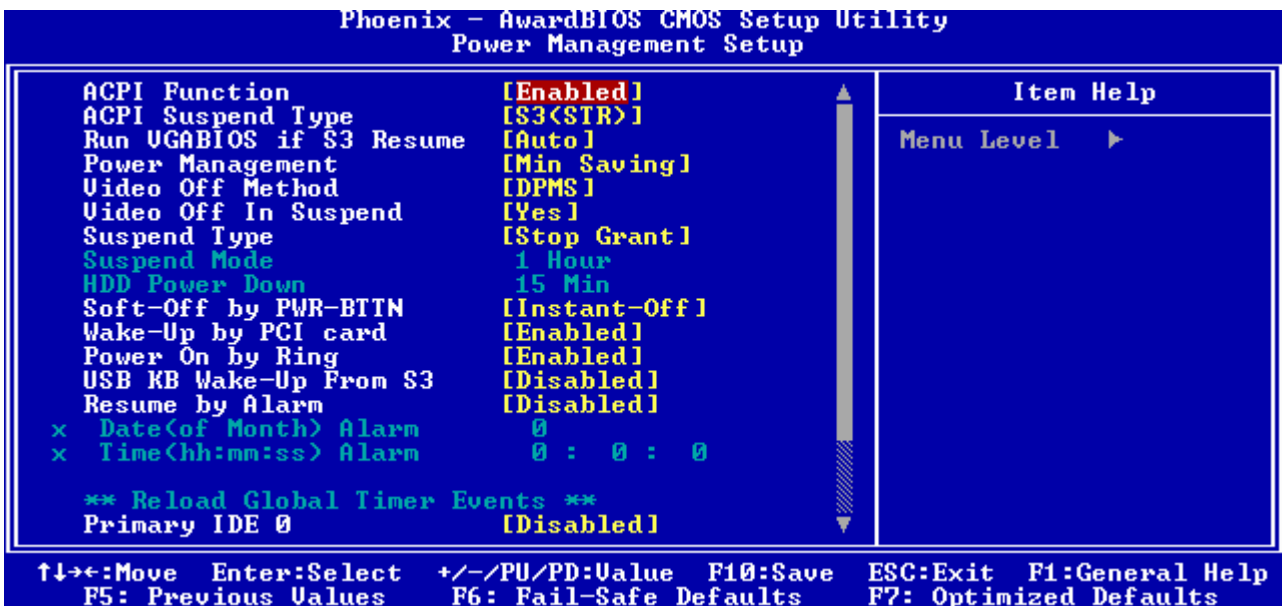
#### 4.2.4.2.5 USB Mouse Function

This item allows you to set the system's USB Mouse to Enabled/Disabled.

#### 4.2.4.2.6 USB Storage Function

This item allows you to set the USB storage function.

### 4.2.5 Power Management Setup



#### 4.2.5.1 ACPI Function

This function enables PCs to implement Power Management functions through Operating System and also provides the opportunity to integrated the interface for controlling power management and Plug-n-Play features on system devices.

#### 4.2.5.2 ACPI Suspend Type

This item allows to set the ACPI suspend(sleep) mode instead of simply turning off a computer. In S1 the computer consumes less power because HDDs and some other devices are powered off, but CPU is still running and it requires its fan to rotate. In S3 mode it's only RAM (system memory) that remains powered.

#### 4.2.5.3 Run VGABIOS if S3 Resume

This item is to select whether to run VGABIOS if resumed from S3 state but for older VGA drivers only. Please select Auto (Default) if in doubt.

#### 4.2.5.4 Power Management

There are three selections for power management and HDD power down. The Min. Power Saving sets the HDD Power Down at 15 Min., Max. Power Saving at 1 Min., and User defined from 1 Min. to 15 Min. and disabled but from 1 Min. to 1 hour while disabled.

#### 4.2.5.5 Video Off Method

Determines the manner in which the monitor is blanked. V/H SYNC + Blank turns off vertical and horizontal synchronization ports and writes blanks to the video buffer; DPMS Support is for the monitor supports the Display Power Management Signaling(DPMS) standard of the Video Electronics Standards Association(VESA); Blank Screen set the system only writes blanks to the video buffer.

#### 4.2.5.6 Video Off In Suspend

This item allows to set if the monitor is blanked in Suspend mode. The default setting is Yes.

#### 4.2.5.7 Suspend Type

This item will set the system status to shut down the PC with choices of Stop Grant and PwrOn Suspend.

#### 4.2.5.8 Suspend Mode

Min. Power Saving: Minimum power management. Doze Mode = 1 hr. Standby Mode = 1 hr., Suspend Mode = 1 hr., and HDD Power Down = 15 min.

Max. Power Saving: Maximum power management -- ONLY AVAILABLE FOR SL CPU's. Doze Mode = 1 min., Standby Mode = 1 min., Suspend Mode = 1 min., and HDD Power Down = 1 min.

User Defined: Allow you to set each mode individually. When not disabled, each of the ranges is from 1 min. to 1 hr. except for HDD Power Down, which ranges from 1 min. to 15 min. and disable.

#### 4.2.5.9 HDD Power Down

When "Enabled" and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

The choice: Disabled, 1~15Min

#### 4.2.5.10 Sort-Off by PWR-BTTN

Pressing the power button for more than 4 seconds/Instant-Off forces the system to enter the Soft-Off state when the system has "hung".(Only could working on ATX Power supply).

#### 4.2.5.11 Wake-Up by PCI Card

This will enable the system to wake up through PCI Card peripheral or not.

#### **4.2.5.12 Power On by Ring**

The function allows the system boot up if there's an incoming call from the modem.

#### **4.2.5.13 USB KB Wake-Up From S3**

This option is used to enabled/disabled USB keyboard wake up with suspend to RAM.

#### **4.2.5.14 Resume by Alarm**

When "Enabled", you can set the date and time at which the RTC (real-time clock) alarm awakens the system from Suspend mode.

The choice: Enabled, Disabled.

#### **4.2.5.15 Primary/Secondary IDE 0/1**

This function is for setting IDE 0/1 on primary/secondary mode.

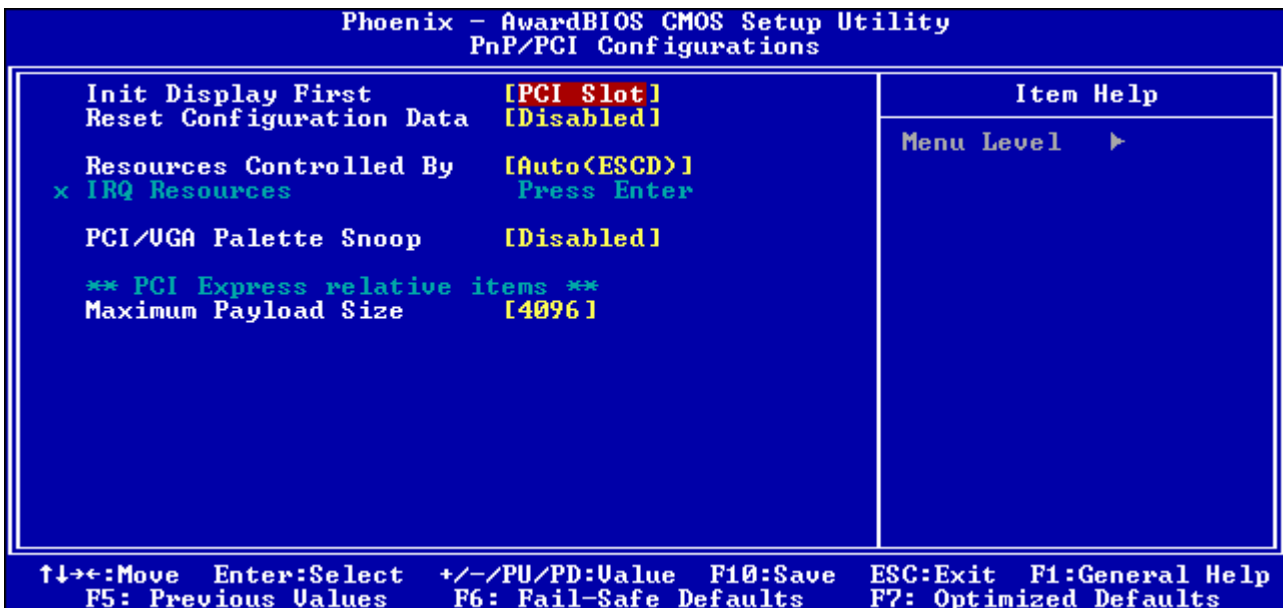
#### **4.2.5.16 FDD,COM,LPT Port**

System can be awaked by Floppy Drive, COM or LPT port.

#### **4.2.5.17 PCI PIRQ[A-D]#**

This function will cause the system waking up completely from the power management mode.

## 4.2.6 PnP/PCI Configurations



### 4.2.6.1 Init Display First

This item allows you to decide to active whether PCI Slot or Onboard/AGP first.

### 4.2.6.2 Reset Configuration Data

Normally, you leave this field Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system cannot boot.

### 4.2.6.3 Resources Controlled By

The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows®95. If you set this field to “manual” choose specific resources by going into each of the sub menu that follows this field.

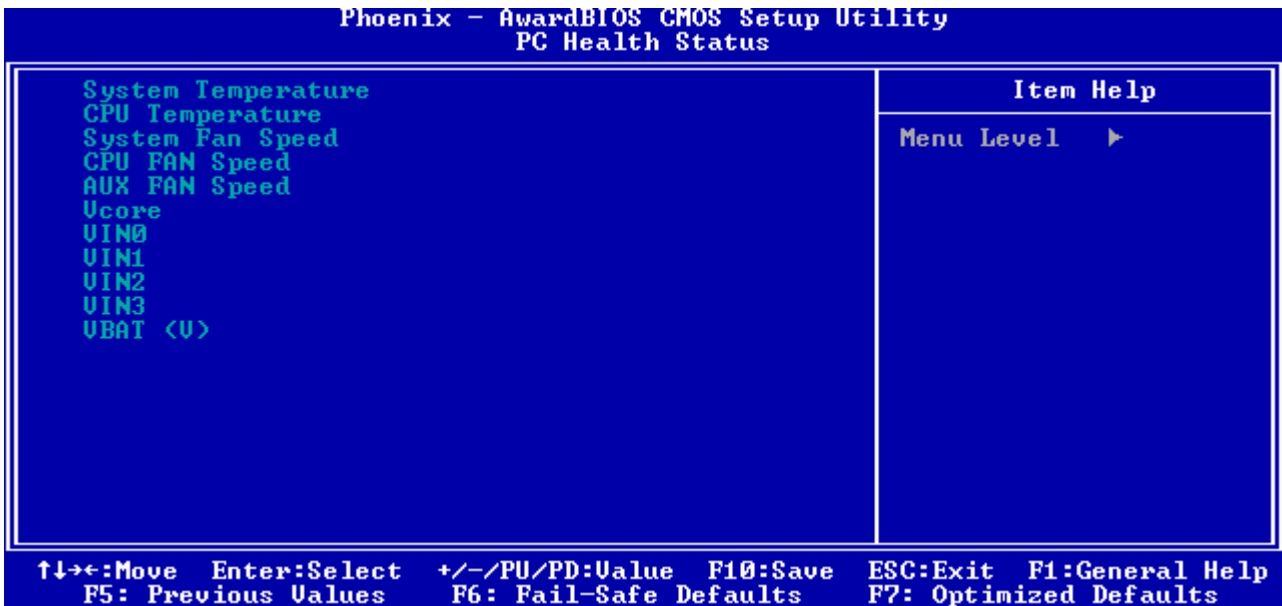
### 4.2.6.4 PCI/VGA Palette Snoop

This function determines if the graphics card should allow VGA palette snooping by a fixed function display card. It is only useful if a fixed-function display card using that requires a VGA-compatible graphics card to be present. Otherwise, leave the setting as default Disabled.

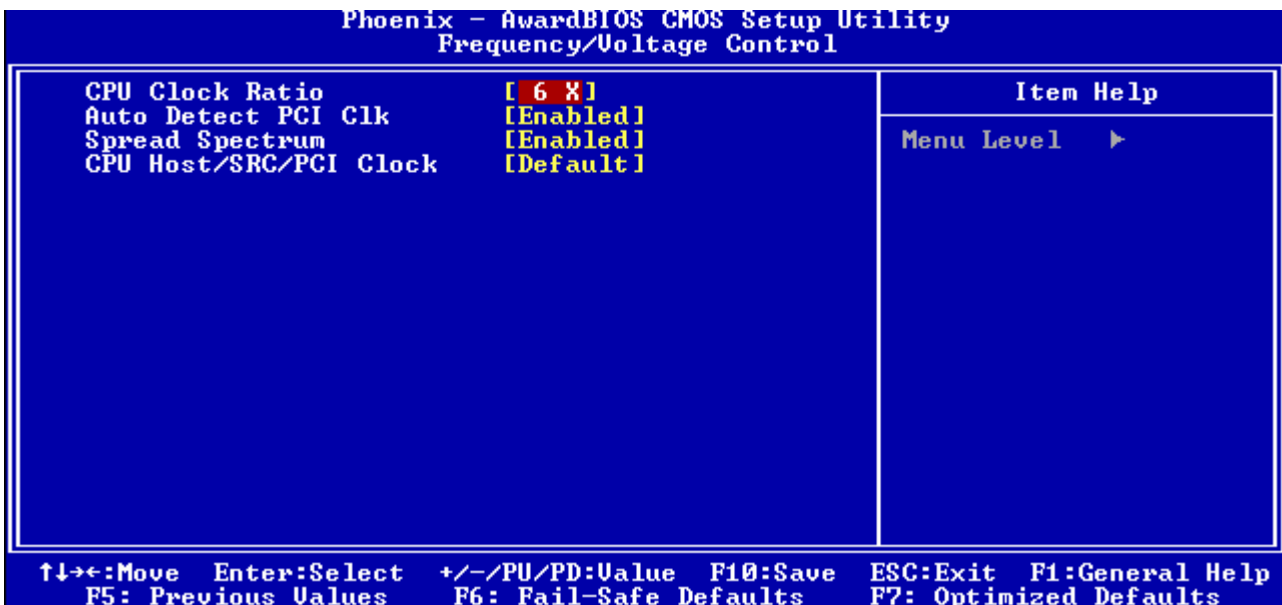
### 4.2.6.5 Maximum Payload

This item allows to set the maximum TLP payload size (unit in byte) for the PCI Express devices.

#### 4.2.7 PC Health Status



#### 4.2.8 Frequency/Voltage Control



##### 4.2.8.1 CPU Clock Ratio

This item allows you to set up the CPU clock ratio, but this function depends on different CPU performance. It is only effective for those clock ratio haven't been locked.

##### 4.2.8.2 Auto Detect PCI/DIMM Clk

This item allows to enable/disable auto detect PCI/DIMM clock.

##### 4.2.8.3 Spread Spectrum

This is to adjust extreme value of the pulse for EMI test.

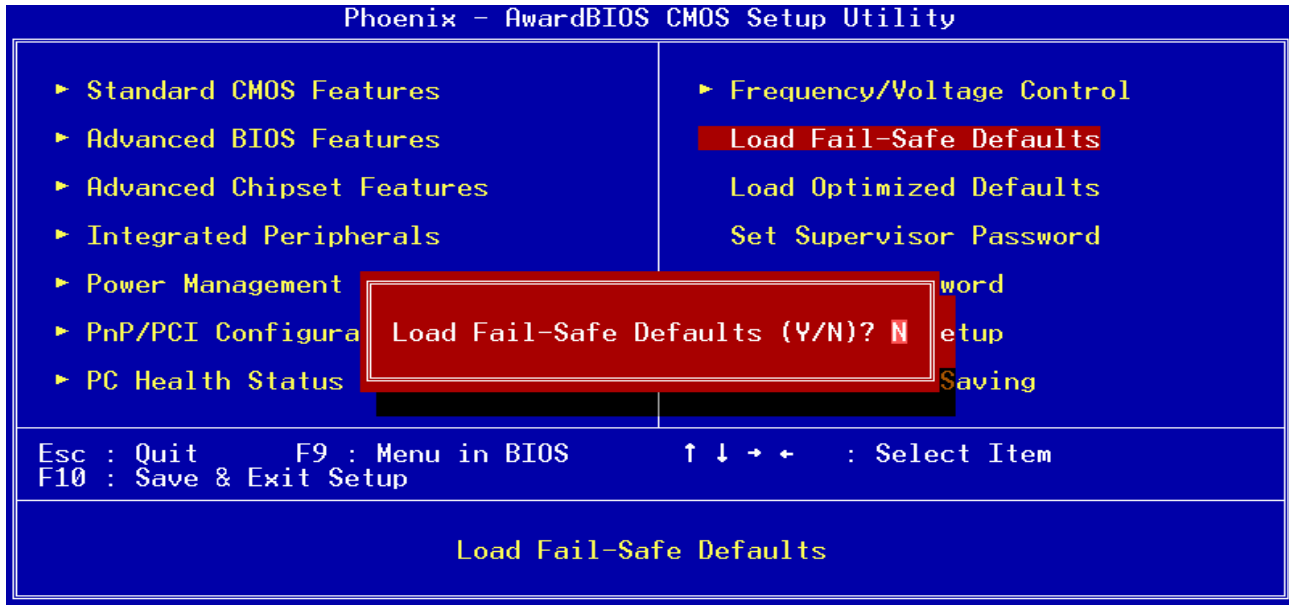
##### 4.2.8.4 CPU Host/SRC/PCI Clock

This item allows you to select CPU Host/SRC/PCI Clock.

#### 4.2.9 Load Fail-Safe Default

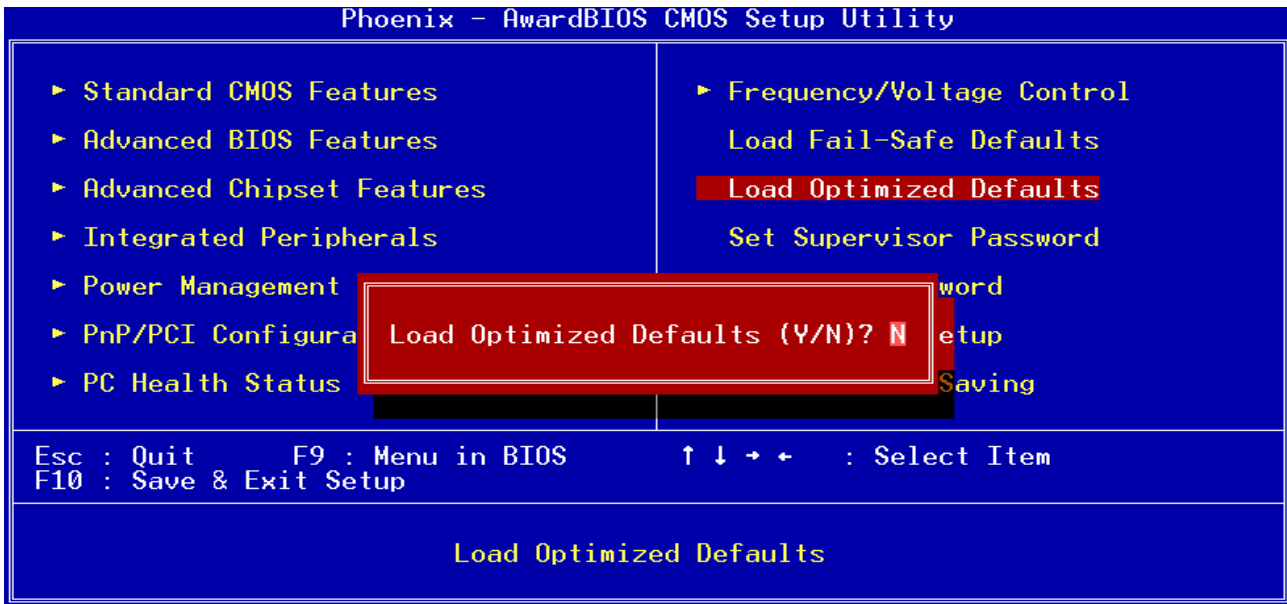
Use this menu to load the BIOS default values for the minimal/stable performance for your system to operate.

Press <Y> to load the BIOS default values for the most stable, minimal-performance system operations.



#### 4.2.10 Load Optimized Defaults

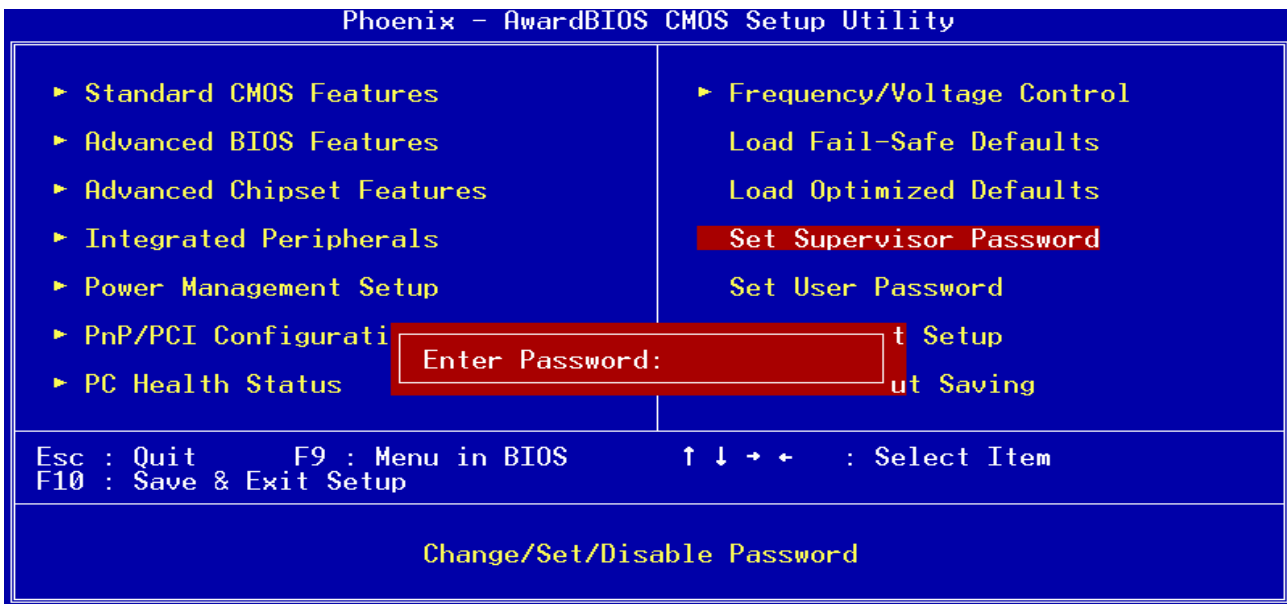
Use this menu to load the BIOS default values that are factory settings for optimal performance system operations. While Award has designed the custom BIOS to maximize performance, the factory has the right to change these defaults to meet their needs. Press <Y> to load the default values setting for optimal performance system operations.



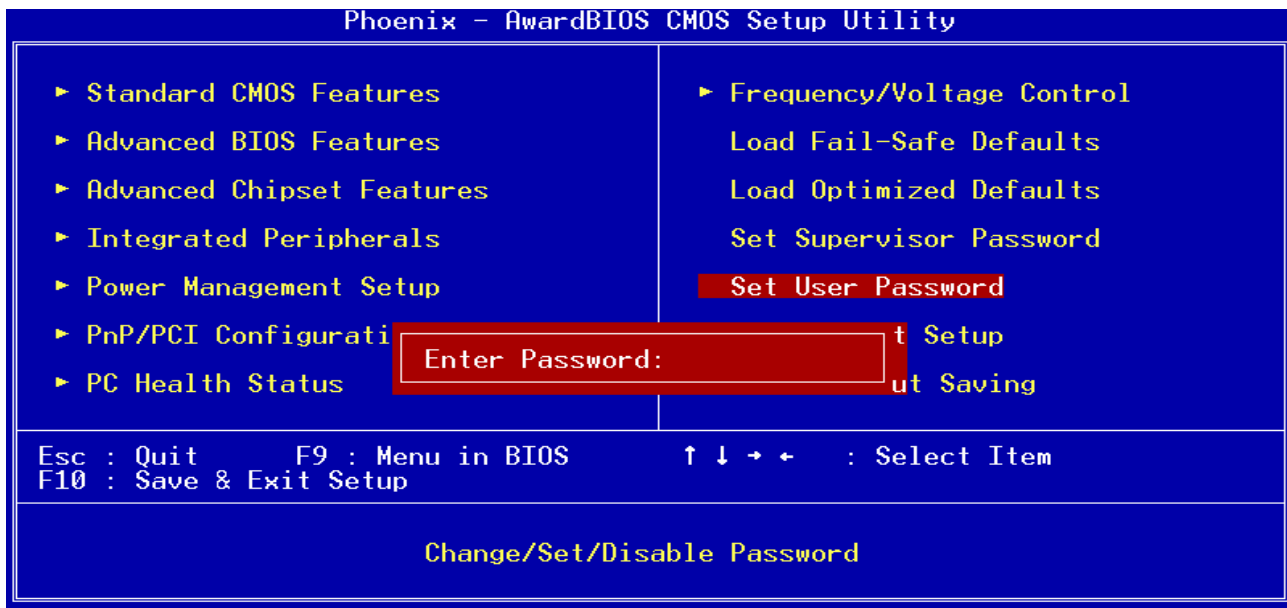
#### 4.2.11 Supervisor/User Password Setting

You can set either supervisor or user password, or both of them.

Supervisor Password: able to enter/change the options of setup menus



User Password: able to enter but no right to change the options of setup menus.



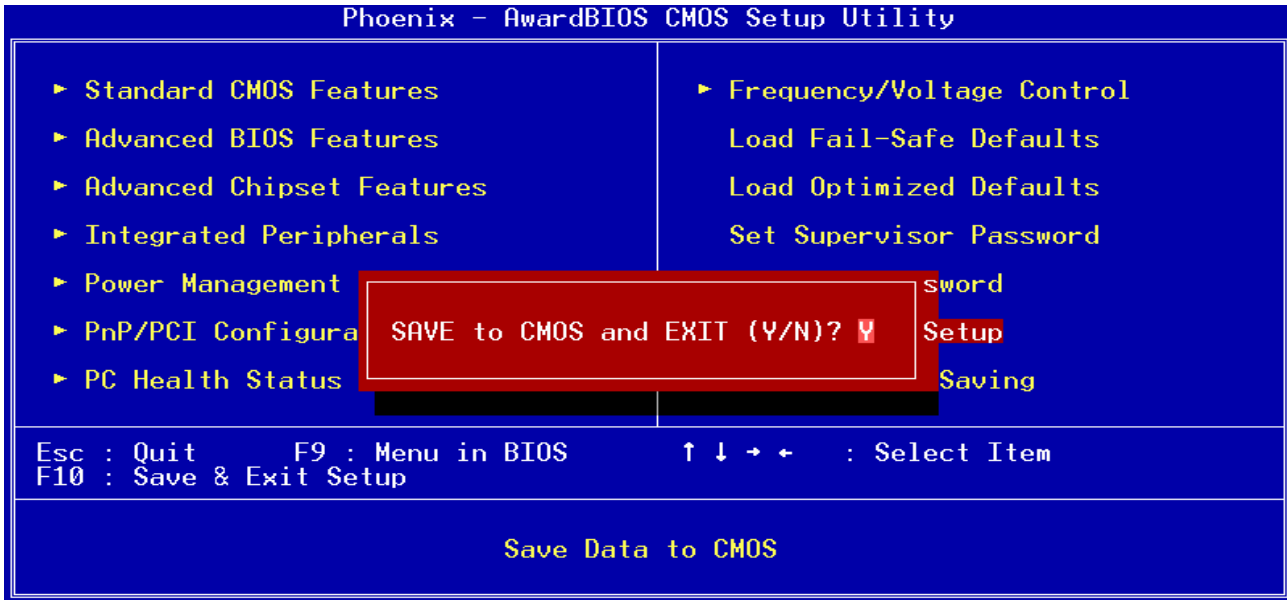
Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password. To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

**PASSWORD DISABLED.**

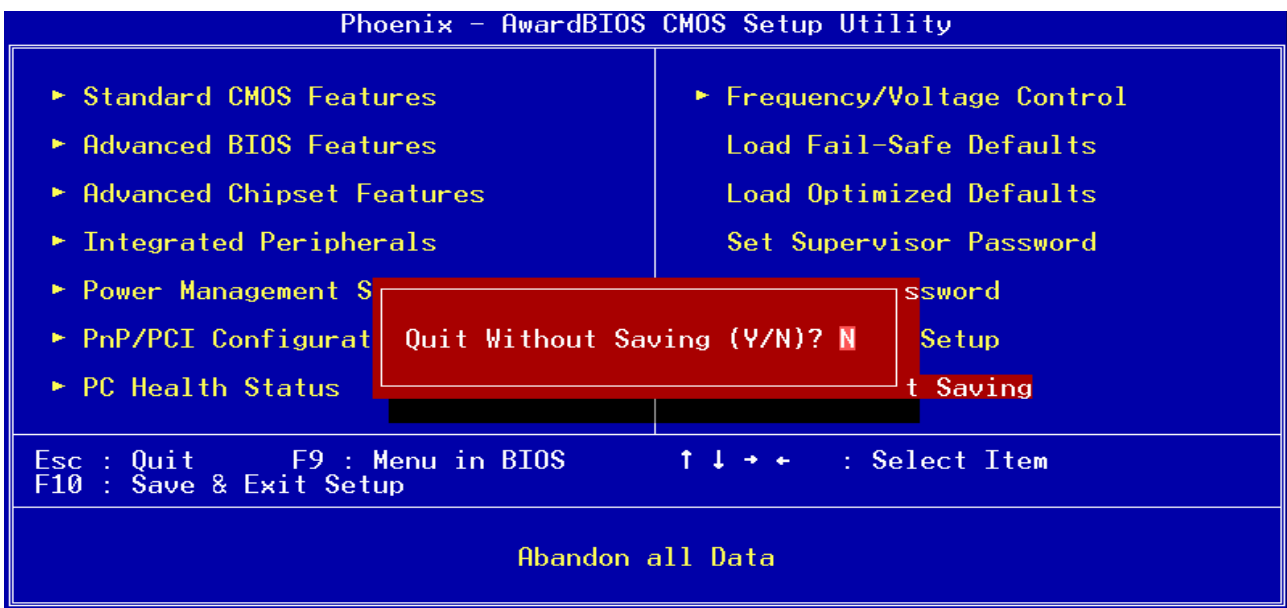
When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration. Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer. You determine when the password is required within the BIOS Features Setup Menu and its Security option (see Section 3). If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup

#### 4.2.12 Exit Selection

Save CMOS value changes to CMOS and exit setup. Enter <Y> to store the selection made in the menus in CMOS, a special section in memory that stays on after turning the system off. The BIOS configures the system according to the Setup selection stored in CMOS when boot the computer next time. The system is restarted after saving the values.



Abandon all CMOS value changes and exit setup, and the system is restarted after exiting





## Appendix

## Appendix A: Watchdog Timer Programming

The Watchdog Timer (WDT) is a special hardware device that monitors the computer system during normal operation. The WDT has a clock circuit that times down from a set number to zero. If a monitored item occurs before that timer reaches zero, the WDT resets and counts down again. If for some reason the monitored item doesn't occur before the timer reaches zero, the WDT performs an action, such as a diagnostic operation (rebooting the computer) or generate an NMI.

Watchdog Configuration		
Address Port: 2Eh	Data Port: 2Fh	Description
87h	na	Enter Key
87h	na	Enter Key
07h	08h	Setup Watch Dog Function
30h	01h	Enable Watch Dog Function
F5h	00h	00h: select second mode, 08h: select minute mode
F6h	00h	Time-out occurs after 0~255 second/minute, 00h: Time-out disable

## Appendix B: GPIO Programming

The General Purpose I/O pins are provided for custom system design. The pin programming as input mode or output mode is depending on the configuration. The pin definitions are as the following table:

GPIOBASE Address: 480h			
Pin No.	IN/OUT Register Address	Data Register Address	PIN BIT
2	GPIOBASE + 04h + 2	GPIOBASE + 0Ch + 2	4
3	GPIOBASE + 04h + 0	GPIOBASE + 0Ch + 0	6
4	GPIOBASE + 34h + 0	GPIOBASE + 38h + 0	6
5	GPIOBASE + 04h + 0	GPIOBASE + 0Ch + 0	7
6	GPIOBASE + 34h + 0	GPIOBASE + 38h + 0	7
7	GPIOBASE + 04h + 2	GPIOBASE + 0Ch + 2	1
8	GPIOBASE + 34h + 2	GPIOBASE + 38h + 2	0
9	GPIOBASE + 04h + 2	GPIOBASE + 0Ch + 2	6

### IN/OUT Register

0: The respective GPIO PIN is programmed as an output port

1: The respective GPIO PIN is programmed as an input port

### Data Register

Read/Write: for output port

Read Only: for input port

### Configure pin 2 to be an output port and output LOW

#### 【C Language】 Example:

1. `iret = inportb(0x486);`
2. `iret = iret & ~0x04;`      // set bit2 to 0
3. `outportb(0x486, iret);`    // set pin2 to output
4. `iret = inportb(0x48E);`
5. `iret = iret & ~0x04;`      // set bit2 to 0
6. `outportb(0x48E, iret);`    // pin 2 output 0

