SBC86840 Series

Intel® Core™ 2 Duo All-In-One

Mini ITX Board with DualView Display

User's Manual

Disclaimers

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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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Printed in Taiwan

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.

Trademarks Acknowledgments

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MEMO

Chapter 1
Introduction

The **SBC86840**, a Mini ITX board, supports Intel® Core™ 2 Duo and Celeron® M processors with graphics, audio, and Gigabit Ethernet interfaces. It is practically finest embedded Socket P board in the market. It integrates Intel® GME965 & ICH8M chipsets, excellent Multiple I/O, LVDS LCD, Gigabit Ethernet and HD digital Audio interface to make all in one single module as computing engine. It provides one PCI Express X16 for graphics for expansion purpose. Additionally, it provides you with unique embedded features, such as four serial ports (three RS-232 and one RS-232/422/485) and Mini ITX form factor that applies an extensive array of PC peripherals. This module supports various I/O features: CRT, LVDS LCD, Gigabit Ethernet, HD Audio, PATA IDE, SATA IDE, USB 2.0, GPIO and Watchdog timer.

1.1 Specifications

- **CPU: Socket P (478-pin) for Intel® Core™ 2 Duo and Celeron® M processors**
- **Chipset: Intel® GME965 & ICH8M**
- **Bus Clock: 533/677/800MHz FSB**
- **BIOS**
  - Phoenix-Award BIOS, Y2K compliant
  - 16Mbit SPI Flash, DMI, Plug and Play
  - SmartView for multiple LCD type selection, display mode option and application extension features
  - "Load Optimized Default" to backup customized Setting in the BIOS flash chip to prevent from CMOS battery fail
- **System Memory**
  - Two x 240-pin unbuffered DDR2 DIMM sockets
  - Maximum to 4GB DDR2 memory
- **L2 Cache：** integrated in CPU
- **Onboard IDE**
  - One PATA-100 with 40-pin box-header
  - PATA-100 as PIO Mode 0-4, DMA Mode 0-2 and Ultra DMA/33/66/100
  - Three SATA-II connectors
- **Compact Flash Socket：**
  - One Compact Flash Type II Socket (optional)
- **Onboard Multi I/O：**
  - Three RS-232, one RS-232/422/485
  - One 26-pin box-header for shared FDD or LPT (Default LPT Port)
- **USB Interface：** Eight USB ports with fuse protection and complies with USB Spec. Rev. 2.0
- **Real Time Clock：** Integrate Intel® ICH8M
- **Watchdog Timer：**
  - 1~255 seconds; up to 255 levels

- **Graphics/Streaming：**
  - Mobile Intel® Graphics Media Accelerator X3100
  - Maximum up to 384MB Dynamic Video Memory Technology (DVMT 4.0)
  - Maximum display resolution:
    - CRT: 2048 x1536
    - LVDS: 1920 X1200 (24-bit single/dual channel LVDS interface)
  - DualView display mode:
    - CRT: 2048 x1536
    - LVDS: 1920 X1200 (24-bit single/dual channel LVDS interface)
  - LCD backlight control supported
- **Expansion Interface：**
  - One PCI Express x16 slot for discrete graphics card and ADD2 + Card
  - One PCI Express Mini Card (optional)
  - One PCI Express x4 slot for 3 PCI Express x1 through riser and direct plug PCI Express x1 card
- **Ethernet：**
  - One Intel® 82566DM and one 82573V Gigabit Ethernet
  - Equipped with RJ-45 interface
- **Audio：**
  - Realtek High Definition codec audio
  - MIC-in, Line-out
- **Power Management：**
  - ACPI (Advanced Configuration and Power Interface)
- **Form Factor：**
  - Mini ITX form factor（170mm* 170mm）

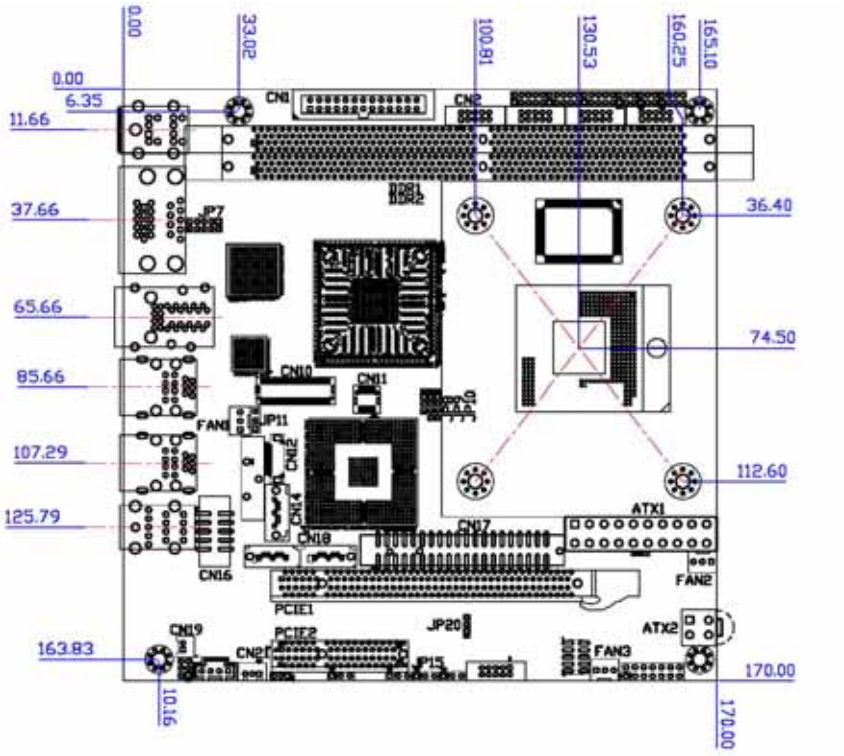
***NOTE**: All specifications and images are subject to change without notice.*

1.2 Utilities Supported

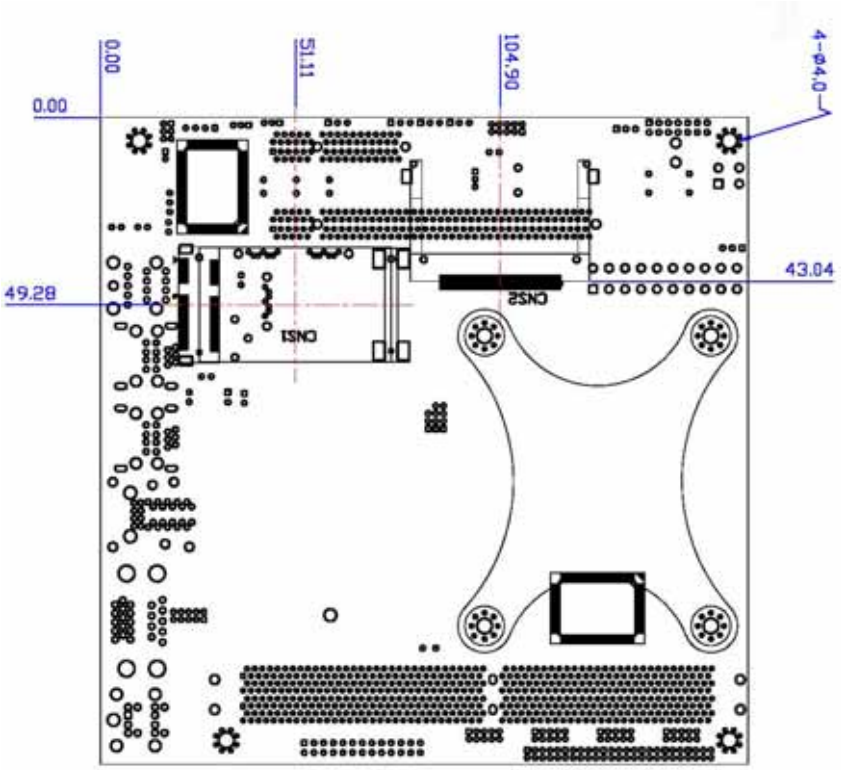
- Chipset Driver
- Ethernet Driver
- Graphic Drivers
- Audio Drivers

Chapter 2
Jumpers and Connectors

2.1 Board Dimensions and Fixing Holes



Component Side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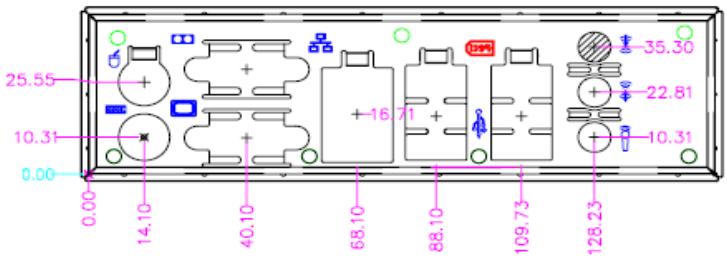
CNS2
CNS1

Solder Side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40.10
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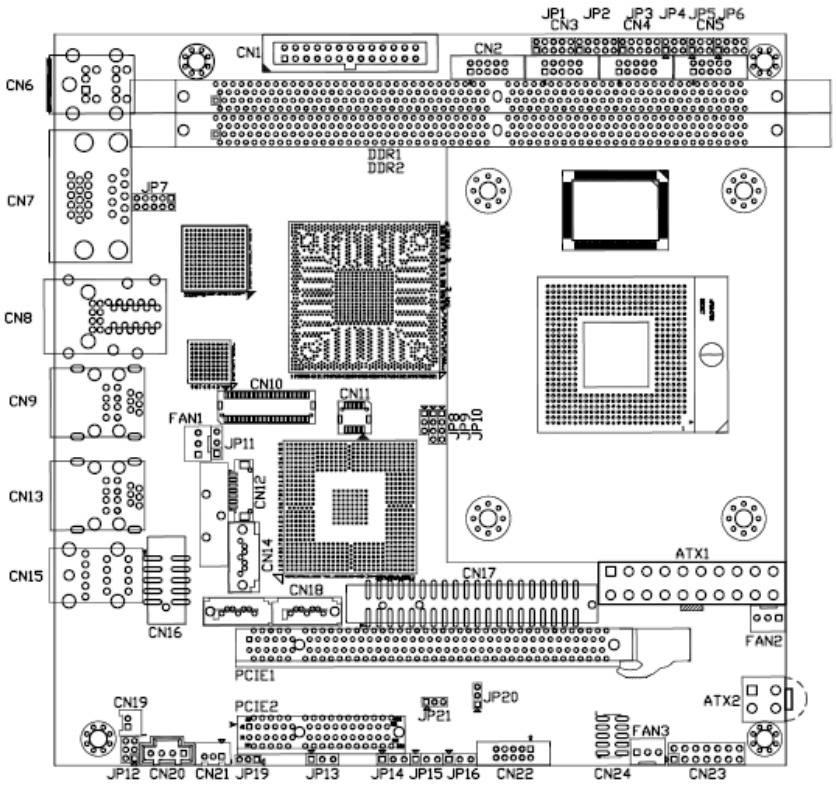
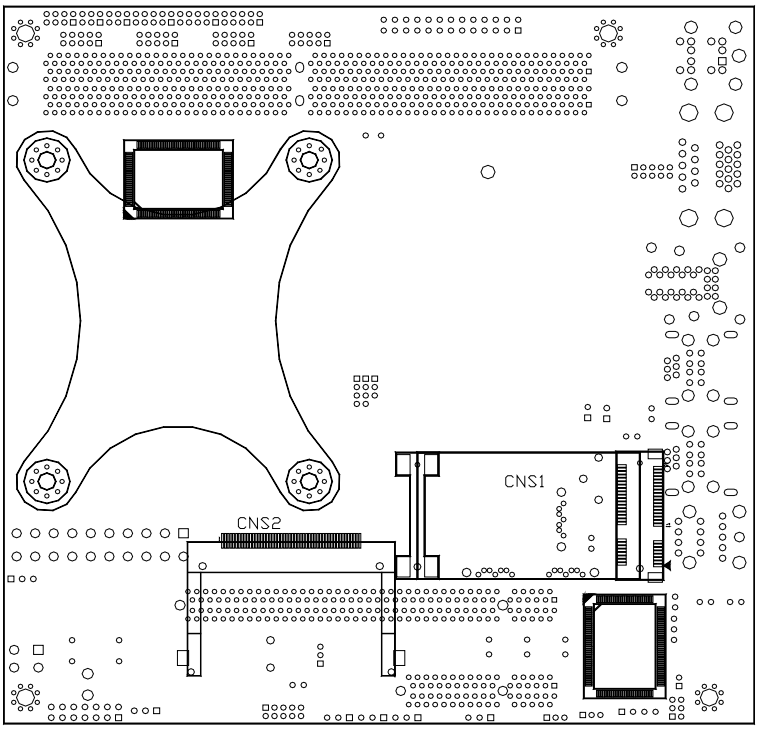
109.73
128.23

2.2 Board Layout



Component Side



Solder Side

2.3 Jumper Settings

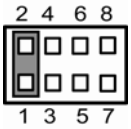
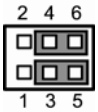
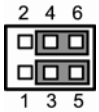
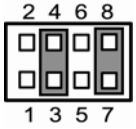
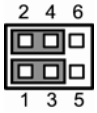
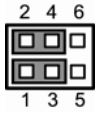
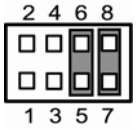
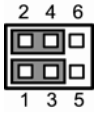
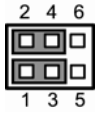
Proper jumer settings configure the SBC86840 to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

Here is a list of jumper settings：

Jumper	Default Setting		Jumper Setting
JP1	COM2 Mode Select	CN2 Pin 1: DCD	Short 7-9
		CN2 Pin 8: RI	Short 8-10
JP2	COM3 Mode Select	CN3 Pin 1: DCD	Short 7-9
		CN3 Pin 8: RI	Short 8-10
JP3	COM4 Mode Select	CN4 Pin 1: DCD	Short 7-9
		CN4 Pin 8: RI	Short 8-10
JP4	COM1 Mode Select : RS-232		Short 3-5, 4-6
JP5	COM1 Mode Select : RS-232		Short 3-5, 4-6
JP6	COM1 Mode Select : RS-232		Short 1-2
JP7	COM1 Mode Select	CN7 Pin 1: DCD	Short 7-9
		CN7 Pin 9: RI	Short 8-10
JP8	CPU Frequency Select : Auto		Short 1-2
JP9	CPU Frequency Select : Auto		Short 1-2
JP10	CPU Frequency Select : Auto		Short 1-2
JP11	LVDS Voltage select : 3.3V		Short 1-2
JP12	Audio Line Out/Speaker Out : Line Out		Short 1-3, 2-4
JP13	Clear CMOS Setting : Normal		Short 1-2
JP14	TPM Address Select : 4EH(Optional)		Short 1-2
JP15	Compact Flash Select : Slave (Optional)		Short 1-2
JP16	Compact Flash Power Select : 3.3V (Optional)		Short 1-2
JP19	USB Port5/6(CN16) Power Select : 5V		Short 2-3
JP20	USB Port7/8(CN22) Power Select : 5V		Short 2-3
JP21	PCI-Express x16 Slot select : Normal		Short 1-2

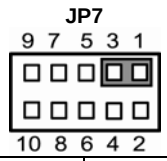
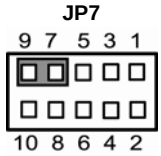
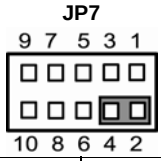
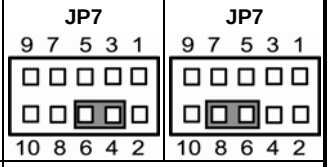
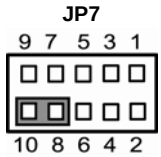
2.3.1 COM1 Mode Select Jumper: JP4, JP5, JP6

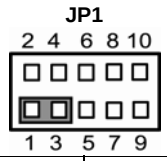
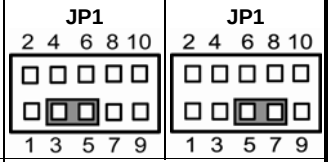
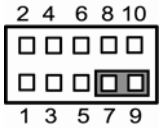
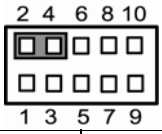
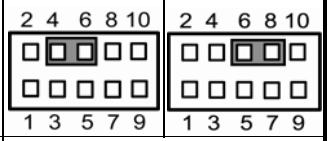
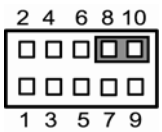
These jumpers select the COM1 port's communication mode to operate RS-232 or RS-422/485.

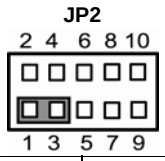
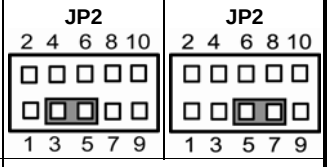
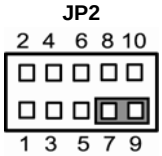
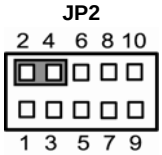
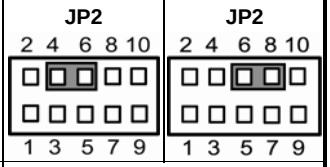
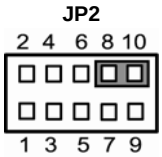
Description	Function	Jumper Setting		
COM1 Mode Select	RS-232 (Default)	**JP6** 	**JP5** 	**JP4** 
	RS-422	**JP6** 	**JP5** 	**JP4** 
	RS-485	**JP62** 	**JP5** 	**JP4** 

2.3.2 COM1~COM4 Mode Select for Type Jumpers: JP1, JP2, JP3, JP7

These jumpers select the COM1~COM4 ports' pin-1 to operate DCD with +5V and +12V power, and pin-8 or pin-9 to operate RI with +5V and +12V.

Description	Function	Jumper Setting
COM1 (CN7)	Pin 1=12V	
	Pin 1=5V	
	*Pin 1=DCD (Default)	
	Pin 9=12V	
	Pin 9=5V	
	*Pin 9=RI (Default)	

Description	Function	Jumper Setting
COM2 (CN2)	Pin 1=12V	
	Pin 1=5V	
	*Pin 1=DCD (Default)	
	Pin 8=12V	
	Pin 8=5V	
	*Pin 8=RI (Default)	

Description	Function	Jumper Setting
COM3 (CN3)	Pin 1=12V	
	Pin 1=5V	
	*Pin 1=DCD (Default)	
	Pin 8=12V	
	Pin 8=5V	
	*Pin 8=RI (Default)	

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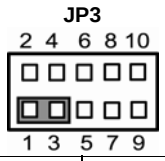
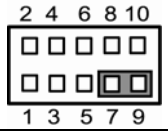
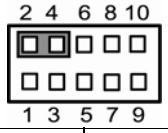
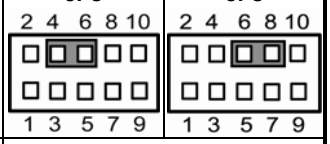
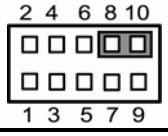
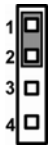
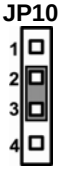
COM4 (CN4)	Pin 1=12V	
	Pin 1=5V	
	*Pin 1=DCD (Default)	
	Pin 8=12V	
	Pin 8=5V	
	*Pin 8=RI (Default)	

2.3.3 CPU Frequency Select Jumpers: JP8, JP9, JP10

These jumpers help you set the CPU frequency.

Description	Function	Jumper Setting		
CPU Frequency Select	Auto (Default)	**JP8** 	**JP9** 	**JP10** 
	FSB 667 MHz	**JP8** 	**JP9** 	**JP10** 
	FSB 800 MHz	**JP8** 	**JP9** 	**JP10** 

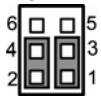
2.3.4 LVDS Voltage Selection Jumper: JP11

This jumper is to select the voltage for LVDS interface.

Description	Function	Jumper Setting
LVDS Voltage Selection	3.3V (Default)	**JP11** 
	5V	**JP11** 

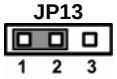
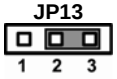
2.3.5 Audio Output Selection Jumper: JP12

This jumper makes the selection of Audio output.

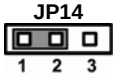
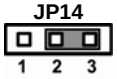
Description	Function	Jumper Setting
Audio Output Selection	Line Out (Default)	JP12 
	Speak Out	JP12 

2.3.6 CMOS Clear Jumper: JP13

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)	JP13 
	Clear CMOS	JP13 

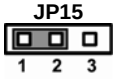
2.3.7 TPM PP (Physical Presence) Address Select Jumper: JP14

Description	Function	Jumper Setting
TPM (Physical Presence) Address Select	2EH.	JP14 
	4EH. (Default)	JP14 

This jumper is *optional*. It is not mounted as a default design.

2.3.8 CompactFlash Setting Jumper: JP15

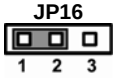
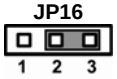
Use this jumper to select the Master or Slave CompactFlash interface.

Description	Function	Jumper Setting
CompactFlash Mode (Master/Slave) Selection	Slave (Default)	JP15 
	Master	JP15 

This jumper is *optional*. It is not mounted as a default design.

2.3.9 CompactFlash Voltage Selection Jumper: JP16

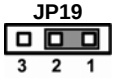
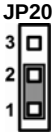
Use this jumper to select the voltage for CompactFlash interface.

Description	Function	Jumper Setting
CompactFlash Voltage Selection	3.3V (Default)	JP16 
	5V	JP16 

This jumper is *optional*. It is not mounted as a default design.

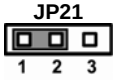
2.3.10 USB Power Selection Jumper: JP19 (for CN16), JP20 (for CN22)

Use this jumper to select the voltage for USB interface.

Description	Function	Jumper Setting	
USB Power Selection	5V_DUAL	JP19  	JP20 
	5V (Default)	JP19  	JP20 

2.3.11 PCI-Express x16 Slot Selection Jumper: JP21

Use this jumper to select PCI-Express x16 card or Add2 card.

Description	Function	Jumper Setting
PCI-Express x16 selection	PCI-Express x16 card (Default)	JP21 
	Add2 card	JP21 

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 **SBC86840** Series.

Connectors	Label
Parallel Port or Floppy Connector (Default : LPT)	CN1
Serial Port2 Connector	CN2
Serial Port3 Connector	CN3
Serial Port4 Connector	CN4
Digital I/O (DIO) Connector	CN5
PS2 Keyboard/Mouse Connector	CN6
VGA & Serial Port1 Connector	CN7
LAN1/LAN2 Connector	CN8
USB Port1/2 & IEEE1394 Port1 Connector	CN9
LVDS Connector	CN10
TV-OUT Connector (Optional)	CN11
LVDS Backlight Connector	CN12
USB Port3/4 & IEEE1394 Port2 Connector	CN13
Serial ATA Port 2 Connector	CN14
Audio Phone Jack Connector	CN15
USB Port5/6 Connector	CN16
Parallel IDE Connector	CN17
Serial ATA Port1/3 Connector	CN18
Audio S/PDIF-OUT Connector	CN19
Audio CD-In Connector	CN20
SM Bus Connector	CN21
USB Port7/8 Connector	CN22
Front Panel Bezel Connector	CN23
SPI Flash Record Connector	CN24
Mini PCI-Express Socket (Optional)	CNS1
Compact Flash Connector(Optional)	CNS2
PCI-Express x16 Slot	PCIE1
PCI-Express x4 Expansion Slot	PCIE2
DDRII Long-DIMM 2	DDR1
DDRII Long-DIMM 1	DDR2
NB FAN Connector	FAN1

Connectors	Label
CPU FAN Connector	FAN2
System FAN Connector	FAN3
ATX 2X10 Power Connector	ATX1
ATX +12V 2X2 Power Connector	ATX2

2.4.1 Print Port or Floppy Connector: CN1

Print Port Connector [Default]

This board has a multi-mode parallel port to support:

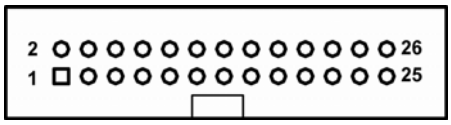
1. Standard mode:
IBM PC/XT, PC/AT and PS/2™ compatible with bi-directional parallel port

2. Enhanced mode:
Enhance parallel port (EPP) compatible with EPP 1.7 and EPP 1.9 (IEEE 1284 compliant)

3. High speed mode:
Microsoft and Hewlett Packard extended capabilities port (ECP) IEEE 1284 compliant

Pin	Description	Pin	Description
1	STB#	2	AFD#
3	PD0	4	ERR#
5	PD1	6	INIT#
7	PD2	8	SLIN#
9	PD3	10	GND
11	PD4	12	GND
13	PD5	14	GND
15	PD6	16	GND
17	PD7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

CN1

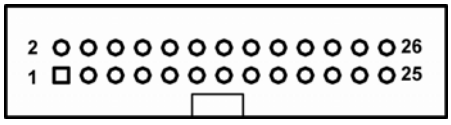


Floppy Connector [Optional]

You can plug one end of FDD cable in the FDD connector, and the other end of cable to the FDD drive. It supports the types of The FDD drives 360KB, 720KB, 1.2MB, 1.44MB and 2.88MB.

Pin	Description	Pin	Description
1	DRIVE0	2	NC
3	INDEX	4	NC
5	MOTOR ON	6	NC
7	DSKCHG	8	NC
9	DIR	10	GND
11	STEP	12	GND
13	WDATA	14	GND
15	WGATE	16	GND
17	TRK0	18	GND
19	WPT	20	GND
21	RDATA	22	GND
23	HDSEL	24	GND
25	DSKCHG	26	NC

CN1



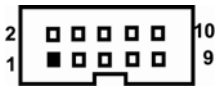
The Parallel port and Floppy drive share the same connector so that you can select only one out of them. The parallel port is the default setting.

2.4.2 Serial Port Connectors: CN2, CN3, CN4

Please refer to the RS-232 pin assignment as listed below:

Pin	Description	Pin	Description
1	Data Carrier Detect (DCD)	2	Data Set Ready (DSR)
3	Receive Data (RXD)	4	Request to Send (RTS)
5	Transmit Data (TXD)	6	Clear to Send (CTS)
7	Data Terminal Ready (DTR)	8	Ring Indicator (RI)
9	Ground (GND)	10	NC

CN2, CN3, CN4

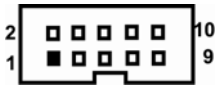


2.4.3 Digital I/O Port (DIO) Connector: CN5

The board is equipped an 8-channel digital I/O connector **CN5** 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	Description	Pin	Description
1	Digital Input 1	2	Digital Output 1
3	Digital Input 2	4	Digital Output 2
5	Digital Input 3	6	Digital Output 3
7	Ground(GND)	8	Digital Output 4
9	Ground(GND)	10	Digital Output 5

CN5

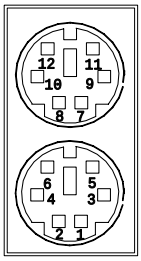


2.4.4 PS/2 Keyboard and Mouse Connector: CN6

The board provides a keyboard and Mouse interface with a DIN connector. To install the PS/2 keyboard and mouse, plug the mouse to the upper port (Green), and the keyboard to the lower port (Purple).

Pin	Description	Pin	Description
1	K/B Data	7	M/S Data
2	NC	8	NC
3	GND	9	GND
4	VCC	10	VCC
5	K/B CLK	11	M/S CLK
6	NC	12	NC

CN6

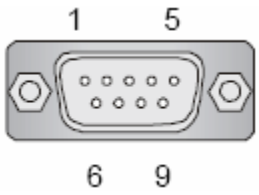


2.4.5 VGA & Serial Port 1 Connectors: CN7A, CN7B

CN7 is a double deck D-Sub connector. The upper **CN7B** is a standard 9-pin pin DB9 connector for the Serial Port1 RS-232/422/485, jumper selectable with auto flow control features. The +5V/12V power capability is on DCD and RI, depending on the jumper setting.
CN7A is a standard 15-pin DB15 connector for the CRT VGA display.

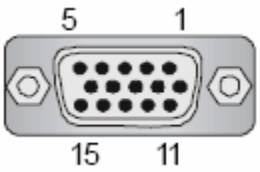
Pin	Description
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground (GND)
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)

CN7B



Pin	Description
1	Red
2	Green
3	Blue
4	N.C
5	Ground (GND)
6	AnalogGround（AGND）
7	AnalogGround（AGND）
8	AnalogGround（AGND）
9	+5V
10	Ground (GND)
11	N.C
12	DDC DATA
13	Horizontal Sync
14	Vertical Sync
15	DDC CLK

CN7A



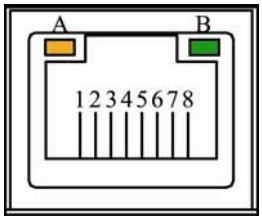
2.4.6 LAN1/LAN2 Connectors: CN8_A, CN8_B

The board is equipped with a high performance Plug and Play Ethernet interface fully compliant with the IEEE 802.3 standard. To connect the board to 10-Base-T, 100-Base-T or 1000 Base-T hub, just plug one end of cable to the Ethernet connector and connect the other end (phone jack) to a 10-Base-T, 100-Base-T or 1000 Base-T hub.

Pin	Description
1	LAN2_MDI0+
2	LAN2_MDI0-
3	LAN2_MDI1+
4	LAN2_MDI1-
5	LAN2_MDI2+
6	LAN2_MDI2-
7	LAN2_MDI3+
8	LAN2_MDI3-
A	Active LED
B	100 LAN LED(Green)/ 1000 LAN LED(Orange)

CN8_A

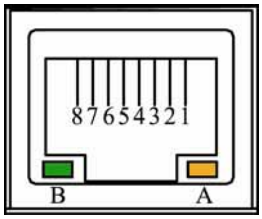
LAN1(Intel 82566)



COM1	Description
1	MDI0+
2	MDI0-
3	MDI1+
4	MDI1-
5	MDI2+
6	MDI2-
7	MDI3+
8	MDI3-
A	Active LED (Yellow)
B	1000 (Orange) / 100 (Green) LAN LED

CN8_B

LAN2(Intel 82573V)



Please restart your system after installing the LAN driver.

2.4.7 USB*2 + IEEE1394 Connectors: CN9, CN13

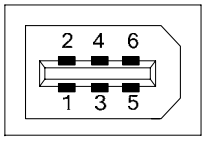
The board supports two three-layer USB & IEEE1394a connectors, **CN9** and **CN13**.

The upper **CN9A** and **CN13A** ports are for IEEE1394a, compliant with the Serial Interface Standard set by the Institute of Electrical and Electronics Engineers, which feature high speed, high bandwidth and hot plug that can connect with IEEEa1394 devices and peripherals.

The lower double-deck **CN9B** and **CN13B** are USB 2.0 ports compliant (480Mbps) that can be connected to any USB peripherals, such as keyboard, mouse, scanner.

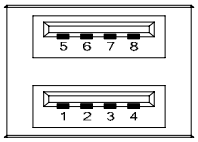
Pin	Description
1	+12V
2	GND
3	XTPB0N
4	XTPB0P
5	XTPA0N
6	XTPA0P

CN9A



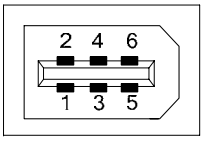
Pin	Description
1	+5V
2	USB D0-
3	USB D0+
4	GND
5	+5V
6	USB D1-
7	USB D1+
8	GND

CN9B



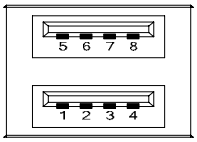
Pin	Description
1	+12V
2	GND
3	XTPB1N
4	XTPB1P
5	XTPA1N
6	XTPA1P

CN13A



Pin	Description
1	+5V
2	USB D2-
3	USB D2+
4	GND
5	+5V
6	USB D3-
7	USB D3+
8	GND

CN13B

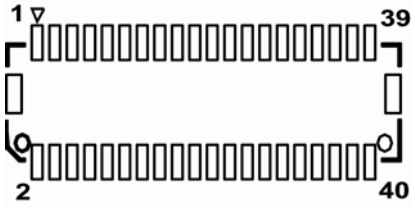


2.4.8 LVDS Flat Panel Connector: CN10

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	Description	Pin	Description
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-
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

CN10

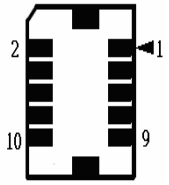


2.4.9 TV-OUT Connector: CN11

The TV-OUT connector on the SBC is a 10-pin connector. It is strongly recommended to use the matching Hirose DF20A-10DS-1C connector.

Pin	Description	
1	TVB-DAC	Luminance+Sync(S-Video)
2	GND	
3	GND	
4	GND	
5	TVA-DAC	Composite(RCA)
6	GND	
7	GND	
8	GND	
9	TVC-DAC	Crominance(S-Video)
10	GND	

CN11



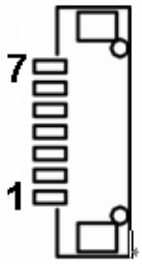
This connector is *optional*. It is not mounted as a default design.

2.4.10 LVDS Backlight Connector: CN12

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

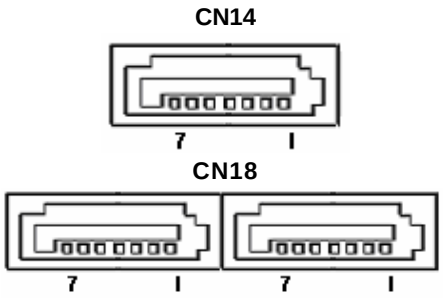
CN12



2.4.11 SATA Connectors: CN14, CN18

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

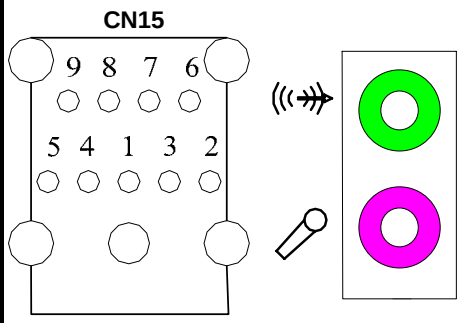
Pin	Description
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND



2.4.12 Audio Phone Jack Connector: CN15

After installing onboard audio driver, you may connect speaker to Line Out jack, microphone to MIC in jack.

Pin	Description
1	Ground (GND)
2	MIC_IN_L
3	MIC_JD
4	Ground (GND)
5	MIC_IN_R
6	AUDIO_OUT_L
7	FRONT_JD
8	Ground (GND)
9	AUDIO_OUT_R

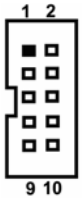


2.4.13 USB Port 4/5/6/7 Connectors: CN16, CN22

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

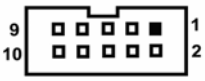
Pin	Description	Pin	Description
1	+5V	2	+5V
3	USB4-	4	USB5-
5	USB4+	6	USB5+
7	Ground (GND)	8	Ground (GND)
9	Ground (GND)	10	Ground (GND)

CN16



Pin	Description	Pin	Description
1	+5V	2	+5V
3	USB7-	4	USB6-
5	USB7+	6	USB6+
7	Ground (GND)	8	Ground (GND)
9	Ground (GND)	10	Ground (GND)

CN22



2.4.14 Parallel IDE Connector: CN17

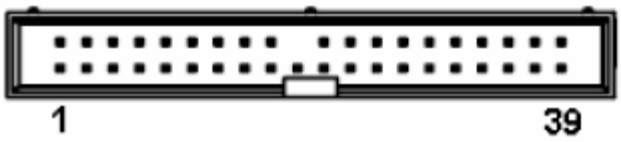
An IDE device can be connected to the computer via an IDE connector. One IDE connector is for one single IDE cable to connect two IDE devices. If you want to install two IDE devices, please configure one IDE device as Master, and the other as Slave by setting the jumper.

Please refer to next page for the detailed CN17 pin assignment.

CN17 Pin Assignment:

Pin	Description	Pin	Description	Pin	Description
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
16	Data 14	17	Data 0	18	Data 15
19	GND	20	No connector	21	DREQ
22	GND	23	IOW #	24	GND
25	IOR #	26	GND	27	IOCHRDY
28	CSEL	29	DACK#	30	GND
31	IRQ	32	No connector	33	SA1
34	PATADET	35	SA0	36	SA2
37	HDC CS0 #	38	HDC CS1 #	39	HDD Active #
40	GND				

CN17

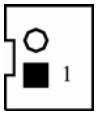


2.4.15 Audio S/PDIF-OUT Connector: CN19

This connector is to connect S/PDIF (Sony & Philips Digital Interconnect Format) interface for digital audio transmission.

Pin	Description
1	S/PDIF-OUT
2	GND

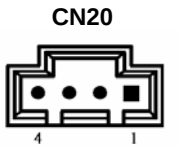
CN19



2.4.16 Audio CD-In Connector: CN20

This connector is provided for external audio input.

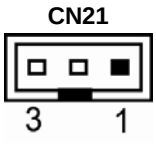
Pin	Description
1	CD IN_L
2	GND
3	GND
4	CD IN_R



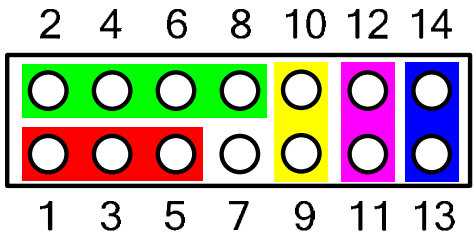
2.4.17 SMBUS Connector: CN21

This connector CN21 is for SMBUS interface support.

Pin	Description
1	SMB_CLOCK
2	SMB_DATA
3	GND



2.4.18 Flat Panel Bezel Connector: CN23



- **Power LED**

  This 3-pin connector named as Pin 1, 3 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 +.

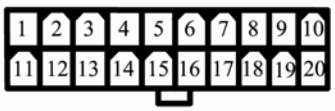
2.4.19 ATX Power Connector: ATX1

Steady and sufficient power can be supplied to all components on the board through the power connector. Please make sure all components and devices are properly installed before connecting the power connector. Align the power connector with its proper location on the board and connect tightly.

If you use a 20-pin ATX power supply, please remove the small cover from the power connector before plugging in the power cord; otherwise, please do not remove it.

Pin	Description	Pin	Description
1	3.3V	2	3.3V
3	GND	4	5V
5	GND	6	5V
7	GND	8	PW_OK
9	5V_SB	10	12V
11	3.3V	12	-12V
13	GND	14	PS_ON
15	GND	16	GND
17	GND	18	-5V
19	5V	20	5V

ATX1

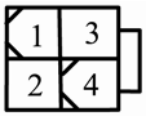


2.4.20 ATX +12V Power Connector: ATX2

The ATX2 power connector is mainly for CPU power supply. If the ATX2 power connector is not connected, the system won't start.

Pin	Description
1	GND
2	GND
3	+12V
4	+12V

CN1



2.4.21 Mini PCI-Express Socket: CNS1 (Optional)

CNS1 is a Mini PCI Express Card Socket to support both a PCI Express x1 link and a USB 2.0 link. A PCI Express Mini Card can be applied to either PCI Express or USB 2.0 (or both). The USB 2.0 support will be helpful during the transition to PCI Express, because peripheral vendors will need time to design their chipsets to have the PCI Express function. During the transition period, PCI Express Mini Cards can be quickly implemented by using USB 2.0.

This connector is *optional*. It is not mounted as a default design.

Pin	Description	Pin	Description
1	PCIE_WAKE#	2	+3.3V
3	N.C	4	GND
5	N.C	6	+1.5 V
7	GND	8	N.C
9	GND	10	N.C
11	PCIE_CLK-	12	N.C
13	PCIE_CLK+	14	N.C
15	GND	16	N.C
17	N.C	18	GND
19	N.C	20	N.C
21	GND	22	PCIE_RESET#
23	PCIE_RXN	24	+3.3V_SBY
25	PCIE_RXP	26	GND
27	GND	28	+1.5V

Pin	Description	Pin	Description
29	GND	30	SMB_CLK
31	PCIE_TXN	32	SMB_DATA
33	PCIE_TXP	34	GND
35	GND	36	USB_D-
37	N.C	38	USB_D+
39	N.C	40	GND
41	N.C	42	N.C
43	N.C	44	N.C
45	N.C	46	N.C
47	N.C	48	+1.5V
49	N.C	50	GND
51	N.C	52	+3.3V

2.4.22 CompactFlash™ Socket: CNS2 (Optional)

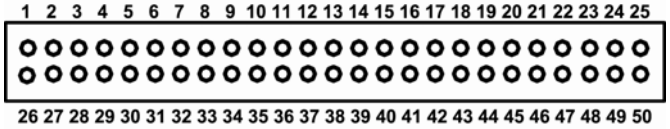
The board is equipped with a CompactFlash™ disk type-II socket on the solder side to support an IDE interface CompactFlash™ disk card with DMA mode supported. The socket is especially designed to avoid incorrect installation of the CompactFlash™ disk card. When installing or removing the CompactFlash™ disk card, please make sure the system power is off. The CompactFlash™ disk card is defaulted as the C: or D: disk drive in your PC system.

This connector is *optional*. It is not mounted as a default design.

Pin	Description	Pin	Description
1	GND	2	Data 3
3	Data 4	4	Data 5
5	Data 6	6	Data 7
7	CS0-	8	Address 10
9	ATASEL	10	Address 9
11	Address 8	12	Address 7
13	+5V	14	Address 6
15	Address 5	16	Address 4
17	Address 3	18	Address 2

Pin	Description	Pin	Description
19	Address 1	20	Address 0
21	Data 0	22	Data 1
23	Data 2	24	IOCS16-
25	CD2-	26	CD1-
27	Data 11	28	Data 12
29	Data 13	30	Data 14
31	Data 15	32	CS1-
33	VS1-	34	IORD-
35	IOWR-	36	WE#
37	INTR	38	+5V
39	CSEL-	40	VS2-
41	RESET-	42	IORDY-
43	DMAREQ	44	DMAACK-
45	DASP-	46	PATADET
47	Data 8	48	Data 9
49	Data 10	50	GND

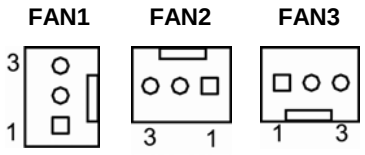
CNS2



2.4.23 Fan Connectors: FAN1, FAN2, FAN3

Pentium microprocessors require a fan for heat dispensing. **FAN1** is a fan connector for North Bridge fan connector, **FAN2** for CPU, and **FAN3** for system. These fan connectors are for fan power supply.

Pin	Description
1	Ground
2	+12V
3	Sensor



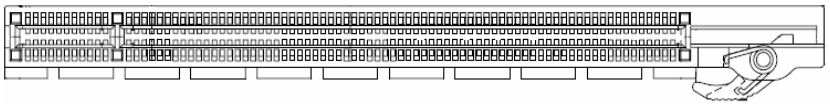
2.4.24 PCI-Express x16 Slot: PCIE1

PCIE1 slot supports the PCI-Express x16 graphics interface for PCI-Express x16 graphics cards.

Pin	Description	Pin	Description	Pin	Description	Pin	Description
A1	N.C	A2	+12V	B1	+12V	B2	+12V
A3	+12V	A4	GND	B3	+12V	B4	GND
A5	N.C	A6	N.C	B5	SMCLK	B6	SMDAT
A7	N.C	A8	N.C	B7	GND	B8	+3.3V
A9	+3.3V	A10	+3.3V	B9	N.C	B10	3.3VAUX
A11	RESET#	A12	GND	B11	WAKE#	B12	N.C
A13	PCIE_CLK+	A14	PCIE_CLK-	B13	GND	B14	PEG_TXP0
A15	GND	A16	PEG_RXP0	B15	PEG_TXN0	B16	GND
A17	PEG_RXN0	A18	GND	B17	N.C	B18	GND
A19	N.C	A20	GND	B19	PEG_TXP1	B20	PEG_TXN1
A21	PEG_RXP1	A22	PEG_RXN1	B21	GND	B22	GND
A23	GND	A24	GND	B23	PEG_TXP2	B24	PEG_TXN2
A25	PEG_RXP2	A26	PEG_RXN2	B25	GND	B26	GND
A27	GND	A28	GND	B27	PEG_TXP3	B28	PEG_TXN3
A29	PEG_RXP3	A30	PEG_RXN3	B29	GND	B30	N.C
A31	GND	A32	N.C	B31	N.C	B32	GND
A33	N.C	A34	GND	B33	PEG_TXP4	B34	PEG_TXN4
A35	PEG_RXP4	A36	PEG_RXN4	B35	GND	B36	GND
A37	GND	A38	GND	B37	PEG_TXP5	B38	PEG_TXN5
A39	PEG_RXP5	A40	PEG_RXN5	B39	GND	B40	GND
A41	GND	A42	GND	B41	PEG_TXP6	B42	PEG_TXN6
A43	PEG_RXP6	A44	PEG_RXN6	B43	GND	B44	GND
A45	GND	A46	GND	B45	PEG_TXP7	B46	PEG_TXN7
A47	PEG_RXP7	A48	PEG_RXN7	B47	GND	B48	N.C
A49	GND	A50	N.C	B49	GND	B50	PEG_TXP8
A51	GND	A52	PEG_RXP8	B51	PEG_TXN8	B52	GND

Pin	Description	Pin	Description	Pin	Description	Pin	Description
A53	PEG_RXN8	A54	GND	B53	GND	B54	PEG_TXP9
A55	GND	A56	PEG_RXP9	B55	PEG_TXN9	B56	GND
A57	PEG_RXN9	A58	GND	B57	GND	B58	PEG_TXP10
A59	GND	A60	PEG_RXP10	B59	PEG_TXN10	B60	GND
A61	PEG_RXN10	A62	GND	B61	GND	B62	PEG_TXP1
A63	GND	A64	PEG_RXP11	B63	PEG_TXN11	B64	GND
A65	PEG_RXN11	A66	GND	B65	GND	B66	PEG_TXP12
A67	GND	A68	PEG_RXP12	B67	PEG_TXN12	B68	GND
A69	PEG_RXN12	A70	GND	B69	GND	B70	PEG_TXP13
A71	GND	A72	PEG_RXP13	B71	PEG_TXN13	B72	GND
A73	PEG_RXN13	A74	GND	B73	GND	B74	PEG_TXP14
A75	GND	A76	PEG_RXP14	B75	PEG_TXN14	B76	GND
A77	PEG_RXN14	A78	GND	B77	GND	B78	PEG_TXP15
A79	GND	A80	PEG_RXP15	B79	PEG_TXN15	B80	GND
A81	PEG_RXN15	A82	GND	B81	N.C	B82	N.C

PCIE1

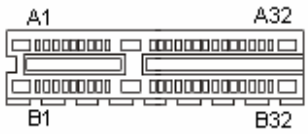


2.4.25 PCI-EXPRESS x4 Expansion Slot: PCIE2

This PCI-Express x4 Expansion Slot **(PCIE2)** supports 3 PCI-Express x1 graphics interface throught riser card.

Pin	Description	Pin	Description	Pin	Description	Pin	Description
A1	N.C	A2	+12V	B1	+12V	B2	+12V
A3	+12V	A4	GND	B3	+12V	B4	GND
A5	N.C	A6	N.C	B5	SMCLK	B6	SMDAT
A7	N.C	A8	N.C	B7	GND	B8	+3.3V
A9	+3.3V	A10	+3.3V	B9	N.C	B10	3.3VAUX
A11	RESET#	A12	GND	B11	WAKE#	B12	N.C
A13	PCIE_CLK+	A14	PCIE_CLK-	B13	GND	B14	PEG_TXP0
A15	GND	A16	PEG_RXP0	B15	PEG_TXN0	B16	GND
A17	PEG_RXN0	A18	GND	B17	N.C	B18	GND
End of the x1 Connector							
A19	N.C	A20	GND	B19	PCIE_CLK2+	B20	PCIE_CLK2-
A21	PCIE_CLK3+	A22	PCIE_CLK3-	B21	GND	B22	GND
A23	GND	A24	GND	B23	PEG_TXP2	B24	PEG_TXN2
A25	PEG_RXP2	A26	PEG_RXN2	B25	GND	B26	GND
A27	GND	A28	GND	B27	PEG_TXP3	B28	PEG_TXN3
A29	PEG_RXP3	A30	PEG_RXN3	B29	GND	B30	N.C
A31	GND	A32	N.C	B31	N.C	B32	N.C

PCIE2



Please be noted the PCIe x4 slot is compliant with PICMG v1.3 standard that you directly insert one PCIe x1, or three PCIe x1 through riser card for expansion. This slot does not support regular PCIe x4 add-on card.

Chapter 3
Hardware Description

3.1 Microprocessors

The **SBC86840** Series supports Intel® Core™ 2 Duo and Celeron® M 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 **SBC86840** Series uses Award Plug and Play BIOS with a single 16Mbit SPI Flash EPROM.

3.3 System Memory

The **SBC86840** Series industrial CPU card supports two 240-pin DDR2 DIMM sockets for a maximum memory of 4GB DDR2 SDRAMs. The memory module can come in sizes of 256MB, 512MB, 1GB and 2GB.

3.4 I/O Port Address Map

The Intel® Core™ 2 Duo and 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
04E-4F	Super I/O 2
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
2E8-2EF	Communications Port (COM4)
2F8-2FF	Communications Port (COM2)
376	Secondary IDE Channel
378-37F	Printer Port (LPT1)
3B0-3BB	Mobile Intel® 965 Express Chipset Family
3C0-3DF	Mobile Intel® 965 Express Chipset Family
3E8-3EF	Communications Port (COM3)
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 **SBC86840 Series** is a 100% PC compatible control board. It consists of 16 interrupt request lines, and four out of them can be programmable. The mapping list of the 16 interrupt request lines is shown as the following table.

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 <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 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 <Del> 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 <DEL> TO ENTER SETUP

4.2 Control Keys

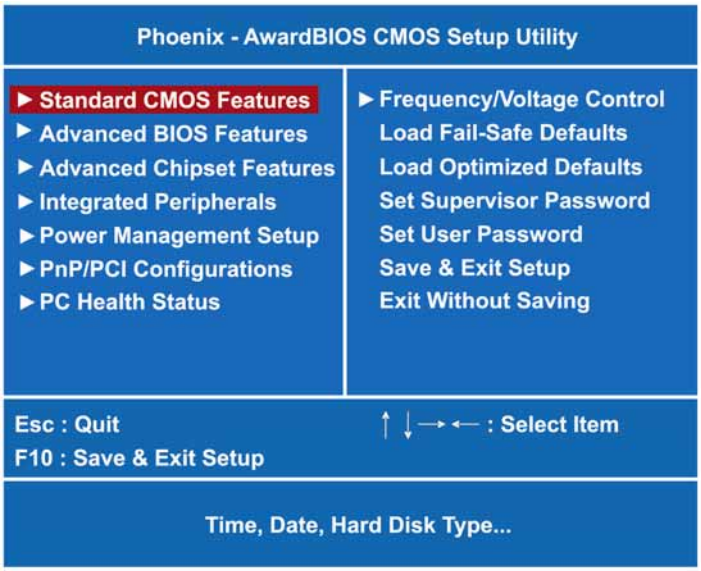
Up arrow	Move cursor to the previous item
Down arrow	Move cursor to the next item
Left arrow	Move cursor to the item on the left hand
Right arrow	Move to the item in the right hand
Esc key	Main Menu -- Quit and delete changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current 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.

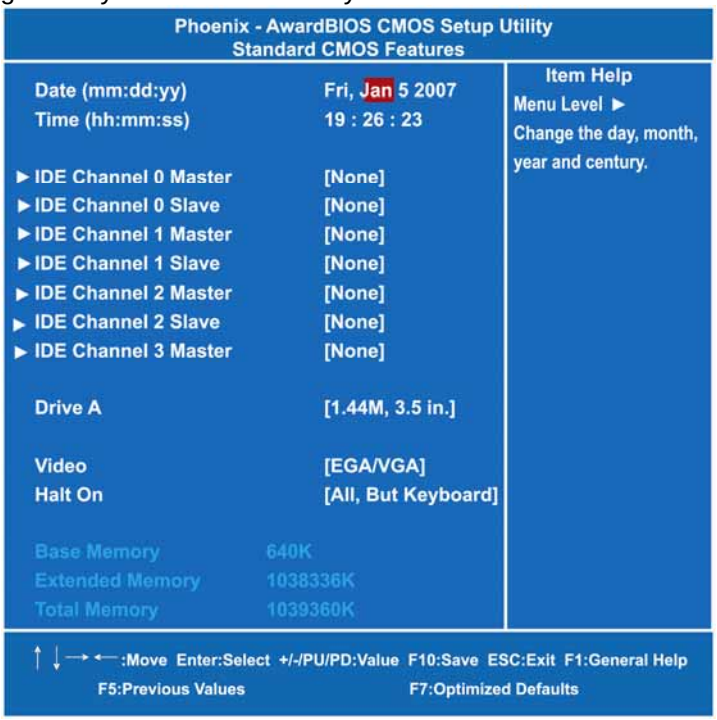


NOTE: *If your computer can not boot after making and saving system changes with Setup, the Award BIOS will reset your system to the CMOS default settings via its built-in override feature.*

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 0~3 Master/IDE Channel 0~2 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>.

- **Drive A**
  Select the type of floppy drive installed in your system, and the default setting is *"None"*.

- **Video**
  Select the display adapter type for your system.

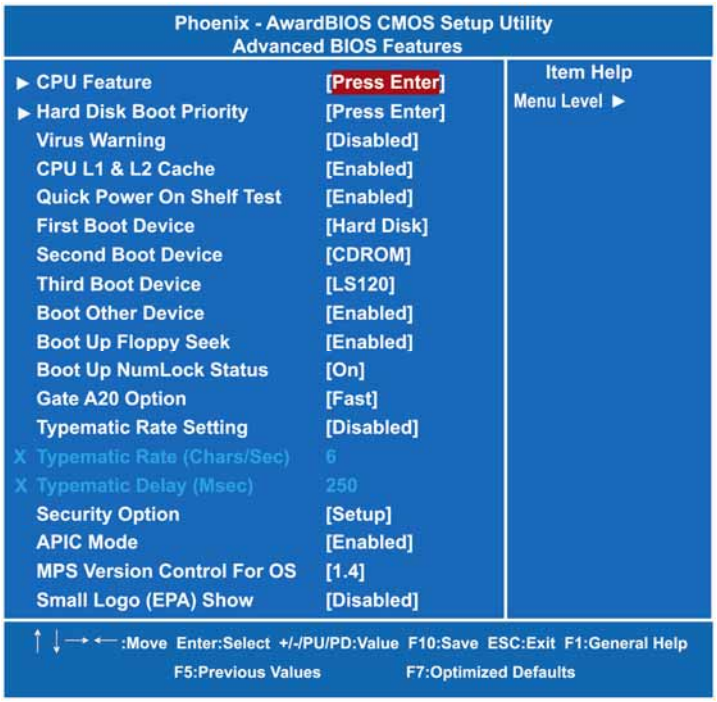
- **Halt On**
  This item determines whether the system will halt or not, if an error is detected while powering up.

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.

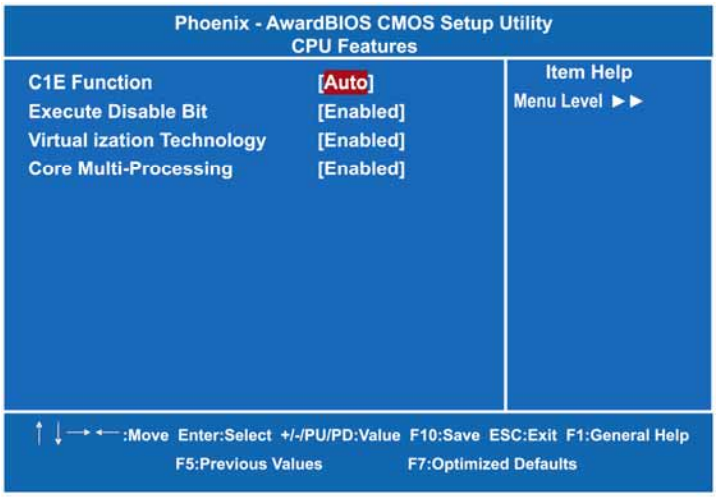
4.6 Advanced BIOS Features

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

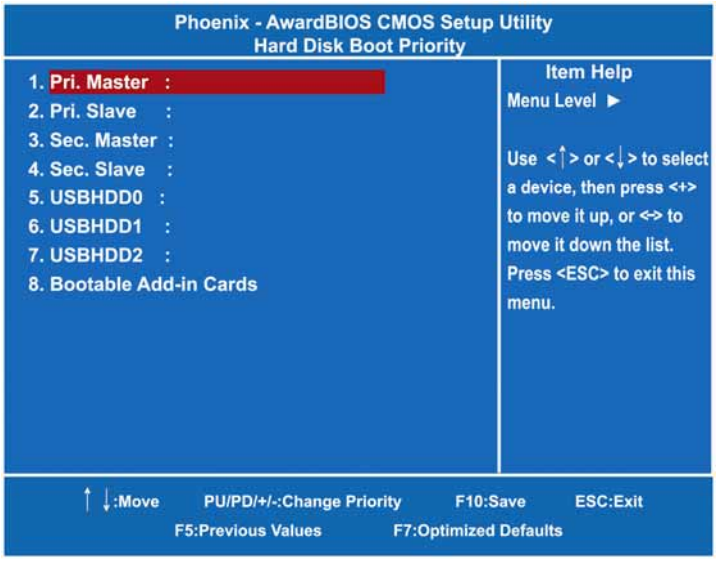


- **CPU Feature**

Scroll to this item and press <Enter> to view the CPU Feature sub menu.



- **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 function allows you to choose the VIRUS Warning feature for IDF Hard Disk boot sector protection. If this function is enabled and attempt to write data into this area, BIOS will show a warning message on screen and alarm beep.
- **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

- **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, HDD0~3, 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*".
- **Boot Up Floppy Seek**
  During POST, BIOS will determine the floppy disk drive type, 40 or 80 tracks. The 360Kb type is 40 tracks while 720Kb, 1.2MB and 1.44MB are all 80 tracks. The default value is *"Enabled"*.

Enabled	BIOS searches for floppy disk drive to determine if it is 40 or 80 tracks. Please be noted BIOS can not differentiate 720K, 1.2M or 1.44M drive type as they all are 80 tracks.
Disabled	BIOS will not search for the type of floppy disk drive by track number. There will be no warning message displayed if the installed drive is 360K.

- **Boot Up NumLock Status**
  Set the the Num Lock status when the system is powered on. The default value is *"On"*.
- **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.

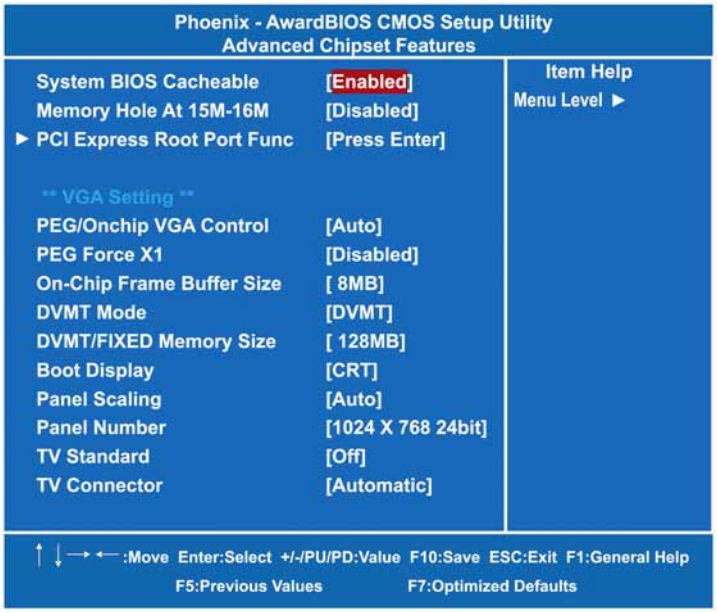
NOTE: *To disable the security, select PASSWORD SETTING at Main Menu and then you will be asked to enter a password. Do not type anything, just press <Enter> and it will disable the security. Once the security is disabled, the system will boot and you can enter Setup freely.*

- **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 disabled, the EPA logo will not appear.

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

4.7 Advanced Chipset Features

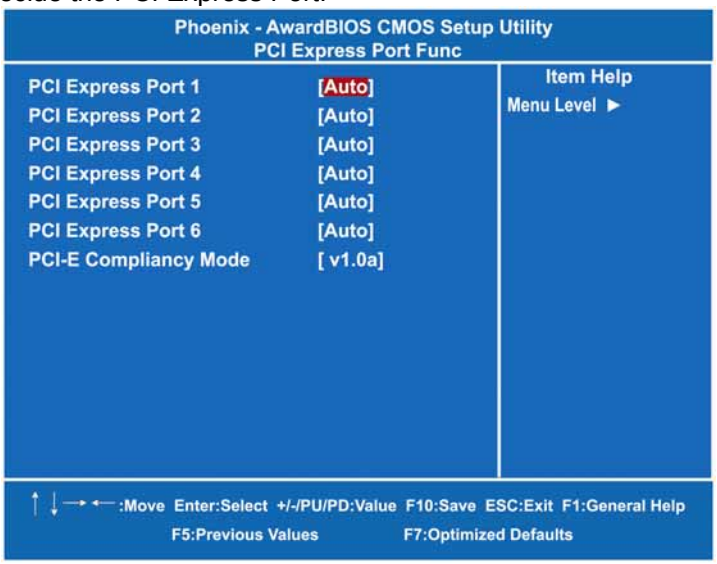
This section contains completely optimized chipset's features on the board that you are strongly recommended to leave all items on this page at their default values unless you are very familiar with the technical specifications of your system hardware.



- **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"*.

- **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.

- **PCI Express Root Port Func**
  Scroll to this item and press <Enter> to view the sub menu to decide the PCI Express Port.



Press <Esc> to return to the Advanced Chipset Featurs page, and press it again, return to the Main Menu page.

***** VGA Setting *****

- **PEG/Onchip VGA Control**
  This setting allows you to select whether to use the onchip graphics processor or the PCI Express card. When set to [Auto], the BIOS will check if a PCI Express graphics card is installed or not. If a PCI Express graphics card is detected, the board will boot up using that card. Otherwise, it is defaulted to the onchip graphics processor.
- **PEG Force X1**
  This BIOS feature allows you to convert a PCI Express X16 slot into a PCI Express X1 slot. When this item is enabled, the PCI Express X16 slot will be forced to run in the PCI Express X1 mode. When this item is disabled, the PCI Express X16 slot will be allowed to run its normal PCI Express X16 mode.

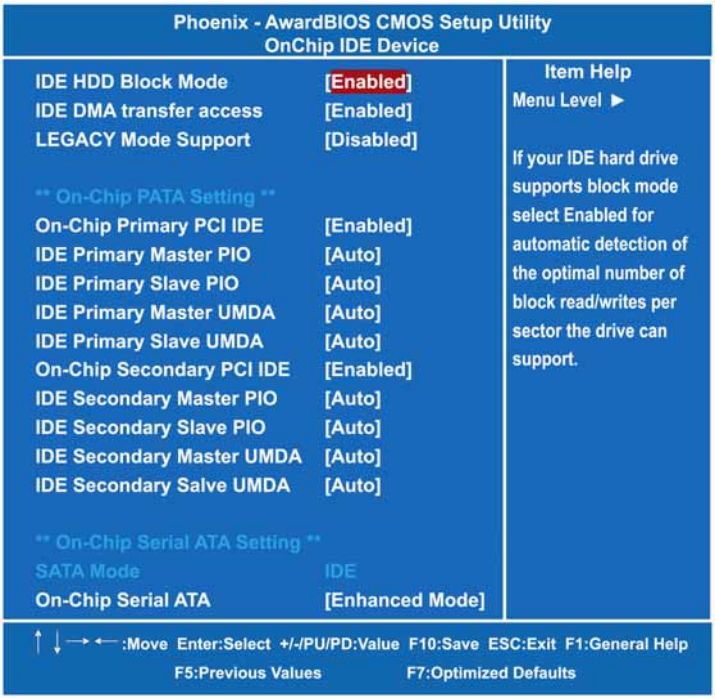
- **On-Chip Frame Buffer Size**
  Use this item to set the VGA frame buffer size.
- **DVMT Mode**
  DVMT (Dynamic Video Memory Technology) helps you select the video mode.
- **DVMT/Fixed Memory Size**
  DVMT (Dynamic Video Memory Technology) allows you to select a maximum size of dynamic amount usage of the video memory. The system would configure the video memory dependent on your application.
- **Boot Display**
  This item is to select Display Device that the screen will be shown.
- **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.
- **Panel Number**
  This item is to select panel resolution that you want.
- **TV Standard**
  This item is to select the output mode of TV Standard.
- **TV Connector**
  This item is to select the type of TV display connector.

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.
  - **LEGACY Mode Support**
    Legacy mode support allows devices to function in an operating environment that is not USB-aware.

***** On-Chip PATA Setting *****

- **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.

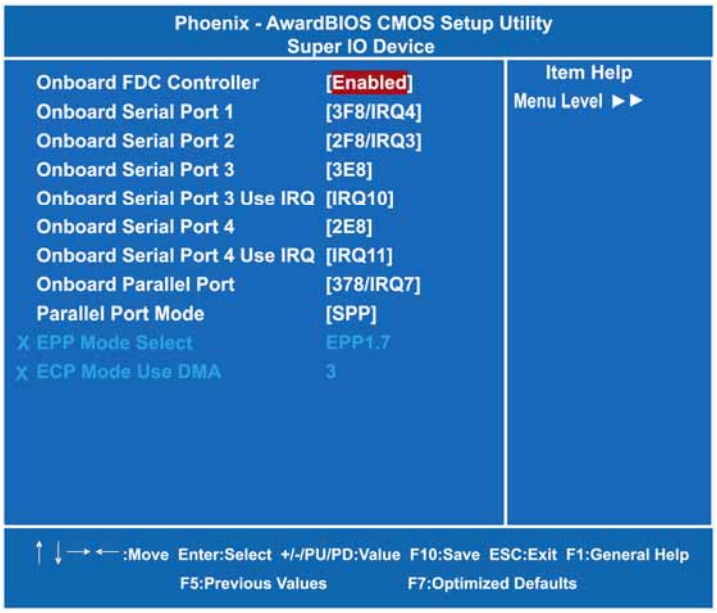
***** On-Chip Serial ATA Setting *****

- **SATA Mode**
  There are these options for you to set up SATA mode: IDE, RAID or AHCI.
- **On-Chip Serial ATA**
  Use this item to enable or disable the built-in on-chip serial ATA.

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.



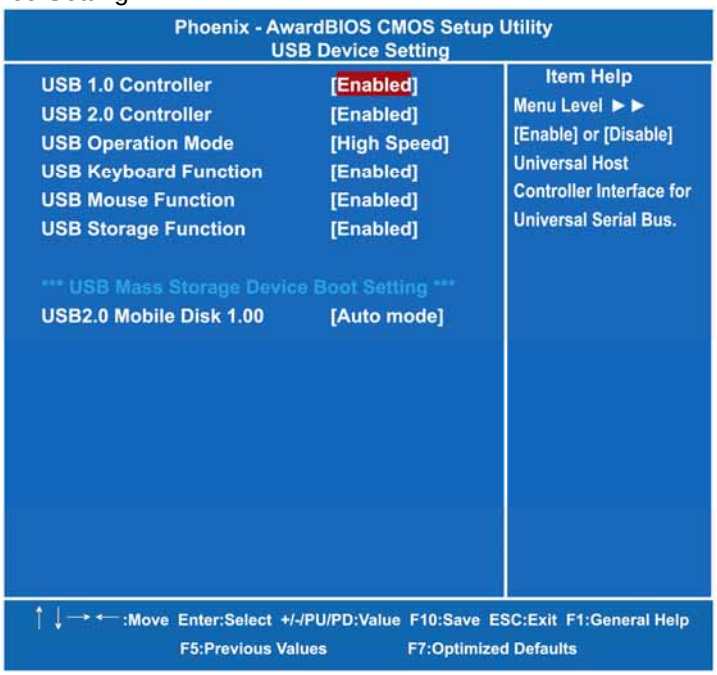
  - **Onboard FDC Controller**
    Select Enabled, if your system has a floppy disk controller (FDC) installed on the system board and you want to use it. If you install and-in FDC or the system has no floppy drive, select Disabled in this field. Options: Enabled and Disabled.
  - **Onboard Serial Port 1/2**
    Select an address and corresponding interrupt for the serial port.
  - **Onboard Serial Port 3**
    This item assigns which I/O address to access onboard serial port 3.
  - **Serial Port 3 Use IRQ**
    This item selects a corresponding interrupt for the third serial port.
  - **Onboard Serial Port 4**
    This item assigns which I/O address to access onboard serial port 4.

- **Serial Port 4 Use IRQ**
  This item selects a corresponding interrupt for the fourth serial port.
- **Onboard Paralellel Port**
  This item allows you to determine the I/O address for onboard parallel port. Options are: *"378H/IRQ7"*, *"278H/IRQ5"*, *"3BC/IRQ7"* and *"Disabled"*.
- **Parallel Port Mode**
  Select an operating mode for the onboard parallel (printer) port. Select Normal unless your hardware and software require another mode in this field. Options are: *"EPP1.9"*, *"ECP"*, *"SPP"*, *"ECPEPP1.7"* and *"EPP1.7"*.
- **EPP Mode Select**
  Select EPP port type 1.7 or 1.9.
- **ECP Mode Use DMA**
  Select a DMA channel for the parallel port while using the ECP mode.

Press <Esc> to return to the Integrated Peripherals page, and press it again to the Main Menu.

- **USB Device Setting**

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

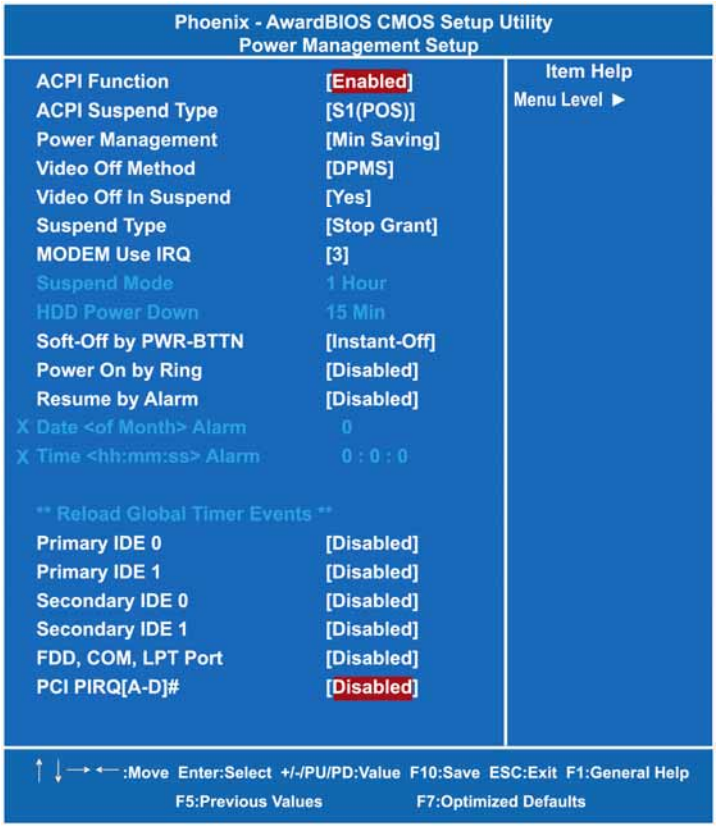


  - **USB 1.0 Controller**
    Enable this item if you are using the USB 1.0 in the system. You should disable this item if a higher-level controller is added.
  - **USB 2.0 Controller**
    Enable this item if you are using the EHCI (USB2.0) controller in the system.
  - **USB Keyboard Function**
    Enable this item if the system has a Universal Serial Bus (USB) controller, and you have a USB keyboard.
  - **USB Mouse Function**
    Enable this item to boot the hard drive by a USB mouse.
  - **USB Storage Function**
    Use this item to enable or disable Legacy suppor of USB Mass Storage.

Press <Esc> to return to the Integrated Peripherals 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 defaulted in the "*Enabled*" mode.

- **ACPI Suspend Type**
  This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, such as Windows 98SE, Windows ME and Windows 2000, you can choose to enter the Standby mode in S1 (POS) or S3 (STR) fashion through the setting of this field. Options are:
  [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 contexts.
  [S3 (STR)] The S3 sleep mode is a lower power state where the information of system configuration and open applications/files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a "wake up" event occurs.

- **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.

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

Disabled	System will never enter SUSPEND mode
1/2/4/6/8/10/20/30/40 Min/1 Hr	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

- **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 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.

- **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 ****

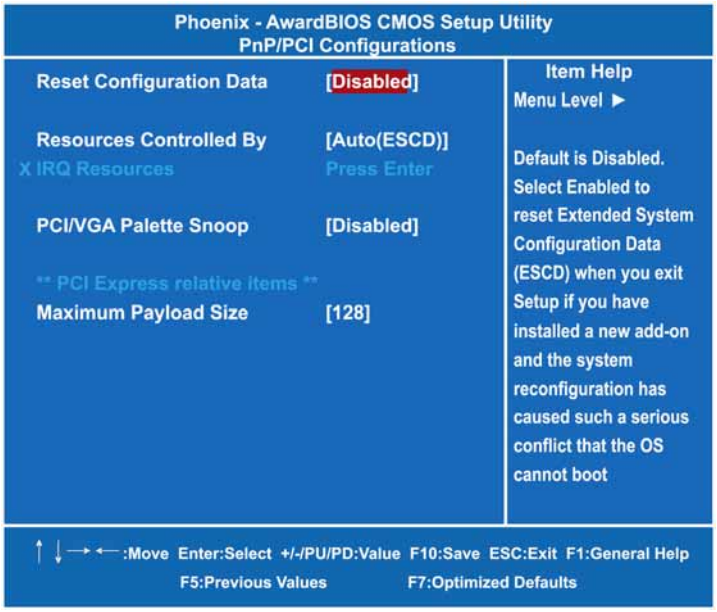
Global Timer (power management) events can prevent the system from entering a power saving mode or can awaken the system from such a mode.

- **Primary/Secondary IDE 0/1**
  Use this item to configure the IDE devices monitored by the system.
- **COM Port**
  Use this item to configure the COM ports 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 page.

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.



- **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.

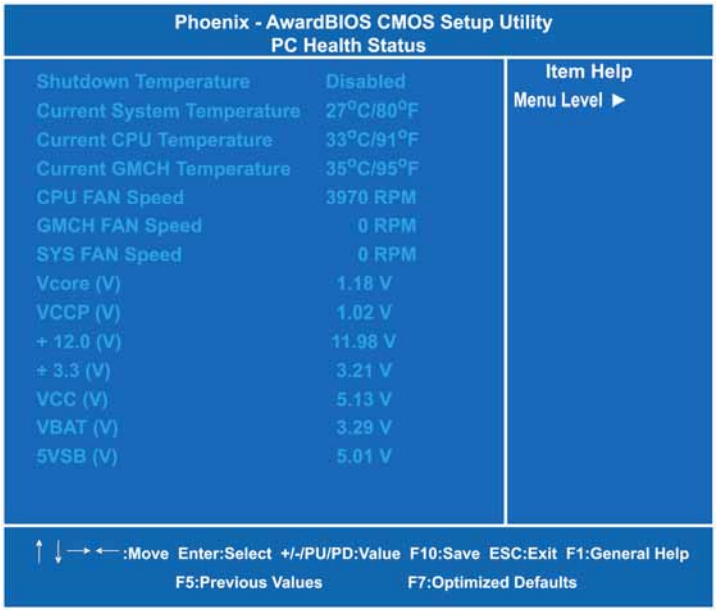
**** PCI Express relative items ****

- **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 page.

4.11 PC Health Status

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



- **Shutdown Temperature**
  It helps you set the maximum temperature they system can reach before powering down.
- **Current SYSTEM Temperature**
  Show you the current system1 temperature.
- **Current CPU Temperature**
  The current system CPU temperature will be automatically detected by the system.
- **Current GMCH Temperature**
  The current GMCH temperature will be automatically detected by the system.
- **Current CPU FAN Speed**
  These optional and read-only items show current speeds in RPM

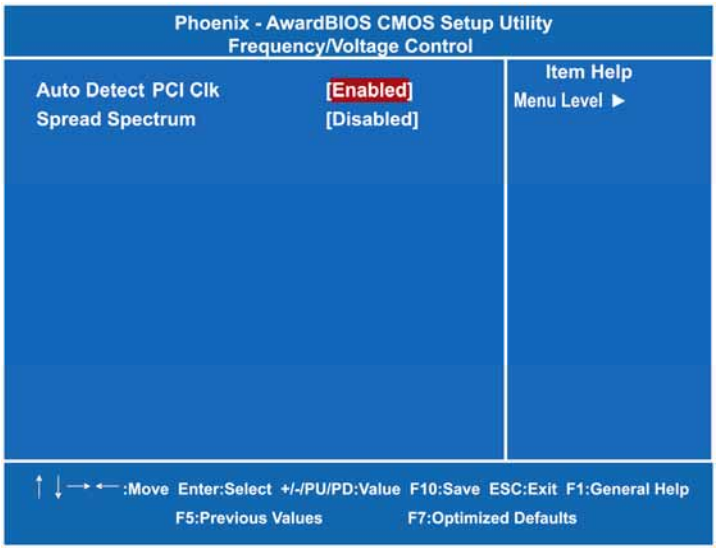
(Revolution Per Minute) for the CPU fan and chassis fan as monitored by the hardware monitoring IC.

- **Current SYS FAN Speed**
  Show you the current system fan1 temperature.
- **Vcore +3.3V/+5V/+12V/VBAT(V)/5VSB**
  Show you the voltage of +3.3V/+5V/+12V.

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

4.12 Frequency/Voltage Control

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

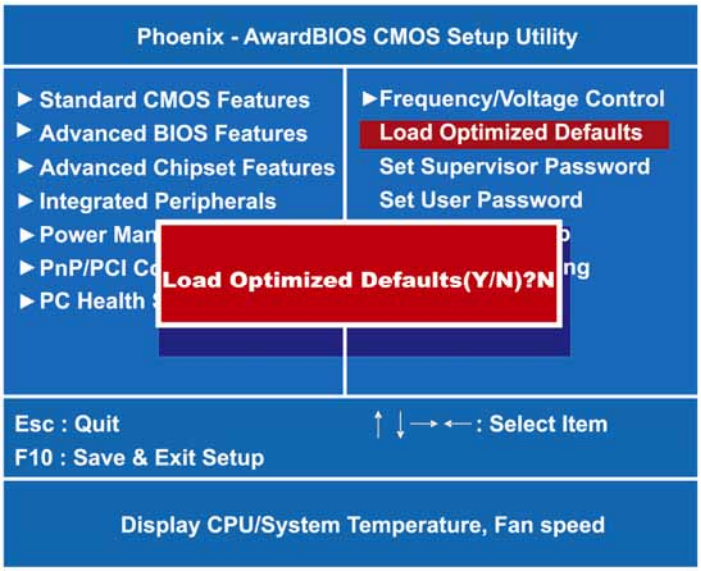


- **Auto Detect PCI Clk**
  The item enables or disables the auto detection of the PCI clock.
- **Spread Spectrum**
  This item is to adjust extreme values of the pulse for EMI test.

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

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

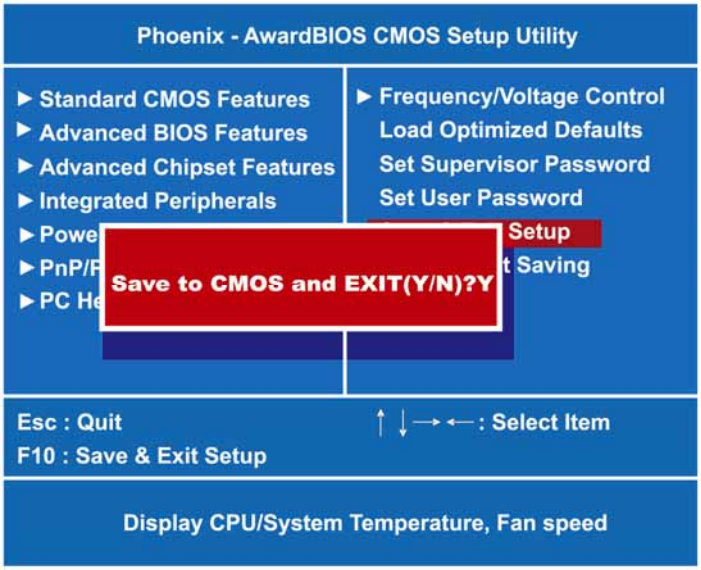
When a password is enabled, you have to type it every time you enter the Setup. It prevents any unauthorized persons from changing your system configuration.

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.

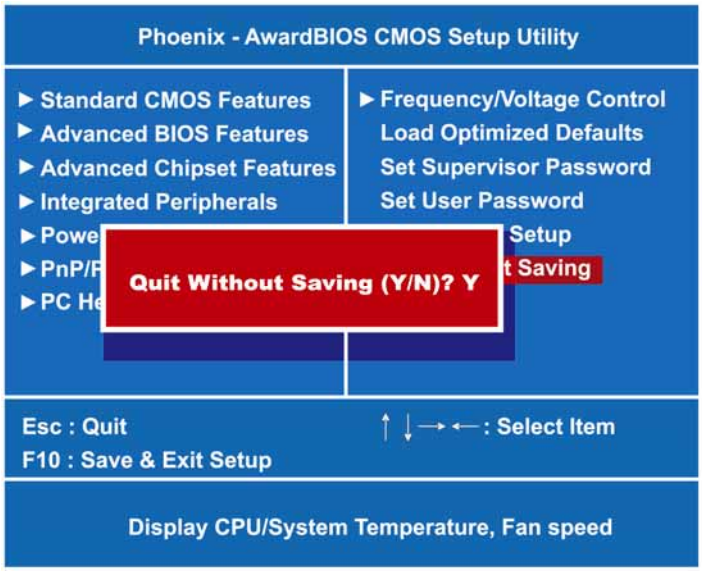
4.15 Save & Exit Setup

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.



A p p e n d i x 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:

O 2E 30
O 2F 00 ; Can be disable at any time

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

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
↓
SelectMultiplexed 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 3 IN/5 OUT)

(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 FF)

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
↓
SelectMultiplexed 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 3 IN/5 OUT)

(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)