



IEI Technology Corp .



**MODEL:
WSB-945GSE**

**45 nm Intel® Atom™ Processor PCIMG 1.0 CPU Card
2 GB DDR2 Memory, VGA, Dual PCIe GbE
CompactFlash® and Dual SATA**

User Manual

Rev. 1.02 – 14 July, 2011



Revision

Date	Version	Changes
14 July, 2011	1.02	Updated product name
5 February, 2009	1.01	Minor edits
31 October, 2008	1.00	Initial release

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Manual Conventions



WARNING!

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously. Warnings are easy to recognize. The word “warning” is written as “**WARNING**,” both capitalized and bold and is followed by text. The text is the warning message. A warning message is shown below:



WARNING:

This is an example of a warning message. Failure to adhere to warning messages may result in permanent damage to the WSB-945GSE or personal injury to the user. Please take warning messages seriously.



CAUTION!

Cautionary messages should also be heeded to help reduce the chance of losing data or damaging the WSB-945GSE. Cautions are easy to recognize. The word “caution” is written as “**CAUTION**,” both capitalized and bold and is followed. The text is the cautionary message. A caution message is shown below:



CAUTION:

This is an example of a caution message. Failure to adhere to cautions messages may result in permanent damage to the WSB-945GSE. Please take caution messages seriously.

WSB-945GSE PCIMG 1.0 CPU Card

A black triangle containing a yellow checkmark.

NOTE:

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes. Notes are easy to recognize. The word “note” is written as “**NOTE**,” both capitalized and bold and is followed by text. The text is the cautionary message. A note message is shown below:

A black triangle containing a yellow checkmark.

NOTE:

This is an example of a note message. Notes should always be read. Notes contain critical information about the WSB-945GSE. Please take note messages seriously.

Packing List



NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the WSB-945GSE from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

The items listed below should all be included in the WSB-945GSE package.

- 1 x WSB-945GSE Single Board Computer
- 2 x SATA cable (P/N: 32000-062800-RS)
- 1 x Keyboard/Mouse Y-cable (P/N: 32000-000138-RS)
- 1 x Dual RS-232 cable (P/N: 19800-000051-RS)
- 1 x USB cable (P/N: CB-USB02-RS)
- 1 x Utility CD
- 1 x QIG (quick installation guide)

Images of the above items are shown in **Chapter 3**.

Table of Contents

1 INTRODUCTION	1
1.1 INTRODUCTION.....	2
1.2 WSB-945GSE OVERVIEW	2
1.2.1 Overview Photo.....	2
1.2.2 Peripheral Connectors and Jumpers	3
1.2.3 Technical Specifications.....	4
2 DETAILED SPECIFICATIONS	6
2.1 DIMENSIONS.....	7
2.1.1 Board Dimensions.....	7
2.1.2 External Interface Panel Dimensions	8
2.2 DATA FLOW	9
2.3 EMBEDDED WSB-945GSE PROCESSOR.....	10
2.3.1 Overview	10
2.3.2 Features	10
2.3.3 Front Side Bus (FSB).....	11
2.4 INTEL® 945GSE NORTHBRIDGE CHIP	11
2.4.1 DDR2 Controller.....	12
2.4.2 Graphics.....	12
2.4.2.1 Analog CRT Graphics Mode.....	13
2.5 INTEL® ICH7M SOUTHBRIDGE CHIPSET	13
2.5.1 Audio Codec '97 Controller.....	14
2.5.2 IDE Interface	15
2.5.2.1 IDE Connector	15
2.5.2.2 CompactFlash® Slot.....	16
2.5.3 Low Pin Count (LPC) Interface.....	16
2.5.4 PCI Interface.....	17
2.5.4.1 PCI Edge Connector	17
2.5.4.2 iTE IT8888G PCI-to-ISA Chip.....	17
2.5.5 PCIe Bus	18
2.5.5.1 PCIe GbE Ethernet.....	18

2.5.6	<i>Real Time Clock</i>	19
2.5.7	<i>SATA Controller</i>	19
2.5.8	<i>USB Controller</i>	20
2.6	LPC BUS COMPONENTS	21
2.6.1	<i>BIOS Chipset</i>	21
2.6.2	<i>iTE IT8718F Super I/O chipset</i>	21
2.6.2.1	<i>LPC Interface</i>	22
2.6.2.2	<i>16C550 UARTs</i>	22
2.6.2.3	<i>Digital Input/Output</i>	22
2.6.2.4	<i>Enhanced Hardware Monitor</i>	22
2.6.2.5	<i>Fan Speed Controller</i>	22
2.6.2.6	<i>Keyboard/Mouse Controller</i>	23
2.6.2.7	<i>Parallel Port</i>	23
2.7	ENVIRONMENTAL AND POWER SPECIFICATIONS	23
2.7.1	<i>System Monitoring</i>	23
2.7.2	<i>Operating Temperature and Temperature Control</i>	24
2.7.3	<i>Power Consumption</i>	24
3	UNPACKING	25
3.1	ANTI-STATIC PRECAUTIONS	26
3.2	UNPACKING	26
3.2.1	<i>Unpacking Precautions</i>	26
3.3	UNPACKING CHECKLIST	27
3.3.1	<i>Package Contents</i>	27
3.3.2	<i>Optional Items</i>	28
4	CONNECTORS	30
4.1	PERIPHERAL INTERFACE CONNECTORS	31
4.1.1	<i>Layout</i>	31
4.2	PERIPHERAL INTERFACE CONNECTORS	31
4.2.1	<i>External Interface Panel Connectors</i>	32
4.3	INTERNAL PERIPHERAL CONNECTORS	32
4.3.1	<i>ATX Power Supply Enable Connector</i>	33
4.3.2	<i>Audio Kit Connector</i>	34
4.3.3	<i>CompactFlash® Socket</i>	36

WSB-945GSE PCIMG 1.0 CPU Card

4.3.4 Digital I/O Connector	37
4.3.5 Fan Connector	39
4.3.6 Front Panel Connector	41
4.3.7 IDE Connector	43
4.3.8 Infrared Interface Connector	45
4.3.9 Keyboard Connector	46
4.3.10 Parallel Port Connector	48
4.3.11 SATA Drive Connectors	50
4.3.12 Serial Port Connectors	51
4.3.13 USB Connectors	53
4.4 EXTERNAL PERIPHERAL INTERFACE CONNECTOR PANEL	55
4.4.1 Keyboard/Mouse Connector	55
4.4.2 LAN Connectors	56
4.4.3 USB Connectors	57
4.4.4 VGA Connector	58
5 INSTALLATION	59
5.1 ANTI-STATIC PRECAUTIONS	60
5.2 INSTALLATION CONSIDERATIONS	61
5.2.1 Installation Notices	61
5.2.2 Installation Checklist	62
5.3 UNPACKING	62
5.4 DIMM INSTALLATION	63
5.5 CF CARD INSTALLATION	64
5.6 JUMPER SETTINGS	65
5.6.1 CF Card Setup	66
5.6.2 Clear CMOS Jumper	67
5.7 CHASSIS INSTALLATION	69
5.7.1 Airflow	69
5.7.2 Motherboard Installation	70
5.8 INTERNAL PERIPHERAL DEVICE CONNECTIONS	70
5.8.1 5.1 Channel Audio Kit Installation	71
5.8.2 7.1 Channel Audio Kit Installation	72
5.8.3 ATA Flat Cable Connection	74
5.8.4 SATA Drive Connection	75

5.8.5 Dual RS-232 Cable with Slot Bracket.....	76
5.8.6 USB Cable (Dual Port) with Slot Bracket	77
5.8.7 Parallel Port Cable without Bracket	79
5.9 EXTERNAL PERIPHERAL INTERFACE CONNECTION	80
5.9.1 LAN Connection (Single Connector)	81
5.9.2 PS/2 Y-Cable Connection.....	81
5.9.3 Serial Device Connection	82
5.9.4 USB Connection (Dual Connector).....	83
5.9.5 VGA Monitor Connection	84
6 BIOS SETUP.....	86
6.1 INTRODUCTION.....	87
6.1.1 Starting Setup.....	87
6.1.2 Using Setup	87
6.1.3 Getting Help.....	88
6.1.4 Unable to Reboot After Configuration Changes.....	88
6.1.5 BIOS Menu Bar.....	88
6.2 MAIN.....	89
6.3 ADVANCED.....	90
6.3.1 CPU Configuration.....	92
6.3.2 IDE Configuration	93
6.3.2.1 IDE Master, IDE Slave	95
6.3.3 Super IO Configuration	100
6.3.4 Hardware Health Configuration.....	103
6.3.5 Power Configuration.....	107
6.3.5.1 ACPI configuration	108
6.3.5.2 APM Configuration.....	109
6.3.6 Remote Configuration	112
6.3.7 USB Configuration.....	116
6.4 PCI/PNP.....	117
6.5 BOOT.....	120
6.5.1 Boot Settings Configuration.....	121
6.5.2 Boot Device Priority	123
6.6 SECURITY.....	123
6.7 CHIPSET	124

WSB-945GSE PCIMG 1.0 CPU Card

6.7.1 Northbridge Chipset Configuration.....	126
6.7.2 Southbridge Configuration	128
6.8 EXIT	128
7 SOFTWARE INSTALLATION	131
7.1 AVAILABLE SOFTWARE DRIVERS	132
7.2 STARTING THE DRIVER PROGRAM	132
7.3 CHIPSET DRIVER INSTALLATION.....	134
7.4 VGA DRIVER INSTALLATION.....	139
7.5 LAN DRIVER INSTALLATION	144
7.6 AUDIO DRIVER INSTALLATION	147
7.6.1 HD Audio Installation.....	147
7.6.2 AC'97 Driver Installation.....	150
A BIOS OPTIONS	154
B TERMINOLOGY.....	157
C DIGITAL I/O INTERFACE.....	161
C.1 INTRODUCTION	162
C.2 DIO CONNECTOR PINOUTS.....	162
C.3 ASSEMBLY LANGUAGE SAMPLES.....	163
C.3.1 Enable the DIO Input Function.....	163
C.3.2 Enable the DIO Output Function.....	163
D WATCHDOG TIMER	164
E ADDRESS MAPPING	167
E.1 DIRECT MEMORY ACCESS (DMA).....	168
E.2 INPUT/OUTPUT (IO).....	168
E.3 INTERRUPT REQUEST (IRQ).....	170
E.4 MEMORY.....	171
F HAZARDOUS MATERIALS DISCLOSURE.....	172
F.1 HAZARDOUS MATERIALS DISCLOSURE TABLE FOR IPB PRODUCTS CERTIFIED AS ROHS COMPLIANT UNDER 2002/95/EC WITHOUT MERCURY	173

List of Figures

Figure 1-1: WSB-945GSE	2
Figure 1-2: WSB-945GSE Overview [Front View]	3
Figure 2-1: WSB-945GSE Dimensions (mm).....	7
Figure 2-2: External Interface Panel Dimensions (mm).....	8
Figure 2-3: Data Flow Block Diagram	9
Figure 2-4: Intel® Atom™ N270 CPU	10
Figure 2-5: Front Side Bus.....	11
Figure 2-6: Intel® 945GSE Northbridge Chip.....	11
Figure 2-7: DDR2 DIMM Socket	12
Figure 2-8: VGA Connector	13
Figure 2-9: Intel® ICH7M Southbridge Chipset	14
Figure 2-10: IDE Connector	15
Figure 2-11: CompactFlash® Slot	16
Figure 2-12: PCI Edge Connector	17
Figure 2-13: iTE IT8888G PCI-to-ISA Chip.....	18
Figure 2-14: Realtek PCI GbE Controllers.....	18
Figure 2-15: SATA Connectors	20
Figure 2-16: Onboard USB Implementation.....	20
Figure 2-17: Super I/O	21
Figure 4-1: Connector and Jumper Locations [Front Side]	31
Figure 4-2: ATX Power Supply Enable Connector Location	33
Figure 4-3: Audio Connector Location (9-pin).....	35
Figure 4-4: CF Card Socket Location	36
Figure 4-5: Digital I/O Connector Locations	38
Figure 4-6: CPU Fan Connector Location	40
Figure 4-7: Front Panel Connector Pinout Locations	42
Figure 4-8: IDE Device Connector Locations	44
Figure 4-9: Infrared Connector Pinout Locations	46
Figure 4-10: Keyboard Connector Location	47
Figure 4-11: Parallel Port Connector Location	49

WSB-945GSE PCIMG 1.0 CPU Card

Figure 4-12: SATA Drive Connector Locations	51
Figure 4-13: COM Connector Pinout Locations	52
Figure 4-14: USB Connector Pinout Locations	54
Figure 4-15: WSB-945GSE External Peripheral Interface Connector	55
Figure 4-16: PS/2 Pinout and Configuration	56
Figure 4-17: RJ-45 Ethernet Connector	57
Figure 4-18: VGA Connector	58
Figure 5-1: Installing a DIMM	63
Figure 5-2: CF Card Installation	65
Figure 5-3: CF Card Setup Jumper Location	67
Figure 5-4: Clear CMOS Jumper	69
Figure 5-5: 5.1 Channel Audio Kit	72
Figure 5-6: 7.1 Channel Audio Kit	73
Figure 5-7: IDE Cable Connection	74
Figure 5-8: SATA Drive Cable Connection	75
Figure 5-9: SATA Power Drive Connection	76
Figure 5-10: Dual RS-232 Cable Installation	77
Figure 5-11: Dual USB Cable Connection	78
Figure 5-12: LPT Cable Connection	79
Figure 5-13: Connect the LPT Device	80
Figure 5-14: LAN Connection	81
Figure 5-15: PS/2 Keyboard/Mouse Connector	82
Figure 5-16: Serial Device Connector	83
Figure 5-17: USB Connector	84
Figure 5-18: VGA Connector	85
Figure 7-1: Start Up Screen	133
Figure 7-2: Select Operating System	133
Figure 7-3: Drivers	134
Figure 7-4: Chipset Driver Screen	135
Figure 7-5: Chipset Driver Welcome Screen	135
Figure 7-6: Chipset Driver License Agreement	136
Figure 7-7: Chipset Driver Read Me File	137
Figure 7-8: Chipset Driver Setup Operations	138
Figure 7-9: Chipset Driver Installation Finish Screen	139
Figure 7-10: VGA Driver Read Me File	140

Figure 7-11: VGA Driver Setup Files Extracted	140
Figure 7-12: VGA Driver Welcome Screen	141
Figure 7-13: VGA Driver License Agreement.....	141
Figure 7-14: VGA Driver Read Me File.....	142
Figure 7-15: VGA Driver Setup Operations	143
Figure 7-16: VGA Driver Installation Finish Screen	143
Figure 7-17: LAN Driver Welcome Screen	144
Figure 7-18: LAN Driver Welcome Screen	145
Figure 7-19: LAN Driver Installation	146
Figure 7-20: LAN Driver Installation Complete.....	146
Figure 7-21: Audio Driver Options	147
Figure 7-22: Extract HD Audio Driver Installation Files.....	148
Figure 7-23: HD Audio Driver Welcome Screen	149
Figure 7-24: System Update	150
Figure 7-25: AC'97 Driver Installation File Extraction.....	151
Figure 7-26: AC'97 Driver Installation Welcome Screen.....	151
Figure 7-27: AC'97 Driver Installation Verification	152
Figure 7-28: AC'97 Driver Installation.....	152
Figure 7-29: AC'97 Driver Installation Complete	153

List of Tables

Table 1-1: Technical Specifications.....	5
Table 2-1: Supported HDD Specifications.....	16
Table 2-2: Power Consumption.....	24
Table 3-1: Packing List.....	28
Table 3-2: Power Consumption.....	29
Table 4-1: Peripheral Interface Connectors.....	32
Table 4-2: Rear Panel Connectors.....	32
Table 4-3: ATX Power Supply Enable Connector Pinouts.....	34
Table 4-4: Audio Connector Pinouts (9-pin).....	35
Table 4-5: CF Card Socket Pinouts.....	37
Table 4-6: DIO Connector Pinouts.....	38
Table 4-7: CPU Fan Connector Pinouts.....	40
Table 4-8: Front Panel Connector Pinouts.....	43
Table 4-9: IDE Connector Pinouts.....	45
Table 4-10: Infrared Connector Pinouts.....	46
Table 4-11: Keyboard Connector Pinouts.....	48
Table 4-12: Parallel Port Connector Pinouts.....	50
Table 4-13: SATA Drive Connector Pinouts.....	51
Table 4-14: COM Connector Pinouts.....	53
Table 4-15: USB Port Connector Pinouts.....	55
Table 4-16: Keyboard Connector Pinouts.....	56
Table 4-17: LAN Pinouts.....	57
Table 4-18: RJ-45 Ethernet Connector LEDs.....	57
Table 4-19: USB Port Pinouts.....	58
Table 4-20: VGA Connector Pinouts.....	58
Table 5-1: Jumpers.....	66
Table 5-2: CF Card Setup Jumper Settings.....	66
Table 5-3: Clear CMOS Jumper Settings.....	68
Table 5-4: IEI Provided Cables.....	70
Table 6-1: BIOS Navigation Keys.....	88

BIOS Menus

BIOS Menu 1: Main	89
BIOS Menu 2: Advanced	91
BIOS Menu 3: CPU Configuration	92
BIOS Menu 4: IDE Configuration	93
BIOS Menu 5: IDE Master and IDE Slave Configuration	95
BIOS Menu 6: Super IO Configuration	100
BIOS Menu 7: Hardware Health Configuration	103
BIOS Menu 8: Power Configuration	107
BIOS Menu 9: ACPI Configuration	108
BIOS Menu 10: Advanced Power Management Configuration	109
BIOS Menu 11: Remote Access Configuration	112
BIOS Menu 12: USB Configuration	116
BIOS Menu 13: PCI/PnP Configuration	118
BIOS Menu 14: Boot	120
BIOS Menu 15: Boot Settings Configuration	121
BIOS Menu 16: Boot Device Priority Settings	123
BIOS Menu 17: Security	124
BIOS Menu 18: Chipset	125
BIOS Menu 19: North Bridge Chipset Configuration	126
BIOS Menu 20: Southbridge Chipset Configuration	128
BIOS Menu 21: Exit	129

Chapter

1

Introduction

1.1 Introduction



Figure 1-1: WSB-945GSE

The WSB-945GSE PCIMG 1.0 CPU cards are embedded 45 nm Intel® Atom™ processor platforms. The embedded Intel® Atom™ N270 processor has a 1.60 GHz clock speed, a 533 MHz FSB and a 512 KB L2 cache. The WSB-945GSE supports one 240-pin 533 MHz 2.0 GB (max.) DDR2 SDRAM DIMM. The WSB-945GSE also comes with two PCI Express (PCIe) Gigabit Ethernet (GbE) connectors.

1.2 WSB-945GSE Overview

1.2.1 Overview Photo

The WSB-945GSE has a wide variety of peripheral interface connectors. Figure 1-2 is a labeled photo of the peripheral interface connectors on the WSB-945GSE.

WSB-945GSE PCIMG 1.0 CPU Card

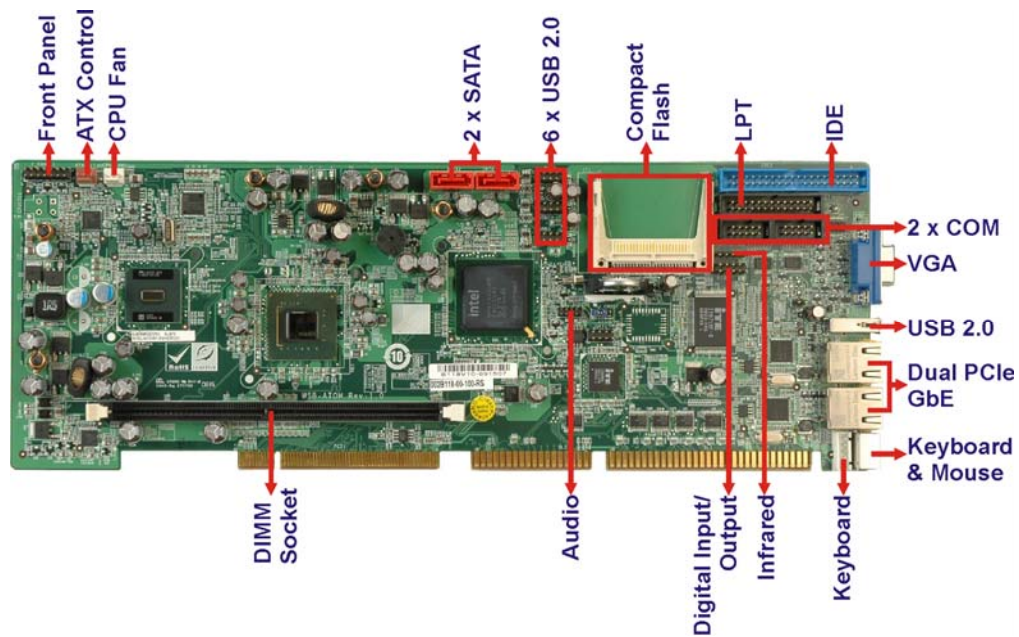


Figure 1-2: WSB-945GSE Overview [Front View]

1.2.2 Peripheral Connectors and Jumpers

The WSB-945GSE has the following connectors on-board:

- 1 x Audio connector
- 1 x ATX power control connector
- 1 x CompactFlash® socket
- 1 x Digital input/output (DIO) connector
- 1 x Fan connector
- 1 x Front panel connector
- 1 x IDE disk drive connectors (40-pin)
- 1 x Infrared interface (IrDA) connector
- 1 x Keyboard connector
- 1 x Parallel port connector
- 2 x SATA drive connectors
- 2 x RS-232 serial port connectors
- 3 x USB 2.0 connectors (6 USB devices)

The WSB-945GSE has the following external peripheral interface connectors on the board rear panel.

- 2 x Ethernet connectors
- 1 x PS/2 connector
- 1 x USB connectors
- 1 x VGA connector

The WSB-945GSE has the following on-board jumpers:

- Clear CMOS
- CF card setup

1.2.3 Technical Specifications

WSB-945GSE technical specifications are listed in Table 1-1. See **Chapter 2** for details.

Specification	WSB-945GSE
Form Factor	PICMG 1.0
System CPU	45 nm 1.60 GHz Intel® Atom™ N270
Front Side Bus (FSB)	533 MHz
System Chipset	Northbridge: Intel® 945GSE Southbridge: Intel® ICH7M
Memory	One 240-pin DIMM socket supports one 533 MHz 2.0 GB (max.) DDR2 SDRAM DIMM
CompactFlash®	One CompactFlash® socket
Super I/O	iTE IT8718F
Display	Intel® Generation 3.5 integrated GFX core (133 MHz)
BIOS	AMI BIOS label
Audio	5.1 channel audio kit with Realtek ALC655 AC'97 codec 7.1 channel HD audio kit with Realtek ALC883 codec supports dual audio streams
LAN	Two Realtek RTL8111CP GbE controllers

WSB-945GSE PCIMG 1.0 CPU Card

Specification	WSB-945GSE
COM	Two RS-232 serial ports
USB2.0	Seven USB 2.0 devices supported (six internal, one external)
Hard Drives	One 40-pin IDE connector connects to two Ultra ATA33/66/100/133 devices
SATA	Two 3.0 Gb/s SATA drives supported
Keyboard/mouse	One external PS/2 connector
Parallel Port	One 26-pin parallel port connector
Digital I/O	One 8-bit digital input/output connector; 4-bit input/4-bit output through the iTE IT8718F super I/O
Watchdog Timer	Software programmable 1-255 sec. through the iTE IT8718F super I/O
Infrared	One infrared connector supports Serial Infrared (SIR) Amplitude Shift Keyed IR (ASKIR)
Power Supply	ATX and AT power supported
Power Consumption	5 V @ 2.55 A 12 V @ 0.23 A (with 2.0 GB DDR2 memory)
Temperature	0°C – 60°C (32°F - 140°F)
Humidity (operating)	5%~95% non-condensing
Dimensions (LxW)	338 mm x 122 mm
Weight (GW/NW)	1000g/250g

Table 1-1: Technical Specifications

Chapter

2

Detailed Specifications

WSB-945GSE PCIMG 1.0 CPU Card

2.1 Dimensions

2.1.1 Board Dimensions

The dimensions of the board are listed below:

- Length: 338 mm
- Width: 122 mm

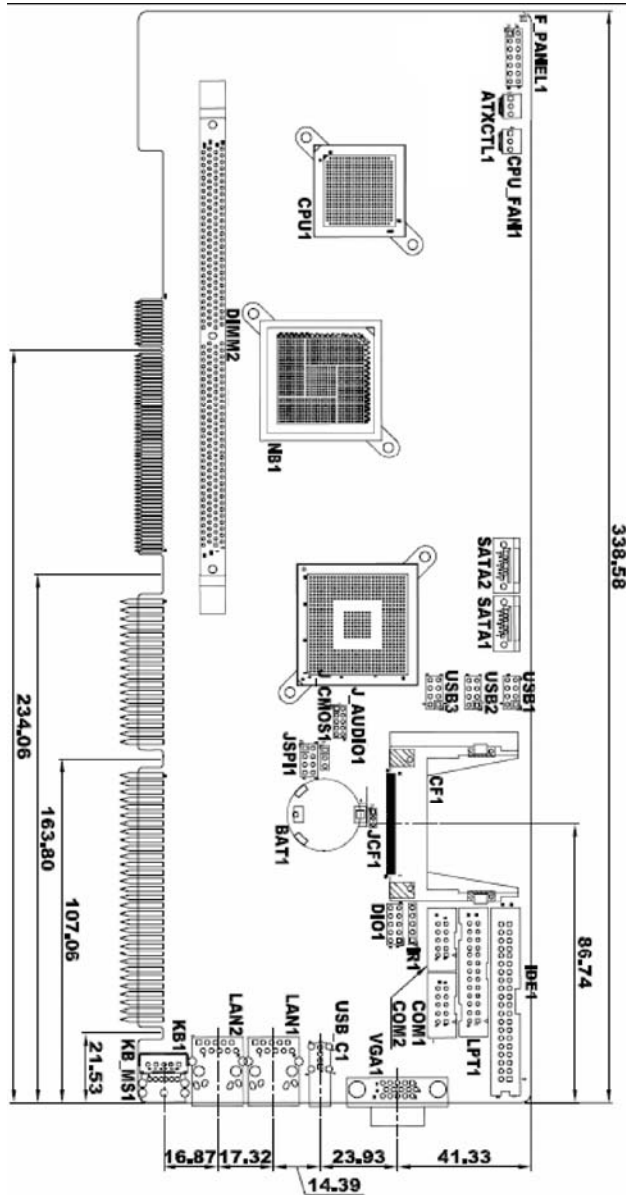


Figure 2-1: WSB-945GSE Dimensions (mm)

2.1.2 External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in Figure 2-2.

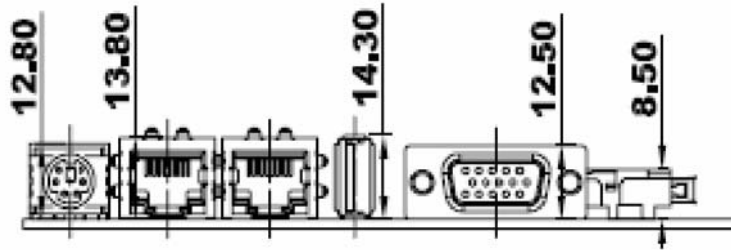


Figure 2-2: External Interface Panel Dimensions (mm)

2.2 Data Flow

Figure 2-3 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.

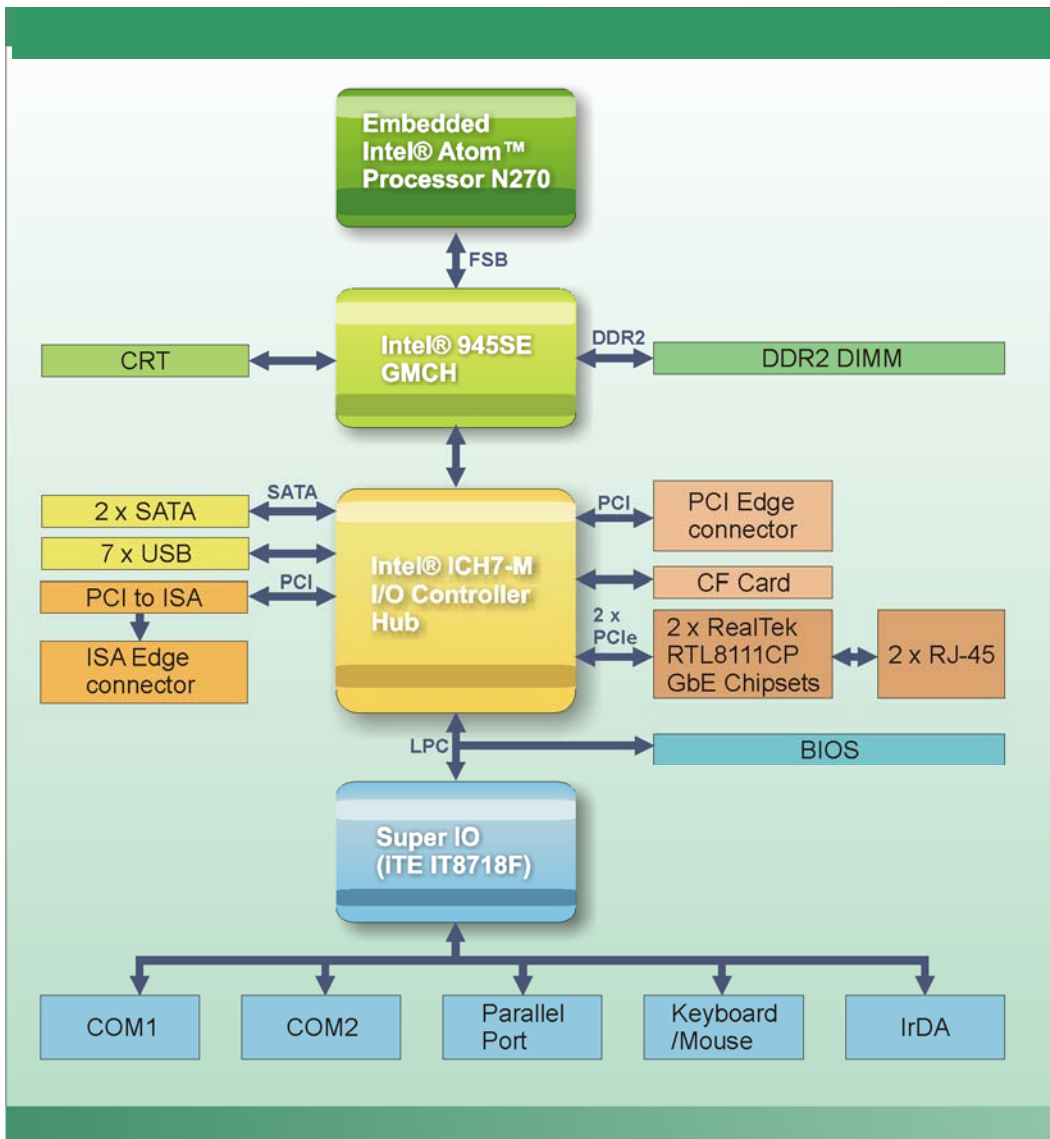


Figure 2-3: Data Flow Block Diagram

2.3 Embedded WSB-945GSE Processor

2.3.1 Overview

The WSB-945GSE comes with an embedded 45 nm 1.60 GHz Intel® Atom™ N270 processor. The processor supports a 533 MHz FSB and has a 1.60 GHz 512 KB L2 cache. The low power processor has a maximum power of 2.5 W. The processor is covered with a heat sink and is shown in Figure 2-4 below.



Figure 2-4: Intel® Atom™ N270 CPU

2.3.2 Features

Some of the features of the Intel® Atom™ N270 are listed below

- On-die, primary 32-kB instructions cache and 24-kB write-back data cache
- 533 MHz source-synchronous front side bus (FSB)
- 2-Threads support
- On-die 512-kB, 8-way L2 cache
- Support for IA 32-bit architecture
- Intel® Streaming SIMD Extensions-2 and -3 (Intel® SSE2 and Intel® SSE3) support and Supplemental Streaming SIMD Extension 3 (SSSE3) support
- Micro-FCBGA8 packaging technologies
- Thermal management support via Intel® Thermal Monitor 1 and Intel Thermal Monitor 2
- FSB Lane Reversal for flexible routing
- Supports C0/C1(e)/C2(e)/C4(e)
- L2 Dynamic Cache Sizing

WSB-945GSE PCIMG 1.0 CPU Card

- Advanced power management features including Enhanced Intel SpeedStep® Technology
- Execute Disable Bit support for enhanced security

2.3.3 Front Side Bus (FSB)

The Intel® Atom™ processor on the WSB-945GSE is interfaced to the Intel® 945GSE Northbridge through a 533 MHz front side bus (FSB). The FSB is shown in Figure 2-5 below.

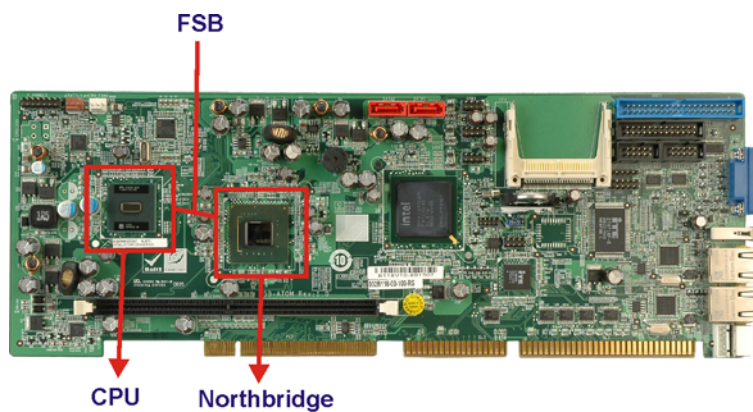


Figure 2-5: Front Side Bus

2.4 Intel® 945GSE Northbridge Chip

The Intel® 945GSE Graphics and Memory Controller Hub (GMCH) supports the embedded Intel® Atom™ N270 processor. The Intel® 945GSE is interfaced to the processor through a 533 MHz FSB.

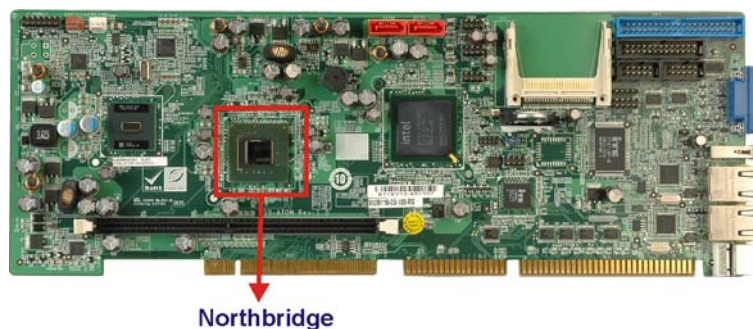


Figure 2-6: Intel® 945GSE Northbridge Chip

2.4.1 DDR2 Controller

There is one 240-pin DDR2 DIMM socket on the WSB-945GSE. The socket supports DDR2 DIMM with the following specifications:

- Maximum Memory supported 2 GB (1 GB per rank)
- Support for DDR2 at 400 MHz and 533 MHz
- No support for Dual-Channel Interleaved mode of operation
- Enhanced Addressing support (Swap only)

The DIMM socket is shown in Figure 2-7 below.

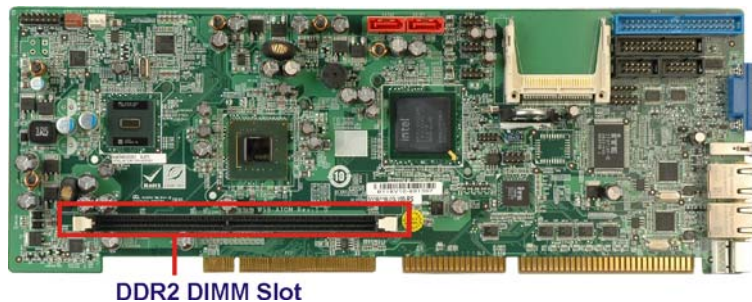


Figure 2-7: DDR2 DIMM Socket

2.4.2 Graphics

The Intel® 945GSE supports CRT. The internal graphics engine has the following features:

- Intel® Gen 3.5 Integrated Graphics Engine
- 250-MHz core render clock and 200 MHz core display clock at 1.05-V core voltage
- Supports CRT
- Dynamic Video Memory Technology (DVMT 3.0)
- Intel® Display Power Saving Technology 2.0 (Intel® DPST 2.0)
- Intel® Smart 2D Display Technology (Intel® S2DDT)
- 4x pixel rate HWMC
- Microsoft DirectX® 9.1 operating system
- Intermediate Z in Classic Rendering

WSB-945GSE PCIMG 1.0 CPU Card

- Internal Graphics Display Device States: D0, D1, D3
- Graphics Display Adapter States: D0, D3.

2.4.2.1 Analog CRT Graphics Mode

The analog CRT bus is interfaced to an external DB-15 interface connector. The connector is shown below.



Figure 2-8: VGA Connector

Some of the features of the CRT include:

- Integrated 400-MHz RAMDAC
- Analog Monitor Support up to QXGA
- Support for CRT Hot Plug

2.5 Intel® ICH7M Southbridge Chipset

The Intel® ICH7M Southbridge chipset is connected to the Intel® 945GSE Northbridge GMCH through the chip-to-chip Direct Media Interface (DMI). Some of the features of the Intel® ICH7M are listed below.

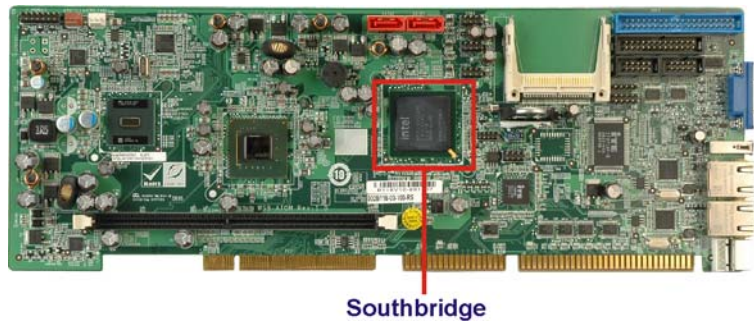


Figure 2-9: Intel® ICH7M Southbridge Chipset

- Complies with PCI Express Base Specification, Revision 1.0a
- Complies with PCI Local Bus Specification, Revision 2.3 and supports 33 MHz PCI operations
- Supports ACPI Power Management Logic
- Contains:
 - Enhanced DMA controller
 - Interrupt controller
 - Timer functions
- Integrated SATA host controller with DMA operations interfaced to two SATA connectors on the WSB-945GSE
- Integrated IDE controller supports Ultra ATA 100/66/33
- Supports the four USB 2.0 devices on the WSB-945GSE with four UHCI controllers and one EHCI controller
- Complies with System Management Bus (SMBus) Specification, Version 2.0
- Supports Audio Codec '97 (AC'97) Revision 2.3
- Supports Intel® High Definition Audio
- Contains Low Pin Count (LPC) interface
- Supports Firmware Hub (FWH) interface
- Serial peripheral interface support

2.5.1 Audio Codec '97 Controller

The Audio Codec '97 (AC'97) controller integrated into the Intel® ICH7M complies with AC'97 Component Specification, Version 2.3. The AC'97 controller is connected to the onboard audio connector. The audio connector is connected to an optional 5.1 channel or 7.1 channel audio kit with an embedded AC'97 audio codec. The AC'97 controller

WSB-945GSE PCIMG 1.0 CPU Card

supports up to six PCM audio output channels. Complete surround sound requires six-channel audio consisting of:

- Front left
- Front right
- Back left
- Back right
- Center
- Subwoofer

2.5.2 IDE Interface

The IDE interface connects with

- 2.5.2.1 IDE Connector 15
- 2.5.2.2 CompactFlash® Slot 16

2.5.2.1 IDE Connector

The IDE connector on the Intel® ICH7M Southbridge connects to an IDE hard disk or other IDE device. The IDE connector is shown in Figure 2-10 below.



Figure 2-10: IDE Connector

PIO IDE transfers up to 16 MB/s and Ultra ATA transfers of 100 MB/s. The integrated IDE interface is able to support the following IDE HDDs:

- **Ultra ATA/100**, with data transfer rates up to 100 MB/s
- **Ultra ATA/66**, with data transfer rates up to 66 MB/s
- **Ultra ATA/33**, with data transfer rates up to 33 MB/s

Specification	Ultra ATA/100	Ultra ATA/66	Ultra ATA/33
IDE devices	2	2	2
PIO Mode	0 – 4	0 – 4	0 – 4
PIO Max Transfer Rate	16.6 MB/s	16.6 MB/s	16.6 MB/s
DMA/UDMA designation	UDMA 5	UDMA 4	UDMA 2
DMA/UDMA Max Transfer	100 MB/s	66 MB/s	33 MB/s
Controller Interface	5 V	5 V	5 V

Table 2-1: Supported HDD Specifications

2.5.2.2 CompactFlash® Slot

The CompactFlash® slot on the WSB-945GSE is interfaced through the IDE interface on the Intel® ICH7M Southbridge. The CompactFlash® slot is shown in Figure 2-10 below.

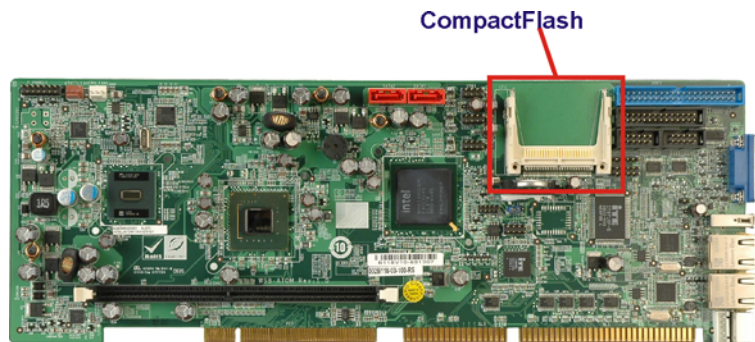


Figure 2-11: CompactFlash® Slot

2.5.3 Low Pin Count (LPC) Interface

The Intel® ICH7M LPC interface complies with the LPC 1.1 specifications. The LPC bus from the Intel® ICH7M is connected to the following components:

- BIOS chipset
- Super I/O chipset

WSB-945GSE PCIMG 1.0 CPU Card

2.5.4 PCI Interface

The PCI interface on the Intel® ICH7M is compliant with the PCI Revision 2.3 implementation. Some of the features of the PCI interface are listed below.

- PCI Revision 2.3 compliant
- 33 MHz
- 5 V tolerant PCI signals (except PME#)
- Integrated PCI arbiter supports up to seven PCI bus masters

The PCI bus connections are shown in the subsections below.

2.5.4.1 PCI Edge Connector

The PCI interface is connected directly to the edge connector on the WSB-945GSE. The location of the PCI edge connector is shown in Figure 2-12 below.

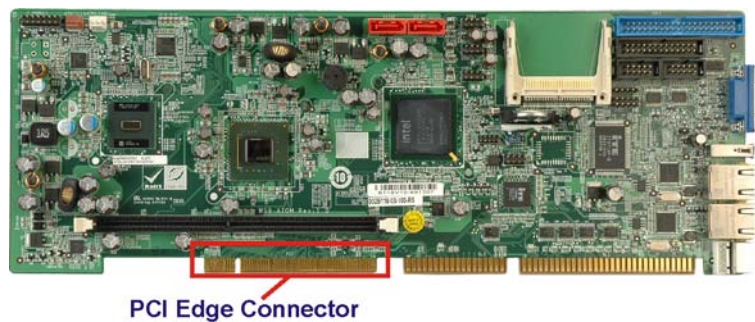


Figure 2-12: PCI Edge Connector

2.5.4.2 iTE IT8888G PCI-to-ISA Chip

The PCI interface is connected to the ISA edge connector through the iTE IT8888G PCI-to-ISA chip. The location of the PCI edge connector is shown in Figure 2-13 below.

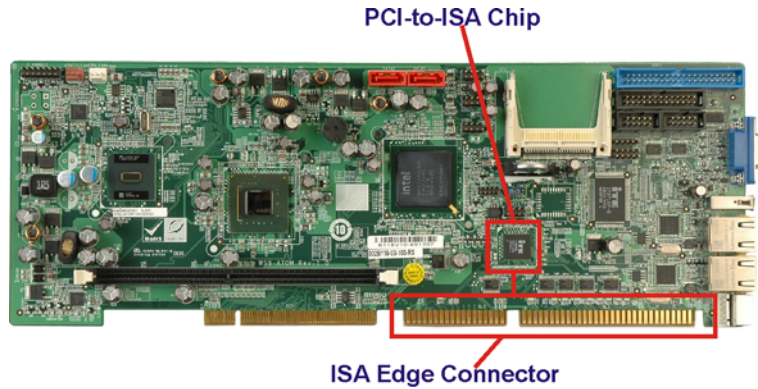


Figure 2-13: iTE IT8888G PCI-to-ISA Chip

2.5.5 PCIe Bus

The Intel® ICH7M Southbridge chipset has four PCIe lanes. Two of the four PCIe lanes are interfaced to PCIe GbE controllers.

2.5.5.1 PCIe GbE Ethernet

Two PCIe lanes are connected to two Realtek RTL8111C PCIe GbE controllers shown in Figure 2-14 below.

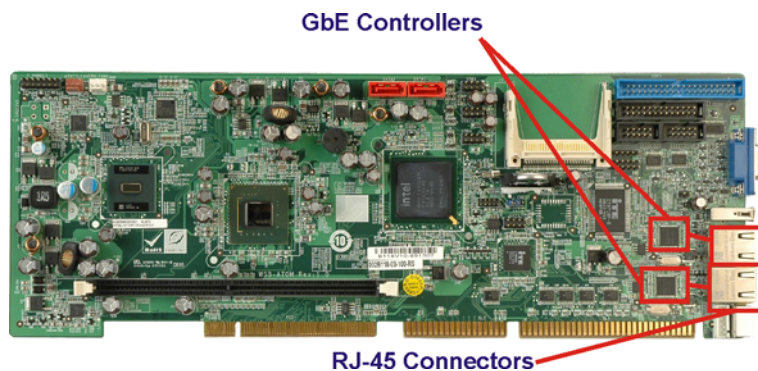


Figure 2-14: Realtek PCI GbE Controllers

The Realtek RTL8111C PCIe GbE controllers combine a triple-speed IEEE 802.3 compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver, 32-bit PCIe bus controller, and embedded memory. With state-of-the-art DSP technology and mixed-mode signal technology, they offer high-speed transmission over CAT 5 UTP cable or CAT 3 UTP (10 Mb/s only) cable. Functions such as Crossover Detection &

WSB-945GSE PCIMG 1.0 CPU Card

Auto-Correction, polarity correction, adaptive equalization, cross-talk cancellation, echo cancellation, timing recovery, and error correction are implemented to provide robust transmission and reception capability at high speeds.

Some of the features of the Realtek RTL8111C PCIe GbE controllers are listed below.

- Integrated 10/100/1000 transceiver
- Auto-Negotiation with Next Page capability
- Supports PCI Express™ 1.1
- Supports pair swap/polarity/skew correction
- Crossover Detection & Auto-Correction
- Wake-on-LAN and remote wake-up support
- Microsoft® NDIS5, NDIS6 Checksum Offload (IPv4, IPv6, TCP, UDP) and Segmentation Task-offload (Large send and Giant send) support
- Supports Full Duplex flow control (IEEE 802.3x)
- Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
- Supports IEEE 802.1P Layer 2 Priority Encoding
- Supports IEEE 802.1Q VLAN tagging
- Serial EEPROM
- Transmit/Receive on-chip buffer support
- Supports power down/link down power saving
- Supports PCI MSI (Message Signaled Interrupt) and MSI-X
- Supports Receive-Side Scaling (RSS)

2.5.6 Real Time Clock

256 bytes of battery backed RAM is provided by the Motorola MC146818 A real time clock (RTC) integrated into the ICH6. The RTC operates on a 3 V battery and 32.768 KHz crystal. The RTC keeps track of the time and stores system data even when the system is turned off.

2.5.7 SATA Controller

The integrated SATA controller on the Intel® ICH7M Southbridge supports two SATA drives with independent DMA operations. Two SATA controllers are connected to two SATA connectors on the WSB-945GSE. The SATA connectors are shown in Figure 2-15.

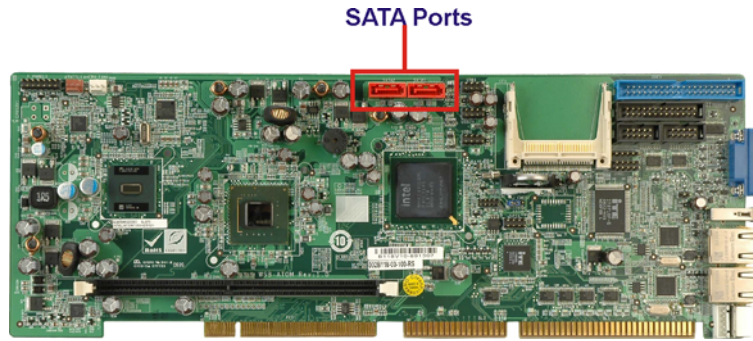


Figure 2-15: SATA Connectors

SATA controller specifications are listed below.

- Supports two SATA drives
- Supports 3.0 Gb/s data transfer speeds
- Supports Serial ATA Specification, Revision 1.0a

2.5.8 USB Controller

Up to six high-speed, full-speed or low-speed USB devices are supported by the Intel® ICH7M on the WSB-945GSE. High-speed USB 2.0, with data transfers of up to 480 MB/s, is enabled with the Intel® ICH7M integrated Enhanced Host Controller Interface (EHCI) compliant host controller. USB full-speed and low-speed signaling is supported by the Intel® ICH7M integrated Universal Host Controller Interface (UHCI) controllers.

The six USB ports implemented on the WSB-945GSE are connected to three internal connectors and one external connector. See Figure 2-16.

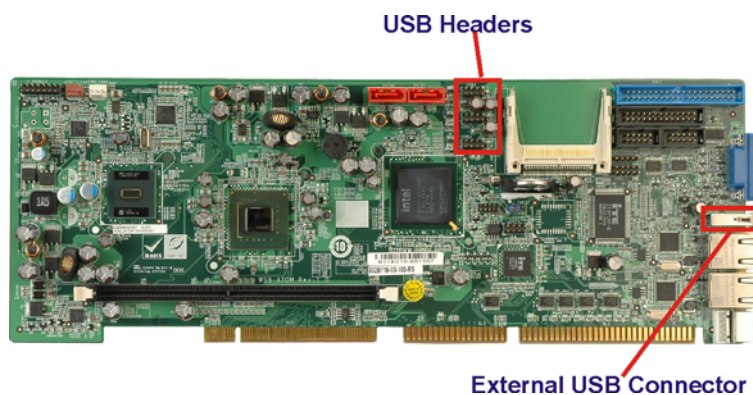


Figure 2-16: Onboard USB Implementation

2.6 LPC Bus Components

The iTE IT8718F LPC bus is connected to components listed below:

- BIOS chipset
- Super I/O chipset
- LPC Serial Port Chipset

2.6.1 BIOS Chipset

The BIOS chipset has a licensed copy of AMI BIOS installed on the chipset. Some of the BIOS features are listed below:

- AMI Flash BIOS
- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (Pre-boot Execution Environment) support
- USB booting support

2.6.2 iTE IT8718F Super I/O chipset

The iTE IT8718F Super I/O chipset is connected to the Intel® ICH7M Southbridge through the LPC bus.



Figure 2-17: Super I/O

The iTE IT8718F is an LPC interface-based Super I/O device that comes with Environment Controller integration. Some of the features of the iTE IT8718F chipset are listed below:

- ACPI and LANDesk Compliant
- Enhanced Hardware Monitor
- Fan Speed Controller
- Two 16C550 UARTs for serial port control
- One IEEE 1284 Parallel Port
- Keyboard Controller
- Watchdog Timer

Some of the Super I/O features are described in more detail below:

2.6.2.1 LPC Interface

The LPC interface on the Super I/O complies with the Intel® Low Pin Count Specification Rev. 1.0. The LPC interface supports both LDRQ# and SERIRQ protocols as well as PCI PME# interfaces.

2.6.2.2 16C550 UARTs

The onboard Super I/O has two integrated 16C550 UARTs that can support the following:

- Two standard serial ports
- IrDa 1.0 and ASKIR protocols

2.6.2.3 Digital Input/Output

The input mode supports switch debouncing or programmable external IRQ routing. The output mode supports two sets of programmable LED blinking periods.

2.6.2.4 Enhanced Hardware Monitor

The Super I/O Enhanced Hardware Monitor monitors three thermal inputs, VBAT internally, and eight voltage monitor inputs. These hardware parameters are reported in the BIOS and can be read from the BIOS Hardware Health Configuration menu.

2.6.2.5 Fan Speed Controller

The Super I/O fan speed controller enables the system to monitor the speed of the fan. One of the pins on the fan connector is reserved for fan speed detection and interfaced to the fan speed controller on the Super I/O. The fan speed is then reported in the BIOS.

2.6.2.6 Keyboard/Mouse Controller

The Super I/O keyboard/mouse controller can execute the 8042 instruction set. Some of the keyboard controller features are listed below:

- The 8042 instruction is compatible with a PS/2 keyboard and PS/2 mouse
- Gate A20 and Keyboard reset output
- Supports multiple keyboard power on events
- Supports mouse double-click and/or mouse move power on events

2.6.2.7 Parallel Port

The multi-mode high-performance parallel port supports the bi-directional Standard Parallel Port (SPP), the Enhanced Parallel Port (EPP) and the Extended Capabilities Port (ECP) modes.

2.7 Environmental and Power Specifications

2.7.1 System Monitoring

Two thermal inputs on the WSB-945GSE Super I/O Enhanced Hardware Monitor monitors the following temperatures:

- CPU temperature
- System temperature

The WSB-945GSE Super I/O Enhanced Hardware Monitor also monitors the following fan speeds:

- CPU Fan speed

Voltage inputs on the WSB-945GSE Super I/O Enhanced Hardware Monitor monitors the following voltages:

- CPU Core
- +1.05 V
- +3.30 V
- +5.00 V
- +12 V

- +1.5 V
- +1.8 V
- +5 VSB
- VBAT

The values for the above environmental parameters are all recorded in the BIOS Hardware Health Configuration menu.

2.7.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the WSB-945GSE are listed below.

- Minimum Operating Temperature: 0°C (32°F)
- Maximum Operating Temperature: 60°C (140°F)

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the Northbridge and Southbridge chipsets to ensure the operating temperature of these chips remain low.

2.7.3 Power Consumption

Table 2-2 shows the power consumption parameters for the WSB-945GSE running with a 1.60 GHz Intel® Atom™ with 2.0 GB DDR2 memory.

Voltage	Current
+5 V	2.55 A
+12 V	0.23 A

Table 2-2: Power Consumption

Chapter

3

Unpacking

3.1 Anti-static Precautions



WARNING!

Failure to take ESD precautions during the installation of the WSB-945GSE may result in permanent damage to the WSB-945GSE and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the WSB-945GSE. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the WSB-945GSE, 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 WSB-945GSE, place it on an anti-static pad. This reduces the possibility of ESD damaging the WSB-945GSE.
- **Only handle the edges of the PCB:** - When handling the PCB, hold the PCB by the edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the WSB-945GSE is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 3.1**.
- Make sure the packing box is facing upwards so the WSB-945GSE does not fall out of the box.
- Make sure all the components shown in **Section 3.3** are present.

WSB-945GSE PCIMG 1.0 CPU Card

3.3 Unpacking Checklist









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 WSB-945GSE was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

3.3.1 Package Contents

The WSB-945GSE is shipped with the following components:

Quantity	Item and Part Number	Image
1	WSB-945GSE	
2	SATA cable (P/N: 32000-062800-RS)	
1	KB/MS PS/2 Y-cable (P/N: 32000-000138-RS)	
1	Dual RS-232 cable (P/N: 19800-000051-RS)	
1	USB cable (P/N: CB-USB02-RS)	
1	Mini jumper pack (2.4 mm) (P/N:33100-000079-RS)	









Quantity	Item and Part Number	Image
1	Utility CD	
1	Quick Installation Guide	

Table 3-1: Packing List

3.3.2 Optional Items

The WSB-945GSE is shipped with the following components:

Item and Part Number	Image
Dual USB cable (wo bracket) (P/N: 32000-044300-RS)	
LPT cable (wo bracket) (P/N: 32200-015100-RS)	
ATX cable (P/N: 32100-043403)	
HDTV output cable (P/N: 32000-083701-RS)	
ATA 66/100 flat cable (P/N: 32200-000052-RS)	
SATA power cable (P/N: 32100-088600-RS)	

WSB-945GSE PCIMG 1.0 CPU Card



Item and Part Number	Image
Audio kit_ 5.1 Channel (P/N: AC-KIT08R-R10)	
Audio kit_ 7.1 Channel (P/N: AC-KIT-883HD-R10)	

Table 3-2: Power Consumption

Chapter

4

Connectors

WSB-945GSE PCIMG 1.0 CPU Card

4.1 Peripheral Interface Connectors

This chapter outlines all internal and external connectors on the WSB-945GSE.

4.1.1 Layout

Figure 4-1 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.

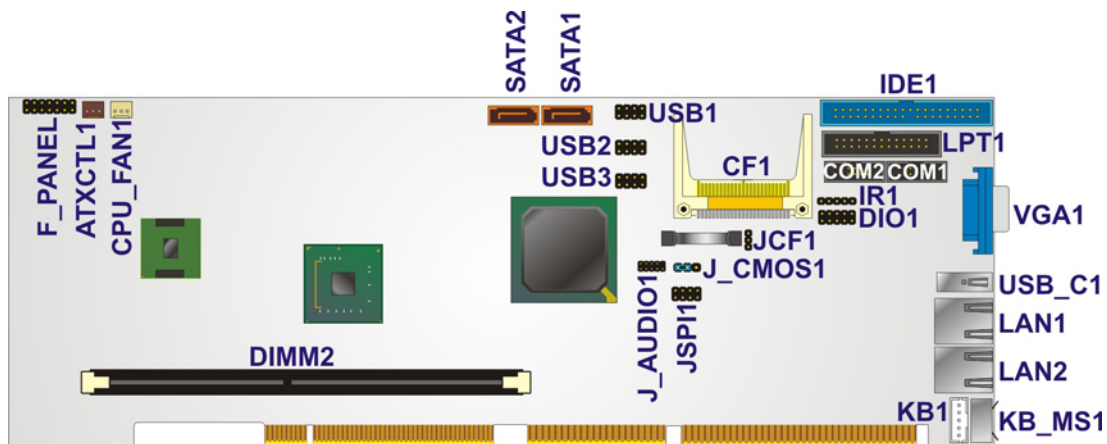


Figure 4-1: Connector and Jumper Locations [Front Side]

4.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the WSB-945GSE. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
ATX power control connector	3-pin wafer	ATXCTL1
Audio kit connector	9-pin header	J_AUDIO1
CompactFlash® slot	CF slot	CF1
CPU fan connector	3-pin wafer	CPU_FAN1
Digital I/O connector	10-pin header	DIO1
Front panel connector	14-pin header	F_PANEL1
IDE connector	40-pin box header	IDE1

Connector	Type	Label
Infrared interface connector	5-pin header	IR1
Keyboard connector	5-pin box header	KB1
Parallel port connector	26-pin box header	LPT1
SATA port connector	SATA port	SATA1
SATA port connector	SATA port	SATA2
Serial port connector	10-pin header	COM1
Serial port connector	10-pin header	COM2
USB 2.0 connector	8-pin header	USB1
USB 2.0 connector	8-pin header	USB2
USB 2.0 connector	8-pin header	USB3

Table 4-1: Peripheral Interface Connectors

4.2.1 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the WSB-945GSE. Detailed descriptions of these connectors can be found in **Section 4.4** on **page 55**.

Connector	Type	Label
LAN connector	RJ-45	LAN1
LAN connector	RJ-45	LAN2
Keyboard/mouse	PS/2	KB_MS1
USB port	USB port	USB_C1
VGA port connector	15-pin female	VGA1

Table 4-2: Rear Panel Connectors

4.3 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the WSB-945GSE.

WSB-945GSE PCIMG 1.0 CPU Card

4.3.1 ATX Power Supply Enable Connector

CN Label:	ATXCTL1
CN Type:	3-pin wafer (1x3)
CN Location:	See Figure 4-2
CN Pinouts:	See Table 4-3

The ATX power supply enable connector connects to an ATX power supply and signals the power-on and power-off events.

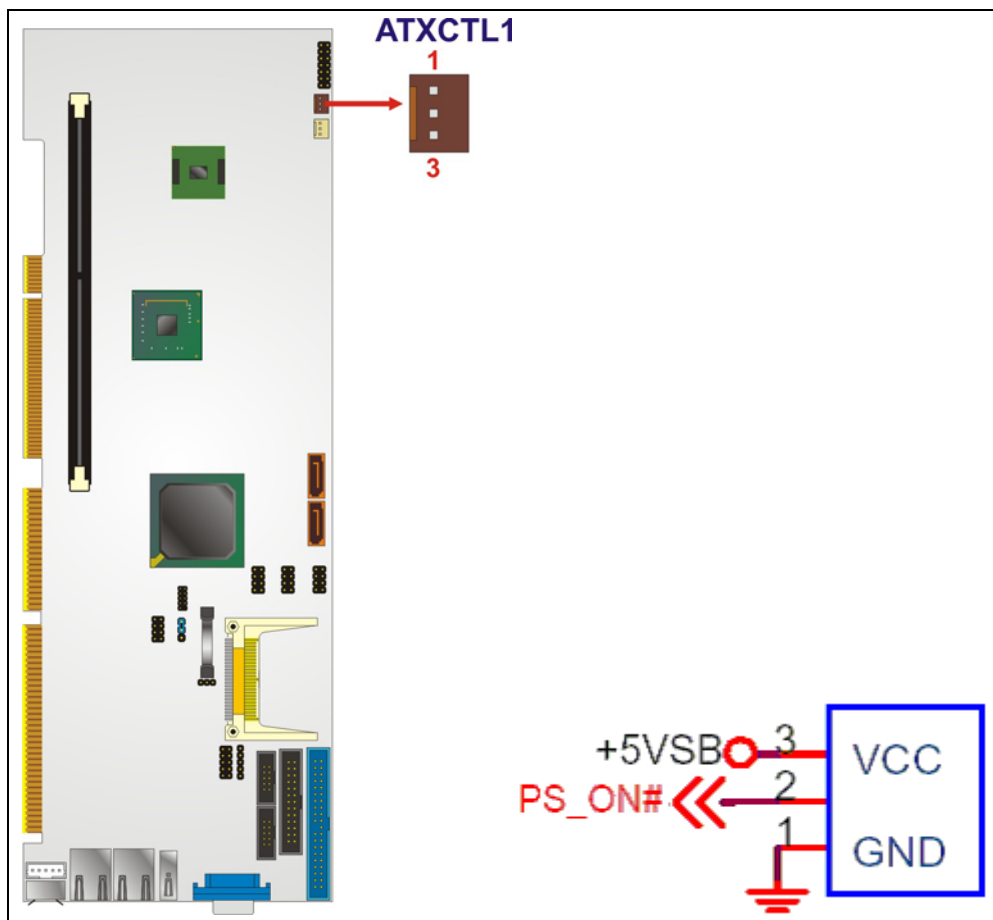


Figure 4-2: ATX Power Supply Enable Connector Location

PIN NO.	DESCRIPTION
1	GND
2	PS-ON

PIN NO.	DESCRIPTION
3	+5 V Standby

Table 4-3: ATX Power Supply Enable Connector Pinouts

4.3.2 Audio Kit Connector

- CN Label:** J_AUDIO1
- CN Type:** 9-pin header (2x5)
- CN Location:** See Figure 4-3
- CN Pinouts:** See Table 4-4

The 9-pin audio connector is connected to an external audio kit available from IEI. The external audio kits add audio capabilities to the system.

WSB-945GSE PCIMG 1.0 CPU Card

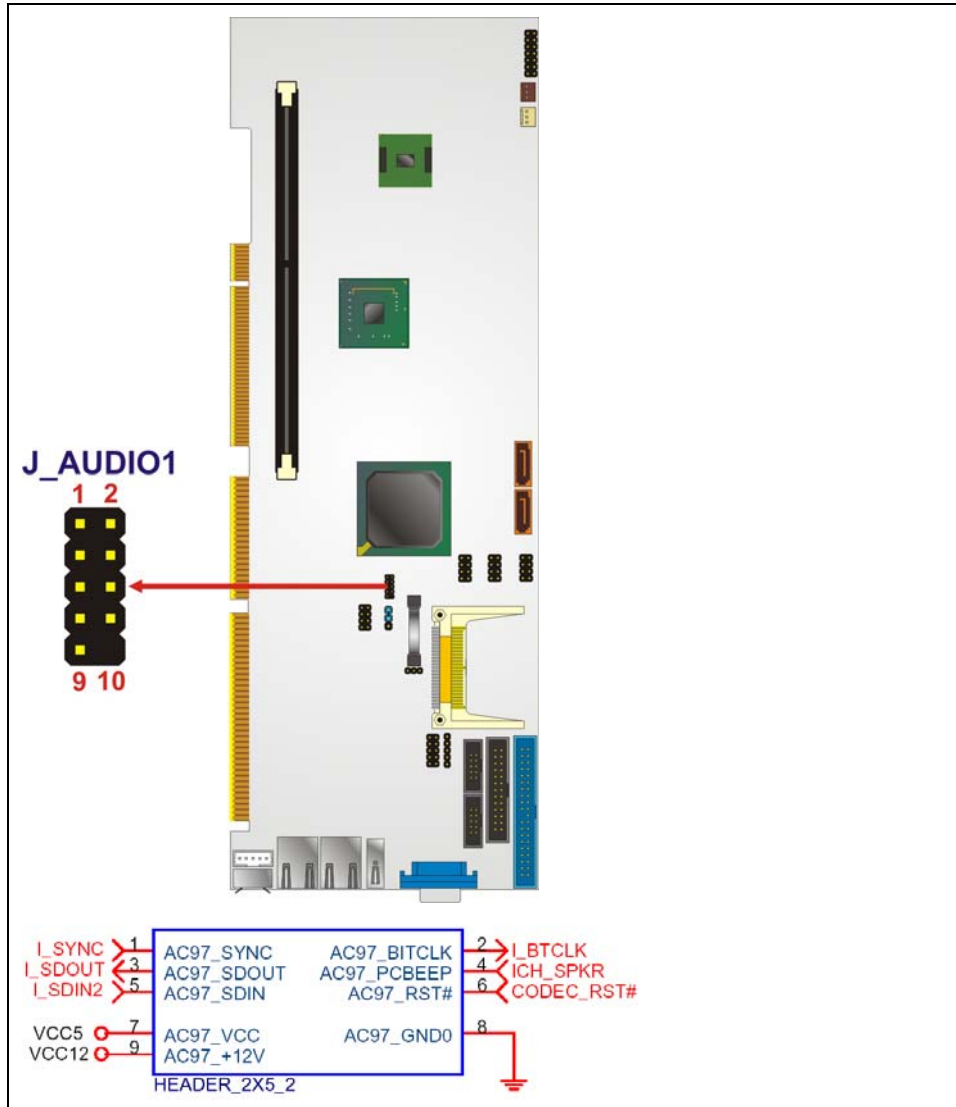


Figure 4-3: Audio Connector Location (9-pin)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SYNC	2	BITCLK
3	SDOUT	4	PCBEEP
5	SDIN	6	RST#
7	VCC	8	GND
9	+12 V		

Table 4-4: Audio Connector Pinouts (9-pin)

4.3.3 CompactFlash® Socket

- CN Label:** CF1
- CN Type:** 50-pin header (2x25)
- CN Location:** See Figure 4-4
- CN Pinouts:** See Table 4-5

The CompactFlash® card slot allows a CompactFlash® type I or II card to be installed.

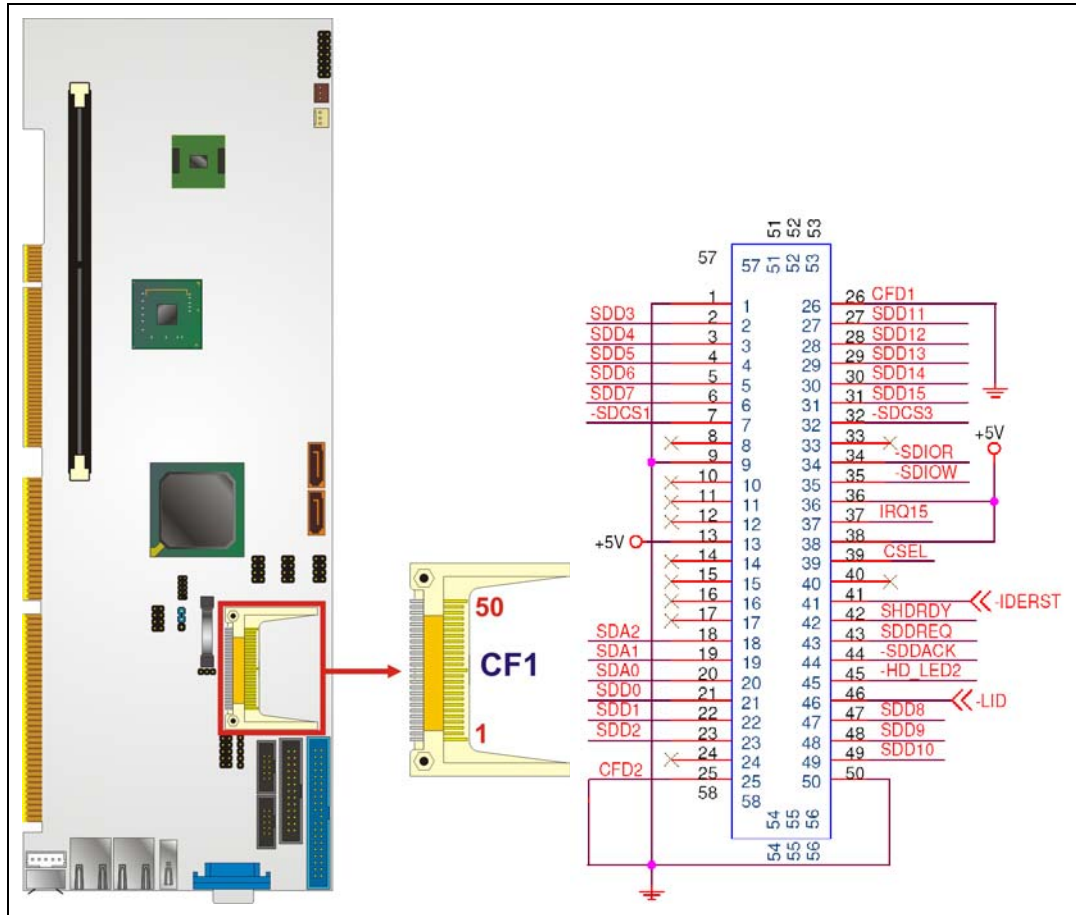


Figure 4-4: CF Card Socket Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12

WSB-945GSE PCIMG 1.0 CPU Card

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	CE#	32	CE2#
8	A10	33	VS1#
9	OE#	34	IOR#
10	A9	35	IOW#
11	A8	36	WE#
12	A7	37	IRQ
13	VCC	38	VCC
14	A6	39	CSEL#
15	A5	40	VS2#
16	A4	41	RESET#
17	A3	42	WAIT#
18	A2	43	INPACK#
19	A1	44	REG#
20	A0	45	BVD2
21	DATA 0	46	BVD1
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	IOCS16#	49	DATA 10
25	CD2#	50	GND2

Table 4-5: CF Card Socket Pinouts

4.3.4 Digital I/O Connector

- CN Label:** DIO1
- CN Type:** 10-pin header (2x5)
- CN Location:** See Figure 4-5
- CN Pinouts:** See Table 4-6

The digital input/output connector is managed through a Super I/O chip. The DIO connector pins are user programmable.

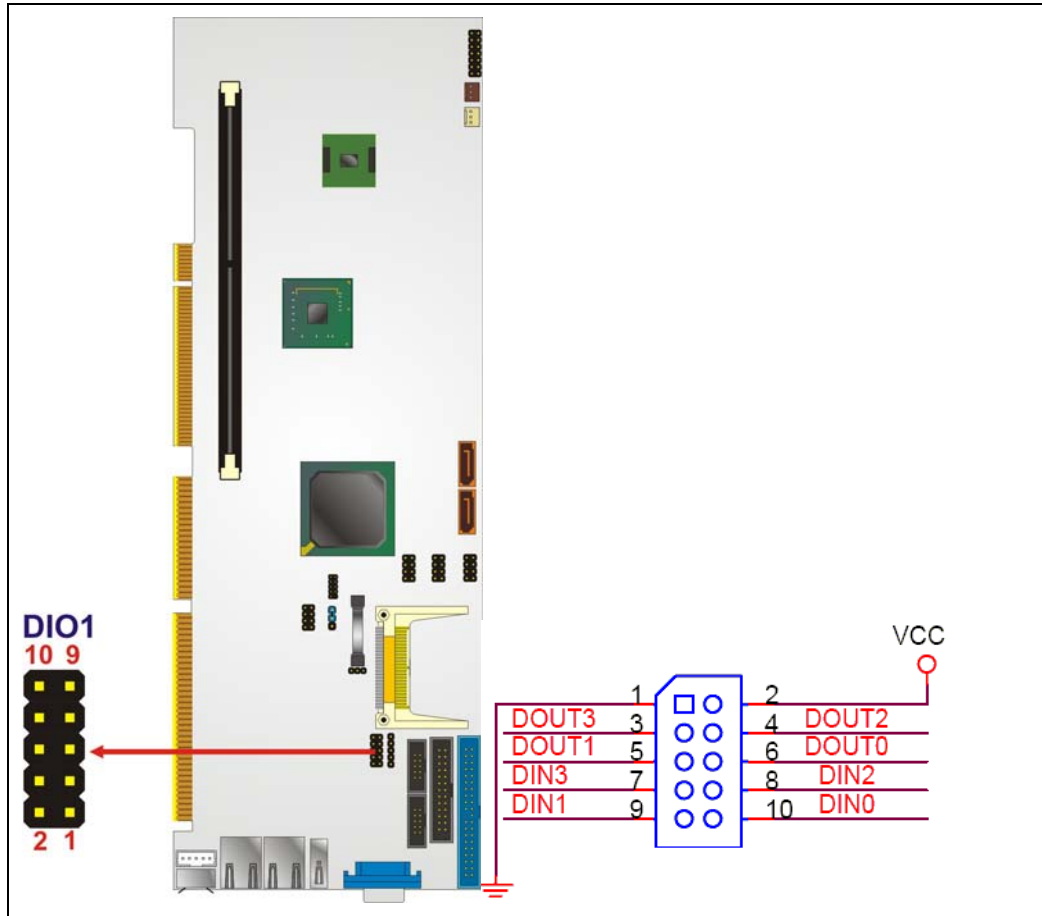


Figure 4-5: Digital I/O Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
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 4-6: DIO Connector Pinouts

4.3.5 Fan Connector

CN Label:	CPU_FAN1
CN Type:	3-pin header
CN Location:	See Figure 4-6
CN Pinouts:	See Table 4-7

The cooling fan connector provides a 12 V, 500mA current to the cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

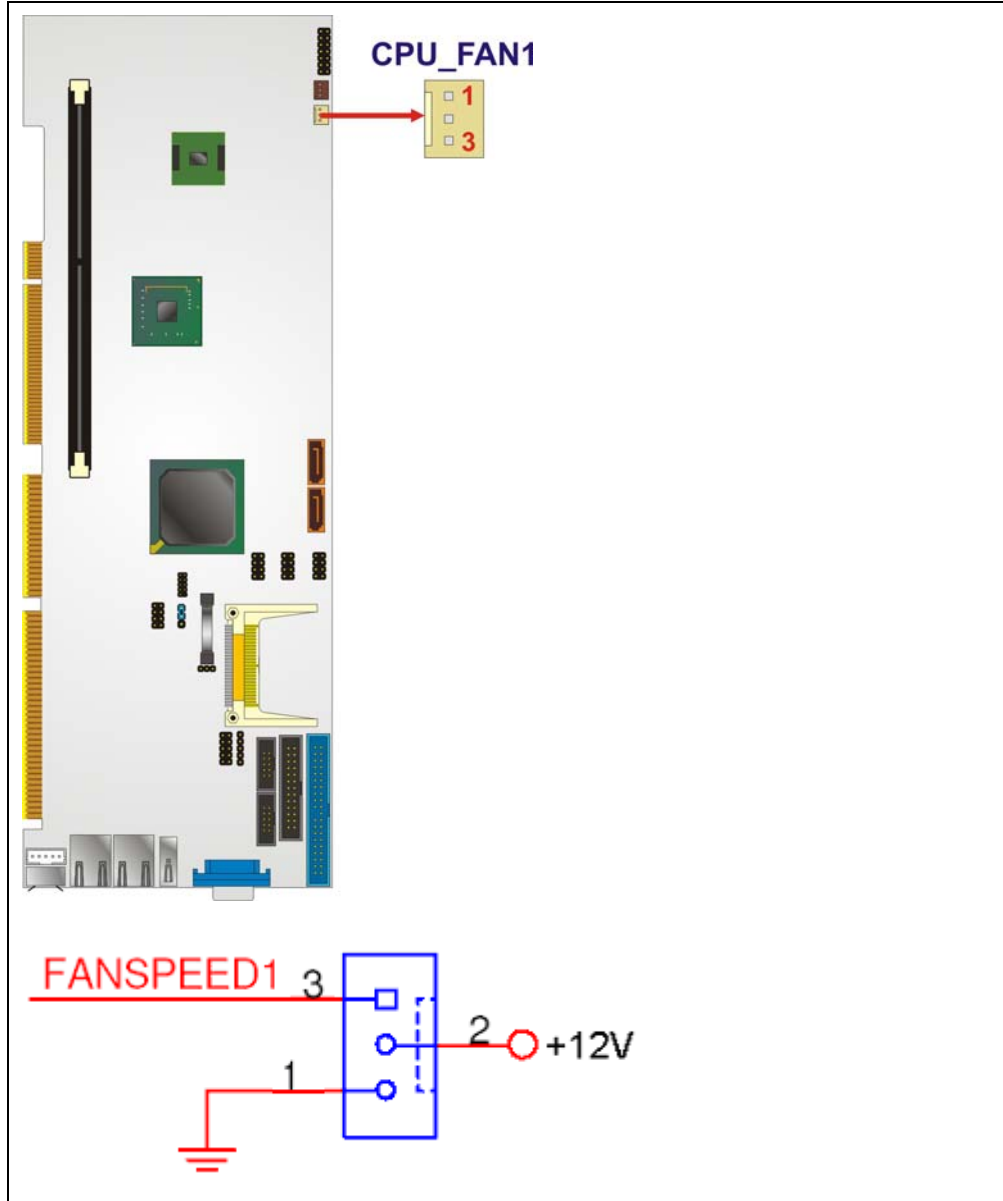


Figure 4-6: CPU Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12 V
3	Fan Speed Detect

Table 4-7: CPU Fan Connector Pinouts

WSB-945GSE PCIMG 1.0 CPU Card

4.3.6 Front Panel Connector

CN Label:	F_PANEL1
CN Type:	14-pin header (2x7)
CN Location:	See Figure 4-7
CN Pinouts:	See Table 4-8

The front panel connector connects to external switches and indicators to monitor and controls the motherboard. These indicators and switches include:

- Power button
- Reset
- Speaker
- Power LED
- HDD LED

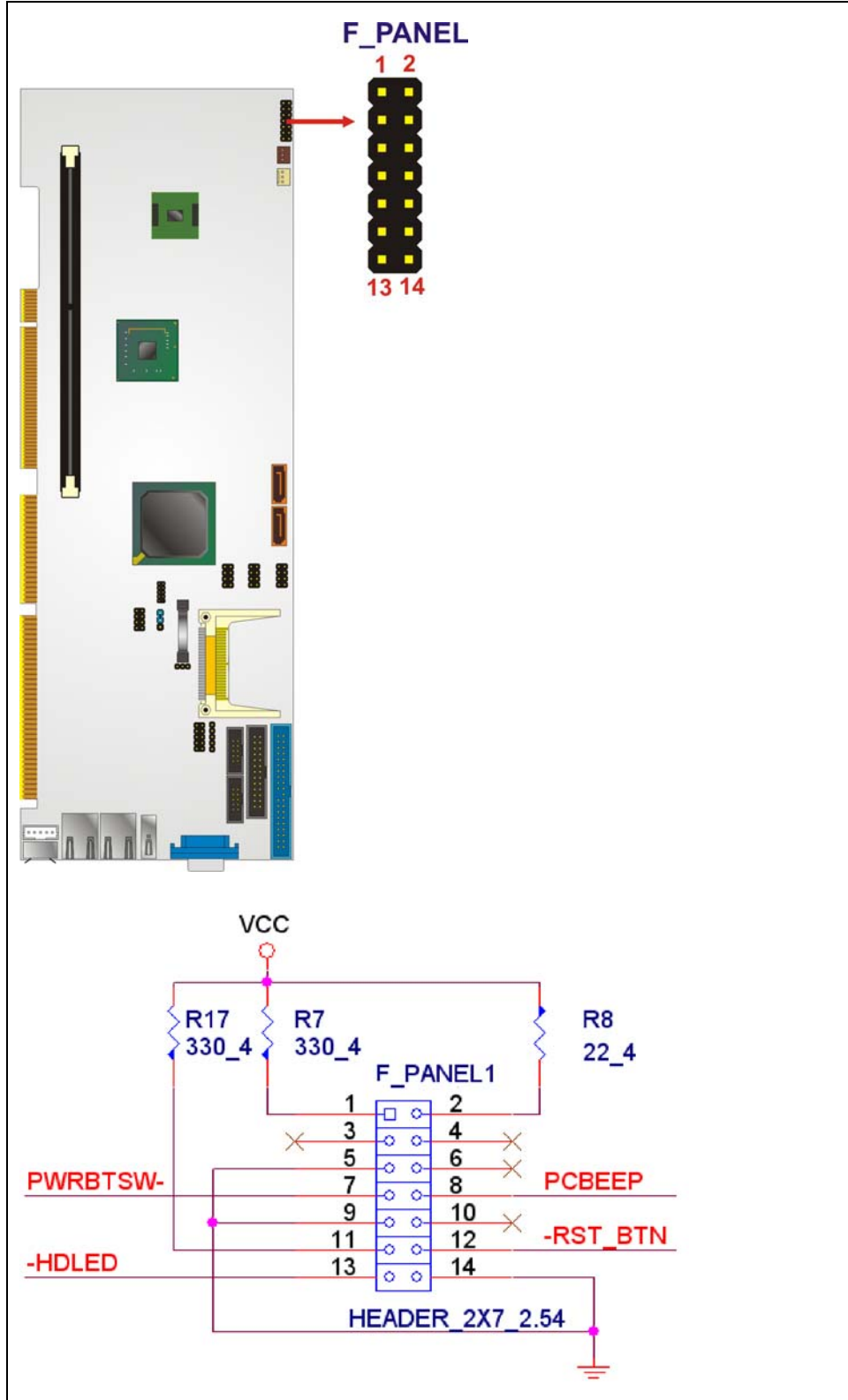


Figure 4-7: Front Panel Connector Pinout Locations

WSB-945GSE PCIMG 1.0 CPU Card

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

Table 4-8: Front Panel Connector Pinouts

4.3.7 IDE Connector

- CN Label:** IDE1
- CN Type:** 40-pin header (2x20)
- CN Location:** See Figure 4-8
- CN Pinouts:** See Table 4-9

One 40-pin IDE device connector on the WSB-945GSE supports connectivity to two hard disk drives.

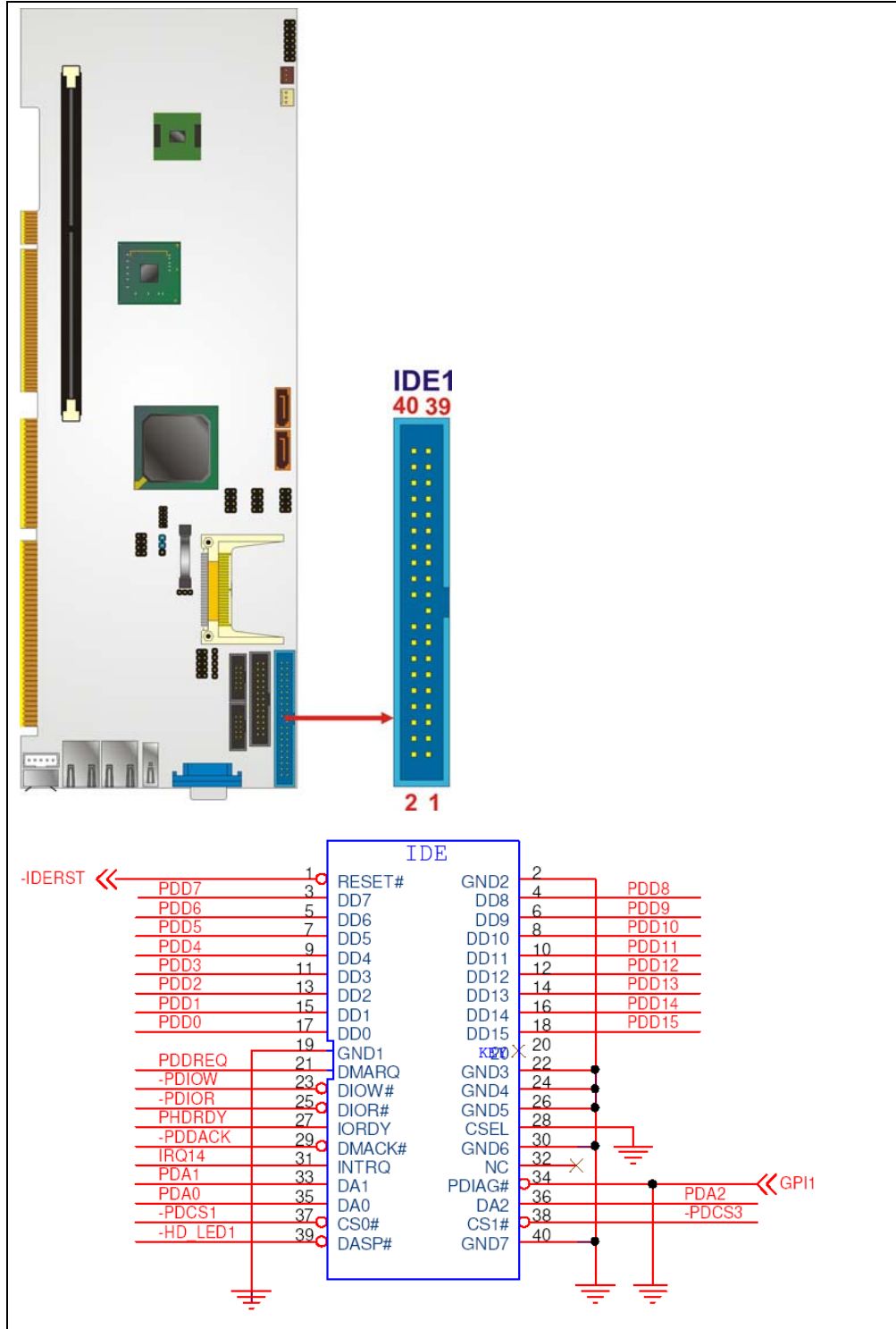


Figure 4-8: IDE Device Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND

WSB-945GSE PCIMG 1.0 CPU Card

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	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-DEFAULT
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 4-9: IDE Connector Pinouts

4.3.8 Infrared Interface Connector

- CN Label:** IR1
- CN Type:** 5-pin header (1x5)
- CN Location:** See Figure 4-9
- CN Pinouts:** See Table 4-10

The infrared interface connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.

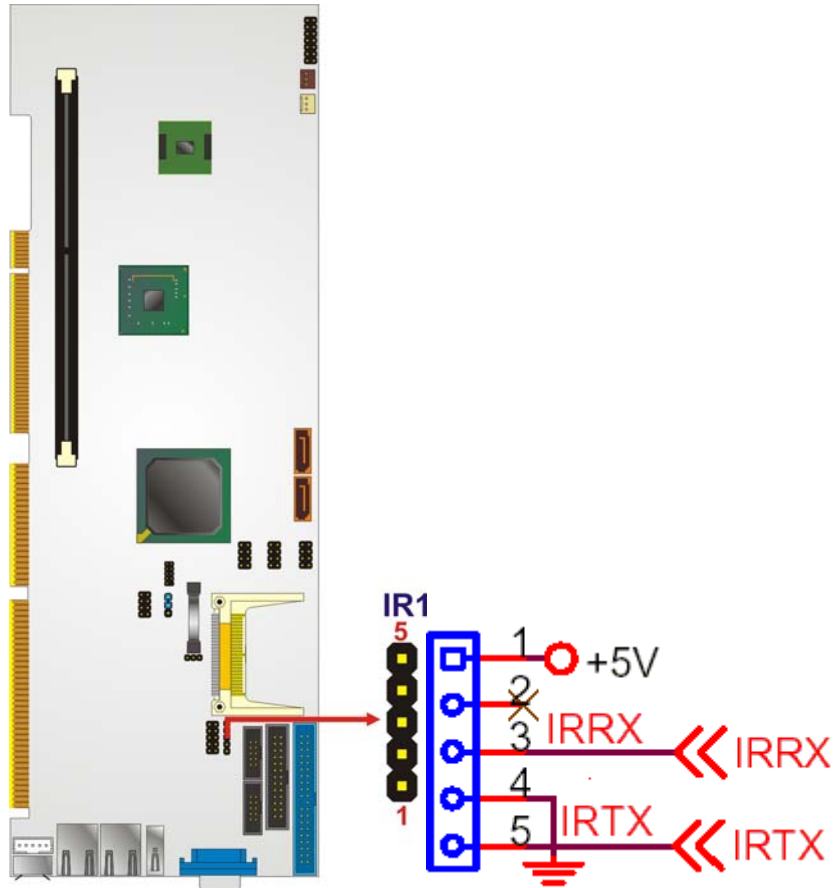


Figure 4-9: Infrared Connector Pinout Locations

PIN NO.	DESCRIPTION
1	VCC
2	NC
3	IR-RX
4	GND
5	IR-TX

Table 4-10: Infrared Connector Pinouts

4.3.9 Keyboard Connector

- CN Label:** KB1
- CN Type:** 5-pin header (1x5)
- CN Location:** See Figure 4-10

WSB-945GSE PCIMG 1.0 CPU Card

CN Pinouts: See Table 4-11

The keyboard connector can be connected to a standard PS/2 cable or PS/2 cable to add keyboard and mouse functionality to the system.

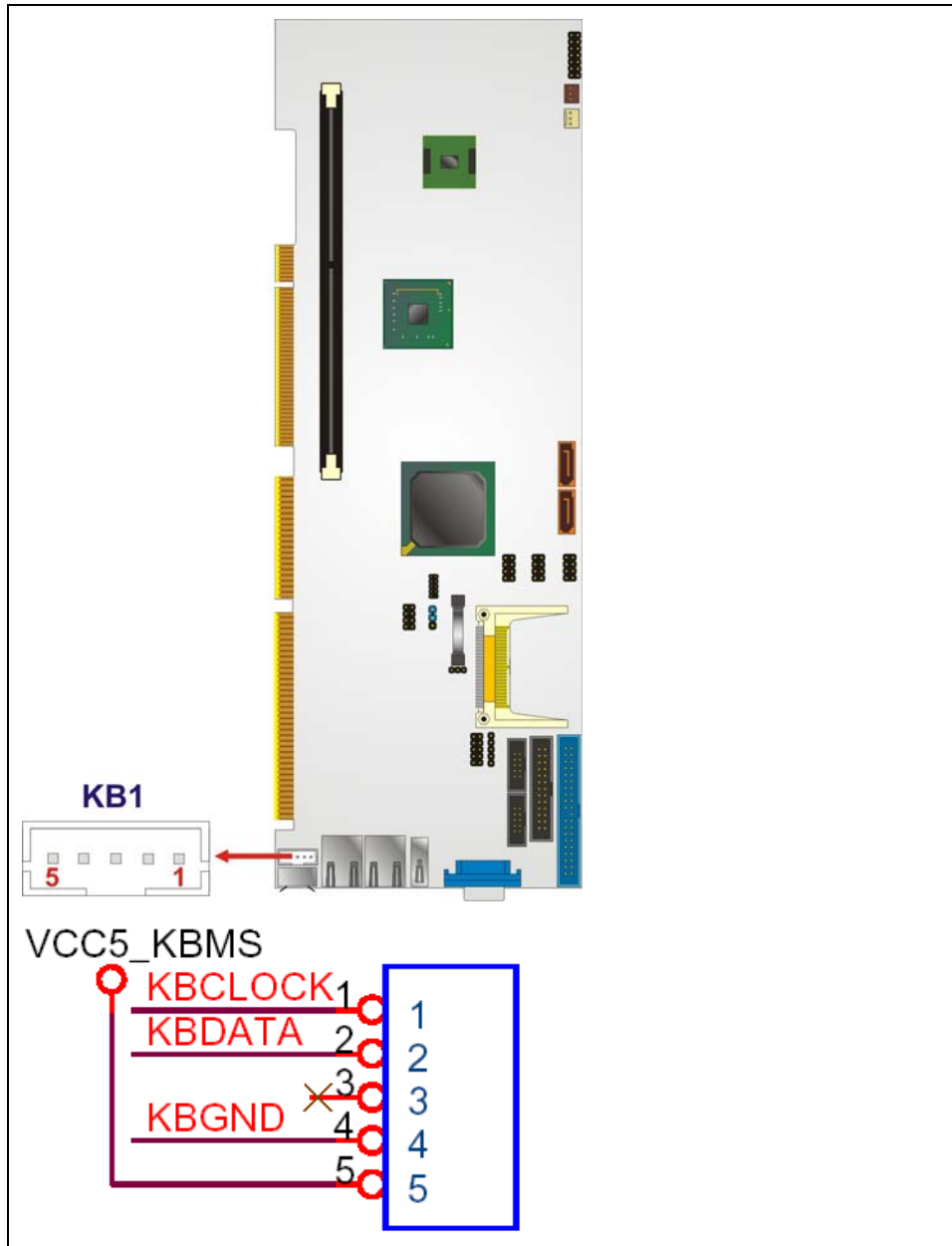


Figure 4-10: Keyboard Connector Location

PIN NO.	DESCRIPTION
1	Keyboard clock

PIN NO.	DESCRIPTION
2	Keyboard data
3	N/C
4	GROUND
5	VCC

Table 4-11: Keyboard Connector Pinouts

4.3.10 Parallel Port Connector

- CN Label:** LPT1
- CN Type:** 26-pin box header
- CN Location:** See Figure 4-11
- CN Pinouts:** See Table 4-12

The 26-pin parallel port connector connects to a parallel port connector interface or some other parallel port device such as a printer.

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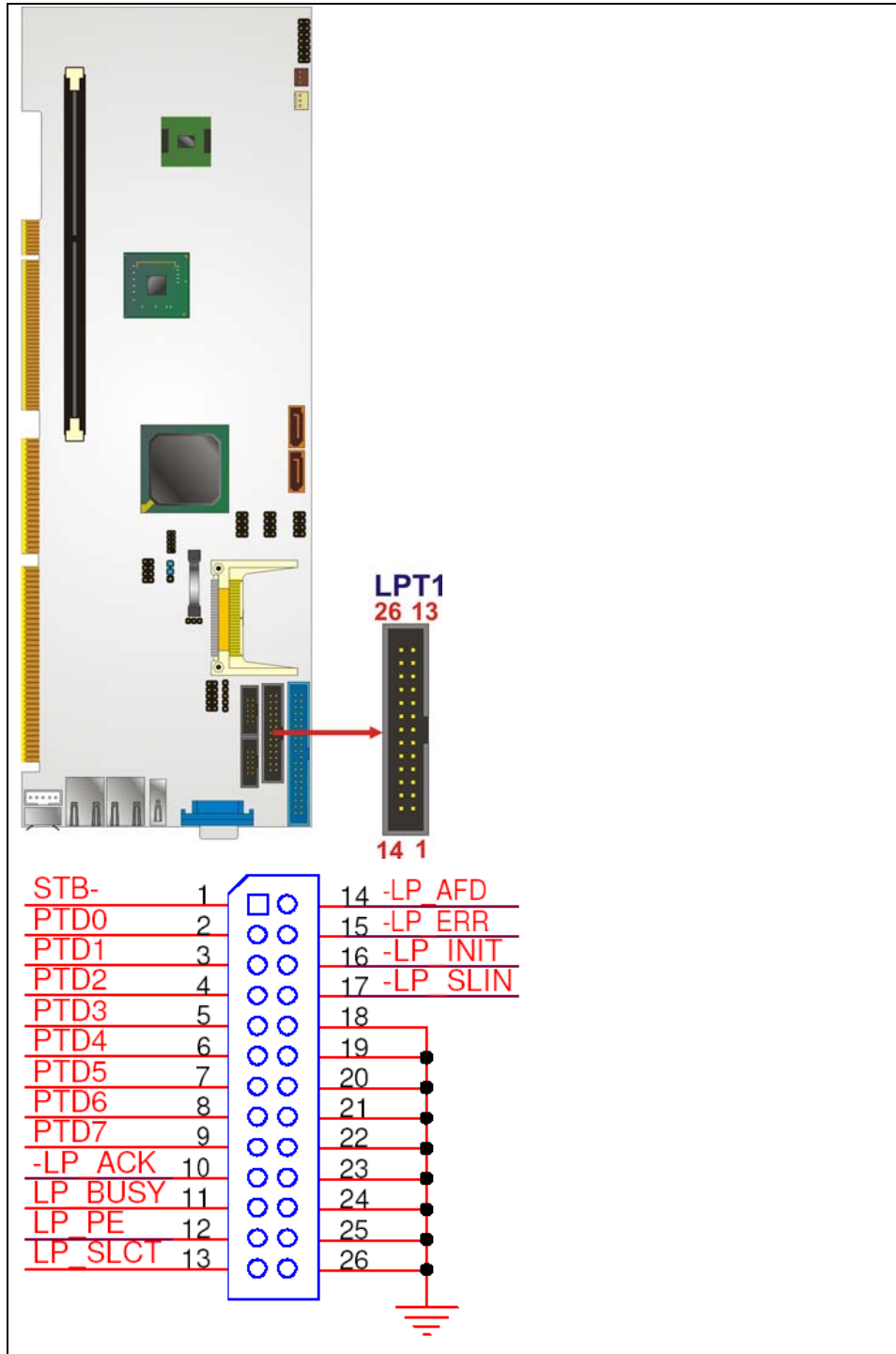


Figure 4-11: Parallel Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	14	AUTO FORM FEED #

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
2	DATA 0	15	ERROR#
3	DATA 1	16	INITIALIZE
4	DATA 2	17	PRINTER SELECT LN#
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	26	NC

Table 4-12: Parallel Port Connector Pinouts

4.3.11 SATA Drive Connectors

- CN Label:** SATA1, SATA2
- CN Type:** 7-pin SATA drive connectors
- CN Location:** See Figure 4-12
- CN Pinouts:** See Table 4-13

The four SATA drive connectors are each connected to a first generation SATA drive. First generation SATA drives transfer data at speeds as high as 150 Mb/s. The SATA drives can be configured in a RAID configuration.

WSB-945GSE PCIMG 1.0 CPU Card

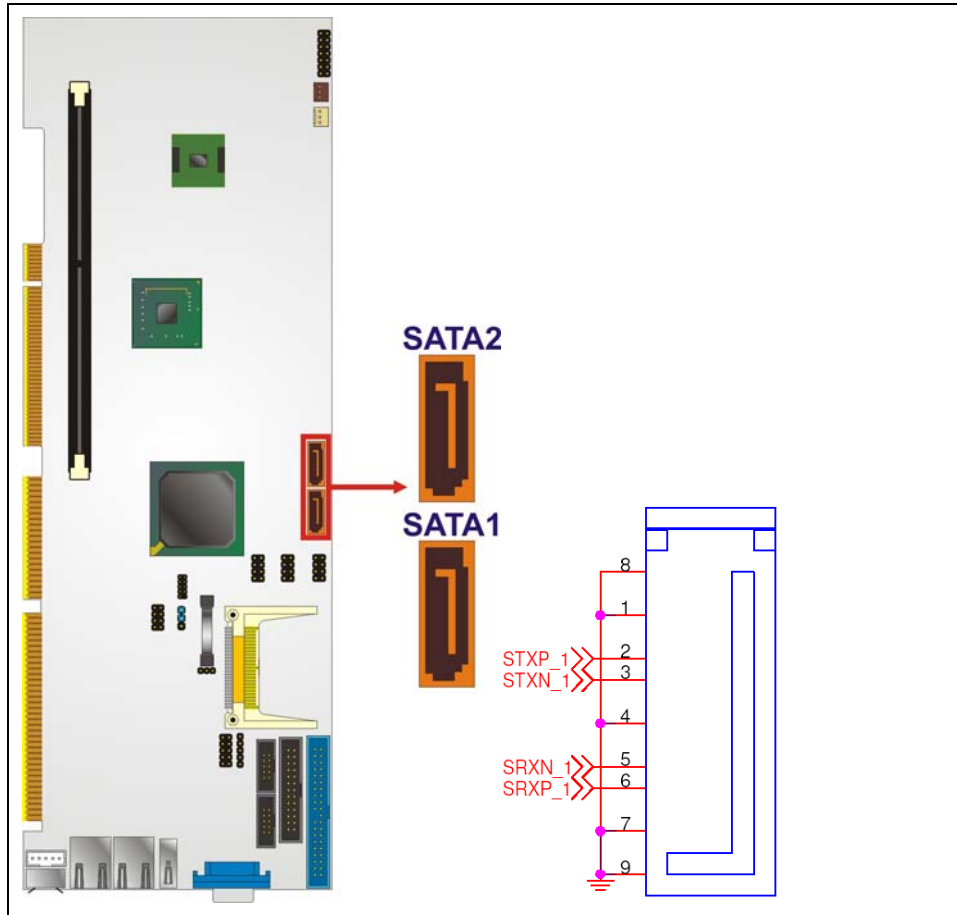


Figure 4-12: SATA Drive Connector Locations

PIN NO.	DESCRIPTION
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 4-13: SATA Drive Connector Pinouts

4.3.12 Serial Port Connectors

CN Label: COM1 and COM2

CN Type: 10-pin header (2x5)

CN Location: See Figure 4-13

CN Pinouts: See Table 4-14

The 10-pin serial port connector provides a second RS-232 serial communications channel. The COM serial port connectors can be connected to external RS-232 serial port devices.

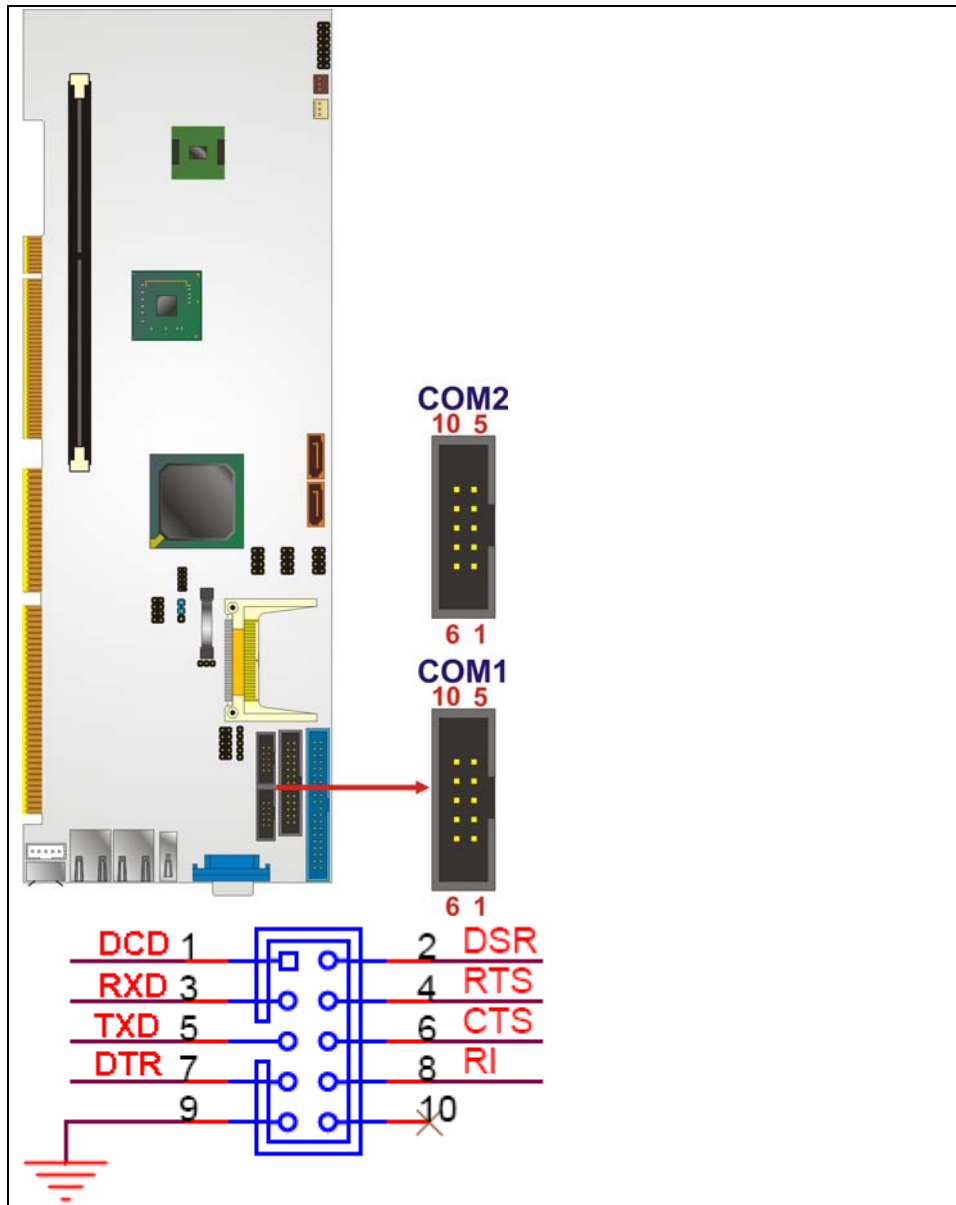


Figure 4-13: COM Connector Pinout Locations

WSB-945GSE PCIMG 1.0 CPU Card

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Data Carrier Direct (DCD)	2	Data Set Ready (DSR)
3	Receive Data (RXD)	4	Request To Send (RTS)
5	Transmit Data (TXD)	6	Clear To Send (CTS)
7	Data Terminal Ready (DTR)	8	Ring Indicator (RI)
9	Ground (GND)	10	N/C

Table 4-14: COM Connector Pinouts

4.3.13 USB Connectors

CN Label: USB1, USB2 & USB3

CN Type: 8-pin header (2x4)

CN Location: See Figure 4-14

CN Pinouts: See Table 4-15

The 2x4 USB pin connectors each provide connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.

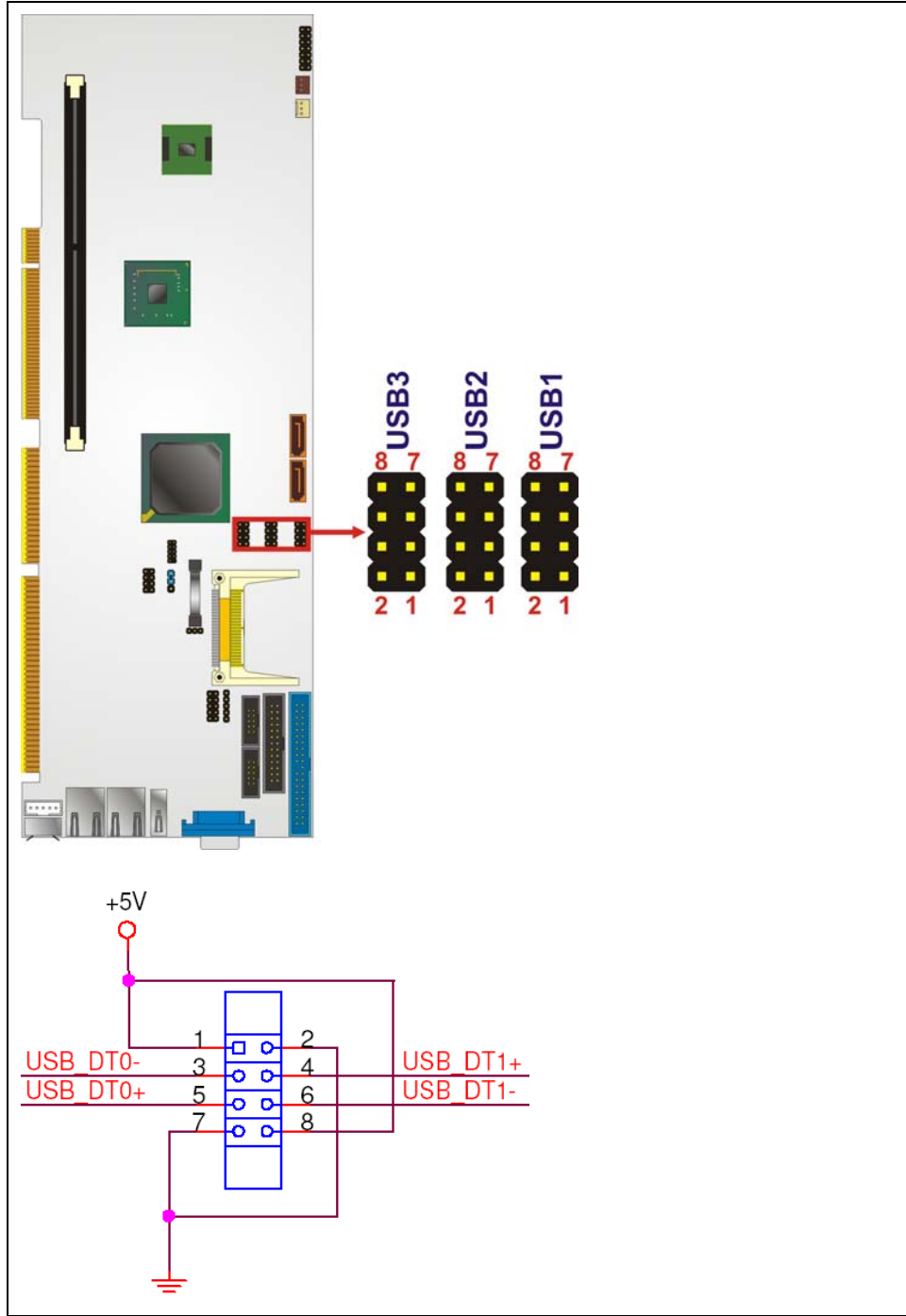


Figure 4-14: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATA1-	4	DATA2+

WSB-945GSE PCIMG 1.0 CPU Card

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
5	DATA1+	6	DATA2-
7	GND	8	VCC

Table 4-15: USB Port Connector Pinouts

4.4 External Peripheral Interface Connector Panel

Figure 4-15 shows the WSB-945GSE external peripheral interface connector (EPIC) panel. The WSB-945GSE EPIC panel consists of the following:

- 2 x RJ-45 LAN connectors
- 1 x PS/2 connectors
- 1 x Serial port connectors
- 2 x USB connectors
- 1 x VGA connector

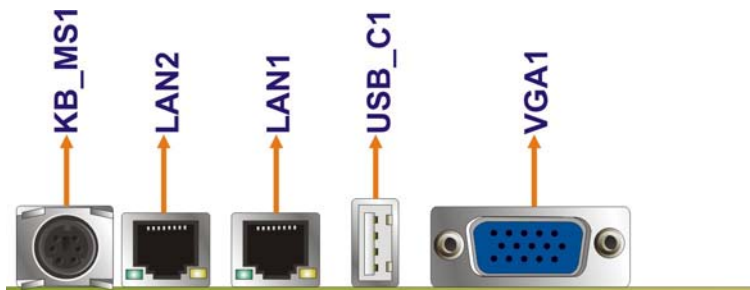
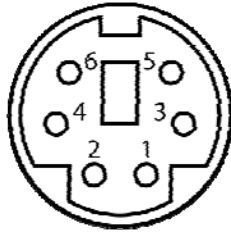


Figure 4-15: WSB-945GSE External Peripheral Interface Connector

4.4.1 Keyboard/Mouse Connector

- CN Label:** KB/MS
- CN Type:** PS/2
- CN Location:** See Figure 4-15
- CN Pinouts:** See Figure 4-16, Table 4-16

The WSB-945GSE keyboard and mouse connector is a standard PS/2 connector.


Figure 4-16: PS/2 Pinout and Configuration

PIN	DESCRIPTION
1	KB DATA
2	MS DATA
3	GND
4	VCC
5	KB CLOCK
6	MS CLOCK

Table 4-16: Keyboard Connector Pinouts

4.4.2 LAN Connectors

- CN Label:** LAN1 & LAN2
- CN Type:** RJ-45
- CN Location:** See Figure 4-15
- CN Pinouts:** See Table 4-17

The WSB-945GSE is equipped with two built-in RJ-45 Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

PIN	DESCRIPTION	PIN	DESCRIPTION
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+
3	MDIA2-	7	MDIA0-

WSB-945GSE PCIMG 1.0 CPU Card

PIN	DESCRIPTION	PIN	DESCRIPTION
4	MDIA1-	8	MDIA0+

Table 4-17: LAN Pinouts

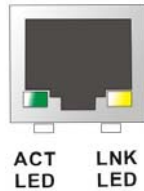


Figure 4-17: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See Table 4-18.

STATUS	DESCRIPTION	STATUS	DESCRIPTION
GREEN	Activity	YELLOW	Linked

Table 4-18: RJ-45 Ethernet Connector LEDs

4.4.3 USB Connectors

- CN Label:** USB_C1
- CN Type:** USB port
- CN Location:** See Figure 4-15
- CN Pinouts:** See Table 4-19

The WSB-945GSE has one external USB 2.0 port. The ports connect to both USB 2.0 and USB 1.1 devices.

PIN NO.	DESCRIPTION
1	VCC
2	DATA-
3	DATA+

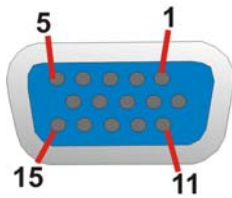
PIN NO.	DESCRIPTION
4	GND

Table 4-19: USB Port Pinouts

4.4.4 VGA Connector

- CN Label:** VGA1
- CN Type:** 15-pin Female
- CN Location:** See Figure 4-15
- CN Pinouts:** See Figure 4-18 and Table 4-20

The WSB-945GSE has a single 15-pin female connector for connectivity to standard display devices.


Figure 4-18: VGA Connector

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

Table 4-20: VGA Connector Pinouts

Chapter

5

Installation

5.1 Anti-static Precautions



WARNING:

Failure to take ESD precautions during the installation of the WSB-945GSE may result in permanent damage to the WSB-945GSE and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the WSB-945GSE. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the WSB-945GSE, 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 WSB-945GSE, place it on an anti-static pad. This reduces the possibility of ESD damaging the WSB-945GSE.
- **Only handle the edges of the PCB:-:** When handling the PCB, hold the PCB by the edges.

5.2 Installation Considerations



NOTE:

The following installation notices and installation considerations should be read and understood before the WSB-945GSE is installed. All installation notices pertaining to the installation of the WSB-945GSE should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the WSB-945GSE and injury to the person installing the motherboard.

5.2.1 Installation Notices



WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the WSB-945GSE, WSB-945GSE 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 WSB-945GSE 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 WSB-945GSE 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 WSB-945GSE off:
 - When working with the WSB-945GSE, 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 WSB-945GSE **DO NOT**:

- **DO NOT** remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- **DO NOT** use the product before verifying all the cables and power connectors are properly connected.
- **DO NOT** allow screws to come in contact with the PCB circuit, connector pins, or its components.

5.2.2 Installation Checklist

The following checklist is provided to ensure the WSB-945GSE is properly installed.

- All the items in the packing list are present
- A compatible memory module is properly inserted into the slot
- The CF Type I or CF Type II card is properly installed into the CF socket
- The jumpers have been properly configured
- The WSB-945GSE is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
 - Primary and secondary IDE device
 - SATA drives
 - Power supply
 - USB cable
 - Serial port cable
- The following external peripheral devices are properly connected to the chassis:
 - VGA screen
 - Keyboard
 - Mouse
 - RS-232 serial communications device
 - USB devices

5.3 Unpacking

When the WSB-945GSE is unpacked, please check all the unpacking list items listed in Chapter 3 are indeed present. If any of the unpacking list items are not available please

WSB-945GSE PCIMG 1.0 CPU Card

contact the WSB-945GSE vendor reseller/vendor where the WSB-945GSE was purchased or contact an IEI sales representative.

5.4 DIMM Installation



WARNING:

Using incorrectly specified DIMM may cause permanently damage the WSB-945GSE. Please make sure the purchased DIMM complies with the memory specifications of the WSB-945GSE. DIMM specifications compliant with the WSB-945GSE are listed in **Chapter 2**.

To install a DIMM into a DIMM socket, please follow the steps below and refer to Figure 5-1.

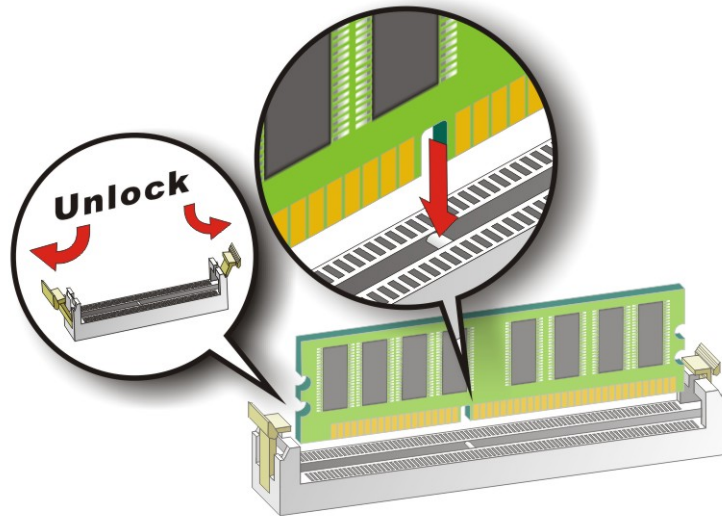


Figure 5-1: Installing a DIMM

Step 1: Open the DIMM socket handles. The DIMM socket has two handles that secure the DIMM into the socket. Before the DIMM can be inserted into the socket, the handles must be opened. See Figure 5-1.

- Step 2: Align the DIMM with the socket.** The DIMM must be oriented in such a way that the notch in the middle of the DIMM must be aligned with the plastic bridge in the socket. See Figure 5-1.
- Step 3: Insert the DIMM.** Once properly aligned, the DIMM can be inserted into the socket. As the DIMM is inserted, the white handles on the side of the socket will close automatically and secure the DIMM to the socket. See Figure 5-1.
- Step 4: Removing a DIMM.** To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

5.5 CF Card Installation



NOTE:

The WSB-945GSE can support both CF Type I cards and CF Type II cards. For the complete specifications of the supported CF cards please refer to Chapter 2.

To install the a CF card (Type 1 or Type 2) onto the WSB-945GSE, please follow the steps below:

- Step 1: Locate the CF card socket.** Place the WSB-945GSE on an anti-static pad with the solder side facing up. Locate the CF card.
- Step 2: Align the CF card.** Make sure the CF card is properly aligned with the CF socket.
- Step 3: Insert the CF card.** Gently insert the CF card into the socket making sure the socket pins are properly inserted into the socket. See Figure 5-2.

WSB-945GSE PCIMG 1.0 CPU Card

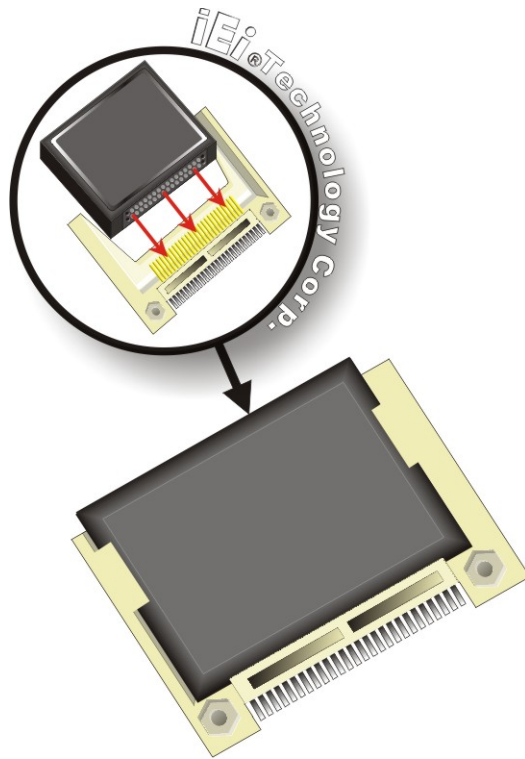


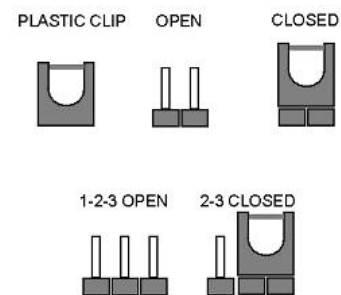
Figure 5-2: CF Card Installation

5.6 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.



Jumper Locations

Before the WSB-945GSE is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the WSB-945GSE are listed in Table 5-1.

Description	Label	Type
CF Card Setting	JCF1	3-pin header
Clear CMOS	J_CMOS1	3-pin header

Table 5-1: Jumpers

5.6.1 CF Card Setup

- Jumper Label:** JCF1
- Jumper Type:** 3-pin header
- Jumper Settings:** See Table 5-2
- Jumper Location:** See Figure 5-3

The CF Card Setup jumper sets the CF Type I card or CF Type II cards as either the slave device or the master device. CF Card Setup jumper settings are shown in Table 5-2.

CF Card Setup	Description	
1-2	Slave	Default
2-3	Master	

Table 5-2: CF Card Setup Jumper Settings

The CF Card Setup jumper location is shown in Figure 5-3.

WSB-945GSE PCIMG 1.0 CPU Card

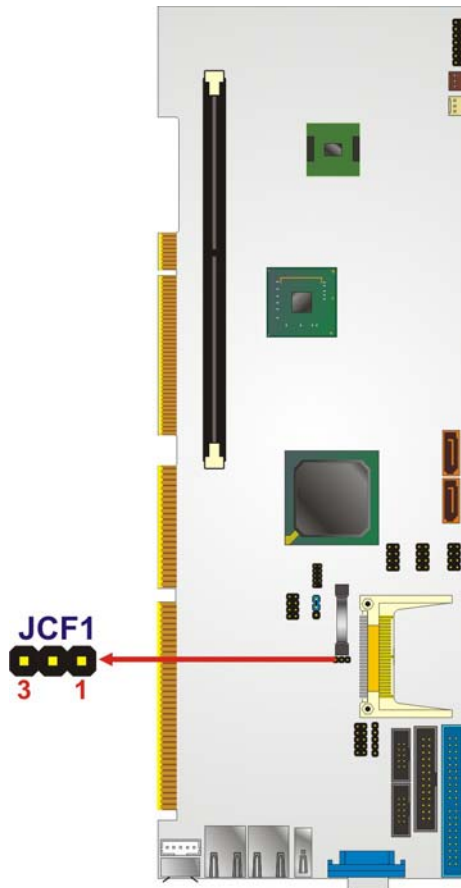


Figure 5-3: CF Card Setup Jumper Location

5.6.2 Clear CMOS Jumper

Jumper Label:	J_CMOS1
Jumper Type:	3-pin header
Jumper Settings:	See Table 5-3
Jumper Location:	See Figure 5-4

If the WSB-945GSE fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the “CMOS Settings Wrong” message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu.

The clear CMOS jumper settings are shown in Table 5-3.

AT Power Select	Description	
1-2	Keep CMOS Setup	Default
2-3	Clear CMOS Setup	

Table 5-3: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in Figure 5-4 below.

WSB-945GSE PCIMG 1.0 CPU Card

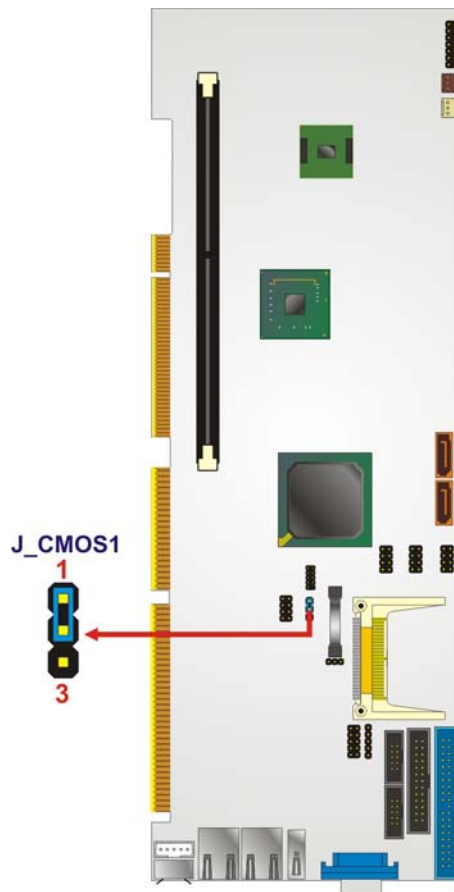


Figure 5-4: Clear CMOS Jumper

5.7 Chassis Installation

5.7.1 Airflow



WARNING:

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the WSB-945GSE must have air vents to allow cool air to move into the system and hot air to move out.

The WSB-945GSE must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual

power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

**NOTE:**

IEI has a wide range of backplanes available. Please contact your WSB-945GSE vendor, reseller or an IEI sales representative at sales@iei.com.tw or visit the IEI website (<http://www.ieworld.com.tw>) to find out more about the available chassis.

5.7.2 Motherboard Installation

To install the WSB-945GSE motherboard into the chassis please refer to the reference material that came with the chassis.

5.8 Internal Peripheral Device Connections

The cables listed in Table 5-4 are shipped with the WSB-945GSE.

Quantity	Type
1	Keyboard and Mouse cable
2	SATA drive cable
1	Power cable
1	Dual RS-232 cable

Table 5-4: IEI Provided Cables

Some optional items that can be purchased separately and installed on the WSB-945GSE include:

- Dual port USB cable
- Parallel port cable
- RS-232/422/485 cable
- ATX power cable
- HDTV out cable

WSB-945GSE PCIMG 1.0 CPU Card

- 5.1 channel audio kit
- 7.1 channel audio kit

5.8.1 5.1 Channel Audio Kit Installation



NOTE:

This is an optional item that must be ordered separately. For further information please contact the nearest WSB-945GSE distributor, reseller or vendor or contact an iEi sales representative directly. Send any queries to sales@iei.com.tw.

The optional 5.1 channel audio kit connects to the 10-pin audio connector on the WSB-945GSE. The audio kit consists of three audio jacks. One audio jack, Mic In, connects to a microphone. The remaining two audio jacks, Line-In and Line-Out, connect to two speakers. To install the audio kit, please refer to the steps below:

- Step 1: Connect the audio kit cable.** The audio kit is shipped with a cable that connects the audio kit to the WSB-945GSE. Connect the cable to the connector on the back of the audio kit. Make sure the pins are properly aligned (i.e. pin 1 connects to pin 1).
- Step 2: Locate the audio connector.** The location of the 10-pin audio connector is shown in **Chapter 3**.
- Step 3: Align pin 1.** Align pin 1 on the on-board connector with pin 1 on the audio kit cable connector. Pin 1 on the audio kit cable connector is indicated with a white dot. See Figure 5-5.

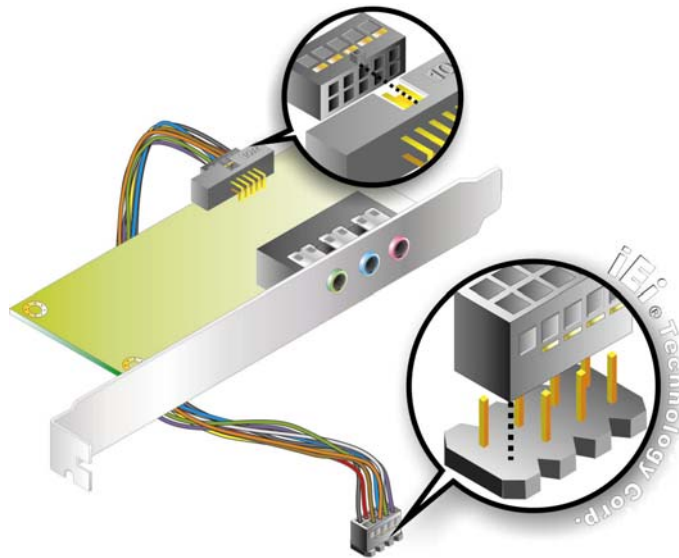


Figure 5-5: 5.1 Channel Audio Kit

- Step 4:** **Mount the audio kit onto the chassis.** Once the audio kit is connected to the WSB-945GSE, secure the audio kit bracket to the system chassis.
- Step 5:** **Connect the audio devices.** Connect one speaker to the line-in audio jack, one speaker to the line-out audio jack and a microphone to the mic-in audio jack.
- Step 6:** **Install the driver.** If the 5.1 channel audio kit is used, the ALC655 Realtek codec driver must be installed. Refer to **Chapter 7** for driver installation instructions.

5.8.2 7.1 Channel Audio Kit Installation



NOTE:

This is an optional item that must be ordered separately. For further information please contact the nearest WSB-945GSE distributor, reseller or vendor or contact an iEi sales representative directly. Send any queries to sales@iei.com.tw.

WSB-945GSE PCIMG 1.0 CPU Card

The optional 7.1 channel audio kit connects to the 10-pin audio connector on the WSB-945GSE. The audio kit consists of five audio jacks. One audio jack, Mic In, connects to a microphone. The remaining four audio jacks, Line-In, Front-Out, Rear-Out, and Center Subwoofer, connect to speakers. To install the audio kit, please refer to the steps below:

- Step 1: Connect the audio kit cable.** The audio kit is shipped with a cable that connects the audio kit to the WSB-945GSE. Connect the cable to the connector on the back of the audio kit. Make sure the pins are properly aligned (i.e. pin 1 connects to pin 1).
- Step 2: Locate the audio connector.** The location of the 10-pin audio connector is shown in **Chapter 3**.
- Step 3: Align pin 1.** Align pin 1 on the on-board connector with pin 1 on the audio kit cable connector. Pin 1 on the audio kit cable connector is indicated with a white dot. See Figure 5-6.

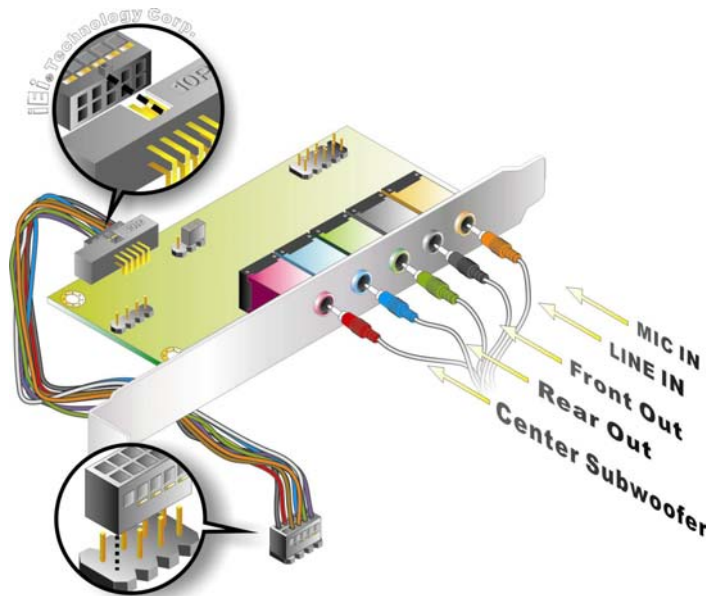


Figure 5-6: 7.1 Channel Audio Kit

- Step 4: Mount the audio kit onto the chassis.** Once the audio kit is connected to the WSB-945GSE, secure the audio kit bracket to the system chassis.

Step 5: Connect the audio devices. Connect one speaker to the line-in audio jack, one speaker to the line-out audio jack and a microphone to the mic-in audio jack.

Step 6: Install the driver. If the 7.1 channel audio kit is used, the ALC883 Realtek codec driver must be installed. Refer to **Chapter 7** for driver installation instructions.

5.8.3 ATA Flat Cable Connection

The ATA 66/100 flat cable connects to the WSB-945GSE to one or two IDE devices. To connect an IDE HDD to the WSB-945GSE please follow the instructions below.

Step 1: Locate the IDE connector. The location/s of the IDE device connector/s is/are shown in **Chapter 3**.

Step 2: Insert the connector. Connect the IDE cable connector to the onboard connector. See Figure 5-7. A key on the front of the cable connector ensures it can only be inserted in one direction.

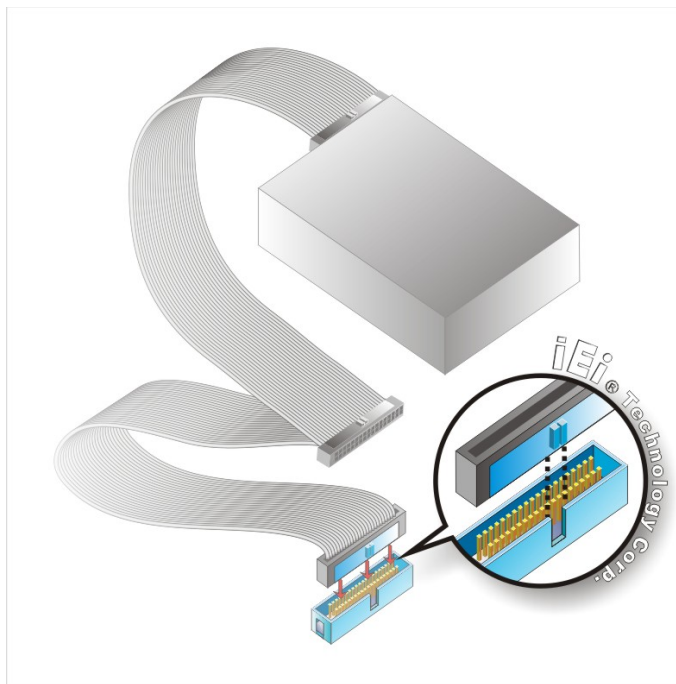


Figure 5-7: IDE Cable Connection

WSB-945GSE PCIMG 1.0 CPU Card

Step 3: **Connect the cable to an IDE device.** Connect the two connectors on the other side of the cable to one or two IDE devices. Make sure that pin 1 on the cable corresponds to pin 1 on the connector.

5.8.4 SATA Drive Connection

The WSB-945GSE 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 onboard SATA drive connector. See Figure 5-8.

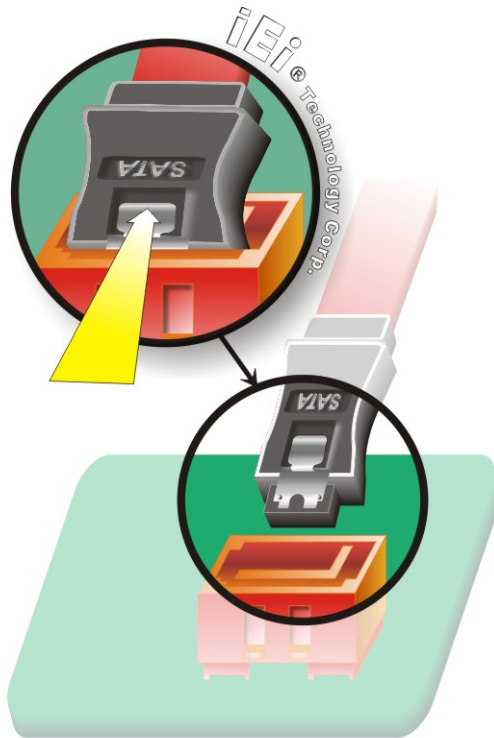


Figure 5-8: SATA Drive Cable Connection

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 5-9.

Step 4: Connect the SATA power cable. Connect the SATA power connector to the back of the SATA drive. See Figure 5-9.



Figure 5-9: SATA Power Drive Connection

5.8.5 Dual RS-232 Cable with Slot Bracket

The dual RS-232 cable slot connector consists of two connectors attached to two independent cables. Each cable is then attached to a D-sub 9 male connector that is mounted onto a slot. To install the dual RS-232 cable, please follow the steps below.

Step 1: Locate the connectors. The locations of the RS-232 connectors are shown in Chapter 3.

Step 2: Insert the cable connectors. Insert one connector into each serial port box headers. See Figure 5-10. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

WSB-945GSE PCIMG 1.0 CPU Card

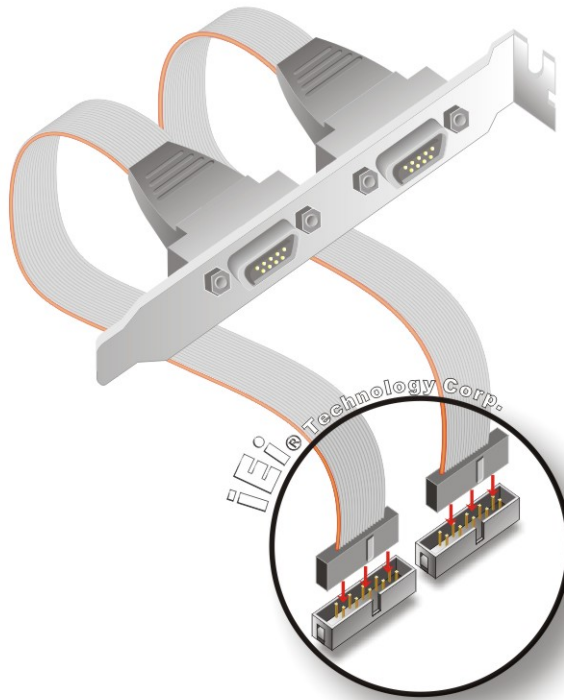


Figure 5-10: Dual RS-232 Cable Installation

Step 3: Secure the bracket. The dual RS-232 connector has two D-sub 9 male connectors secured on a bracket. To secure the bracket to the chassis please refer to the reference material that came with the chassis.

5.8.6 USB Cable (Dual Port) with Slot Bracket

The WSB-945GSE is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

Step 1: 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 2: **Align the connectors.** The cable has two connectors. Correctly align pin 1 on each cable connector with pin 1 on the WSB-945GSE USB connector.

Step 3: **Insert the cable connectors.** Once the cable connectors are properly aligned with the USB connectors on the WSB-945GSE, connect the cable connectors to the on-board connectors. See Figure 5-11.

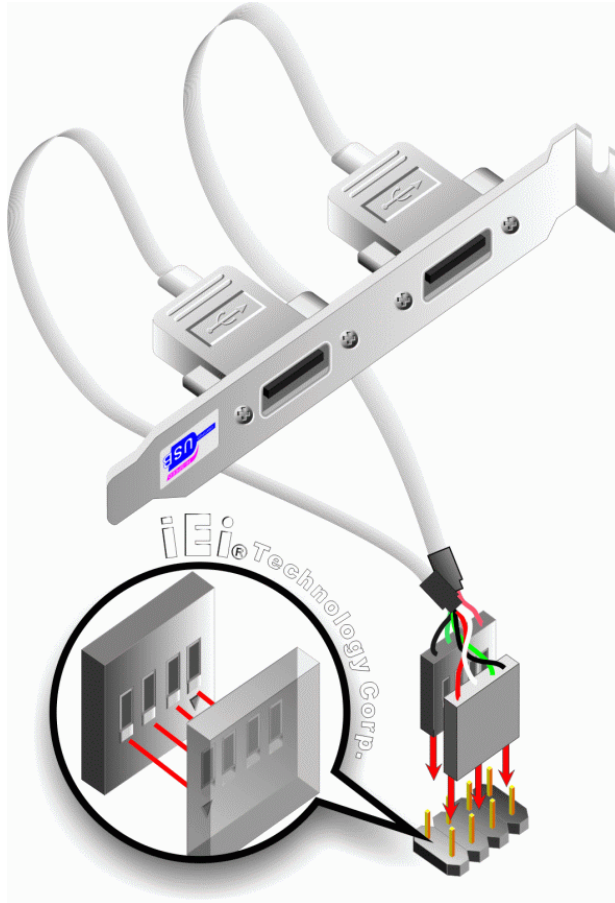


Figure 5-11: Dual USB Cable Connection

Step 4: **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.

WSB-945GSE PCIMG 1.0 CPU Card

5.8.7 Parallel Port Cable without Bracket

The optional parallel port (LPT) cable respectively connects the on-board LPT 26-pin box header to an external LPT device (like a printer). The cable comprises a 26-pin female header, to be connected to the on-board LPT box-header, on one side and on the other side a standard external LPT connector. To connect the LPT cable, please follow the steps below.

Step 1: Locate the connector. The LPT connector location is shown in **Chapter 4**.

Step 2: Align the connectors. Correctly align pin 1 on the cable connector with pin 1 on the WSB-945GSE LPT box-header connector. See Figure 5-12.

Step 3: Insert the cable connectors Once the cable connector is properly aligned with the 26-pin box-header connector on the WSB-945GSE, connect the cable connector to the on-board connector. See Figure 5-12.

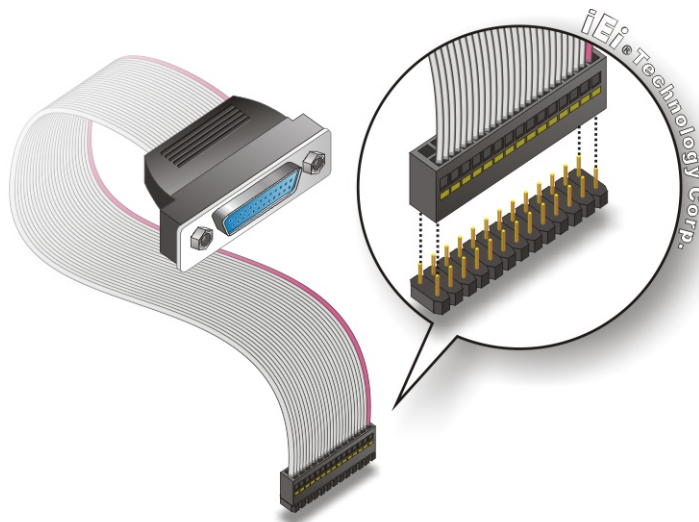


Figure 5-12: LPT Cable Connection

Step 4: Attach the LPT connector to the chassis. To secure the LPT interface connector to the chassis please refer to the installation instructions that came with the chassis.

Step 5: Connect LPT device. Once the LPT interface connector is connected to the chassis, the LPT device can be connected to the LPT interface connector. See

Figure 5-13

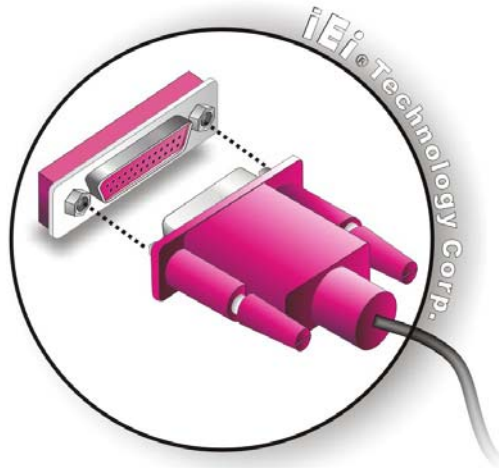


Figure 5-13: Connect the LPT Device

5.9 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- RJ-45 Ethernet cable connectors
- PS/2 devices
- Serial port devices
- USB devices
- VGA monitors

To install these devices, connect the corresponding cable connector from the actual device to the corresponding WSB-945GSE external peripheral interface connector making sure the pins are properly aligned.

WSB-945GSE PCIMG 1.0 CPU Card

5.9.1 LAN Connection (Single Connector)

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

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the WSB-945GSE. See Figure 5-14.

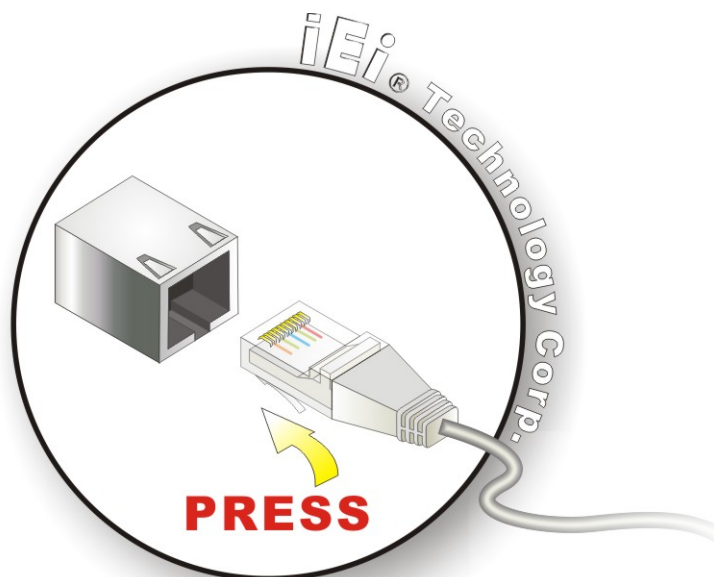


Figure 5-14: LAN Connection

Step 3: **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the onboard RJ-45 connector.

5.9.2 PS/2 Y-Cable Connection

The WSB-945GSE has a PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is connected to the PS/2 Y-cable that came with the WSB-945GSE. One of the PS/2 cables is connected to a keyboard and the other to a mouse to the system. Follow the steps below to connect a keyboard and mouse to the WSB-945GSE.

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

Step 2: Insert the keyboard/mouse connector. Insert the PS/2 connector on the end of the PS/2 y-cable into the external PS/2 connector. See Figure 5-15.

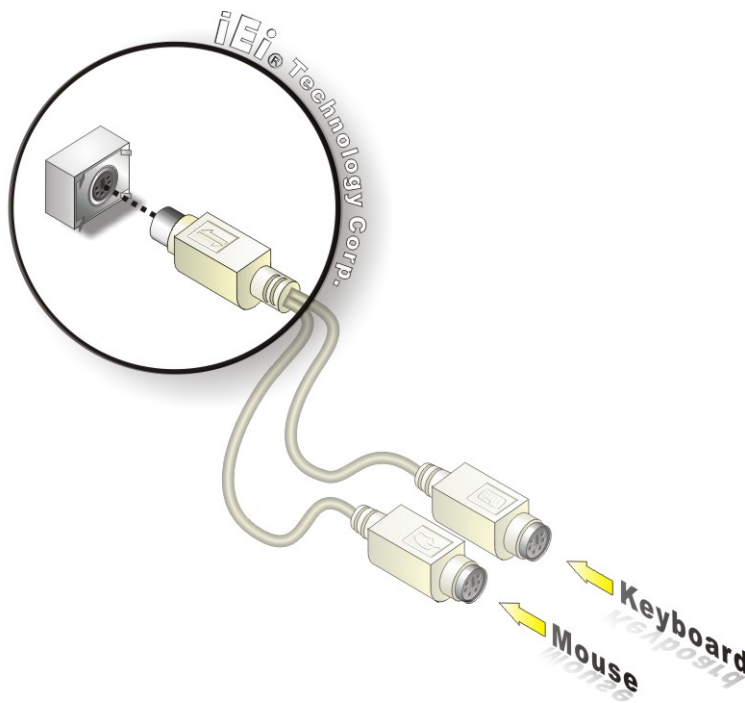


Figure 5-15: PS/2 Keyboard/Mouse Connector

Step 3: Connect the keyboard and mouse. Connect the keyboard and mouse to the appropriate connector. The keyboard and mouse connectors can be distinguished from each other by looking at the small graphic at the top of the connector.

5.9.3 Serial Device Connection

The WSB-945GSE 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 WSB-945GSE.

WSB-945GSE PCIMG 1.0 CPU Card

Step 1: Locate the DB-9 connector. The location of the DB-9 connector is shown in Chapter 3.

Step 2: 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 5-16.

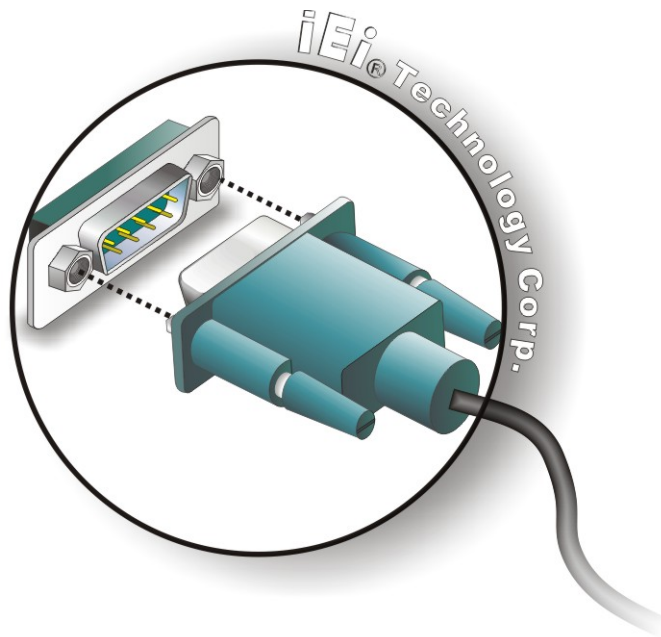


Figure 5-16: Serial Device Connector

Step 3: Secure the connector. Secure the serial device connector to the external interface by tightening the two retention screws on either side of the connector.

5.9.4 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 WSB-945GSE.

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 5-17.

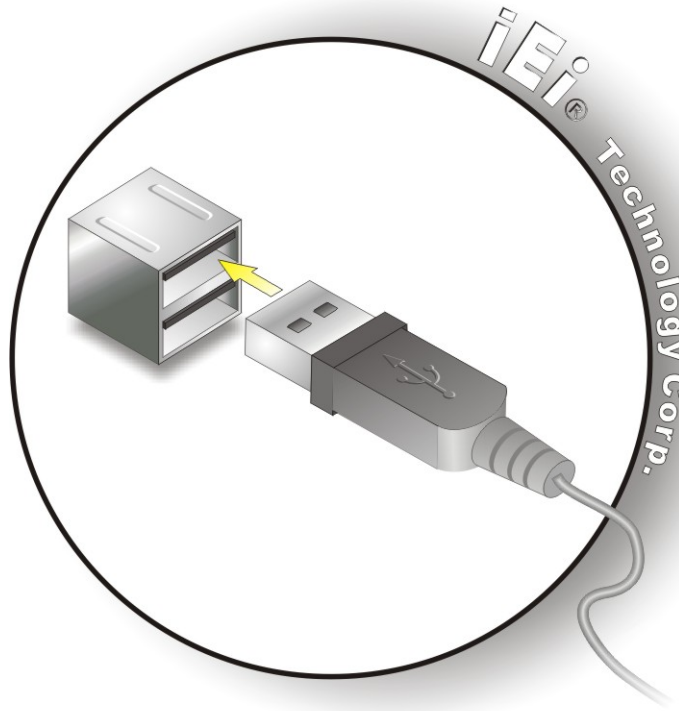


Figure 5-17: USB Connector

5.9.5 VGA Monitor Connection

The WSB-945GSE 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 WSB-945GSE, please follow the instructions below.

- Step 1:** **Locate the female DB-15 connector.** The location of the female DB-15 connector is shown in **Chapter 3**.
- Step 2:** **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.

WSB-945GSE PCIMG 1.0 CPU Card

Step 3: 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 WSB-945GSE. See Figure 5-18.

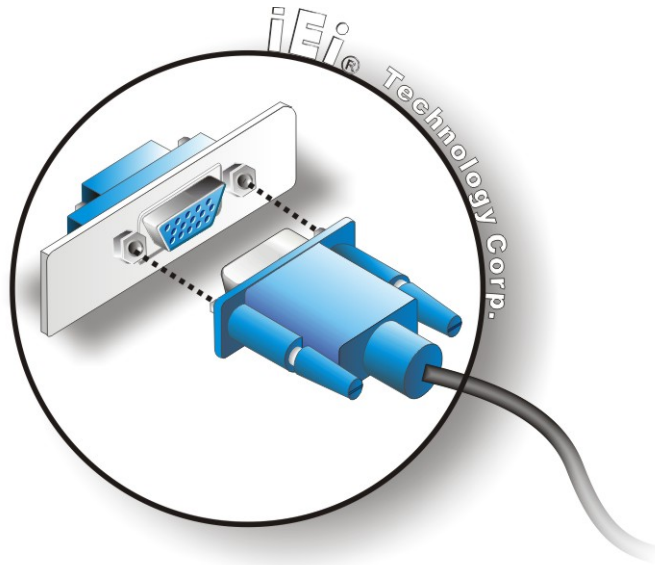


Figure 5-18: VGA Connector

Step 4: 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.

Chapter

6

BIOS Setup

6.1 Introduction

A licensed copy of AMI BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

6.1.1 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.

6.1.2 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

Key	Function
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
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 6-1: BIOS Navigation Keys

6.1.3 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.

6.1.4 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**.

6.1.5 BIOS Menu Bar

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

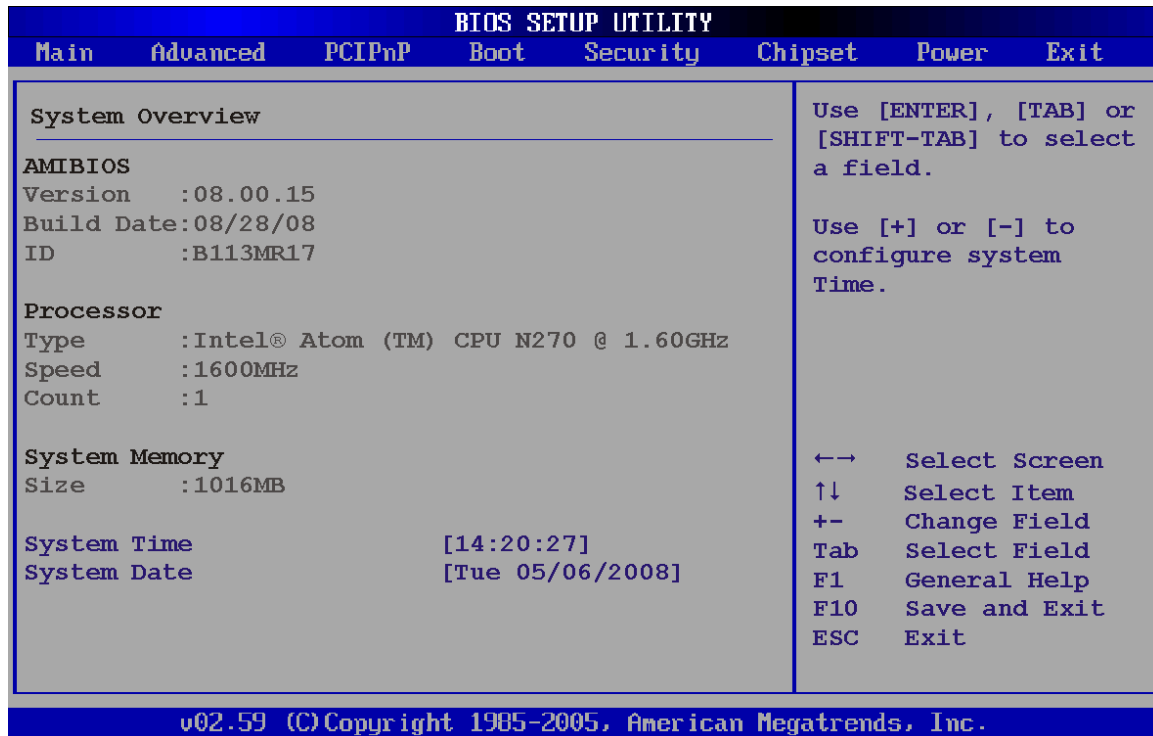
- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
- **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.

WSB-945GSE PCIMG 1.0 CPU Card

6.2 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.

6.3 Advanced

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

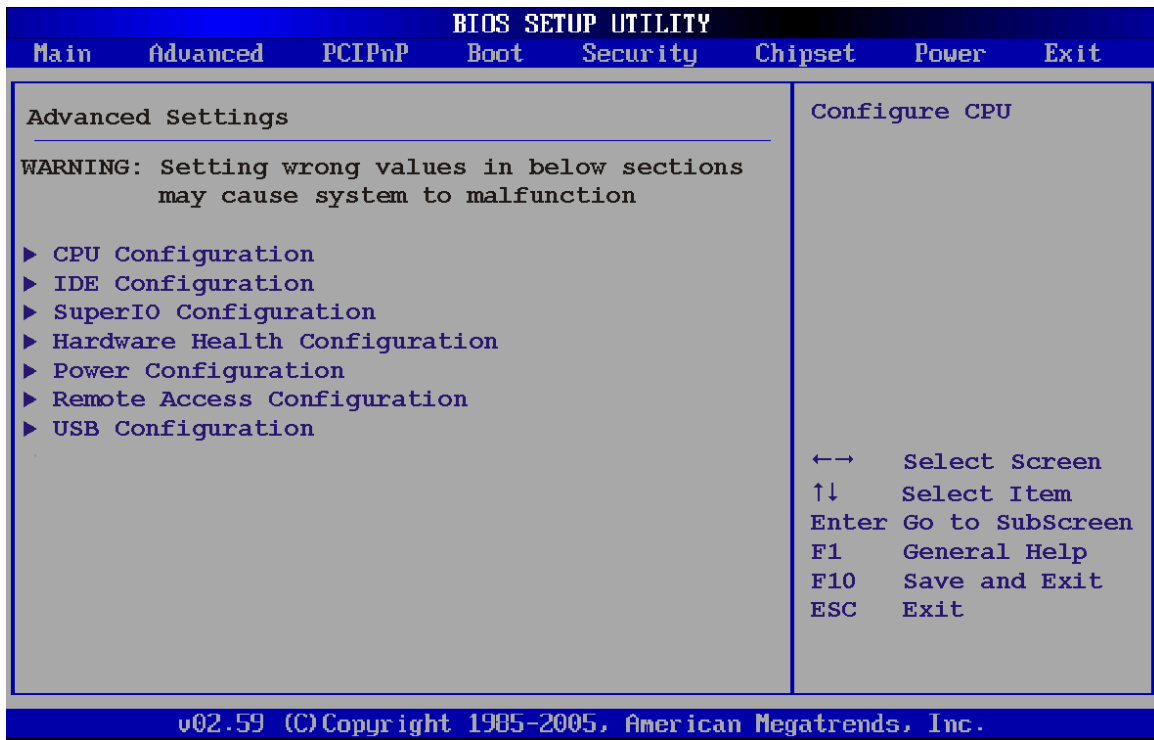


WARNING:

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.

- 6.3.1 CPU Configuration 92
- 6.3.2 IDE Configuration..... 93
- 6.3.3 Super IO Configuration 100
- 6.3.4 Hardware Health Configuration..... 103
- 6.3.5 Power Configuration..... 107
- 6.3.6 Remote Configuration 112
- 6.3.7 USB Configuration 116

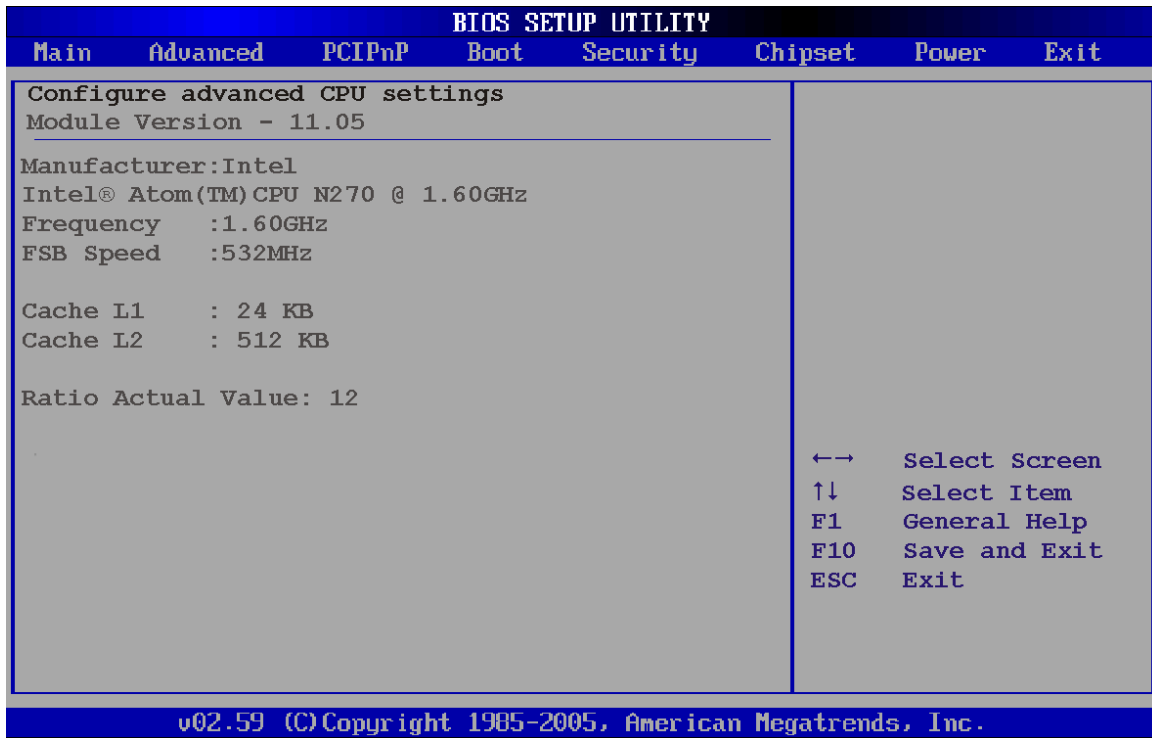
WSB-945GSE PCIMG 1.0 CPU Card



BIOS Menu 2: Advanced

6.3.1 CPU Configuration

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



BIOS Menu 3: CPU Configuration

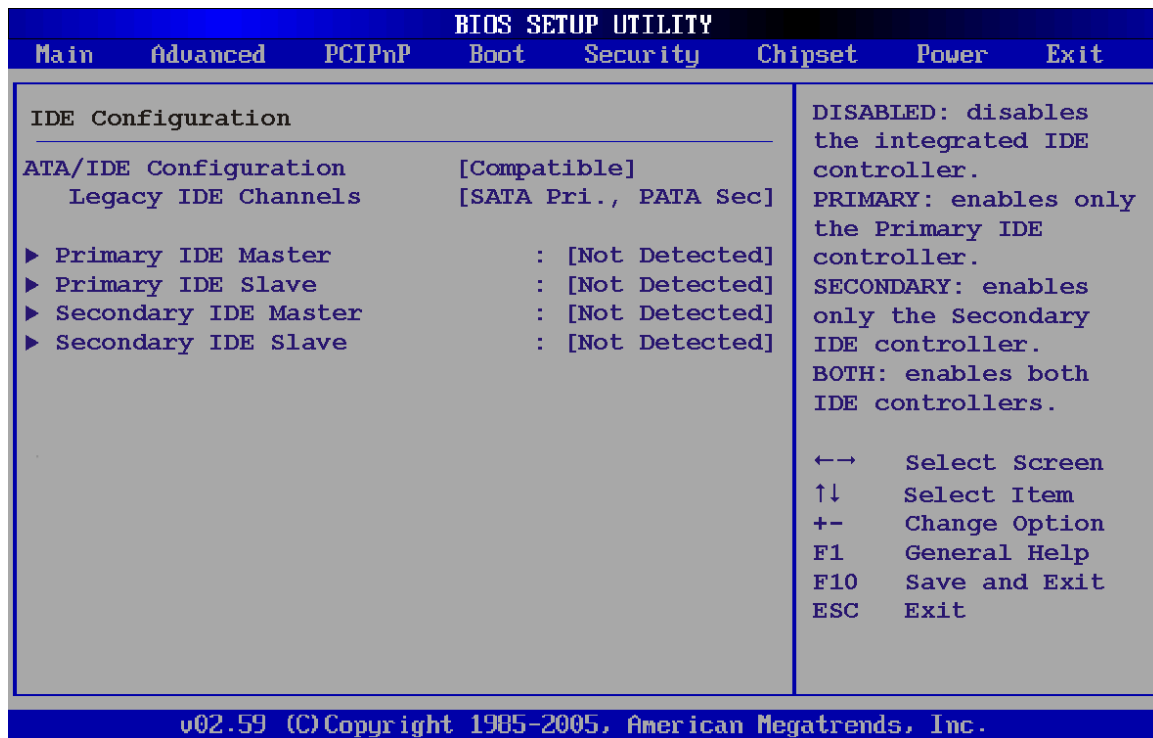
The CPU Configuration menu (BIOS Menu 3) lists the following CPU details:

- **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

WSB-945GSE PCIMG 1.0 CPU Card

6.3.2 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.

→ **Legacy IDE Channels [PATA Pri, SATA Sec]**

→ **SATA Only** Only the SATA drives are enabled.

→ **SATA Pri, PATA Sec** **DEFAULT** The IDE drives are enabled on the Primary IDE channel. The SATA drives are enabled on the Secondary IDE channel.

→ **PATA Only** The IDE drives are enabled on the primary and secondary IDE channels. SATA drives are disabled.

→ **IDE Master and IDE Slave**

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

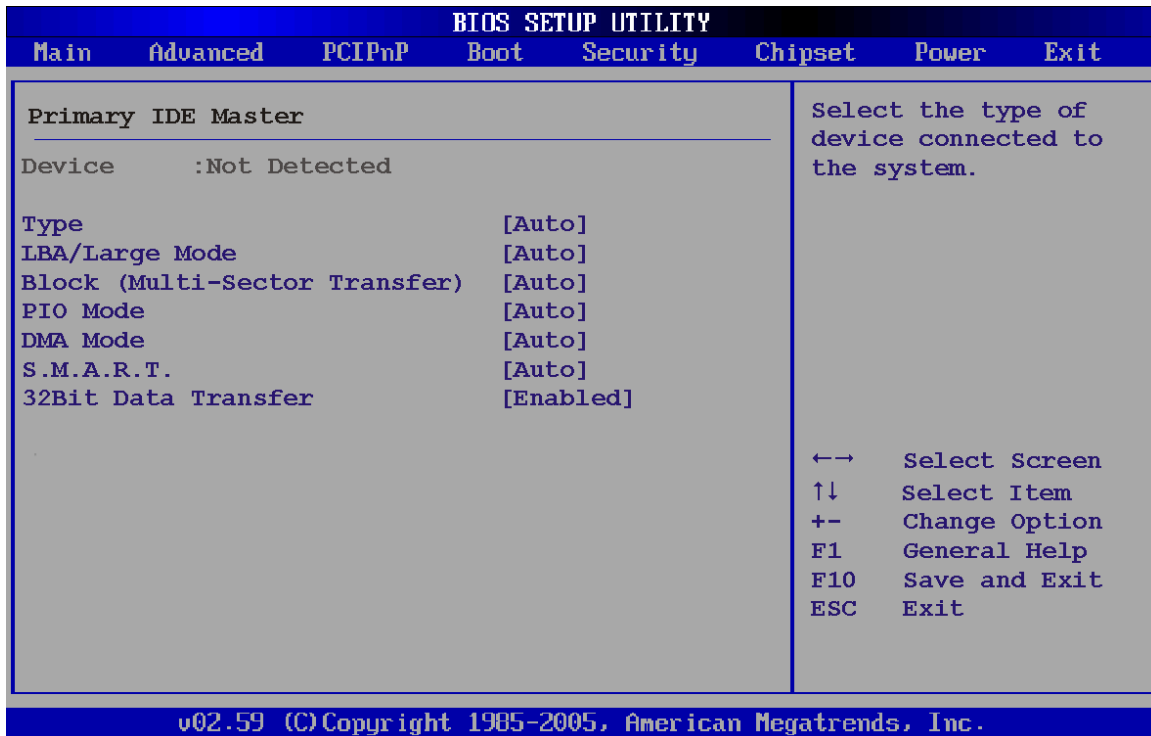
- Primary IDE Master
- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave

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 6.3.2.1** appear.

WSB-945GSE PCIMG 1.0 CPU Card

6.3.2.1 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 auto 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 |

WSB-945GSE PCIMG 1.0 CPU Card

→ 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
- **UDMA1** 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

WSB-945GSE PCIMG 1.0 CPU Card

- **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

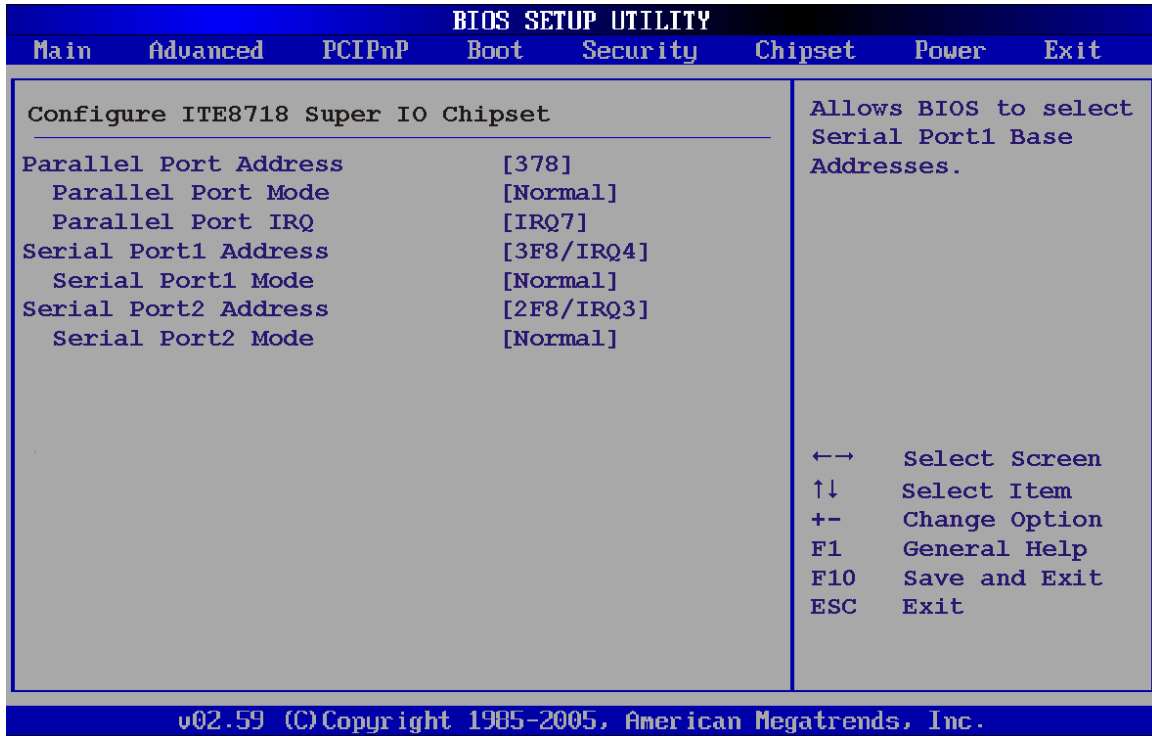
→ **32Bit Data Transfer [Enabled]**

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.

6.3.3 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

➔ Parallel Port Address [Disabled]

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

- ➔ **Disabled** **DEFAULT** No base address is assigned to the Parallel Port
- ➔ **378** 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.

WSB-945GSE PCIMG 1.0 CPU Card

- **Normal** **DEFAULT** The normal parallel port mode is the standard mode for parallel port operation.
- **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

→ **Serial Port1 Address [3F8/IRQ4]**

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/IRQ4** **DEFAULT** Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4
- **3E8/IRQ4** Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4

→ **2E8/IRQ3** Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

→ **Serial Port1 Mode [Normal]**

Use the **Serial Port1 Mode** option to select the transmitting and receiving mode for the first serial port.

→ **Normal** **DEFAULT** Serial Port 1 mode is normal

→ **IrDA** Serial Port 1 mode is IrDA

→ **ASK IR** Serial Port 1 mode is ASK IR

→ **Serial Port2 Address [2F8/IRQ3]**

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/IRQ3** **DEFAULT** Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3

→ **3E8/IRQ4** Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4

→ **2E8/IRQ3** Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

→ **Serial Port2 Mode [Normal]**

Use the **Serial Port2 Mode** option to select the Serial Port2 operational mode.

→ **Normal** **DEFAULT** Serial Port 2 mode is normal

→ **IrDA** Serial Port 2 mode is IrDA

→ **ASK IR** Serial Port 2 mode is ASK IR

WSB-945GSE PCIMG 1.0 CPU Card

6.3.4 Hardware Health Configuration

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

BIOS SETUP UTILITY							
Main	Advanced	PCIPnP	Boot	Security	Chipset	Power	Exit
Hardware Health Event Monitoring							
CPU FAN Mode Setting		[Full On Mode]					
CPU Temperature		:43C/109F					
System Temperature		:33C/91F					
CPU Fan Speed		:4821 RPM					
CPU Core		:1.136 V					
+1.05V		:1.040 V					
+3.30V		:3.296 V					
+5.00V		:5.026 V					
+12V		:11.840 V					
+1.5V		:1.488 V					
+1.8V		:1.792 V					
+5VSB		:5.053 V					
VBAT		:3.184 V					
						←→	Select Screen
						↑↓	Select Item
						F1	General Help
						F10	Save and Exit
						ESC	Exit
v02.59 (C) Copyright 1985-2005, American Megatrends, Inc.							

BIOS Menu 7: Hardware Health Configuration

→ CPU FAN Mode Setting [Full On Mode]

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

- **Full On Mode** **DEFAULT** Fan is on all the time
- **Automatic mode** Fan is off when the temperature is low enough. Parameters must be set by the user.
- **PWM Manual mode** Pulse width modulation set manually

When the **CPU FAN Mode Setting** option is in the **Automatic Mode**, the following parameters can be set.

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

When the **CPU FAN Mode Setting** option is in the **PWM Manual Mode**, the following parameters can be set.

- CPU Fan PWM control

→ **CPU Temp. Limit of OFF [000]**



WARNING:

Setting this value too high may cause the fan to stop when the CPU is at a high temperature and therefore cause the system to be damaged.

The **CPU Temp. Limit of OFF** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Temp. Limit of OFF** option to select the CPU temperature at which the cooling fan should automatically turn off. To select a value, select the **CPU Temp. Limit of OFF** option and enter a decimal number between 000 and 127. The temperature range is specified below.

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

→ **CPU Temp. Limit of Start [020]**



WARNING:

Setting this value too high may cause the fan to start only when the CPU is at a high temperature and therefore cause the system to be damaged.

WSB-945GSE PCIMG 1.0 CPU Card

The **CPU Temp. Limit of Start** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Temp. Limit of Start** option to select the CPU temperature at which the cooling fan should automatically turn on. When the fan starts, it rotates using the starting pulse width modulation (PWM) specified in the **Fan 3 Start PWM** option below. To select a value, select the **CPU Temp. Limit of Start** option and enter a decimal number between 000 and 127. The temperature range is specified below.

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

→ CPU Fan Start PWM [070]

The **Fan 3 Start PWM** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **Fan 3 Start PWM** option to select the PWM mode the fan starts to rotate with after the temperature specified in the **Temperature 3 Limit of Start** is exceeded. The Super I/O chipset supports 128 PWM modes. To select a value, select the **Fan 3 Start PWM** option and enter a decimal number between 000 and 127. The temperature range is specified below.

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

→ Slope PWM [0.5 PWM]

The **Slope PWM 1** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **Slope PWM 1** option to select the linear rate at which the PWM mode increases with respect to an increase in temperature. A list of available options is shown below:

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

- 64 PWM

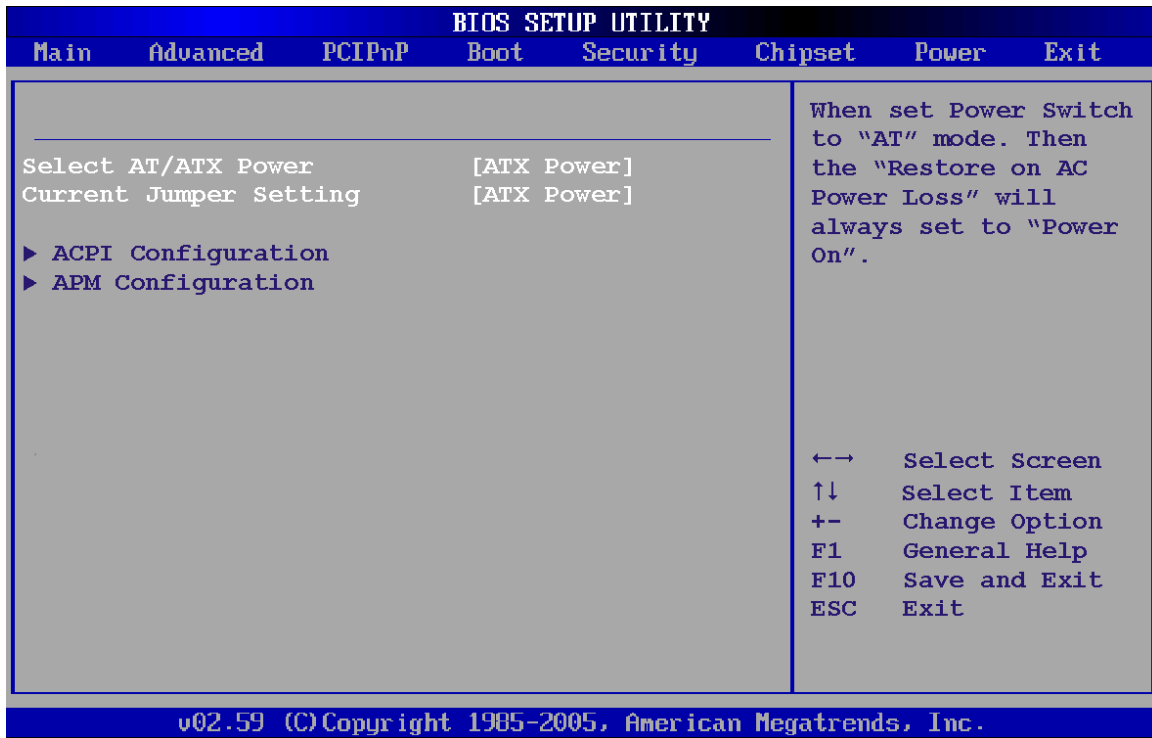
The following system parameters and values are shown. The system parameters that are monitored are:

- **System Temperatures:** The following system temperatures are monitored
 - CPU Temperature
 - System Temperature
- **Fan Speeds:** The CPU cooling fan speed is monitored.
 - CPU Fan Speed
- **Voltages:** The following system voltages are monitored
 - CPU Core
 - +1.05 V
 - +3.30 V
 - +5.00 V
 - +12.0 V
 - +1.5 V
 - +1.8 V
 - 5 VSB
 - VBAT

WSB-945GSE PCIMG 1.0 CPU Card

6.3.5 Power Configuration

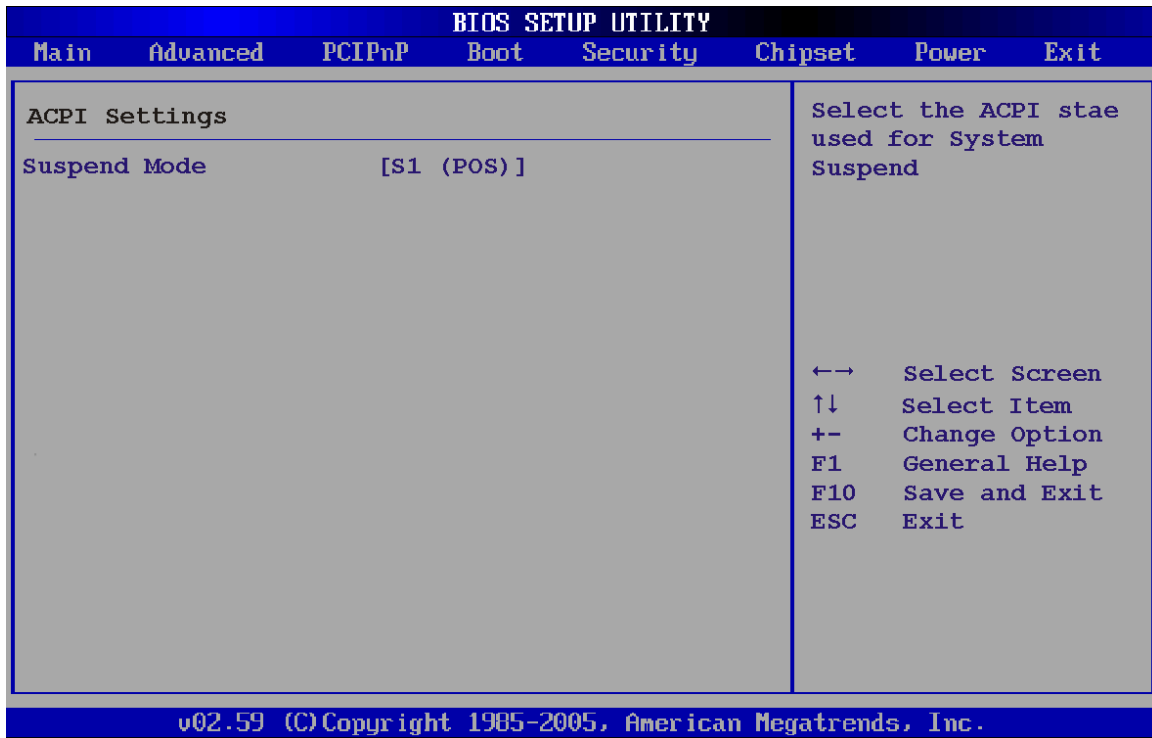
The **Power Configuration** menu (BIOS Menu 8) configures the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.



BIOS Menu 8: Power Configuration

6.3.5.1 ACPI configuration

The **ACPI Configuration** menu (BIOS Menu 9) configures the Advanced Configuration and Power Interface (ACPI).



BIOS Menu 9: ACPI Configuration

→ Suspend Mode [S1(POS)]

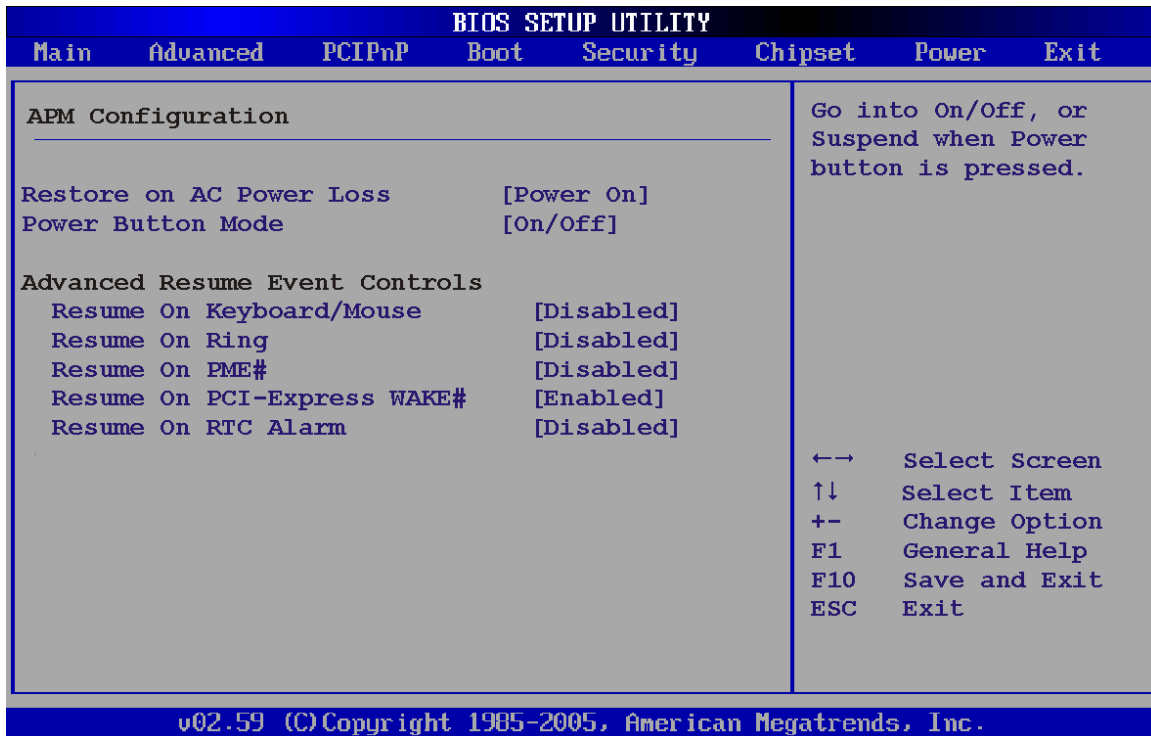
Use the **Suspend Mode** BIOS option to specify the sleep state the system enters when it is not being used.

- **S1 (POS) DEFAULT** System appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.
- **S3 (STR)** System appears off. The CPU has no power; RAM is in slow refresh; the power supply is in a reduced power mode.

WSB-945GSE PCIMG 1.0 CPU Card

6.3.5.2 APM Configuration

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



BIOS Menu 10: Advanced Power Management Configuration

→ Restore on AC Power Loss [Last State]

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

→ **Power Button Mode [On/Off]**

Use the **Power Button Mode** BIOS to specify how the power button functions.

- **On/Off** **DEFAULT** When the power button is pressed the system is either turned on or off
- **Suspend** When the power button is pressed the system goes into suspend mode

→ **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
- **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-Express WAKE# [Enabled]**

Use the **Resume PCI-Express WAKE#** BIOS option to enable activity on the PCI-Express WAKE# signal to rouse the system from a suspend or standby state.

- **Disabled** Wake event not generated by PCI-Express WAKE# signal activity

WSB-945GSE PCIMG 1.0 CPU Card

→ **Enabled** **DEFAULT** Wake event generated by PCI-Express WAKE# signal 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:

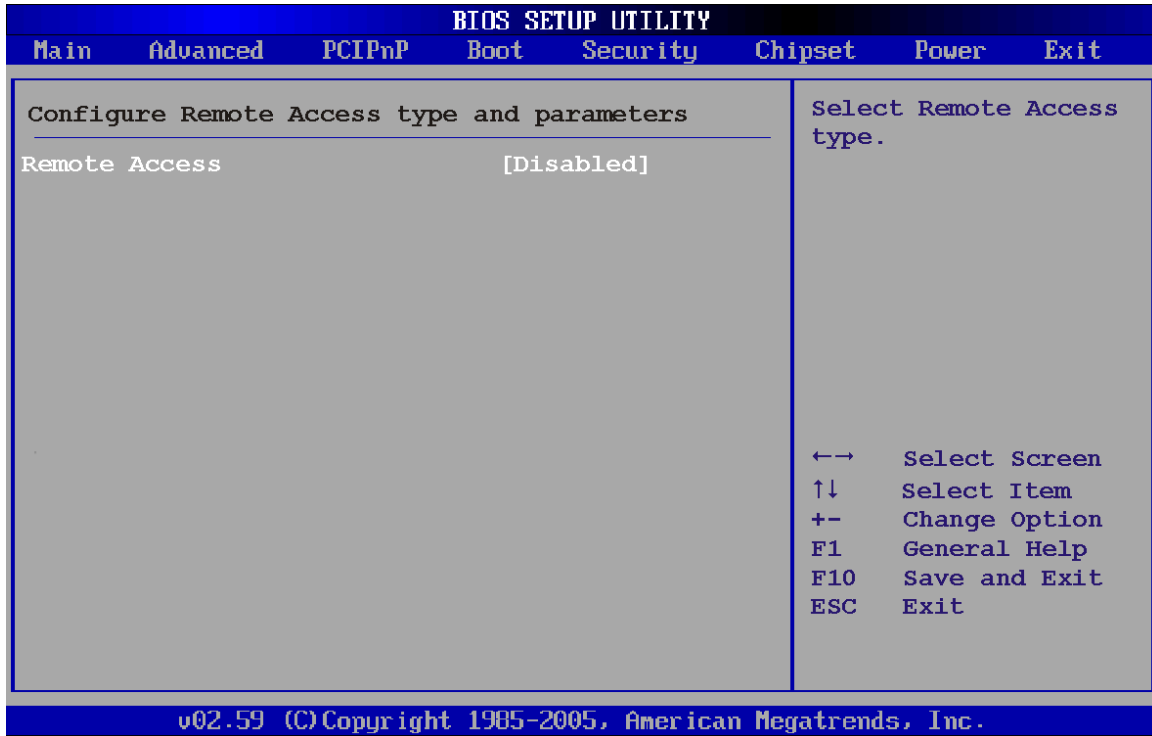
RTC Alarm Date (Days)

System Time

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

6.3.6 Remote 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.

WSB-945GSE PCIMG 1.0 CPU Card

- **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 allows 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 must be set on the host (a management computer running a terminal software) and the slave

→ Flow Control [None]

Use the **Flow Control** option to report the flow control method for the console redirection application.

- **None** **DEFAULT** No control flow,
- **Hardware** Hardware is set as the console redirection
- **Software** Software is set as the console redirection

→ 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

WSB-945GSE PCIMG 1.0 CPU Card

→ VT-UTF8 Combo Key Support [Disabled]

Use the **VT-UFT8 Combo Key Support** option to enable additional keys that are not provided by VT100 for the PC 101 keyboard.

The VT100 Terminal Definition is the standard convention used to configure and conduct emergency management tasks with UNIX-based servers. VT100 does not support all keys on the standard PC 101-key layout, however. The VT-UTF8 convention makes available additional keys that are not provided by VT100 for the PC 101 keyboard.

- **Disabled** **DEFAULT** Disables the VT-UTF8 terminal keys
- **Enabled** Enables the VT-UTF8 combination key. Support for ANSI/VT100 terminals

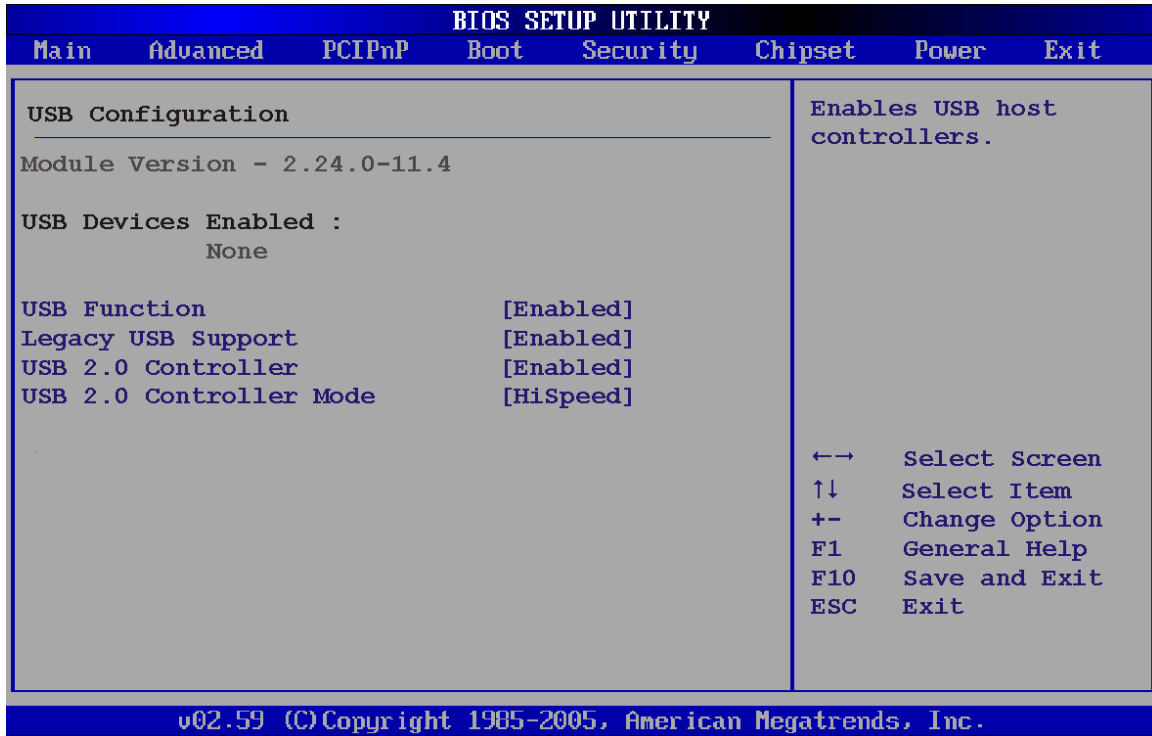
→ Sredir Memory Display Delay [Disabled]

Use the **Sredir Memory Display Delay** option to select the delay before memory information is displayed. Configuration options are listed below

- No Delay **DEFAULT**
- Delay 1 sec
- Delay 2 sec
- Delay 4 sec

6.3.7 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 Functions [Enabled]

Use the **USB Function** option to enable or disable the USB controllers.

- Disabled USB controllers are enabled
- Enabled **DEFAULT** USB controllers are disabled

→ USB 2.0 Controller [Enabled]

The **USB 2.0 Controller** BIOS option enables or disables the USB 2.0 controller

- Disabled USB function disabled

WSB-945GSE PCIMG 1.0 CPU Card

→ **Enabled** **DEFAULT** USB function enabled

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

The **USB2.0 Controller Mode** BIOS option sets the speed of the USB2.0 controller.

→ **FullSpeed** The controller is capable of operating at full speed
12 Mb/s

→ **HiSpeed** **DEFAULT** The controller is capable of operating at high speed
480 Mb/s

→ **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

6.4 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 Power Exit
Advanced PCI/PnP Settings			Available: Specified IRQ is available to be use by PCI/PnP devices.
IRQ3		[Reserved]	Reserved: Specified IRQ is reserved for use by legacy ISA devices.
IRQ4		[Reserved]	
IRQ5		[Available]	
IRQ7		[Reserved]	
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]	+− Change Option
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]	
v02.59 (C) Copyright 1985-2005, American Megatrends, Inc.			

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

WSB-945GSE PCIMG 1.0 CPU Card

- 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

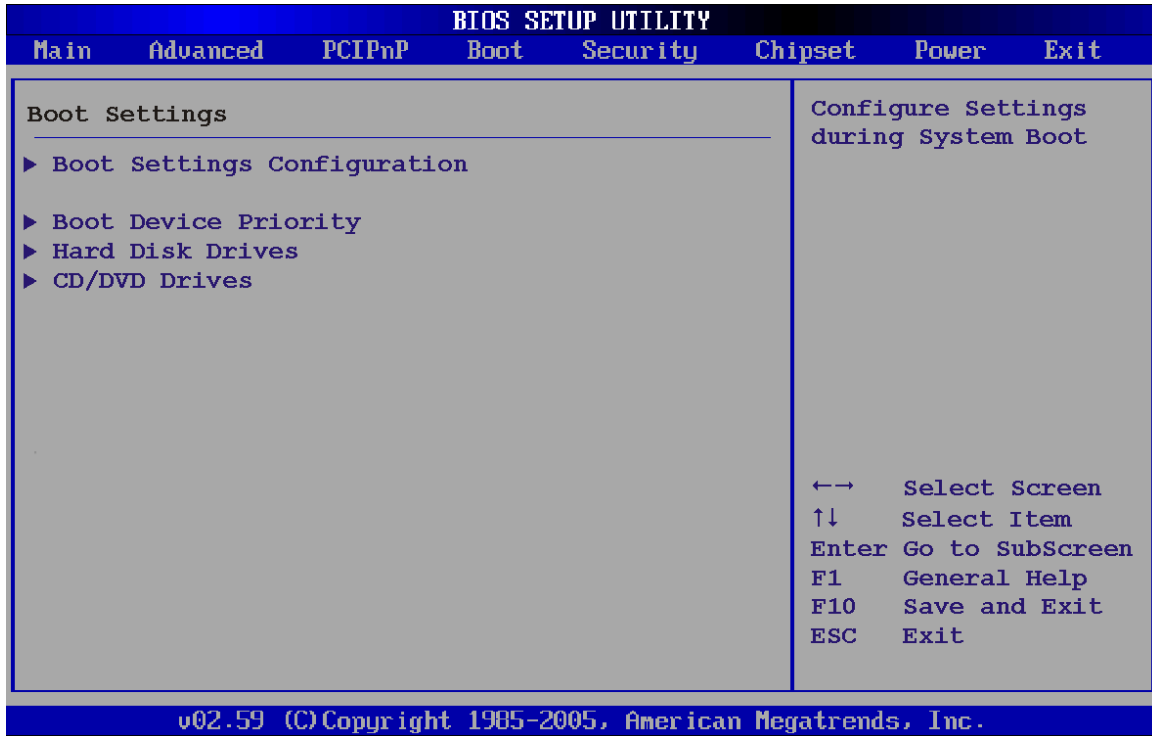
→ Reserved Memory Size [Disabled]

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

6.5 Boot

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

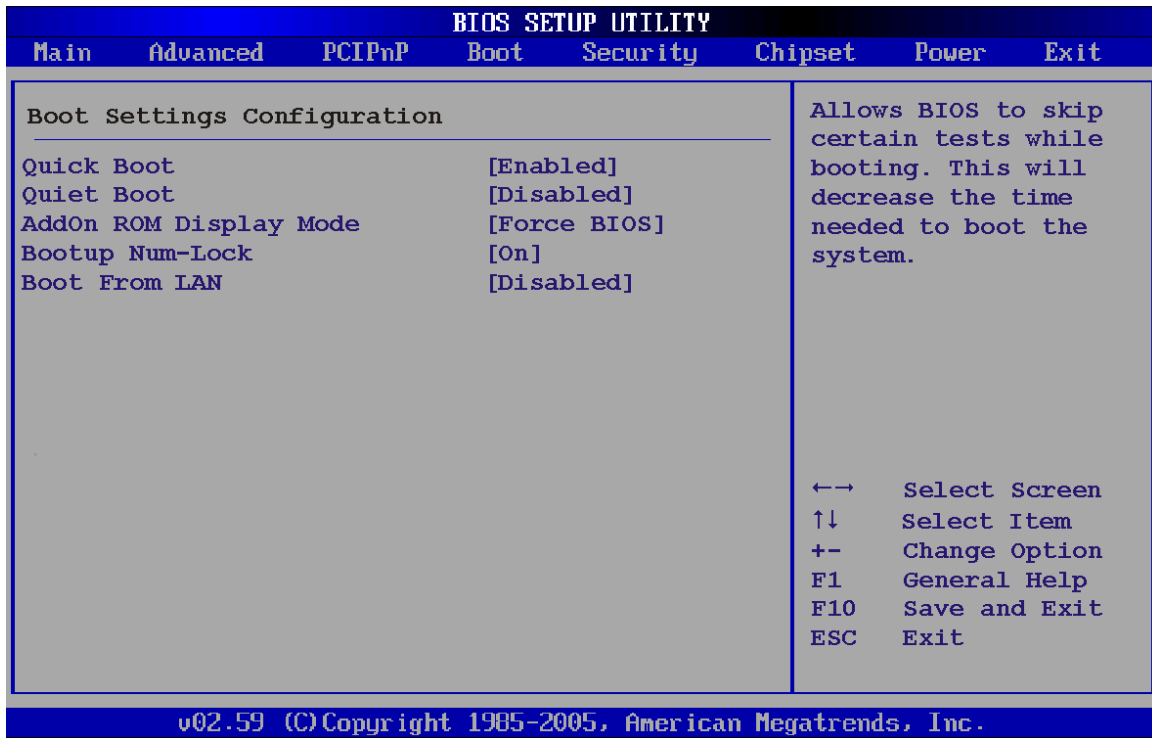


BIOS Menu 14: Boot

WSB-945GSE PCIMG 1.0 CPU Card

6.5.1 Boot Settings Configuration

Use the Boot Settings Configuration menu (BIOS Menu 14) 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]**

The **AddOn ROM Display Mode** option allows add-on ROM (read-only memory) messages to be displayed.

→ **Force BIOS** **DEFAULT** Allows the computer system to force a third party BIOS to display during system boot.

→ **Keep Current** Allows the computer system to display the information during system boot.

→ **Bootup Num-Lock [Off]**

The **Bootup Num-Lock** BIOS option allows the Number Lock setting to be modified during boot up.

→ **Off** **DEFAULT** 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** 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]**

The **BOOT From LAN Support** option enables the system to be booted from a remote system.

→ **Disabled** **DEFAULT** Cannot be booted from a remote system through the LAN

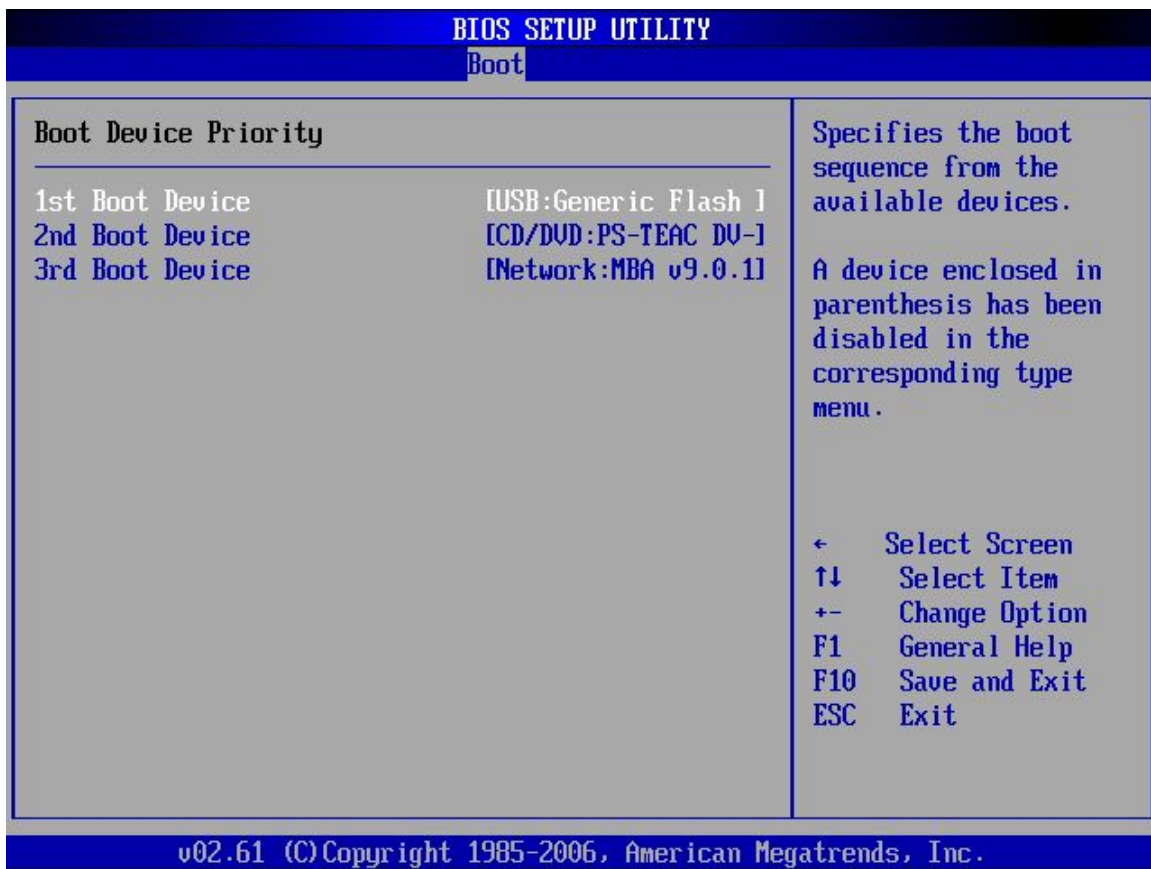
WSB-945GSE PCIMG 1.0 CPU Card

- ➔ **Enabled** **DEFAULT** Can be booted from a remote system through the LAN

6.5.2 Boot Device Priority

Use the **Boot Device Priority** menu (BIOS Menu 16) to specify the boot sequence from the available devices. The following options are available:

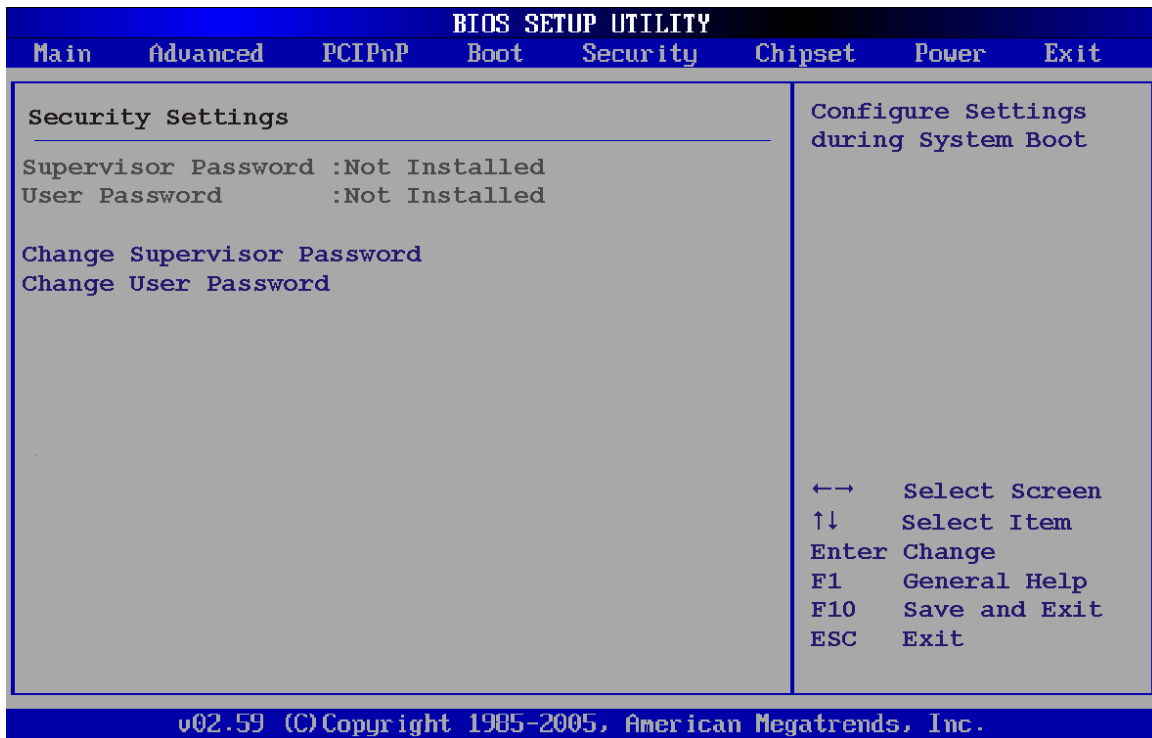
- 1st Boot Device
- 2nd Boot Device
- 3rd Boot Device



BIOS Menu 16: Boot Device Priority Settings

6.6 Security

Use the Security menu (BIOS Menu 17) to set system and user passwords.



BIOS Menu 17: 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**.

6.7 Chipset

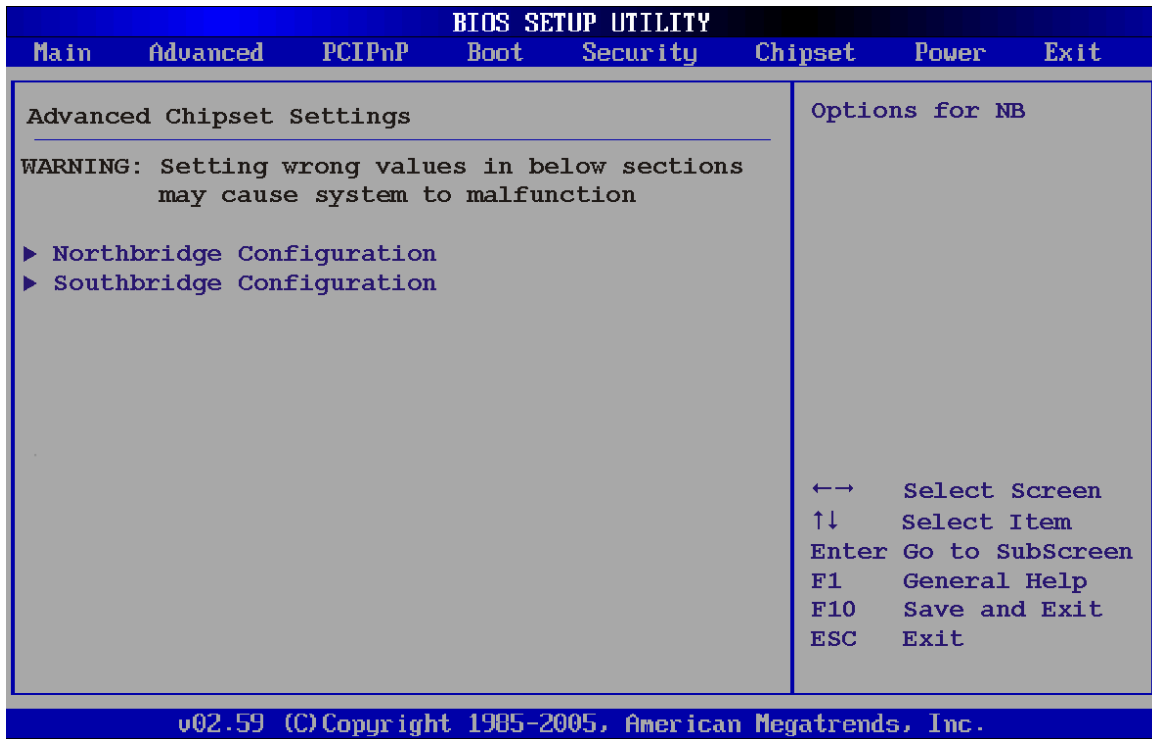
Use the **Chipset** menu (BIOS Menu 18) to access the Northbridge and Southbridge configuration menus

WSB-945GSE PCIMG 1.0 CPU Card



WARNING!

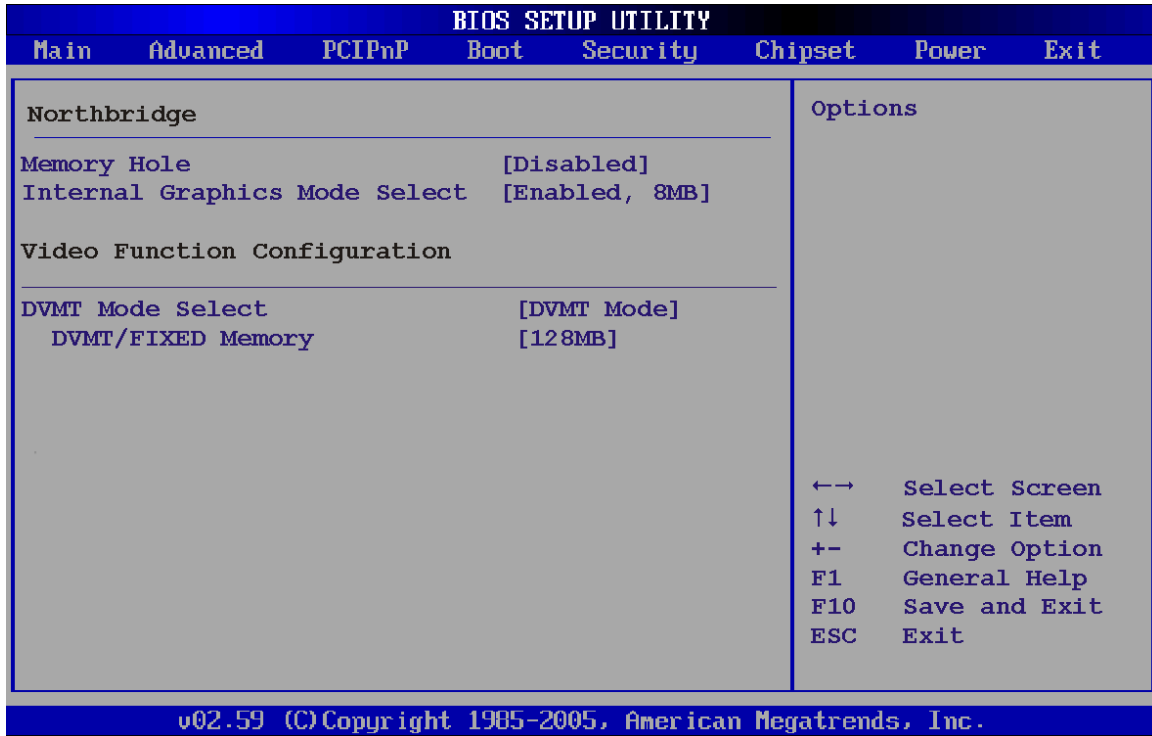
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 18: Chipset

6.7.1 Northbridge Chipset Configuration

Use the **Northbridge Chipset Configuration** menu (BIOS Menu 18) to configure the Northbridge chipset settings.



BIOS Menu 19:North Bridge Chipset Configuration

→ Memory Hole [Disabled]

The **Memory Hole** reserves the 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
- **Enabled** Memory is reserved for ISA expansion cards

WSB-945GSE PCIMG 1.0 CPU Card

→ Internal Graphics Mode Select [Enable, 8 MB]

The **Internal Graphic Mode Select** option determines the amount of system memory that can be used by the Internal graphics device.

- **Disable**
- **Enable, 1 MB** 1 MB of memory used by internal graphics device
- **Enable, 8 MB** **DEFAULT** 8 MB of memory used by internal graphics device

→ DVMT Mode Select [DVMT Mode]

Use the **DVMT Mode Select** option to select the Intel Dynamic Video Memory Technology (DVMT) operating mode.

- **Fixed Mode** A fixed portion of graphics memory is reserved as graphics memory.
- **DVMT Mode** **DEFAULT** Graphics memory is dynamically allocated according to the system and graphics needs.
- **Combo Mode** A fixed portion of graphics memory is reserved as graphics memory. If more memory is needed, graphics memory is dynamically allocated according to the system and graphics needs.

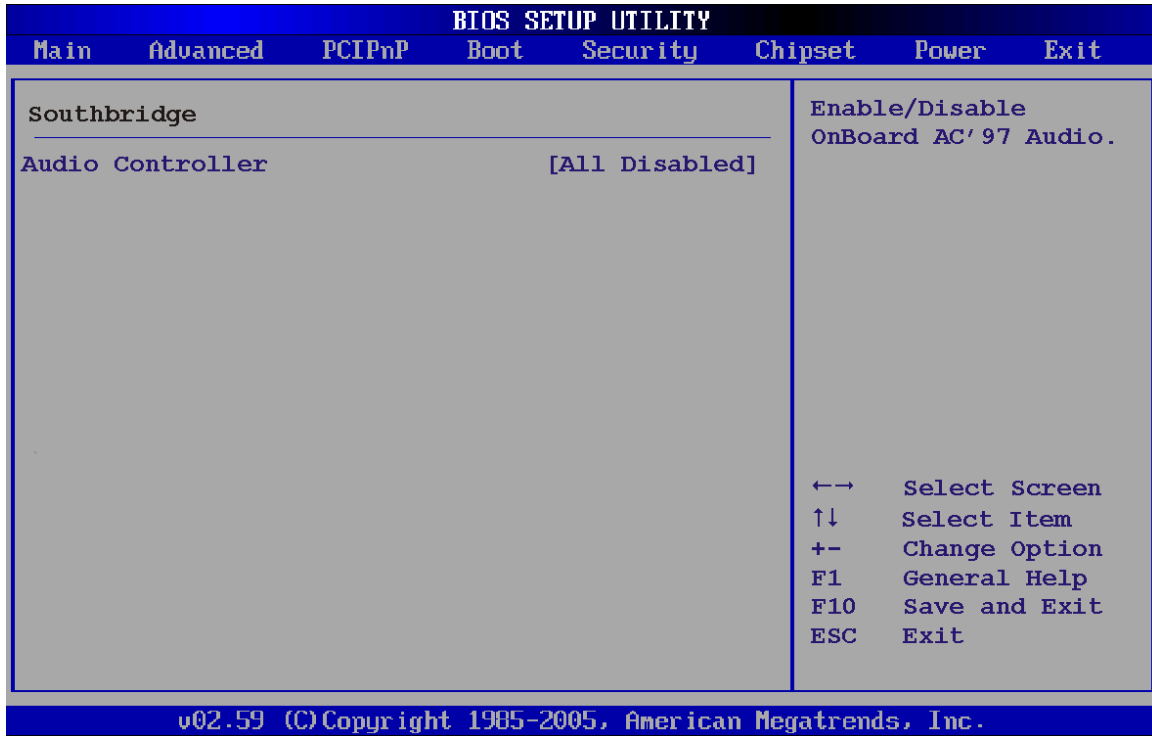
→ DVMT/FIXED Memory

Use the **DVMT/FIXED Memory** option to specify the maximum amount of memory that can be allocated as graphics memory. This option can only be configured for if **DVMT Mode** or **Fixed Mode** is selected in the **DVMT Mode Select** option. If **Combo Mode** is selected, the maximum amount of graphics memory is 128 MB. Configuration options are listed below.

- 64 MB
- 128 MB **DEFAULT**
- Maximum DVMT

6.7.2 Southbridge Configuration

The **Southbridge Configuration** menu (BIOS Menu 20) allows the Southbridge chipset to be configured.



BIOS Menu 20: Southbridge Chipset Configuration

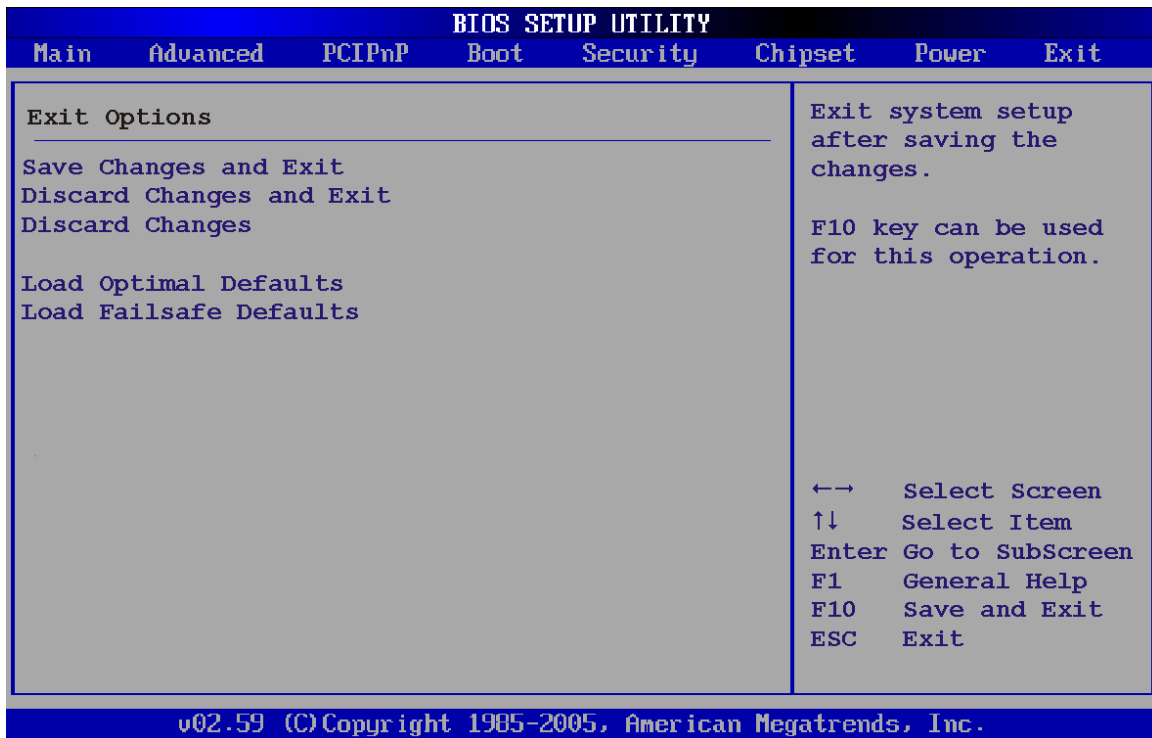
→ Audio Controller [All Disabled]

The **Audio Controller** option enables or disables the audio controller.

- **Azalia** Audio controller configured as Azalia
- **AC'97 Audio Only** The on-board AC'97 audio controller is enabled.
- **All Disabled** **DEFAULT** The on-board audio controller is disabled.

6.8 Exit

Use the **Exit** menu (BIOS Menu 21) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 21: 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.**

Chapter

7

Software Installation

7.1 Available Software Drivers



NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The following drivers can be installed on the system:

- Chipset
- VGA
- LAN
- Audio

Installation instructions are given below.

7.2 Starting the Driver Program

To access the driver installation programs, please do the following.

Step 1: Insert the CD-ROM that came with the system into a CD-ROM drive attached to the system.

Step 2: The screen in Figure 7-1 appears.

WSB-945GSE PCIMG 1.0 CPU Card

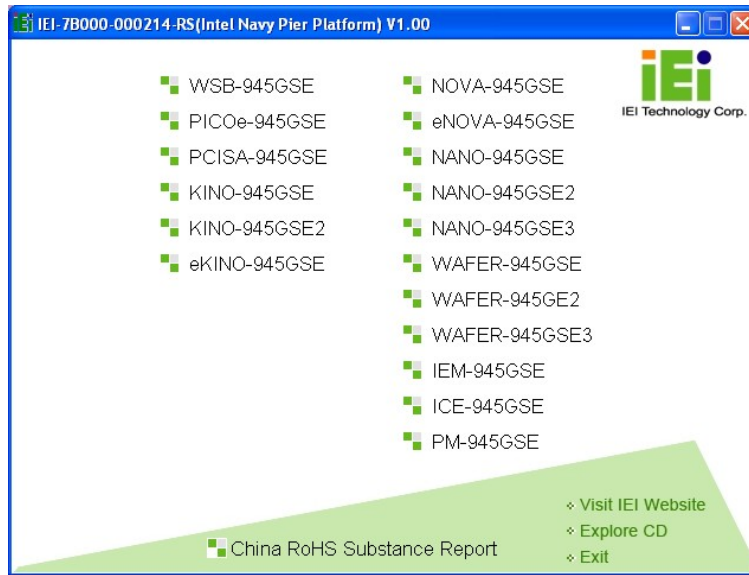


Figure 7-1: Start Up Screen

Step 3: Click **WSB-945GSE**.

Step 4: The screen in Figure 7-2 appears.

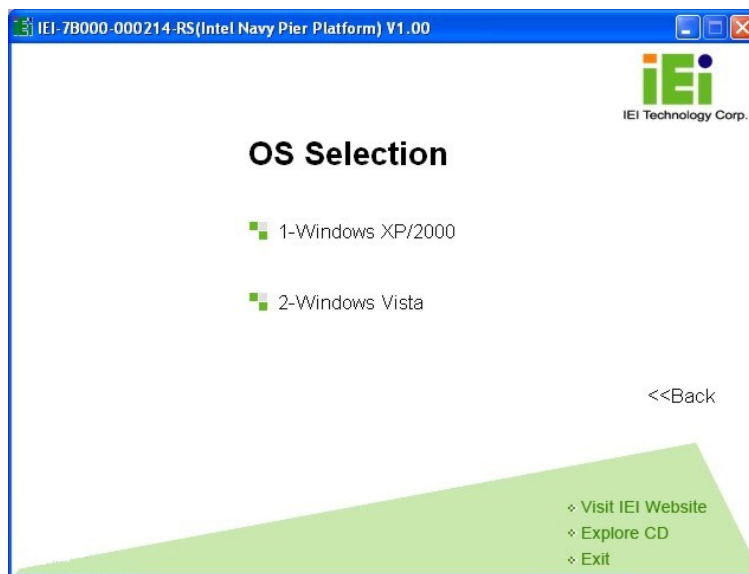


Figure 7-2: Select Operating System

Step 5: Select the operating system installed on the WSB-945GSE system. This manual describes the installation for a **Windows XP** operating system.

Step 6: The list of drivers in Figure 7-3 appears.

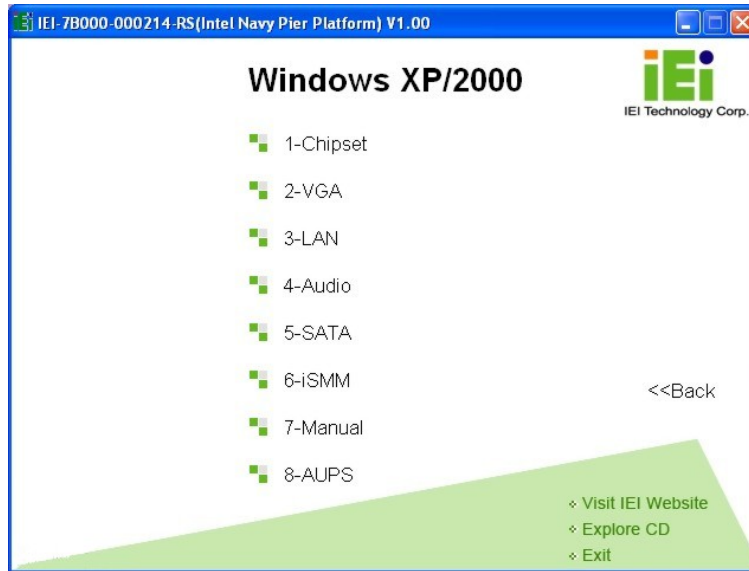


Figure 7-3: Drivers

7.3 Chipset Driver Installation

To install the chipset driver, please do the following.

- Step 1:** Access the driver list shown in Figure 7-3. (See **Section 7.2**)
- Step 2:** Click “1-Chipset Driver”
- Step 3:** The setup files are extracted as shown in Figure 7-4.

WSB-945GSE PCIMG 1.0 CPU Card

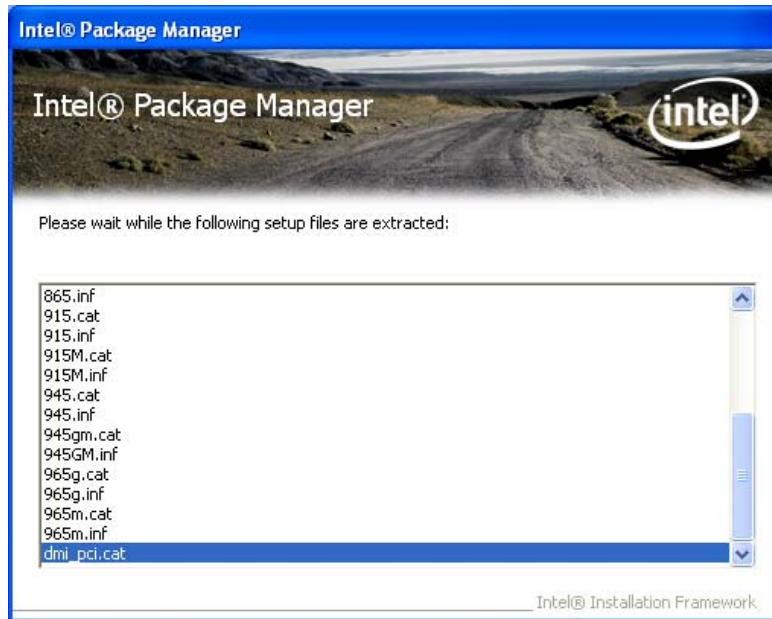


Figure 7-4: Chipset Driver Screen

Step 4: When the setup files are completely extracted the **Welcome Screen** in Figure 7-5 appears.



Figure 7-5: Chipset Driver Welcome Screen

Step 5: Click **Next** to continue.

Step 6: The license agreement in Figure 7-6 appears.



Figure 7-6: Chipset Driver License Agreement

Step 7: Read the **License Agreement**.

Step 8: Click the **Yes** icon to continue.

Step 9: The Read Me file in Figure 7-7 appears.

WSB-945GSE PCIMG 1.0 CPU Card



Figure 7-7: Chipset Driver Read Me File

Step 10: Click **Next** to continue.

Step 11: **Setup Operations** are performed as shown in Figure 7-8.



Figure 7-8: Chipset Driver Setup Operations

Step 12: Once the **Setup Operations** are complete, click the **Next** icon to continue.

Step 13: The **Finish** screen appears.

WSB-945GSE PCIMG 1.0 CPU Card



Figure 7-9: Chipset Driver Installation Finish Screen

Step 14: Select “Yes, I want to restart the computer now” and click the **Finish** icon.

See Figure 7-9.

7.4 VGA Driver Installation

To install the VGA driver, please do the following.

Step 1: Access the driver list shown in Figure 7-3. (See **Section 7.2**)

Step 2: Click “**2-VGA**”

Step 3: The VGA Read Me file in Figure 7-10 appears.

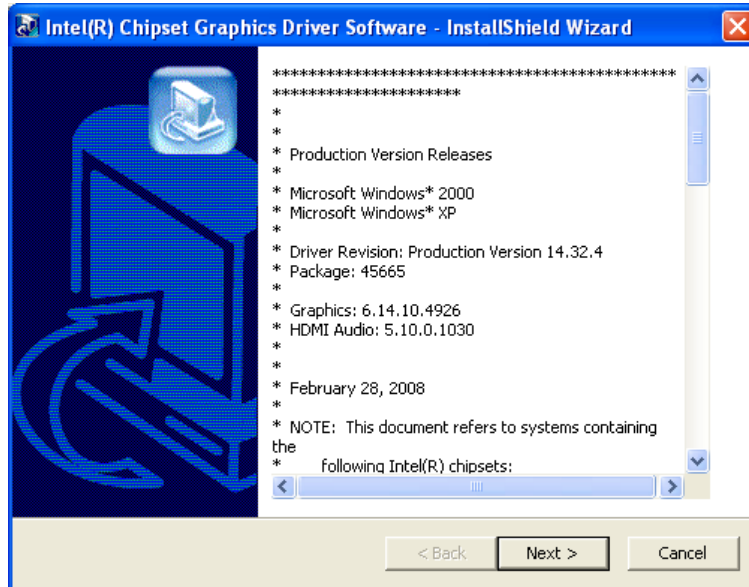


Figure 7-10: VGA Driver Read Me File

Step 4: Click **Next** to continue.

Step 5: The installation files are extracted. See Figure 7-11.

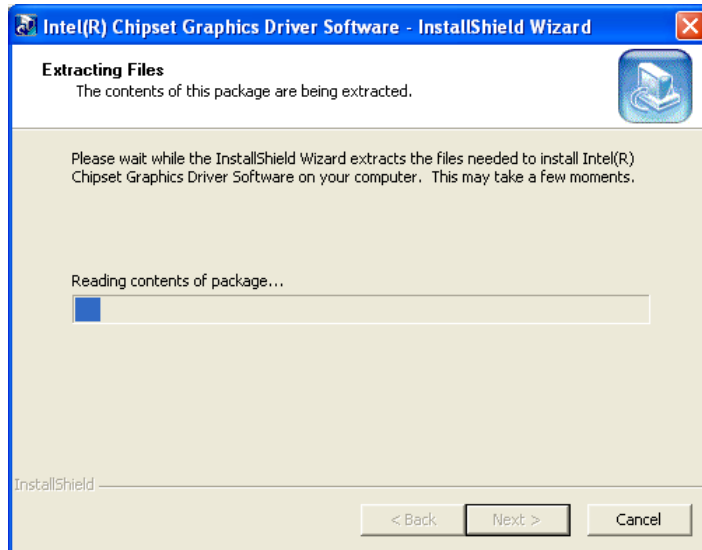


Figure 7-11: VGA Driver Setup Files Extracted

Step 6: The **Welcome Screen** in Figure 7-12 appears.

WSB-945GSE PCIMG 1.0 CPU Card



Figure 7-12: VGA Driver Welcome Screen

Step 7: Click **Next** to continue.

Step 8: The license agreement in Figure 7-13 appears.

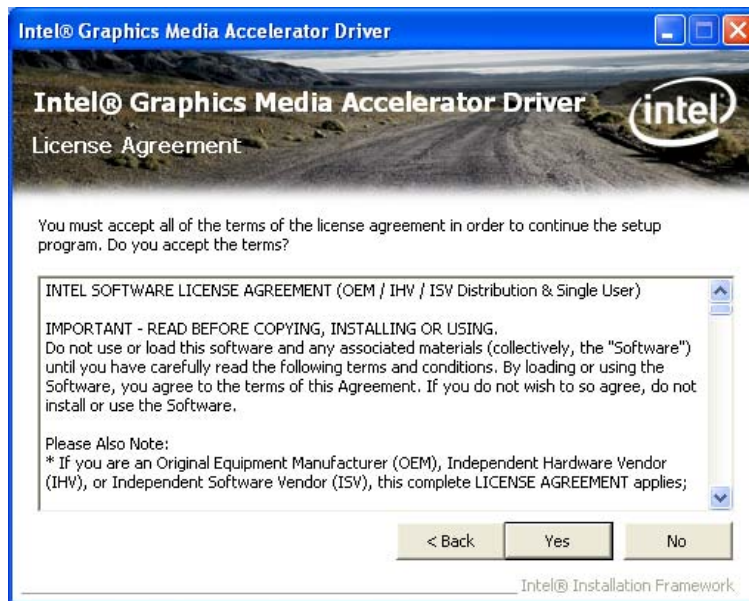


Figure 7-13: VGA Driver License Agreement

Step 9: Read the **License Agreement**.

Step 10: Click the **Yes** icon to continue.

Step 11: The Readme file in Figure 7-14 appears.

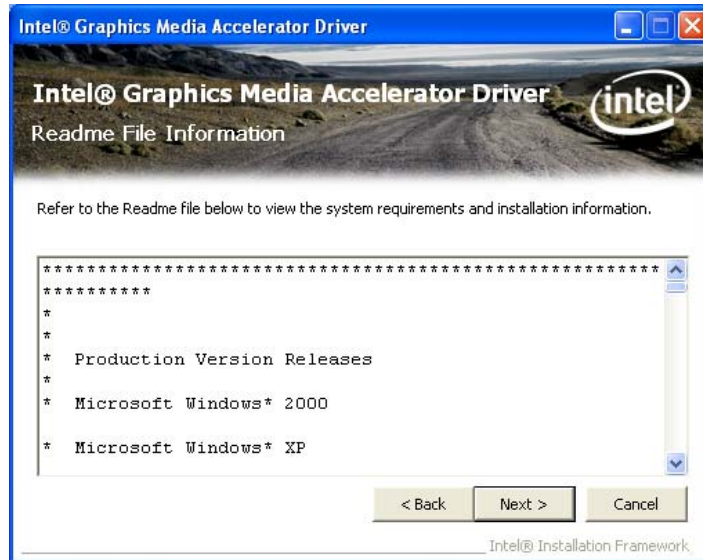


Figure 7-14: VGA Driver Read Me File

Step 12: Click **Next** to continue.

Step 13: Setup Operations are performed as shown in Figure 7-15.



NOTE:

The “Found New Hardware Wizard” will appear and then disappear during this step. Do not adjust any settings in the “Found New Hardware Wizard” window.

WSB-945GSE PCIMG 1.0 CPU Card

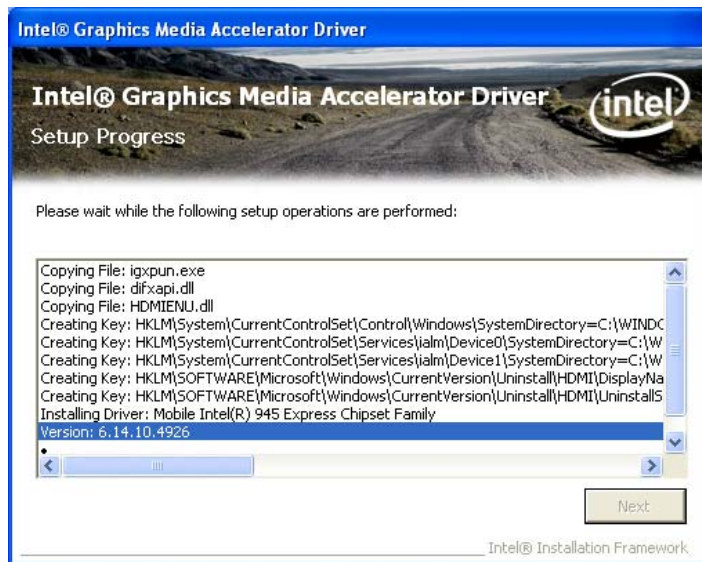


Figure 7-15: VGA Driver Setup Operations

Step 14: Once the **Setup Operations** are complete, click the **Next** icon to continue.

Step 15: The **Finish** screen appears.

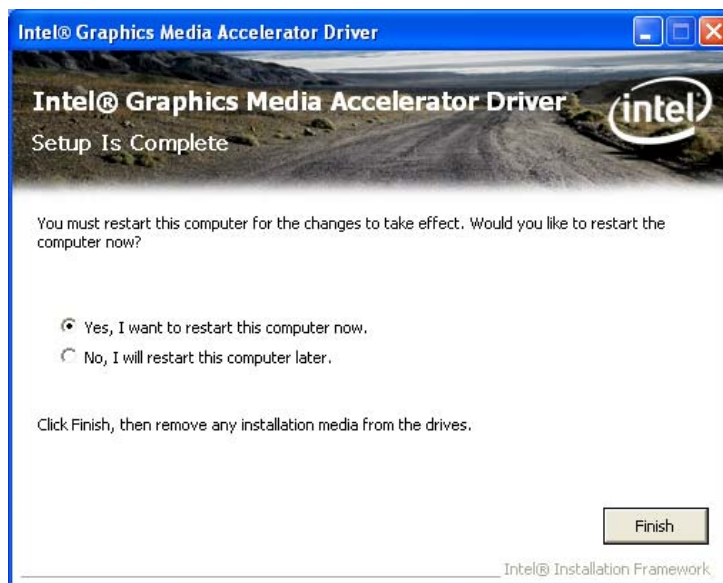


Figure 7-16: VGA Driver Installation Finish Screen

Step 16: Select “**Yes, I want to restart the computer now**” and click the **Finish** icon.

See Figure 7-16.

7.5 LAN Driver Installation

To install the chipset driver, please do the following.

Step 1: Access the driver list shown in Figure 7-3. (See **Section 7.2**)

Step 2: Click “3-LAN”

Step 3: The **Welcome** screen in Figure 7-17 appears.

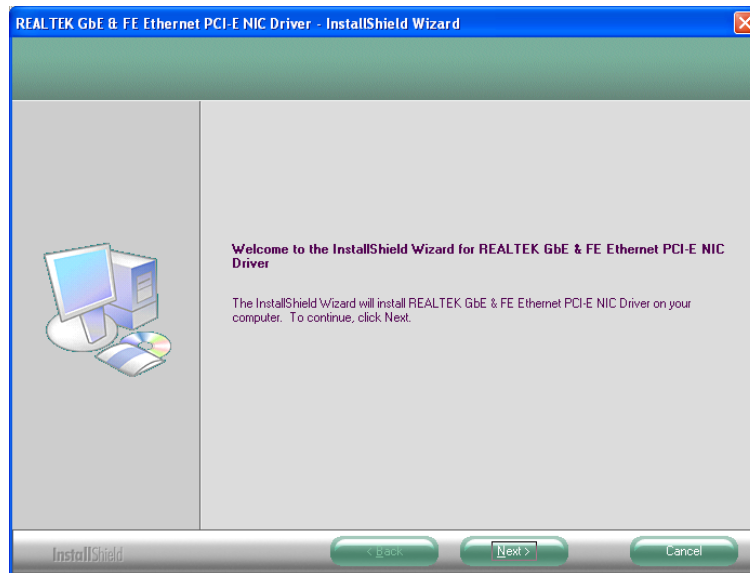


Figure 7-17: LAN Driver Welcome Screen

Step 4: Click **Next** to continue.

Step 5: The **Ready to Install** screen in Figure 7-18 appears.

WSB-945GSE PCIMG 1.0 CPU Card

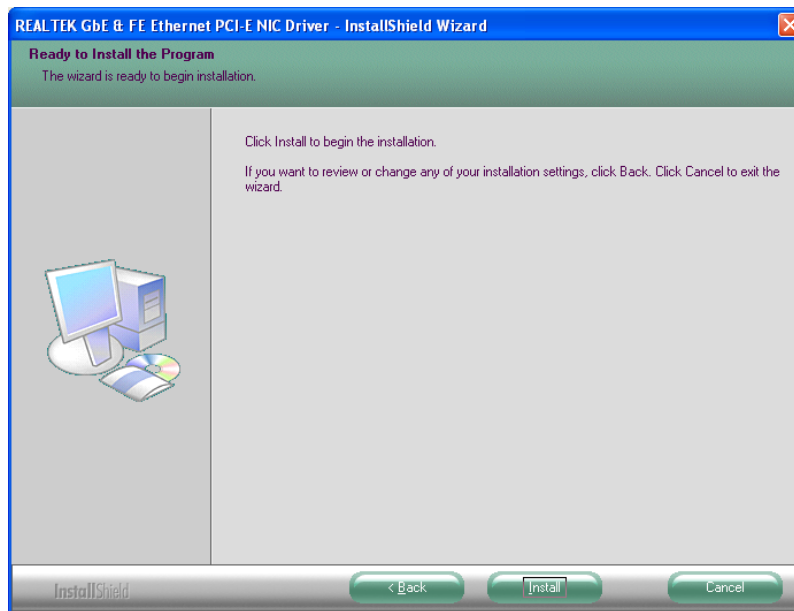


Figure 7-18: LAN Driver Welcome Screen

Step 6: Click **Next** to proceed with the installation.

Step 7: The program begins to install.

Step 8: The installation progress can be monitored in the progress bar shown in Figure 7-19.

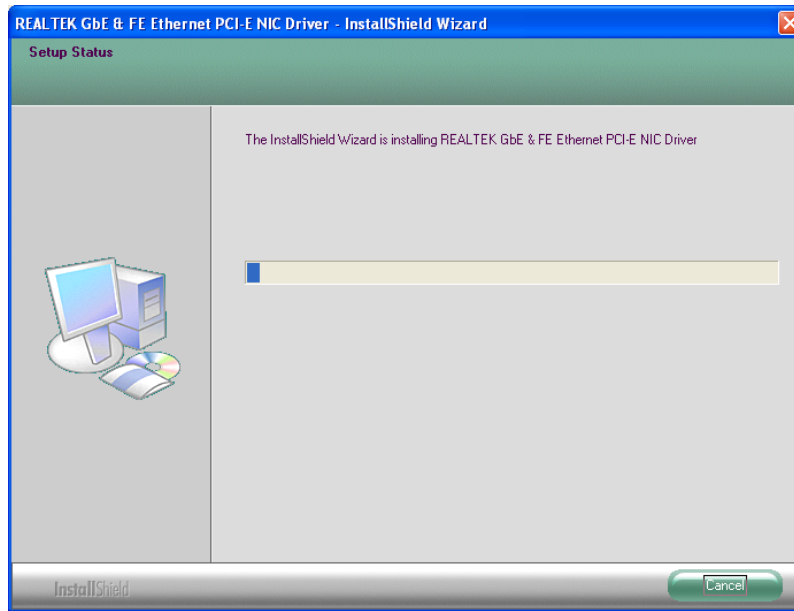


Figure 7-19: LAN Driver Installation

Step 9: When the driver installation is complete, the screen in Figure 7-20 appears.

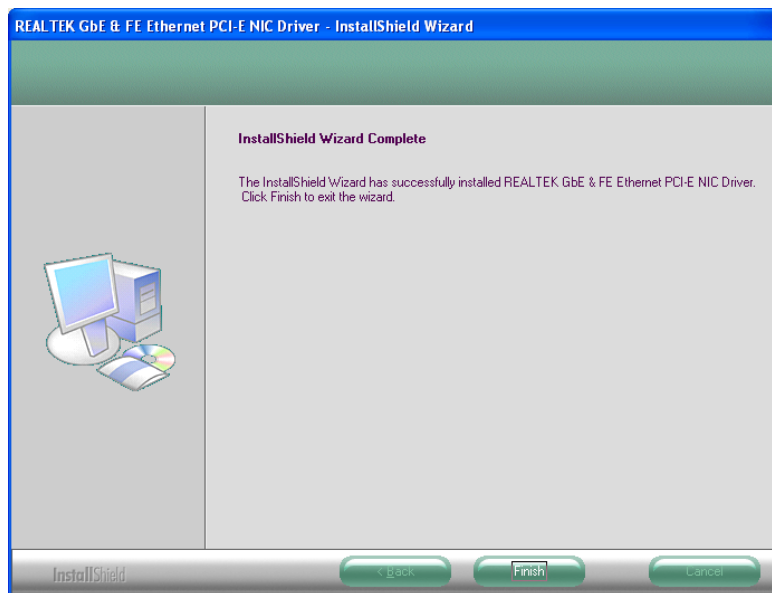


Figure 7-20: LAN Driver Installation Complete

Step 10: Click Finish to exit the InstallShield Wizard (Figure 7-20).

WSB-945GSE PCIMG 1.0 CPU Card

7.6 Audio Driver Installation

To install the chipset driver, please do the following.

Step 1: Access the driver list shown in Figure 7-3. (See **Section 7.2**)

Step 2: Click “4-Audio”

Step 3: The screen in Figure 7-21 appears.

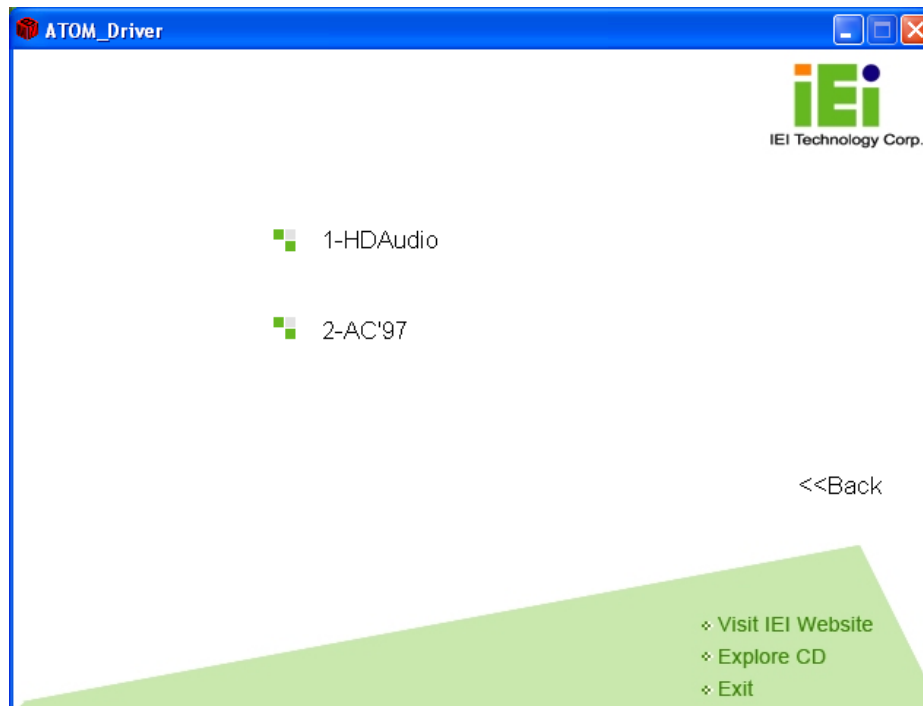


Figure 7-21: Audio Driver Options

7.6.1 HD Audio Installation

To install the HD Audio driver, please do the following:

Step 1: Select “1-HDAudio” in Figure 7-21.

Step 2: Installation files are extracted as shown in Figure 7-22.

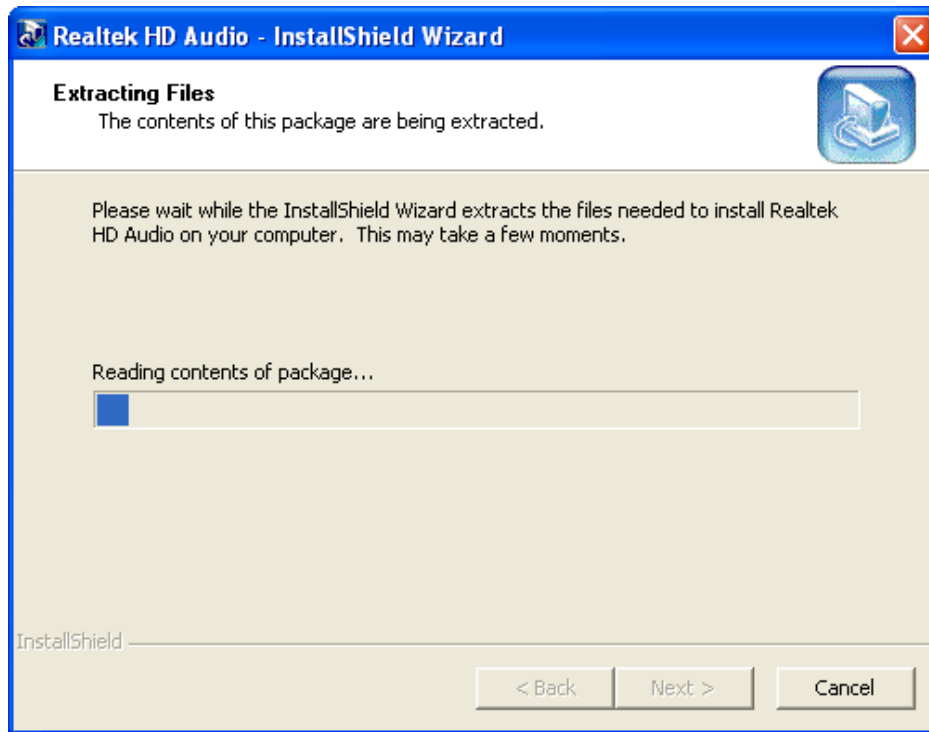


Figure 7-22: Extract HD Audio Driver Installation Files

Step 3: The **Welcome** screen in Figure 7-23 appears.

WSB-945GSE PCIMG 1.0 CPU Card

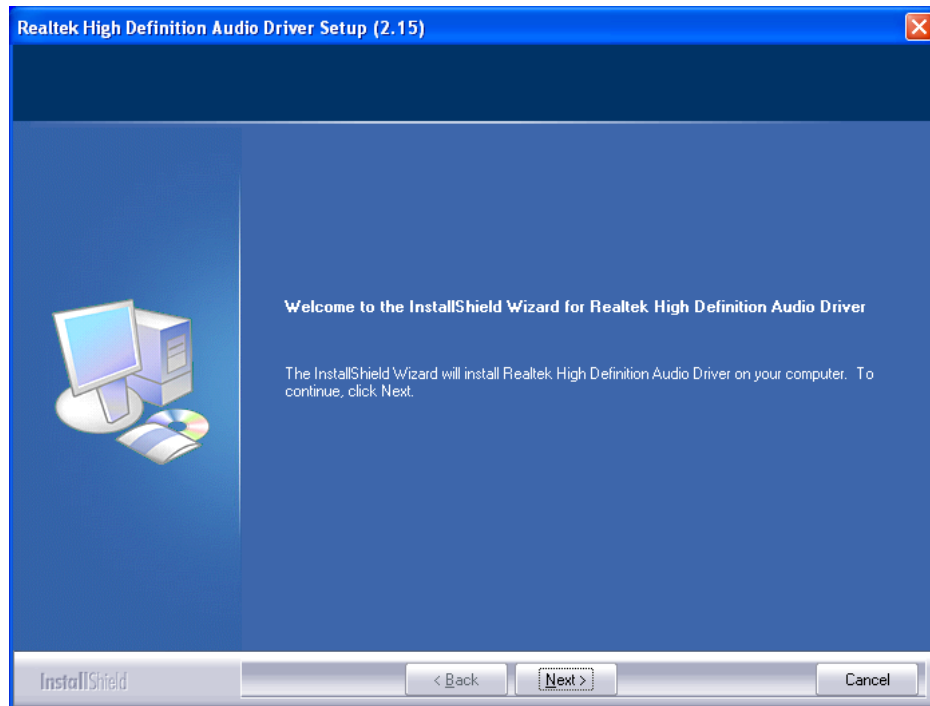


Figure 7-23: HD Audio Driver Welcome Screen

Step 4: Click **Next** to continue.

Step 5: The system updates. See Figure 7-24.

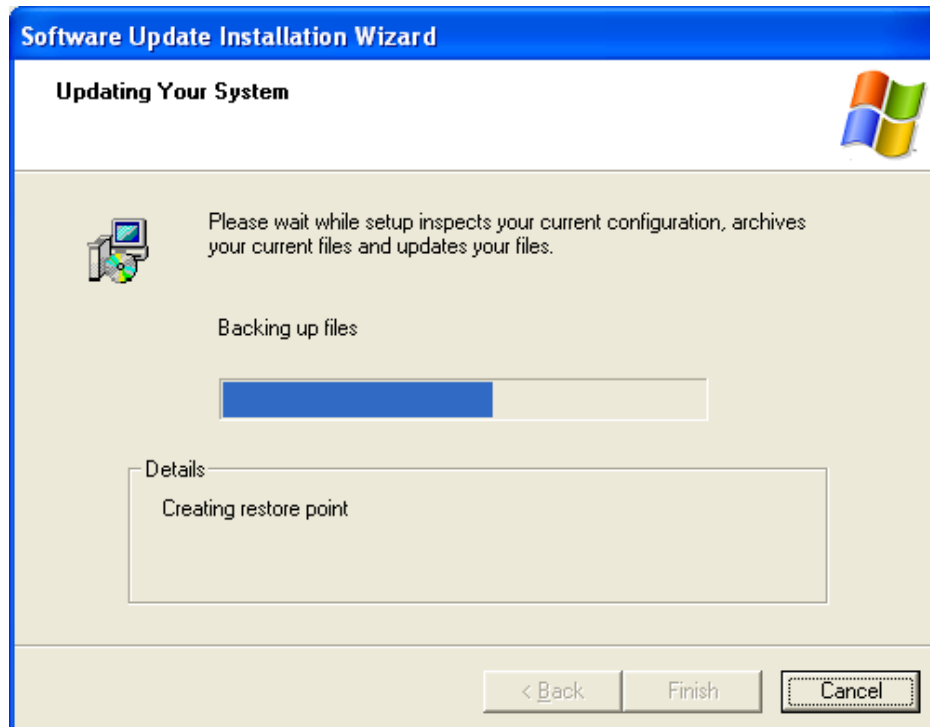


Figure 7-24: System Update

Step 6: Follow the installation instructions until the HD Audio driver installation is complete.

7.6.2 AC'97 Driver Installation

To install the AC'97 audio driver, please do the following:

Step 1: Select "2-AC'97" in Figure 7-21

Step 2: The installation files are extracted as shown in Figure 7-25.

WSB-945GSE PCIMG 1.0 CPU Card

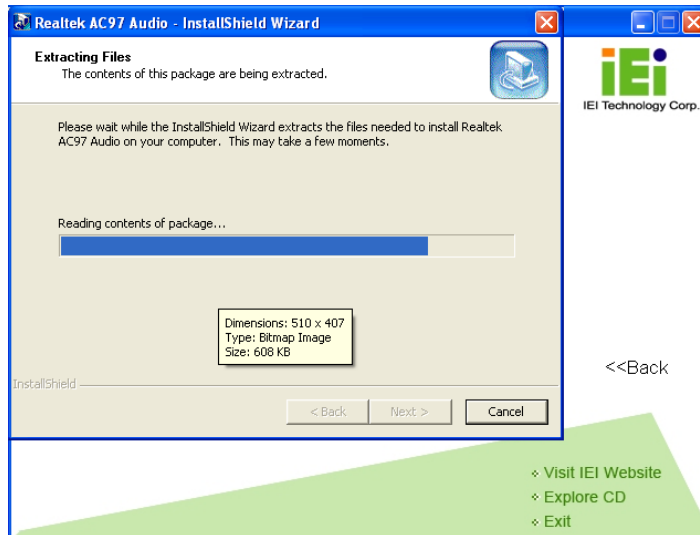


Figure 7-25: AC'97 Driver Installation File Extraction

Step 3: The AC'97 Driver Installation screen in Figure 7-26 appears.

Step 4: Click **Next** to continue.

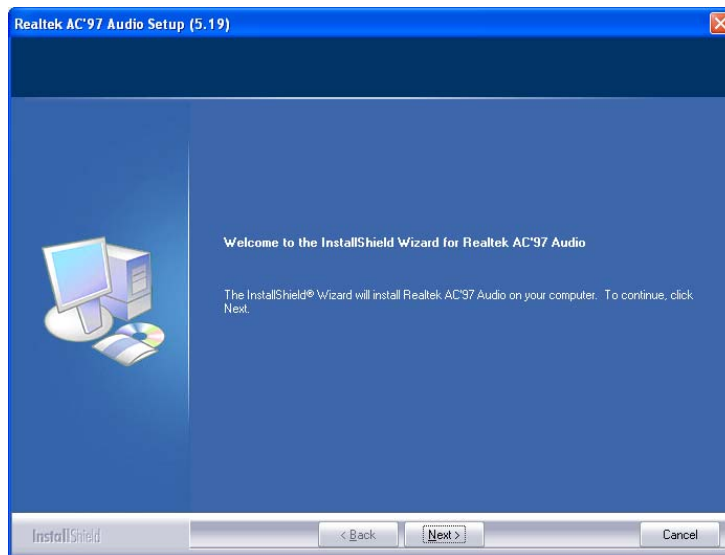


Figure 7-26: AC'97 Driver Installation Welcome Screen

Step 5: The Verification window in Figure 7-27 may appear.

Step 6: Click **“Continue Anyway.”**



Figure 7-27: AC'97 Driver Installation Verification

Step 7: The driver installation begins. See Figure 7-28.

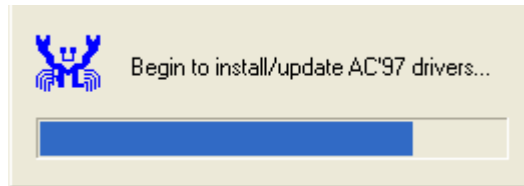


Figure 7-28: AC'97 Driver Installation

Step 8: When the driver is installed, the driver installation finish screen in Figure 7-29 appears.

WSB-945GSE PCIMG 1.0 CPU Card

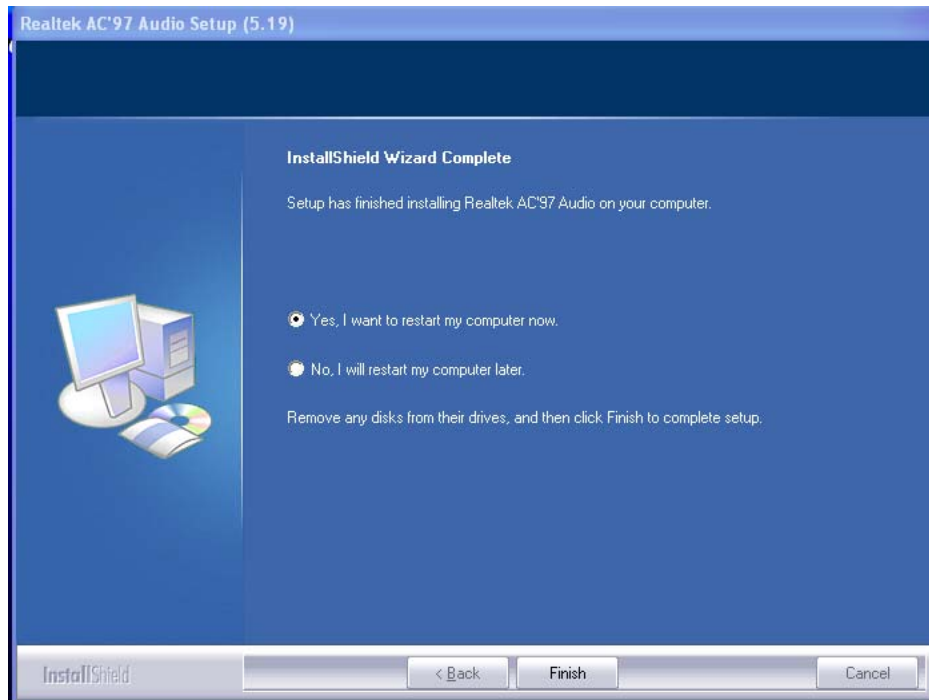


Figure 7-29: AC'97 Driver Installation Complete

Step 9: Select “Yes, I wish to restart my computer now” And click **Finish** to exit the InstallShield Wizard and restart the computer.

Appendix

A

BIOS Options

WSB-945GSE PCIMG 1.0 CPU Card

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

➔ System Overview	89
➔ System Time [xx:xx:xx]	90
➔ System Date [xx/xx/xx]	90
➔ ATA/IDE Configurations [Compatible]	93
➔ Legacy IDE Channels [PATA Pri, SATA Sec]	94
➔ IDE Master and IDE Slave	94
➔ Auto-Detected Drive Parameters	95
➔ Type [Auto]	96
➔ LBA/Large Mode [Auto]	97
➔ Block (Multi Sector Transfer) [Auto]	97
➔ PIO Mode [Auto]	97
➔ DMA Mode [Auto]	98
➔ S.M.A.R.T [Auto]	99
➔ 32Bit Data Transfer [Enabled]	99
➔ Parallel Port Address [Disabled]	100
➔ Parallel Port Mode [Normal]	100
➔ Parallel Port IRQ [IRQ7]	101
➔ Serial Port1 Address [3F8/IRQ4]	101
➔ Serial Port1 Mode [Normal]	102
➔ Serial Port2 Address [2F8/IRQ3]	102
➔ Serial Port2 Mode [Normal]	102
➔ CPU FAN Mode Setting [Full On Mode]	103
➔ CPU Temp. Limit of OFF [000]	104
➔ CPU Temp. Limit of Start [020]	104
➔ CPU Fan Start PWM [070]	105
➔ Slope PWM [0.5 PWM]	105
➔ Suspend Mode [S1(POS)]	108
➔ Restore on AC Power Loss [Last State]	109
➔ Power Button Mode [On/Off]	110
➔ Resume on Keyboard/Mouse [Disabled]	110
➔ Resume on Ring [Disabled]	110
➔ Resume on PCI-Express WAKE# [Enabled]	110
➔ Resume On RTC Alarm [Disabled]	111

➔ Remote Access [Disabled].....	112
➔ Serial Port Number [COM1].....	113
➔ Base Address, IRQ [2F8h,3].....	113
➔ Serial Port Mode [115200 8,n,1].....	113
➔ Flow Control [None].....	114
➔ Redirection After BIOS POST [Always]	114
➔ Terminal Type [ANSI].....	114
➔ VT-UTF8 Combo Key Support [Disabled].....	115
➔ Sredir Memory Display Delay [Disabled].....	115
➔ USB Functions [Enabled].....	116
➔ USB 2.0 Controller [Enabled].....	116
➔ USB2.0 Controller Mode [HiSpeed].....	117
➔ Legacy USB Support [Enabled].....	117
➔ IRQ# [Available].....	118
➔ DMA Channel# [Available]	119
➔ Reserved Memory Size [Disabled]	119
➔ Quick Boot [Enabled]	121
➔ Quiet Boot [Disabled]	121
➔ AddOn ROM Display Mode [Force BIOS]	122
➔ Bootup Num-Lock [Off]	122
➔ Boot From LAN Support [Disabled]	122
➔ Change Supervisor Password.....	124
➔ Change User Password.....	124
➔ Memory Hole [Disabled].....	126
➔ Internal Graphics Mode Select [Enable, 8 MB]	127
➔ DVMT Mode Select [DVMT Mode].....	127
➔ DVMT/FIXED Memory	127
➔ Audio Controller [All Disabled].....	128
➔ Save Changes and Exit	129
➔ Discard Changes and Exit.....	129
➔ Discard Changes.....	129
➔ Load Optimal Defaults.....	129
➔ Load Failsafe Defaults.....	130

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.
CompactFlash®	CompactFlash® is a solid-state storage device. CompactFlash® devices use flash memory in a standard size enclosure. Type II is thicker than Type I, but a Type II slot can support both types.
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.

WSB-945GSE PCIMG 1.0 CPU Card

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 MB/s and 16.6 MB/s.
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 Gb/s 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 Gb/s and the SATA II bus has data transfer speeds of up to 3.0 Gb/s.
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 12 Mb/s data transfer rates and USB 2.0 supports 480 Mb/s 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 WSB-945GSE 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

The following table describes how the DIO connector pins are connected to the Digital I/O port.

Pin	Description	Super I/O Pin	Super I/O Pin Description
1	Ground	N/A	N/A
2	VCC	N/A	N/A
3	Output 3	GP23	General Purpose I/O Port 2 Bit 3
4	Output 2	GP22	General Purpose I/O Port 2 Bit 2
5	Output 1	GP21	General Purpose I/O Port 2 Bit 1
6	Output 0	GP20	General Purpose I/O Port 2 Bit 0
7	Input 3	GP33	General Purpose I/O 33
8	Input 2	GP32	General Purpose I/O 32
9	Input 1	GP31	General Purpose I/O 31
10	Input 0	GP30	General Purpose I/O 30

Table C-1: Digital I/O Connector 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. IEI support is contacted or the IEI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

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

Address Mapping

E.1 Direct Memory Access (DMA)

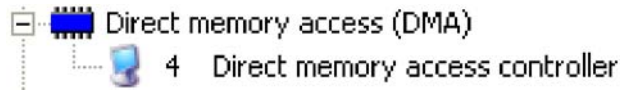


Figure E-1: Direct Memory Access (DMA)

E.2 Input/Output (IO)

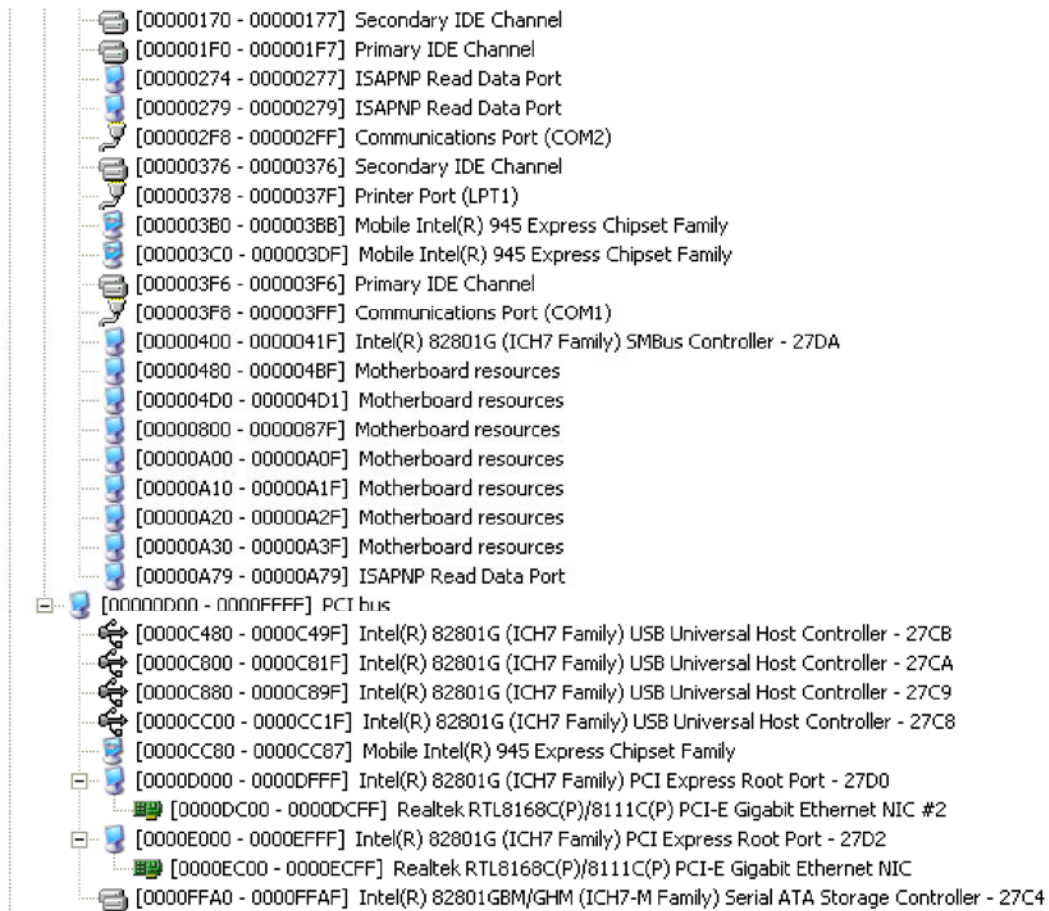


Figure E-2: Input/Output (1 of 2)

WSB-945GSE PCIMG 1.0 CPU Card

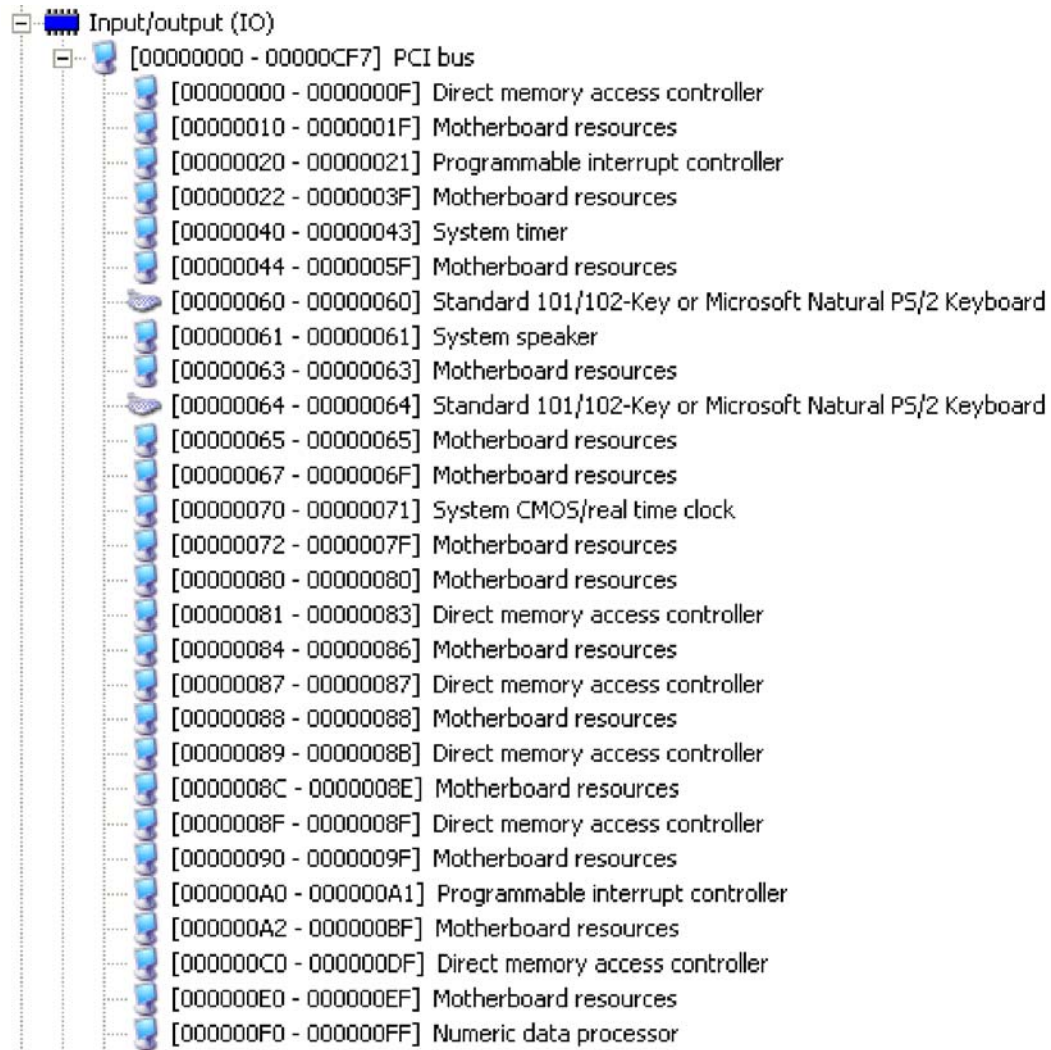


Figure E-3: Input/Output (2 of 2)

E.3 Interrupt Request (IRQ)

Interrupt request (IRQ)	
(ISA) 0	System timer
(ISA) 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
(ISA) 3	Communications Port (COM2)
(ISA) 4	Communications Port (COM1)
(ISA) 8	System CMOS/real time clock
(ISA) 9	Microsoft ACPI-Compliant System
(ISA) 12	Microsoft PS/2 Mouse
(ISA) 13	Numeric data processor
(ISA) 14	Primary IDE Channel
(ISA) 15	Secondary IDE Channel
(PCI) 5	Intel(R) 82801G (ICH7 Family) SMBus Controller - 27DA
(PCI) 16	Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
(PCI) 16	Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CB
(PCI) 16	Mobile Intel(R) 945 Express Chipset Family
(PCI) 16	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC #2
(PCI) 17	Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D2
(PCI) 17	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
(PCI) 18	Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CA
(PCI) 19	Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C9
(PCI) 23	Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C8
(PCI) 23	Intel(R) 82801G (ICH7 Family) USB2 Enhanced Host Controller - 27CC

Figure E-4: Interrupt Request (IRQ)

E.4 Memory

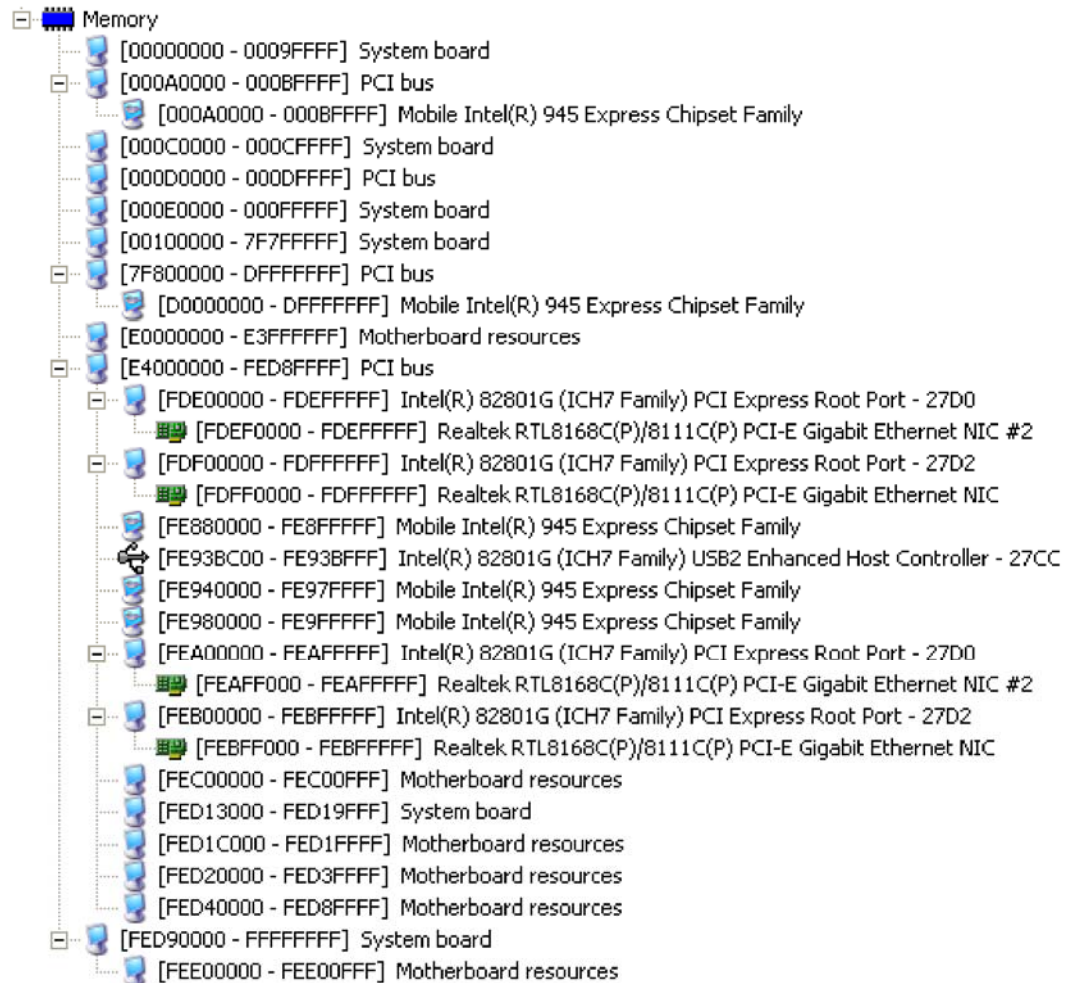


Figure E-5: Memory

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

WSB-945GSE PCIMG 1.0 CPU Card

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。