SBC86831 Series

Intel® Intel® Yonah & Merom Core™ 2 Duo/Core™ Duo/Core™ Solo All-In-One Mini ITX Board

User's Manual

Disclaimers

This manual has been carefully checked and believed to contain accurate information. AXIOMTEK Co., Ltd. assumes no responsibility for any infringements of patents or any third party's rights, and any liability arising from such use.

AXIOMTEK does not warrant or assume any legal liability or responsibility for the accuracy, completeness or usefulness of any information in this document. AXIOMTEK does not make any commitment to update the information in this manual.

AXIOMTEK reserves the right to change or revise this document and/or product at any time without notice.

No part of this document may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of AXIOMTEK Co., Ltd.

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.

November 2007, Version A3
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

Table of Contents

MEMO

Chapter 1
Introduction

The **SBC86831**, a Mini ITX board, supports Socket M (478) for Intel® Yonah & Merom Core™ 2 Duo, Core™ Duo, Core™ Solo processors with FSB533/667MHz and graphics, audio, and Gigabit Ethernet interfaces. The board is practically finest embedded Socket M board in the market that integrates Intel® 945GME and ICH*7M chipsets to support two 240-pin DDR2 SDRAM with maximum 4GB system memory, excellent Multiple I/O, CRT + LVDS LCD, Gigabit Ethernet and AC'97 Audio interface. For expansion purpose, it provides one PCI Express X16 for SDVO-C, PCI slot for two PCI Masters through riser and direct plug for one Master, and an optional PCI Express Mini Card on the soldering side. 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. 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: Socket M (478-pin) for Intel® Yonah & Merom Core™ 2 Duo, Core™ Duo and Core™ Solo processors**
- **Chipset: Intel® 945GME & ICH7M**
- **Bus Clock: 533/677MHz FSB**
- **BIOS**
  - Phoenix-Award BIOS, Y2K compliant
  - 16Mbit 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 2.54 box-header
  - PATA-100 as PIO Mode 0-4, DMA Mode 0-2 and Ultra DMA/33/66/100
  - Two SATA-150/300 connectors
- **Compact Flash Socket：**
  - One CompactFlash™ Type II Socket via PATA IDE (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
- **Firewire**
  - Two IEEE 1394a ports

- **Real Time Clock：** Integrate Intel® ICH*7M
- **Watchdog Timer：**
  - 1~255 seconds; up to 255 levels
- **Graphics/Streaming：**
  - Intel® 945GME GMCH Gen 3.5 integrated graphic engine
  - Maximum up to 224MB frame buffer sharing system memory
  - Maximum display resolution:
    - CRT: 2048 x1536
    - LVDS: 1600 X1200 (24-bit single/dual channel LVDS interface)
  - DualView display mode:
    - CRT: 2048 x1536
    - LVDS: 1600 X1200 (24-bit single/dual channel LVDS interface)
  - LCD backlight control supported
- **Expansion Interface：**
  - One PCI Express x16 slot for ADD2+ Card as default（PCI Express x16 for discrete graphics is optional with on-board LVDS function removal）
  - One PCI Express Mini Card (optional)
  - One PCI slot for 2 Bus master 32-bit expansion
- **Ethernet：**
  - Two RTL8111B Gigabit Ethernet
  - Equipped with RJ-45 interface
- **Audio：**
  - AC'97 codec audio compliant with ALC655
  - MIC-in, Line-out
- **Power Management：**
  - ACPI (Advanced Configuration and Power Interface)
- **Form Factor：**
  - Mini ITX form factor（170mm* 170mm）

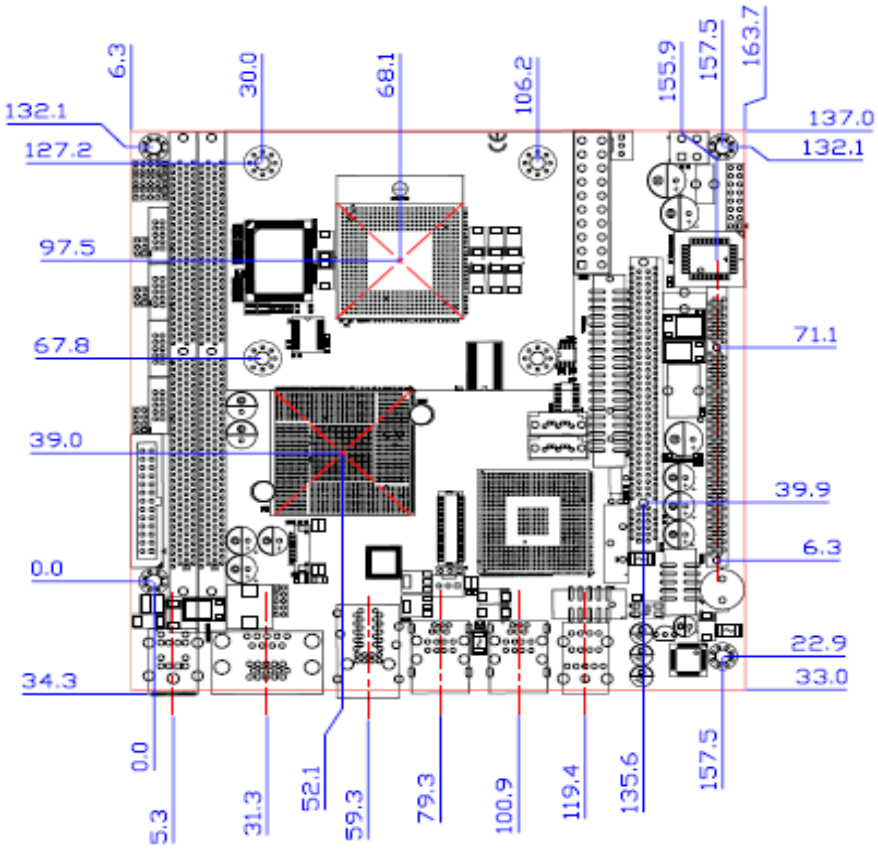
***NOTE**: All specifications and images are subject to change without notice.*

1.2 Utilities Supported

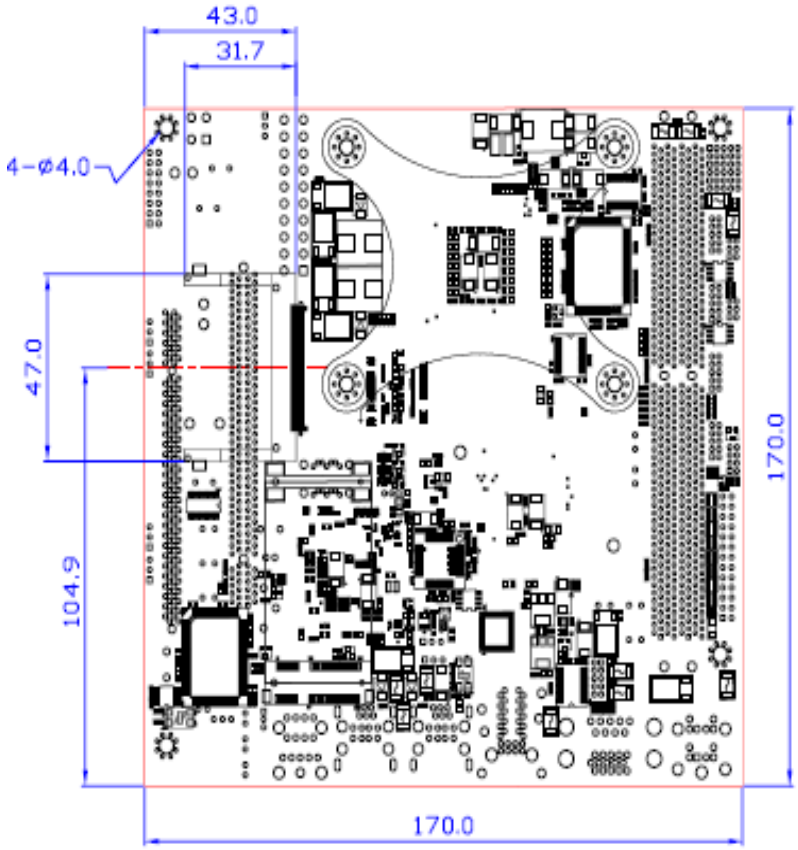
- Chipset Driver
- Ethernet Driver
- Graphic Drivers
- Audio Drivers

Chapter 2
Jumpers and Connectors

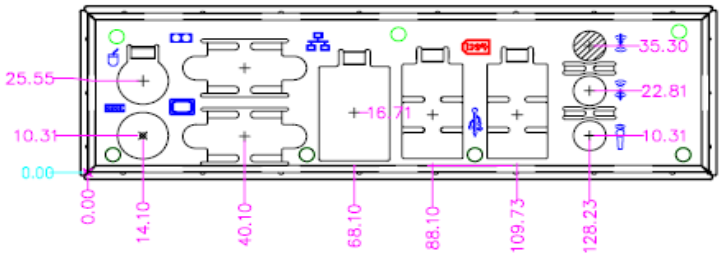
2.1 Board Dimensions and Fixing Holes



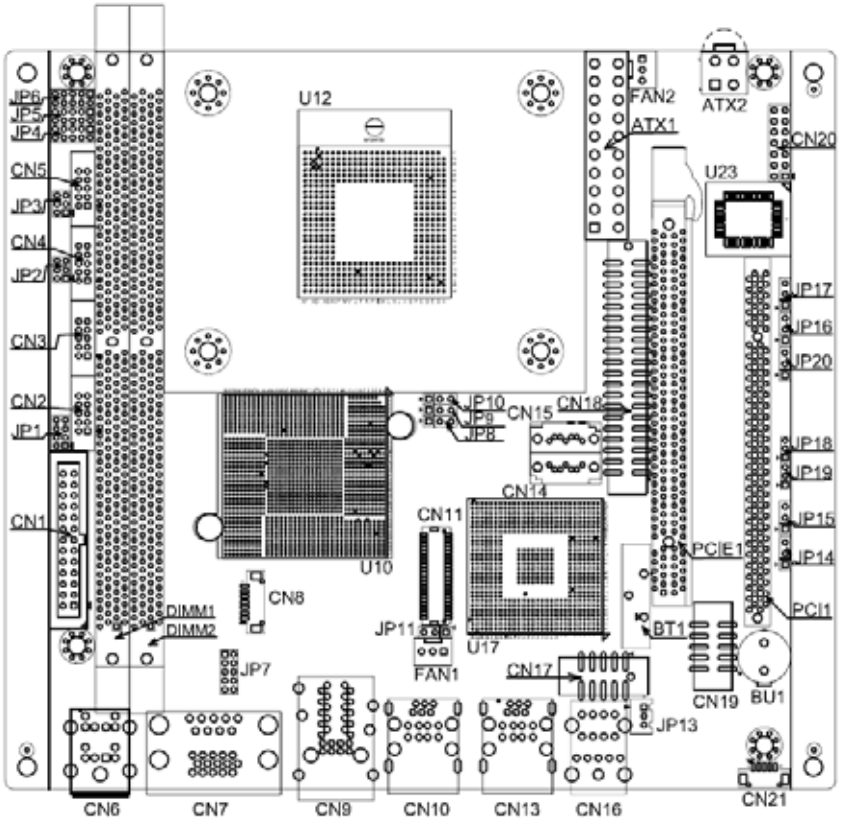
Component Side


43.0
31.7
4-ø4.0
47.0
104.9
170.0
170.0

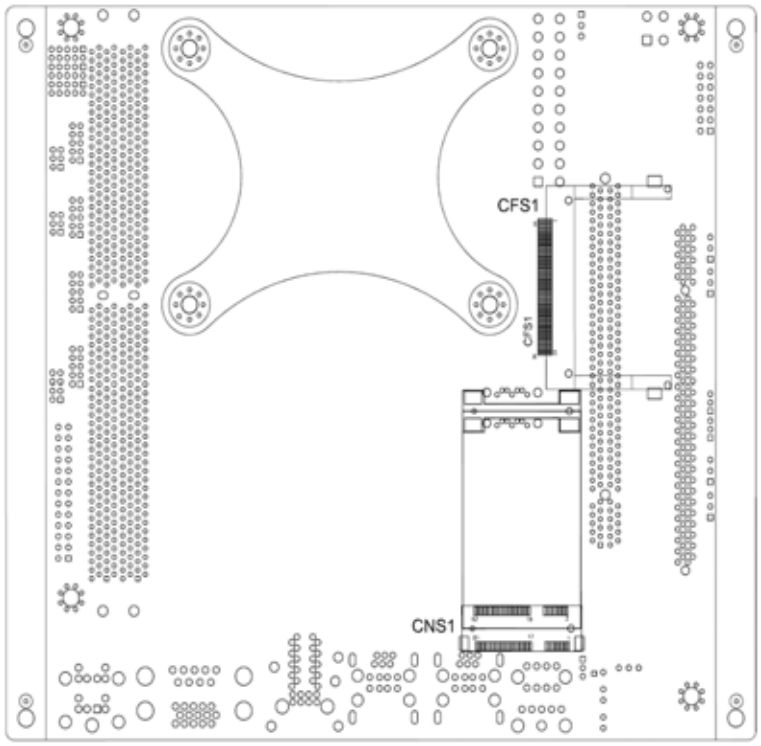
Solder Side


25.55
10.31
0.00
16.71
35.30
22.81
10.31
0.00
14.10
40.10
68.10
88.10
109.73
128.23

2.2 Board Layout



Component Side



Solder Side

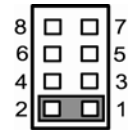
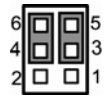
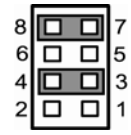
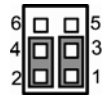
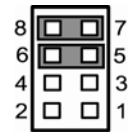
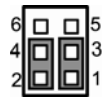
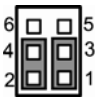
2.3 Jumper Settings

Proper jumer settings configure the **SBC86831** to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

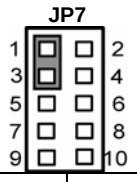
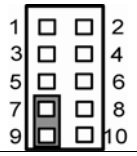
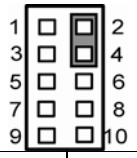
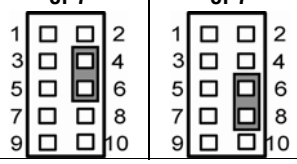
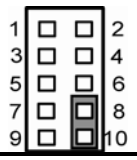
Jumper	Default Setting		Jumper Setting
JP1	COM1 Mode Select: RS-232		Short 1-2
JP2	COM1 Mode Select: RS-232		Short 3-5, 4-6
JP3	COM1 Mode Select: RS-232		Short 3-5, 4-6
JP4	COM2 Mode Select	CN2 Pin 1: DCD	Short 7-9
		CN2 Pin 8: RI	Short 8-10
JP5	COM3 Mode Select	CN3 Pin 1: DCD	Short 7-9
		CN3 Pin 8: RI	Short 8-10
JP6	COM4 Mode Select	CN4 Pin 1: DCD	Short 7-9
		CN4 Pin 8: RI	Short 8-10
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
JP14	Clear CMOS Setting : Normal		Short 1-2
JP15	TPM Function (Optional)		Short 1-2
JP16	Compact Flash Select : Slave (Optional)		Short 1-2
JP17	Compact Flash Power Select : 3.3V		Short 1-2
JP18	USB2 Voltage select : 5V		Short 2-3
JP19	USB1 Voltage select : 5V		Short 2-3
JP20	PCI-Express x16 select: Normal		Short 1-2

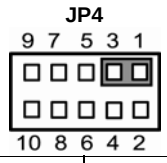
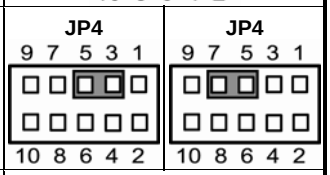
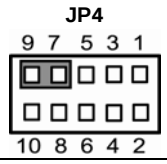
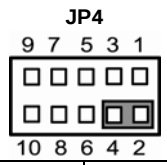
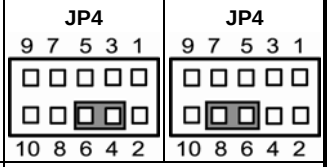
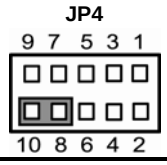
2.3.1 COM1 Mode Select Jumper: JP1, JP2, JP3

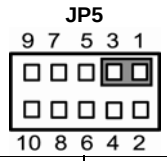
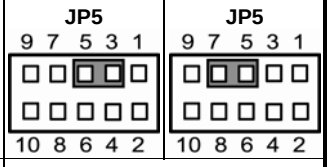
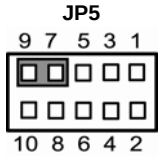
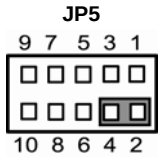
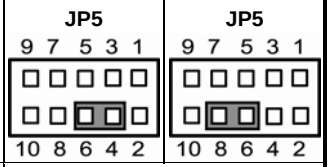
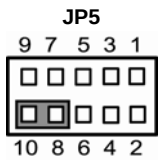
These jumpers select the COM1 port's communication mode to operate RS-232 or RS-422/485.

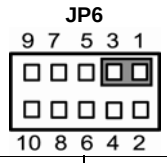
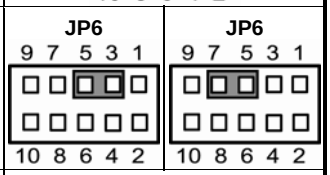
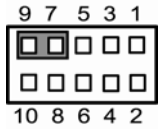
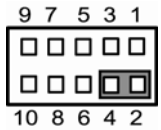
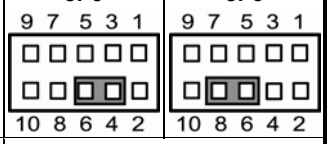
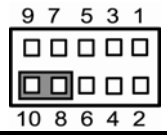
Description	Function	Jumper Setting		
COM1 Mode Select	RS-232 (Default)	JP1 	JP2 	JP3 
	RS-422	JP1 	JP2 	JP3 
	RS-485	JP1 	JP2 	JP3 

2.3.2 COM1~COM4 Mode Select for Type Jumpers: JP4, JP5, JP6, JP7

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)	

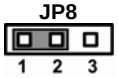
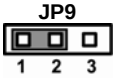
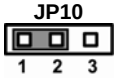
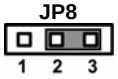
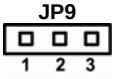
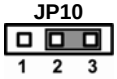
Description	Function	Jumper Setting
COM2 (CN2)	Pin 1=12V	
	Pin 1=5V	
	*Pin 1=DCD (Default)	
	Pin 8=12V	
	Pin 8=5V	
	*Pin 8=RI (Default)	

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)	

Description	Function	Jumper Setting
COM4 (CN4)	Pin 1=12V	
	Pin 1=5V	
	*Pin 1=DCD (Default)	
	Pin 8=12V	
	Pin 8=5V	
	*Pin 8=RI (Default)	

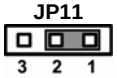
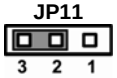
2.3.3 CPU Frequency Select Jumpers: JP8, JP9, JP10

These jumpers help you set the CPU frequency.

Description	Function	Jumper Setting		
CPU Frequency Select	Auto (Default)	JP8 	JP9 	JP10 
	FSB 533 MHz	JP8 	JP9 	JP10 
	FSB 667 MHz	JP8 	JP9 	JP10 

2.3.4 LVDS Voltage Selection Jumper: JP11

This jumper is to select the voltage for LVDS interface.

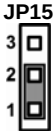
Description	Function	Jumper Setting
LVDS Voltage Selection	3.3V (Default)	JP11 
	5V	JP11 

2.3.5 CMOS Clear Jumper: JP14

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)	JP14 
	Clear CMOS	JP14 

2.3.6 TPM PP (Physical Presence) Address Select Jumper: JP15

Description	Function	Jumper Setting
TPM (Physical Presence) Address Select	Accept both H/W & S/W signals. (Default)	JP15 
	Only Accept H/W signals.	JP15 

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

2.3.7 CompactFlash™ Mode Selection Jumper: JP16 (Optional)

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

Description	Function	Jumper Setting
CompactFlash™ Mode (Master/Slave) Selection	Slave (Default)	JP16 3 2 1
	Master	JP16 3 2 1

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

2.3.8 CompactFlash™ Voltage Selection Jumper: JP17

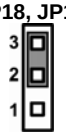
Use this jumper to select the voltage for CompactFlash™ interface.

Description	Function	Jumper Setting
CompactFlash™ Voltage Selection	3.3V (Default)	JP17 3 2 1
	5V	JP17 3 2 1

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

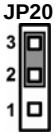
2.3.9 USB Power Selection Jumper: JP18 (for CN17), JP19 (for CN19)

Use this jumper to select the voltage for USB interface.

Description	Function	Jumper Setting
USB Power Selection	5V_SBY	**JP18, JP19** 
	5V (Default)	**JP18, JP19** 

2.3.10 PCI-Express x16 Select Jumper: JP20

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

Description	Function	Jumper Setting
PCI-Express x16 select: Normal	PCI-Express x16 card (Default)	**JP20** 
	Add2 card	**JP20** 

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 **SBC86831** 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 Connector	CN5
PS2 Keyboard/Mouse Connector	CN6
VGA & Serial Port1 Connector	CN7
LVDS Backlight Connector	CN8
LAN*2 Connector	CN9
USB*2+IEE1394 Connector	CN10
LVDS Connector	CN11
USB*2+IEE1394 Connector	CN13
SATA Connector	CN14
SATA Connector	CN15
Audio Phone Jack Connector	CN16
USB Connector	CN17
Parallel IDE Connector	CN18
USB Connector	CN19
Flat Panel Bezel Connector	CN20
Internal Audio Connector	CN21
ATX Power Connector	ATX1
+12V Power Connector	ATX2
Compact Flash™ Socket (Optional)	CFS1
PCI-EXPRESS Mini Card Socket (Optional)	CNS1
DDRII DIMM	DIMM1
DDRII DIMM	DIMM2
System FAN Connector	FAN1
CPU FAN Connector	FAN2

Connectors	Label
SM BUS Connector	JP13
Slim PCI Slot	PCI1
PCI- EXPRESS X16 Slot	PCIE1

-- End of Connectors Table --

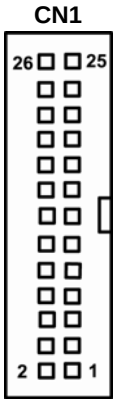
2.4.1 Print Port or Floppy Connector: CN1

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	Signal	Pin	Signal
1	Strobe#	2	Auto Form Feed#
3	Data 0	4	Error#
5	Data 1	6	Initialize#
7	Data 2	8	Printer Select In#
9	Data 3	10	GND
11	Data 4	12	GND
13	Data 5	14	GND
15	Data 6	16	GND
17	Data 7	18	GND
19	Acknowledge#	20	GND
21	Busy	22	GND
23	Paper Empty#	24	GND
25	Printer Select	26	NC

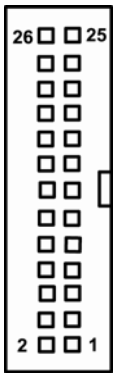


Floppy Connector [Optional]

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 FDD drives 360KB, 720KB, 1.2MB, 1.44MB and 2.88MB.

Pin	Signal	Pin	Signal
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

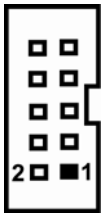
CN2, CN3, CN4

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	Signal	Pin	Signal
1	Digital Input 0	2	Digital Output 0
3	Digital Input 1	4	Digital Output 1
5	Digital Input 2	6	Digital Output 2
7	Ground(GND)	8	Digital Output 3
9	Ground(GND)	10	Digital Output 4

CN5

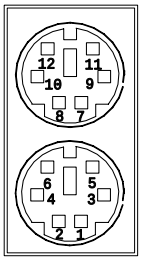


2.4.4 Keyboard and PS/2 Mouse Connector: CN6

The board provides a keyboard and Mouse interface with a DIN connector.

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

CN6

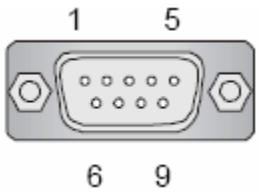


2.4.5 VGA & Serial Port 1 Connectors: CN7A, CN7B

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

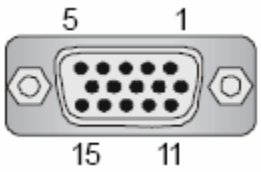
Pin	Description
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground (GND)
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)

CN7A



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

CN7B

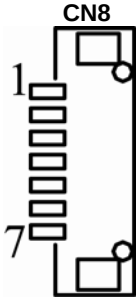


2.4.6 LVDS Backlight Connector: CN8

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

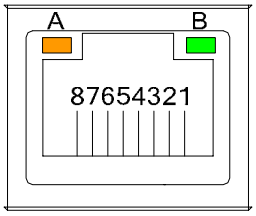
CN8



2.4.7 LAN*2 Connectors: CN9_A, CN9_B

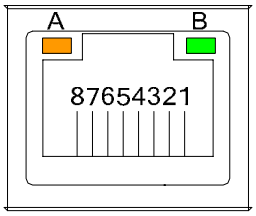
Pin	Signal
1	MDI0+
2	MDI0-
3	MDI1+
4	MDI1-
5	MDI2+
6	MDI2-
7	MDI3+
8	MDI3-
A	Active LED (Yellow)
B	1000 (Orange) / 100 (Green) LAN LED

CN9_A



Pin	Signal
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

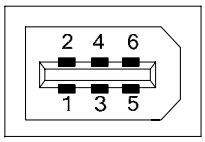
CN9_B



2.4.8 USB*2 + IEEE1394 Connectors: CN10, CN13

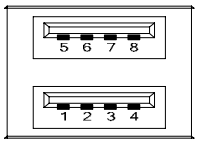
Pin	Signal
1	+12V
2	GND
3	XTPB0N
4	XTPB0P
5	XTPA0N
6	XTPA0P
7	GND

CN10A, CN13A



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

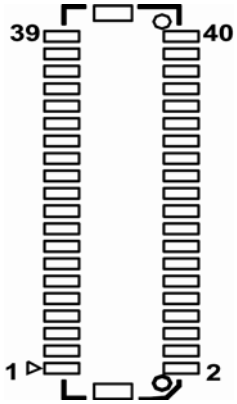
CN10B, CN13B



2.4.9 LVDS Flat Panel Connector: CN11

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

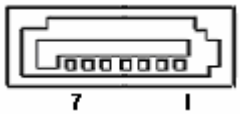
CN11



2.4.10 SATA Connectors: CN14, CN15

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

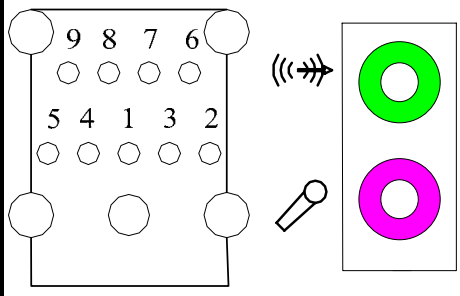
CN14, CN15



2.4.11 Audio Phone Jack Connector: CN16

Pin	Signal
1	AUDIO_GND
2	MIC_IN1
3	MIC_IN
4	NC
5	MIC_IN2
6	LINE_OUT_L
7	LINE_OUT_L1
8	LINE_OUT_R1
9	LINE_OUT_R

CN16



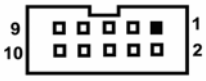
2.4.12 USB Connectors: CN17, CN19

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

Please refer to next page for detailed pin assignment table.

Pin	Signal	Pin	Signal
1	+5V	2	+5V
3	UDB4-	4	USB5-
5	USB4+	6	USB5+
7	Ground (GND)	8	Ground (GND)
9	Ground (GND)	10	Ground (GND)

CN17



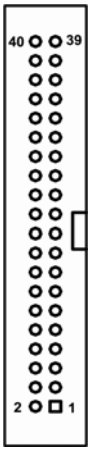
Pin	Signal	Pin	Signal
1	+5V	2	+5V
3	UDB7-	4	USB6-
5	USB7+	6	USB6+
7	Ground (GND)	8	Ground (GND)
9	Ground (GND)	10	Ground (GND)

CN19

2.4.13 Parallel IDE Connector: CN18

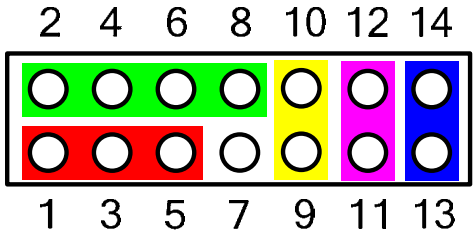
Pin	Signal	Pin	Signal	Pin	Signal
1	Reset #	2	GND	3	Data 7
4	Data 8	5	Data 6	6	Data 9
7	Data 5	8	Data 10	9	Data 4
10	Data 11	11	Data 3	12	Data 12
13	Data 2	14	Data 13	15	Data 1
16	Data 14	17	Data 0	18	Data 15
19	GND	20	No connector	21	No connector
22	GND	23	IOW #	24	GND
25	IOR #	26	GND	27	IOCHRDY
28	No connector	29	No connector	30	GND-Default
31	Interrupt	32	No connector	33	SA1
34	No connector	35	SA0	36	SA2
37	HDC CS0 #	38	HDC CSI #	39	HDD Active #
40	GND				

CN18



2.4.14 Flat Panel Bezel Connector: CN20

This connector (**CN20**) is making the connection to front panel switches and LEDs.



- **Power LED**

  This 3-pin connector (Pin 1, 3, 5) connects a LED indicator to the system power 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**

  This 4-pin connector (Pin 2, 4, 6, 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 (Pin 9, 10) connects the front panel's ATX power button to the CPU card, which allows users to control ATX power supply to be power on/off.

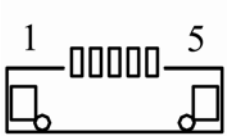
- **System Reset Switch**
  This 2-pin connector (Pin 11, 12) can be connected to the case-mounted reset switch that reboots your computer, not turns OFF the power switch. It is a better way to reboot your system for a longer life of the system's power supply.

- **HDD Activity LED**
  This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. The 2-pin connector (Pin 13, 14) connects the hard disk drive to the front panel HDD LED, Pin 13 assigned as -, and Pin 14 as +.

2.4.15 Internal Audio Connector: CN21

Pin	Signal
1	LINE_OUT_L
2	GND
3	LINE_OUT_R
4	GND
5	MIC_IN

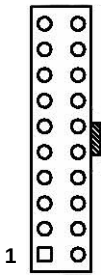
CN21



2.4.16 ATX Power Connector: ATX1

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

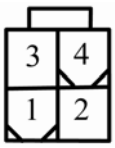
ATX1



2.4.17 +12V ATX Power Connector: ATX2

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

ATX2



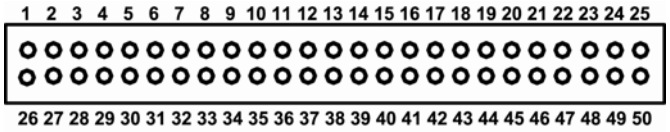
2.4.18 CompactFlash™ Socket: CFS1 (Optional)

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	Signal	Pin	Signal
1	GND	26	CD1-
2	Data 3	27	Data 11
3	Data 4	28	Data 12
4	Data 5	29	Data 13
5	Data 6	30	Data 14
6	Data 7	31	Data 15
7	CS0-	32	CS1-
8	Address 10	33	VS1-
9	ATASEL	34	IORD-
10	Address 9	35	IOWR-
11	Address 8	36	WE#
12	Address 7	37	INTR
13	+5V	38	+5V
14	Address 6	39	CSEL-
15	Address 5	40	VS2-
16	Address 4	41	RESET-
17	Address 3	42	IORDY-
18	Address 2	43	DMAREQ
19	Address 1	44	DMAACK-
20	Address 0	45	DASP-
21	Data 0	46	PDIAG-
22	Data 1	47	Data 8
23	Data 2	48	Data 9
24	IOCS16-	49	Data 10
25	CD2-	50	GND

CFS1



2.4.19 PCI-Express Mini Card Socket: CNS1 (Optional)

CNS1 is a PCI Express Mini 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.

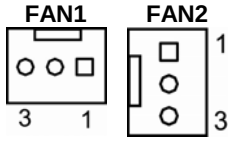
Pin	Signal	Pin	Signal
1	PCIE_WAKE-	2	+3.3V
3	N.C	4	GND
5	N.C	6	+1.5 V
7	GND	8	N.C
9	GND	10	N.C
11	PCIE_CLK-	12	N.C
13	PCIE_CLK+	14	N.C
15	GND	16	N.C

Pin	Signal	Pin	Signal
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
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

2.4.20 System & CPU Fan Connectors: FAN1, FAN2

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

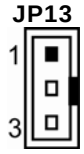
Pin	Signal
1	GND
2	+12V
3	Sensor



2.4.21 SMBUS Connector: JP13

Connector JP13 is for SMBUS interface support.

Pin	Signal
1	CLOCK
2	DATA
3	GND

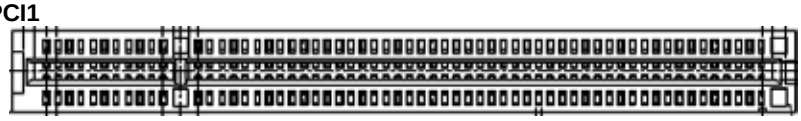


2.4.22 Slim PCI Slot: PCI1

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	TRST-	A2	+12V	B1	-12V	B2	TCK
A3	TMS	A4	TDI	B3	GND	B4	TDO
A5	+5V	A6	INTA-	B5	+5V	B6	+5V
A7	INTC-	A8	+5V	B7	INTB-	B8	INTD-
A9	N.C	A10	+5V	B9	N.C	B10	REQ1-
A11	N.C	A12	GND	B11	N.C	B12	GND
A13	GND	A14	GNT1-	B13	GND	B14	CLK_33M
A15	RESET-	A16	+5V	B15	GND	B16	CLK_33M
A17	GNT0-	A18	GND	B17	GND	B18	REQ0-
A19	PME-	A20	AD[30]	B19	+5V	B20	AD[31]
A21	+3.3V	A22	AD[28]	B21	AD[29]	B22	GND
A23	AD[26]	A24	GND	B23	AD[27]	B24	AD[25]
A25	AD[24]	A26	IDSEL	B25	+3.3V	B26	C/BE3-
A27	+3.3V	A28	AD[22]	B27	AD[23]	B28	GND
A29	AD[20]	A30	GND	B29	AD[21]	B30	AD[19]
A31	AD[18]	A32	AD[16]	B31	+3.3V	B32	AD[17]
A33	+3.3V	A34	FRAME-	B33	C/BE2-	B34	GND
A35	GND	A36	TRDY-	B35	IRDY-	B36	+3.3V
A37	GND	A38	STOP-	B37	DEVSEL-	B38	GND
A39	+3.3V	A40	SMB_CLK	B39	LOCK-	B40	PERR-
A41	SMD_DATA	A42	GND	B41	+3.3V	B42	SERR-
A43	PAR	A44	AD[15]	B43	+3.3V	B44	C/BE1-

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A45	+3.3V	A46	AD[13]	B45	AD[14]	B46	GND
A47	AD[11]	A48	GND	B47	AD[12]	B48	AD[10]
A49	AD[9]	A52	C/BE-	B49	GND	B52	AD[6]
A53	+3.3V	A54	AD[6]	B53	AD[7]	D54	+3.3V
A55	AD[4]	A56	GND	B55	AD[5]	B56	AD[3]
A57	AD[2]	A58	AD[0]	B57	GND	B58	AD[1]
A59	+5V	A60	REQ64-	B59	+5V	B60	ACK64-
A61	+5V	A62	+5V	B61	+5V	B62	+5V

PCI1



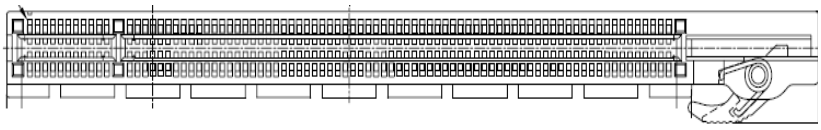
2.4.23 PCI-Express x16 Slot: PCIE1

PCIE1 is for the PCI-Express x16 graphics interface to support PCI-Express x16 graphics cards (PCI-Express x16) and Add2 card (SDVO Bus).

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	N.C	A2	+12V	B1	+12V	B2	+12V
A3	+12V	A4	GND	B3	+12V	B4	GND
A5	N.C.	A6	N.C.	B5	SMB_CLK	B6	SMB_DATA
A7	N.C	A8	N.C	B7	GND	B8	+3.3V
A9	+3.3V	A10	+3.3V	B9	N.C	B10	+3.3V_SBY
A11	PCIE_RESET-	A12	GND	B11	PCIE_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

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
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	MCH_CFG_20
A49	GND	A50	N.C	B49	GND	B50	PEG_TXP8
A51	GND	A52	PEG_RXP8	B51	PEG_TXN8	B52	GND
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_RXP1	B59	PEG_TXN10	B60	GND
A61	PEG_RXN10	A62	GND	B61	GND	B62	PEG_TXP11
A63	GND	A64	PEG_RXP1	B63	PEG_TXN11	B64	GND
A65	PEG_RXN11	A66	GND	B65	GND	B66	PEG_TXP12
A67	GND	A68	PEG_RXP1	B67	PEG_TXN12	B68	GND
A69	PEG_RXN12	A70	GND	B69	GND	B70	PEG_TXP13
A71	GND	A72	PEG_RXP1	B71	PEG_TXN13	B72	GND
A73	PEG_RXN13	A74	GND	B73	GND	B74	PEG_TXP14
A75	GND	A76	PEG_RXP1	B75	PEG_TXN14	B76	GND
A77	PEG_RXN14	A78	GND	B77	GND	B78	PEG_TXP15
A79	GND	A80	PEG_RXP1	B79	PEG_TXN15	B80	GND
A81	PEG_RXN15	A82	GND	B81	N.C	B82	N.C

PCIE1



Chapter 3
Hardware Description

3.1 Microprocessors

The **SBC86831** Series supports Intel® Yonah & Merom Core™ 2 Duo, Core™ Duo, and Core™ Solo 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 **SBC86831** Series uses Award Plug and Play BIOS with a single 16Mbit SPI Flash EPROM.

3.3 System Memory

The **SBC86831** 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® Yonah & Merom Core™ 2 Duo, Core™ Duo, and Core™ Solo 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 **SBC86831 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

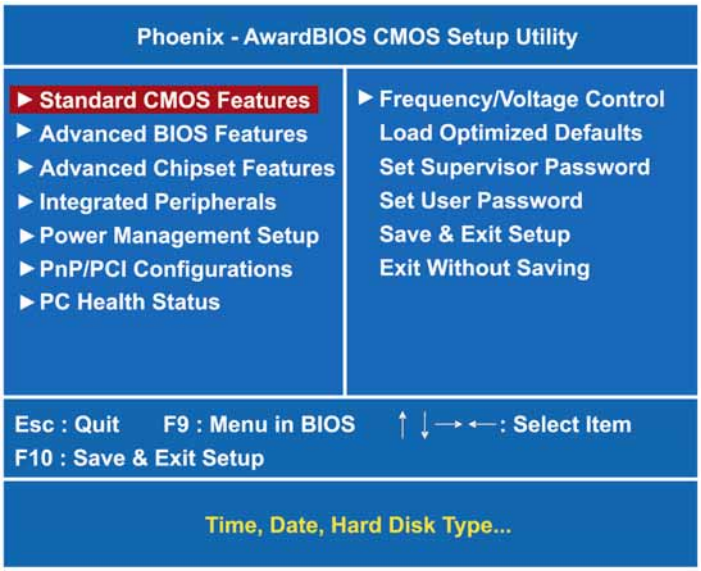
Up arrow	Move cursor to the previous item
Down arrow	Move cursor to the next item
Left arrow	Move cursor to the item on the left hand
Right arrow	Move to the item in the right hand
Esc key	Main Menu -- Quit and delete changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current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

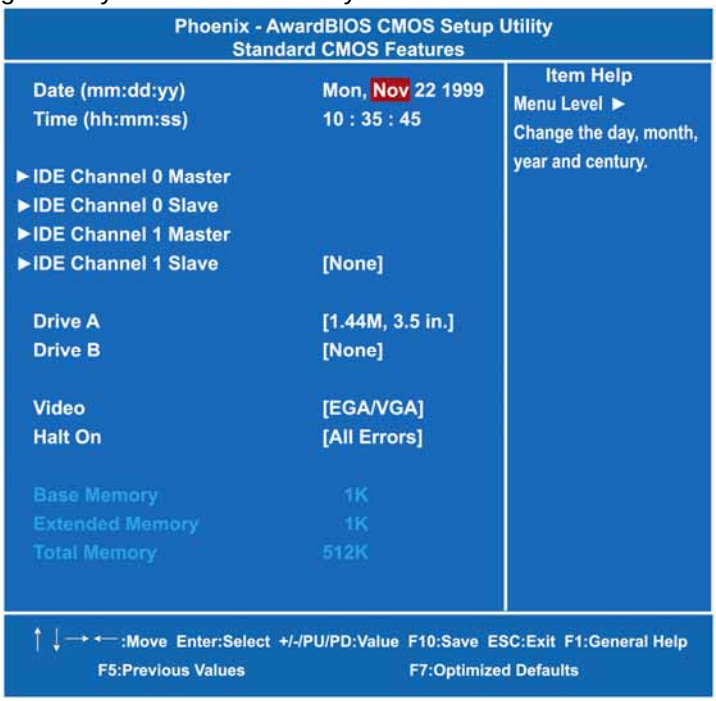


NOTE: *If your computer can not boot after making and saving system changes with Setup, the Award BIOS will reset your system to the CMOS default settings via its built-in override feature.*

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 Master/IDE Channel 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>.

- **Dive A type/Drive B type**
  The item identifies the types of floppy disk installed in the computer, as drive A or drive B.

None	No floppy drive installed
360K, 3.5 in	3.5 inch PC-type standard drive; 360Kb Mini ITXcity
1.2M, 3.5 in	3.5 inch AT-type high-density drive; 1.2MB Mini ITXcity
720K, 3.5 in	3.5 inch double-sided drive; 720Kb Mini ITXcity
1.44M, 3.5 in	3.5 inch double-sided drive; 1.44MB Mini ITXcity
2.88M, 3.5 in	3.5 inch double-sided drive; 2.88MB Mini ITXcity

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

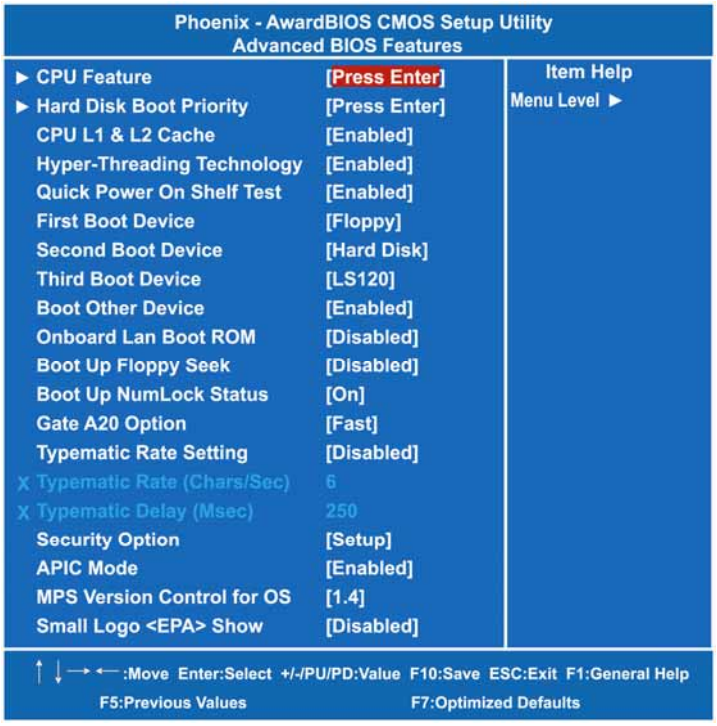
- **Halt On**
  This item determines whether the system will halt or not, if an error is detected while powering up.

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.

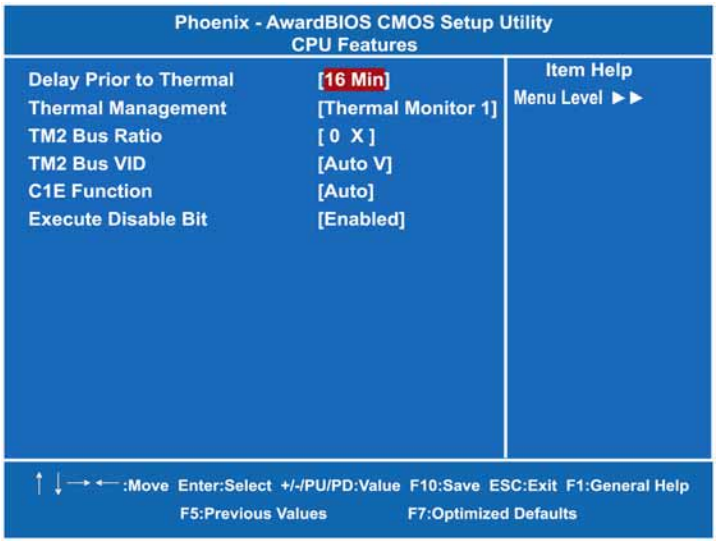
4.6 Advanced BIOS Features

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

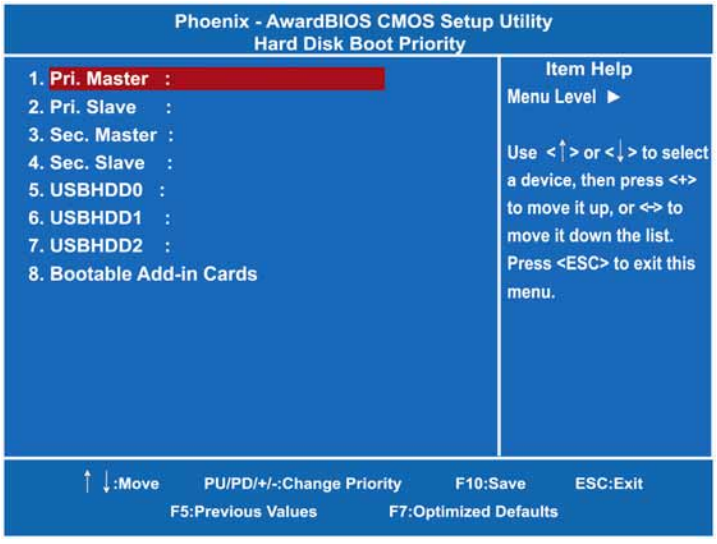


- **CPU Feature**

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.

- **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

- Hyper-Threading Technology
  Use this item to enable or disable Hyper-Threading Technology, which makes a single physical processor perform multi-tasking function as two logical ones.

- **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, Hard Disk, CDROM, ZIP100, USB-FDD, USB-ZIP, USB-CDROM, LAN and Disabled.

- **Onboard Lan Boot ROM**
  Use this item to enable or disable the Boot ROM function of the onboard LAN chip when the system boots up.

- **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.

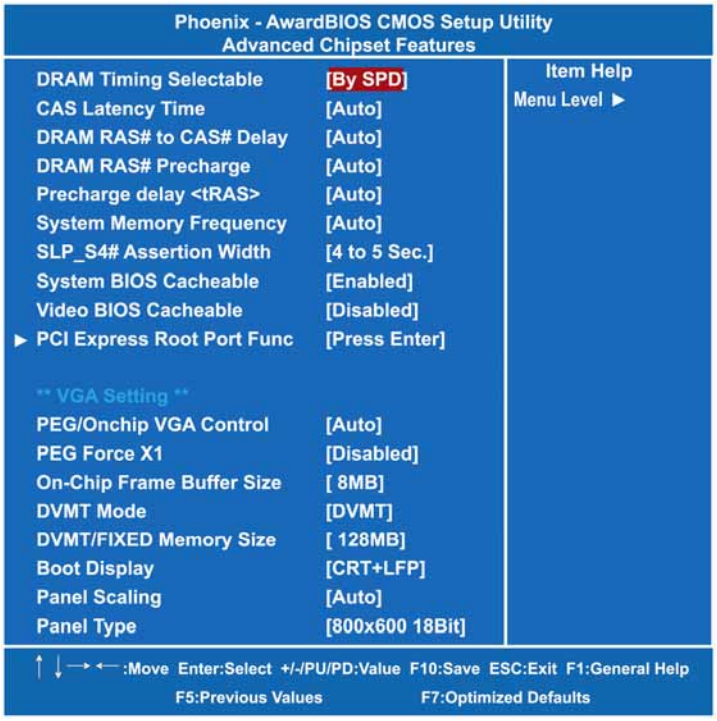
NOTE: *To disable the security, select PASSWORD SETTING at Main Menu and then you will be asked to enter a password. Do not type anything, just press <Enter> and it will disable the security. Once the security is disabled, the system will boot and you can enter Setup freely.*

- **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.



- **DRAM Timing By SPD**
  Use this item to enable or disable the SDRAM timing, which can be defined by Serial Presence Detect.

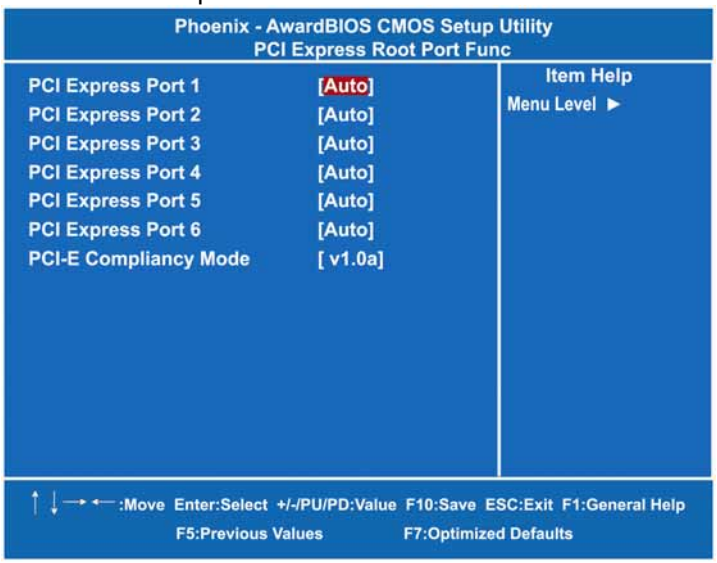
- **CAS Latency Time**
  You can select CAS latency time to HCLKs 2, 3, or Auto. The board designer should have set up these values in accordance with the installed DRAM. Do not change these values unless you have to change the specifications of the installed DRAM or CPU.

- **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.
- **SLP_S4# Assertion Width**
- **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.

- **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 *****

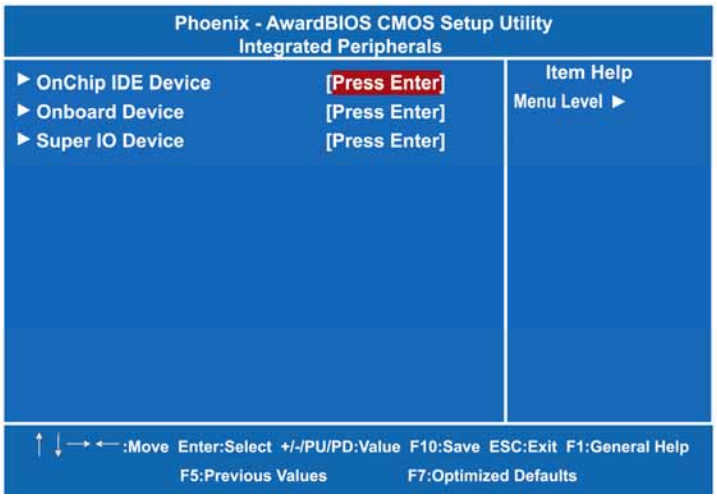
- **PEG/Onchip VGA Control**
  This setting allows you to select whether to use the onchip graphics processor or the PCI Express card. When set to [Auto], the BIOS will check if a PCI Express graphics card is installed or not. If a PCI Express graphics card is detected, the board will boot up using that 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.

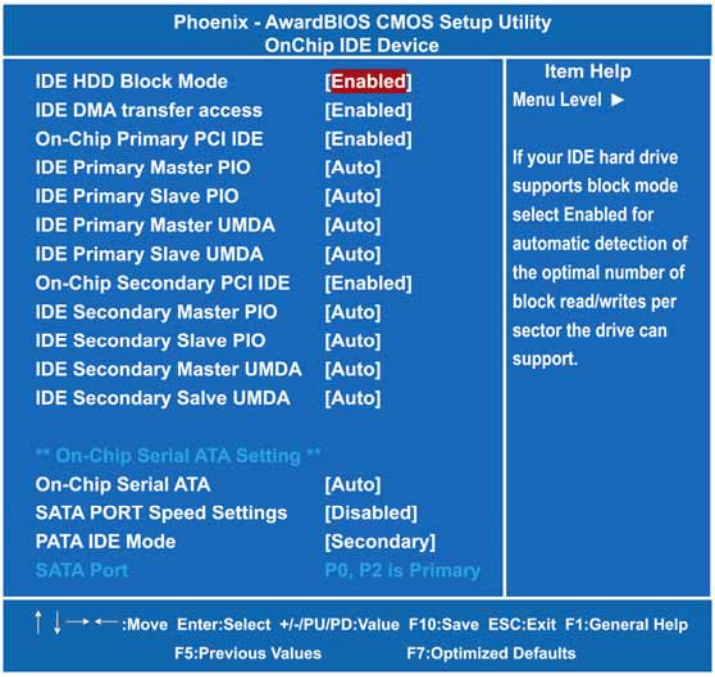
Press <Esc> to return to the Main Menu page.

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.

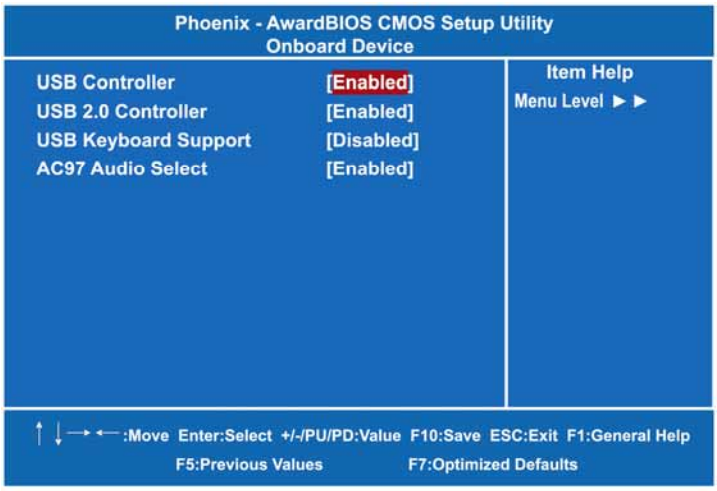
***** On-Chip Serial ATA Setting *****

- **On-Chip Serial ATA**
  Use this item to enable or disable the built-in on-chip serial ATA.
- **SATA PORT Speed Settings**
  Use this item to select SATA I or SATA II device support forcedly.
- **PATA IDE Mode**
  Use this item to set the PATA IDE mode. When set to Primary, P1 and P3 are Secondary; on the other hand, when set to Secondary, P0 and P2 are Primary.
- **SATA Port**
  If the "PATA IDE Mode" is Primary, it will show " P1, P3 is Secondary" which means SATA 2 and SATA 4 are Secondary. If the "PATA IDE Mode " is Secondary, it will show " P0, P2 is Primary " which means SATA 1 and SATA 3 are Primary.

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.

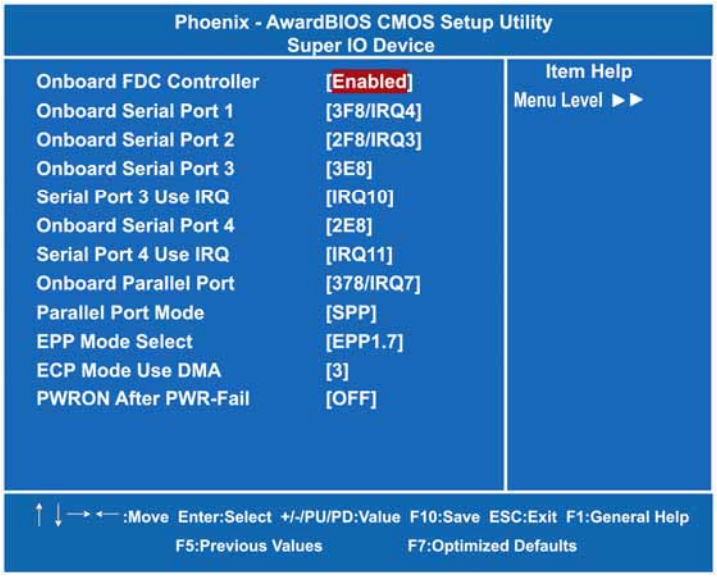


  - **USB Controller**
    Enable this item if you are using the USB in the system. You should disable this item if a higher-level controller is added.
  - **USB 2.0 Controller**
    Enable this item if you are using the EHCI (USB2.0) controller in the system.
  - **USB Keyboard Support**
    Enable this item if the system has a Universal Serial Bus (USB) controller, and you have a USB keyboard.
  - **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.



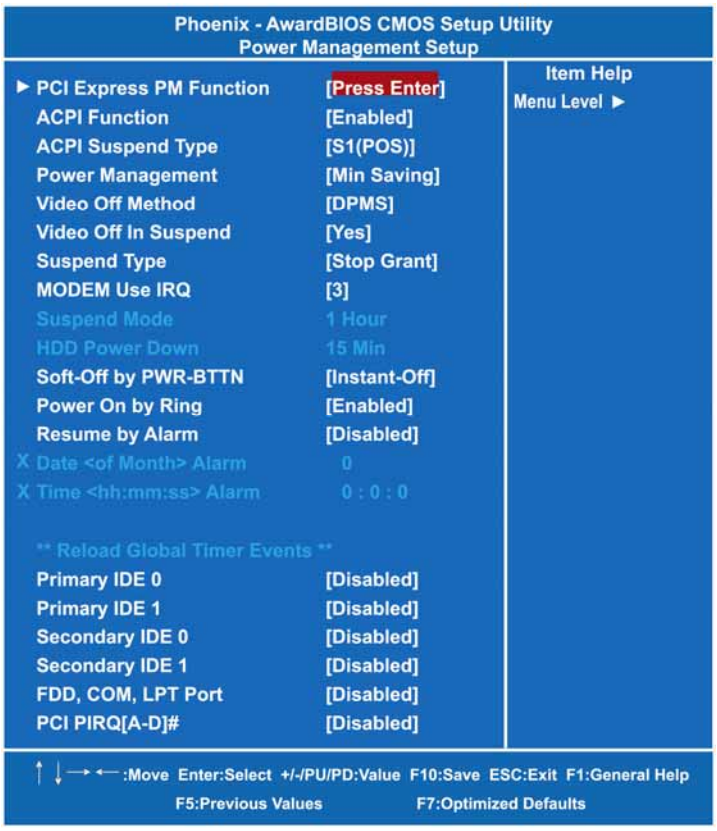
  - **Onboard FDC Controller**
    Select Enabled, if your system has a floppy disk controller (FDC) installed on the system board and you want to use it. If you install and-in FDC or the system has no floppy drive, select Disabled in this field. Options: "*Enabled*" and "*Disabled*".
  - **Onboard Serial Port 1/2**
    Select an address and corresponding interrupt for the serial port. Options are: *"3F8/IRQ4", "2F8/IRQ3", "3E8/IRQ4", "2E8/IRQ3", "Auto"* and *"Disabled".*
  - **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: *"SPP", "EPP", "ECP", "ECP+EPP"* and *"Normal"*.
- **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.
- **PWRON After PWR-Fail**
  This item enables your computer to automatically restart or return to its operating status.

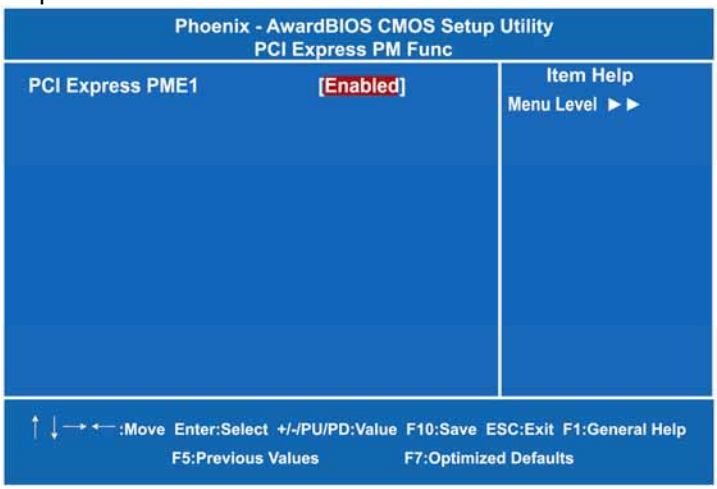
Press <Esc> to return to the Integrated Peripherals page, and press it again to the Main Menu.

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.



- **PCI Express PM Func**
  Scroll to this item and press <Enter> to view the sub menu PCI Express PM Function.



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

- **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.

- **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.

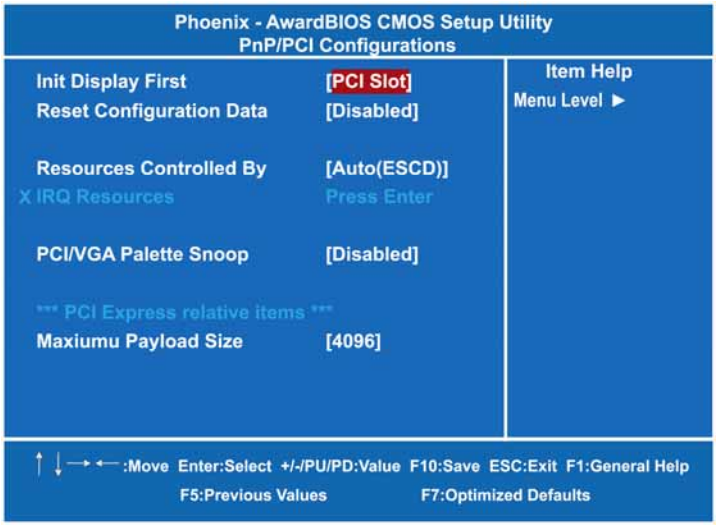
- **Primary/Secondary IDE 0/1**
  Use this item to configure the IDE devices monitored by the system.

- **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.



- **Init Display First**
  This item allows you to decide whether PCI Slot or AGP 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.

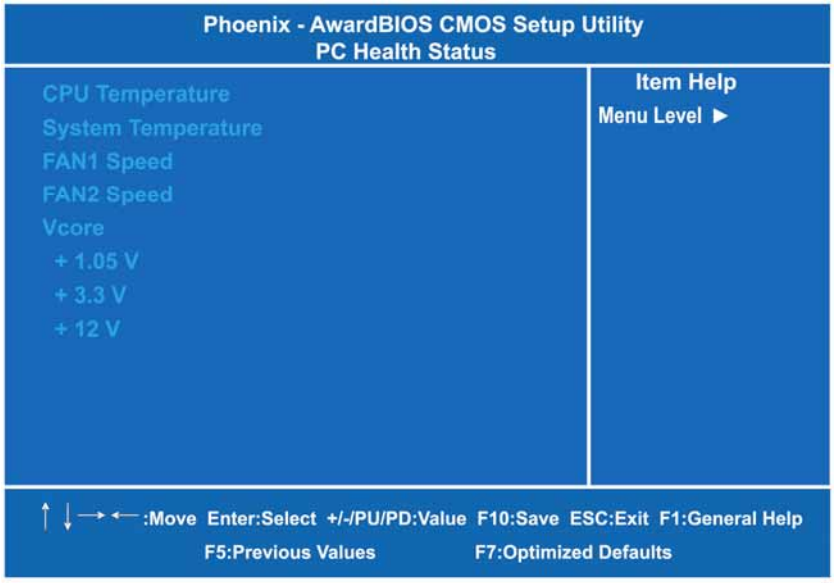
**** PCI Express relative items ****

- **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 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.

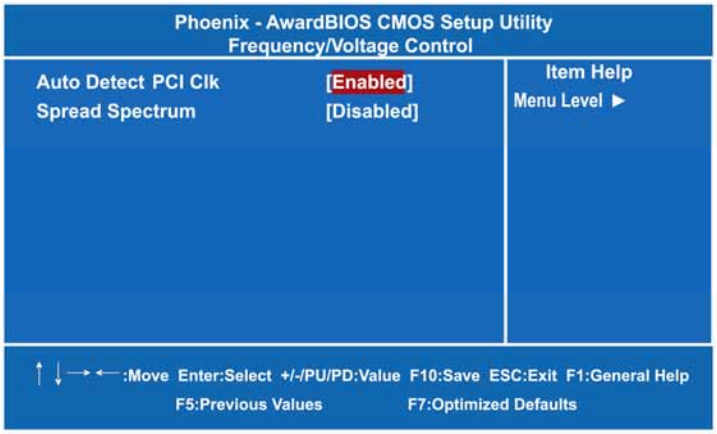


- **CPU Temperature**
  The current system CPU temperature will be automatically detected by the system.
- **SYSTEM Temperature**
  Show you the current system1 temperature.
- **FAN1 Speed**
  Show you the current system fan1 temperature.
- **FAN2 Speed**
  Show you the current system fan2 temperature.
- **Vcore +3.3V/+5V/+12V/VBAT(V)/5VSB**
  Show you the voltage +1.05V/+3.3V/+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.

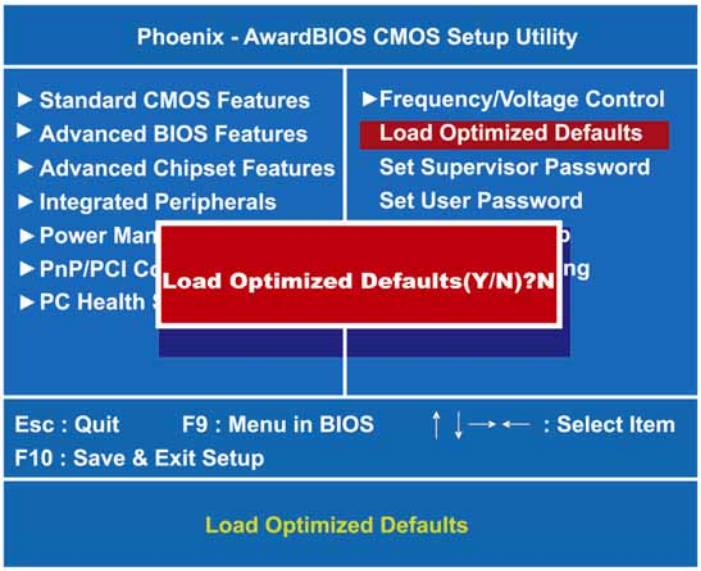


- **Auto Detect PCI Clk**
  The item enables or disables the auto detection of the PCI clock.
- **Spread Spectrum**
  This item is to adjust extreme values of the pulse for EMI test.

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

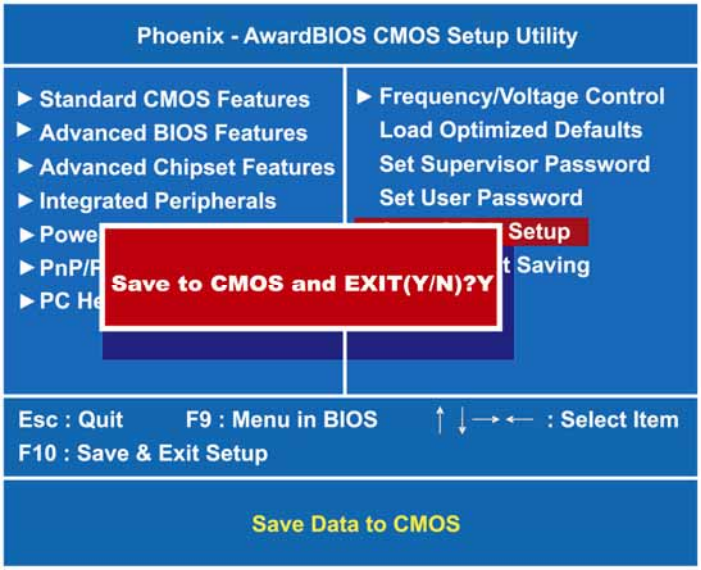
When a password is enabled, you have to type it every time you enter the Setup. It prevents any unauthorized persons from changing your system configuration.

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.

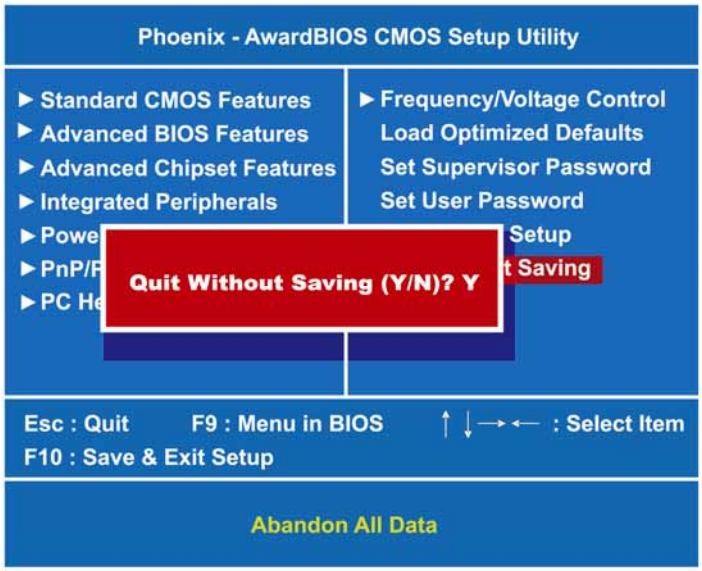
4.15 Save & Exit Setup

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.



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:

O 2E 30
O 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

Digital I/O Software Programming

- GPI program sample:

O 2E 87	
O 2E 87	
O 2E 2A	
O 2F FF	Setting GP10~GP17
O 2F FF	
O 2E 07	
O 2F 07	Select Device 7
O 2E 30	
O 2F 01	Setting logic device active
O 2E F0	
O 2F E0	GP10~GP14 Setting: output GP15~GP17 Setting: input
O 2E F1	If output pin, it can be read or written; if input pin, it can be read only.
I 2F	Display input read value

- GPO program sample:

o 2e 87	
o 2e 87	
o 2e 2A	
o 2f FF	Setting GP10~GP17
o 2e 07	
o 2f 07	Select Device 7
o 2e 30	
o 2f 01	Setting logic device active
o 2e F0	
o 2f E0	GP10~GP14 Setting: output GP15~GP17 Setting: input
o 2e F1	If output pin, it can be read or written; if input pin, it can be read only.
o 2f FF	