



**AX12270**  
**V4 PC/104 CPU Module**  
**With CRT, LCD and Ethernet**  
**User's Manual**

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## **CAUTION**

If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

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## ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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## Chapter 1

### Introduction



The **AX12270** is the powerful engine of PC/104 form factor CPU Module. It comes with high-performance VIA V4 compliant processors, maximum up to 15 watts support (both C7 & Eden up to 1.5GHz), and high integration core logic controller VIA CX700 and ITE8888G PCI-to-ISA bridge that features Ultra Low Power V4 C7/Eden CPUs, DualView with different content and resolution, USB DOM support as SSD, and PC/104+ for both 16-bit ISA and 32-bit PCI expansion. It is a PC/104 form factor board with support for one onboard system memory DDR2 (up to 256MB), graphics UMA with maximum up to 64MB memory, and both CRT and LVDS (dual channel 24-bit) LCD. It is equipped with four USB2.0 ports, one PATA IDE port, two serial ports for RS-232 and RS-232/422/485, one P/S port for Keyboard/Mouse, an interface for fast Ethernet, and a digital I/O. The built-in Watchdog Timer has enhanced the system reliability that achieves a unique feature to distinguish itself from other boards.

## **Specifications**

- **CPU: VIA V4 complaint C7 and Eden processors**
- **System Chipset**
  - Integrated chipsets VIA CX700 and ITE8888G
- **System memory**
  - Onboard maximum DDR2 memory up to 256MB
- **BIOS**
  - AWARD BIOS, Plug-and-Play 4Mbit Flash ROM with integrated Ethernet Novell RPL and Windows PXE Boot ROM functions
- **SSD**
  - USB DiskOnModule and bootable
- **Onboard IDE**
  - One channel supports up to two devices
  - PIO Mode 0-4, DMA Mode 0-2
- **Standard I/O**
  - Two serial ports, including one RS-232 and one RS-232/422/485
  - One PATA-133 IDE Interface
  - One PS/2 Keyboard & Mouse Interface
- **Ethernet**
  - Realtek 8139DL PCI Bus 10/100M Base-T
- **Power Management**
  - Supports Plug & Play, APM(ACPI support)

- **Watchdog Timer**
  - Generates a system reset
  - Software programmable time interval
  - 255 levels, 0~255 seconds
- **Graphics**
  - UMA with maximum up to 64MB memory
  - Supports both CRT and LVDS LCD
- **Expansion Interface**
  - PC/104 for 16-Bit ISA Bus Expansion
  - PC/104 for 32-Bit PCI Bus Expansion
- **Operating system**
  - Windows XP
  - Windows XP Embedded
  - Windows CE 5.0 & 6.0
  - Embedded Linux
- **Power supply voltage:** +5 V (4.75 ~ 5.25 V)
- **Power consumption**
  - Maximum: +5 V @ 3.32 A
  - Typical: +5 V @ 1.6 A
- **Operating temperature:** 0 ~ 60° C (32 ~ 140° F)
  - **With Eden 400MHz is fanless**
  - **With Eden 1GHz is fan required**

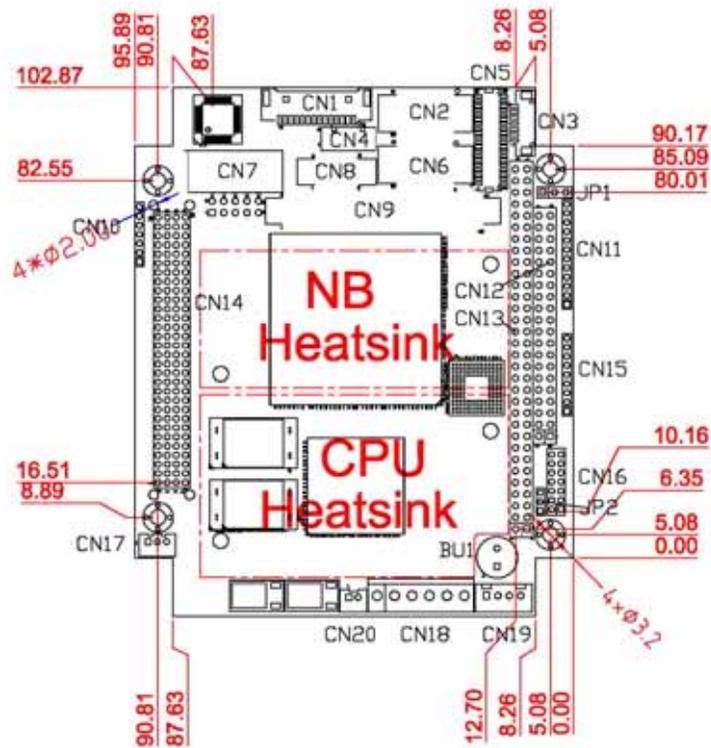


**NOTE:** *All specifications and images are subject to change without notice.*

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## Chapter 2 Jumpers and Connectors

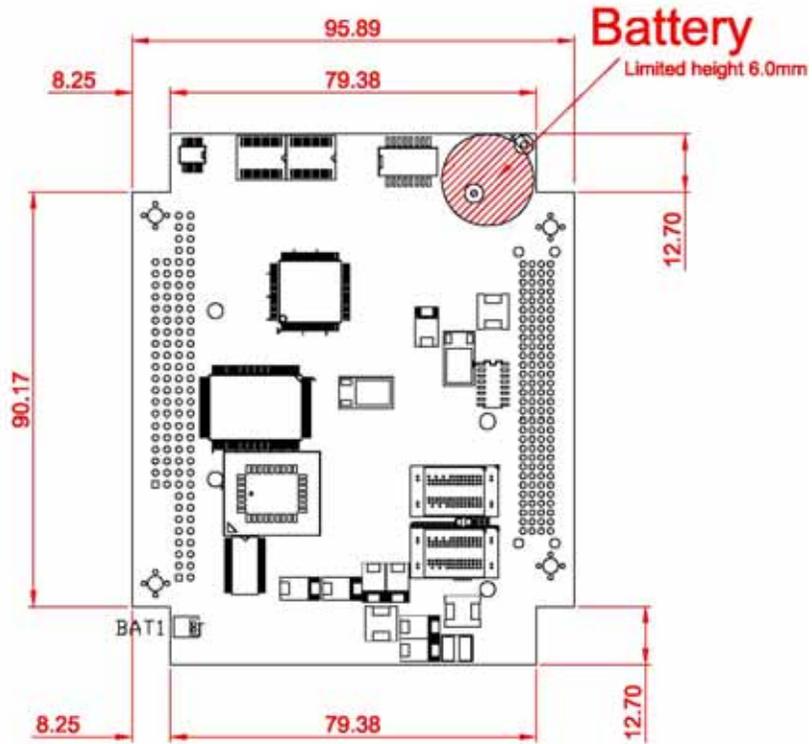
### 2.1 Board Layout



Component Side



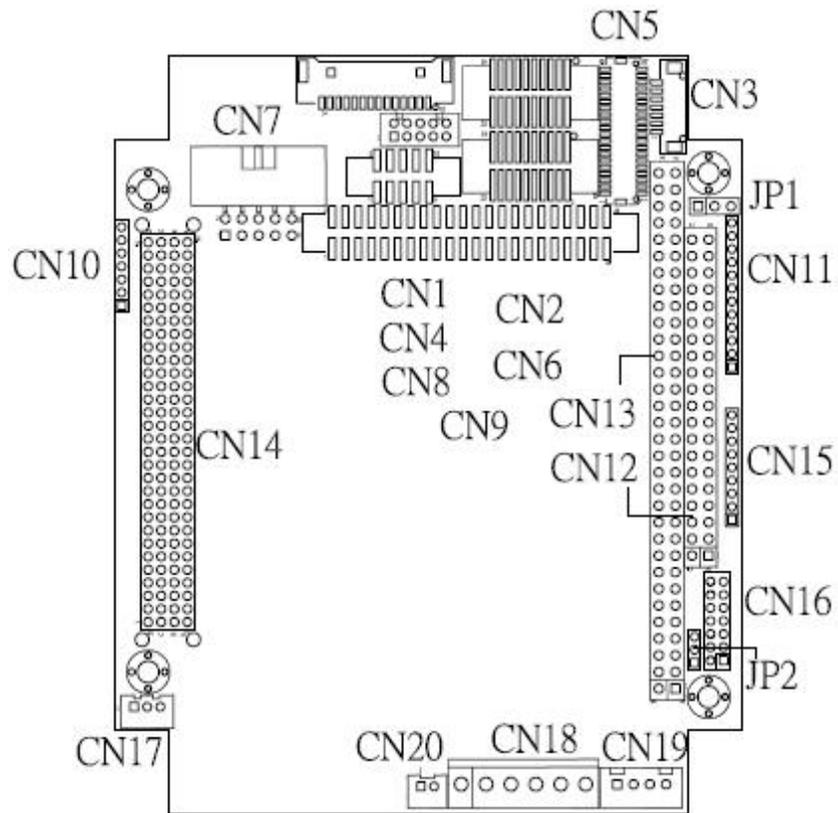
**Note:** The Limited Height of Component side is 15 mm.



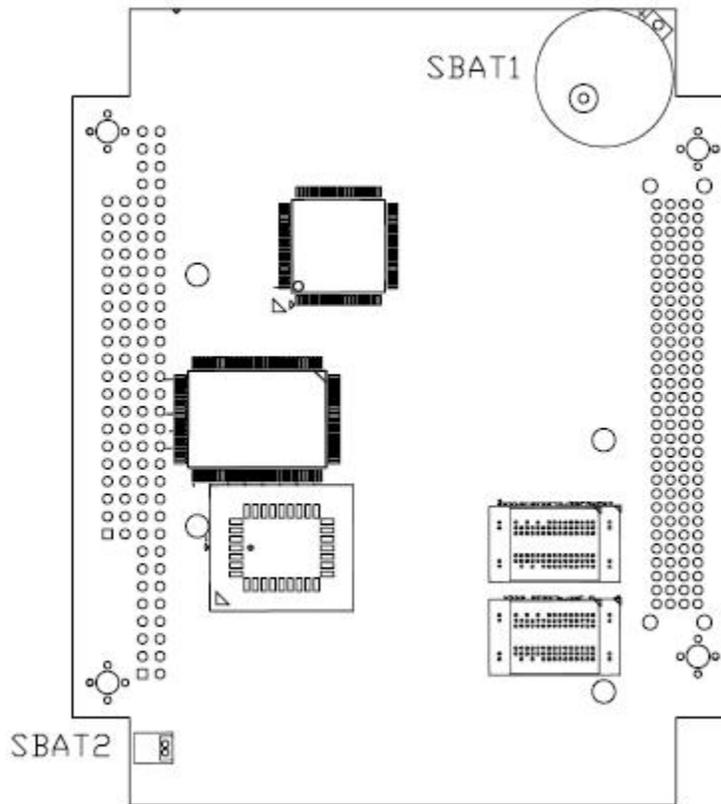
Solder Side

 **Note:** The Limited Height of Solder side: battery area is 6 mm, and the other 4.83 mm.

## 2.2 Placement



Component Side



**Solder Side**

## 2.3 Jumper Settings

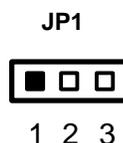
Proper jumper settings configure the **AX12270** to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

Jumper	Description	Jumper Setting
JP1	LVDS Voltage Selection Default: 3.3V	Short 1-2
JP2	Normal Operation/Clear CMOS setting Default: Normal Operation	Short 1-2
CN10	COM1 Mode Select Default: RS-232	Short 7-6
CN11	COM1 Mode Select Default: RS-232	Short 1-2, 4-5, 7-8, 10-11

### 2.3.1 LVDS Voltage Selection: JP1

This jumper is to select the voltage for LVDS interface.

Options	Settings
3.3V	Short 1-2 (default)
5V	Short 2-3



### 2.3.2 CMOS Clear Jumper: JP2

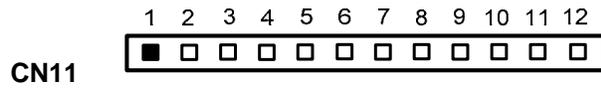
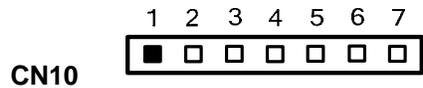
You may need to use this jumper to clear the CMOS memory if incorrect settings in the Setup Utility.

Options	Settings
Normal	Short 1-2 (default)
Clear CMOS	Short 2-3



### 2.3.3 COM1 Mode Jumpers: CN10.CN11

COM1	CN10	CN11
RS-232 (default)	7-6	1-2, 4-5, 7-8, 10-11
RS-422	1-2, 5-6	2-3, 5-6, 8-9, 11-12
RS-485	1-2, 3-4	2-3, 5-6, 8-9, 11-12



## 2.4 Connectors

Connectors connect the CPU card with other parts of the system. Make sure all connectors are properly and firmly connected. Here is a summary table shows you all connectors on the AX12270 Series.

Connectors	Label
LAN Connector	CN1
Serial Port1 Connector	CN2
Serial Port2 Connector	
LCD Backlight Connector	CN3
USB Port0 & Port1 Connector	CN4
LCD Connector	CN5
VGA/PS2 Connector	CN6
USB Port2 & Port3 Connector	CN7
Audio Connector	CN8
IDE Connector	CN9
COM1 Mode setting	CN10
COM1 Mode setting	CN11
PC104-B Slot	CN12
PC104-A Slot	CN13
PCI104 Slot	CN14
Digital I/O Connector	CN15
Front Panel Bezel Connector	CN16
SMBUS Connector	CN17
+12V & +5V Power Connector	CN18
+5V Standby & PS on Connector	CN19
CPU Fan Connector	CN20
Battery Connector	SBAT2

### 2.4.1 LVDS Backlight Connector: CN3

The 7-pin inverter connector on the SBC is a Hirose connector. It is strongly recommended to use the matching connector Hirose DF13-7S-1.25C.

Pin	Signal
1	12V
2	12V
3	5V
4	ENABLEI
5	GND
6	GND
7	GND

### 2.4.2 LVDS Flat Panel Connector: CN5

The LVDS connector on the SBC is a 40-pin connector. It is strongly recommended to use the matching connector JST SHDR-40V-S-B.

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	Channel B D3-	12	Channel B D0-
13	Channel B D3+	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-

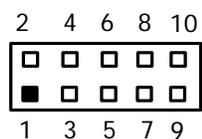
Pin	Signal	Pin	Signal
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND
41	N.C.	38	N.C.
43	N.C.	40	N.C.

### 2.4.3 USB Connectors: CN4, CN7

The 10-pin standard Universal Serial Bus (USB) connectors CN4.CN7 are for installing peripheral devices supporting the USB interface.

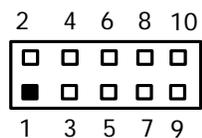
#### CN4 for USB0 and USB1

Pin	Signal	Pin	Signal
1	VCC	2	VCC
3	D0-	4	D1-
5	D0+	6	D1+
7	Ground (GND)	8	Ground (GND)
9	Ground (GND)	10	Ground (GND)



#### CN7 for USB2 and USB3

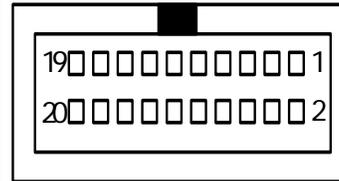
Pin	Signal	Pin	Signal
1	VCC	2	VCC
3	D2-	4	D3-
5	D2+	6	D3+
7	Ground (GND)	8	Ground (GND)
9	Ground (GND)	10	Ground (GND)



### 2.4.4 VGA & PS/2 Connector: CN6

Connector CN6 is for PS/2 Mouse/Keyboard and CRT VGA display connection.

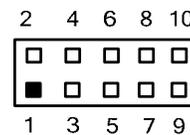
Pin	Signal	Pin	Signal
1	VCC	11	Green
2	GND	12	GND
3	Keyboard Data	13	Blue
4	Keyboard Clock	14	GND
5	N.C.	15	VCC
6	Mouse Data	16	DDC Data
7	Mouse Clock	17	DDC Clock
8	GND	18	GND
9	Red	19	Horizontal Sync
10	GND	20	Vertical Sync



### 2.4.5 Audio Connector: CN8

CN8 is a 10-pin connector to support the audio interface.

Pin	Signal	Pin	Signal
1	MIC-IN	2	GND
3	Line In L	4	GND
5	Line In R	6	GND
7	Audio Out L	8	GND
9	Audio Out R	10	GND



### 2.4.6 Ethernet Connector: CN1

CN1 is an Ethernet connector that connects the AX12270 to a 10-Base-T or 100-Base-T hub just by plugging one end of the cable to LAN1, and connecting the other end (phone jack) to a 10-Base-T or 100-Base-T hub.

Pin	Signal	Pin	Signal
1	100 LAN LED	2	VCC
3	GND	4	N.C.
5	N.C.	6	Rx- (Data reception negative)
7	N.C.	8	N.C.
9	Rx+(Data reception positive)	10	Tx- (Data transmission negative)
11	Tx+ (Data transmission positive)	12	N.C.
13	VCC	14	Active LED



### 2.4.7 IDE Interface Connector: CN9

There is one channel to support two IDE drives. Here is a list of IDE1 connector (44-pin) Pin Assignment:

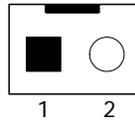
Pin	Signal	Pin	Signal	Pin	Signal
1	Reset #	2	GND	3	Data 7
4	Data 8	5	Data 6	6	Data 9
7	Data 5	8	Data 10	9	Data 4
10	Data 11	11	Data 3	12	Data 12
13	Data 2	14	Data 13	15	Data 1

Pin	Signal	Pin	Signal	Pin	Signal
16	Data 14	17	Data 0	18	Data 15
19	GND	20	N.C.	21	DREQ
22	GND	23	IOW #	24	GND
25	IOR #	26	GND	27	IORDY
28	Pull down	29	DACK#	30	GND
31	IRQ	32	N.C.	33	SA1
34	PDIAG	35	SA0	36	SA2
37	CS1 #	38	CS3 #	39	Active #
40	GND	41	VCC	42	VCC
43	GND	44	N.C.		

### 2.4.8 CPU Fan Connector: CN20

A CPU fan is always needed for cooling CPU heat. The CPU fan connector CN20 provides power to the fan.

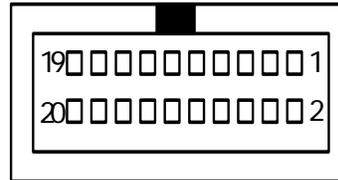
Pin	Signal
1	GND
2	+5V



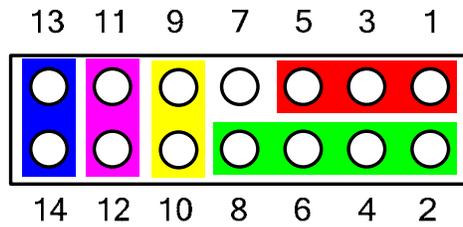
### 2.4.9 Serial Port Interface Connector: CN2

The **AX12270** has two onboard serial ports, CN2 for RS232, and CN10, CN11 for RS-232/422/485, jumper selectable.

Pin	Signal	Pin	Signal
1	NDCD2	11	NDCD4
2	NDSR2	12	NDSR4
3	NRX2	13	NRX4
4	NRTS2	14	NRTS4
5	NTX2	15	NTX4
6	NCTS2	16	NCTS4
7	NDTR2	17	NDTR4
8	NRI2	18	NRI4
9	GND	19	GND
10	N.C	20	N.C



### 2.4.10 Flat Panel Bezel Connector: CN16



#### ■ Power LED

This 3-pin connector named as Pin 1 and Pin 5 connect the system power LED indicator to such a switch on the case. Pin 1 is assigned as +, and Pin 5 as -. The Power LED lights up when the system is powered ON.

#### ■ External Speaker and Internal Buzzer Connector

Pin 2, 4, 6 and 8 can be connected to the case-mounted speaker unit or internal buzzer. While connecting the CPU card to an internal buzzer, please short pins 2-4; while connecting to an external speaker, you need to set pins 2-4 to Open and connect the speaker cable to pin 8 (+) and pin 2 (-).

#### ■ ATX Power On/Off Button

This 2-pin connector named as Pin 9 and 10 connect the front panel's ATX power button to the CPU card, which allows users to control ATX power supply to be power on/off.

#### ■ System Reset Switch

Pin 11 and 12 can be connected to the case-mounted reset switch that reboots your computer, not turns OFF the power switch. It is a better way to reboot your system for a longer life of the system's power supply.

■ **HDD Activity LED**

This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, Pin 13 assigned as -, and Pin 14 as +.

**2.4.11 PC/104 Bus Connector: CN13**

The PC/104 is an industrial standard with a compact form factor of 3.6" x 3.8" dimensions, and fully compatible with the ISA Bus. The PC/104 interface is easily adapted to off -shelf PC/104 modules, such as sound module, fax modem module and multi-I/O module.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	IOCHCHK*	2	0V	3	SD7	4	RESETDRV
5	SD6	6	+5V	7	SD5	8	IRQ9
9	SD4	10	-5V	11	SD3	12	DRQ2
13	SD2	14	-12V	15	SD1	16	ENDXFR*
17	SD0	18	+12V	19	IOCHRDY	20	(KEY)
21	AEN	22	SMEMW*	23	SA19	24	SMEMR*
25	SA18	26	IOW*	27	SA17	28	IOR *
29	SA16	30	DACK3*	31	SA15	32	DRQ3
33	SA14	34	DACK1*	35	SA13	36	DRQ1
37	SA12	38	REFRESH*	39	SA11	40	SYSCLK
41	SA10	42	IRQ7	43	SA9	44	IRQ6
45	SA8	46	IRQ5	47	SA7	48	IRQ4
49	SA6	50	IRQ3	51	SA5	52	DACK2*
53	SA4	54	TC	55	SA3	56	SALE
57	SA2	58	+5V	59	SA1	60	OSC
61	SA0	62	0V	63	0V	64	0V

### 2.4.12 PC/104 Bus Connector: CN12

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	0V	2	0V	3	MEMCS16*	4	SBHE*
5	IOCS16*	6	LA23	7	IRQ10	8	LA22
9	IRQ11	10	LA21	11	IRQ12	12	LA20
13	IRQ15	14	LA19	15	IRQ14	16	LA18
17	DACK0*	18	LA17	19	DRQ0	20	MEMR*
21	DACK5*	22	MEMW*	23	DRQ5	24	SD8
25	DACK6*	26	SD9	27	DRQ6	28	SD10
29	DACK7*	30	SD11	31	DRQ7	32	SD12
33	+5V	34	SD13	35	MASTER*	36	SD14
37	0V	38	SD15	39	0V	40	(KEY)

### 2.4.13 PCI104 Bus: CN14

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	N.C	B1	Reserved	C1	+5V	D1	AD0
A2	N.C	B2	AD2	C2	AD1	D2	+5V
A3	AD5	B3	GND	C3	AD4	D3	AD3
A4	C/BE0#	B4	AD7	C4	GND	D4	AD6
A5	GND	B5	AD9	C5	AD8	D5	GND
A6	AD11	B6	N.C	C6	AD10	D6	M66EN
A7	AD14	B7	AD13	C7	GND	D7	AD12
A8	+3.3V	B8	C/BE1#	C8	AD15	D8	+3.3V
A9	SERR#	B9	GND	C9	SB0#	D9	PAR
A10	GND	B10	PERR#	C10	+3.3V	D10	SDONE
A11	STOP*	B11	+3.3V	C11	LOCK#	D11	GND
A12	+3.3V	B12	TRDY#	C12	GND	D12	DEVSEL#
A13	FRAME#	B13	GND	C13	IRDY#	D13	+3.3V
A14	GND	B14	AD16	C14	+3.3V	D14	C/BE2#

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A15	AD18	B15	+3.3V	C15	AD17	D15	GND
A16	AD21	B16	AD20	C16	GND	D16	AD19
A17	+3.3V	B17	AD23	C17	AD22	D17	+3.3V
A18	IDSEL0	B18	GND	C18	IDSEL1	D18	IDSEL2
A19	AD24	B19	C/BE3#	C19	N.C.	D19	IDSEL3
A20	GND	B20	AD26	C20	AD25	D20	GND
A21	AD29	B21	+5V	C21	AD28	D21	AD27
A22	+5V	B22	AD30	C22	GND	D22	AD31
A23	REQ0#	B23	GND	C23	REQ1#	D23	N.C.
A24	GND	B24	REQ2#	C24	+5V	D24	GNT0#
A25	GNT1#	B25	N.C	C25	GNT2#	D25	GND
A26	+5V	B26	CLK0	C26	GND	D26	CLK1
A27	CLK2	B27	+5V	C27	CLK3	D27	GND
A28	GND	B28	INTD#	C28	+5V	D28	RST#
A29	+12V	B29	INTA#	C29	INTB#	D29	INTC#
A30	-12V	B30	Reserved	C30	Reserved	D30	GND

### 2.4.14 DIO Connector: CN15

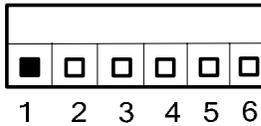
Pin	Signal
1	In-0
2	In-1
3	In-2
4	GND
5	Out-0
6	Out-1
7	Out-2
8	Out-3
9	Out-4



### 2.4.15 Power Connector 1: CN18

Use this connector to connect +12V & +5V power supply.

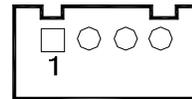
PIN	Signal
1	+12V
2	GND
3	GND
4	GND
5	+5V
6	+5V



### 2.4.16 Power Connector 2: CN19

Connector CN19 is a +5V Standby & PS On Connector.

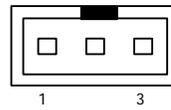
PIN	Signal	PIN	Signal
1	+5V Standby	2	GND
3	GND	4	PS_ON



### 2.4.17 SMBUS Connector: CN17

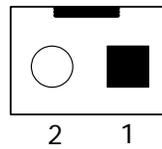
Use this connector CN17 to connect SMBUS devices.

Pin	Signal
1	CLOCK
2	DATA
3	GND



### 2.4.18 Battery Connector: SBAT2

Pin	Signal
1	Cathode
2	Anode



**MEMO**

## **Chapter 3**

### **Hardware Description**

This chapter provides you with detailed description about the **AX12270** CPU board's hardware features.

#### **3.1 Processor**

The AX12270 comes with an embedded high-performance VIA V4 compliant Eden processor. The CPU can be operated under Windows CE, Windows XP, Windows XP Embedded and Embedded Linux systems.

#### **3.2 CPU Bus Clock**

The Host Clock can be doubled inside the CPU to operate in a range of 400MHz.

#### **3.3 BIOS**

The **AX12270** uses Award Plug and Play BIOS with a single 4Mbit Flash EPROM.

#### **3.4 System Memory**

The AX12270 PC/104 CPU module supports DDR2 memory onboard with maximum system memory 256MB unbuffered SDRAMs.

### 3.5 I/O Port Address Map

The CPU card communicates via I/O ports. A total 1KB port addresses can be assigned to other devices via I/O expansion cards.

Address	Devices
000-01F	DMA controller #1
020-003	Interrupt controller #1
022-023	STPC Specific Registers
040-043	Timer Controller
060	Keyboard controller
061	Port B
064	Kbd Ctlr, CMD, STAT Byte
070	Real Time Clock
071	Real Time Clock Data
078	General Purpose I/O
080-08F	DMA page register
0A0-A1	Interrupt controller #2
0C0-0DE	DMA controller #1
0F0	Reset Numeric Error
102	VGA Setup Register
170-177	Secondary IDE Channel
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2#2 (COM2)
378-37F	Parallel Port 1
3B4, 3B5, 3BA	VGA Registers
3D4, 3D5, 3DA	VGA Registers
03C-3F5	VGA Registers
3F6	IDE Command Port
3F7	Floppy Command Port
3F8-3FF	Serial Port 1#1 (COM1)
CF8	PCI Configuration Address Registers
CFC-CFF	PCI Configuration Data Registers
46E8	VGA Add-in mode enable Register

Address	Devices
C000-C0FF	PCI Configuration Registers
3F8-3FF	Serial port #3 (COM3)
2E8-2EF	Serial port #4 (COM4)

### 3.6 Interrupt Controller

The **AX12270** is a fully PC compatible control board. The mapping list of the 16 interrupt request lines is shown as below:

NMI	Parity check error
IRQ0	System timer output
IRQ1	Keyboard
IRQ2	Interrupt rerouting from IRQ8 through IRQ15
IRQ3	Serial port #2
IRQ4	Serial port #1
IRQ5	Serial port #3
IRQ6	Floppy disk controller
IRQ7	Parallel port #1
IRQ8	Real time clock
IRQ9	Ethernet
IRQ10	Serial port #4
IRQ11	User available
IRQ12	PS/2 Mouse
IRQ13	Math coprocessor
IRQ14	Primary IDE channel
IRQ15	Secondary IDE Channel

**MEMO**

## Chapter 4

### Award BIOS Utility

The Phoenix-Award BIOS provides users with a built-in Setup program to modify basic system configuration. All configured parameters are stored in a battery-backed-up RAM (CMOS RAM) to save the Setup information whenever the power is turned off.

#### 4.1 Entering Setup

There are two ways to enter the Setup program. You may either turn ON the computer and press <Del> immediately, or press the <Del> and/or <Ctrl>, <Alt>, and <Esc> keys simultaneously when the following message appears at the bottom of the screen during POST (Power on Self Test).

TO ENTER SETUP PRESS DEL KEY

If the message disappears before you respond and you still wish to enter Setup, restart the system and try again. This is possible by turning the system power to OFF then to ON, pressing the "RESET" button on the system case, or by simultaneously pressing <Ctrl>, <Alt>, and <Del> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will be prompted with the following:

PRESS <F1> TO CONTINUE, <CTRL-ALT-ESC> OR <DEL> TO ENTER SETUP

## 4.2 Control Keys

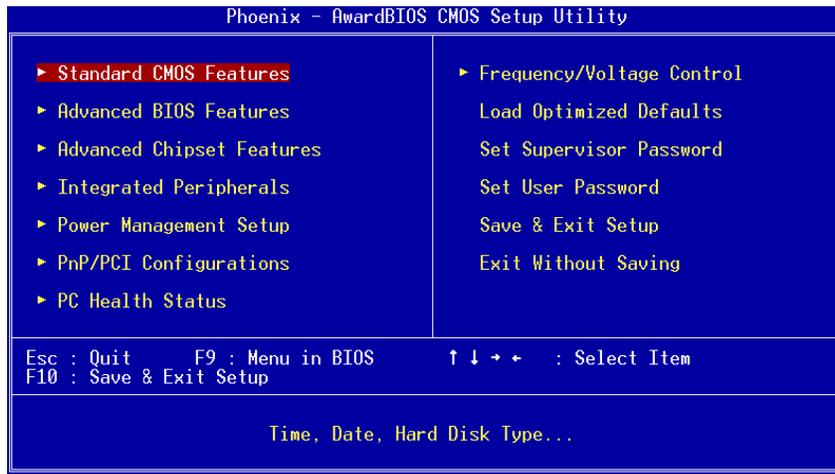
<b>Up arrow</b>	Moves cursor to the previous item
<b>Down arrow</b>	Moves cursor to the next item
<b>Left arrow</b>	Moves cursor to the item on the left hand
<b>Right arrow</b>	Move to the item in the right hand
<b>Esc key</b>	Main Menu -- Quits and deletes changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exits current page and returns to Main Menu
<b>PgUp/"+" key</b>	Increases the numeric value or makes changes
<b>PgDn/"-" key</b>	Decreases the numeric value or makes changes
<b>F1 key</b>	General help, only for Status Page Setup Menu and Option Page Setup Menu
<b>(Shift) F2 key</b>	Change color from total 16 colors. F2 to select color forward, (Shift) F2 to select color backward
<b>F3 key</b>	Reserved
<b>F4 key</b>	Reserved
<b>F5 key</b>	Restores the previous CMOS value from CMOS, only for Option Page Setup Menu
<b>F6 key</b>	Loads the default CMOS value from BIOS default table, only for Option Page Setup Menu
<b>F7 key</b>	Loads the Setup default, only for Option Page Setup Menu
<b>F8 key</b>	Reserved
<b>F9 key</b>	Reserved
<b>F10 key</b>	Saves all the CMOS changes, only for Main Menu

## 4.3 Getting Help

- **Main Menu**  
The on-line description of the highlighted setup function is displayed at the bottom of the screen.
- **Status Page Setup Menu/Option Page Setup Menu**  
Press <F1> to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <F1> or <Esc>.

## 4.4 The Main Menu

Once you enter the Award BIOS CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from ten setup functions and two exit choices. Use the arrow keys to select the setup function you intend to configure then press <Enter> to accept or enter its sub-menu.

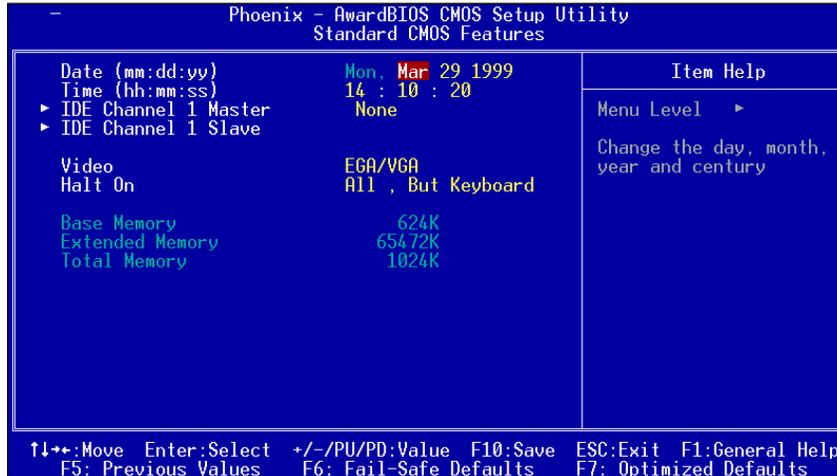


**NOTE:** If you find that your computer cannot boot after making and saving system changes with Setup, the Award BIOS, via its built-in override feature, resets your system to the CMOS default settings.

We strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your system manufacturer to provide the absolute maximum performance and reliability.

## 4.5 Standard CMOS Setup Menu

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.



- **Date**

The date format is <day>, <date> <month> <year>. Press <F3> to show the calendar.

<b>day</b>	The day of week, from Sun to Sat, determined by the BIOS, is read only
<b>date</b>	The date, from 1 to 31 (or the maximum allowed in the month), can key in the numerical / function key
<b>month</b>	The month, Jan through Dec.
<b>year</b>	The year, depends on the year of BIOS

- **Time**

The time format is <hour> <minute> <second> accepting either functions key or numerical key. The time is calculated based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.

- **IDE Primary Master/Primary Slave**

The categories identify the types of one channel that have been installed in the computer. There are 45 predefined types and 2 users definable types are for Enhanced IDE BIOS. Type 1 to Type 45 is predefined. Type User is user-definable.

Press <PgUp>/<+> or <PgDn>/<-> to select a numbered hard disk type or type the number and press <Enter>. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information within this category. If your hard disk drive type does not match or is not listed, you can use Type User to define your own drive type manually.

If you select Type User, related information is asked to be entered to the following items. Enter the information directly from the keyboard and press <Enter>. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.

If the controller of HDD interface is ESDI, select "Type 1".

If the controller of HDD interface is SCSI, select "None".

If the controller of HDD interface is CD-ROM, select "None".

<b>CYLS.</b>	number of cylinders	<b>LANDZONE</b>	landing zone
<b>HEADS</b>	number of heads	<b>SECTORS</b>	number of sectors
<b>PRECOMP</b>	write precom	<b>MODE</b>	HDD access mode

If there is no hard disk drive installed, select NONE and press <Enter>.

- **Halt On**

This field determines whether the system will halt if an error is detected during power up.

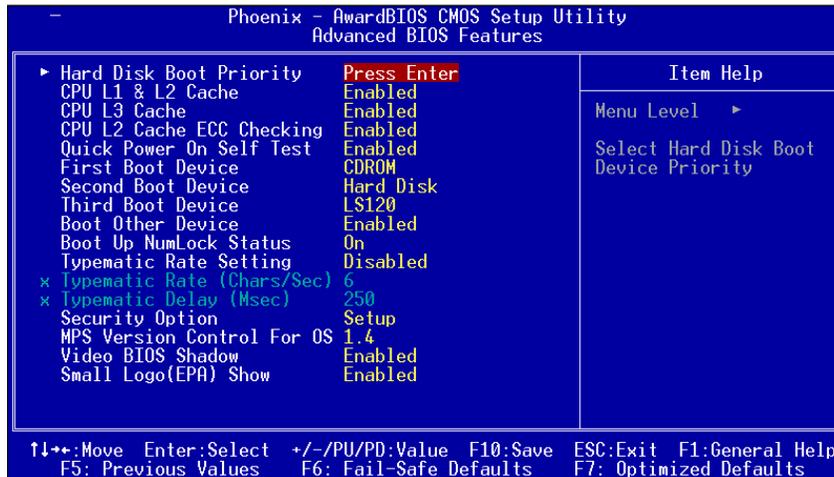
<b>No errors</b>	The system boot will halt on any error detected. (default)
<b>All errors</b>	Whenever the BIOS detect a non-fatal error, the system will stop and you will be prompted.
<b>All, But Keyboard</b>	The system boot will not stop for a keyboard error; it will stop for all other errors.

All, But Diskette	The system boot will not stop for a disk error; it will stop for all other errors.
All, But Disk/Key	The system boot will not stop for a keyboard or disk error; it will stop for all other errors.

Press <Esc> to return to the Main Menu page.

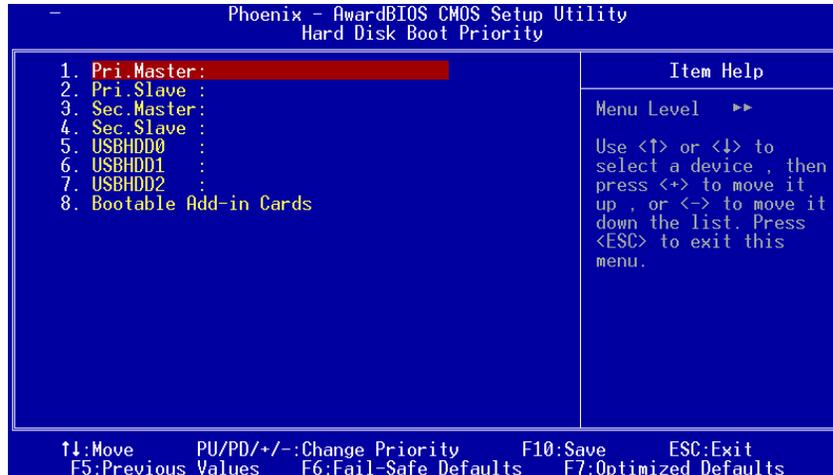
## 4.6 Advanced BIOS Features

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.



- **Hard Disk Boot Priority**

Scroll to this item and press <Enter> to view the sub menu to decide the disk boot priority.



Press <Esc> to return to the Advanced BIOS Features page.

- **CPU L1 & L2 Cache /L3 Cache**

These items enable or disable the actual CPU internal level 1/2 cache or level 3 cache function. Leave these items at default value for better performance.

Enabled	Enable cache
Disabled	Disable cache

- **Quick Power On Self Test**

This option speeds up Power on Self Test (POST) after you turn on the system power. If set as Enabled, BIOS will shorten or skip some check items during POST. The default setting is "Enabled".

Enabled	Enable Quick POST
Disabled	Normal POST

- **First/Second/Third Boot Device**

These items allow the selection of the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> devices that the system will search for during its boot-up sequence. The wide range of selection includes Floppy, LS120, ZIP100, HDD0~3, SCSI, and CDROM.

- **Boot Other Device**

This item allows the user to enable/disable the boot device not listed on the First/Second/Third boot devices option above. The default setting is **Enabled**.

- **Boot Up NumLock Status**

Selects power on state for NumLock. The default value is "On".

- **Typematic Rate Setting**

This determines the typematic rate of the keyboard. The default value is "Disabled".

<b>Enabled</b>	Enable typematic rate and typematic delay programming
<b>Disabled</b>	Disable typematic rate and typematic delay programming. The system BIOS will use default value of these 2 items and the default is controlled by keyboard.

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

This option refers to the number of characters the keyboard can type per second. The default value is "6".

<b>6</b>	6 characters per second
<b>8</b>	8 characters per second
<b>10</b>	10 characters per second
<b>12</b>	12 characters per second
<b>15</b>	15 characters per second
<b>20</b>	20 characters per second
<b>24</b>	24 characters per second
<b>30</b>	30 characters per second

- **Typematic Delay (Msec)**

This option sets the display time interval from the first to the second character when holding a key. The default value is "250".

<b>250</b>	250 msec
<b>500</b>	500 msec
<b>750</b>	750 msec
<b>1000</b>	1000 msec

- **Security Option**

This item allows you to limit access to the system and Setup, or just to Setup. The default value is "Setup".

<b>System</b>	The system will not boot and access to Setup will be denied if the incorrect password is entered at the prompt.
<b>Setup</b>	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, just press <Enter> and it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.*

- **MPS Version Control For OS**

This item specifies the version of the Multiprocessor Specification (MPS). Version 1.4 has extended configuration tables to improve support for multiple PCI bus configurations and provide future expandability.

- **Video BIOS Shadow**

Enable this parameter to turn on BIOS ROM shadowing for the block of memory normally used for standard VGA video ROM code.

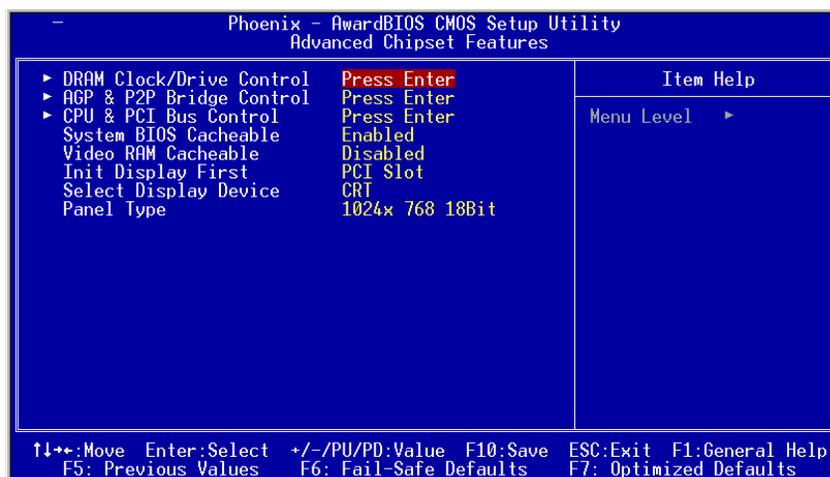
- **Small Logo (EPA) Show**

Set the Logo (EPA) show or not. The default value is "**Disabled**".

Press <Esc> to return to the Main Menu page.

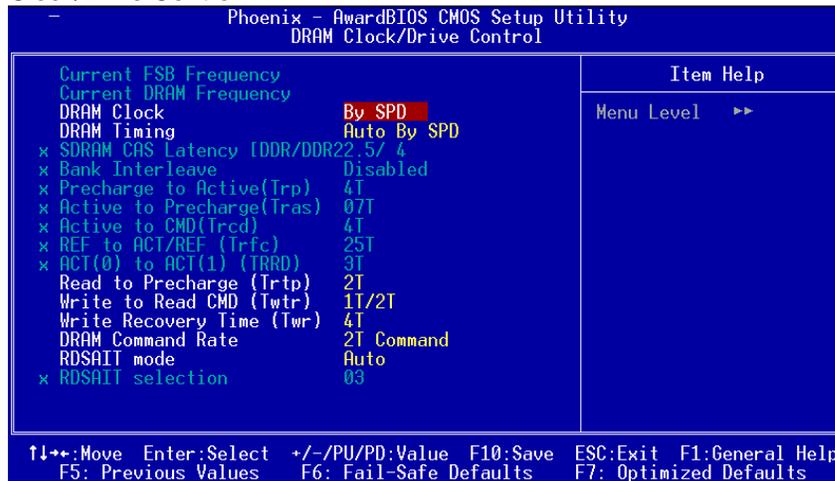
## 4.7 Advanced Chipset Features

Since the features in this section are related to the chipset on the CPU board and are completely optimized, you are not recommended to change the default settings in this setup table unless you are well oriented with the chipset features.



- **DRAM Clock/Drive Control**

Scroll to this item and press <Enter> to view the sub menu DRAM Clock/Drive Control.



- **Current FSB/DRAM Frequency**

These items allow you to manually determine CPU Front-Side Bus (FSB) and memory speed.

- **DRAM Clock**

Use this item to adjust memory speed. Option **By SPD** (Serial Detect Presence) makes it possible to do an automatic selection.

- **DRAM Timing**

Use this item to increase the timing of the memory. This is related to the cooling of memory.

- **Read to Precharge (Trtp)**

Use this item to adjust time interval between a read and a precharge command.

- **Write to Read CMD (Twtr)**

The default time setting is 1T/2T.

- **Write Recovery Time (Twr)**

Use this item to specify the time (in cycles of clock) necessarily

inserted between the operation of valid writing memory and a cooling report.

- **DRAM Command Rate**

Use this item to manually define the chipset-to-memory latency values.

- **RDSAIT Mode**

This item is to select the RDSAIT mode auto or manual.

Press <Esc> to return to the Advanced Chipset Features page.

- **AGP & P2P Bridge Control**

Use this item to set AGP and P2P Bridge controls for allocating system RAM amount to AGP for video purposes.

- **CPU & PCI Bus Control**

Use this item to enable the immediate Write to PCI Bus, or disable it for a later execution.

- **System BIOS Cacheable**

Use this item to enable or disable the system BIOS cache.

- **Video RAM Cacheable**

Use this item to enable or disable the video RAM cache.

- **Init Display First**

If two video cards are used (1 AGP and 1 PCI), use this item to specify one of them as the primary display adapter. The default is PCI Slot.

- **Select Display Device**

This item allows you to select the output for your system display. Configuration options: [CRT] [Flat Panel] [Panel +CRT].

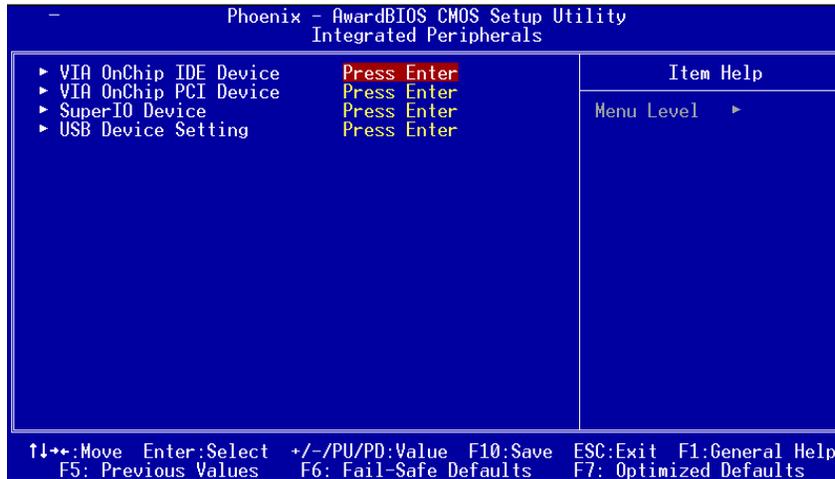
- **Panel Type**

This setting refers to the native resolution of the display.

Press <Esc> to return to the Main Menu page.

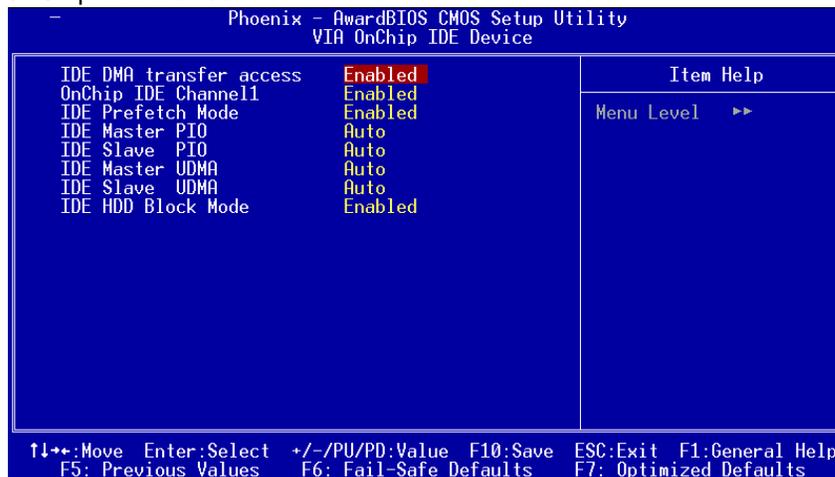
## 4.8 Integrated Peripherals

This section allows you to configure your SuperIO Device, IDE Function, Onboard Device, and ITE8888.



- **VIA OnChip IDE Device**

Scroll to this item and press <Enter> to view the sub menu VIA OnChip IDE Device.

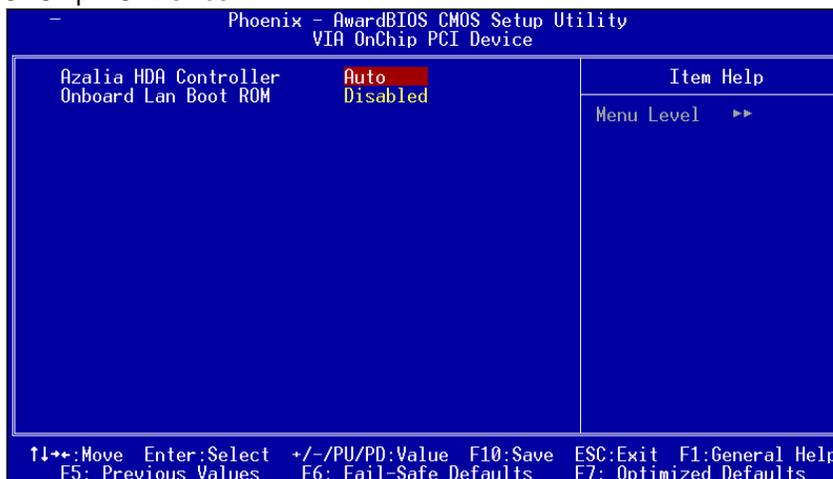


- **IDE DMA transfer access**  
Automatic data transfer between system memory and IDE device with minimum CPU intervention. This improves data throughput and frees CPU to perform other tasks.
- **OnChip IDE Channel0/1**  
The board supports two channel of ordinary IDE interface. Select "Enabled" to activate each channel separately.
- **IDE Prefetch Mode**  
Selecting "Enabled" reduces latency between each drive read/write cycle, but may cause instability in IDE subsystems that cannot support such fast performance. If you are getting disk drive errors, try setting this value to Disabled. This field does not appear when the Internal PCI/IDE field, above, is Disabled.
- **IDE Master/Slave PIO**  
The four 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 to 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.
- **IDE Master/Slave UDMA**  
Select the mode of operation for the IDE drive. Ultra DMA-33/66/100/133 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver. If your hard drive and your system software both support Ultra DMA-33/66/100/133, select Auto to enable UDMA mode by BIOS.
- **IDE HDD Block Mode**  
Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your 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.

Press <Esc> to return to the Integrated Peripherals page.

- **VIA OnChip PCI Device**

Scroll to this item and press <Enter> to view the sub menu VIA OnChip PCI Device.

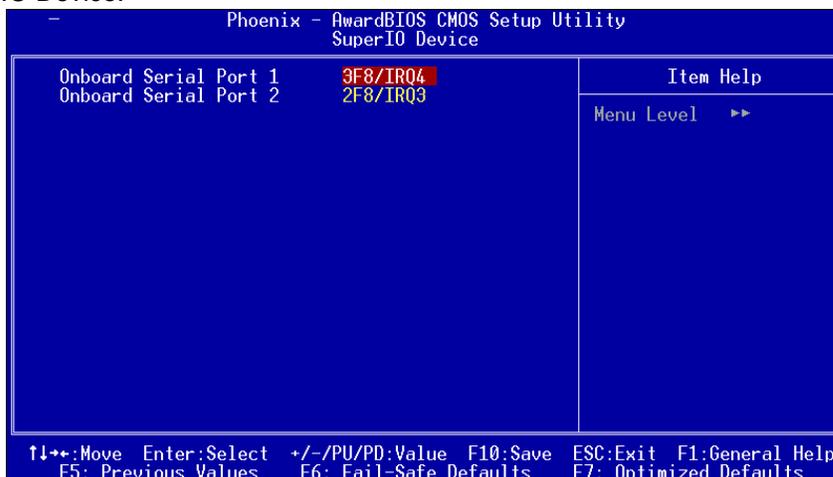


- **Azalia HDA Controller**  
This item allows you to disable or set the Azalia HDA Controller (High Definition Audio).
- **Onboard Lan Boot ROM**  
Use this item to enables the onboard LAN Boot feature.

Press <Esc> to return to the Integrated Peripherals page.

- **Super IO Device**

Scroll to this item and press <Enter> to view the sub menu Super IO Device.



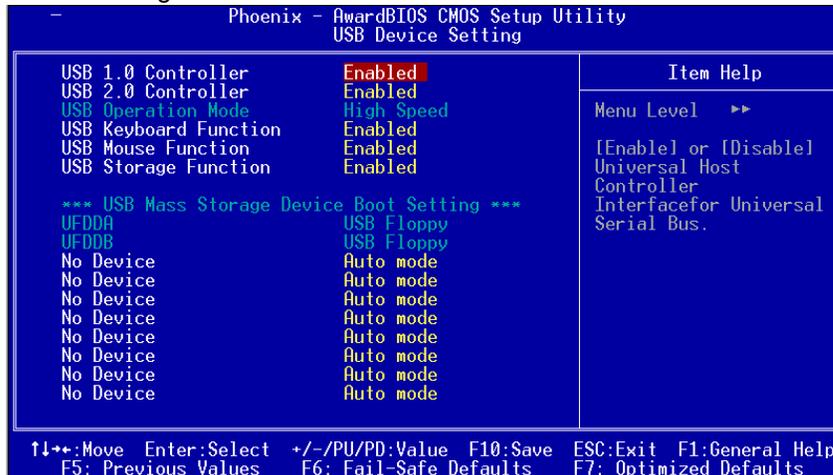
- **Onboard Serial Port 1 / 2**

Select an address and corresponding interrupt for the serial port. Options: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

Press <Esc> to return to the Integrated Peripherals page.

- **USB Device Setting**

Scroll to this item and press <Enter> to view the sub menu USB Device Setting.

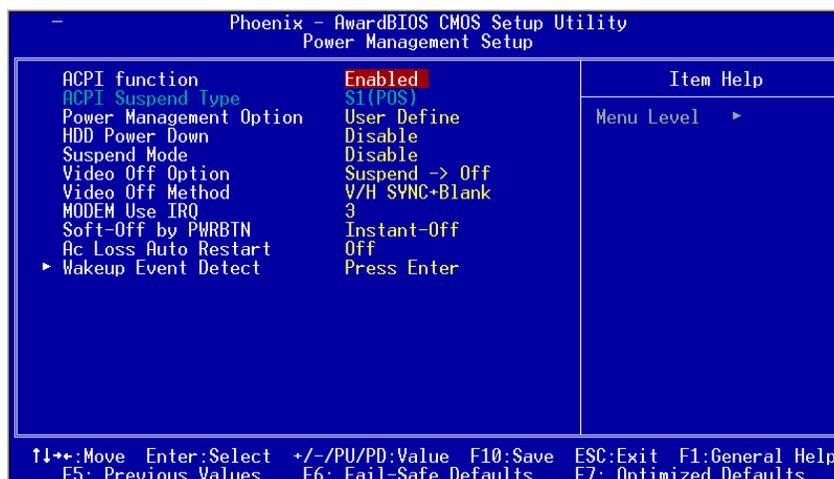


- > **USB1.1 Controller**  
This setting is used to enable/disable the onboard USB 1.1 controller.
- > **USB 2.0 Controller**  
This setting is used to enable/disable the onboard USB 2.0 controller.
- > **USB Operation Mode**  
This setting controls the USB operation speed.
- > **USB Keyboard / Mouse / Storage Function**  
Set to [Enabled] if your need to use a USB-interfaced keyboard/mouse/storage device in the operating system that does not support or have any USB driver installed, such as DOS and SCO Unix.

Press <Esc> to return to the Integrated Peripherals, and next to the Main Menu page.

## 4.9 Power Management Setup

The Power Management Setup allows you to save energy of your system effectively. It will shut down the hard disk and turn OFF video display after a period of inactivity.



- ACPI Function**  
 This item allows you to enable/disable the Advanced Configuration and Power Management (ACPI). The function is always Enabled.
- ACPI Suspend Type**  
 This item specifies the power saving modes for ACPI function. It only supports S1:  
 [S1(POS)] The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system context.
- Power Management**  
 This option allows you to select the type of power Management. The options available are APM, ACPI.
- HDD Power Down**  
 If HDD activity is not detected for the length of time specified in this field, the hard disk drive will be powered down while all other devices remain active.

- **Suspend Mode**

After the selected period of system inactivity (1 minute to 1 hour), all devices except the CPU shut off. The default value is "Disabled".

<b>Disabled</b>	System will never enter SUSPEND mode
<b>1/2/4/6/8/10/20/30/40 Min/1 Hr</b>	Defines the continuous idle time before the system entering SUSPEND mode. If any item defined in (J) is enabled & active, SUSPEND timer will be reloaded

- **Video Off Option**

This setting is used to control the mode in which the monitor will shut down. Setting options are:

<b>Always On</b>	Monitor remains on during power-saving modes.
<b>Suspend → Off</b>	Monitor blanked when system enters Suspend mode.
<b>Susp, Stby → Off</b>	Monitor blanked when system enters either Suspend or Standby mode.
<b>All Modes → Off</b>	Monitor blanked when system enters any power saving.

- **Video Off Method**

This setting determines the manner in which the monitor is blanked.

- **Modem Use IRQ**

<b>3, 4, 5, 7, 9, 10, 11, NA</b>	For external modem, 3 or 4 will be used for card type modem. It is up to card definition. Default is 3.
--------------------------------------	---

- **Soft-Off by PWRBTN**

This feature allows users to configure the power button function. Settings are:

<b>Instant-Off</b>	This option follows the conventional manner systems perform when power is turned OFF. Instant-Off is a soft power OFF sequence requiring only the switching of the power supply button to OFF
<b>Delay 4 Sec.</b>	Upon turning OFF system from the power switch, this option will delay the complete system power OFF sequence by approximately 4 seconds. Within this delay period, system will temporarily enter into Suspend Mode enabling you to restart the system at once.

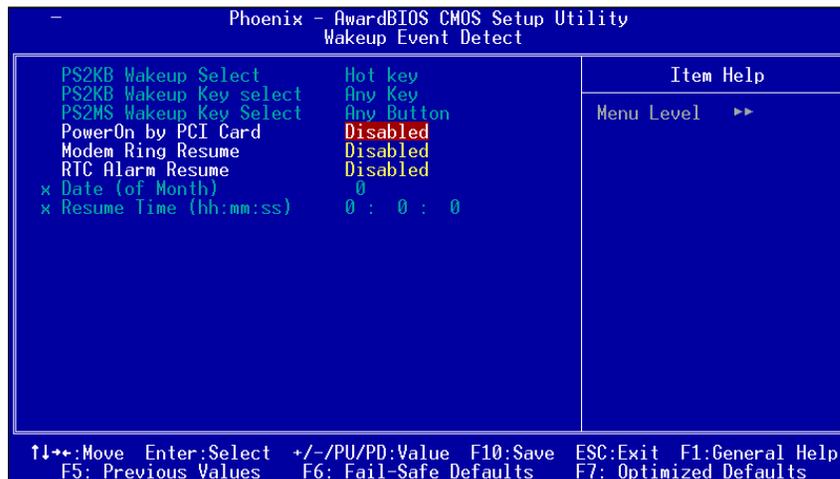
- **Ac Loss Auto Restart**

This setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

<b>Off</b>	Leaves the computer in the power off state.
<b>On</b>	Leaves the computer in the power on state.
<b>Former-sts</b>	Restores the system to the status before power failure or interrupt occurred.

- **Wakeup Event Detect**

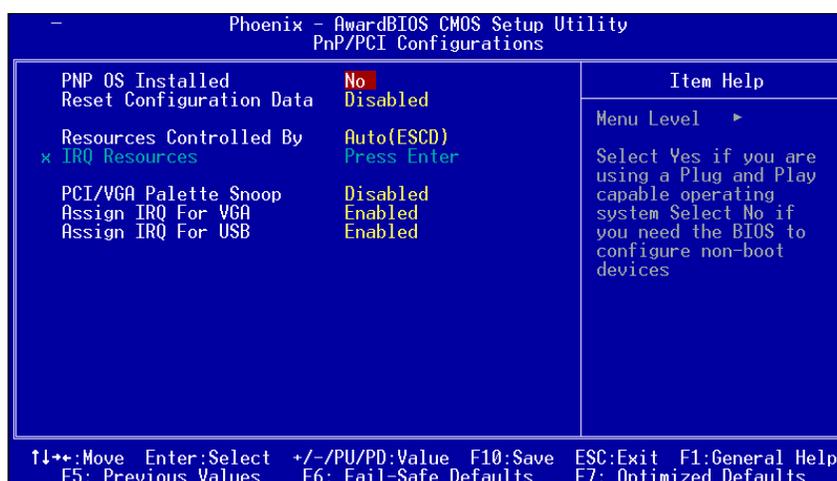
Scroll to this item and press <Enter> to view the sub menu Wakeup Event Detect.



- **PS2 KB Wakeup Select**  
The item specifies how the system will be awakened from power saving mode when input signal of the PS2 keyboard is detected. Use the <PageUp> & <PageDown> keys to select the options. When selecting [Password], enter the desired password.
- **PS2 KB Wakeup Key Select**  
This setting only works when **PS2 KB Wakeup Select** is set to [Hot Key].
- **PS2 MS Wakeup Key Select**  
This setting determines whether the system will be awakened from power saving modes when input signal of the PS/2 mouse is detected.
- **Power On by PCI Card**  
When setting to [Enabled], this setting allows your system to be awakened from the power saving modes through any event on PCI PME (Power Management Event).
- **Modem Ring Resume**  
This item enables the modem ring to wake up the computer system from a power saving mode.
- **RTC Alarm Resume**  
When [Enabled], you can set the date and time at which the RTC (real-time clock) alarm awakens the system from suspend mode.
- **Date (of Month)**  
When **RTC Alarm Resume** is set to [Enabled], the field specifies the month for it.
- **Resume Time (hh:mm:ss)**  
You can choose what hour, minute and second the system will boot up.

## 4.10 PnP/PCI Configuration Setup

This section describes configuring the PCI bus system. PCI, or Personal Computer Interconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.



- PNP OS Installed**  
 Select Yes if the system operating environment is Plug-and-Play aware (e.g., Windows 95). The default value is "No".
- Reset Configuration Data**  
 Normally, you leave this field Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup or if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system can not boot. The options available are Enabled and Disabled.
- Resources Controlled By**  
 The Award Plug and Play BIOS can automatically configure all the boot and Plug and Play-compatible devices. If you select Auto, all the interrupt request (IRQ), DMA assignment, and Used DMA fields disappear, as the BIOS automatically assigns them. The default

value is *“Manual”*.

- **IRQ Resources**

When resources are controlled manually, assign each system interrupt as one of the following types, depending on the type of device using the interrupt:

1. Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific interrupt (such as IRQ4 for serial port 1).
2. PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

The default value is *“PCI/ISA PnP”*.

- **PCI/VGA Palette Snoop**

Some non-standard VGA display cards may not show colors properly. This field allows you to set whether MPEG ISA/VESA VGA Cards can work with PCI/VGA or not. When enabled, a PCI/VGA can work with a MPEG ISA/VESA VGA card. When disabled, a PCI/VGA cannot work with a MPEG ISA/VESA Card.

- **Assign IRQ For VGA**

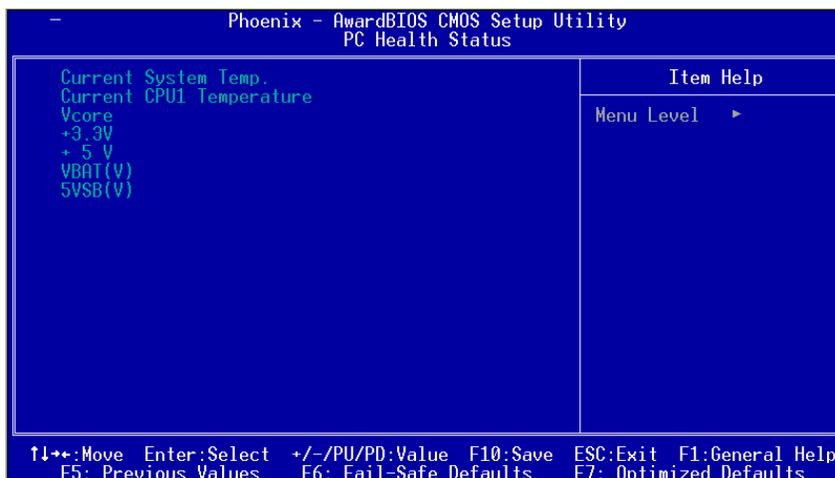
The Enabled item allows the BIOS to auto-route an IRQ for use by a VGA card.

- **Assign IRQ For USB**

It enables or disables IRQ allocation for the USB (Universal Serial Bus). Enable this if you are using a USB device.

## 4.11 PC Health Status

This section describes about the hardware monitoring that lets you monitor the parameters for critical voltages, critical temperatures, and fan speeds.

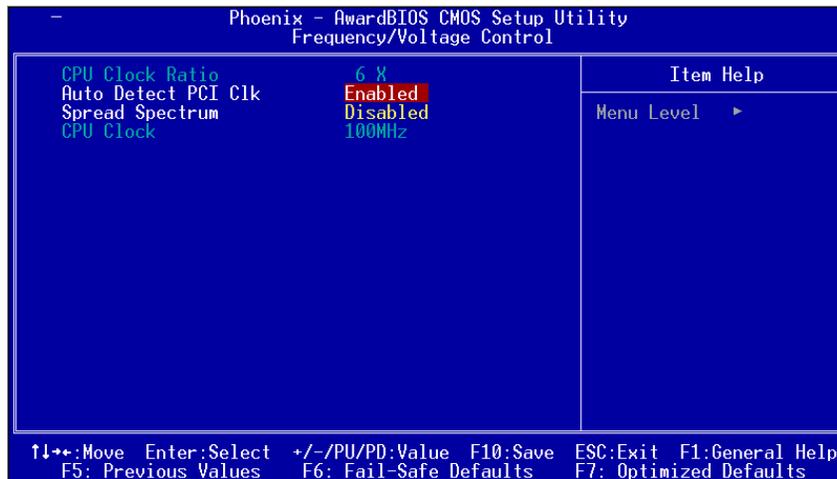


- **Current CPU Temperature**

These read-only fields reflect the functions of the hardware thermal sensor that monitors the chip blocks and system temperatures to ensure the system is stable.

## 4.12 Frequency/Voltage Control

This section is to control the CPU frequency and Supply Voltage, DIMM OverVoltage and AGP voltage.



- **CPU Clock Ratio**  
This item shows the multiplier of the CPU.
- **Auto Detect PCI Clk**  
The enabled item can automatically disable the clock source for a PCI slot which does not have a module in it, reducing EMI (ElectroMagnetic Interference).
- **Spread Spectrum**  
If spread spectrum is enabled, EMI (ElectroMagnetic Interference) generated by the system can be significantly reduced.
- **CPU Clock**  
This item shows the CPU's clock.

### **4.13 Load Optimized Defaults**

This option allows you to load the default values to your system configuration. These default settings are optimal and enable all high performance features. To load BIOS defaults value to CMOS SRAM, enter "Y". If not, enter "N".

### **4.14 Set Supervisor/User Password**

You can set either supervisor or user password, or both of them. The differences between are:

1. **Supervisor password:** can enter and change the options of the setup menus.
2. **User password:** just can enter but do not have the right to change the options of the setup menus.

When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

**ENTER PASSWORD:**

Type the password with eight characters at most, and press <Enter>. The password typed will now 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 password, just press <Enter> when you are prompted to enter password. A message will confirm the password being disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

**PASSWORD DISABLED.**

When a password is enabled, you have to type it every time you enter Setup. This prevents any unauthorized person from changing your system configuration.

Additionally when a password is enabled, you can also require the BIOS to request a password every time the system reboots. 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. If the Security option is set to "System", the password is required during boot up and entry into Setup. If set as "Setup", prompting will only occur prior to entering Setup.

### **4.15 Save & Exit Setup**

This allows you to determine whether or not to accept the modifications. Typing "Y" quits the setup utility and saves all changes into the CMOS memory. Typing "N" brings you back to Setup utility.

### **4.16 Exit Without Saving**

Select this option to exit the Setup utility without saving the changes you have made in this session. Typing "Y" will quit the Setup utility without saving the modifications. Typing "N" will return you to Setup utility.

***MEMO***

## Appendix A Watchdog Timer

### Watdog Timer Setting

After the system stops working for a while, it can be auto-reset by the Watchdog Timer. The integrated Watchdog Timer can be set up in the system reset mode by program.

- Timeout Value Range
  - 1 to 255
  - Second
- Program Sample

Watchdog Timer can be set to system reset after 5-second timeout.

2E, 87	Enter the extended function mode
2E, 87	Enter the extended function mode
2E, 07	
2F, 08	Logical Device 8
2E, 29	
2F, 20	Set WDT Funtion Enable
2E F3	
2F N	0 or 4
2E, F4	
2F, M	M=00~FF
2E, 30	Activate
2F, 01	
Q	Quite

## Using the Watchdog Function

Start	
↓	
Un-Lock WDT	: O 2E 87 ; Un-lock super I/O O 2E 87 ; Un-lock super I/O
↓	
Select Logic device	: O 2E 07 O 2F 08
↓	
Set WDT Funtion	: O 2E 29 O 2F 20
↓	
Set Second or Minute	: O 2E F3 O 2F N =00 or 04(See below table)
↓	
Set base timer	: O 2E F4 O 2F M=00,01,02,...FF(Hex) ,Value=0 to 255
↓	
IF No re-set timer	: WDT time-out, generate RESET
IF to disable WDT	: O 2E 30 O 2F 00 ; Can be disable at any time
Activate WDT	: O 2E 30 O 2F 01

M	N=0	M	N=0	M	N=0	M	N=4
02	1sec	33	50sec	B5	180sec	11	992sec
03	2sec	38	55sec	BF	190sec	22	2012sec
04	3sec	3D	60sec	C9	200sec	33	3032sec
05	4sec	42	65sec	D3	210sec	43	3992sec
06	5sec	47	70sec	DD	220sec	54	5012sec
07	6sec	4C	75sec	E7	230sec	65	6032sec
08	7sec	51	80sec	F1	240sec	75	6992sec
09	8sec	56	85sec	FB	250sec	86	8012sec
M	N=0	M	N=0	M	N=4	M	N=4
0B	10sec	65	100sec	05	272sec	97	9032sec
10	15sec	6F	110sec	06	332sec	A7	9992sec
15	20sec	79	120sec	07	392sec	B8	11012sec
1A	25sec	83	130sec	08	452sec	C9	12032sec
1F	30sec	8D	140sec	09	512sec	D9	12992sec
24	35sec	97	150sec	0A	572sec	EA	14012sec
29	40sec	A1	160sec	0B	632sec	FB	15032sec
2E	45sec	AB	170sec	0C	692sec		

**MEMO**

## Appendix B

### Digital I/O

#### Digital I/O Software Programming

- GPI program sample:

<b>O 2E 87</b>	Extended Functions Enable Register
<b>O 2E 87</b>	Extended Functions Enable Register
<b>o 2e 07</b>	EFIR=EFER (Extended Functions Index Register) point to Logical Device Number Reg.
<b>o 2f 07</b>	EFDR=EFIR+1 (select logical device 7, GPIO in logical device 7 )
<b>O 2E 29</b>	Select CR29
<b>o 2f 80</b>	(Define the PINs to be GPIO or Game Port 1) "80" Pin121 ~ 128 set GPIO
<b>o 2e 30</b>	Select CR30 (Active or inactive)
<b>o 2f 01</b>	Set 01 (Active), 00 (inactive)
<b>o 2e f0</b>	Select CRF0 (Set the PINs to be GPO or GPI Function)
<b>o 2f ff</b>	Set the PINs to be GPI
<b>o 2e f1</b>	Select CRF1 (Set the PINs to be Read only??)
<b>i 2f</b>	Show the PINs Status
<b>FE</b>	Indicate GPO15 (CN15 Pin3) tie Low , other ties, High
<b>q</b>	Quit debug

- GPO program sample:

<b>O 2e 87</b>	Extended Functions Enable Register
<b>O 2e 87</b>	Extended Functions Enable Register
<b>o 2e 07</b>	EFIR=EFER (Extended Functions Index Register) point to Logical Device Number Reg.
<b>o 2f 07</b>	EFDR=EFIR+1 (select logical device 7, GPIO in logical device 7 )
<b>O 2e 29</b>	Select CR29
<b>o 2f 80</b>	(Define the PINs to be GPIO or Game Port 1) "80" Pin121 ~ 128 set GPIO
<b>o 2e 30</b>	Select CR30 (Active or inactive)
<b>o 2f 01</b>	Set 01 (Active), 00 (inactive)
<b>o 2e f0</b>	Select CRF0 (Set the PINs to be GPO or GPI Function)
<b>o 2f 00</b>	Set the PINs to be GPO
<b>o 2e f1</b>	Select CRF1 (Set the PINs to be Read only??)
<b>o 2f 00</b>	Set the PINs to be R/W
<b>o 2e f2</b>	Select CRF2 (Output High / Low)
<b>o 2f 00</b>	Set the PINs to be all Low Level (FF=all High Level)
<b>q</b>	Quit debug