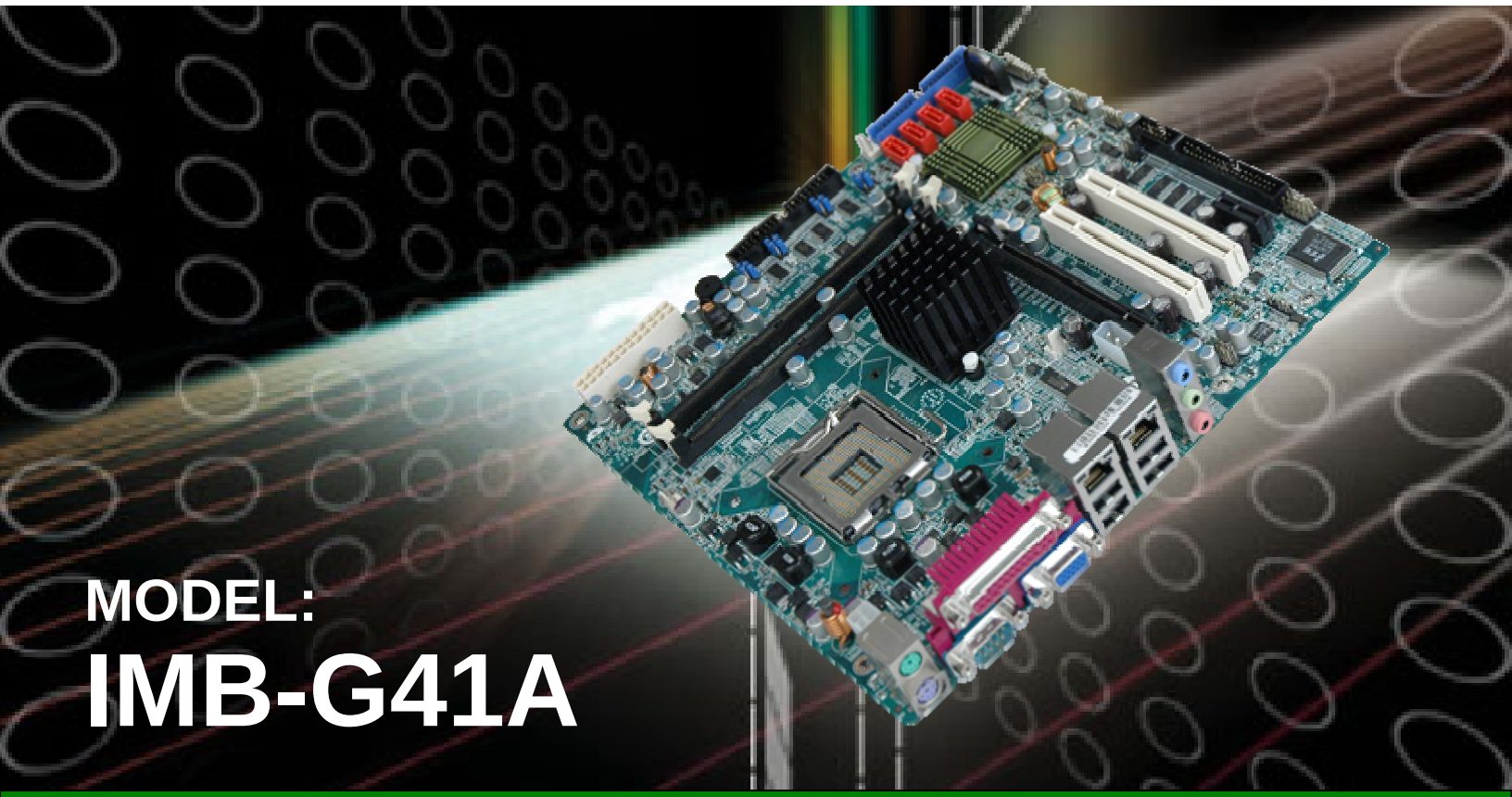
IEI Technology Corp.



MODEL:

IMB-G41A

MicroATX LGA775 Motherboard for Intel® Core™ 2 Duo/Quad/Extreme CPU, 800/1066/1333MHz FSB, VGA, LAN, SATA, IDE, Parallel port, PCI, PCIe x1, PCIe x16, USB, HD Audio, RoHS Compliant

User Manual

Rev. 1.01 – 22 June, 2010

RoHS Lead Free

Revision

Date	Version	Changes
22 June, 2010	1.01	Minor edit
1 February, 2010	1.00	Initial release

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Chapter

1

Introduction

1.1 Introduction

Figure 1-1: IMB-G41A

The IMB-G41A is a MicroATX motherboard. It accepts a Socket LGA775 Intel® Core™ 2 Duo/Quad/Extreme processor and supports two 800/1066/1333 MHz Dual-channel DDR3 DIMM modules up to 4.0 GB each. The IMB-G41A includes a VGA port. Expansion and I/O include two PCI card slots, a PCIe x16 card slot, a PCIe x1 card slot, High Definition audio, four USB ports on the rear panel, four USB ports via pin headers, four SATA connectors, a LPT port, and a keyboard/mouse connector.

1.2 Benefits

Some of the IMB-G41A motherboard benefits include:

- Powerful graphics with multiple monitors
- Staying connected with both wired LAN connections
- Speedy running of multiple programs and applications

1.3 Features

Some of the IMB-G41A motherboard features are listed below:

- Micro-ATX
- RoHS compliant
- LGA 775 CPU socket
- 800/1066/1333 MHz Front Side Bus
- Two PCI card expansion slots
- One PCIe x16 card expansion slot
- One PCIe x1 card expansion slot
- Supports two dual-channel DDR3 DIMMs
- One external RS-232 serial port
- Eight internal RS-232 serial ports connectors
- One internal RS-232/422/485 serial port connector
- Two Gigabit Ethernet connectors
- Four SATA connectors
- High Definition audio
- Intel® GMA X4500 for DX10 and OpenGL 2.0 support

1.4 Connectors

The connectors on the IMB-G41A are shown in the figure below.

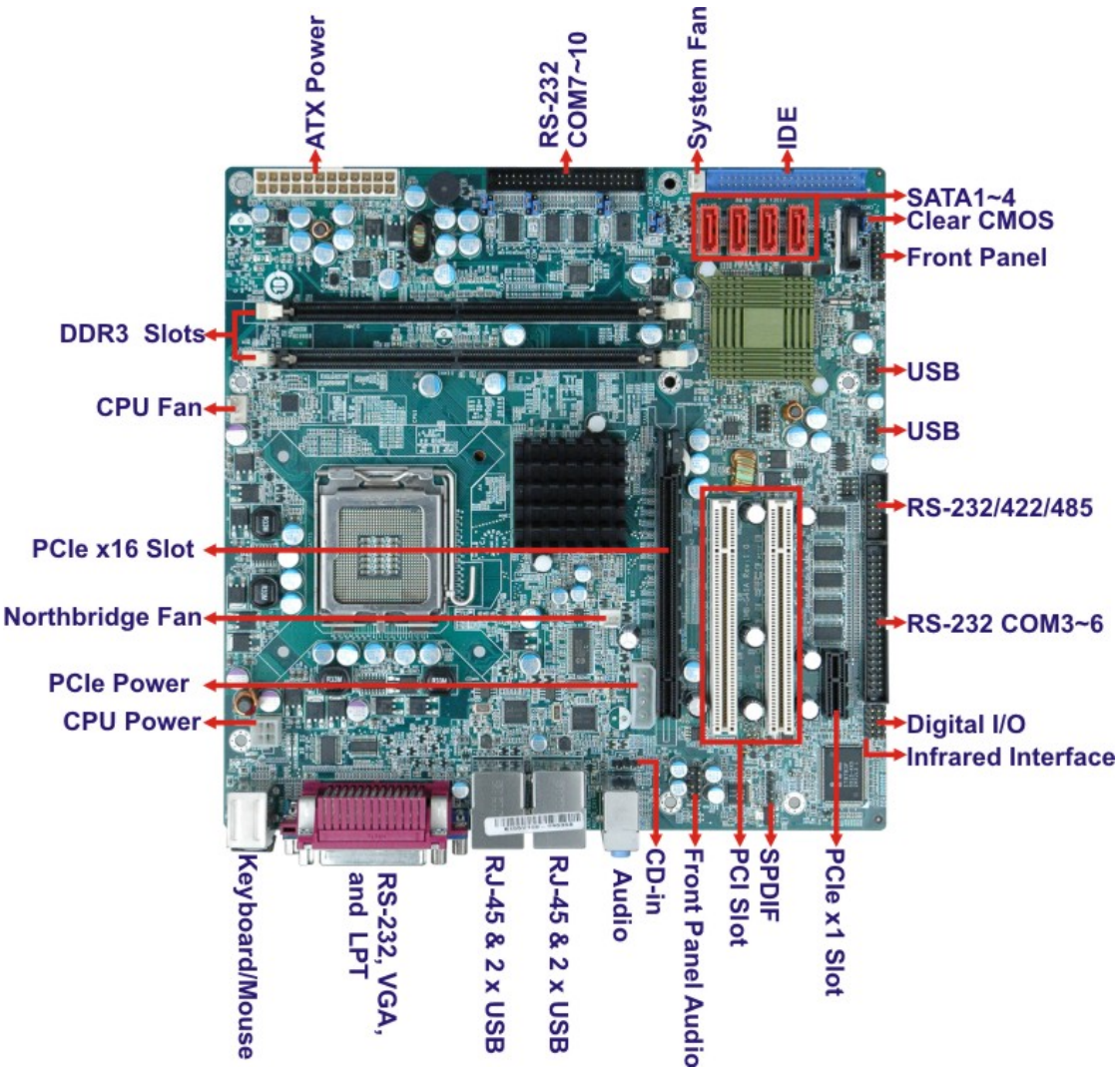


Figure 1-2: Connectors

1.5 Dimensions

The main dimensions of the IMB-G41A are shown in the diagram below.

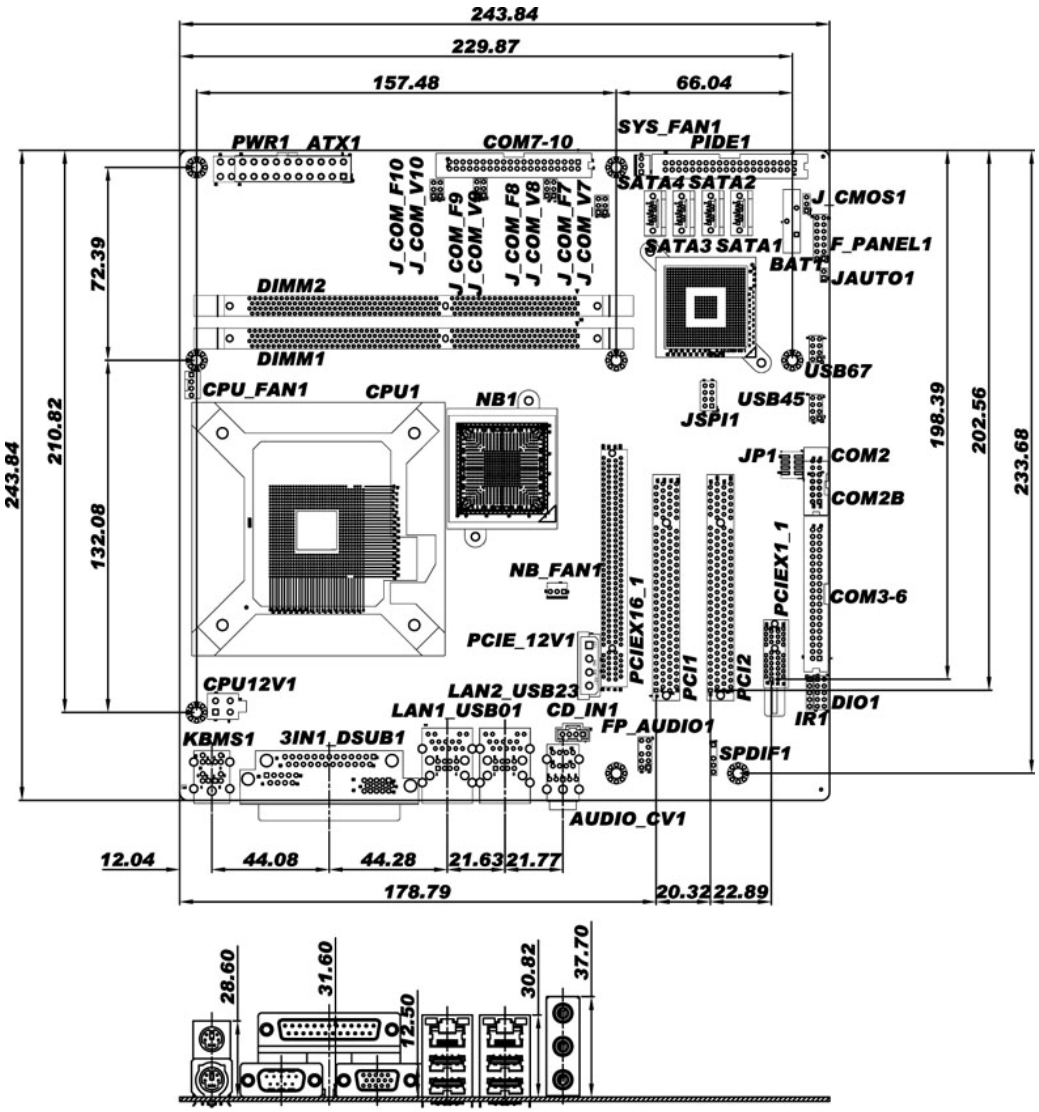


Figure 1-3: IMB-G41A Dimensions (mm)

1.6 Data Flow

Figure 1-4 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

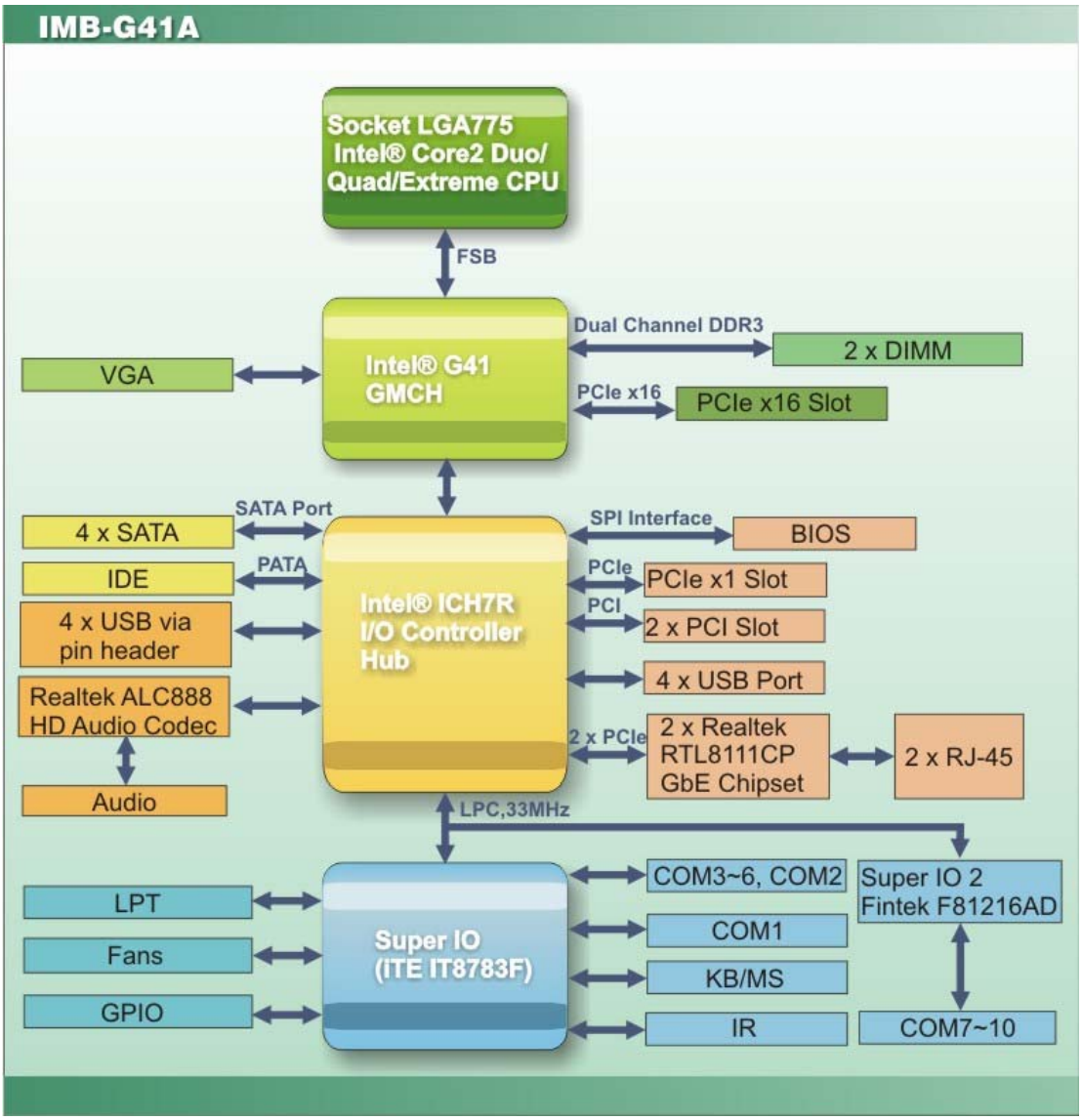


Figure 1-4: Data Flow Diagram

1.7 Technical Specifications

IMB-G41A technical specifications are listed below.

Specification/Model	IMB-G41A
Form Factor	MicroATX
CPU Supported	LGA775 Socket Intel® Core™ 2 Duo/Quad/Extreme
Front Side Bus (FSB)	800 MHz, 1066 MHz or 1333 MHz
Northbridge Chipset	Intel® G41
Integrated Graphics	Intel® GMA X4500 Up to 2048 x 1536 32-bit color @ 75 Hz refresh Supports DirectX 10/OpenGL 2.0
Memory	Two 240-pin dual-channel 800/1066/1333 MHz DDR3 DIMMs up to 4.0 GB each
Southbridge Chipset	Intel® ICH7
Audio	Realtek ALC888 HD Audio codec
BIOS	AMI BIOS
Digital I/O	8-bit, 4-bit input/4-bit output
Ethernet Controllers	Two Realtek RTL8111CP
Super I/O Controller	ITE IT8783F
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	
PCI	Two PCI slots
PCIe	One PCIe x1 slot One PCIe x16 slot
I/O Interface Connectors	
Audio Connectors	One external audio jack (line-in, line-out, mic-in) One internal front panel audio connector One internal S/PDIF connector
Display port	One VGA

Specification/Model	IMB-G41A
Ethernet	Two RJ-45 ports
Keyboard/Mouse	Dual PS/2 port
LPT	One IEEE 1284 parallel port (supports normal, EPP and ECP modes)
Serial Ports	One RS-232 serial port One RS-232/422/485 via internal box pin headers Eight RS-232 via internal box pin headers
USB 2.0/1.1 ports	Four USB ports Four USB ports by internal pin headers
Parallel ATA (IDE)	One Parallel ATA (IDE) connector
Serial ATA	Four independent Serial ATA (SATA) channels with 3.0 Gb/s data transfer rates
Environmental and Power Specifications	
Power Supply	ATX supported
Power Consumption	5V @ 7.26A, 12V @ 0.26A, Vcore_12V @ 3.24A, 3.3V @ 0.16A 3.16GHz Intel® Core™2 Duo E8500 with 2GB x 2 DDR3 800MHz
Operating temperature	0ºC ~ 60ºC/32˚F ~ 140˚F (requires cooler and silicone heat sink paste)
Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	244 mm x 244 mm
Weight GW/NW	1200 g / 700 g

Table 1-1: IMB-G41A Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions

WARNING!

Static electricity can destroy certain electronics. Make sure to follow the ESD precautions to prevent damage to the product, and injury to the user.

Make sure to adhere to the following guidelines:

- ***Wear an anti-static wristband***: Wearing an anti-static wristband can prevent electrostatic discharge.
- ***Self-grounding***: Touch a grounded conductor every few minutes to discharge any excess static buildup.
- ***Use an anti-static pad***: When configuring any circuit board, place it on an anti-static mat.
- ***Only handle the edges of the PCB***: Don't touch the surface of the motherboard. Hold the motherboard by the edges when handling.

2.2 Unpacking Precautions

When the IMB-G41A is unpacked, please do the following:

- Follow the antistatic guidelines above.
- Make sure the packing box is facing upwards when opening.
- Make sure all the packing list items are present.

2.3 Packing List

NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the IMB-G41A was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

The IMB-G41A is shipped with the following components:

Quantity	Item and Part Number	Image
1	IMB-G41A	
2	Quad ports RS-232 cable without bracket (**P/N**: 32205-001202-100-RS)	
4	SATA cable (**P/N**: 32000-062800-RS)	
1	I/O shielding (**P/N**: 45014-0017C0-00-RS)	
1	Mini jumper pack (2.54mm) (**P/N**:33100-000079-RS)	
1	Utility CD	

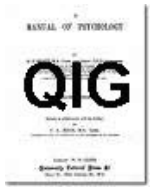
Quantity	Item and Part Number	Image
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
CPU cooler kit (**P/N**: CF-520-RS)	
CPU cooler kit (**P/N**: CF-775A-RS)	
PCIe 16X SDVO interface DVI graphic card (**P/N**: SDVO-100DVI-R10)	
PCIe 16X SDVO interface VGA graphic card (**P/N**: SDVO-100VGA-R10)	
RS-232/422/485 Cable (**P/N**: 32200-000063-RS)	

Item and Part Number	Image
Dual USB cable (with bracket) (**P/N**: CB-USB02A-RS)	
SATA power cable (**P/N**: 32100-088600-RS)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 IMB-G41A Layout

The figures below show all the connectors and jumpers.

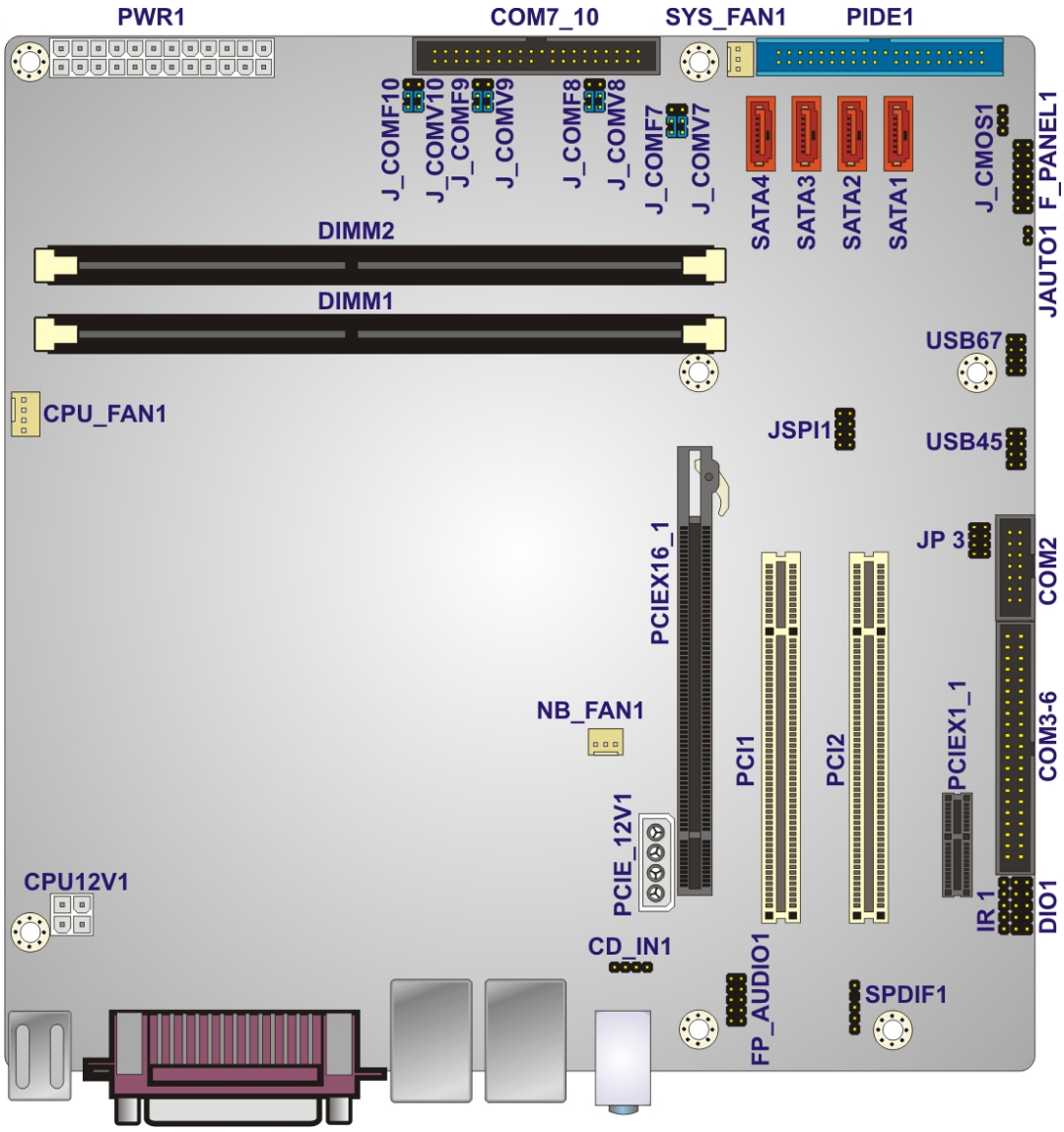


Figure 3-1: Connectors and Jumpers

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
ATX Power	24-pin ATX (2x12)	PWR1
CD-In	4-pin header	CD_IN1
CPU fan	4-pin wafer	CPU_FAN1
CPU power	4-pin box header	CPU12V1
Digital I/O	10-pin header	DIO1
Front panel	10-pin header	F_PANEL1
Front panel audio	9-pin header	FP_AUDIO1
Infrared interface	5-pin header	IR1
Memory card	DIMM slot	DIMM1, DIMM2
Northbridge fan	3-pin wafer	NB_FAN1
Parallel ATA (IDE)	40-pin box header	PIDE1
PCI card slot	PCI card slot	PCI1, PCI2
PCI-E power	4-pin molex	PCIE_12V1
PCIe x1 slot	PCIe x1 card slot	PCIEX1_1
PCIe x16 slot	PCIe x16 card slot	PCIEX16_1
S/PDIF	5-pin header	SPDIF1
SATA	7-pin SATA connector	SATA1~4
Serial port, RS-232	40-pin box headers	COM3-6, COM7-10
Serial port, RS-232/422/485	14-pin box headers	COM2
System fan	3-pin wafer	SYS_FAN1,
USB	8-pin headers (2x4)	USB45, USB67

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

The table below lists the connectors on the external I/O panel.

Connector	Type	Label
Audio	Audio jack	AUDIO_CV1
COM1, LPT, and VGA ports	9-pin male DB-9, 25-pin male DB-25, 15-pin female DE15	3IN1_DSUB1
Keyboard/Mouse	Dual PS/2	KBMS1
Ethernet and USB ports	RJ-45, USB	LAN1_USB_01 LAN2_USB_23

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the IMB-G41A.

3.2.1 ATX Power Connector

CN Label: **PWR1**

CN Type: 24-pin ATX (2x12)

CN Location: See **Figure 3-2**

CN Pinouts: See **Table 3-3**

The ATX power connector connects to an ATX power supply.

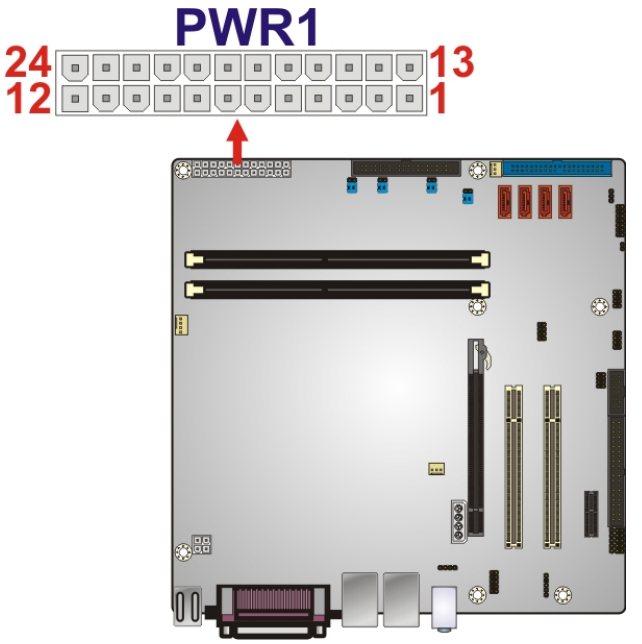


Figure 3-2: ATX Power Connector Pinout Locations

Pin	Description	Pin	Description
1	+3.3 V	13	+3.3 V
2	+3.3 V	14	-12 V
3	GND	15	GND
4	+5 V	16	PS-ON
5	GND	17	GND
6	+5 V	18	GND
7	GND	19	GND
8	PW-OK	20	NC
9	+VCC5SB	21	+5 V
10	+12 V	22	+5 V
11	+12 V	23	+5 V
12	+3.3 V	24	GND

Table 3-3: ATX Power Connector Pinouts

3.2.2 CD-In Connector

CN Label:	**CD_IN1**
CN Type:	4-pin header
CN Location:	See **Figure 3-3**
CN Pinouts:	See **Table 3-4**

This connector accepts analog stereo audio input from a CD-ROM. Analog audio output is mostly found on older CD-ROMs.

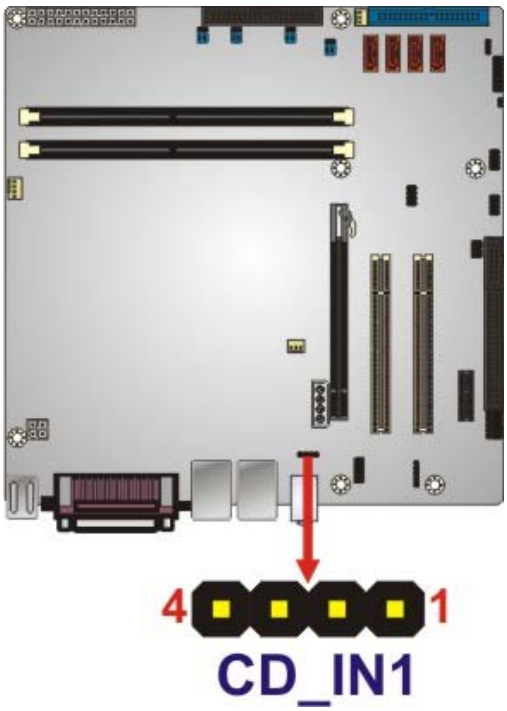


Figure 3-3: Audio CD In Connector Pinouts (4-pin)

Pin	Description
1	CD Signal (Left)
2	Ground
3	Ground
4	CD Signal (Right)

Table 3-4: Audio CD In Connector Pinouts

3.2.3 CPU Fan Connector

CN Label:	**CPU_FAN1**
CN Type:	4-pin header
CN Location:	See **Figure 3-4**
CN Pinouts:	See **Table 3-5**

The fan connector attaches to a CPU cooling fan.

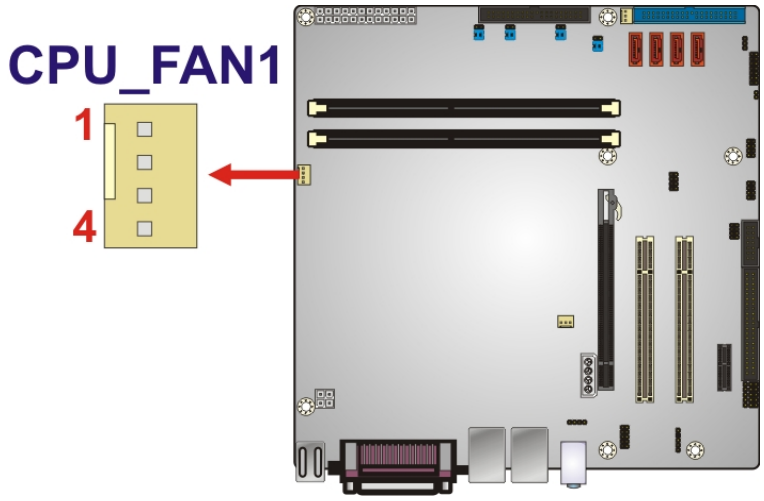


Figure 3-4: CPU Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12 V
3	FAN_Detect
4	FAN_CTRL

Table 3-5: CPU Fan Connector Pinouts

3.2.4 CPU Power Input Connector

CN Label:	**CPU12V2**
CN Type:	4-pin AT
CN Location:	See **Figure 3-5**
CN Pinouts:	See **Table 3-6**

The CPU power input connector provides power to the CPU.

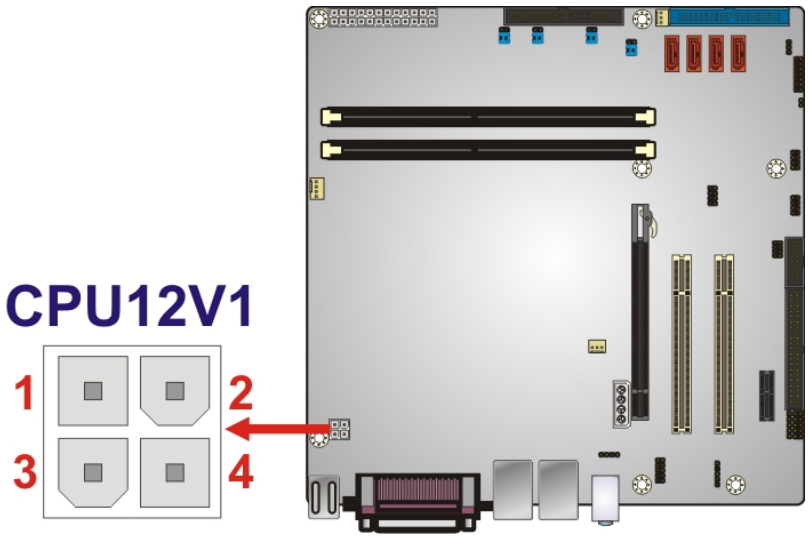


Figure 3-5: CPU Power Input Connector Location

PIN NO.	DESCRIPTION
1	GND
2	GND
3	12 V
4	12 V

Table 3-6: CPU Power Input Connector Pinouts

3.2.5 Digital I/O Connector

CN Label: **DIO1**

CN Type: 10-pin header

CN Location: See **Figure 3-6**

CN Pinouts: See **Table 3-7**

The digital I/O connector provides programmable input and output for external devices. The digital I/O provides 4-bit output and 4-bit input.

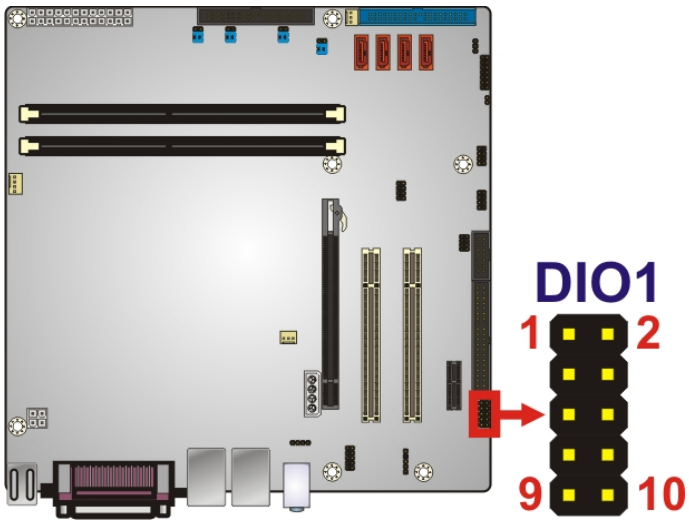


Figure 3-6: Digital I/O Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	5 V
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 3-7: Digital I/O Connector Pinouts

3.2.6 Front Panel Audio Connector

CN Label:	**FP_AUDIO1**
CN Type:	10-pin header
CN Location:	See **Figure 3-7**
CN Pinouts:	See **Table 3-8**

This connector connects to speakers, a microphone and an audio input.

Figure 3-7: Audio Connector Pinouts

Pin	Description	Pin	Description
1	MIC_L	2	GND
3	MIC_R	4	Audio Detect
5	Line2_R	6	GNC
7	Jack Detection	8	N/C
9	Line2_L	10	GND

Table 3-8: Front Panel Audio Connector Pinouts

3.2.7 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 10-pin header

CN Location: See **Figure 3-8**

CN Pinouts: See **Table 3-9**

The front panel connector connects to the indicator LEDs and buttons on the computer's front panel.

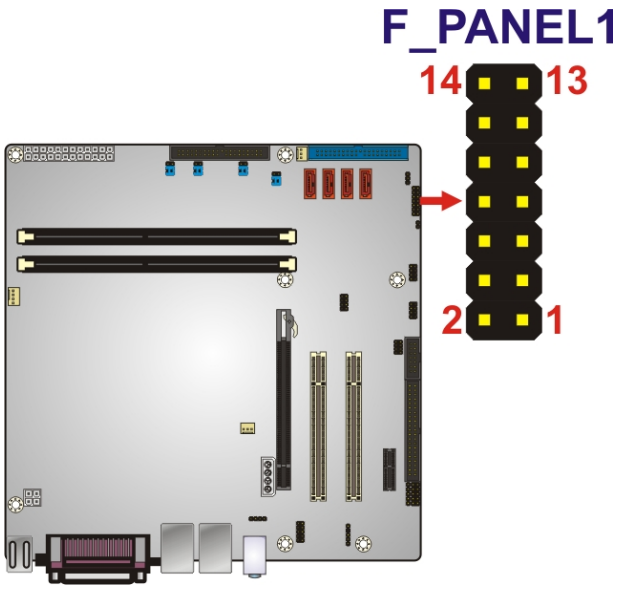


Figure 3-8: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	+5 V	Speaker	2	+5 V
	3	N/C		4	N/C
	5	Ground		6	N/C
Power Button	7	PWRBTN-		8	Speaker
	9	GND	Reset	10	N/C
HDD LED	11	+5 V		12	Reset-
	13	HDD LED-		14	GND

Table 3-9: Front Panel Connector Pinouts

3.2.8 Infrared Interface Connector

CN Label: **IR1**

CN Type: 5-pin header (1x5)

CN Location: See **Figure 3-9**

CN Pinouts: See **Table 3-10**

The infrared connector attaches to an infrared receiver for use with remote controls.

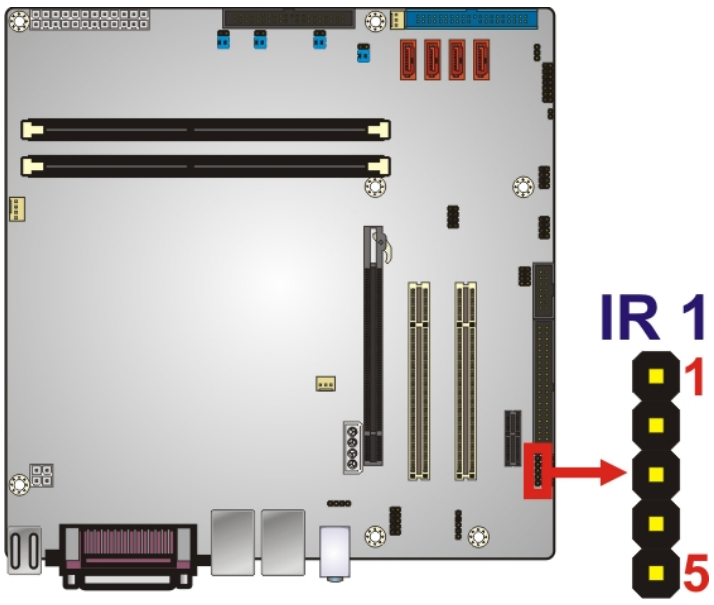


Figure 3-9: Infrared Connector Location

Pin	Description
1	VCC
2	NC
3	IR-RX
4	GND
5	IR-TX

Table 3-10: Infrared Connector Pinouts

3.2.9 Memory Card Slot

CN Label: **DIMM1, DIMM2**

CN Type: DIMM slot

CN Location: See **Figure 3-13**

The DIMM slots are for DIMM memory modules.

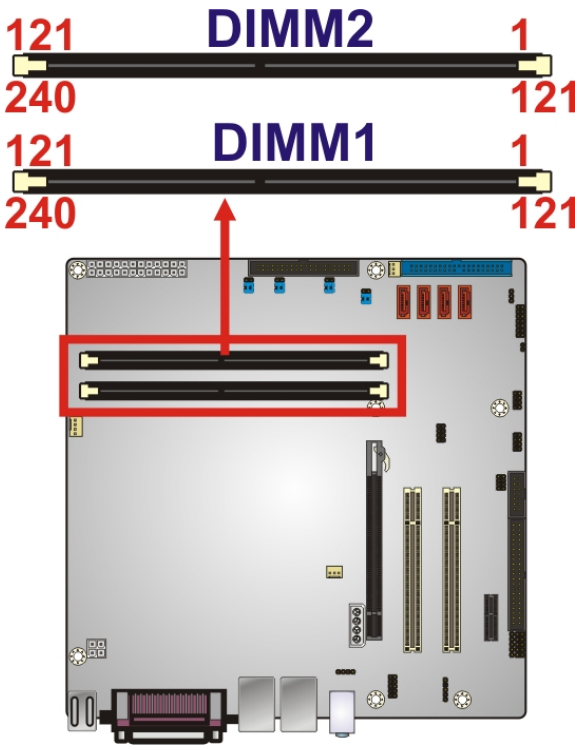


Figure 3-10: Memory Card Slot Location

3.2.10 Northbridge Fan Connector

CN Label:	**NB_FAN1**
CN Type:	3-pin header
CN Location:	See **Figure 3-21**
CN Pinouts:	See **Table 3-20**

The Northbridge fan connector attaches to a Northbridge cooling fan.

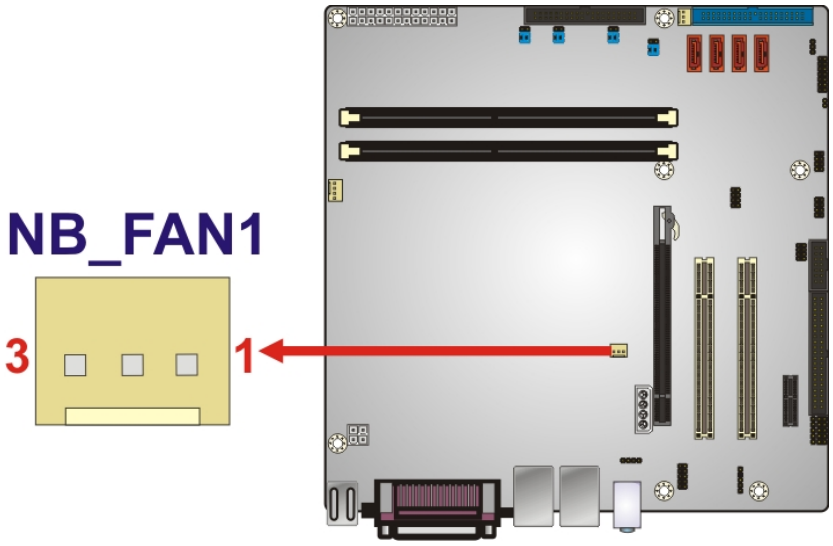


Figure 3-11: Northbridge Fan Connector Location

Pin	Description
1	Fan Speed Detect
2	+12 V
3	GND

Table 3-11: Northbridge Fan Connector Pinouts

3.2.11 Parallel ATA (IDE) Connector

CN Label:	**PIDE1**
CN Type:	44-pin box header (2x22)
CN Location:	See **Figure 3-12**
CN Pinouts:	See **Table 3-12**

The Parallel ATA (IDE) connector can connect to a Parallel ATA (IDE) hard drive or optical device.

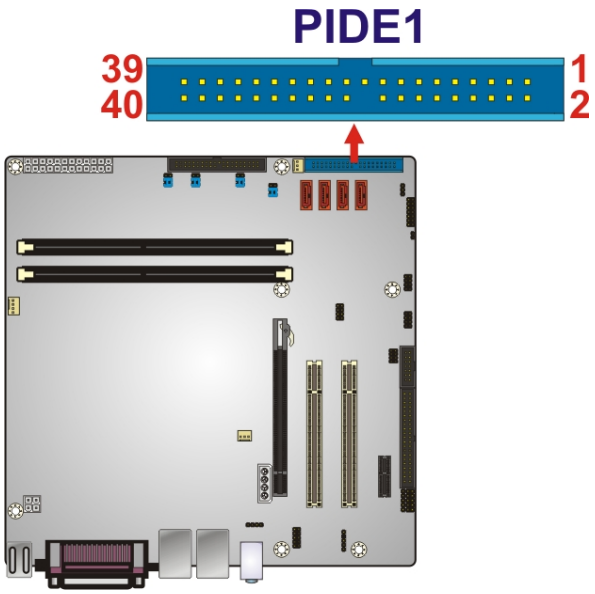


Figure 3-12: Parallel ATA (IDE) Connector Location

Pin	Description	Pin	Description
1	RESET#	2	GROUND
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

Pin	Description	Pin	Description
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	BALE - DEFAULT
29	IDE DACK	30	GROUND
31	INTERRUPT	32	N/C
33	SA1	34	PDIAG#
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

Table 3-12: Parallel ATA (IDE) Connector Pinouts

3.2.12 PCI Card Slot

CN Label: **PCI1, PCI2**

CN Type: PCI card slot

CN Location: See **Figure 3-13**

The PCI card slot is for installing PCI expansion cards.

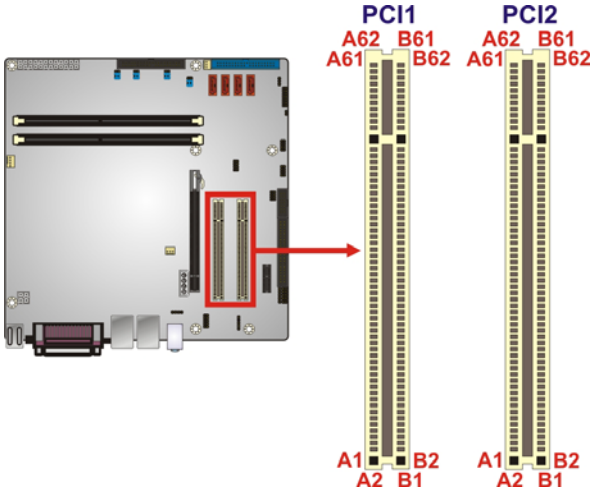


Figure 3-13: PCI Card Slot Location

3.2.13 PCI Express Power

CN Label:	**PCIE_12V1**
CN Type:	4-pin Molex
CN Location:	See **Figure 3-14**
CN Pinouts:	See **Table 3-13**

Provides extra power to the PCIe x16 card.

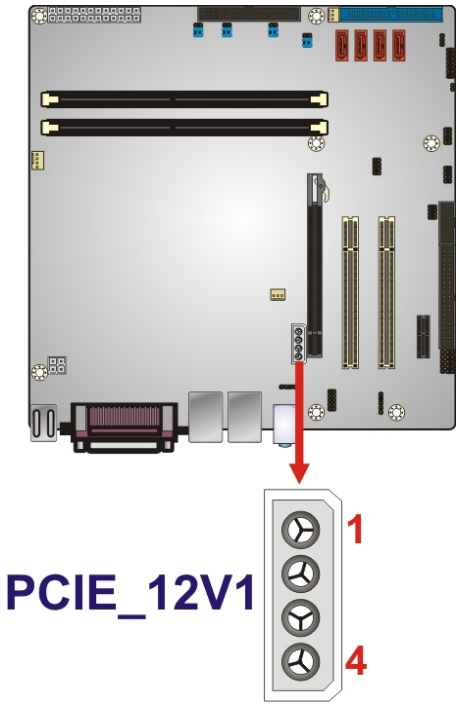


Figure 3-14: PCIe Power

Pin	Description
1	VCC5V
2	GND
3	GND
4	VCC12V

Table 3-13: PCIe Power

3.2.14 PCI Express x1 Slot

CN Label: **PCIEX1_1**

CN Type: PCIe x1 card slot

CN Location: See **Figure 3-15**

CN Pinouts: See **Table 3-14**

The PCIe x1 expansion card slot is for PCIe x1 expansion cards.

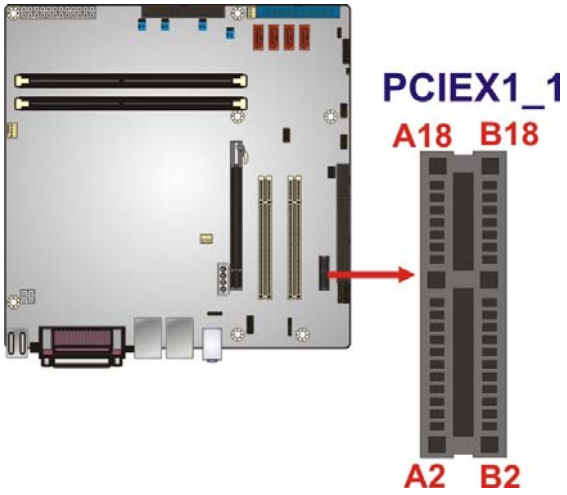


Figure 3-15: PCIe x1 Slot Location

Pin	Description	Pin	Description
A1	+12v	B1	PRSNT#1
A2	+12v	B2	+12v
A3	RSVD	B3	+12v
A4	GND	B4	GND
A5	SMCLK	B5	JTAG2
A6	SMDAT	B6	JTAG3
A7	GND	B7	JTAG4
A8	+3.3v	B8	JTAG5
A9	JTAG1	B9	+3.3v
A10	3.3 Vaux	B10	+3.3v
A11	WAKE#	B11	PWRGD
A12	RSVD	B12	GND
A13	GND	B13	REFCLK+
A14	HSOp(0)	B14	REFCLK-
A15	HSOn(0)	B15	GND
A16	GND	B16	HSIp(0)
A17	PRSNT#2	B17	HSIn(0)

Pin	Description	Pin	Description
A18	GND	B18	GND

Table 3-14: PCIe x1 Slot Pinouts

3.2.15 PCI Express x16 Slot

CN Label: **PCIEX16_1**

CN Type: PCIe x16 card slot

CN Location: See **Figure 3-16**

CN Pinouts: See **Table 3-15** (Side A) **Table 3-16** (Side B)

The PCIe x16 expansion cards slot is for PCIe x16 expansion cards.

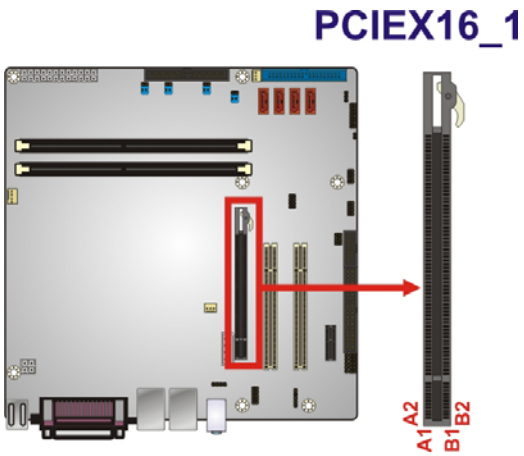


Figure 3-16: PCIe x16 Slot Location

Pin	Description	Pin	Description	Pin	Description	Pin	Description
A1	Name	A22	HSIn(1)	A43	HSIp(6)	A64	HSIp(11)
A2	PRSNT#1	A23	GND	A44	HSIn(6)	A65	HSIn(11)
A3	+12v	A24	GND	A45	GND	A66	GND
A4	+12v	A25	HSIp(2)	A46	GND	A67	GND
A5	GND	A26	HSIn(2)	A47	HSIp(7)	A68	HSIp(12)
A6	JTAG2	A27	GND	A48	HSIn(7)	A69	HSIn(12)
A7	JTAG3	A28	GND	A49	GND	A70	GND

Pin	Description	Pin	Description	Pin	Description	Pin	Description
A8	JTAG4	A29	HSIp(3)	A50	RSVD	A71	GND
A9	JTAG5	A30	HSIn(3)	A51	GND	A72	HSIp(13)
A10	+3.3v	A31	GND	A52	HSIp(8)	A73	HSIn(13)
A11	+3.3v	A32	RSVD	A53	HSIn(8)	A74	GND
A12	PWRGD	A33	RSVD	A54	GND	A75	GND
A13	GND	A34	GND	A55	GND	A76	HSIp(14)
A14	REFCLK+	A35	HSIp(4)	A56	HSIp(9)	A77	HSIn(14)
A15	REFCLK-	A36	HSIn(4)	A57	HSIn(9)	A78	GND
A16	GND	A37	GND	A58	GND	A79	GND
A17	HSIp(0)	A38	GND	A59	GND	A80	HSIp(15)
A18	HSIn(0)	A39	HSIp(5)	A60	HSIp(10)	A81	HSIn(15)
A19	GND	A40	HSIn(5)	A61	HSIn(10)	A82	GND
A20	RSVD	A41	GND	A62	GND		
A21	GND	A42	GND	A63	GND		

Table 3-15: PCIe x16 Side A Pinouts

Pin	Description	Pin	Description	Pin	Description	Pin	Description
B1	+12v	B22	GND	B43	GND	B64	GND
B2	+12v	B23	HSOp(2)	B44	GND	B65	GND
B3	RSVD	B24	HSOn(2)	B45	HSOp(7)	B66	HSOp(12)
B4	GND	B25	GND	B46	HSOn(7)	B67	HSOn(12)
B5	SMCLK	B26	GND	B47	GND	B68	GND
B6	SMDAT	B27	HSOp(3)	B48	PRSNT#2	B69	GND
B7	GND	B28	HSOn(3)	B49	GND	B70	HSOp(13)
B8	+3.3v	B29	GND	B50	HSOp(8)	B71	HSOn(13)
B9	JTAG1	B30	RSVD	B51	HSOn(8)	B72	GND
B10	3.3 Vaux	B31	PRSNT#2	B52	GND	B73	GND
B11	WAKE#	B32	GND	B53	GND	B74	HSOp(14)
B12	RSVD	B33	HSOp(4)	B54	HSOp(9)	B75	HSOn(14)
B13	GND	B34	HSOn(4)	B55	HSOn(9)	B76	GND
B14	HSOp(0)	B35	GND	B56	GND	B77	GND

Pin	Description	Pin	Description	Pin	Description	Pin	Description
B15	HSOn(0)	B36	GND	B57	GND	B78	HSOp(15)
B16	GND	B37	HSOp(5)	B58	HSOp(10)	B79	HSOn(15)
B17	PRSNT#2	B38	HSOn(5)	B59	HSOn(10)	B80	GND
B18	GND	B39	GND	B60	GND	B81	PRSNT#2
B19	HSOp(1)	B40	GND	B61	GND	B82	RSVD#2
B20	HSOn(1)	B41	HSOp(6)	B62	HSOp(11)		
B21	GND	B42	HSOn(6)	B63	HSOn(11)		

Table 3-16: PCIe x16 Side B Pinouts

3.2.16 SATA Drive Connectors

CN Label: **SATA1~4**

CN Type: 7-pin SATA drive connectors

CN Location: See **Figure 3-17**

The SATA drive connectors can be connected to SATA drives.

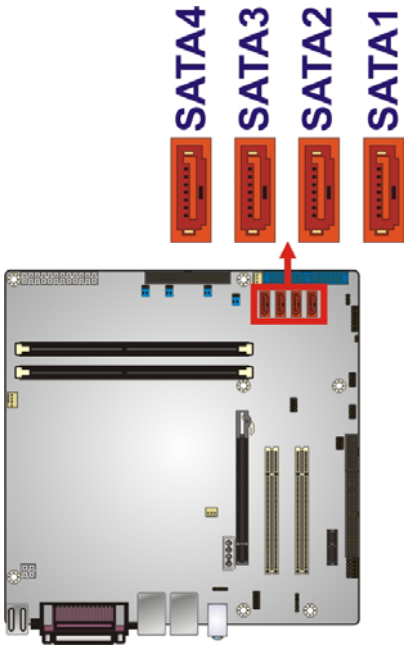


Figure 3-17: SATA Drive Connector Location

3.2.17 Serial Port Connector, RS-232/422/485

CN Label:	**COM2**
CN Type:	14-pin header (2x7)
CN Location:	See **Figure 3-18**
CN Pinouts:	See **Table 3-17**

Used for RS-232/422/485 communications.

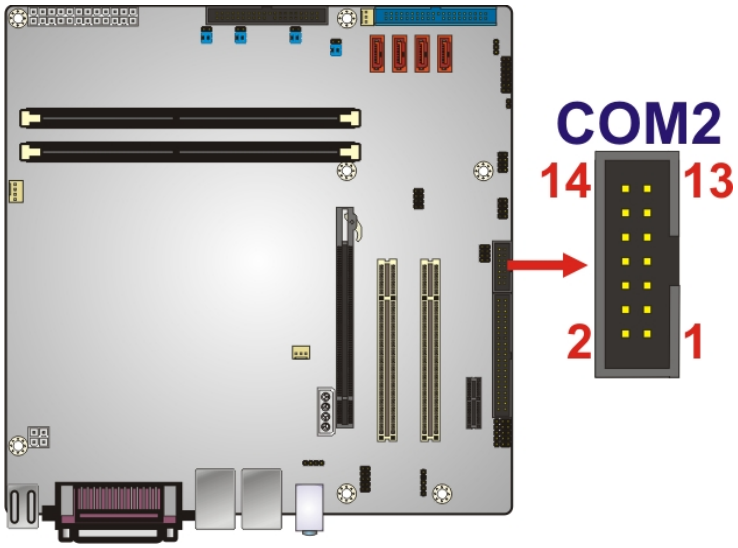


Figure 3-18: Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	N/C
11	TXD485+	12	TXD485-
13	RXD485+	14	RXD485-

Table 3-17: Serial Port Connector Pinouts

3.2.18 Serial Port Connectors, RS-232

CN Label:	**COM3-6, COM7-10**
CN Type:	40-pin header (2x20)
CN Location:	See **Figure 3-19**
CN Pinouts:	See **Table 3-18**

Each of these connectors provides RS-232 connections for four serial ports.

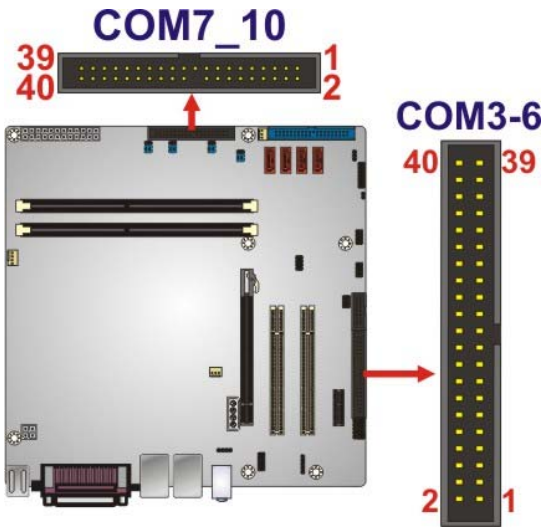


Figure 3-19: Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DATA CARRIER DETECT (DCD1)	2	DATA SET READY (DSR1)
3	RECEIVE DATA (RXD1)	4	REQUEST TO SEND (RTS1)
5	TRANSMIT DATA (TXD1)	6	CLEAR TO SEND (CTS1)
7	DATA TERMINAL READY (DTR1)	8	RING INDICATOR (RI1)
9	GND	10	GND
11	DATA CARRIER DETECT (DCD2)	12	DATA SET READY (DSR2)
13	RECEIVE DATA (RXD2)	14	REQUEST TO SEND (RTS2)
15	TRANSMIT DATA (TXD2)	16	CLEAR TO SEND (CTS2)
17	DATA TERMINAL READY (DTR2)	18	RING INDICATOR (RI2)
19	GND	20	GND

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
21	DATA CARRIER DETECT (DCD3)	22	DATA SET READY (DSR3)
23	RECEIVE DATA (RXD3)	24	REQUEST TO SEND (RTS3)
25	TRANSMIT DATA (TXD3)	26	CLEAR TO SEND (CTS3)
27	DATA TERMINAL READY (DTR3)	28	RING INDICATOR (RI3)
29	GND	30	GND
31	DATA CARRIER DETECT (DCD4)	32	DATA SET READY (DSR4)
33	RECEIVE DATA (RXD4)	34	REQUEST TO SEND (RTS4)
35	TRANSMIT DATA (TXD4)	36	CLEAR TO SEND (CTS4)
37	DATA TERMINAL READY (DTR4)	38	RING INDICATOR (RI4)
39	GND	40	GND

Table 3-18: Serial Port Connector Pinouts

3.2.19 S/PDIF Connector

CN Label: **SPDIF1**

CN Type: 5-pin header

CN Location: See **Figure 3-20**

CN Pinouts: See **Table 3-19**

Use the SPDIF connector to connect digital audio devices to the system.

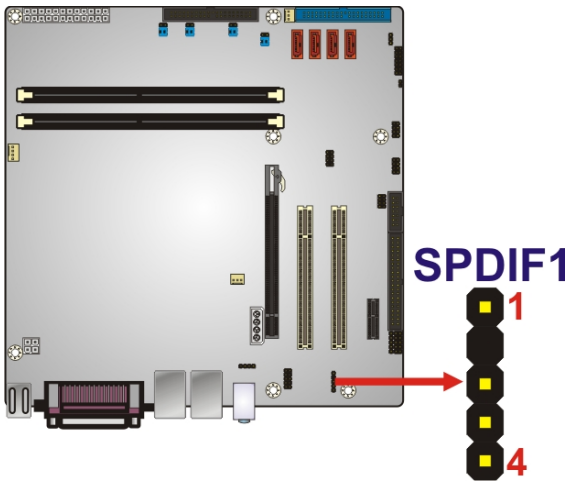


Figure 3-20: SPDIF Connector Location

PIN	DESCRIPTION
1	VCC AUDIO
2	NC
3	SPDIF OUT
4	GND AUDIO
5	SPDIF IN

Table 3-19: SPDIF Connector Pinouts

3.2.20 System Fan Connector

CN Label: **SYS_FAN1**

CN Type: 3-pin header

CN Location: See **Figure 3-21**

CN Pinouts: See **Table 3-20**

The fan connector attaches to a cooling fan.

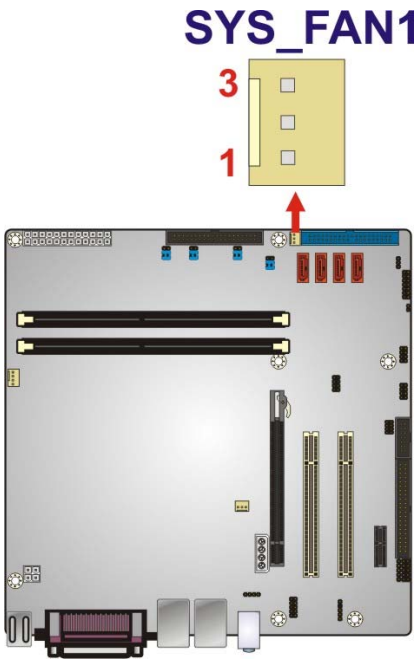


Figure 3-21: System Fan Connector Location

PIN NO.	DESCRIPTION
1	NC
2	+12 V
3	GND

Table 3-20: System Fan Connector Pinouts

3.2.21 USB Connectors

CN Label: **USB45, USB67**

CN Type: 8-pin header (2x4)

CN Location: See **Figure 3-22**

CN Pinouts: See **Table 3-21**

The USB connectors connect to USB devices. Each pin header provides two USB ports.

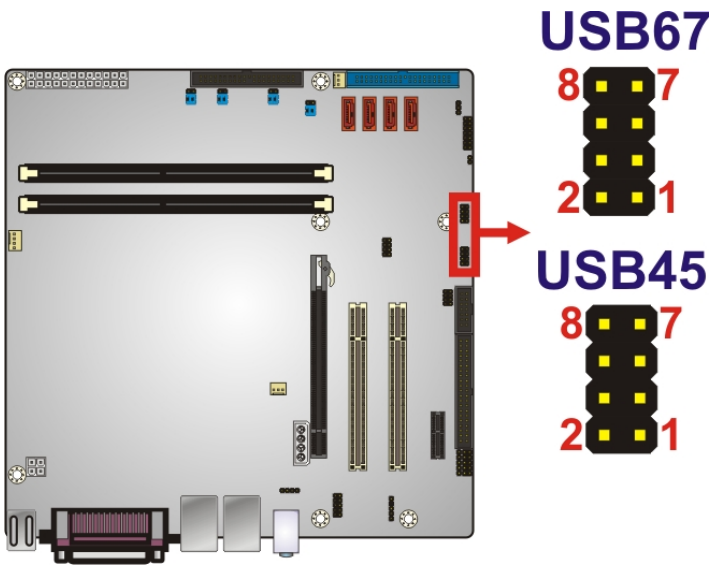


Figure 3-22: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATAN-	4	DATAM+
5	DATAN+	6	DATA1M-
7	GND	8	VCC

Table 3-21: USB Port Connector Pinouts

3.3 External Peripheral Interface Connector Panel

The figure below shows the external peripheral interface connector (EPIC) panel. The EPIC panel consists of the following:

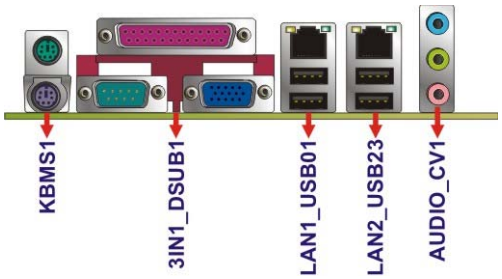


Figure 3-23: External Peripheral Interface Connector

3.3.1 Audio Connector

CN Label: **AUDIO_CV1**

CN Type: Audio jack

CN Location: See **Figure 3-23**

The audio jacks connect to external audio devices.

- **Line In port (Light Blue):** Connects a CD-ROM, DVD player, or other audio devices.
- **Line Out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.

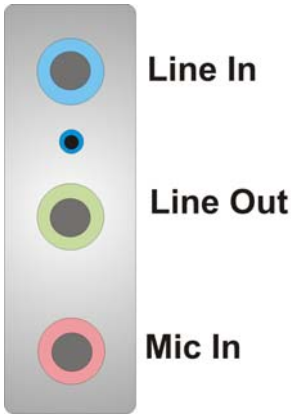


Figure 3-24: Audio Connector

3.3.2 Keyboard/Mouse Connector

CN Label: **KBMS1**

CN Type: Dual PS/2

CN Location: See **Figure 3-23**

CN Pinouts: See **Figure 3-25** and **Table 3-22**

The PS/2 ports are for connecting a PS/2 mouse and a PS/2 keyboard.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	L_KDAT	7	L_MDAT
2	NC	8	NC
3	GND	9	GND
4	5 V	10	5 V
5	L_KCLK	11	L_MCLK
6	NC	12	NC

Table 3-22: PS/2 Connector Pinouts

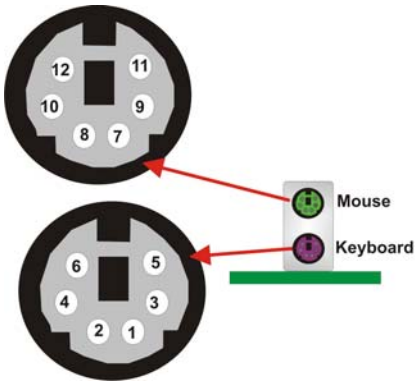


Figure 3-25: PS/2 Pinouts

3.3.3 LAN Connector

CN Label: **LAN1, LAN2**

CN Type: RJ-45

CN Location: See **Figure 3-23**

CN Pinouts: See **Table 3-23**

The LAN connector connects to a local network.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TXA+	5	TXC-
2	TXA-	6	TXB-
3	TXB+	7	TXD+
4	TXC+	8	TXD-

Table 3-23: LAN Pinouts

3.3.4 Parallel Port Connector

CN Label: **3IN1_DSUB1**

CN Type: 26-pin box header

CN Location: See **Figure 3-23**

CN Pinouts: See **Table 3-24**

The parallel port connects to parallel port device, typically a printer.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	14	AUTO FORM FEED #
2	DATA 0	15	ERROR#
3	DATA 1	16	INITIALIZE
4	DATA 2	17	PRINTER SELECT IN#
5	DATA 3	18	GROUND
6	DATA 4	19	GROUND
7	DATA 5	20	GROUND
8	DATA 6	21	GROUND
9	DATA 7	22	GROUND
10	ACKNOWLEDGE	23	GROUND
11	BUSY	24	GROUND
12	PAPER EMPTY	25	GROUND
13	PRINTER SELECT		

Table 3-24: Parallel Port Connector Pinouts

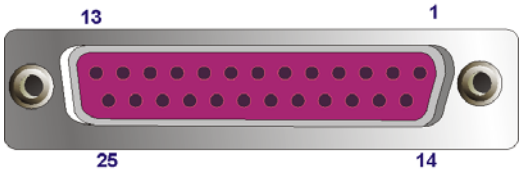


Figure 3-26: Parallel Port Connector Pinouts

3.3.5 Serial Port Connectors (COM1)

CN Label: **3IN1_DSUB1**

CN Type: DB-9 connector

CN Location: See **Figure 3-23**

CN Pinouts: See **Table 3-25** and **Figure 3-27**

The serial port connects to a RS-232 serial communications device.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	6	DSR
2	RX	7	RTS
3	TX	8	CTS
4	DTR	9	RI
5	GND		

Table 3-25: Serial Port Pinouts

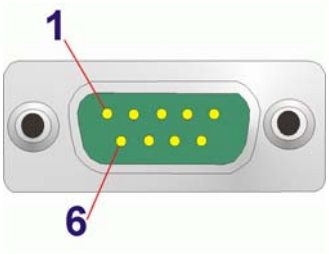


Figure 3-27: Serial Port Pinouts

3.3.6 USB Connector

CN Label: **USB01, USB23**

CN Type: USB port

CN Location: See **Figure 3-23**

CN Pinouts: See **Table 3-26**

The USB connector can be connected to a USB device.

PIN NO.	DESCRIPTION
1	5 V
2	DATA-
3	DATA+
4	GND

Table 3-26: USB Port Pinouts

3.3.7 VGA Connector

CN Label: **3IN1_DSUB1**

CN Type: 15-pin Female

CN Location: See **Figure 3-23**

CN Pinouts: See **Figure 3-28** and **Table 3-27**

The VGA connector connects to a monitor that accepts a standard VGA input.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VCC / NC	10	GND
11	NC	12	DDC DAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 3-27: VGA Connector Pinouts

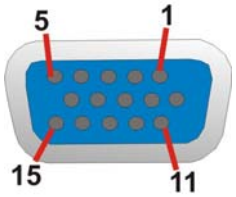


Figure 3-28: VGA Connector

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the IMB-G41A may result in permanent damage to the IMB-G41A and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMB-G41A. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMB-G41A or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the IMB-G41A, place it on an antic-static pad. This reduces the possibility of ESD damaging the IMB-G41A.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before installation. All installation notices must be strictly adhered to. Failing to adhere to these precautions may lead to severe damage and injury to the person performing the installation.

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - The user manual provides a complete description of the IMB-G41A installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the IMB-G41A on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the IMB-G41A off:
  - When working with the IMB-G41A, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the IMB-G41A **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.2.1 Socket LGA775 CPU Installation

NOTE:

To enable Hyper-Threading, the CPU and chipset must both support it.

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure the correct cooling kit is properly installed.

The LGA775 socket is shown in **Figure 4-1**.

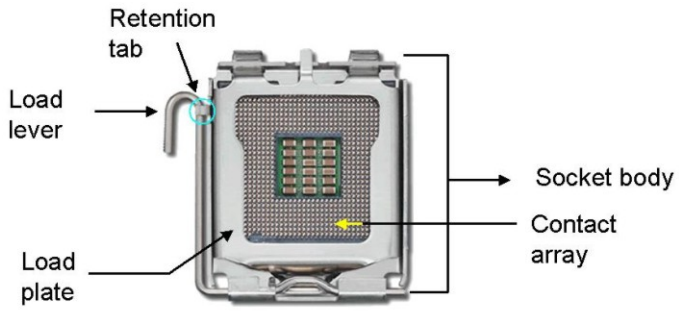


Figure 4-1: Intel LGA775 Socket

To install the CPU, follow the steps below.

WARNING:

DO NOT touch the pins at the bottom of the CPU. When handling the CPU, only hold it on the sides.

Step 1: **Remove the protective cover.** The black protective cover can be removed by pulling up on the tab labeled "Remove". See **Figure 4-2**.

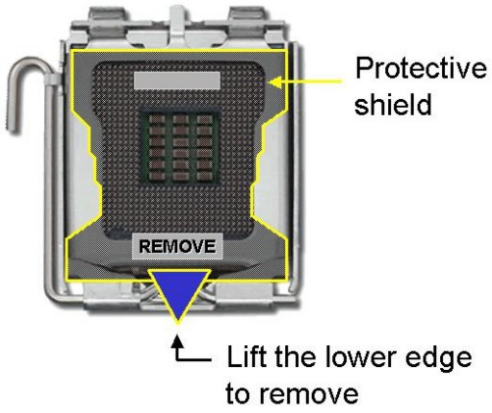


Figure 4-2: Remove Protective Cover

Step 2: **Open the socket**. Disengage the load lever by pressing the lever down and slightly outward to clear the retention tab. Fully open the lever, then open the load plate. See **Figure 4-3**.

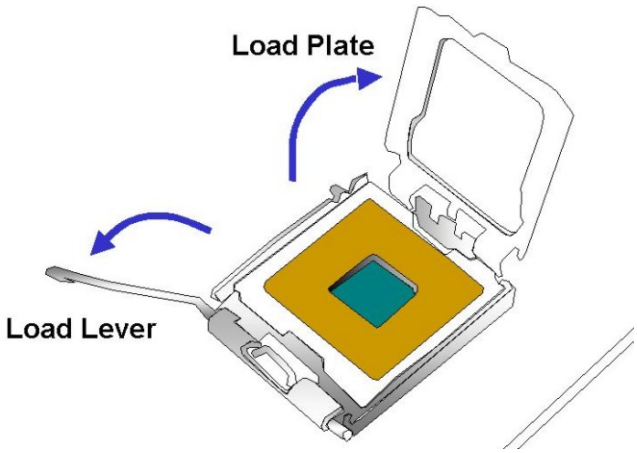


Figure 4-3: CPU Socket Load Plate

Step 3: **Inspect the CPU socket.** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

Step 4: **Orientate the CPU properly.** The contact array should be facing the CPU socket.

Step 5: **Correctly position the CPU.** Match the Pin 1 mark with the cut edge on the CPU socket.

Step 6: **Align the CPU pins.** Locate pin 1 and the two orientation notches on the CPU. Carefully match the two orientation notches on the CPU with the socket alignment keys.

Step 7: **Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly. See **Figure 4-4**.

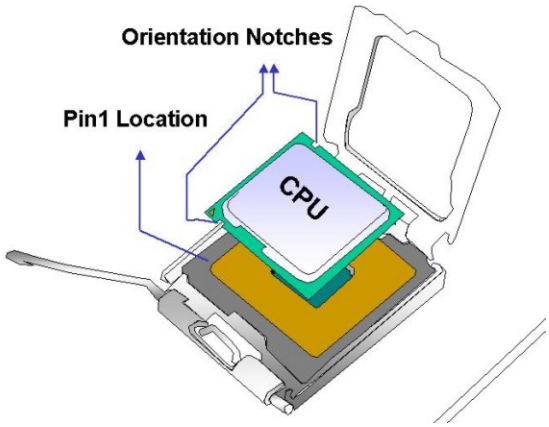


Figure 4-4: Insert the Socket LGA775 CPU

Step 8: **Close the CPU socket.** Close the load plate and engage the load lever by pushing it back to its original position. There will be some resistance, but will not require extreme pressure.

Step 9: **Connect the 12 V power to the board.** Connect the 12 V power from the power supply to the board.

4.2.2 Socket LGA775 Cooling Kit Installation

WARNING:

DO NOT use the original Intel® heat sink and fan. A proprietary one is recommended.

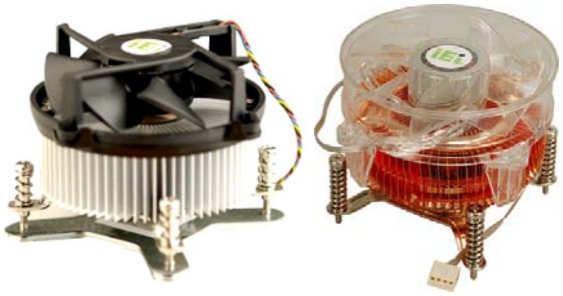


Figure 4-5: Cooling Kits (CF-520 and CF-775A)

The cooling kit can be bought from IEI. The cooling kit has a heatsink and fan.

WARNING:

Do not wipe off (accidentally or otherwise) the pre-sprayed layer of thermal paste on the bottom of the heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the cooling kit, follow the instructions below.

Step 1: **Place the cooling kit onto the socket LGA775 CPU**. Make sure the CPU cable can be properly routed when the cooling kit is installed.

Step 2: **Properly align the cooling kit**. Make sure the four spring screw fasteners can pass through the pre-drilled holes on the PCB.

Step 3: **Mount the cooling kit**. Gently place the cooling kit on top of the CPU. Make sure the four threaded screws on the corners of the cooling kit properly pass through the predrilled holes on the bottom of the PCB.

Step 4: **Secure the cooling kit**. From the solder side of the PCB, align the support bracket to the screw threads on heat sink that were inserted through the PCB holes. (See **Figure 4-6**)

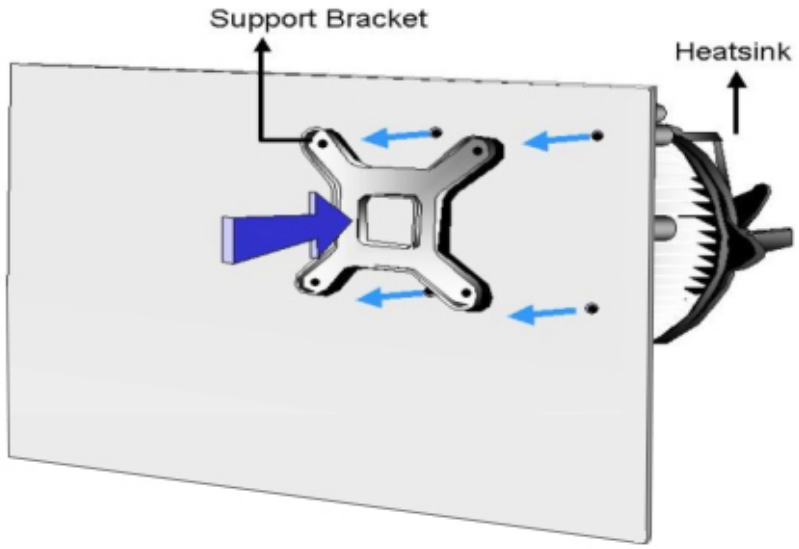


Figure 4-6: Securing the Heat sink to the IMB-G41A

Step 5: **Tighten the screws**. Use a screwdriver to tighten the four screws. Tighten each nut a few turns at a time and do not over-tighten the screws.

Step 6: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the IMB-G41A. Carefully route the cable and avoid heat generating chips and fan blades.

4.2.3 DIMM Installation

To install a DIMM, please follow the steps below and refer to **Figure 4-7**.

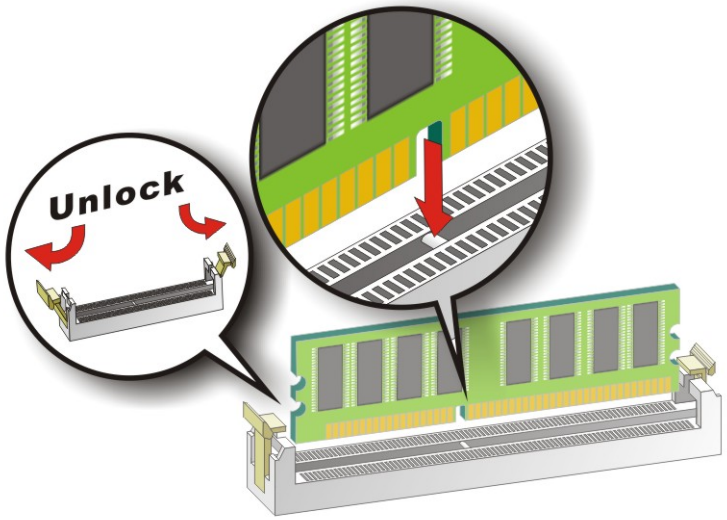


Figure 4-7: DIMM Installation

Step 1: **Open the DIMM socket handles**. Open the two handles outwards as far as they can. See **Figure 4-7**.

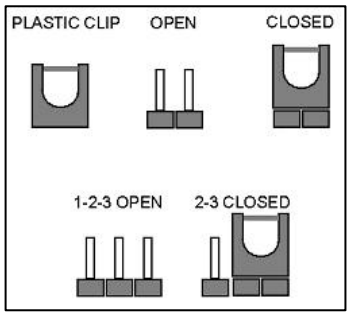
Step 2: **Align the DIMM with the socket**. Align the DIMM so the notch on the memory lines up with the notch on the memory socket. See **Figure 4-7**.

Step 3: **Insert the DIMM**. Once aligned, press down until the DIMM is properly seated. Clip the two handles into place. See **Figure 4-7**.

Step 4: **Removing a DIMM**. To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

4.3 Jumper Settings

NOTE:



A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.

The hardware jumpers must be set before installation. Jumpers are shown in **Table 4-1**.

Description	Label	Type
AT/ATX Auto power setting jumper	JAUTO1	2-pin header
Clear CMOS jumper	J_CMOS1	3-pin header
COM Port RI/Voltage select jumper	J_COM_F7 J_COM_F8 J_COM_F9 J_COM_F10	3-pin header
COM Port RI pin voltage setting	J_COM_V7 J_COM_V8 J_COM_V9 J_COM_V10	3-pin header
COM2 Port RS-232/422/485 mode setting	JP1	6-pin header

Table 4-1: Jumpers

4.3.1 AT/ATX Power Mode

Jumper Label: **JAUTO1**

Jumper Type: 2-pin header

Jumper Settings: See **Table 4-2**

Jumper Location: See **Figure 4-8**

The AT Power Select jumper specifies the systems power mode as AT or ATX.

Setting	Description
Closed	ATX power
Open	AT power

Table 4-2: AT/ATX Power Mode Jumper Settings

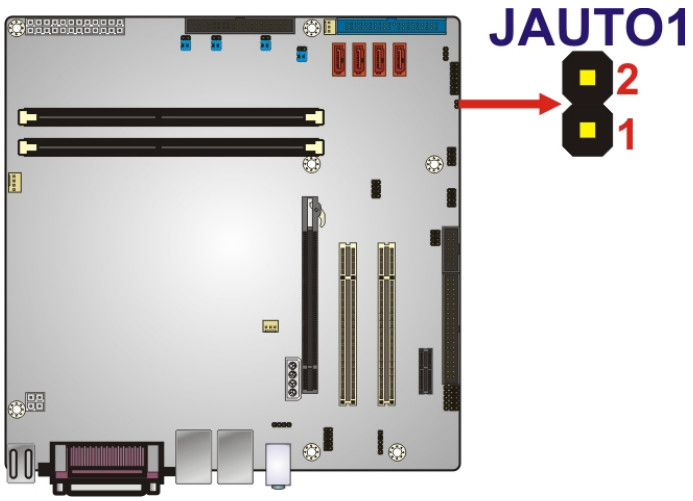


Figure 4-8: AT/ATX Power Mode Jumper Location

4.3.2 Clear CMOS Jumper

Jumper Label: **J_CMOS1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-3**

Jumper Location: See **Figure 4-9**

To reset the BIOS, move the jumper to the "Clear BIOS" position for 3 seconds or more, and then move back to the default position.

Setting	Description
1-2	Normal
2-3	Clear BIOS

Table 4-3: Clear BIOS Jumper Settings

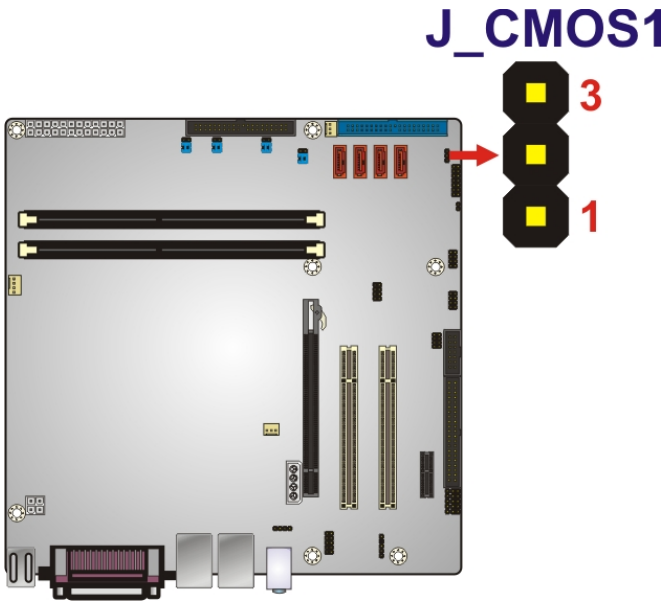


Figure 4-9: Clear BIOS Jumper Location

4.3.3 COM Pin 9 Setting Jumper (COM7~COM10)

Jumper Label: **J_COM_F7, J_COM_F8, J_COM_F9, J_COM_F10**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-4**

Jumper Location: See **Figure 4-10**

The COM Pin 9 Setting jumper configures pin 9 on COM 7~10 as either +5V/+12V power source or as a ring-in (RI) line. See the next section (Section **4.3.4**) to set the voltage if selecting voltage for the RI pin setting. The COM Pin 9 Setting jumper selection options are shown in **Table 4-4**.

Setting	Description
1-2	COM RI Pin use voltage
2-3	COM RI Pin use RI

Table 4-4: COM 1 Pin 9 Setting Jumper Settings

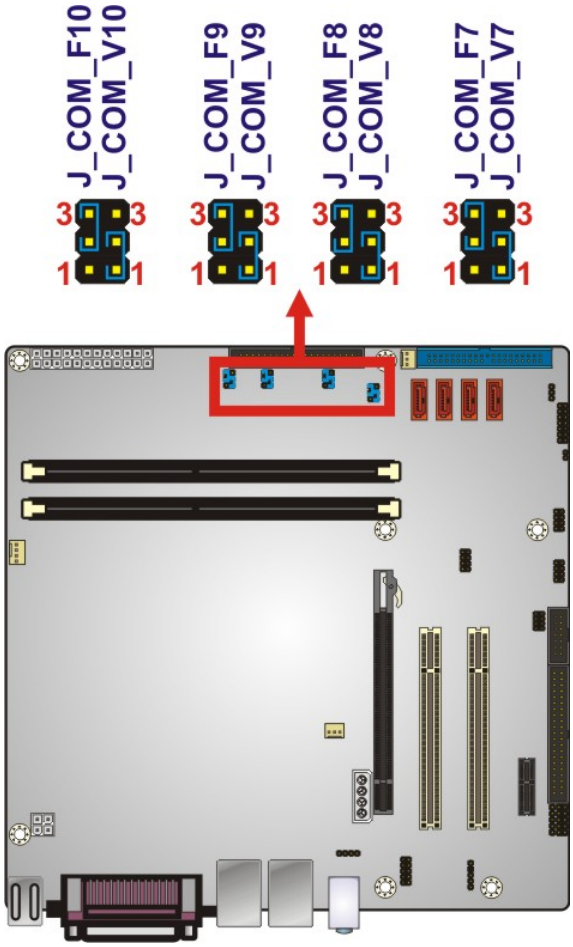


Figure 4-10: COM 1 Pin 9 Setting Jumper Location

4.3.4 COM Pin 9 Setting Jumper (COM7~COM10)

Jumper Label: **J_COM_V7, J_COM_V8, J_COM_V9, J_COM_V10**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-5**

Jumper Location: See **Figure 4-10**

The COM Pin 9 Setting jumper configures pin 9 on COM 7~10 as either a +5 V or +12 V power source. The COM 1 Pin 9 Setting jumper selection options are shown in **Table 4-5**.

Setting	Description
1-2	COM RI Pin use +5 V
2-3	COM RI Pin use +12 V

Table 4-5: COM 1 Pin 9 Setting Jumper Settings

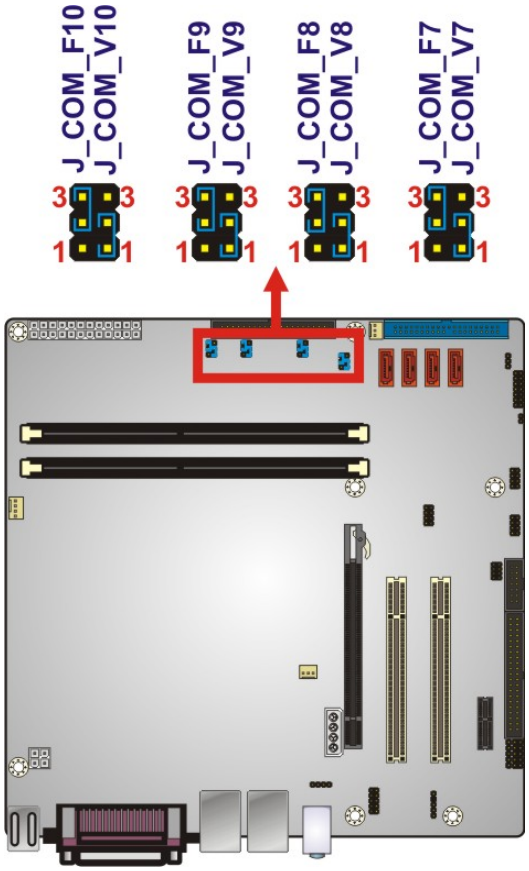


Figure 4-11: COM 1 Pin 9 Setting Jumper Location

4.4 Internal Peripheral Device Connections

This section outlines the installation of peripheral devices to the onboard connectors.

4.4.1 SATA Drive Connection

The IMB-G41A is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the SATA drive connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the on-board SATA drive connector. See **Figure 4-12**.

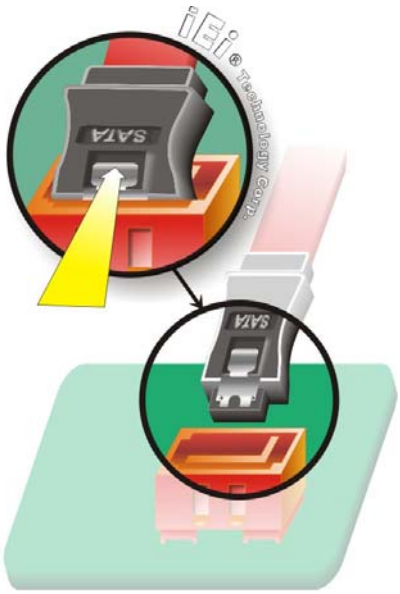


Figure 4-12: SATA Drive Cable Connection

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 4-13**.

Step 4: **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive. See **Figure 4-13**.

Figure 4-13: SATA Power Drive Connection

4.4.2 USB Cable (Dual Port) with Slot Bracket (Optional)

The IMB-G41A is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

Step 5: **Locate the connectors**. The locations of the USB connectors are shown in **Chapter 3**.

WARNING:

If the USB pins are not properly aligned, the USB device can burn out.

Step 6: **Align the connectors**. The cable has two connectors. Correctly align pin 1on each cable connector with pin 1 on the IMB-G41A USB connector.

Step 7: **Insert the cable connectors** Once the cable connectors are properly aligned with the USB connectors on the IMB-G41A, connect the cable connectors to the on-board connectors. See **Figure 4-14**.

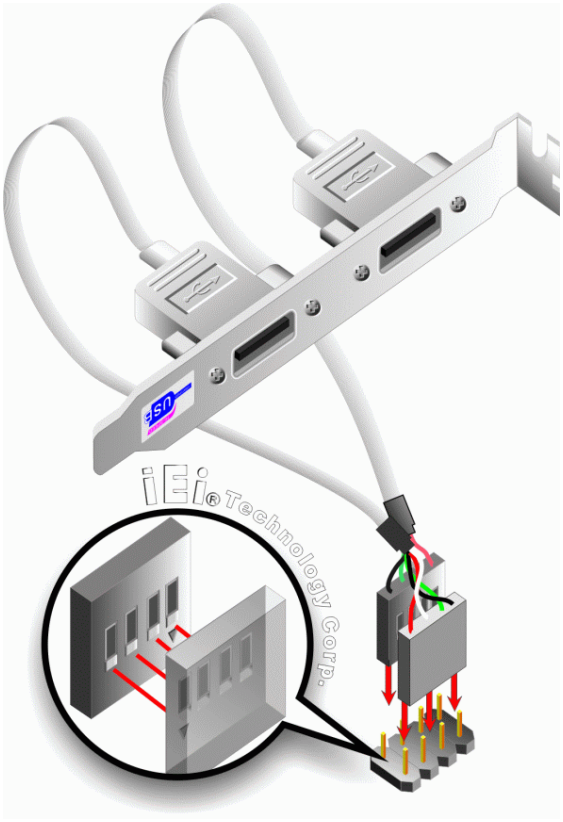


Figure 4-14: Dual USB Cable Connection

Step 8: **Attach the bracket to the chassis**. The USB 2.0 connectors are attached to a bracket. To secure the bracket to the chassis please refer to the installation instructions that came with the chassis.

4.5 External Peripheral Interface Connection

This section describes connecting devices to the external connectors on the IMB-G41A.

4.5.1 Audio Connector

The audio jacks on the external audio connector enable the IMB-G41A to be connected to a stereo sound setup. Each jack supports both input and output. When connecting a device, the High Definition Audio utility will automatically detect input or output. The lime green (top) audio jack does not support input from a microphone. To install the audio devices, follow the steps below.

Step 1: **Identify the audio plugs**. The plugs on your home theater system or speakers may not match the colors on the rear panel.

Step 2: **Plug the audio plugs into the audio jacks**. Plug the audio plugs into the audio jacks. If the plugs on your speakers are different, an adapter will need to be used to plug them into the audio jacks.

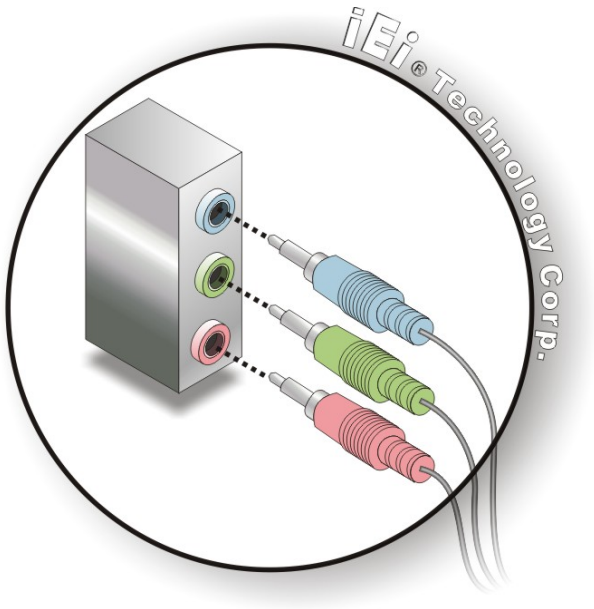


Figure 4-15: Audio Connector

Step 3: **Check audio clarity**. Check that the sound is coming through the right speakers by adjusting the balance front to rear and left to right.

4.5.2 LAN Connection

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

Step 4: **Locate the RJ-45 connectors**. The locations of the USB connectors are shown in **Chapter 4**.

Step 5: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the IMB-G41A. See **Figure 4-16**.

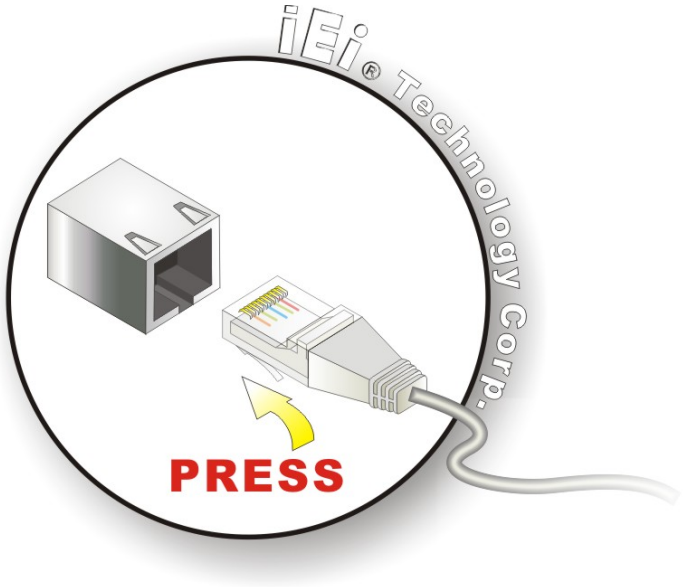


Figure 4-16: LAN Connection

Step 6: **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the on-board RJ-45 connector.

4.5.3 Parallel Device Connection

The IMB-G41A has a single female DB-25 connector on the external peripheral interface panel for parallel devices. Follow the steps below to connect a parallel device to the IMB-G41A.

Step 1: **Locate the DB-25 connector**. The location of the DB-25 connector is shown in **Chapter 3**.

Step 2: **Insert the DB-25 connector**. Insert the DB-25 connector of a parallel device into the DB-25 connector on the external peripheral interface. See **Figure 4-17**.

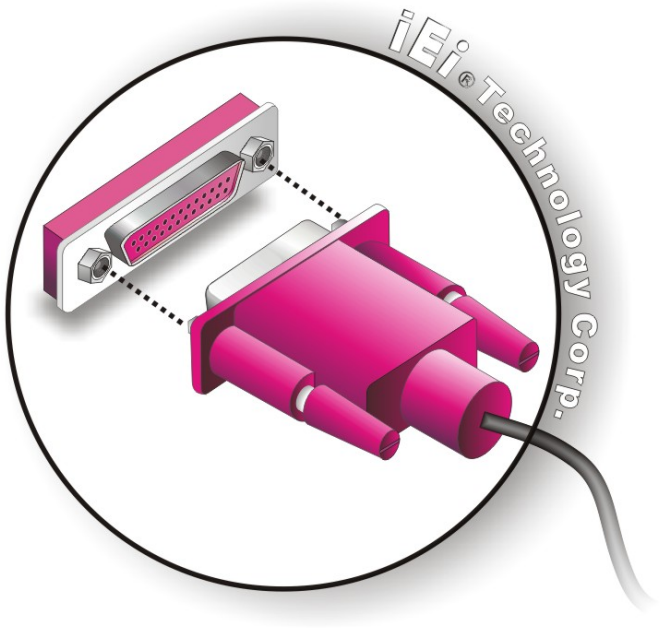


Figure 4-17: Parallel Device Connector

Step 3: **Secure the connector**. Secure the DB-25 connector to the external interface by tightening the two retention screws on either side of the connector.

4.5.4 PS/2 Keyboard and Mouse Connection

The IMB-G41A has a dual PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is used to connect to a keyboard and mouse to the system. Follow the steps below to connect a keyboard and mouse to the IMB-G41A.

Step 1: **Locate the dual PS/2 connector**. The location of the dual PS/2 connector is shown in **Chapter 3**.

Step 2: **Insert the keyboard/mouse connector**. Insert a PS/2 keyboard or mouse connector into the appropriate PS/2 connector on the external peripheral interface connector. See **Figure 4-18**.

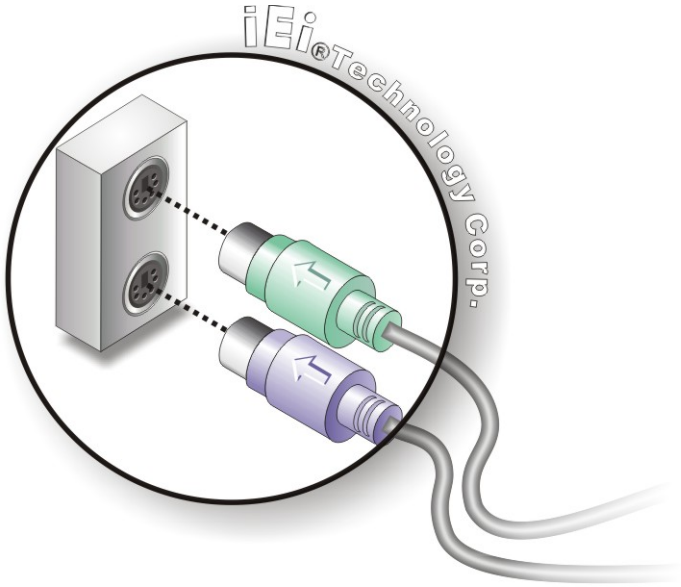


Figure 4-18: PS/2 Keyboard/Mouse Connector

4.5.5 Serial Device Connection

The IMB-G41A has a single female DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the IMB-G41A.

Step 3: **Locate the DB-9 connector**. The location of the DB-9 connector is shown in **Chapter 3**.

Step 4: **Insert the serial connector**. Insert the DB-9 connector of a serial device into the DB-9 connector on the external peripheral interface. See **Figure 4-19**.

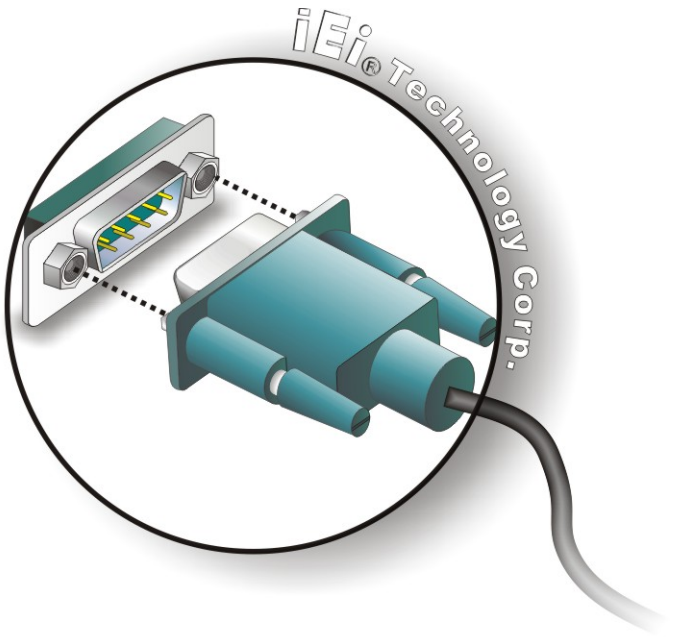


Figure 4-19: Serial Device Connector

Step 5: **Secure the connector**. Secure the serial device connector to the external interface by tightening the two retention screws on either side of the connector.

4.5.6 USB Connection (Dual Connector)

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the IMB-G41A.

Step 1: **Locate the USB Series "A" receptacle connectors**. The location of the USB Series "A" receptacle connectors are shown in **Chapter 3**.

Step 2: **Insert a USB Series "A" plug**. Insert the USB Series "A" plug of a device into the USB Series "A" receptacle on the external peripheral interface. See **Figure 4-20**.

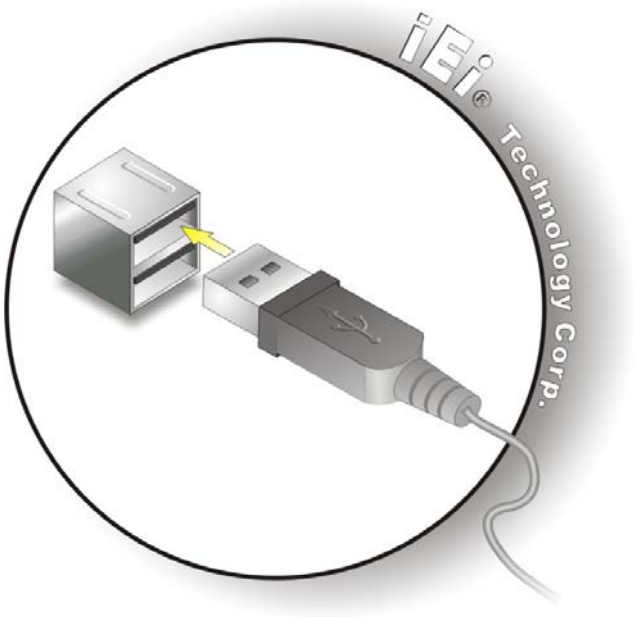


Figure 4-20: USB Connector

4.5.7 VGA Monitor Connection

The IMB-G41A has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the IMB-G41A, please follow the instructions below.

Step 3: **Locate the female DB-15 connector**. The location of the female DB-15 connector is shown in **Chapter 3**.

Step 4: **Align the VGA connector**. Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.

Step 5: **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the IMB-G41A. See **Figure 4-21**.

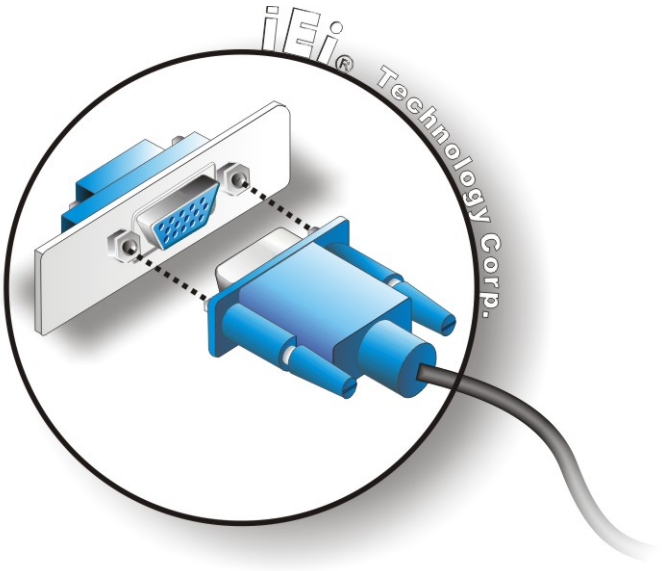


Figure 4-21: VGA Connector

Step 6: **Secure the connector**. Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.

4.6 Software Installation

All the drivers for the IMB-G41A are on the CD that came with the system. To install the drivers, please follow the steps below.

Step 1: Insert the CD into a CD drive connected to the system.

NOTE:

If the installation program doesn't start automatically:
Click "Start->My Computer->CD Drive->autorun.exe"

Step 2: The driver main menu appears (**Figure 4-22**).

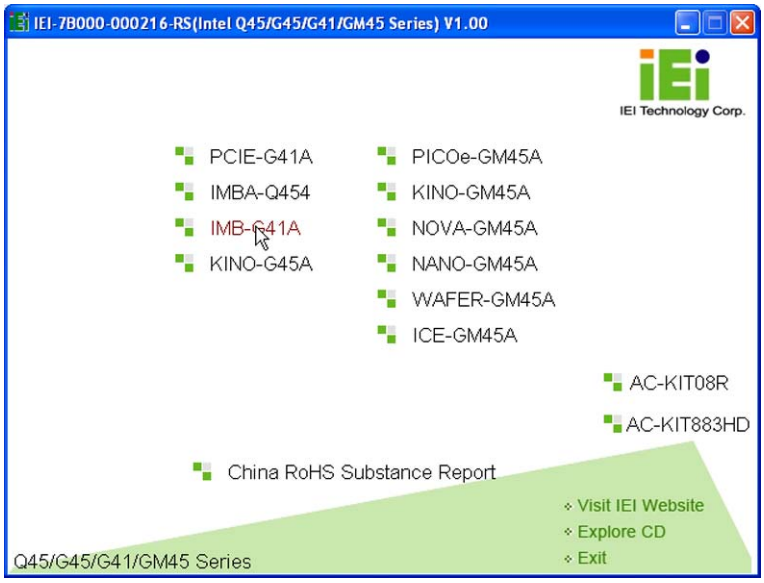


Figure 4-22: Introduction Screen

Step 3: Click IMB-G41A.

Step 4: A new screen with a list of available drivers appears (**Figure 4-23**).

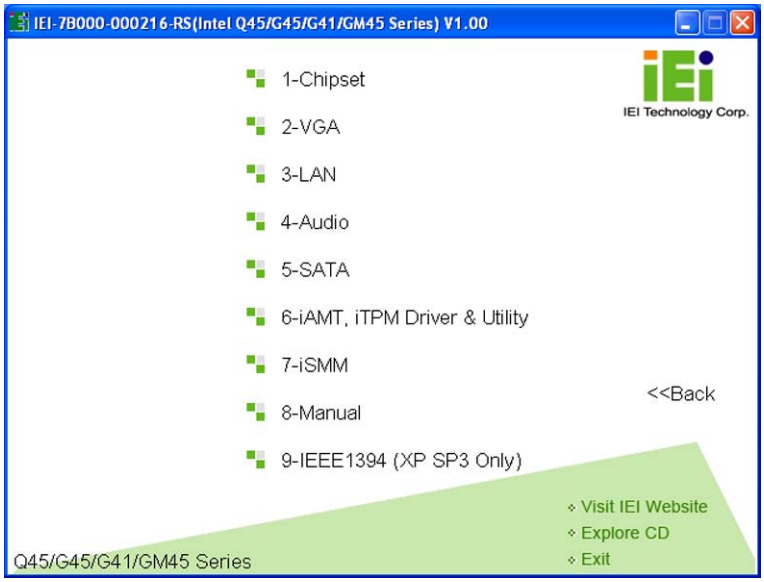


Figure 4-23: Available Drivers

Step 5: Install all of the necessary drivers in this menu.

Chapter

5

BIOS

5.1 Introduction

The BIOS is programmed onto the BIOS chip. The BIOS setup program allows changes to certain system settings. This chapter outlines the options that can be changed.

5.1.1 Starting Setup

The AMI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before the **DELETE** key is pressed, restart the computer and try again.

5.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu

Key	Function
F2 /F3 key	Change color from total 16 colors. F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

5.1.4 Unable to Reboot after Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in Chapter **5**.

5.1.5 BIOS Menu Bar

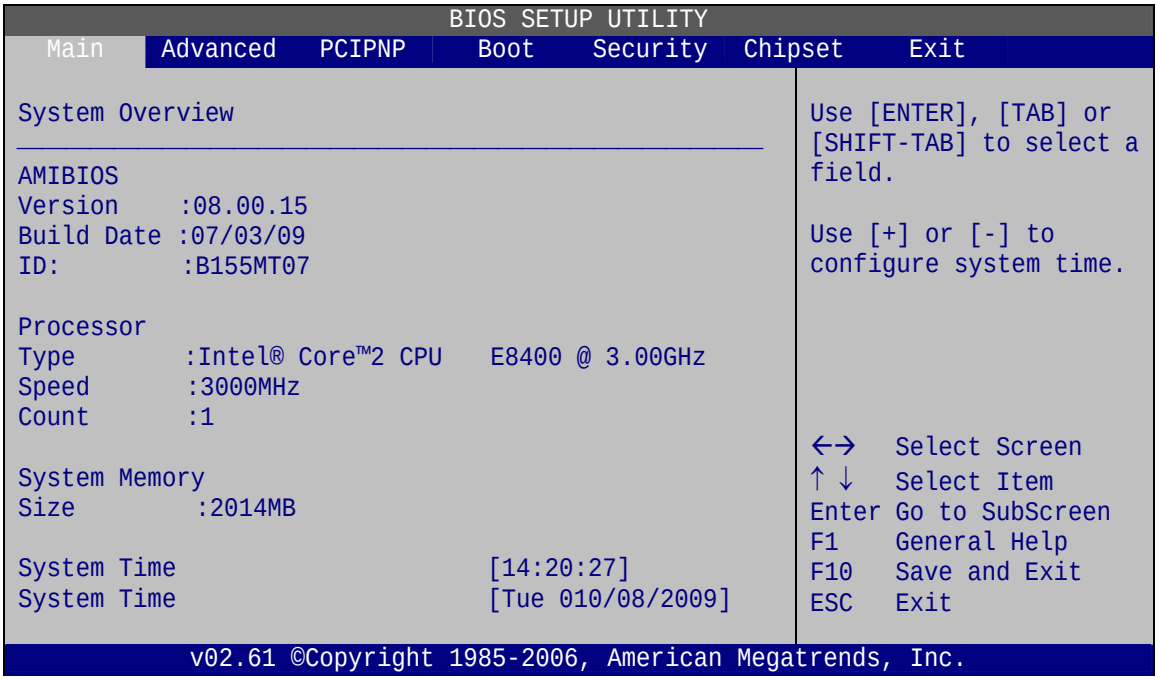
The **menu bar** on top of the BIOS screen has the following main items:

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- PCIPnP – Changes the advanced PCI/PnP Settings
- Boot – Changes the system boot configuration.
- Security – Sets User and Supervisor Passwords.
- Chipset – Changes the chipset settings.
- Power – Changes power management settings.
- Exit – Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered. The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main

➔ System Overview

The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

- AMI BIOS: Displays auto-detected BIOS information
  - **Version:** Current BIOS version
  - **Build Date:** Date the current BIOS version was made
  - **ID:** Installed BIOS ID
- Processor: Displays auto-detected CPU specifications
  - **Type:** Names the currently installed processor
  - **Speed:** Lists the processor speed
  - **Count:** The number of CPUs on the motherboard
- System Memory: Displays the auto-detected system memory.
  - **Size:** Lists memory size

The System Overview field also has two user configurable fields:

➔ **System Time [xx:xx:xx]**

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

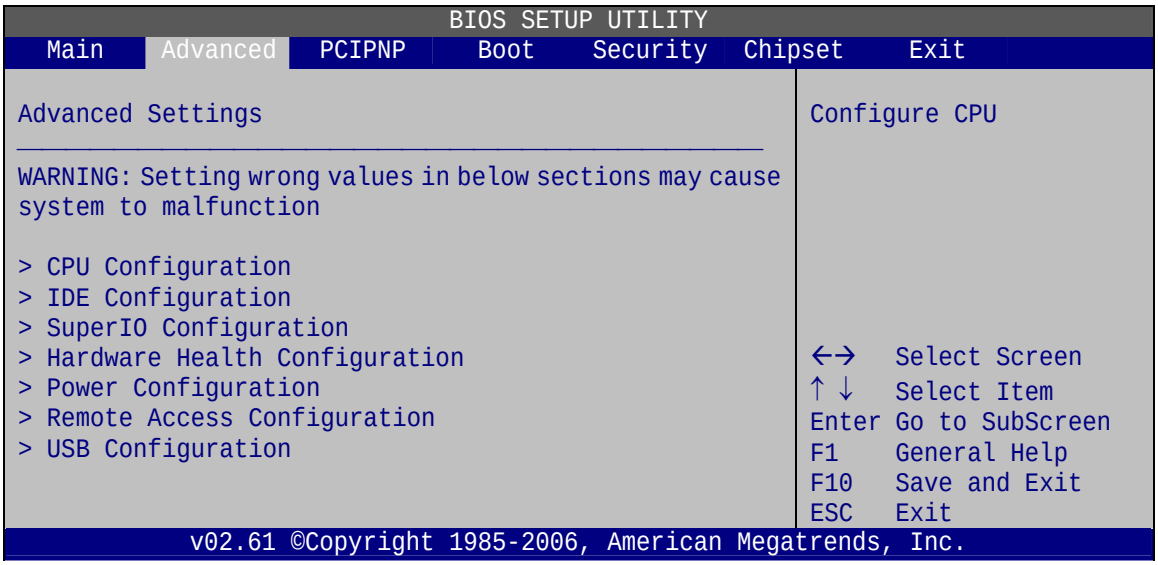
5.3 Advanced

Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:

WARNING!

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

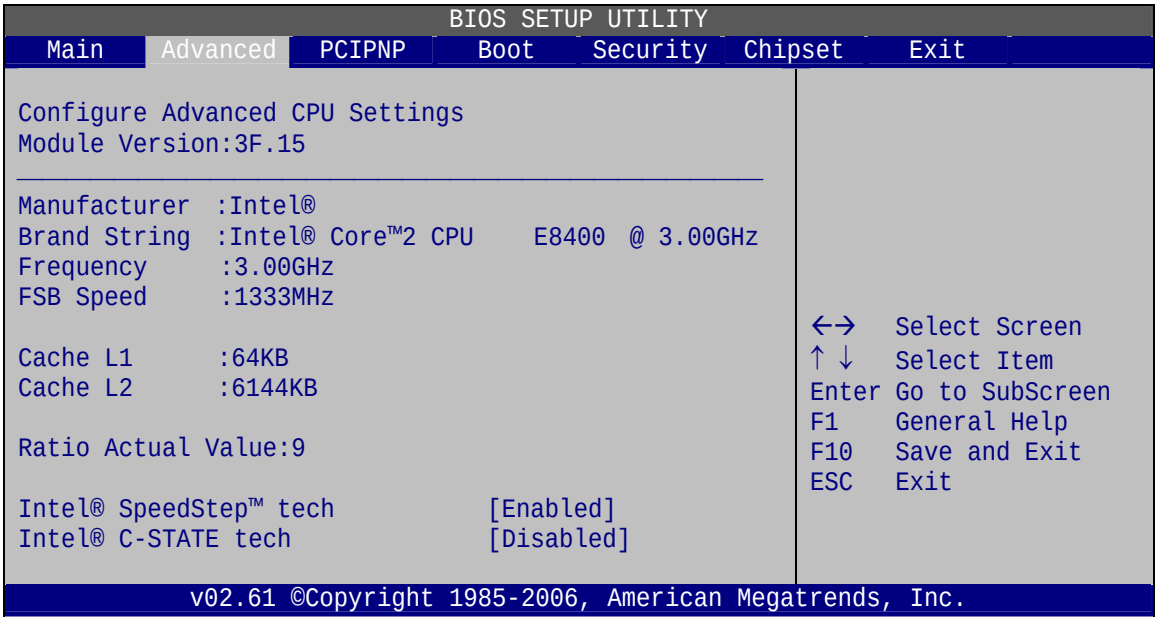
- CPU Configuration (see **Section 5.3.1**)
- IDE Configuration (see **Section 5.3.2**)
- Super IO Configuration (see **Section 5.3.3**)
- Hardware Health Configuration (see **Section 5.3.4**)
- Power Configuration (see **Section 5.3.5**)
- Remote Access Configuration (see **Section 5.3.6**)
- USB Configuration (see **Section 5.3.7**)



BIOS Menu 2: Advanced

5.3.1 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 3**) to view detailed CPU specifications and configure the CPU.



BIOS Menu 3: CPU Configuration

The CPU Configuration menu (**BIOS Menu 3**) lists the following CPU details:

- Manufacturer: Lists the name of the CPU manufacturer
- Brand String: Lists the brand name of the CPU being used
- Frequency: Lists the CPU processing speed
- FSB Speed: Lists the FSB speed
- Cache L1: Lists the CPU L1 cache size
- Cache L2: Lists the CPU L2 cache size

The following **CPU Configuration** menu items can be configured.

- Intel ® SpeedStep ™ tech
- Intel ® C-STATE tech

➔ **Intel (R) SpeedStep (tm) tech. [Enabled]**

Use the **Intel (R) SpeedStep (tm) tech.** option to enable or disable GV3. GV3 technology is a power-saving scheme where the OS optimizes overall power consumption by dynamically changing CPU frequency based on demand.

➔	**Disabled**		Disables SpeedStep i.e. GV3
➔	**Enabled**	**DEFAULT**	Enables SpeedStep i.e. GV3

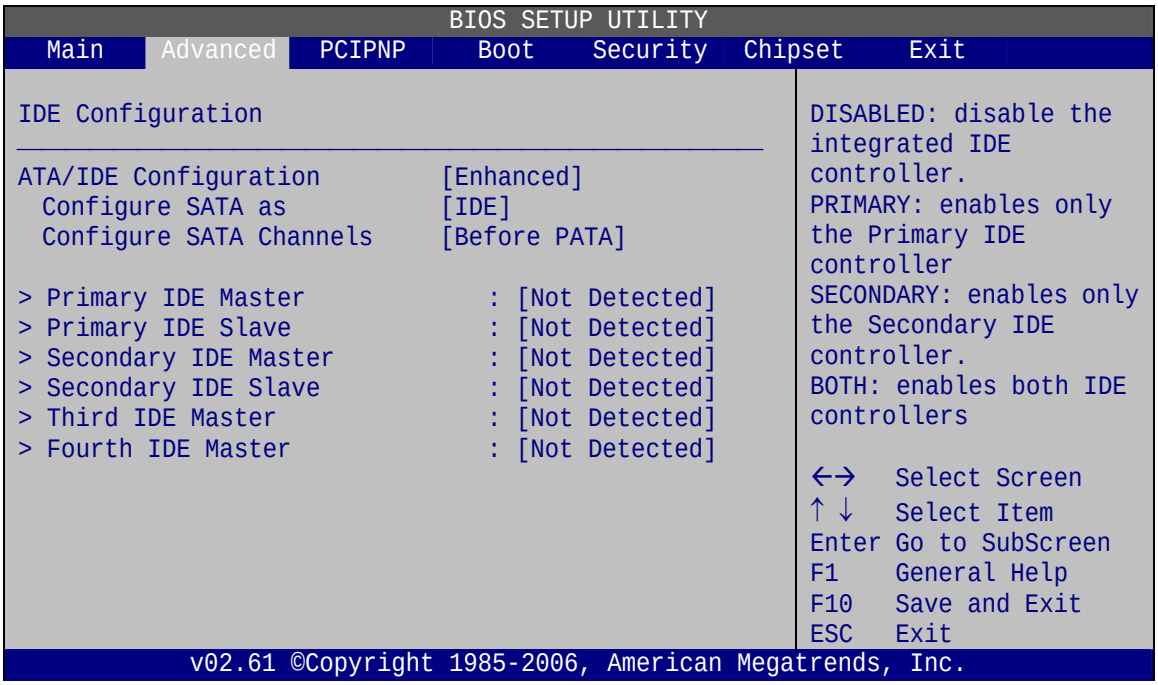
➔ **Intel (R) C-STATE tech. [Enabled]**

Use the **Intel (R) C-STATE tech.** option to enable the CPU to switch to one of the power saving C-States to save power.

➔	**Enabled**	**DEFAULT**	The CPU will change power consumption to one of the C-States to conserve power
➔	**Disabled**		CPU remains at full power consumption

5.3.2 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 4**) to change and/or set the configuration of the IDE devices installed in the system.



BIOS Menu 4: IDE Configuration

➔ **ATA/IDE Configurations [Compatible]**

Use the **ATA/IDE Configurations** option to configure the ATA/IDE controller.

➔ **Disabled** Disables the on-board ATA/IDE controller.

➔ **Compatible** Configures the on-board ATA/IDE controller to be in compatible mode. In this mode, a SATA channel will replace one of the IDE channels. This mode supports up to 4 storage devices.

➔ **Enhanced** **DEFAULT** Configures the on-board ATA/IDE controller to be in Enhanced mode. In this mode, IDE channels and SATA channels are separated. This mode supports up to 6 storage devices. Some legacy OS do not support this mode.

➔ **Configure SATA as [IDE]**

Use the **Configure SATA as** option to configure SATA devices as normal IDE devices.

➔ **IDE** **DEFAULT** Configures SATA devices as normal IDE device.

➔ **Configure SATA Channels [Behind PATA]**

Use the **Configure SATA Channels** option to determine how SATA channels and PATA channels are ordered.

➔ **Before PATA** Puts SATA channels before PATA channels.

➔ **Behind PATA** **DEFAULT** Puts SATA channels behind PATA channels.

➔ **IDE Master and IDE Slave**

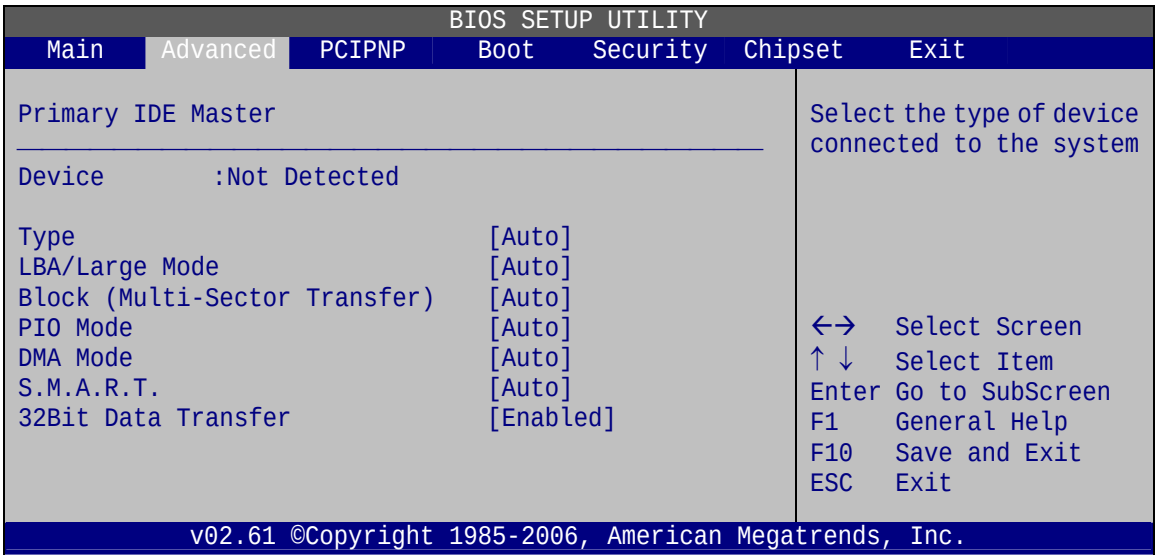
When entering setup, BIOS automatically detects the presence of IDE devices. BIOS displays the status of the automatically detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

- Primary IDE Master
- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave
- Third IDE Master
- Fourth IDE Master

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 5.3.2.1** appear.

5.3.2.1 IDE Master, IDE Slave

Use the **IDE Master** and **IDE Slave** configuration menu to view both primary and secondary IDE device details and configure the IDE devices connected to the system.



BIOS Menu 5: IDE Master and IDE Slave Configuration

➔ **Auto-Detected Drive Parameters**

The “grayed-out” items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

- Device: Lists the device type (e.g. hard disk, CD-ROM etc.)
- Type: Indicates the type of devices a user can manually select
- Vendor: Lists the device manufacturer
- Size: List the storage capacity of the device.
- LBA Mode: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- Block Mode: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.
- PIO Mode: Indicates the PIO mode of the installed device.
- Async DMA: Indicates the highest Asynchronous DMA Mode that is supported.
- Ultra DMA: Indicates the highest Synchronous DMA Mode that is supported.
- S.M.A.R.T.: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.

- 32Bit Data Transfer: Enables 32-bit data transfer.

➔ **Type [Auto]**

Use the **Type** BIOS option select the type of device the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) is complete.

➔ **Not Installed**		BIOS is prevented from searching for an IDE disk drive on the specified channel.
➔ **Auto**	**DEFAULT**	The BIOS automatically detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.
➔ **CD/DVD**		The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.
➔ **ARMD**		This option specifies an ATAPI Removable Media Device. These include, but are not limited to: ZIP LS-120

➔ **LBA/Large Mode [Auto]**

Use the **LBA/Large Mode** option to disable or enable BIOS to auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

➔ **Disabled**		BIOS is prevented from using the LBA mode control on the specified channel.
➔ **Auto**	**DEFAULT**	BIOS auto detects the LBA mode control on the specified channel.

➔ **Block (Multi Sector Transfer) [Auto]**

Use the **Block (Multi Sector Transfer)** to disable or enable BIOS to auto detect if the device supports multi-sector transfers.

➔ **Disabled**		BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.
➔ **Auto**	**DEFAULT**	BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported the data transfer to and from the device occurs multiple sectors at a time.

➔ **PIO Mode [Auto]**

Use the **PIO Mode** option to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

➔ **Auto**	**DEFAULT**	BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.
➔ **0**		PIO mode 0 selected with a maximum transfer rate of 3.3 MB/s
➔ **1**		PIO mode 1 selected with a maximum transfer rate of 5.2 MB/s
➔ **2**		PIO mode 2 selected with a maximum transfer rate of 8.3 MB/s
➔ **3**		PIO mode 3 selected with a maximum transfer rate of 11.1 MB/s
➔ **4**		PIO mode 4 selected with a maximum transfer rate of 16.6 MB/s (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

Use the **DMA Mode** BIOS selection to adjust the DMA mode options.

➔ **Auto**	**DEFAULT**	BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.
➔ **SWDMA0**		Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1 MB/s
➔ **SWDMA1**		Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2 MB/s
➔ **SWDMA2**		Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3 MB/s
➔ **MWDMA0**		Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2 MB/s
➔ **MWDMA1**		Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3 MB/s
➔ **MWDMA2**		Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6 MB/s
➔ **UDMA0**		Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6 MB/s
➔ **UDMA1**		Ultra DMA mode 1 selected with a maximum data transfer rate of 25 MB/s
➔ **UDMA2**		Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3 MB/s
➔ **UDMA3**		Ultra DMA mode 3 selected with a maximum data transfer rate of 44 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)
➔ **UDMA4**		Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)
➔ **UDMA5**		Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **S.M.A.R.T [Auto]**

Use the **S.M.A.R.T** option to auto-detect, disable or enable Self-Monitoring Analysis and Reporting Technology (SMART) on the drive on the specified channel. **S.M.A.R.T** predicts impending drive failures. The **S.M.A.R.T** BIOS option enables or disables this function.

➔ **Auto**	**DEFAULT**	BIOS auto detects HDD SMART support.
➔ **Disabled**		Prevents BIOS from using the HDD SMART feature.
➔ **Enabled**		Allows BIOS to use the HDD SMART feature

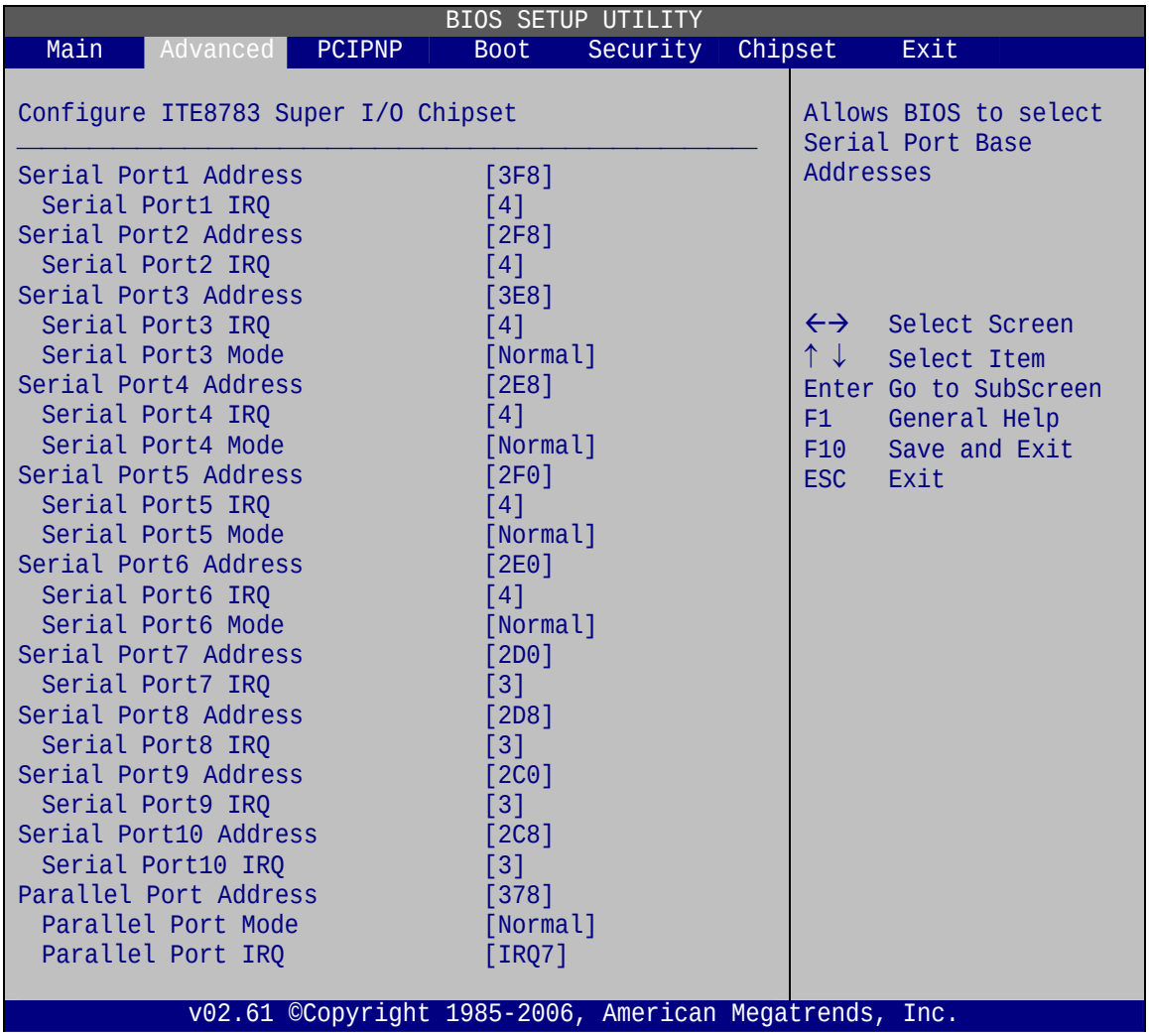
➔ **32Bit Data Transfer [Enabled]**

Use the **32Bit Data Transfer** BIOS option to enables or disable 32-bit data transfers.

➔ **Disabled**		Prevents the BIOS from using 32-bit data transfers.
➔ **Enabled**	**DEFAULT**	Allows BIOS to use 32-bit data transfers on supported hard disk drives.

5.3.3 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 6**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.



BIOS Menu 6: Super IO Configuration

➔ **Serial Port1 Address [3F8]**

Use the **Serial Port1 Address** option to select the Serial Port 1 base address.

➔ **Disabled**		No base address is assigned to Serial Port 1
➔ **3F8**	**DEFAULT**	Serial Port 1 I/O port address is 3F8.
➔ **3E8**		Serial Port 1 I/O port address is 3E8.
➔ **2E8**		Serial Port 1 I/O port address is 2E8.

➔ **Serial Port1 IRQ [4]**

Use the **Serial Port1 IRQ** option to select the interrupt address for serial port 1.

➔ **3**		Serial port 1 IRQ address is 3
➔ **4**	**DEFAULT**	Serial port 1 IRQ address is 4
➔ **10**		Serial port 1 IRQ address is 10
➔ **11**		Serial port 1 IRQ address is 11

➔ **Serial Port2 Address [2F8]**

Use the **Serial Port2 Address** option to select the Serial Port 2 base address.

➔ **Disabled**		No base address is assigned to Serial Port 2
➔ **2F8**	**DEFAULT**	Serial Port 2 I/O port address is 2F8.
➔ **3E8**		Serial Port 2 I/O port address is 3E8.
➔ **2E8**		Serial Port 2 I/O port address is 2E8.

➔ **Serial Port2 IRQ [4]**

Use the **Serial Port2 IRQ** option to select the interrupt address for serial port 2.

➔ **3**		Serial port 2 IRQ address is 3
➔ **4**	**DEFAULT**	Serial port 2 IRQ address is 4
➔ **10**		Serial port 2 IRQ address is 10
➔ **11**		Serial port 2 IRQ address is 11

➔ **Serial Port3 Address [3E8]**

Use the **Serial Port3 Address** option to select the Serial Port 3 base address.

➔ **Disabled**	No base address is assigned to Serial Port 3
➔ **3F8**	Serial Port 3 I/O port address is 2F8.
➔ **2F8**	Serial Port 3 I/O port address is 2F8.

- ➔ **3E8** **DEFAULT** Serial Port 3 I/O port address is 3E8.
- ➔ **2E8** Serial Port 3 I/O port address is 2E8.
- ➔ **2F0** Serial Port 3 I/O port address is 2F0.
- ➔ **2E0** Serial Port 3 I/O port address is 2E0.

➔ **Serial Port3 IRQ [4]**

Use the **Serial Port3 IRQ** option to select the interrupt address for serial port 3.

- ➔ **3** Serial port 3 IRQ address is 3
- ➔ **4** **DEFAULT** Serial port 3 IRQ address is 4
- ➔ **10** Serial port 3 IRQ address is 10
- ➔ **11** Serial port 3 IRQ address is 11

➔ **Serial Port3 Mode [Normal]**

Use the **Serial Port3 Mode** option to select the transmitting and receiving mode for the first serial port.

- ➔ **Normal** **DEFAULT** Serial Port 3 mode is normal
- ➔ **IrDA** Serial Port 3 mode is IrDA
- ➔ **ASK IR** Serial Port 3 mode is ASK IR
- ➔ **Smart Card Reader** Serial Port 3 mode is Smart Card Reader

➔ **Serial Port4 Address [2E8]**

Use the **Serial Port4 Address** option to select the Serial Port 4 base address.

- ➔ **Disabled** No base address is assigned to Serial Port 4
- ➔ **3F8** Serial Port 4 I/O port address is 2F8.
- ➔ **2F8** Serial Port 4 I/O port address is 2F8.
- ➔ **3E8** Serial Port 4 I/O port address is 3E8.

- ➔ **2E8** **DEFAULT** Serial Port 4 I/O port address is 2E8.
- ➔ **2F0** Serial Port 4 I/O port address is 2F0.
- ➔ **2E0** Serial Port 4 I/O port address is 2E0.

➔ **Serial Port4 IRQ [4]**

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

- ➔ **3** Serial port 4 IRQ address is 3
- ➔ **4** **DEFAULT** Serial port 4 IRQ address is 4
- ➔ **10** Serial port 4 IRQ address is 10
- ➔ **11** Serial port 4 IRQ address is 11

➔ **Serial Port4 Mode [Normal]**

Use the **Serial Port4 Mode** option to select the transmitting and receiving mode for the first serial port.

- ➔ **Normal** **DEFAULT** Serial Port 4 mode is normal
- ➔ **IrDA** Serial Port 4 mode is IrDA
- ➔ **ASK IR** Serial Port 4 mode is ASK IR
- ➔ **Smart Card Reader** Serial Port 4 mode is Smart Card Reader

➔ **Serial Port5 Address [2F0]**

Use the **Serial Port5 Address** option to select the Serial Port 5 base address.

- ➔ **Disabled** No base address is assigned to Serial Port 5
- ➔ **3F8** Serial Port 5 I/O port address is 2F8.
- ➔ **2F8** Serial Port 5 I/O port address is 2F8.
- ➔ **3E8** Serial Port 5 I/O port address is 3E8.
- ➔ **2E8** Serial Port 5 I/O port address is 2E8.

- ➔ **2F0** **DEFAULT** Serial Port 5 I/O port address is 2F0.
- ➔ **2E0** Serial Port 5 I/O port address is 2E0.

➔ **Serial Port5 IRQ [4]**

Use the **Serial Port5 IRQ** option to select the interrupt address for serial port 5.

- ➔ **3** Serial port 5 IRQ address is 3
- ➔ **4** **DEFAULT** Serial port 5 IRQ address is 4
- ➔ **10** Serial port 5 IRQ address is 10
- ➔ **11** Serial port 5 IRQ address is 11

➔ **Serial Port5 Mode [Normal]**

Use the **Serial Port5 Mode** option to select the transmitting and receiving mode for the first serial port.

- ➔ **Normal** **DEFAULT** Serial Port 5 mode is normal
- ➔ **IrDA** Serial Port 5 mode is IrDA
- ➔ **ASK IR** Serial Port 5 mode is ASK IR
- ➔ **Smart Card Reader** Serial Port 5 mode is Smart Card Reader

➔ **Serial Port6 Address [2E0]**

Use the **Serial Port6 Address** option to select the Serial Port 6 base address.

- ➔ **Disabled** No base address is assigned to Serial Port 6
- ➔ **3F8** Serial Port 6 I/O port address is 2F8.
- ➔ **2F8** Serial Port 6 I/O port address is 2F8.
- ➔ **3E8** Serial Port 6 I/O port address is 3E8.
- ➔ **2E8** Serial Port 6 I/O port address is 2E8.
- ➔ **2F0** Serial Port 6 I/O port address is 2F0.

➔ **2E0** **DEFAULT** Serial Port 6 I/O port address is 2E0.

➔ **Serial Port6 IRQ [4]**

Use the **Serial Port6 IRQ** option to select the interrupt address for serial port 6.

➔ **3** Serial port 6 IRQ address is 3

➔ **4** **DEFAULT** Serial port 6 IRQ address is 4

➔ **10** Serial port 6 IRQ address is 10

➔ **11** Serial port 6 IRQ address is 11

➔ **Serial Port6 Mode [Normal]**

Use the **Serial Port6 Mode** option to select the transmitting and receiving mode for the first serial port.

➔ **Normal** **DEFAULT** Serial Port 6 mode is normal

➔ **IrDA** Serial Port 6 mode is IrDA

➔ **ASK IR** Serial Port 6 mode is ASK IR

➔ **Smart Card Reader** Serial Port 6 mode is Smart Card Reader

➔ **Serial Port7 Address [2D0]**

Use the **Serial Port7 Address** option to select the Serial Port 7 base address.

➔ **Disabled** No base address is assigned to Serial Port 7

➔ **2D0** **DEFAULT** Serial Port 7 I/O port address is 2D0.

➔ **2D8** Serial Port 7 I/O port address is 2D8.

➔ **2C0** Serial Port 7 I/O port address is 2C0.

➔ **2C8** Serial Port 7 I/O port address is 2C8.

➔ **Serial Port7 IRQ [3]**

Use the **Serial Port7 IRQ** option to select the interrupt address for serial port 7.

➔	**3**	**DEFAULT**	Serial port 7 IRQ address is 3
➔	**4**		Serial port 7 IRQ address is 4
➔	**10**		Serial port 7 IRQ address is 10
➔	**11**		Serial port 7 IRQ address is 11

➔ **Serial Port8 Address [2D8]**

Use the **Serial Port8 Address** option to select the Serial Port 8 base address.

➔	**Disabled**		No base address is assigned to Serial Port 8
➔	**2D0**		Serial Port 8 I/O port address is 2D0.
➔	**2D8**	**DEFAULT**	Serial Port 8 I/O port address is 2D8.
➔	**2C0**		Serial Port 8 I/O port address is 2C0.
➔	**2C8**		Serial Port 8 I/O port address is 2C8.

➔ **Serial Port8 IRQ [3]**

Use the **Serial Port8 IRQ** option to select the interrupt address for serial port 8.

➔	**3**	**DEFAULT**	Serial port 8 IRQ address is 3
➔	**4**		Serial port 8 IRQ address is 4
➔	**10**		Serial port 8 IRQ address is 10
➔	**11**		Serial port 8 IRQ address is 11

➔ **Serial Port9 Address [2C0]**

Use the **Serial Port9 Address** option to select the Serial Port 9 base address.

➔	**Disabled**		No base address is assigned to Serial Port 9
➔	**2D0**		Serial Port 9 I/O port address is 2D0.
➔	**2D8**		Serial Port 9 I/O port address is 2D8.
➔	**2C0**	**DEFAULT**	Serial Port 9 I/O port address is 2C0.

→ **2C8** Serial Port 9 I/O port address is 2C8.

→ **Serial Port9 IRQ [3]**

Use the **Serial Port9 IRQ** option to select the interrupt address for serial port 9.

→ **3** **DEFAULT** Serial port 9 IRQ address is 3

→ **4** Serial port 9 IRQ address is 4

→ **10** Serial port 9 IRQ address is 10

→ **11** Serial port 9 IRQ address is 11

→ **Serial Port10 Address [2C8]**

Use the **Serial Port10 Address** option to select the Serial Port 10 base address.

→ **Disabled** No base address is assigned to Serial Port 10

→ **2D0** Serial Port 10 I/O port address is 2D0.

→ **2D8** Serial Port 10 I/O port address is 2D8.

→ **2C0** Serial Port 10 I/O port address is 2C0.

→ **2C8** **DEFAULT** Serial Port 10 I/O port address is 2C8.

→ **Serial Port10 IRQ [3]**

Use the **Serial Port10 IRQ** option to select the interrupt address for serial port 10.

→ **3** **DEFAULT** Serial port 10 IRQ address is 3

→ **4** Serial port 10 IRQ address is 4

→ **10** Serial port 10 IRQ address is 10

→ **11** Serial port 10 IRQ address is 11

→ **Parallel Port Address [378]**

Use the **Parallel Port Address** option to select the parallel port base address.

➔ **Disabled**		No base address is assigned to the Parallel Port
➔ **378**	**DEFAULT**	Parallel Port I/O port address is 378
➔ **278**		Parallel Port I/O port address is 278
➔ **3BC**		Parallel Port I/O port address is 3BC

➔ **Parallel Port Mode [Normal]**

Use the **Parallel Port Mode** option to select the mode the parallel port operates in.

➔ **Normal**	**DEFAULT**	The normal parallel port mode is the standard mode for parallel port operation.
➔ **Bi-directional**		Parallel port outputs are 8-bits long. Inputs are accomplished by reading 4 of the 8 bits on the status register.
➔ **EPP**		The parallel port operates in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode.
➔ **ECP+EPP**		The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode The parallel port is also be compatible with EPP devices described above

➔ **Parallel Port IRQ [IRQ7]**

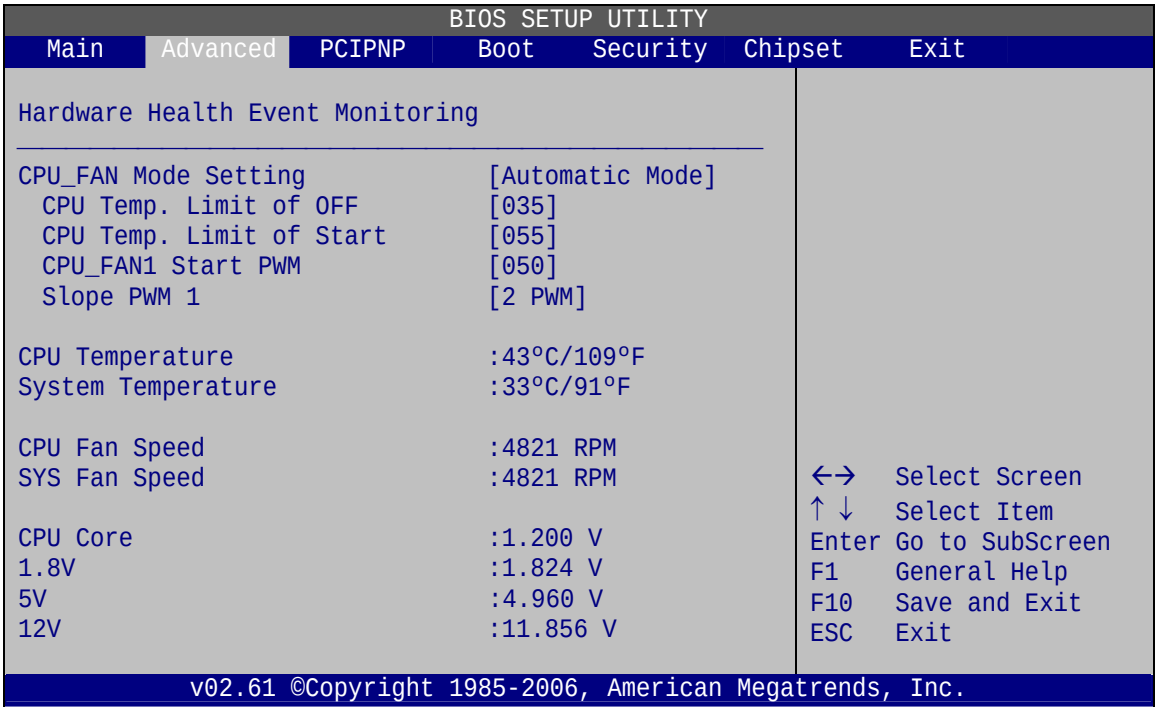
Use the **Parallel Port IRQ** selection to set the parallel port interrupt address.

➔ **IRQ5** IRQ5 is assigned as the parallel port interrupt address

➔ **IRQ7** **DEFAULT** IRQ7 is assigned as the parallel port interrupt address

5.3.4 Hardware Health Configuration

The **Hardware Health Configuration** menu (**BIOS Menu 7**) shows the operating temperature, fan speeds and system voltages.



BIOS Menu 7: Hardware Health Configuration

➔ **Mode Setting [Full On Mode]**

Use the **Mode Setting** option to configure the second fan.

➔ **Full On Mode** **DEFAULT** Fan is on all the time

➔ **Automatic mode** The fan adjusts its speed using these settings:

- Temp. Limit of OFF
- Temp. Limit of Start
- Fan Start PWM
- Slope PWM 1

➔ **PWM Manual mode** The fan spins at the speed set in:

Fan PWM control

➔ **Temp. Limit of OFF [000]**

WARNING:

CPU failure can result if this value is set too high

The fan will turn off if the temperature falls below this value.

- Minimum Value: 0°C
- Maximum Value: 127°C

➔ **Temp. Limit of Start [020]**

WARNING:

CPU failure can result if this value is set too high

When the fan is off, it will only start when the temperature exceeds this setting.

- Minimum Value: 0°C
- Maximum Value: 127°C

➔ **Start PWM [070]**

This is the initial speed of the fan when it first starts spinning.

- PWM Minimum Mode: 0
- PWM Maximum Mode: 127

➔ **Slope PWM [1 PWM]**

A bigger value will increase the fan speed in big amounts. A smaller value will increase the speed more gradually.

- 0 PWM
- 1 PWM
- 2 PWM
- 4 PWM
- 8 PWM
- 16 PWM
- 32 PWM
- 64 PWM

➔ **CPU Fan PWM Control [070]**

This value specifies the speed of the fan.

- PWM Minimum Mode: 0
- PWM Maximum Mode: 127

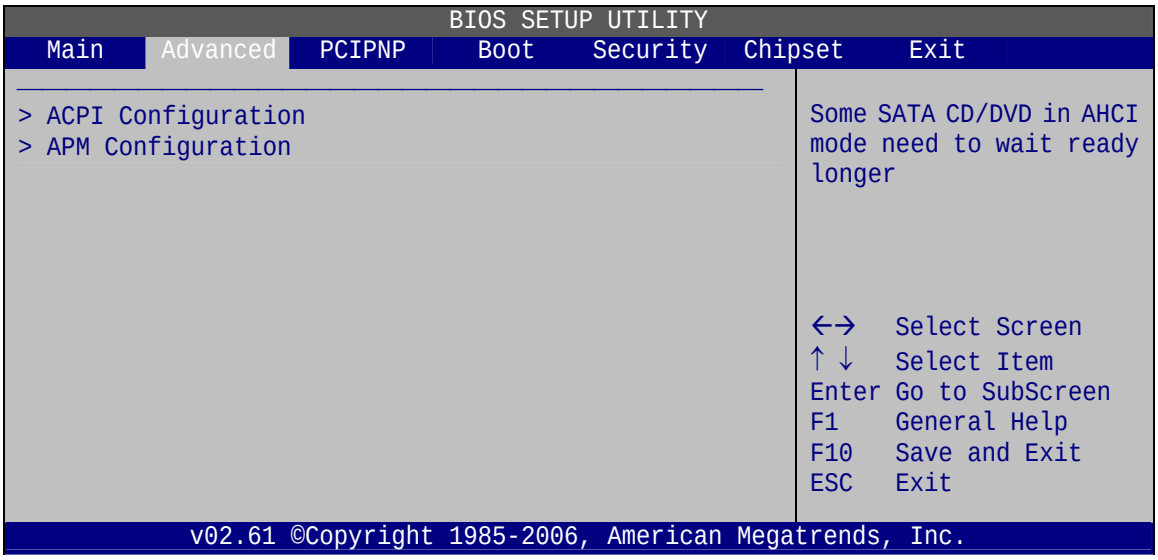
➔ **Hardware Health Monitoring**

The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speeds:
  - CPU Fan Speed
  - SYS Fan Speed
- Voltages:
  - CPU Core
  - +1.80 V
  - +5.00 V
  - +12.0 V

5.3.5 Power Configuration

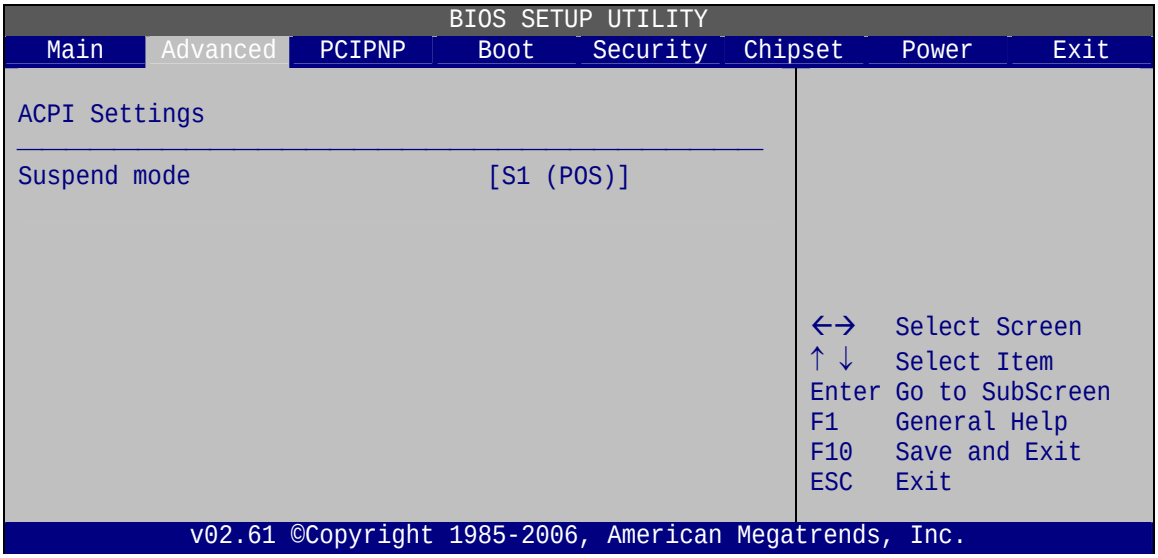
Use the **Power Configuration** menu (**BIOS Menu 9**) configures the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.



BIOS Menu 8: ACPI Configuration

5.3.5.1 ACPI Settings

Use the **General ACPI Settings** menu (**BIOS Menu 9**) to select the ACPI state when the system is suspended.



BIOS Menu 9: ACPI Settings

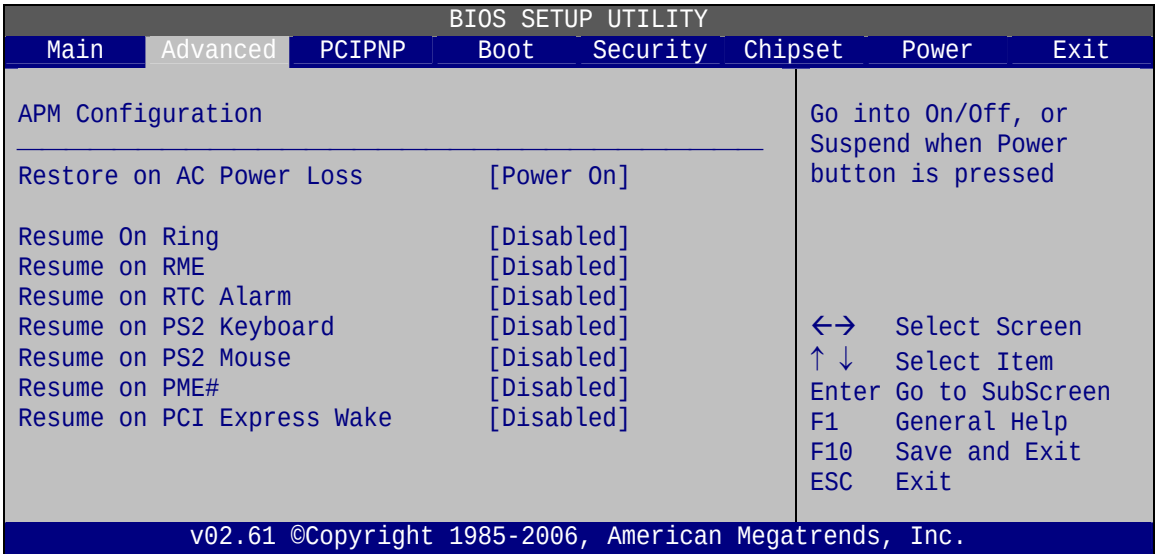
➔ **Suspend Mode [S1(POS)]**

Use the **Suspend Mode** option to specify the sleep state the system enters when it is not being used.

➔ **S1 (POS)** **DEFAULT** The system enters S1 (POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

5.3.5.2 APM Configuration

The **APM Configuration** menu (**BIOS Menu 10**) allows the advanced power management options to be configured.



BIOS Menu 10: APM Configuration

➔ **Restore on AC Power Loss [Power Off]**

Use the **Restore on AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

➔ **Power Off** The system remains turned off

➔ **Power On** **DEFAULT** The system turns on

- ➔ **Last State** The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

➔ **Resume on Keyboard/Mouse [Disabled]**

Use the **Resume on Keyboard/Mouse** BIOS option to enable activity on either the keyboard or mouse to rouse the system from a suspend or standby state. That is, the system is roused when the mouse is moved or a button on the keyboard is pressed.

- ➔ **Disabled** **DEFAULT** Wake event not generated by activity on the keyboard or mouse
- ➔ **Resume On KeyBoard** Wake event generated by activity on the keyboard
- ➔ **Resume On Mouse** Wake event generated by activity on the mouse
- ➔ **Enabled** Wake event generated by activity on the keyboard or mouse

➔ **Resume on Ring [Disabled]**

Use the **Resume on Ring** BIOS option to enable activity on the RI (ring in) modem line to rouse the system from a suspend or standby state. That is, the system will be roused by an incoming call on a modem.

- ➔ **Disabled** **DEFAULT** Wake event not generated by an incoming call
- ➔ **Enabled** Wake event generated by an incoming call

➔ **Resume on PCI PME# [Disabled]**

Use the **Resume on PCI PME#** BIOS option to enable activity on the PCI PME (power management event) controller to rouse the system from a suspend or standby state.

- ➔ **Disabled** **DEFAULT** Wake event not generated by PCI PME controller activity
- ➔ **Enabled** Wake event generated by PCI PME controller activity

➔ **Resume on PCI-Express WAKE# [Enabled]**

The **Resume on PCI-Express WAKE#** BIOS option specifies if the system is roused from a suspended or standby state when there is activity on the PCI-Express bus.

➔ **Disabled**		Wake event not generated by PCI-Express activity
➔ **Enabled**	**DEFAULT**	Wake event generated by PCI-Express activity

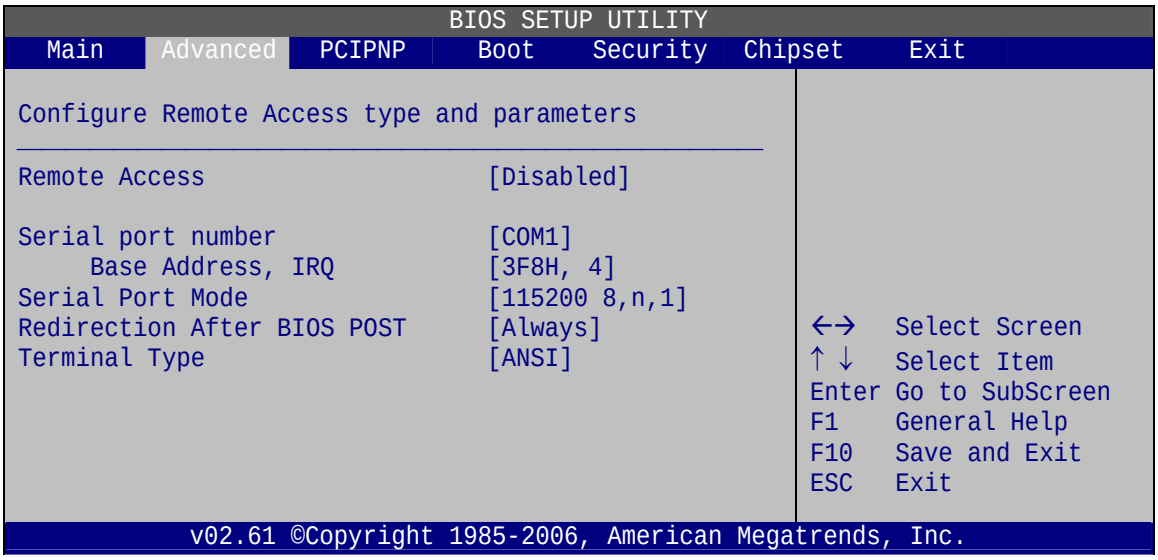
➔ **Resume On RTC Alarm [Disabled]**

Use the **Resume On RTC Alarm** option to specify the time the system should be roused from a suspended state.

➔ **Disabled**	**DEFAULT**	The real time clock (RTC) cannot generate a wake event
➔ **Enabled**		If selected, the following appears with values that can be selected: RTC Alarm Date (Days) System Time After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

5.3.6 Remote Access Configuration

Use the **Remote Access Configuration** menu (**BIOS Menu 11**) to configure remote access parameters. The **Remote Access Configuration** is an AMIBIOS feature and allows a remote host running a terminal program to display and configure the BIOS settings.



BIOS Menu 11: Remote Access Configuration

➔ **Remote Access [Disabled]**

Use the **Remote Access** option to enable or disable access to the remote functionalities of the system.

➔ **Disabled** **DEFAULT** Remote access is disabled.

➔ **Enabled** Remote access configuration options shown below appear:

- Serial Port Number
- Serial Port Mode
- Flow Control
- Redirection after BIOS POST
- Terminal Type
- VT-UTF8 Combo Key Support

These configuration options are discussed below.

➔ **Serial Port Number [COM1]**

Use the **Serial Port Number** option to select the serial port used for remote access.

➔ **COM1** **DEFAULT** System is remotely accessed through COM1

➔ **COM2** System is remotely accessed through COM2

NOTE: Make sure the selected COM port is enabled through the Super I/O configuration menu.

➔ **Base Address, IRQ [2F8h,3]**

The **Base Address, IRQ** option cannot be configured and only shows the interrupt address of the serial port listed above.

➔ **Serial Port Mode [115200 8,n,1]**

Use the **Serial Port Mode** option to select baud rate through which the console redirection is made. The following configuration options are available

- 115200 8,n,1 **DEFAULT**
- 57600 8,n,1
- 38400 8,n,1
- 19200 8,n,1
- 09600 8,n,1

NOTE:

Identical baud rate setting musts be set on the host (a management computer running a terminal software) and the slave

➔ **Redirection After BIOS POST [Always]**

Use the **Redirection After BIOS POST** option to specify when console redirection should occur.

➔ **Disabled** The console is not redirected after POST

➔ **Boot Loader** Redirection is active during POST and during Boot Loader

➔ **Always** **DEFAULT** Redirection is always active (Some OSes may not work if set to Always)

➔ **Terminal Type [ANSI]**

Use the **Terminal Type** BIOS option to specify the remote terminal type.

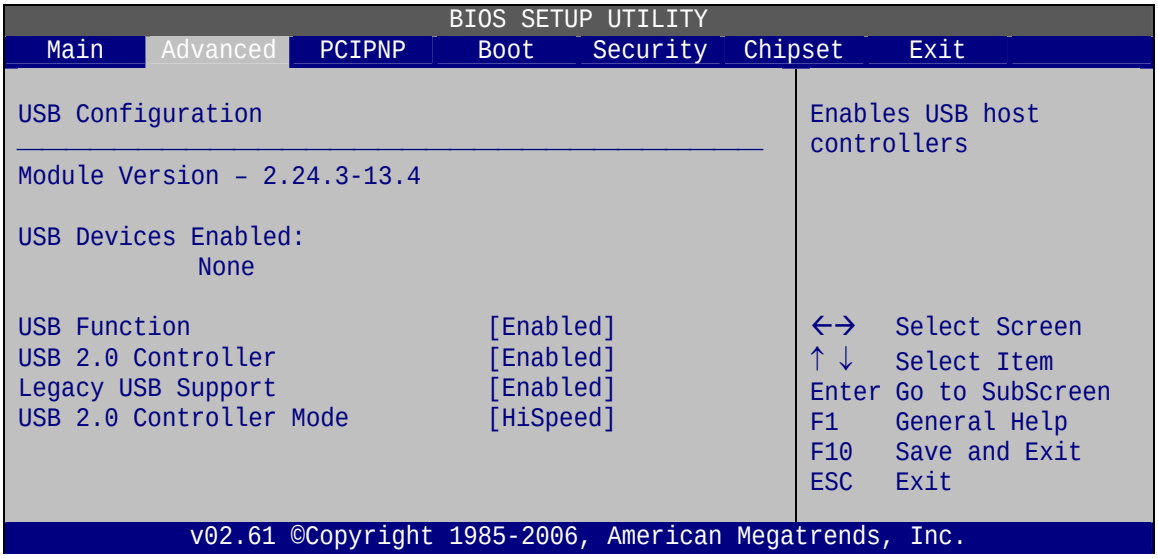
➔ **ANSI** **DEFAULT** The target terminal type is ANSI

➔ **VT100** The target terminal type is VT100

➔ **VT-UTF8** The target terminal type is VT-UTF8

5.3.7 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 12**) to read USB configuration information and configure the USB settings.



BIOS Menu 12: USB Configuration

➔ **USB Configuration**

The **USB Configuration** field shows the system USB configuration. The items listed are:

- Module Version: x.xxxxx.xxxxx

➔ **USB Devices Enabled**

The **USB Devices Enabled** field lists the USB devices that are enabled on the system

➔ **USB Function [Enabled]**

Use the **USB Function** BIOS option to enable or disable USB function support.

➔ **Disabled**		USB function support disabled
➔ **Enabled**	**DEFAULT**	USB function support enabled

➔ **USB 2.0 Controller [Enabled]**

Use the **USB 2.0 Controller** BIOS option to enable or disable the USB 2.0 controller

➔ **Disabled**		USB 2.0 controller disabled
➔ **Enabled**	**DEFAULT**	USB 2.0 controller enabled

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

➔ **Disabled**		Legacy USB support disabled
➔ **Enabled**	**DEFAULT**	Legacy USB support enabled
➔ **Auto**		Legacy USB support disabled if no USB devices are connected

➔ **USB2.0 Controller Mode [HiSpeed]**

Use the **USB2.0 Controller Mode** option to set the speed of the USB2.0 controller.

➔	**FullSpeed**		The controller is capable of operating at 12 Mb/s
➔	**HiSpeed**	**DEFAULT**	The controller is capable of operating at 480 Mb/s

5.4 PCI/PnP

Use the **PCI/PnP** menu (**BIOS Menu 13**) to configure advanced PCI and PnP settings.

WARNING!

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.

```
                         BIOS SETUP UTILITY
  Main    Advanced   PCIPNP    Boot    Security  Chipset    Exit

Advanced PCI/PnP Settings                    Available: Specified IRQ
-------------------------------------------- is available to be use
WARNING: Setting wrong values in below sections the PCI/PnP devices
         may cause system to malfunction     Reserved: Specified IRQ
IRQ3                              [Reserved] is reserved for use by
IRQ4                              [Reserved] legacy ISA devices
IRQ5                              [Available]
IRQ7                              [Available]
IRQ9                              [Available]
IRQ10                             [Available]
IRQ11                             [Available]
IRQ14                             [Available]
IRQ15                             [Available]

DMA Channel 0                     [Available] ←→   Select Screen
DMA Channel 1                     [Available] ↑ ↓  Select Item
DMA Channel 3                     [Available] Enter Go to SubScreen
DMA Channel 5                     [Available] F1    General Help
DMA Channel 6                     [Available] F10   Save and Exit
DMA Channel 7                     [Available] ESC   Exit

Reserved Memory Size              [Disabled]

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```

BIOS Menu 13: PCI/PnP Configuration

➔ **IRQ# [Available]**

Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

➔ **Available** **DEFAULT** The specified IRQ is available to be used by PCI/PnP devices

➔ **Reserved** The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5
- IRQ7
- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

➔ **DMA Channel# [Available]**

Use the **DMA Channel#** option to assign a specific DMA channel to a particular PCI/PnP device.

➔ **Available** **DEFAULT** The specified DMA is available to be used by PCI/PnP devices

➔ **Reserved** The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0
- DM Channel 1
- DM Channel 3

- DM Channel 5
- DM Channel 6
- DM Channel 7

➔ **Reserved Memory Size [Disabled]**

Use the **Reserved Memory Size** BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

➔	**Disabled**	**DEFAULT**	No memory block reserved for legacy ISA devices
➔	**16K**		16 KB reserved for legacy ISA devices
➔	**32K**		32 KB reserved for legacy ISA devices
➔	**64K**		54 KB reserved for legacy ISA devices

5.5 Boot

Use the **Boot** menu (**BIOS Menu 14**) to configure system boot options.

```
                        BIOS SETUP UTILITY
  Main    Advanced   PCIPNP    Boot    Security   Chipset    Exit

Boot Settings                                  Configure settings
_____________________________________________  during system boot.
> Boot Settings Configuration

> Boot Device Priority
> Hard Disk Drives
> CD/DVD Drives
> Removable Drives                             ←→   Select Screen
                                               ↑ ↓   Select Item
                                               Enter Go to SubScreen
                                               F1    General Help
                                               F10   Save and Exit
                                               ESC   Exit

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```
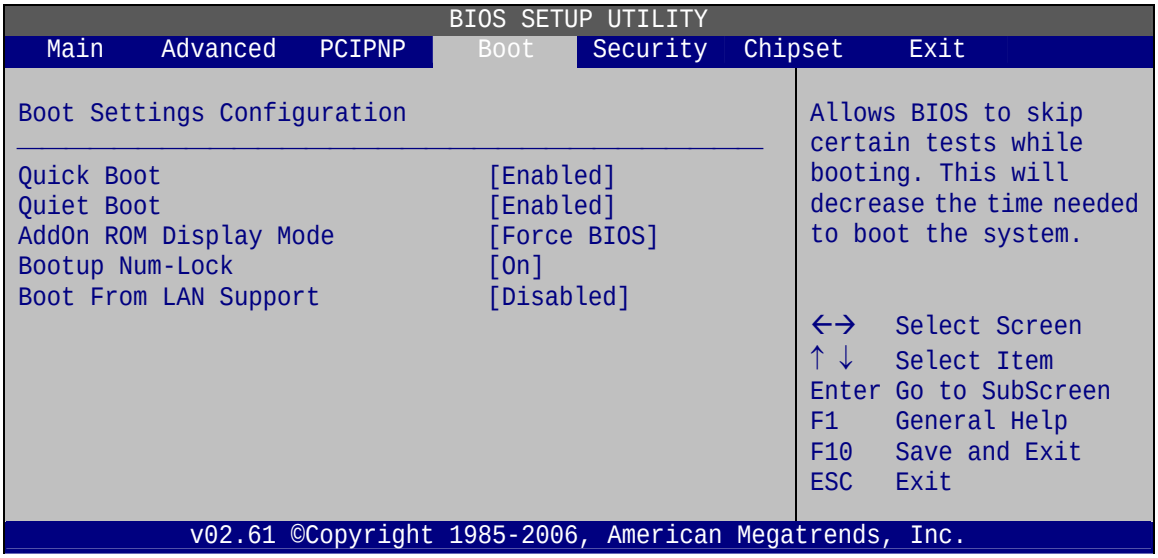

BIOS Menu 14: Boot

5.5.1 Boot Settings Configuration

Use the **Boot Settings Configuration** menu (**BIOS Menu 15**) to configure advanced system boot options.



BIOS Menu 15: Boot Settings Configuration

➔ **Quick Boot [Enabled]**

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

➔ **Disabled** No POST procedures are skipped

➔ **Enabled** **DEFAULT** Some POST procedures are skipped to decrease the system boot time

➔ **Quiet Boot [Disabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔ **Disabled** **DEFAULT** Normal POST messages displayed

➔ **Enabled** OEM Logo displayed instead of POST messages

➔ **AddOn ROM Display Mode [Force BIOS]**

Use the **AddOn ROM Display Mode** option to allow add-on ROM (read-only memory) messages to be displayed.

➔ **Force BIOS**	**DEFAULT**	The system forces third party BIOS to display during system boot.
➔ **Keep Current**		The system displays normal information during system boot.

➔ **Bootup Num-Lock [On]**

Use the **Bootup Num-Lock** BIOS option to specify if the number lock setting must be modified during boot up.

➔ **Off**		Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.
➔ **On**	**DEFAULT**	Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

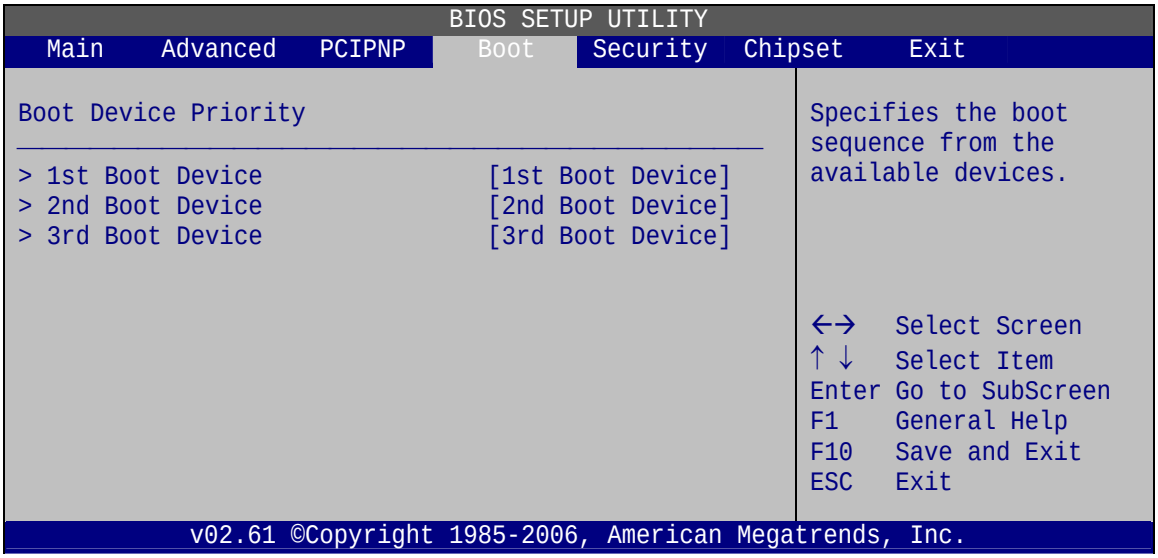
➔ **Boot From LAN Support [Disabled]**

Use the **BOOT From LAN Support** option to enable the system to be booted from a remote system.

➔ **Disabled**	**DEFAULT**	Cannot be booted from a remote system through the LAN
➔ **Enabled**	**DEFAULT**	Can be booted from a remote system through the LAN

5.5.2 Boot Device Priority

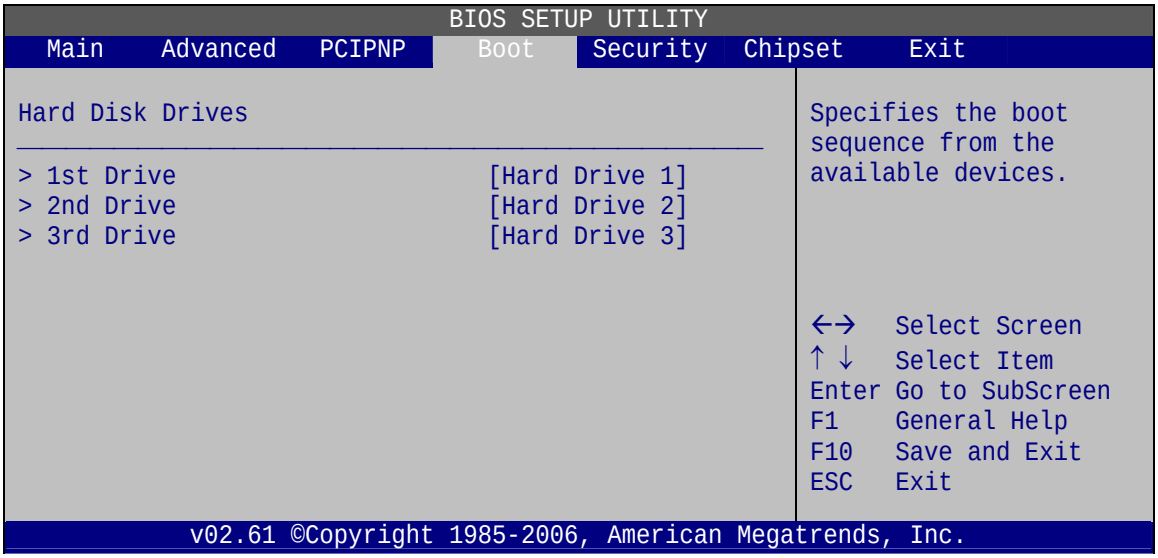
Use the **Boot Device Priority** menu (**BIOS Menu 16**) to specify the boot sequence from the available devices. The drive sequence also depends on the boot sequence in the individual device section.



BIOS Menu 16: Boot Device Priority Settings

5.5.3 Hard Disk Drives

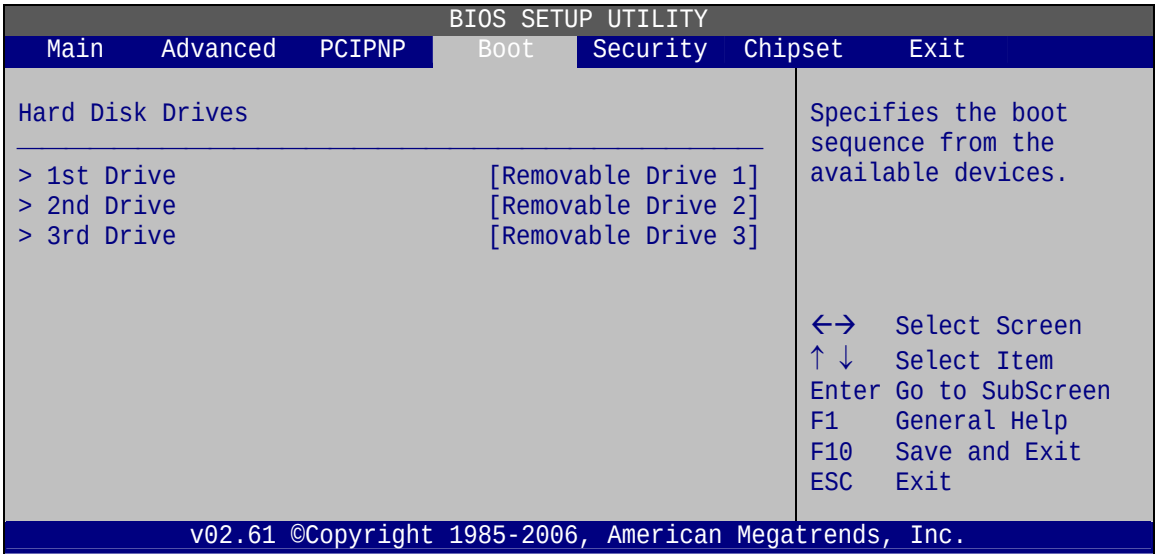
Use the **Hard Disk Drives** menu to specify the boot sequence of the available HDDs. Only installed hard drives are shown.



BIOS Menu 17: Hard Disk Drives

5.5.4 Removable Drives

Use the **Removable Drives** menu (**BIOS Menu 18**) to specify the boot sequence of the removable drives. Only connected drives are shown.



BIOS Menu 18: Removable Drives

5.5.5 CD/DVD Drives

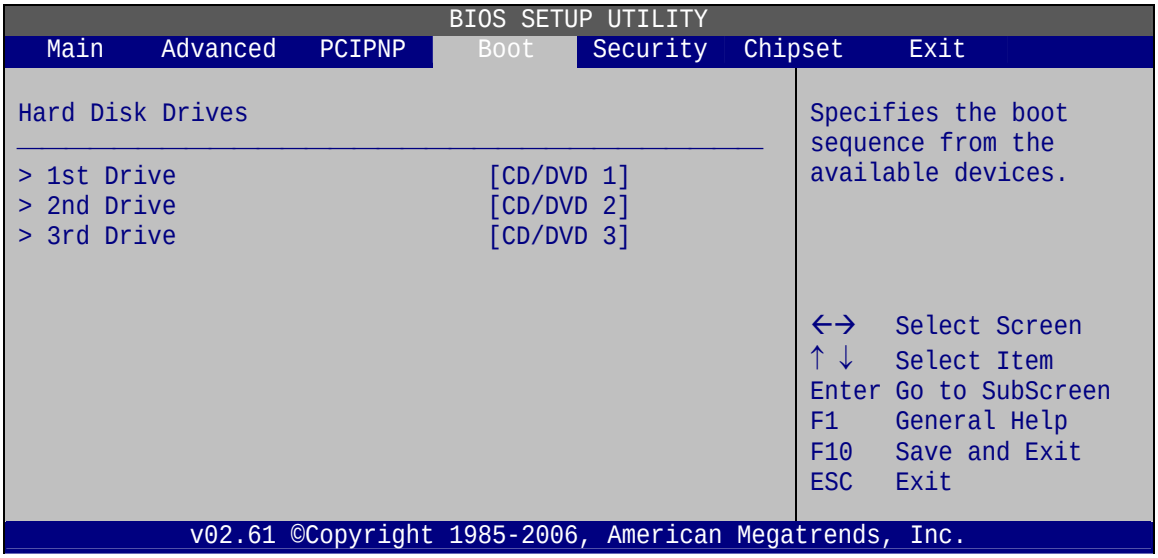
Use the **CD/DVD Drives** menu to specify the boot sequence of the available CD/DVD drives. When the menu is opened, the CD drives and DVD drives connected to the system are listed as shown below:

- 1st Drive [CD/DVD: PM-(part ID)]
- 2nd Drive [HDD: PS-(part ID)]
- 3rd Drive [HDD: SM-(part ID)]
- 4th Drive [HDD: SM-(part ID)]

NOTE:

Only the drives connected to the system are shown. For example, if only two CDs or DVDs are connected only "**1st Drive**" and "**2nd Drive**" are listed.

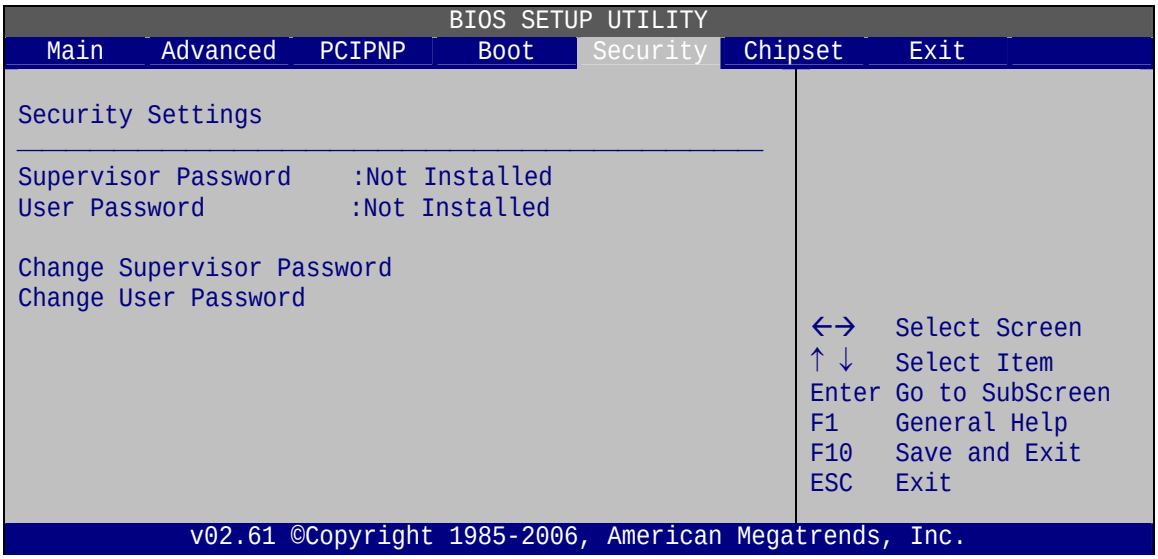
The boot sequence from the available devices is selected. If the "**1st Drive**" option is selected a list of available CD/DVD drives is shown. Select the first CD/DVD drive the system boots from. If the "**1st Drive**" is not used for booting this option may be disabled.



BIOS Menu 19: CD/DVD Drives

5.6 Security

Use the **Security** menu (**BIOS Menu 20**) to set system and user passwords.



BIOS Menu 20: Security

➔ **Change Supervisor Password**

Use the **Change Supervisor Password** to set or change a supervisor password. The default for this option is **Not Installed**. If a supervisor password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change Supervisor Password**.

➔ **Change User Password**

Use the **Change User Password** to set or change a user password. The default for this option is **Not Installed**. If a user password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change User Password**.

➔ **Clear User Password**

Use the **Clear User Password** to clear a user's password. The default for this option is **Not Installed**. If a user password must be cleared, use this option.

➔ **Boot Sector Virus Protection [Disabled]**

Use the **Boot Sector Virus Protection** to enable or disable boot sector protection.

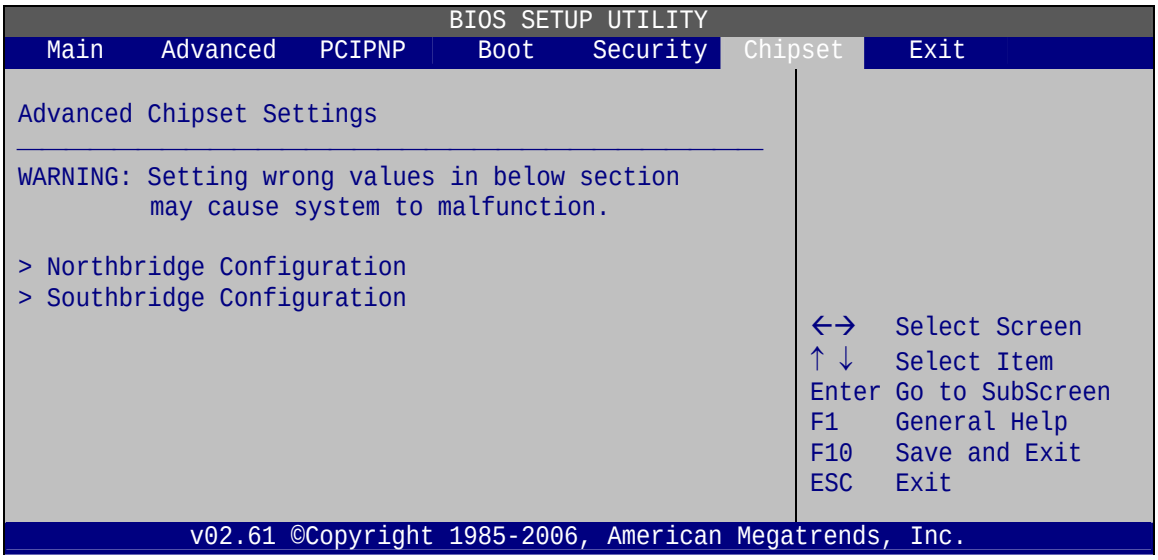
➔	**Disabled**	**DEFAULT**	Disables the boot sector virus protection
➔	**Enabled**		Enables the boot sector virus protection

5.7 Chipset

Use the **Chipset** menu (**BIOS Menu 21**) to access the Northbridge and Southbridge configuration menus

WARNING!

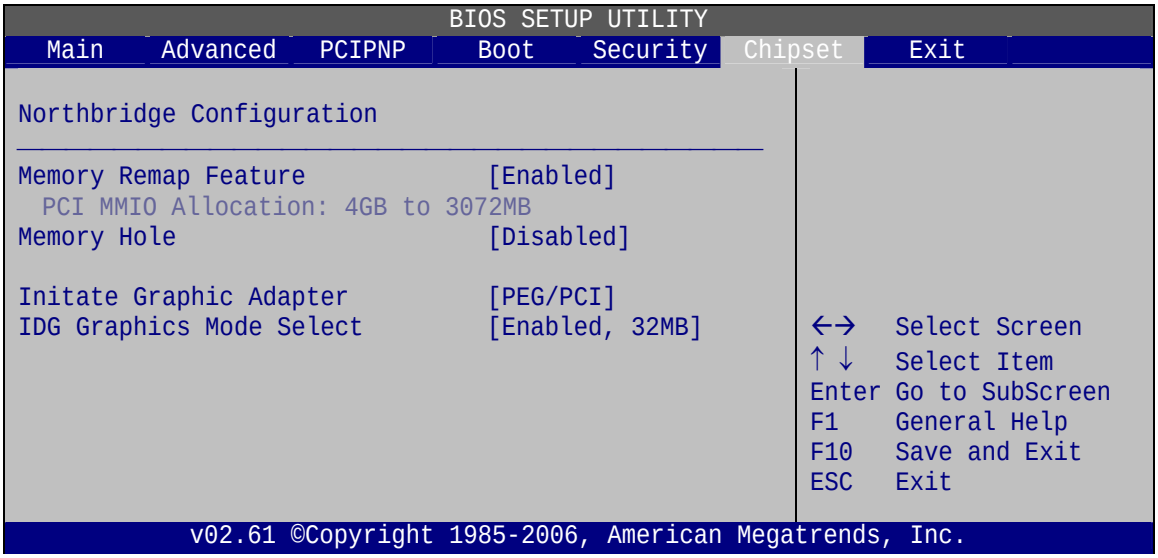
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 21: Chipset

5.7.1 Northbridge Configuration

Use the **Northbridge Chipset Configuration** menu (**BIOS Menu 22**) to configure the Northbridge chipset.



BIOS Menu 22:Northbridge Chipset Configuration

➔ **Memory Remap Feature [Enabled]**

Use the **Memory Remap Feature** option to allow the overlapped PCI memory above the total physical memory to be remapped.

➔ **Enabled**	**DEFAULT**	Overlapped PCI memory can be remapped
➔ **Disabled**		Overlapped PCI memory cannot be remapped

➔ **Memory Hole [Disabled]**

Use the **Memory Hole** option to reserve memory space between 15 MB and 16 MB for ISA expansion cards that require a specified area of memory to work properly. If an older ISA expansion card is used, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

➔ **Disabled**	**DEFAULT**	Memory is not reserved for ISA expansion cards
➔ **15 MB–16 MB**		Between 15 MB and 16 MB of memory is reserved for ISA expansion cards

➔ **Initiate Graphic Adapter**

Use the **Initiate Graphic Adapter** option to select the graphics controller used as the primary boot device. Select either an integrated graphics controller (IGD) or a combination of PCI graphics controller, a PCI express (PEG) controller or an IGD. Configuration options are listed below:

- IGD
- PEG/IGD
- PEG/PCI DEFAULT
- PCI/PEG
- PCI/IGD

➔ **IGD Graphics Mode Select [Enable, 32 MB]**

Use the **IGD Graphic Mode Select** option to specify the amount of system memory that can be used by the internal graphics device.

➔ **Disable**

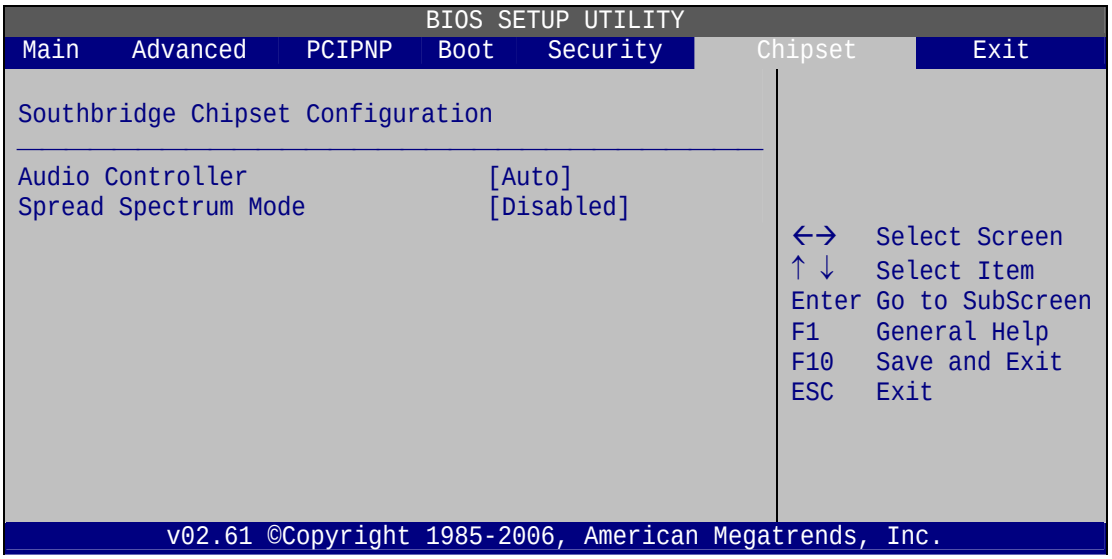
➔ **Enable, 32 MB** **DEFAULT** 32 MB of memory used by internal graphics device

➔ **Enable, 64 MB** 64 MB of memory used by internal graphics device

➔ **Enable, 128 MB** 128 MB of memory used by internal graphics device

5.7.2 Southbridge Configuration

Use the **Southbridge Configuration** menu (**BIOS Menu 23**) to configure the Southbridge chipset.



BIOS Menu 23: Southbridge Chipset Configuration

➔ **Audio Controller [Enabled]**

Use the **Audio Controller** option to enable the audio controller.

➔ **Disabled** Audio controller disabled

➔ **Auto** (Default) Audio controller automatically detected and enabled

➔ **Spread Spectrum [Disabled]**

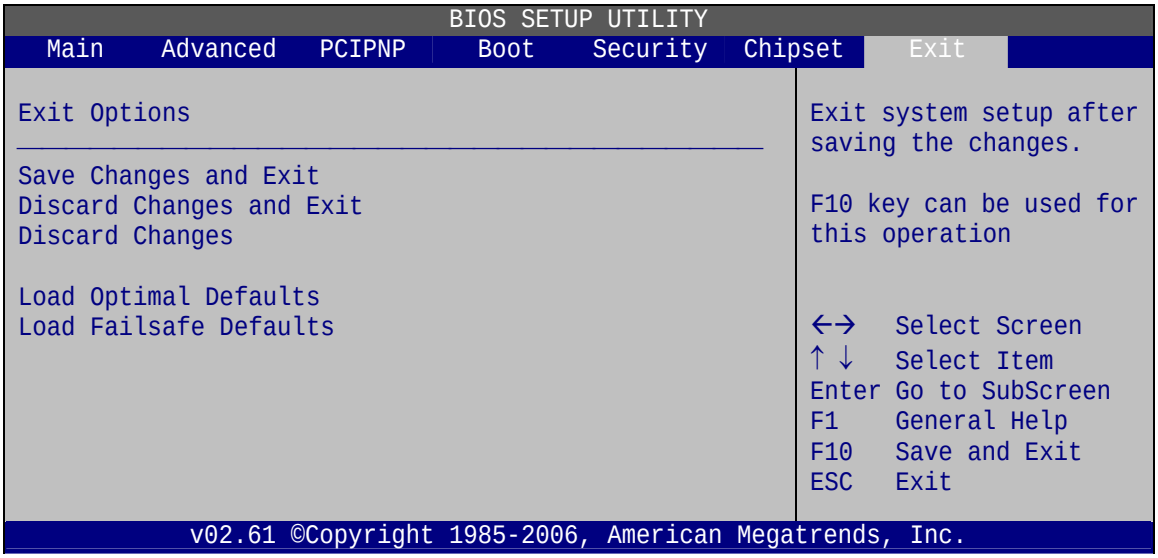
Use the **Spread Spectrum** option to reduce the EMI. Excess EMI is generated when the system clock generator pulses have extreme values. Spreading the pulse spectrum

modulates changes in the extreme values from spikes to flat curves, thus reducing the EMI. This benefit may in some cases be outweighed by problems with timing-critical devices, such as a clock-sensitive SCSI device.

- ➔ **Disabled** **DEFAULT** EMI not reduced
- ➔ **Enabled** EMI reduced

5.8 Exit

Use the **Exit** menu (**BIOS Menu 24**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 24: Exit

➔ Save Changes and Exit

Use the **Save Changes and Exit** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ Discard Changes and Exit

Use the **Discard Changes and Exit** option to exit the BIOS configuration setup program without saving the changes made to the system.

➔ **Discard Changes**

Use the **Discard Changes** option to discard the changes and remain in the BIOS configuration setup program.

➔ **Load Optimal Defaults**

Use the **Load Optimal Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F9 key can be used for this operation.**

➔ **Load Failsafe Defaults**

Use the **Load Failsafe Defaults** option to load failsafe default values for each of the parameters on the Setup menus. **F8 key can be used for this operation.**

Appendix

A

BIOS Options

Below is a list of BIOS configuration options in the BIOS chapter.

Appendix

B

Terminology

AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.
DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.

DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
EIST	Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Output Control Hub (ICH) is an Intel® Southbridge chipset.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.
LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.

LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

C

Digital I/O Interface

C.1 Introduction

The DIO connector on the IMB-G41A is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the Super I/O chipset.

C.2 DIO Connector Pinouts

Refer to the connectors section for pinouts.

C.3 Assembly Language Samples

C.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

MOV	**AX, 6F08H**	Sets the digital port as input
INT	**15H**	Initiates the INT 15H BIOS call

C.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

MOV	**AX, 6F09H**	Sets the digital port as output
MOV	**BL, 09H**	
INT	**15H**	Initiates the INT 15H BIOS call

Appendix

D

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. Contact IEI support or visit the IEI website for specific drivers for other operating systems.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMIs or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer.

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table D-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. When the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

EXAMPLE PROGRAM:

```
; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT     15H

;
; ADD THE APPLICATION PROGRAM HERE
;

        CMP     EXIT_AP, 1      ;is the application over?
        JNE     W_LOOP          ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT     15H

;
; EXIT ;
```

Appendix

E

Compatibility

NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the IMB-G41A

E.1 Compatible Operating Systems

The following operating systems have been successfully run on the IMB-G41A.

- MS-DOS 6.22
- Microsoft Windows XP (32-bit)
- Microsoft Windows 2000
- Red Hat 9.0

E.2 Compatible Processors

The following Intel® Socket 478 processors have been successfully tested on the IMB-G41A

CPU	Model	Frequency
Intel® Core™2 Duo	T7700	2.4 GHz

Table E-1: Compatible Processors

Appendix

F

Hazardous Materials Disclosure

F.1 Hazardous Materials Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	X	O	O	O	O	X
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
电池	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。