



AX12280
Intel[®] 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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MEMO

Chapter 1

Introduction



The **AX12280** is the powerful engine of PC/104 form factor CPU Module. It comes with high-performance supports Intel[®] Celeron[®]-M processors onboard at FSB 400 MHz (Intel[®] ULV Celeron[®] M processor 600 MHz/512K, 1 GHz/0K, 1 GHz/512K). The board integrates Intel[®] 910GML + ICH6M chipsets and ITE8888G PCI-to-ISA bridge that support LVDS + CRT, DualView with different content and resolution, USB DOM support as SSD, and PC/104-Plus for both 16-bit ISA and 32-bit PCI expansion, It provides Gigabit/Fast Ethernet, AC'97 codec audio, four USB2.0 ports, one PATA IDE port, two serial ports for RS-232, one P/S2 port for Keyboard/ Mouse, and a digital I/O. It can achieve the best stability and reliability that makes your system perform the most endurable operation in any critical environments. The built-in Watchdog Timer has enhanced the system reliability that achieves a unique feature to distinguish itself from other boards.

1.1 Specifications

- **CPU: ULV Intel® Celeron® M processors**
 - Intel® ULV Celeron® M processor 600 MHz/512K, 1 GHz/0K, 1 GHz/512K)
- **System Chipset: Intel® 910GML E & ICH6M**
- **BIOS**
 - Phoenix-Award BIOS, Y2K compliant
 - 4Mbit Flash, DMI, Plug and Play
 - PXE Ethernet Boot ROM
 - SmartView for multiple LCD type selection, display mode option and application extension features
 - RPL/PXE Ethernet Boot ROM
 - "Load Optimized Default" customized Setting in the BIOS flash chip to prevent from CMOS battery fail
- **System Memory**
 - One 200-pin DDR2-400 SODIMM sockets
 - Maximum to 1 GB DDR2 memory
- **L2 Cache:** integrated in CPU
- **Onboard SATA**
 - Two ports SATA connector
 - Data transfer rates up to 1.5 Gb/s
- **Onboard Multi-I/O**
 - Two Serial Ports RS-232
- **USB Interface**
 - Four USB ports with fuse protection and complies with USB Spec. Rev. 2.0
- **Watchdog Timer**
 - 1~255 seconds; up to 255 levels
- **Graphics**
 - Mobile Intel® Graphics Media Accelerator 900
 - Maximum up to 128MB Dynamic Video Memory Technology

(DVMT 3.0)

- LVDS port from Integrated Digital LVDS interface for 18-bit single/dual channel LVDS as 1* 40-pin connector and 1* 7-pin inverter connector
- Maximum display resolution:
 - ◆ CRT: 2048 x 1536
 - ◆ LVDS: 1400 x 1050 (18-bit single/dual channel LVDS interface)
- **Ethernet**
 - Co-layout RTL8111B/8111C via PCIe x 1 for Gigabit/Fast Ethernet
 - Equipped with RJ-45 interface
- **Audio**
 - AC'97 codec audio
 - MIC-in, Line-in, Line-out
- **Expansion Interface**
 - PC/104 for 16-Bit ISA Bus Expansion
 - PCI-104 for 32-Bit/33 MHz PCI Bus Expansion
- **Power Management**
 - ACPI (Advanced Configuration and Power Interface)
 - Power supply voltage: +5 V (4.75 ~ 5.25 V)
- **Form Factor**
 - PC/104-Plus form factor



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

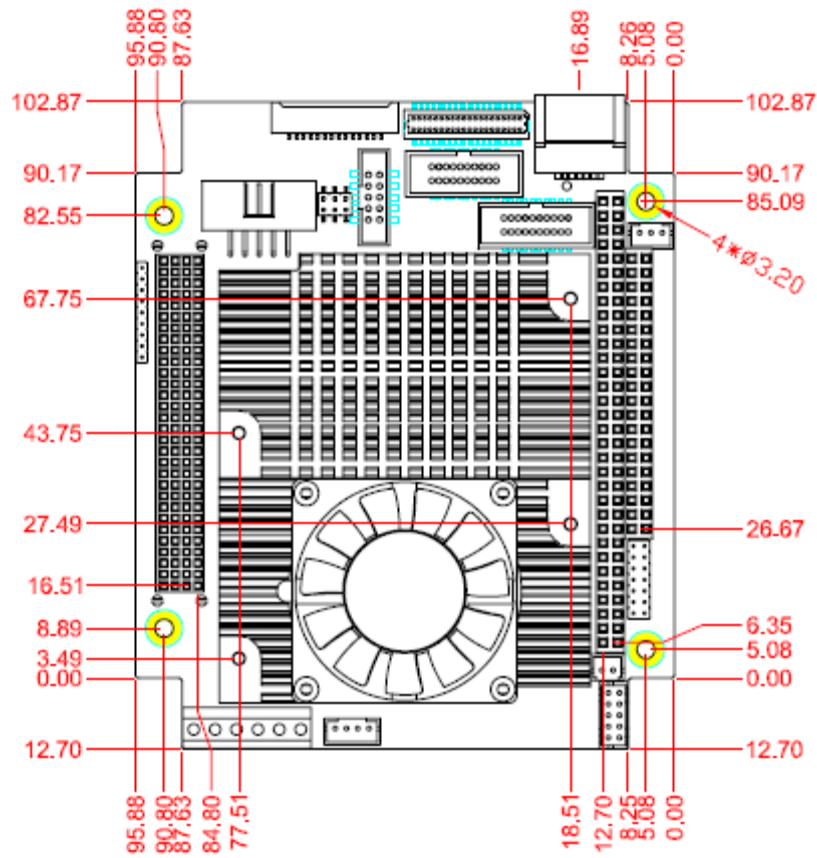
1.2 Utilities Supported

- Chipset Driver
- VGA Driver
- Ethernet Driver
- Audio Driver


MEMO

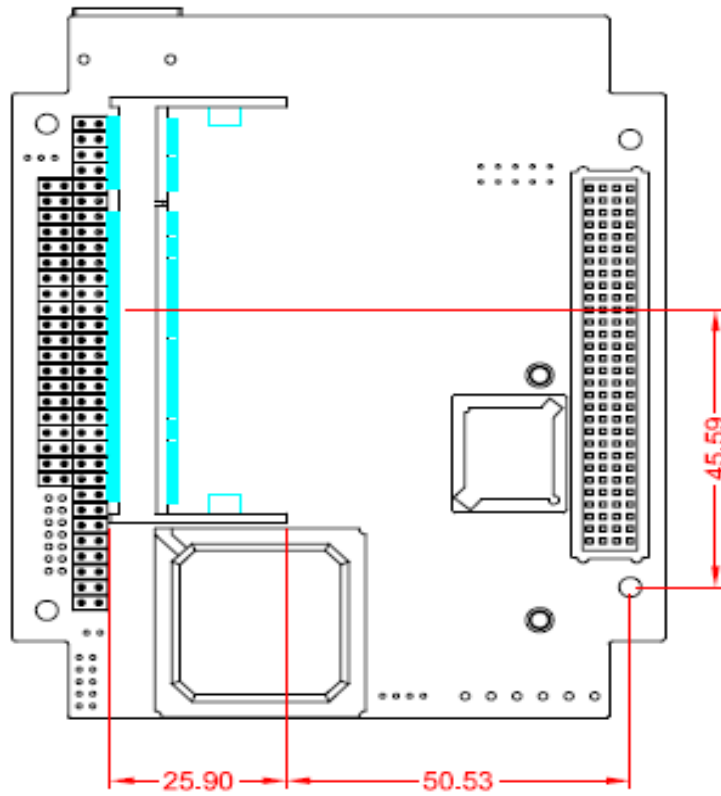
Chapter 2 Jumpers and Connectors

2.1 Board Dimensions and Fixing Holes



Component Side

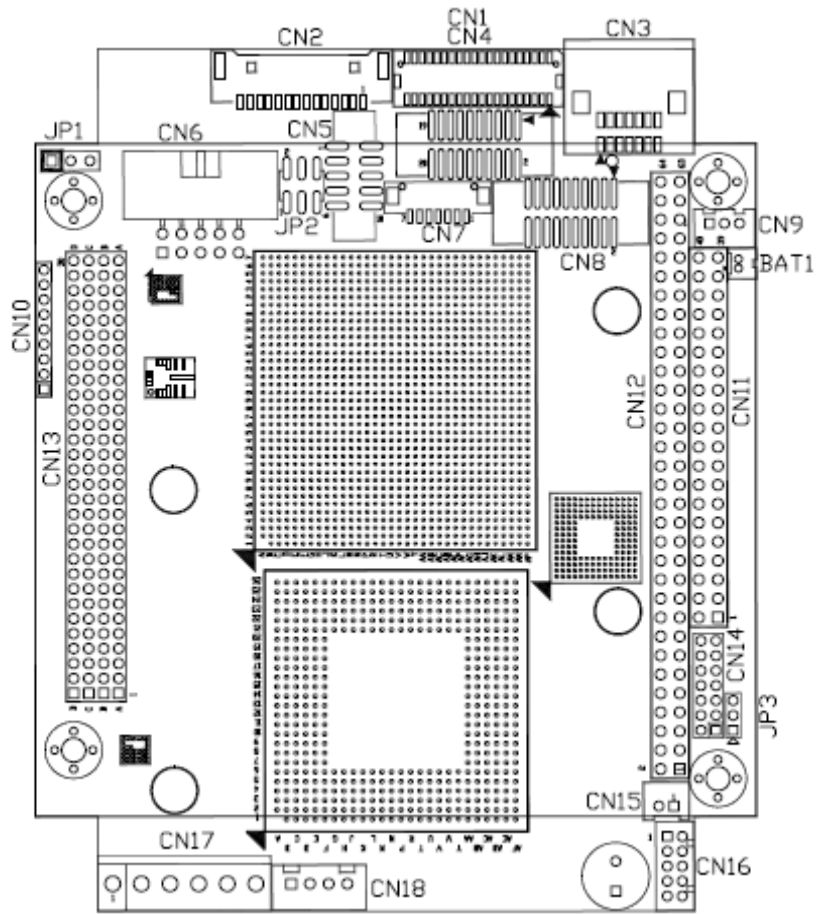
 **Note** The Limited Height of Component Side is 30 mm.



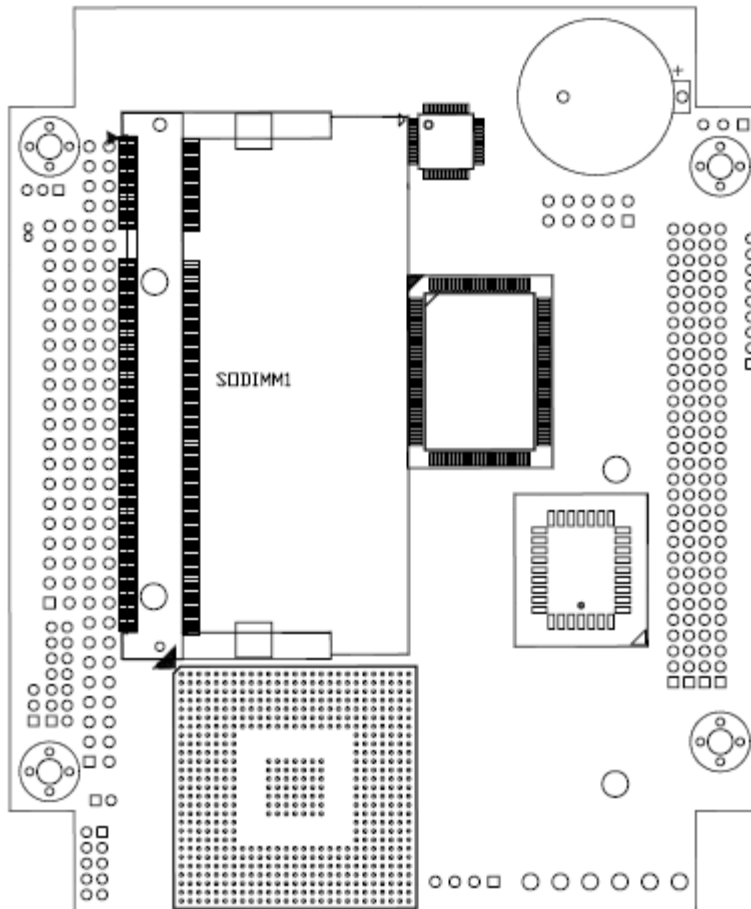
Solder Side

 **Note** The Limited Height of Solder Side is 9 mm.

2.2 Board Layout



Component Side



Solder Side

2.3 Jumper Settings


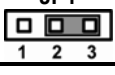
Proper jumper settings configure the **AX12280** to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

Here is a list of jumper settings :

Jumper	Default Setting	Jumper Setting
JP1	LVDS Voltage select : 3.3V	Short 1-2
JP2	Audio Line Out/Speaker Out : Line Out	Short 1-3, 2-4
JP3	Clear CMOS Setting : Normal	Short 1-2

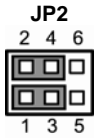
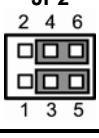
2.3.1 LVDS Voltage Selection Jumper (JP1)

This jumper is to select the voltage for LVDS interface.

Description	Function	Jumper Setting
VDDM	3.3V (Default)	 <p>JP1 1 2 3</p>
	5V	 <p>JP1 1 2 3</p>



2.3.2 Audio Output Selection Jumper (JP2)

This jumper makes the selection of Audio output.

Description	Function	Jumper Setting
Audio Output Selection	Line Out (Default)	 <p>JP2 2 4 6 1 3 5</p>
	Speak Out	 <p>JP2 2 4 6 1 3 5</p>

2.3.3 Clear CMOS Jumper (JP3)

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

Description	Function	Jumper Setting
CMOS Clear	Normal (Default)	 JP3 3 □ 2 □ 1 □
	Clear CMOS	 JP3 3 □ 2 □ 1 □

2.4 Connectors

Connectors connect the board with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected. Here is a summary table shows you all connectors on the **AX12280** Series.

Connectors	Label
LVDS Connector	CN1
LAN Connector	CN2
Serial ATA 1/2 Connector	CN3
VGA / PS/2 Connector	CN4
Audio Connector	CN5
USB Port0/1 Connector	CN6
LVDS Backlight Connector	CN7
COM 1 / COM2 Connector	CN8
SM Bus Connector	CN9
Digital I/O Connector	CN10
PC/104-B Slot	CN11
PC/104-A Slot	CN12
PCI104 Slot	CN13
Front Panel Bezel Connector	CN14
CPU FAN Connector	CN15
USB Port 2/3 Connector	CN16
+12V & +5V Power Connector	CN17
+5V Standby & PS_ON Connector	CN18
Battery Connector	BAT1
DDR SO-DIMM socket	SODIMM1

2.4.1 LVDS Flat Panel Connector (CN1)

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

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	N.C.	12	Channel B D0-
13	N.C.	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	N.C.
31	Channel A D1+	32	N.C.
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

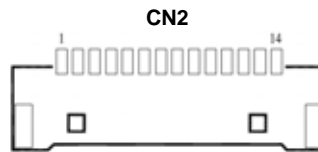
CN1



2.4.2 LAN Connector (CN2)

CN2 is an LAN connector that connects the AX12280 to a 10-Base-T, 100-Base-T or Gigabit hub just by plugging one end of the cable to LAN1, and connecting the other end (phone jack) to a 10-Base-T, 100-Base-T or Gigabit hub.

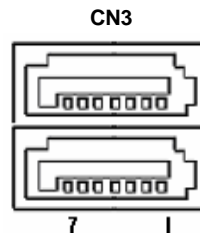
Pin	Signal
1	+3.3V
2	100 LAN LED
3	GND
4	MDI3-
5	MDI3+
6	MDI1-
7	MDI2-
8	MDI2+
9	MDI1+
10	MDI0-
11	MDI0+
12	N.C.
13	+3.3V
14	Active LED-



2.4.3 Serial ATA 1/2 Connector (CN3)

These SATA connectors are for high-speed SATA interface ports and they can be connected to hard disk devices.

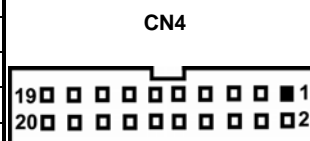
Pin	Signal
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND



2.4.4 VGA / PS/2 Connector (CN4)

Connector **CN4** is for PS/2 Mouse/Keyboard and CRT VGA display connection.

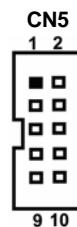
Pin	Signal	Pin	Signal
1	PS/2 VCC	2	GND
3	Keyboard Data	4	Keyboard Clock
5	N.C.	6	Mouse Data
7	Mouse Clock	8	VGA_GND
9	VGA_RED	10	VGA_GND
11	VGA_GREEN	12	VGA_GND
13	VGA_BLUE	14	VGA_GND
15	N.C.	16	DDC_DATA
17	DDC_Clock	18	VGA_GND
19	Horizontal Sync	20	Vertical Sync



2.4.5 Audio Connector (CN5)

CN5 is a 10-pin connector to support the audio interface.

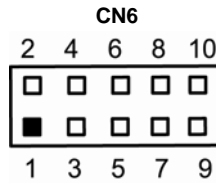
Pin	Signal	Pin	Signal
1	MIC_IN	2	Audio_GND
3	Line_In L	4	Audio_GND
5	Line_In R	6	Audio_GND
7	Audio_Out_L	8	Audio_GND
9	Audio_Out_R	10	Audio_GND



2.4.6 USB Port0/1 Connector (CN6)

These Universal Serial Bus (USB) connectors on this board are for installing versatile USB interface peripherals. These are 10-pin standard USB connectors.

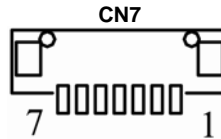
Pin	Signal	Pin	Signal
1	+5V	2	+5V
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	GND	10	GND



2.4.7 LVDS Backlight Connector (CN7)

This is a 7-pin connector for inverter on the board that we strongly recommend you to use the matching DF13-7S-1.25C connector.

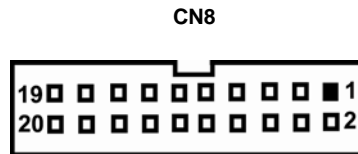
Pin	Signal
1	+12V
2	+12V
3	+5V
4	ENABLE
5	GND
6	GND
7	GND



2.4.8 COM1 / COM2 Connector (CN8)

The **AX12280** has two onboard serial ports, pin assignment as listed below:

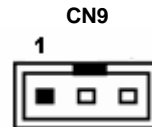
Pin	Signal	Pin	Signal
1	NDCD1	11	NDCD2
2	NDSR1	12	NDSR2
3	NRX1	13	NRX2
4	NRTS1	14	NRTS2
5	NTX1	15	NTX2
6	NCTS1	16	NCTS2
7	NDTR2	17	NDTR2
8	NRI2	18	NRI2
9	GND	19	GND
10	N.C	20	N.C



2.4.9 SMBUS Connector (CN9)

This connector **CN9** is for SMBUS interface support.

Pin	Signal
1	SMB_CLOCK
2	SMB_DATA
3	GND



2.4.10 Digital I/O Connector (CN10)

The board is equipped an 8-channel digital I/O connector **CN10** that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers, sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. The digital I/O is controlled via software programming.

Pin	Signal	CN10
1	Digital Input 1	
2	Digital Input 2	<input type="checkbox"/> 8
3	Digital Input 3	<input type="checkbox"/> 7
4	GND	<input type="checkbox"/> 6
5	Digital Output 1	<input type="checkbox"/> 5
6	Digital Output 2	<input type="checkbox"/> 4
7	Digital Output 3	<input type="checkbox"/> 3
8	Digital Output 4	<input type="checkbox"/> 2
9	Digital Output 5	<input checked="" type="checkbox"/> 1

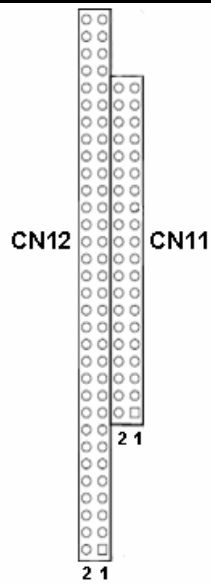
2.4.11 PC/104 Slots (CN11, CN12)

CN11 Pin Assignment List:

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	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	DREQ0	20	MEMR*
21	DACK5*	22	MEMW*	23	DREQ5	24	SD8
25	DACK6*	26	SD9	27	DREQ6	28	SD10
29	DACK7*	30	SD11	31	DREQ7	32	SD12
33	+5V	34	SD13	35	MASTER*	36	SD14
37	GND	38	SD15	39	GND	40	(KEY)

CN12 Pin Assignment List:

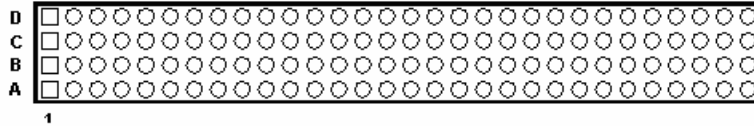
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	IOCHCHK*	2	GND	3	SD7	4	RESETDRV
5	SD6	6	+5V	7	SD5	8	IRQ9
9	SD4	10	N.C.	11	SD3	12	DREQ2
13	SD2	14	N.C.	15	SD1	16	SRDY
17	SD0	18	+12V	19	IOCHRDY	20	GND
21	AEN	22	SMEMW*	23	SA19	24	SMEMR*
25	SA18	26	IOW*	27	SA17	28	IOR *
29	SA16	30	DACK3*	31	SA15	32	DREQ3
33	SA14	34	DACK1*	35	SA13	36	DREQ1
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	BALE
57	SA2	58	+5V	59	SA1	60	OSC
61	SA0	62	GND	63	GND	64	GND



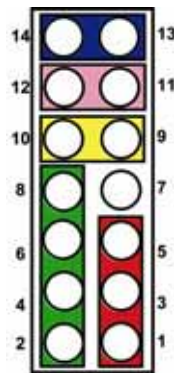
2.4.12 PCI104 Slot (CN13)

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#
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

CN13



2.4.13 Front Panel Bezel Connector (CN14)



- **Power LED**
This 3-pin connector named as Pin 1 and 5 connect the system power LED indicator to such a switch on the case. Pin 1 is assigned as +, and Pin 3, 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 board 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 (-).
- **Power On/Off Button**
This 2-pin connector named as Pin 9 and 10 connect the front panel's power button to the board, which allows users to control the power supply to be power on/off state.

■ **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 +.

2.4.14 CPU FAN Connector (CN15)

A CPU fan is always needed for cooling CPU heat. The CPU fan connector **CN15** provides power to the fan.

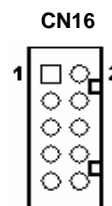
Pin	Signal
1	GND
2	+5V



2.4.15 USB Port2/3 Connector (CN16)

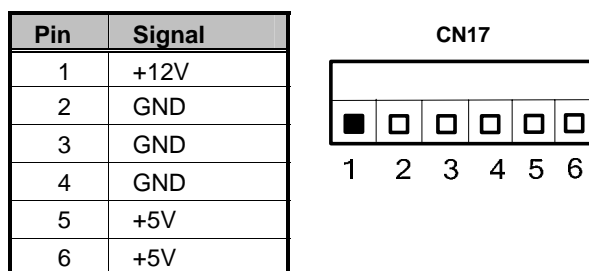
These Universal Serial Bus (USB) connectors on this board are for installing versatile USB interface peripherals. These are 10-pin standard USB connectors.

Pin	Signal	Pin	Signal
1	+5V	2	+5V
3	USB2-	4	USB3-
5	USB2+	6	USB3+
7	GND	8	GND
9	GND	10	GND



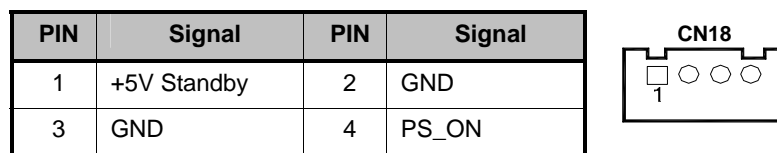
2.4.16 +12V & +5V Power Connector (CN17)

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



2.4.17 +5V Standby & PS_ON Connector (CN18)

Connector **CN18** is a +5V Standby & PS_On Connector.



Chapter 3 Hardware Description

3.1 Microprocessors

The **AX12280 Series** supports Intel® Celeron® -M processors at FSB 400MHz, Intel® ULV Celeron® M processor 600MHz/512K, 1GHz/0K, 1GHz/512K processors, which make your system operated under Windows 2000/XP and Linux environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

3.2 BIOS

The **AX12280 Series** uses Award Plug and Play BIOS with a single 4Mbit Flash EPROM.

3.3 System Memory

The **AX12280 Series** industrial CPU card supports one 200-pin DDR2-400 SODIMM sockets for a maximum memory of 1 GB DDR2 SDRAMs. The memory module can come in sizes of 64MB, 128MB, 256MB, 512MB, 1GB and 2GB.

3.4 I/O Port Address Map

The Intel® Celeron® -M CPUs can communicate via I/O ports. There are total 1KB port addresses available for assignment to other devices via I/O expansion cards.

Address	Devices
000-00F	DMA controller
020-021	Programmable interrupt controller
02E-02F	Super I/O 1
040-043	System timer
060,064	Keyboard controller
061	System speaker
070-073	System CMOS/Real time clock
080-090	DMA controller
094-09F	DMA controller
0A0-0A1	Programmable interrupt controller
0C0-0DF	DMA controller
0F0-0FF	Numeric data processor
170-177	Secondary IDE Channel
1F0-1F7	Primary IDE Channel
274-277	ISAPNP Read Data Port
279	ISAPNP Read Data Port
2F8-2FF	Communications Port (COM2)
376	Secondary IDE Channel
378-37F	Printer Port (LPT1)
3B0-3BB	Mobile Intel® 915GM/GMS,910GML Express Chipset Family
3C0-3DF	Mobile Intel® 915GM/GMS,910GML Express Chipset Family
3F0-3F5	Standard floppy disk controller
3F6	Primary IDE Channel
3F7	Standard floppy disk controller
3F8-3FF	Communications Port (COM1)

3.5 Interrupt Controller

The **AX12280 Series** is a 100% PC compatible control board. The mapping list under XP OS is shown as the following screen.

IRQ	Parity Check Error
IRQ0	System timer
IRQ1	Keyboard
IRQ2	Interrupt rerouting from IRQ8 through IRQ15
IRQ3	Communications Port (COM2)
IRQ4	Communications Port (COM1)
IRQ5	PCI Device Share
IRQ6	Floppy Disk Controller
IRQ7	Printer port #1
IRQ8	System CMOS/Real time clock
IRQ9	ACPI Controller
IRQ10	Communications Port (COM3)
IRQ11	Communications Port (COM4)
IRQ12	PS/2 Compatible Mouse
IRQ13	Numeric data processor
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 immediately, or press the 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 want to enter Setup, please restart the system to try it again. Turning the system power OFF and ON, pressing the "RESET" button on the system case or simultaneously pressing <Ctrl>, <Alt>, and keys can restart the system. If you do not press keys at the right time and the system doesn't boot, an error message will pop out to prompt you the following information:

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

4.2 Control Keys

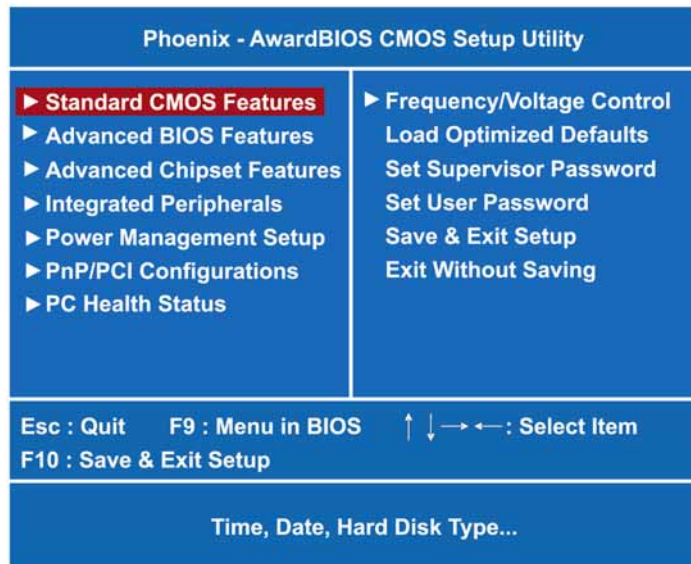
Up arrow	Move cursor to the previous item
Down arrow	Move cursor to the next item
Left arrow	Move cursor to the item on the left hand
Right arrow	Move to the item in the right hand
Esc key	Main Menu -- Quit and delete changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
PgUp/“+” key	Increase the numeric value or make changes
PgDn/“-“ key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
(Shift) F2 key	Change color from total 16 colors. F2 to select color forward, (Shift) F2 to select color backward
F3 key	Reserved
F4 key	Reserved
F5 key	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
F6 key	Load the default CMOS value from BIOS default table, only for Option Page Setup Menu
F7 key	Load the Setup default, only for Option Page Setup Menu
F8 key	Reserved
F9 key	Reserved
F10 key	Save all the CMOS changes, only for Main Menu

4.3 Getting Help

- **Main Menu**
The online 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 out a small Help window that provides the description of using appropriate keys and possible selections for highlighted items. Press <F1> or <Esc> to exit the Help Window.

4.4 The Main Menu

Once you enter the Award BIOS CMOS Setup Utility, the Main Menu appears on the screen. In the Main Menu, there are several Setup functions and a couple of Exit options for your selection. Use arrow keys to select the Setup Page you intend to configure then press <Enter> to accept or enter its sub-menu.

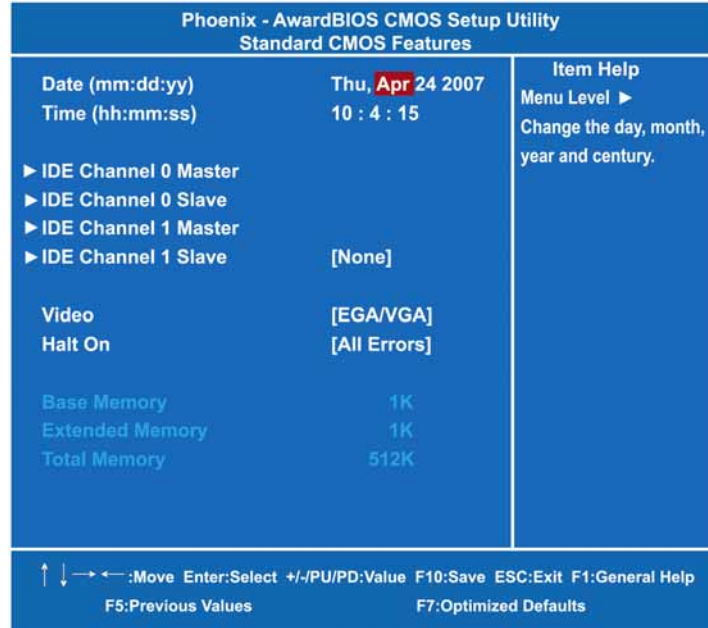


NOTE *If your computer can not boot after making and saving system changes with Setup, the Award BIOS will reset your system to the CMOS default settings via its built-in override feature.*

It is strongly recommended that you should avoid changing the chipset's defaults. Both Award and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

4.5 Standard CMOS Setup Menu

The Standard CMOS Setup Menu displays basic information about your system. Use arrow keys to highlight each item, and use <PgUp> or <PgDn> key to select the value you want in each item.



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

day	It is determined by the BIOS and read only, from Sunday to Saturday.
date	It can be keyed with the numerical/ function key, from 1 to 31.
month	It is from January to December.
year	It shows the current year of BIOS.

- Time**
 This item shows current time of your system with the format <hour> <minute> <second>. The time is calculated based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.

- **IDE Channel 0/1 Master/Slave**

These items identify the types of each IDE channel installed in the computer. There are 45 predefined types (Type 1 to Type 45) and 2 user's definable types (Type User) for Enhanced IDE BIOS. Press <PgUp>/<+> or <PgDn>/<-> to select a numbered hard disk type, or directly type the number and press <Enter>. Please be noted your drive's specifications must match the drive table. The hard disk will not work properly if you enter improper information. If your hard disk drive type does not match or is not listed, you can use Type User to manually define your own drive type. If selecting Type User, you will be asked to enter related information in the following items. Directly key in the information and press <Enter>. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.

If the HDD interface controller supports ESDI, select "Type 1".
 If the HDD interface controller supports SCSI, select "None".
 If the HDD interface controller supports CD-ROM, select "None".

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

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

- **Halt On**

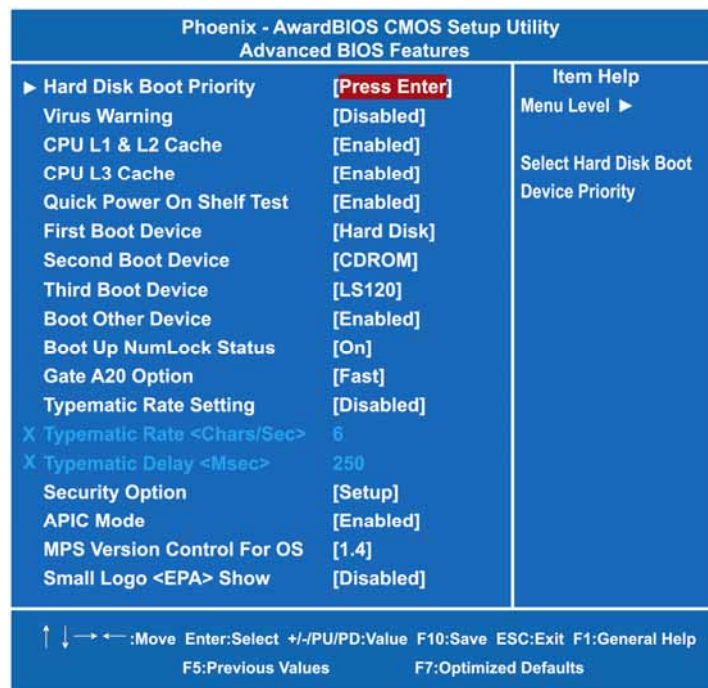
This item determines whether the system will halt or not, if an error is detected while powering up.

No errors	The system booting will halt on any errors detected. (default)
All errors	Whenever BIOS detects a non-fatal error, the system will stop and you will be prompted.
All, But Keyboard	The system booting will not stop for a keyboard error; it will stop for other errors.
All, But Diskette	The system booting will not stop for a disk error; it will stop for other errors.
All, But Disk/Key	The system booting will not stop for a keyboard or disk error; it will stop for other errors.

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

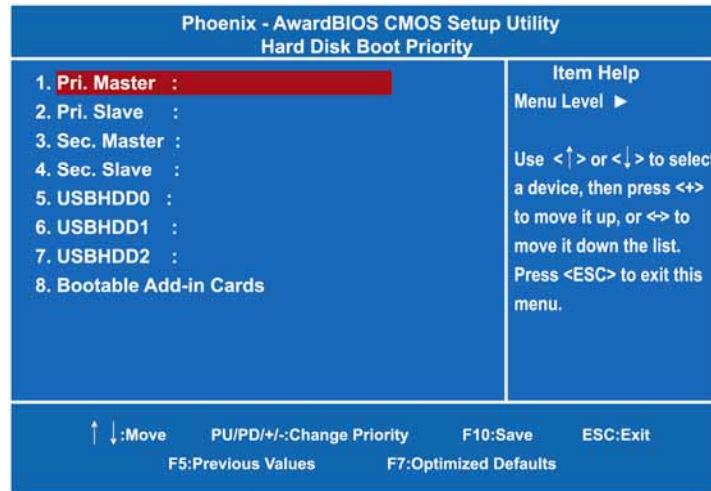
4.6 Advanced BIOS Features

This section allows you to configure and improve your system, 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.

- **Virus Warning**

This option flashes on the screen. During and after the system boot up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system with the following message. You can run an anti-virus program to locate the problem. The default setting is "Disabled".

! WARNING !
Disk boot sector is to be modified
Type "Y" to accept write or "N" to abort write
Award Software, Inc.

Enabled	It automatically activates while the system boots up and a warning message appears for an attempt to access the boot sector
----------------	---

	or hard disk partition table.
Disabled	No warning message will appear for attempts to access the boot sector or hard disk partition table.



NOTE This function is only available with DOS and other operating systems that do not trap INT13.

- **CPU L1 & L2 Cache**

These two options speed up memory access. However, it depends on the CPU/chipset design. The default setting is "Enabled". CPUs without built-in internal cache will not provide the "CPU Internal Cache" item on the menu.

Enabled	Enable cache
Disabled	Disable cache

- **CPU L3 Cache**

Use this item to enable L3 cache only for the CPUs with such a function.

- **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 let you select the 1st, 2nd, and 3rd devices that the system will search for during its boot-up sequence. The wide range of selection includes "Floppy", "LS120", "ZIP100", "Hard Disk", "SCSI" and "CDROM".

- **Boot Other Device**

This item allows users to enable or disable the boot device not listed in the First/Second/Third boot devices option above. The default setting is "Enabled".

- **Gate A20 Option**

The default value is "Fast".

Normal	The A20 signal is controlled by keyboard controller or chipset hardware.
---------------	--

Fast	Default: Fast. The A20 signal is controlled by Port 92 or chipset specific method.
-------------	--

- **Typematic Rate Setting**

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

Enabled	Enable typematic rate and typematic delay programming.
Disabled	Disable typematic rate and typematic delay programming. The system BIOS will use default value of these 2 items, controlled by keyboard.

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

This option refers to character numbers typed per second by the keyboard. The default value is "6".

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

- **Typematic Delay (Msec)**

This option defines how many milliseconds must elapse before a held-down key begins generating repeat characters. The default value is "250".

250	250 msec
500	500 msec
750	750 msec
1000	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".

System	If a wrong password is entered at the prompt, the system will not boot, the access to Setup will be denied, either.
---------------	---

Setup	If a wrong password is entered at the prompt, the system will boot, but the access to Setup will be denied.
--------------	---



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

- **APIC Mode**
Use this item to enable or disable APIC (Advanced Programmable Interrupt Controller) mode that provides symmetric multi-processing (SMP) for systems.
- **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.
- **Small Logo(EPA) Show**
If enabled, the EPA logo will appear during system booting up; if disable, the EPA logo will not appear.

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

4.7 Advanced Chipset Features

This section contains completely optimized chipset's features on the board that you are strongly recommended to leave all items on this page at their default values unless you are very familiar with the technical specifications of your system hardware.

Phoenix - AwardBIOS CMOS Setup Utility		Item Help
Advanced Chipset Features		Menu Level ▶
DRAM Timing Selectable	[By SPD]	
CAS Latency Time	[Auto]	
DRAM RAS# to CAS# Delay	[Auto]	
DRAM RAS# Precharge	[Auto]	
Precharge delay <tRAS>	[Auto]	
System Memory Frequency	[Auto]	
System BIOS Cacheable	[Enabled]	
Video BIOS Cacheable	[Disabled]	
Memory Hole At 15M-16M	[Disabled]	
** VGA Setting **		
On-Chip Frame Buffer Size	[8MB]	
DVMT Mode	[DVMT]	
DVMT/FIXED Memory Size	[128MB]	
Boot Display	[CRT]	
Panel Scaling	[Auto]	
Panel Type	[800x600]	

↑ ↓ → ← :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F7:Optimized Defaults

- DRAM Timing Selectable**
 Use this item to increase the timing of the memory. This is related to the cooling of memory.
- CAS Latency Time**
 You can select CAS latency time to HCLKs 2, 3, or Auto. The board designer should have set up these values in accordance with the installed DRAM. Do not change these values unless you have to change the specifications of the installed DRAM or CPU.
- DRAM RAS# to CAS# Delay**
 When DRAM is refreshed, both rows and columns are addressed separately. This field lets you insert a timing delay between the

CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed.

- **DRAM RAS# Precharge**
The precharge time is the number of cycles it takes for the RAS to accumulate its charge before DRAM refresh. If insufficient time is allowed, refresh may be incomplete and the DRAM may fail to retain data.
- **Precharge Delay <tRAS>**
The precharge time is the number of cycles it takes for DRAM to accumulate its charge before refresh.
- **System Memory Frequency**
This item helps you set main memory frequency. When using an external graphics card, it can be adjusted to enable the best performance for your system.
- **System BIOS Cacheable**
Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result. The default value is "Disabled".
- **Video BIOS Cacheable**
This item allows you to change the Video BIOS location from ROM to RAM. Video Shadow will increase the video speed.
- **Memory Hole At 15M-16M**
Enabling this feature reserves 15MB to 16MB memory address space to ISA expansion cards that specifically require this setting. This makes the memory from 15MB and up unavailable to the system. Expansion cards can only access memory up to 16MB.

*** VGA Setting ***

- **On-Chip Frame Buffer Size**
Use this item to set the VGA frame buffer size.
- **DVMT Mode**
DVMT (Dynamic Video Memory Technology) helps you select the video mode.
- **DVMT/Fixed Memory Size**
DVMT (Dynamic Video Memory Technology) allows you to select a

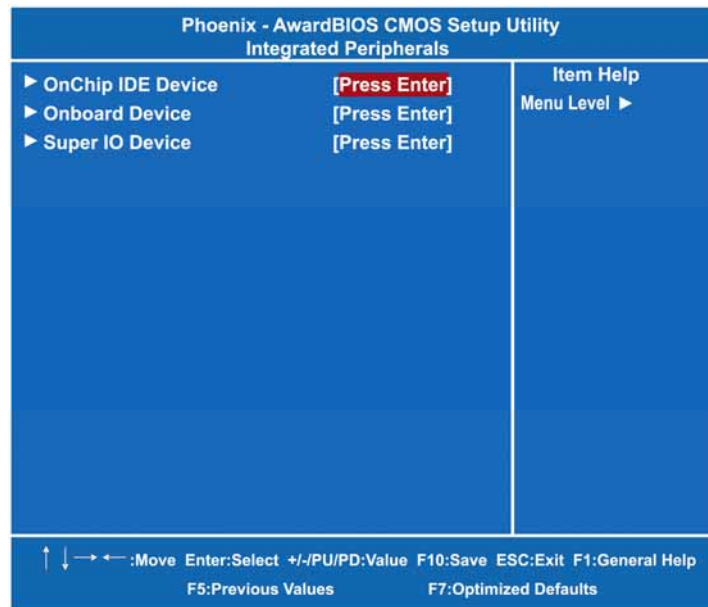
maximum size of dynamic amount usage of the video memory. The system would configure the video memory dependent on your application.

- **Boot Display**
This item is for Intel define ADD card only.
- **Panel Scaling**
This item shows the setting of panel scaling and operates the scaling function that the panel output can fit the screen resolution connected to the output port.

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

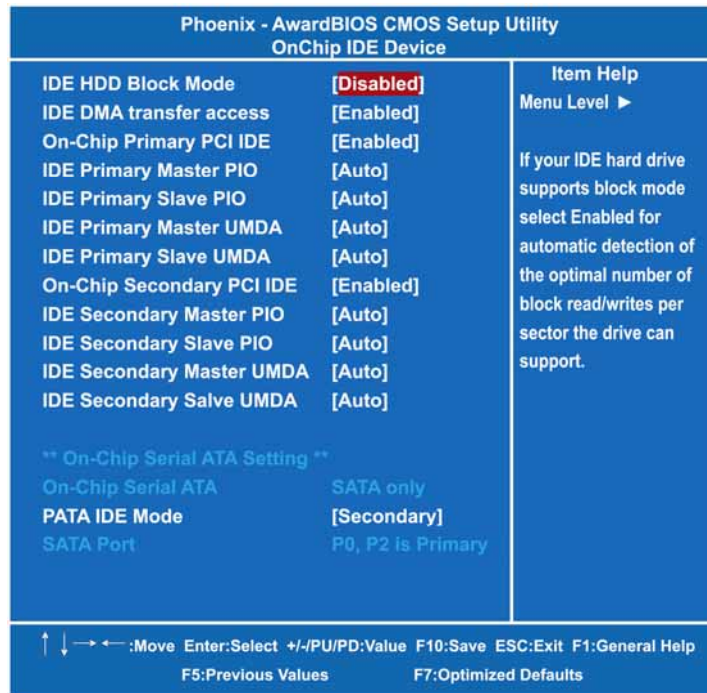
4.8 Integrated Peripherals

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



● **OnChip IDE Device**

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



- **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.
- **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.
- **On-Chip Primary/Secondary PCI IDE**
The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately. The default value is "Enabled".

 **NOTE** Choosing Disabled for these options will

automatically remove the IDE Primary Master/Slave PIO and/or IDE Secondary Master/Slave PIO items on the menu.

- **IDE Primary/Secondary 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 Primary/Secondary 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 system software both support Ultra DMA-33/66/100/133, select Auto to enable UDMA mode by BIOS.

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

- **Onboard Device**

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

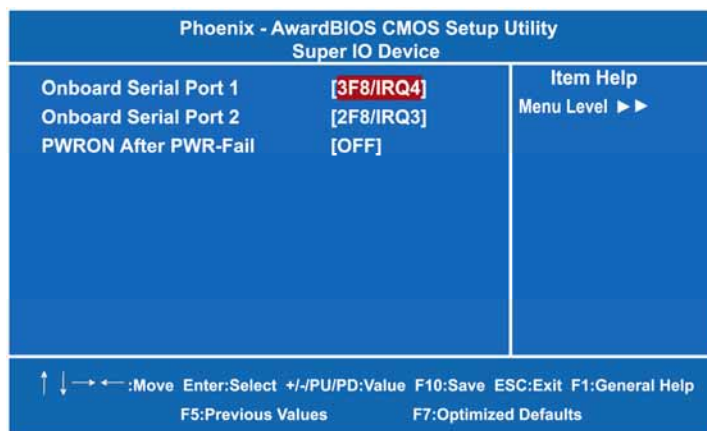


- **USB Controller**
Enable this item if you are using the USB in the system. You should disable this item if a higher-level controller is added.
- **USB 2.0 Controller**
Enable this item if you are using the EHCI (USB2.0) controller in the system.
- **USB Mouse Support**
Enable this item to boot the hard drive by a USB mouse.
- **AC'97 Audio Select**
Use this item to enable or disable the onboard AC'97 Audio function.

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.
- **PWRON After PWR-Fail**
This item enables your computer to automatically restart or return to its operating status.

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

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.

Phoenix - AwardBIOS CMOS Setup Utility Power Management Setup		
ACPI Function	[Enabled]	Item Help
Power Management	[Min Saving]	Menu Level ▶
Video Off Method	[DPMS]	
Video Off In Suspend	[Yes]	
Suspend Type	[Stop Grant]	
MODEM Use IRQ	[3]	
Suspend Mode	1 Hour	
HDD Power Down	15 Min	
Soft-Off by PWR-BTTN	[Instant-Off]	
Wake-Up by PCI card	[Disabled]	
Power On by Ring	[Disabled]	
Resume by Alarm	[Disabled]	
X Date <of Month> Alarm	0	
X Time <hh:mm:ss> Alarm	0 : 0 : 0	
** Reload Global Timer Events **		
Primary IDE 0	[Disabled]	
Primary IDE 1	[Disabled]	
Secondary IDE 0	[Disabled]	
Secondary IDE 1	[Disabled]	
FDD, COM, LPT Port	[Disabled]	
PCI PIRQ[A-D]#	[Disabled]	
↑ ↓ ← → : Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F7: Optimized Defaults		

- ACPI Function**
 This item allows you to enable/disable the Advanced Configuration and Power Management (ACPI). The function is always "Enabled".
- Power Management**
 This option allows you to select the type (or degree) of power saving for Doze, Standby, and Suspend modes. The table below describes each power management mode:

Max Saving	It is maximum power savings, only available for SL CPUs. The inactivity period is 1 minute in each mode.
User Define	It sets each mode. Select time-out periods in the PM Timers section.
Min Saving	It is minimum power savings. The inactivity period is 1 hour in each mode (except the hard drive).
Disabled	Default value

- **Video Off Method**

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

V/H SYNC+Blank	It turns OFF vertical and horizontal synchronization ports and writes blanks to the video buffer.
DPMS	Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards Association (VESA). Use the supplied software for your video subsystem to select video power management values.
Blank Screen	The System only writes blanks to the video buffer.

- **Video Off In Suspend**

This item defines if the video is powered down when the system is put into suspend mode.

- **Suspend Type**

If this item is set to the default Stop Grant, the CPU will go into Idle Mode during power saving mode.

- **Modem Use IRQ**

If you want an incoming call on a modem to automatically resume the system from a powersaving mode, use this item to specify the interrupt request line (IRQ) used by the modem. You might have to connect the fax/modem to the board Wake On Modem connector for working this feature.

- **Suspend Mode**

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

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

- **HDD Power Down**

If HDD activity is not detected for a specified length of time in this field, the hard disk drive will be powered down while other devices remain active.

- **Soft-Off by PWR-BTTN**

This option only works with systems using an ATX power supply. It also allows users to define which type of soft power OFF sequence the system will follow. The default value is *"Instant-Off"*.

Instant-Off	This option follows the conventional manner of system performance when turning the power to OFF. Instant-Off is a software power OFF sequence requiring the power supply button is switched to OFF.
Delay 4 Sec.	Upon the system's turning OFF through the power switch, this option will delay the complete system power OFF sequence approximately 4 seconds. Within this delay period, the system will temporarily enter into the Suspend Mode enabling you to restart the system at once.

- **Wake-Up by PCI card**

If enable this item, the system can automatically resume when the PCI Modem or PCI LAN card receives an incoming call.

- **Power On by Ring**

This option allows the system to resume or wake up upon detecting any ring signals coming from an installed modem. The default value is *"Enabled"*.

- **Resume by Alarm**

If enable this item, the system can automatically resume after a fixed time in accordance with the system's RTC (realtime clock).

**** Reload Global Timer Events ****

Global Timer (power management) events can prevent the system from entering a power saving mode or can awaken the system from such a mode.

- **Primary/Secondary IDE 0/1**

Use this item to configure the IDE devices monitored by the system.

- **FDD, COM, LPT Port**

Use this item to configure the FDD, COM and LPT ports monitored by the system.

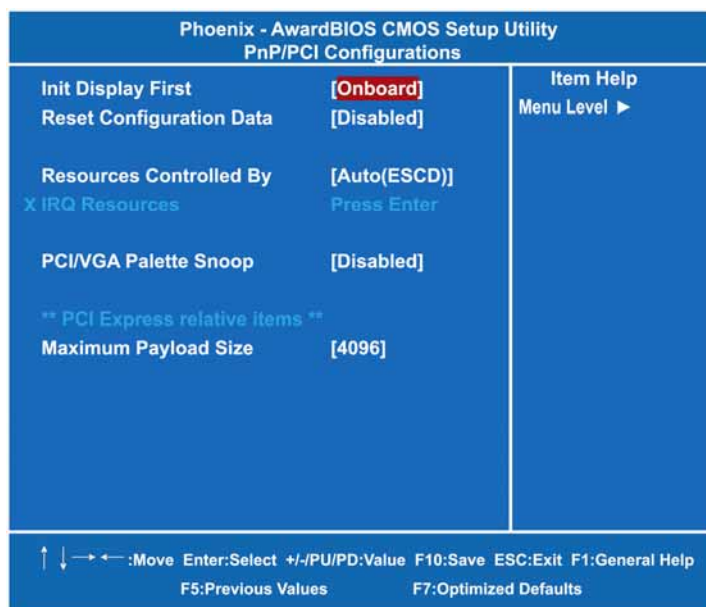
- **PCI PIRQ[A-D]#**

This item can be used to detect PCI device activities; if no activity, the system will enter the sleep mode.

Press <Esc> to return to the Main Menu.

4.10 PnP/PCI Configuration Setup

This section describes the configuration of PCI (Personal Computer Interconnect) bus system, which allows I/O devices to operate at speeds close to the CPU speed while communicating with other important components. This section covers very technical items that only experienced users could change default settings.



- Init Display First**
 This item allows you to decide whether PCI Slot or Onboard to be the first primary display card.
- Reset Configuration Data**
 Normally, you leave this item Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup or if installing a new add-on cause the system reconfiguration a serious conflict that the operating system can not boot. Options: Enabled, Disabled.
- Resources Controlled By**
 The Award Plug and Play BIOS can automatically configure all boot and Plug and Play-compatible devices. If you select Auto, all 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 to one of the following types in accordance with the type of devices 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 item 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.

**** PCI Express relative items ****

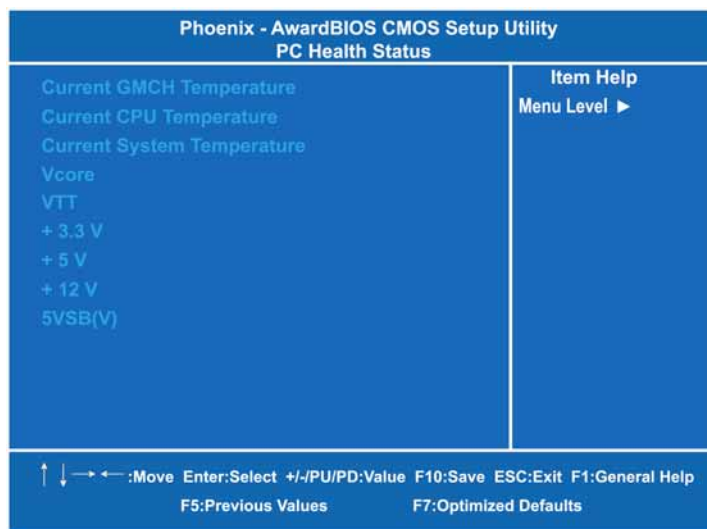
- **Maximum Payload Size**

When using DDR SDRAM and Buffer size selection, another consideration in designing a payload memory is the size of the buffer for data storage. Maximum Payload Size defines the maximum TLP (Transaction Layer Packet) data payload size for the device.

Press <Esc> to return to the Main Menu.

4.11 PC Health Status

This section supports hardware monitoring that lets you monitor those parameters for critical voltages, temperatures and fan speed of the board.

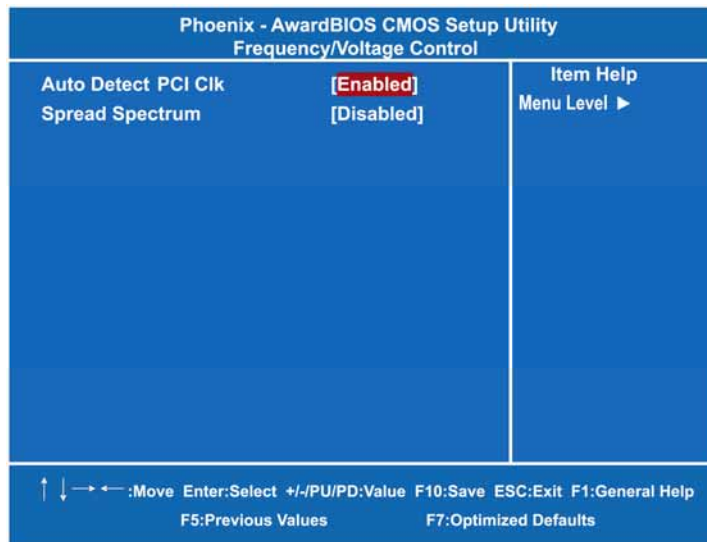


- **Current GMCH Temperature**
The current GMCH temperature will be automatically detected by the system.
- **Current CPU Temperature**
The current system CPU temperature will be automatically detected by the system.
- **Current SYSTEM Temperature**
Show you the current system1 temperature.
- **Vcore +3.3V/+5V/+12V/5VSB**
Show you the voltage of +3.3V/+5V/+12V.

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

4.12 Frequency/Voltage Control

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

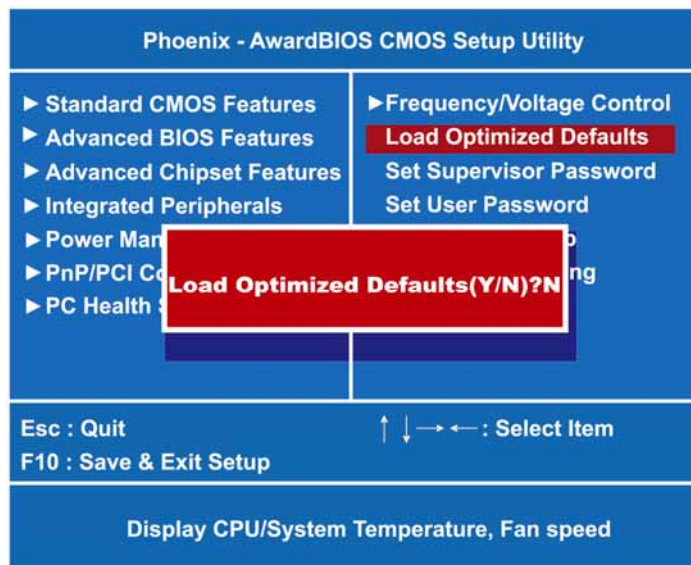


- **Auto Detect PCI Clk**
The enabled item can automatically disable the clock source for a PCI slot without a module, to reduce EMI (ElectroMagnetic Interference).
- **Spread Spectrum**
If spread spectrum is enabled, EMI (ElectroMagnetic Interference) generated by the system can be significantly reduced.

Press <Esc> to return to the Main Menu.

4.13 Load Optimized Defaults

This option allows you to load your system configuration with default values. These default settings are optimized to enable high performance features.



To load CMOS SRAM with SETUP default values, please enter "Y". If not, please enter "N".

4.14 Set Supervisor/User Password

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

1. **Supervisor password:** You can enter and change the options on the setup menu.
2. **User password:** You can just enter, but have no right to change the options on the setup menu.

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 a maximum eight-character password, and press <Enter>. This typed password will clear previously entered password from the CMOS memory. You will be asked to confirm this password. Type this password again and press <Enter>. You may also press <Esc> to abort this selection and not enter a password.

To disable the password, just press <Enter> when you are prompted to enter a password. A message will confirm the password is getting disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED

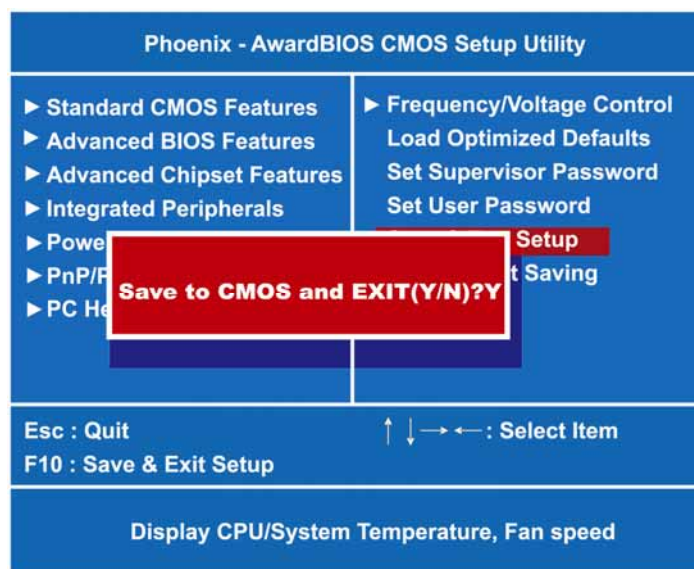
When a password is enabled, you have to type it every time you enter the Setup. It prevents any unauthorized persons from changing your system configuration.

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 decide when the password is required for the BIOS Features Setup Menu and its Security option. If the Security option is set to "System", the password is required during booting up and entry into the Setup; if it is set as "Setup", a prompt will only appear before entering the Setup.

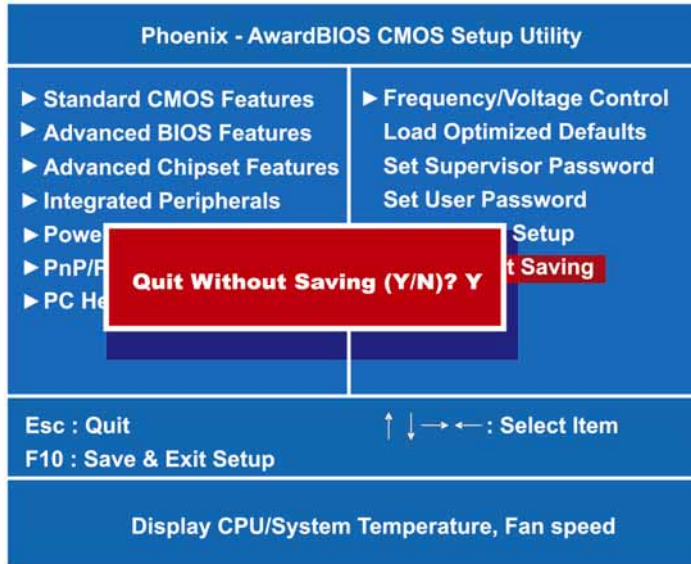
4.15 Save & Exit Setup

This section allows you to determine whether or not to accept your modifications. Type "Y" to quit the setup utility and save all changes into the CMOS memory. Type "N" to bring you back to the Setup utility.



4.16 Exit Without Saving

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



MEMO

Appendix A

Watchdog Timer

Watchdog 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.

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

↓

Activate WDT:

O 2E 30
O 2F 01

↓

Set Second or Minute:

O 2E F5
O 2F N; N=00 or 08(See below table)

↓

Set base timer:

O 2E F6
O 2F M=00, 01, 02...FF (Hex), Value=0 to 255

↓

WDT counting re-set timer:

O 2E F6
O 2F M; M=00, 01, 02...FF (See below table)

; IF to disable WDT:

○ 2E 30

○ 2F 00; Can be disable at any time

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

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

2E, 87	
2E, 87	
2E, 07	
2F, 08	Logical Device 8
2E, 30	Activate
2F, 01	
2E, F5	
2F, N	Set Minute or Second N=08 (Min),00(Sec)
2E, F6	
2F, M	Set Value M = 00 ~ FF

Appendix B

Digital I/O

Using the Digital Input Function

Start

↓

Un-Lock SuperI/O:

O 2E 87 ; Un-lock super I/O

O 2E 87 ; Un-lock super I/O

↓

Select Multiplexed pin to GPIO Function:

O 2E 2A

O 2F FF

↓

Select Logic device:

O 2E 07

O 2F 07

↓

Activate Logic Device:

O 2E 30

O 2F 01

↓

Select GPI Function:

O 2E F0

O 2F E0 (for 3IN / 5OUT)

When set to a '1', respective GPIO port is programmed as an input port.

When set to a '0', respective GPIO port is programmed as an output port.

↓

Read Data:

O 2E F1

I 2F XX (XX is input Data;

If no input source, the value is E0)

Using the Digital Output Function

Start

↓

Un-Lock SuperI/O:

O 2E 87 ; Un-lock super I/O

O 2E 87 ; Un-lock super I/O

↓

Select Multiplexed pin to GPIO Function:

O 2E 2A

O 2F FF

↓

Select Logic device:

O 2E 07

O 2F 07

↓

Activate Logic Device:

O 2E 30

O 2F 01

↓

Select GPO Function:

O 2E F0

O 2F E0 (for 3IN / 5OUT)

When set to a '1', respective GPIO port is programmed as an input port.

When set to a '0', respective GPIO port is programmed as an output port.

↓

Output Data:

O 2E F1

O 2F XX=00, 01, 02...FF (XX is Output Data)