



IEI Technology Corp .



**MODEL:**  
**WAFER-945GSE2**

**3.5" SBC with 1.6 GHz Intel® Atom™ N270, VGA/LVDS, Dual GbE, CFII, USB, SATA, on board 1 GB Memory and PC/104**

# User Manual

Rev. 1.00 11 March, 2009



# Revision

---

| Date              | Version | Changes           |
|-------------------|---------|-------------------|
| 11 March, 2009    | 1.01    | Model name update |
| 17 February, 2009 | 1.00    | Initial release   |

# Copyright

---

## **COPYRIGHT NOTICE**

The information in this document is subject to change without prior notice in order to improve reliability, design and function and does not represent a commitment on the part of the manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

This document contains proprietary information protected by copyright. All rights are reserved. No part of this manual may be reproduced by any mechanical, electronic, or other means in any form without prior written permission of the manufacturer.

## **TRADEMARKS**

All registered trademarks and product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective owners.

# 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 WAFER-945GSE2 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to [sales@iei.com.tw](mailto:sales@iei.com.tw).

The items listed below should all be included in the WAFER-945GSE2 package.

- 1 x WAFER-945GSE2
- 2 x SATA Cable (P/N: 32000-062800-RS)
- 1 x KB/MS Cable (P/N: 32000-023800-RS)
- 1 x Audio Cable (P/N: 32000-072100-RS)
- 2 x Plastic Intermediate Pole for PC/104 (15mm)
- 2 x Plastic Intermediate Pole for PC/104 (20mm)
- 1 x Mini Jumper pack
- 1 x Utility CD
- 1 x QIG (quick installation guide)

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

# Table of Contents

|  |          |
|--|----------|
| <b>1 INTRODUCTION.....</b>                                 | <b>1</b> |
| 1.1 OVERVIEW.....  | 2        |
| 1.1.1 WAFER-945GSE2 Introduction .....                     | 2        |
| 1.2 WAFER-945GSE2 OVERVIEW .....                           | 2        |
| 1.2.1 WAFER-945GSE2 Overview Photo .....                   | 2        |
| 1.2.2 WAFER-945GSE2 Peripheral Connectors and Jumpers..... | 3        |
| 1.2.3 Technical Specifications.....                        | 4        |
| <b>2 DETAILED SPECIFICATIONS .....</b>                     | <b>6</b> |
| 2.1 DIMENSIONS.....  | 7        |
| 2.1.1 Board Dimensions.....                                | 7        |
| 2.1.2 External Interface Panel Dimensions .....            | 7        |
| 2.2 DATA FLOW .....  | 8        |
| 2.3 EMBEDDED WAFER-945GSE2 PROCESSOR .....                 | 9        |
| 2.3.1 Overview .....                                       | 9        |
| 2.3.2 Features .....                                       | 9        |
| 2.3.3 Front Side Bus (FSB).....                            | 10       |
| 2.4 INTEL®945GSE NORTHBRIDGE CHIPSET.....                  | 11       |
| 2.4.1 Intel® 945GSE Overview.....                          | 11       |
| 2.4.2 Intel® 945GSE DDR2 Controller.....                   | 11       |
| 2.4.3 Intel® 945GSE Graphics.....                          | 12       |
| 2.4.3.1 Analog CRT Graphics Mode.....                      | 13       |
| 2.4.3.2 LVDS Interface .....                               | 14       |
| 2.5 INTEL® ICH7-M SOUTHBRIDGE CHIPSET .....                | 15       |
| 2.5.1 Intel® ICH7-M Overview .....                         | 15       |
| 2.5.2 Intel® ICH7-M Audio Codec '97 Controller.....        | 16       |
| 2.5.3 Intel® ICH7-M Low Pin Count (LPC) Interface.....     | 17       |
| 2.5.4 Intel® ICH7-M PCI Interface.....                     | 18       |
| 2.5.5 PCI-to-ISA Bridge.....                               | 18       |
| 2.5.6 Intel® ICH7-M PCIe Bus .....                         | 20       |
| 2.5.6.1 PCIe GbE Ethernet.....                             | 20       |

|  |           |
|--|-----------|
| 2.5.7 Intel® ICH7-M Real Time Clock .....                | 21        |
| 2.5.8 Intel® ICH7-M SATA Controller .....                | 21        |
| 2.5.9 Intel® ICH7-M USB Controller.....                  | 22        |
| 2.6 LPC BUS COMPONENTS .....                             | 23        |
| 2.6.1 LPC Bus Overview.....                              | 23        |
| 2.6.2 BIOS Chipset.....                                  | 23        |
| 2.6.3 iTE IT8718F Super I/O chipset.....                 | 24        |
| 2.6.3.1 Super I/O LPC Interface .....                    | 25        |
| 2.6.3.2 Super I/O 16C550 UARTs .....                     | 25        |
| 2.6.3.3 Super I/O Digital Input/Output .....             | 25        |
| 2.6.3.4 Super I/O Enhanced Hardware Monitor .....        | 25        |
| 2.6.3.5 Super I/O Fan Speed Controller.....              | 25        |
| 2.6.3.6 Super I/O Keyboard/Mouse Controller.....         | 25        |
| 2.7 ENVIRONMENTAL AND POWER SPECIFICATIONS .....         | 26        |
| 2.7.1 System Monitoring .....                            | 26        |
| 2.7.2 Operating Temperature and Temperature Control..... | 26        |
| 2.7.3 Power Consumption.....                             | 27        |
| <b>3 UNPACKING .....</b>                                 | <b>28</b> |
| 3.1 ANTI-STATIC PRECAUTIONS .....                        | 29        |
| 3.2 UNPACKING .....                                      | 29        |
| 3.2.1 Unpacking Precautions.....                         | 29        |
| 3.3 UNPACKING CHECKLIST .....                            | 30        |
| 3.3.1 Package Contents.....                              | 30        |
| 3.3.2 Optional Items.....                                | 31        |
| <b>4 CONNECTORS .....</b>                                | <b>32</b> |
| 4.1 PERIPHERAL INTERFACE CONNECTORS.....                 | 33        |
| 4.1.1 WAFER-945GSE2 Layout .....                         | 33        |
| 4.2 PERIPHERAL INTERFACE CONNECTORS.....                 | 34        |
| 4.2.1 External Interface Panel Connectors.....           | 35        |
| 4.3 INTERNAL PERIPHERAL CONNECTORS .....                 | 35        |
| 4.3.1 ATX Power Connector .....                          | 36        |
| 4.3.2 ATX Power Supply Enable Connector .....            | 36        |
| 4.3.3 Audio Connector (10-pin).....                      | 37        |

|  |           |
|--|-----------|
| 4.3.4 Backlight Inverter Connector .....                             | 38        |
| 4.3.5 CompactFlash® Socket.....                                      | 39        |
| 4.3.6 Digital Input/Output (DIO) Connector.....                      | 41        |
| 4.3.7 Fan Connector (+12V, 3-pin) .....                              | 42        |
| 4.3.8 Keyboard/Mouse Connector .....                                 | 43        |
| 4.3.9 LED Connector .....  | 44        |
| 4.3.10 LVDS LCD Connector .....                                      | 44        |
| 4.3.11 PC/104 Connector.....   | 46        |
| 4.3.12 PC/104 Power Input Connector.....                             | 47        |
| 4.3.13 Power Button Connector.....                                   | 48        |
| 4.3.14 Reset Button Connector .....                                  | 49        |
| 4.3.15 SATA Drive Connectors .....                                   | 50        |
| 4.3.16 Serial Port Connector (COM2 ) (RS-232, RS-422 or RS-485)..... | 51        |
| 4.3.17 USB Connectors (Internal) .....                               | 52        |
| <b>4.4 EXTERNAL PERIPHERAL INTERFACE CONNECTOR PANEL .....</b>       | <b>53</b> |
| 4.4.1 LAN Connectors.....  | 53        |
| 4.4.2 Serial Port Connector (COM1) .....                             | 54        |
| 4.4.3 USB Connectors.....  | 55        |
| 4.4.4 VGA Connector .....  | 55        |
| <b>5 INSTALLATION .....</b>  | <b>57</b> |
| 5.1 ANTI-STATIC PRECAUTIONS .....                                    | 58        |
| INSTALLATION CONSIDERATIONS .....                                    | 58        |
| 5.1.1 Installation Notices .....                                     | 59        |
| 5.1.2 Installation Checklist .....                                   | 60        |
| 5.2 UNPACKING.....   | 60        |
| 5.3 CF CARD INSTALLATION .....                                       | 60        |
| 5.3.1 CF Card Installation.....                                      | 60        |
| 5.4 JUMPER SETTINGS .....  | 62        |
| 5.4.1 AT/ATX Power Select Jumper Settings .....                      | 62        |
| 5.4.2 CF Card Setup .....  | 64        |
| 5.4.3 Clear CMOS Jumper.....   | 64        |
| 5.4.4 COM 2 Function Select Jumper.....                              | 66        |
| 5.4.5 LVDS Voltage Selection.....                                    | 67        |
| 5.5 CHASSIS INSTALLATION.....  | 68        |

|          |  |           |
|----------|--|-----------|
| 5.5.1    | Airflow.....   | 68        |
| 5.5.2    | Motherboard Installation.....                              | 69        |
| 5.6      | INTERNAL PERIPHERAL DEVICE CONNECTIONS.....                | 69        |
| 5.6.1    | Peripheral Device Cables.....                              | 69        |
| 5.6.2    | SATA Drive Connection.....                                 | 70        |
| 5.6.3    | Dual RS-232 Cable Connection (w/o bracket) (Optional)..... | 71        |
| 5.6.4    | Keyboard/Mouse Y-cable Connector.....                      | 73        |
| 5.6.5    | Audio Kit Installation.....                                | 74        |
| 5.6.6    | PC/104 Module Installation.....                            | 75        |
| 5.6.7    | USB Cable (Dual Port without Bracket) (Optional).....      | 76        |
| 5.7      | EXTERNAL PERIPHERAL INTERFACE CONNECTION.....              | 77        |
| 5.7.1    | LAN Connection (Single Connector).....                     | 78        |
| 5.7.2    | Serial Device Connection.....                              | 79        |
| 5.7.3    | USB Connection (Dual Connector).....                       | 80        |
| 5.7.4    | VGA Monitor Connection.....                                | 80        |
| <b>6</b> | <b>BIOS SCREENS.....</b>                                   | <b>82</b> |
| 6.1      | INTRODUCTION.....  | 83        |
| 6.1.1    | Starting Setup.....  | 83        |
| 6.1.2    | Using Setup.....   | 83        |
| 6.1.3    | Getting Help.....  | 84        |
| 6.1.4    | Unable to Reboot After Configuration Changes.....          | 84        |
| 6.1.5    | BIOS Menu Bar.....   | 84        |
| 6.2      | MAIN.....  | 85        |
| 6.3      | ADVANCED.....  | 86        |
| 6.3.1    | CPU Configuration.....                                     | 87        |
| 6.3.2    | IDE Configuration.....                                     | 88        |
| 6.3.2.1  | IDE Master, IDE Slave.....                                 | 89        |
| 6.3.3    | Super I/O Configuration.....                               | 94        |
| 6.3.4    | Hardware Health Configuration.....                         | 95        |
| 6.3.5    | Power Configuration.....                                   | 99        |
| 6.3.5.1  | ACPI configuration.....                                    | 100       |
| 6.3.5.2  | APM Configuration.....                                     | 101       |
| 6.3.6    | Remote Configuration.....                                  | 103       |
| 6.3.7    | USB Configuration.....                                     | 107       |



## WAFER-945GSE2 User Manual

|  |            |
|--|------------|
| 6.4 PCI/PNP.....   | 108        |
| 6.5 BOOT.....  | 110        |
| 6.5.1 <i>Boot Settings Configuration</i> .....                         | 111        |
| 6.5.2 <i>Boot Device Priority</i> .....                                | 113        |
| 6.6 SECURITY.....  | 113        |
| 6.7 CHIPSET.....   | 114        |
| 6.7.1 <i>Northbridge Chipset Configuration</i> .....                   | 115        |
| 6.7.2 <i>Southbridge Configuration</i> .....                           | 117        |
| 6.8 EXIT.....  | 118        |
| <b>7 SOFTWARE DRIVERS.....</b>   | <b>120</b> |
| 7.1 AVAILABLE SOFTWARE DRIVERS.....                                    | 121        |
| 7.2 STARTING THE DRIVER PROGRAM.....                                   | 121        |
| 7.3 CHIPSET DRIVER INSTALLATION.....                                   | 123        |
| 7.4 VGA DRIVER INSTALLATION.....                                       | 127        |
| 7.5 LAN DRIVER INSTALLATION.....                                       | 131        |
| 7.6 AUDIO DRIVER INSTALLATION.....                                     | 134        |
| 7.6.1 <i>AC'97 Driver Installation</i> .....                           | 134        |
| 7.7 INTEL <sup>®</sup> MATRIX STORAGE MANAGER DRIVER INSTALLATION..... | 137        |
| 7.8 iSMM INSTALLATION.....   | 142        |
| <b>A BIOS OPTIONS.....</b>   | <b>149</b> |
| <b>B TERMINOLOGY.....</b>  | <b>153</b> |
| <b>C DIGITAL I/O INTERFACE.....</b>                                    | <b>157</b> |
| C.1 INTRODUCTION.....  | 158        |
| C.2 DIO CONNECTOR PINOUTS.....   | 158        |
| C.3 ASSEMBLY LANGUAGE SAMPLES.....                                     | 159        |
| C.3.1 <i>Enable the DIO Input Function</i> .....                       | 159        |
| C.3.2 <i>Enable the DIO Output Function</i> .....                      | 159        |
| <b>D WATCHDOG TIMER.....</b>   | <b>160</b> |
| <b>E ADDRESS MAPPING.....</b>  | <b>163</b> |
| E.1 DIRECT MEMORY ACCESS (DMA).....                                    | 164        |
| E.2 INPUT/OUTPUT (IO).....   | 165        |
| E.3 INTERRUPT REQUEST (IRQ).....                                       | 167        |

|   |            |
|---|------------|
| E.4 MEMORY .....  | 168        |
| <b>F COMPATIBILITY.....</b>   | <b>169</b> |
| F.1 COMPATIBLE OPERATING SYSTEMS .....  | 170        |
| F.2 COMPATIBLE PROCESSORS.....  | 170        |
| F.3 COMPATIBLE MEMORY MODULES .....   | 171        |
| <b>G HAZARDOUS MATERIALS DISCLOSURE .....</b>   | <b>172</b> |
| G.1 HAZARDOUS MATERIALS DISCLOSURE TABLE FOR IPB PRODUCTS CERTIFIED AS<br>ROHS COMPLIANT UNDER 2002/95/EC WITHOUT MERCURY ..... | 173        |
| <b>H AC'97 AUDIO CODEC .....</b>  | <b>176</b> |
| H.1 INTRODUCTION.....   | 177        |
| <i>H.1.1 Accessing the AC'97 CODEC .....</i>  | <i>177</i> |
| <i>H.1.2 Driver Installation.....</i>   | <i>177</i> |
| H.2 SOUND EFFECT CONFIGURATION.....   | 178        |
| <i>H.2.1 Accessing the Sound Effects Manager .....</i>  | <i>178</i> |
| <i>H.2.2 Sound Effect Manager Configuration Options .....</i>   | <i>179</i> |

# List of Figures

|   |    |
|---|----|
| Figure 1-1: WAFER-945GSE2 .....                               | 2  |
| Figure 1-2: WAFER-945GSE2 Overview [Front View] .....         | 3  |
| Figure 2-1: WAFER-945GSE2 Dimensions (mm).....                | 7  |
| Figure 2-2: External Interface Panel Dimensions (mm).....     | 7  |
| Figure 2-3: Data Flow Block Diagram.....                      | 8  |
| Figure 2-4: Embedded Processor .....                          | 9  |
| Figure 2-5: Front Side Bus.....                               | 10 |
| Figure 2-6: Onboard DDR2 SDRAM .....                          | 12 |
| Figure 2-7: VGA Connector .....                               | 13 |
| Figure 2-8: LVDS Connector.....                               | 14 |
| Figure 2-9: Direct Media Interface.....                       | 15 |
| Figure 2-10: Audio Codec and Connectors .....                 | 16 |
| Figure 2-11: PCI-to-ISA-Bridge.....                           | 19 |
| Figure 2-12: Realtek RTL8111CP PCIe GbE Controllers.....      | 20 |
| Figure 2-13: SATA Connectors .....                            | 22 |
| Figure 2-14: Onboard USB Implementation.....                  | 23 |
| Figure 2-15: Super I/O .....                                  | 24 |
| Figure 4-1: Connector and Jumper Locations [Front Side] ..... | 33 |
| Figure 4-2: Connector and Jumper Locations [solder side]..... | 34 |
| Figure 4-3: ATX Power Connector Location .....                | 36 |
| Figure 4-4: ATX Power Supply Enable Connector Location .....  | 37 |
| Figure 4-5: Audio Connector Pinouts (10-pin).....             | 38 |
| Figure 4-6: Panel Backlight Connector Pinout Locations .....  | 39 |
| Figure 4-7: CF Card Socket Location (solder side).....        | 40 |
| Figure 4-8: DIO Connector Location.....                       | 41 |
| Figure 4-9: +12V Fan Connector Location .....                 | 42 |
| Figure 4-10: Keyboard/Mouse Connector Location .....          | 43 |
| Figure 4-11: LED Connector Locations.....                     | 44 |
| Figure 4-12: LVDS LCD Connector Pinout Location.....          | 45 |
| Figure 4-13: PC/104 Connector .....                           | 46 |

|  |     |
|--|-----|
| Figure 4-14: PC/104 Power Input Connector Pinouts .....                  | 48  |
| Figure 4-15: Power Button Connector Location.....                        | 48  |
| Figure 4-16: Reset Button Connector Locations.....                       | 49  |
| Figure 4-17: SATA Drive Connector Locations .....                        | 50  |
| Figure 4-18: COM2 Connector Pinout Locations .....                       | 51  |
| Figure 4-19: USB Connector Pinout Locations .....                        | 52  |
| Figure 4-20: WAFER-945GSE2 External Peripheral Interface Connector ..... | 53  |
| Figure 4-21: RJ-45 Ethernet Connector.....                               | 54  |
| Figure 4-22: COM1 Pinout Locations.....                                  | 55  |
| Figure 4-23: VGA Connector .....   | 56  |
| Figure 5-1: CF Card Installation .....                                   | 61  |
| Figure 5-2: Jumper Locations .....                                       | 62  |
| Figure 5-3: AT/ATX Power Select Jumper Location.....                     | 63  |
| Figure 5-4: CF Card Setup Jumper Location .....                          | 64  |
| Figure 5-5: Clear CMOS Jumper .....                                      | 66  |
| Figure 5-6: COM 2 Function Select Jumper Location.....                   | 67  |
| Figure 5-7: LVDS Voltage Selection Jumper Pinout Locations .....         | 68  |
| Figure 5-8: SATA Drive Cable Connection.....                             | 70  |
| Figure 5-9: SATA Power Drive Connection.....                             | 71  |
| Figure 5-10: Dual RS-232 Cable Installation .....                        | 72  |
| Figure 5-11: Serial Device Connector.....                                | 73  |
| Figure 5-12: Keyboard/mouse Y-cable Connection .....                     | 74  |
| Figure 5-13: Audio Kit Cable Connection .....                            | 75  |
| Figure 5-14: WAFER-945GSE2 PC/104 module installation .....              | 76  |
| Figure 5-15: Dual USB Cable Connection .....                             | 77  |
| Figure 5-16: LAN Connection .....  | 78  |
| Figure 5-17: Serial Device Connector.....                                | 79  |
| Figure 5-18: USB Connector.....  | 80  |
| Figure 5-19: VGA Connector .....   | 81  |
| Figure 7-1: Start Up Screen .....  | 122 |
| Figure 7-2: Select Operating System.....                                 | 122 |
| Figure 7-3: Drivers .....  | 123 |
| Figure 7-4: Chipset Driver Welcome Screen.....                           | 124 |
| Figure 7-5: Chipset Driver License Agreement .....                       | 124 |
| Figure 7-6: Chipset Driver Read Me File .....                            | 125 |

## WAFER-945GSE2 User Manual

|  |     |
|--|-----|
| Figure 7-7: Chipset Driver Setup Operations .....          | 126 |
| Figure 7-8: Chipset Driver Installation Finish Screen..... | 126 |
| Figure 7-9: VGA Driver Read Me File.....                   | 127 |
| Figure 7-10: VGA Driver Setup Files Extracted .....        | 128 |
| Figure 7-11: VGA Driver Welcome Screen .....               | 128 |
| Figure 7-12: VGA Driver License Agreement.....             | 129 |
| Figure 7-13: VGA Driver Read Me File.....                  | 129 |
| Figure 7-14: VGA Driver Setup Operations .....             | 130 |
| Figure 7-15: VGA Driver Installation Finish Screen .....   | 131 |
| Figure 7-16: LAN Driver Welcome Screen .....               | 132 |
| Figure 7-17: LAN Driver Welcome Screen .....               | 132 |
| Figure 7-18: LAN Driver Installation .....                 | 133 |
| Figure 7-19: LAN Driver Installation Complete.....         | 133 |
| Figure 7-20: AC'97 Audio .....                             | 134 |
| Figure 7-21: AC'97 Audio Driver Options.....               | 135 |
| Figure 7-22: AC'97 Driver Installation Welcome Screen..... | 135 |
| Figure 7-23: AC'97 Driver Installation Verification.....   | 136 |
| Figure 7-24: AC'97 Driver Installation Complete .....      | 136 |
| Figure 7-25: SATA RAID Driver Installation Program .....   | 137 |
| Figure 7-26: SATA RAID Driver Installation Program .....   | 138 |
| Figure 7-27: SATA RAID Setup Program Icon .....            | 138 |
| Figure 7-28: InstallShield Wizard Setup Screen .....       | 139 |
| Figure 7-29: Matrix Storage Manager Setup Screen .....     | 139 |
| Figure 7-30: Matrix Storage Manager Welcome Screen .....   | 140 |
| Figure 7-31: Matrix Storage Manager Warning Screen.....    | 140 |
| Figure 7-32: Matrix Storage Manager License Agreement..... | 141 |
| Figure 7-33: Matrix Storage Manager Readme File .....      | 141 |
| Figure 7-34: Matrix Storage Manager Setup Complete.....    | 142 |
| Figure 7-35: iSMM Directory .....                          | 143 |
| Figure 7-36: iSMM Installation File.....                   | 143 |
| Figure 7-37: iSMM InstallShield Welcome Screen.....        | 144 |
| Figure 7-38: iSMM License Agreement.....                   | 144 |
| Figure 7-39: iSMM Customer Information .....               | 145 |
| Figure 7-40: iSMM Setup Type .....                         | 146 |
| Figure 7-41: iSMM Installation Confirmation .....          | 147 |



**Figure 7-42: iSMM InstallShield Wizard Complete ..... 148**  
**Figure 7-43: iSMM Restart Confirmation ..... 148**

# List of Tables

|   |    |
|---|----|
| Table 1-1: Technical Specifications.....                  | 5  |
| Table 2-1: Power Consumption.....                         | 27 |
| Table 4-1: Peripheral Interface Connectors.....           | 35 |
| Table 4-2: Rear Panel Connectors.....                     | 35 |
| Table 4-3: ATX Power Connector Pinouts.....               | 36 |
| Table 4-4: ATX Power Supply Enable Connector Pinouts..... | 37 |
| Table 4-5: Audio Connector Pinouts (10-pin).....          | 38 |
| Table 4-6: Panel Backlight Connector Pinouts.....         | 39 |
| Table 4-7: CF Card Socket Pinouts.....                    | 41 |
| Table 4-8: DIO Connector Pinouts.....                     | 41 |
| Table 4-9: +12V Fan Connector Pinouts.....                | 42 |
| Table 4-10: Keyboard/Mouse Connector Pinouts.....         | 43 |
| Table 4-11: LED Connector Pinouts.....                    | 44 |
| Table 4-12: LVDS LCD Port Connector Pinouts.....          | 45 |
| Table 4-13: PC/104 Connector Pinouts (1 of 2).....        | 47 |
| Table 4-14: PC/104 Connector Pinouts (2 of 2).....        | 47 |
| Table 4-15: PC/104 Power Input Connector Pinouts.....     | 48 |
| Table 4-16: Power Button Connector Pinouts.....           | 49 |
| Table 4-17: Reset Button Connector Pinouts.....           | 49 |
| Table 4-18: SATA Drive Connector Pinouts.....             | 50 |
| Table 4-19: COM2 Connector Pinouts.....                   | 51 |
| Table 4-20: USB Port Connector Pinouts.....               | 52 |
| Table 4-21: LAN Pinouts.....                              | 54 |
| Table 4-22: RJ-45 Ethernet Connector LEDs.....            | 54 |
| Table 4-23: RS-232 Serial Port (COM 1) Pinouts.....       | 55 |
| Table 4-24: USB Port Pinouts.....                         | 55 |
| Table 4-25: VGA Connector Pinouts.....                    | 56 |
| Table 5-1: Jumpers.....                                   | 62 |
| Table 5-2: AT/ATX Power Select Jumper Settings.....       | 63 |
| Table 5-3: CF Card Setup Jumper Settings.....             | 64 |

|   |           |
|---|-----------|
| <b>Table 5-4: Clear CMOS Jumper Settings.....</b>             | <b>65</b> |
| <b>Table 5-5: COM 2 Function Select Jumper Settings .....</b> | <b>66</b> |
| <b>Table 5-6: LVDS Voltage Selection Jumper Settings.....</b> | <b>68</b> |
| <b>Table 5-7: IEI Provided Cables .....</b>                   | <b>69</b> |
| <b>Table 6-1: BIOS Navigation Keys .....</b>                  | <b>84</b> |



# BIOS Menus

---

|  |     |
|--|-----|
| Menu 1: Main .....                                     | 85  |
| Menu 2: Advanced .....                                 | 87  |
| Menu 3: CPU Configuration .....                        | 87  |
| Menu 4: IDE Configuration .....                        | 88  |
| Menu 5: IDE Master and IDE Slave Configuration .....   | 90  |
| Menu 6: Super I/O Configuration .....                  | 94  |
| Menu 7: Hardware Health Configuration .....            | 96  |
| Menu 8: Power Configuration .....                      | 99  |
| Menu 9: Advanced Power Configuration .....             | 100 |
| Menu 10: ACPI Configuration .....                      | 100 |
| Menu 11: Advanced Power Management Configuration ..... | 101 |
| Menu 12: Remote Access Configuration [Advanced] .....  | 104 |
| Menu 13: USB Configuration .....                       | 107 |
| Menu 14: PCI/PnP Configuration .....                   | 109 |
| Menu 15: Boot .....                                    | 111 |
| Menu 16: Boot Settings Configuration .....             | 111 |
| Menu 17: Boot Device Priority Settings .....           | 113 |
| Menu 18: Security .....                                | 114 |
| Menu 19: Chipset .....                                 | 115 |
| Menu 20: Northbridge Chipset Configuration .....       | 115 |
| Menu 21: Southbridge Chipset Configuration .....       | 118 |
| Menu 22: Exit .....                                    | 119 |



Chapter

1

# Introduction

---

## 1.1 Overview

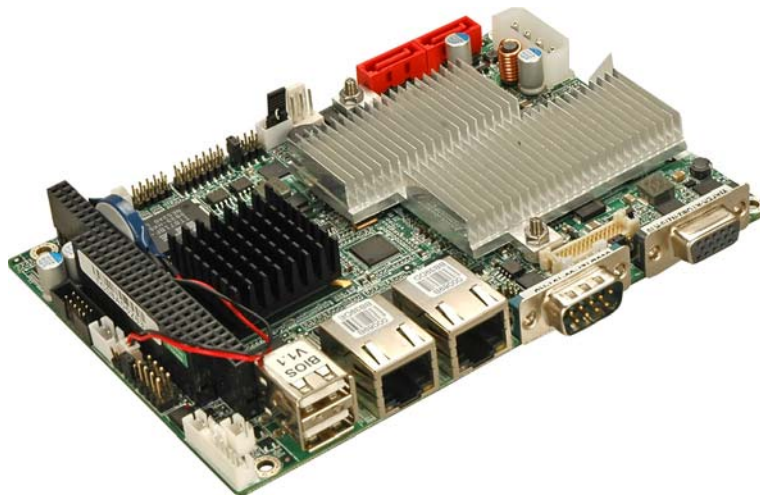


Figure 1-1: WAFER-945GSE2

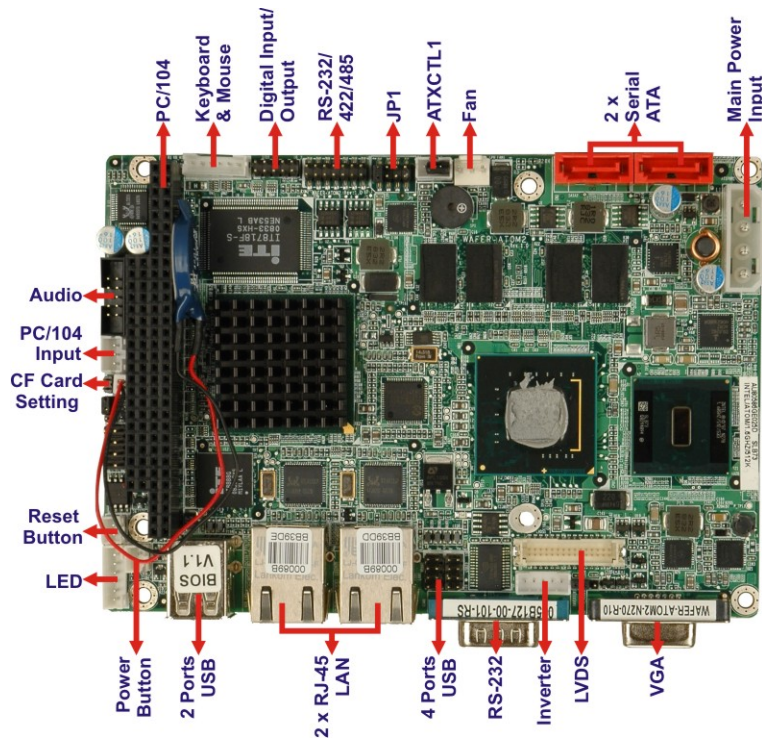
### 1.1.1 WAFER-945GSE2 Introduction

WAFER-945GSE2 3.5" motherboards are embedded 45 nm Intel® Atom™ processor platforms. The Intel® Atom™ processor N270 embedded on the WAFER-945GSE2 has a 1.60 GHz clock speed, a 533 MHz FSB and a 512 KB L2 cache. The WAFER-945GSE2 also includes onboard 1.0 GB DDR2 SDRAM. The board comes with an LVDS connector and supports both 18-bit and 36-bit single channel LVDS screens. The WAFER-945GSE2 also comes with two PCI Express (PCIe) Gigabit Ethernet (GbE) connectors, a CompactFlash® socket on the solder side, and a PC/104 slot for expansion and increased connectivity.

## 1.2 WAFER-945GSE2 Overview

### 1.2.1 WAFER-945GSE2 Overview Photo

The WAFER-945GSE2 has a wide variety of peripheral interface connectors. **Figure 1-2** is a labeled photo of the peripheral interface connectors on the WAFER-945GSE2.



**Figure 1-2: WAFER-945GSE2 Overview [Front View]**

## 1.2.2 WAFER-945GSE2 Peripheral Connectors and Jumpers

The WAFER-945GSE2 has the following connectors on-board:

- 1 x ATX power connector
- 1 x ATX enable connector
- 1 x Audio connector
- 1 x Backlight inverter connector
- 1 x CompactFlash® socket
- 1 x Digital input/output (DIO) connector
- 1 x Fan connector
- 1 x Keyboard and mouse connector
- 1 x LED connector
- 1 x LVDS connector
- 1 x PC/104 ISA connector
- 1 x Power button connector
- 1 x Reset button connector

- 1 x RS-232 serial port connector
- 2 x Serial ATA (SATA) drive connectors
- 2 x USB 2.0 connectors (supports four USB 2.0 devices)

The WAFER-945GSE2 has the following external peripheral interface connectors on the board rear panel.

- 2 x Ethernet connectors
- 1 x RS-232/422/485 serial port connector
- 2 x USB connectors
- 1 x VGA connector

The WAFER-945GSE2 has the following on-board jumpers:

- AT Power mode setting
- Clear CMOS
- CF card setting
- COM2 Port mode setting
- LVDS1 Voltage selection

### 1.2.3 Technical Specifications

WAFER-945GSE2 technical specifications are listed in **Table 1-1**. See **Chapter 2** for details.

| Specification        | WAFER-945GSE2  |
|----------------------|--|
| Form Factor          | 3.5"   |
| System CPU           | 45 nm 1.6 GHz Intel® Atom™ N270                          |
| Front Side Bus (FSB) | 533 MHz  |
| System Chipset       | Northbridge: Intel® 945GSE<br>Southbridge: Intel® ICH7-M |
| Memory               | Onboard 533 MHz 1.0 GB DDR2 SDRAM                        |
| CompactFlash®        | One CompactFlash® Type II socket                         |
| Super I/O            | ITE IT8718   |

|                             |  |
|-----------------------------|--|
| <b>Display</b>              | Intel® Generation 3.5 integrated GFX core (133 MHz)<br>18-bit dual channel LVDS integrated in Intel® 945GSE<br>Dual-display supported (VGA and LVDS) |
| <b>BIOS</b>                 | AMI BIOS label   |
| <b>Audio</b>                | Realtek ALC655 AC'97 codec   |
| <b>LAN</b>                  | Two Realtek RTL8111CPP GbE controllers   |
| <b>COM</b>                  | One RS-232 serial port<br>One RS-232/422/485 serial port connector   |
| <b>USB2.0</b>               | Six USB 2.0 devices supported: <ul style="list-style-type: none"> <li>▪ Four by onboard pin-headers</li> <li>▪ Two by external connectors</li> </ul> |
| <b>SATA</b>                 | Two 1.5 Gbps SATA drives supported   |
| <b>Keyboard/mouse</b>       | One internal pin-header connector  |
| <b>Expansion</b>            | One PC/104 ISA slot (ISA DMA Mode not supported)   |
| <b>Digital I/O</b>          | One 8-bit digital input/output connector; 4-bit input/4-bit output through the ITE IT8718 super I/O  |
| <b>Watchdog Timer</b>       | Software programmable 1-255 sec. through the ITE IT8718 super I/O  |
| <b>Power Supply</b>         | 5.0 V only<br>12 V for LCD/System Fan<br>AT and ATX support  |
| <b>Power Consumption</b>    | 5V @ 3.1 A (1.6 GHz Intel® Atom™ with onboard 1.0 GB DDR2 SDRAM)   |
| <b>Temperature</b>          | 0°C – 60°C (32°F - 140°F)  |
| <b>Humidity (operating)</b> | 5%~95% non-condensing  |
| <b>Dimensions (LxW)</b>     | 146 mm x 102 mm  |
| <b>Weight (GW/NW)</b>       | 700g/230g  |

**Table 1-1: Technical Specifications**



Chapter

2

# Detailed Specifications

---



## 2.1 Dimensions

### 2.1.1 Board Dimensions

The dimensions of the board are shown below:

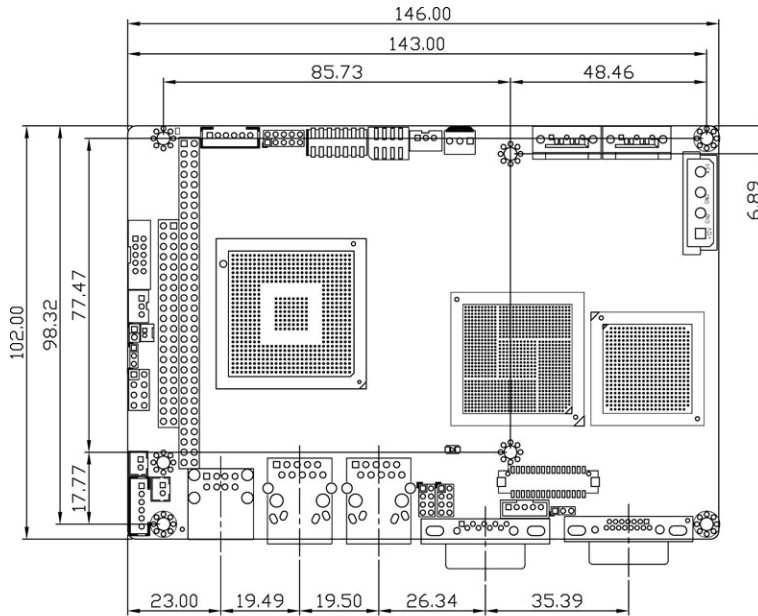


Figure 2-1: WAFER-945GSE2 Dimensions (mm)

### 2.1.2 External Interface Panel Dimensions

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

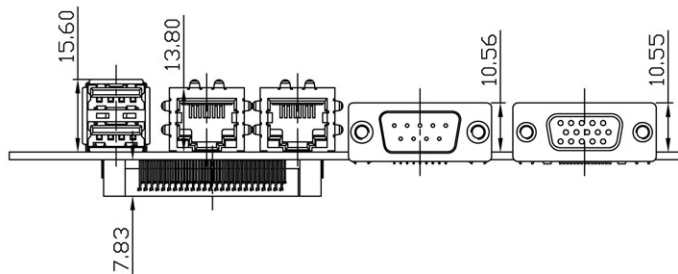


Figure 2-2: External Interface Panel Dimensions (mm)

## 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.

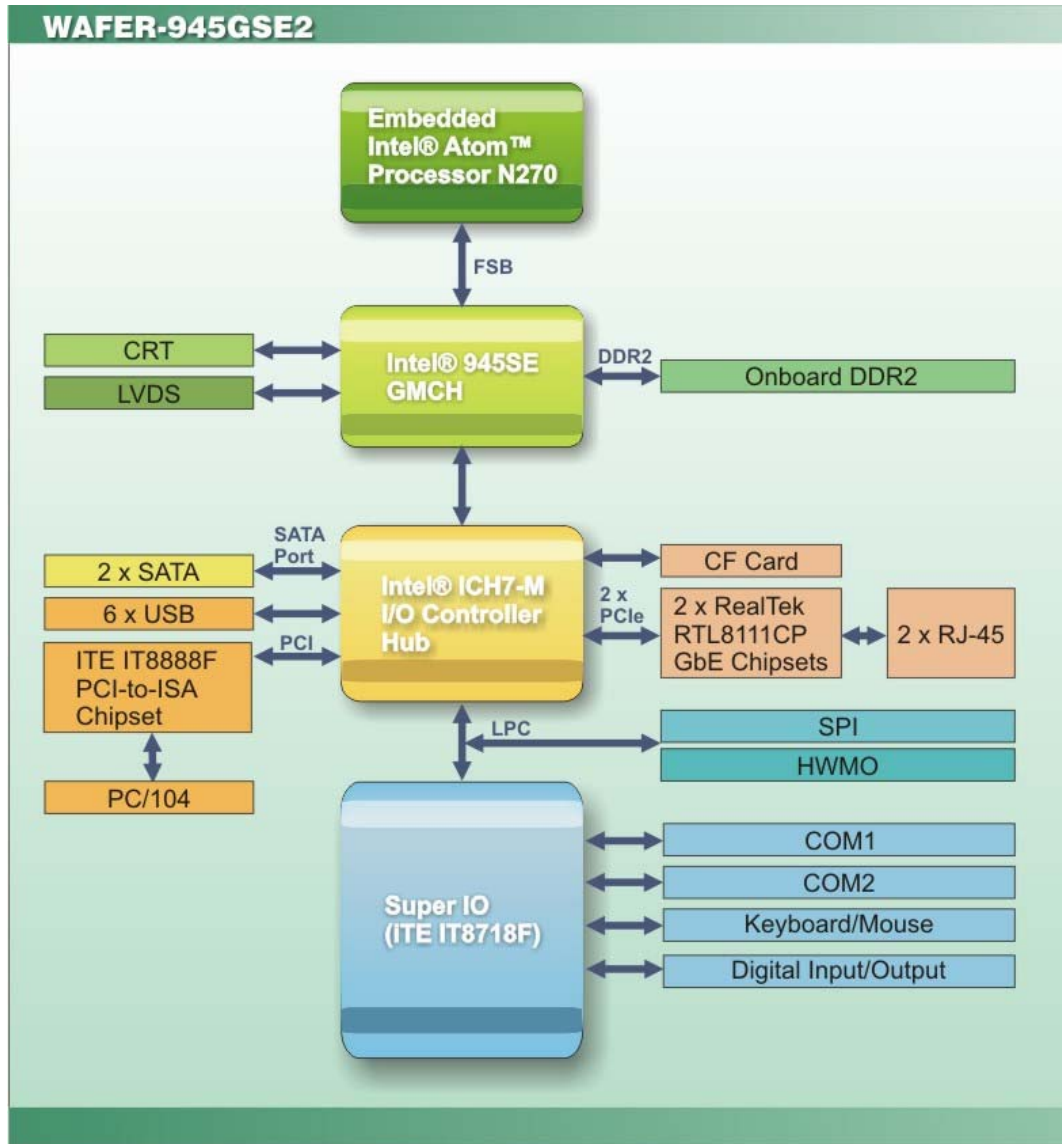
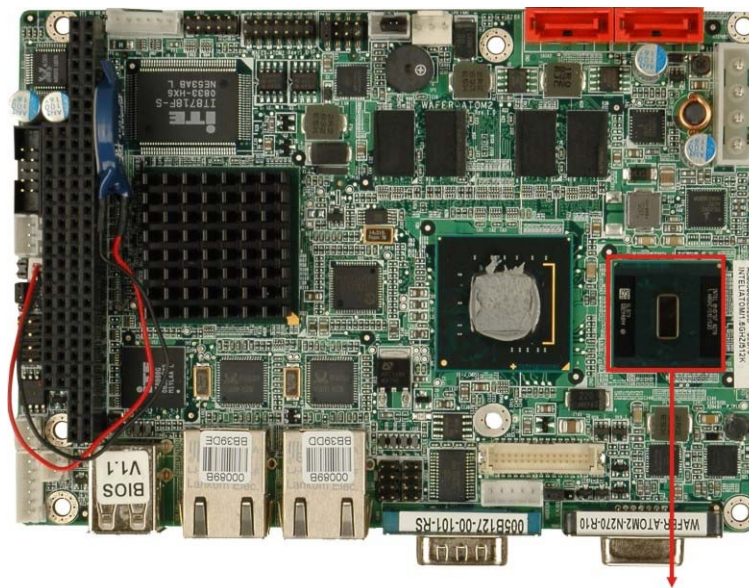


Figure 2-3: Data Flow Block Diagram

## 2.3 Embedded WAFER-945GSE2 Processor

### 2.3.1 Overview

The WAFER-945GSE2 comes with an embedded 45 nm 1.60 GHz Intel® Atom™ processor N270. The processor supports a 533 MHz FSB and has a 1.6 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.



1.6 GHz Intel® Atom™ processor N270

Figure 2-4: Embedded Processor

### 2.3.2 Features

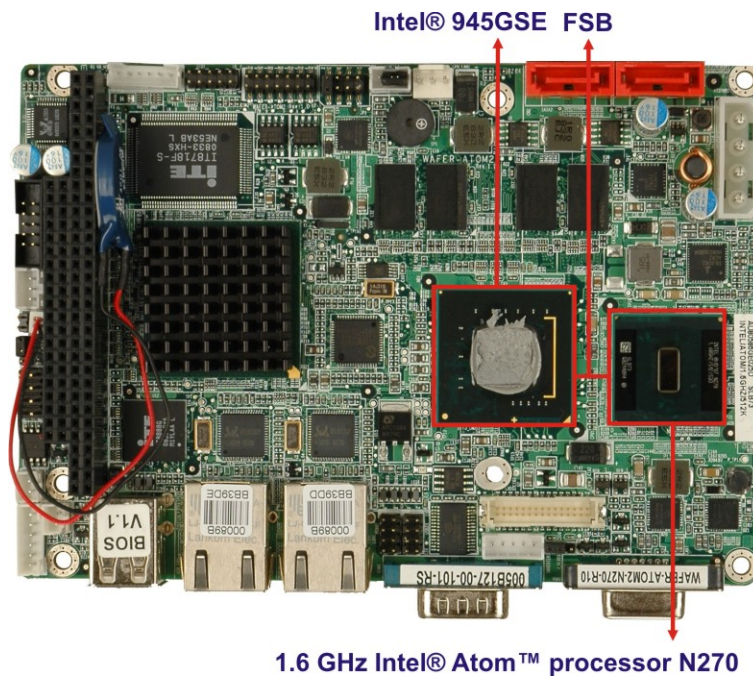
Some of the features of the Intel® Atom™ processor N270 are listed below

- 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
- 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 WAFER-945GSE2 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 Chipset

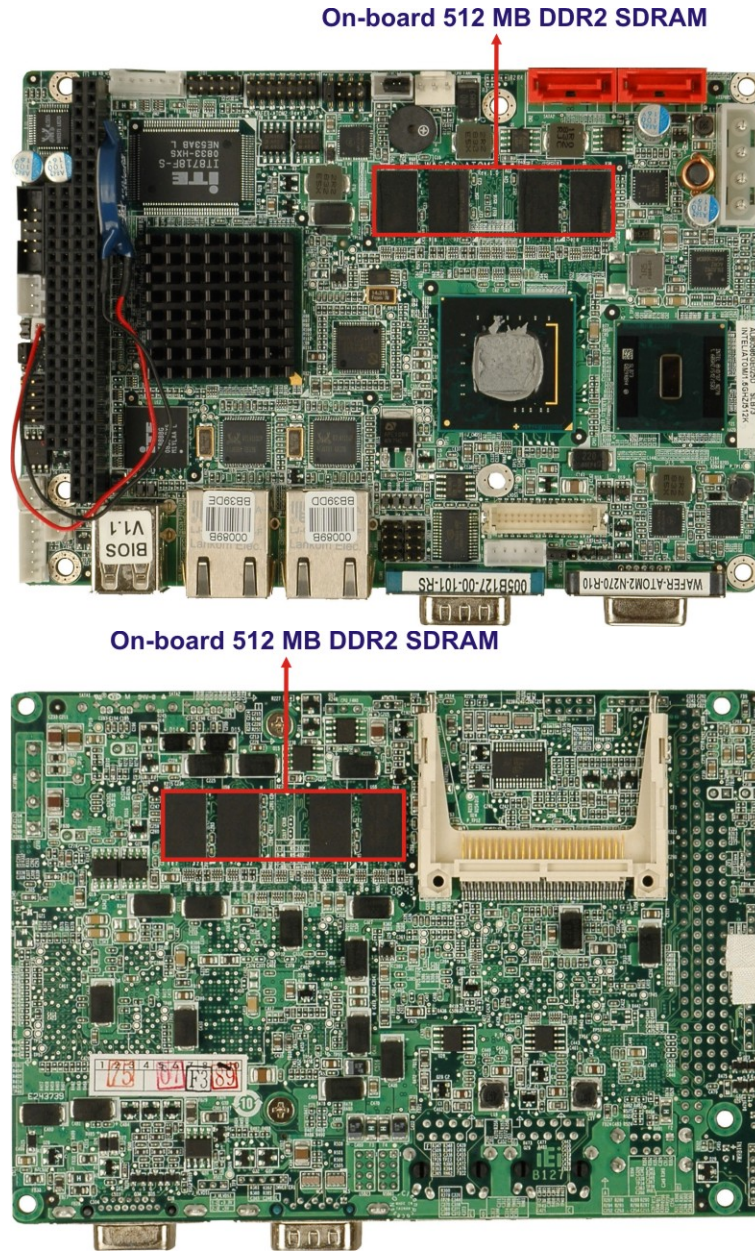
### 2.4.1 Intel® 945GSE Overview

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.

### 2.4.2 Intel® 945GSE DDR2 Controller

- There is 1.0 GB DDR2 onboard the WAFER-945GSE2.

The onboard 1.0 GB DDR2 SDRAM is covered by the heatsink and is shown in **Figure 2-6** below.



**Figure 2-6: Onboard DDR2 SDRAM**

### 2.4.3 Intel® 945GSE Graphics

The Intel® 945GSE supports CRT and LVDS. 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 TV-Out, LVDS, CRT and SDVO
- 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)
- Intel® Automatic Display Brightness
- Video Capture via x1 concurrent PCIe port
- Concurrent operation of x1 PCIe and SDVO
- 4x pixel rate HWMC
- Microsoft DirectX\* 9.1 operating system
- Intermediate Z in Classic Rendering
- Internal Graphics Display Device States: D0, D1, D3
- Graphics Display Adapter States: D0, D3.

### 2.4.3.1 Analog CRT Graphics Mode

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

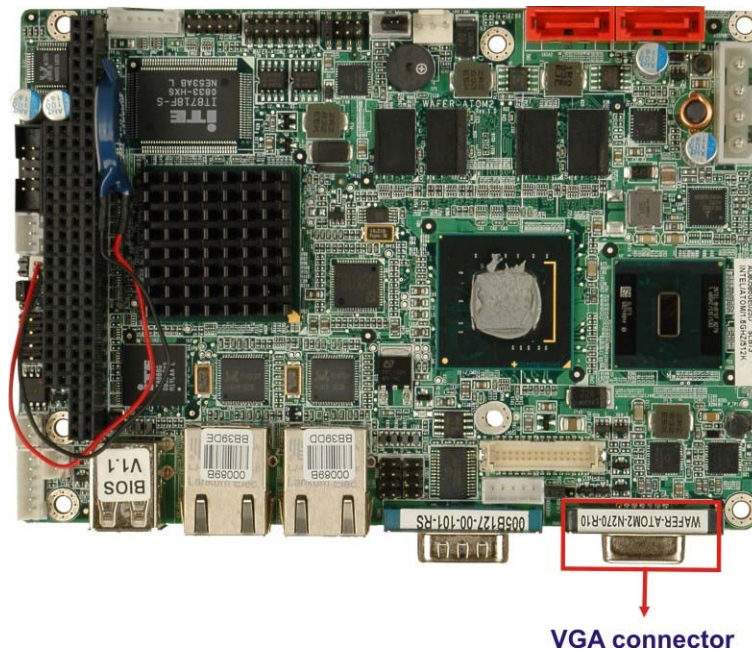


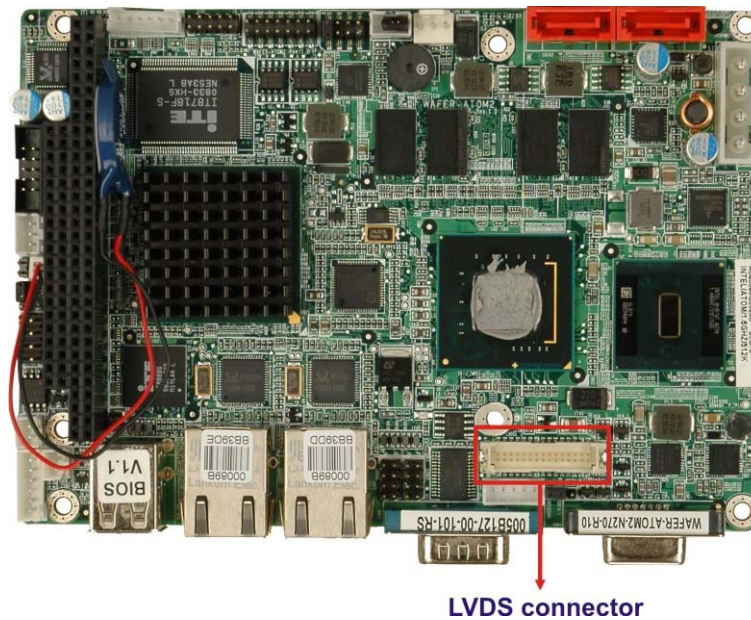
Figure 2-7: VGA Connector

Some of the features of the CRT include:

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

### 2.4.3.2 LVDS Interface

The LVDS interface is connected directly to one of the LVDS connectors on the board.



**Figure 2-8: LVDS Connector**

Some of the features of the LVDS interface include:

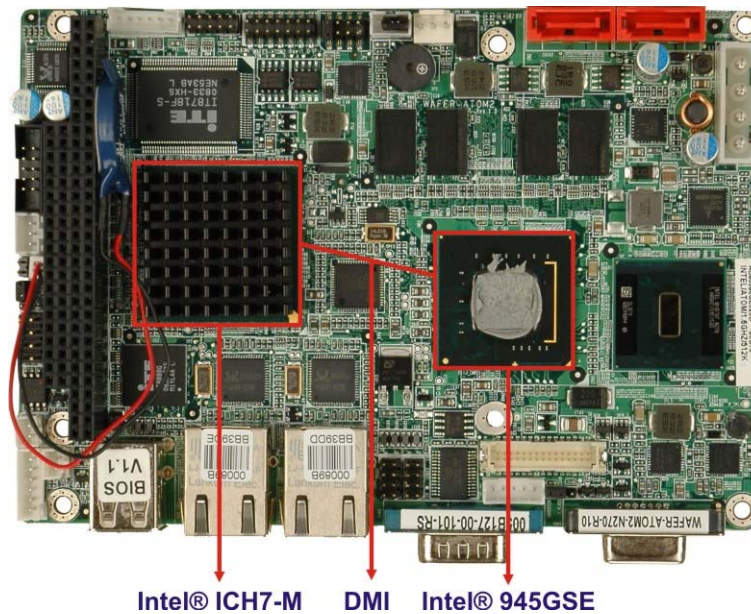
- Panel support up to UXGA (1600 x 1200)
- 25-MHz to 112-MHz single-/dual-channel; @18 bpp
  - TFT panel type supported
- Pixel Dithering for 18-bit TFT panel to emulate 24-bpp true color displays
- Panel Fitting, Panning, and Center Mode Supported
- CPIS 1.5 compliant
- Spread spectrum clocking supported
- Panel Power Sequencing support
- Integrated PWM interface for LCD backlight inverter control



## 2.5 Intel® ICH7-M Southbridge Chipset

### 2.5.1 Intel® ICH7-M Overview

The Intel® ICH7-M Southbridge chipset is connected to the Intel® 945GSE Northbridge GMCH through the chip-to-chip Direct Media Interface (DMI).



**Figure 2-9: Direct Media Interface**

Some of the features of the Intel® ICH7-M are listed below.

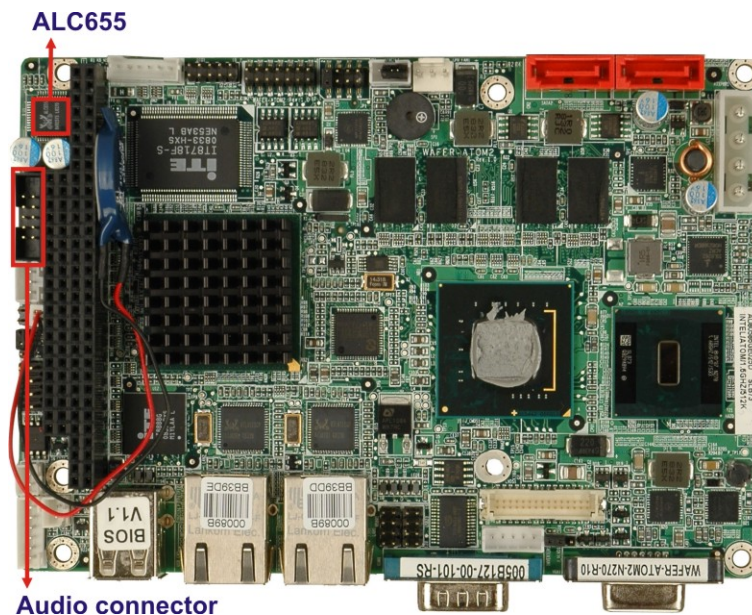
- Complies with PCI Express Base Specification, Revision 1.0a
- Complies with PCI Local Bus Specification, Revision 2.3 and supports 33MHz PCI operations
- Supports ACPI Power Management Logic
- Contains:
  - Enhanced DMA controller
  - Interrupt controller
  - Timer functions
- Integrated SATA host controller with DMA operations interfaced to four SATA connectors on the WAFER-945GSE2
- Integrated IDE controller supports Ultra ATA 100/66/33
- Supports the four USB 2.0 devices on the WAFER-945GSE2 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

### 2.5.2 Intel® ICH7-M Audio Codec '97 Controller

The Integrated AC'97 v2.3 compliant audio controller is integrated to a RealTek ALC655 audio codec. The RealTek ALC655 is in turn connected to onboard audio connectors, which are then connected to compliant audio devices. The RealTek ALC655 is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio codec. The codec and the audio connectors are shown in **Figure 2-10**.



**Figure 2-10: Audio Codec and Connectors**

Some of the features of the RealTek ALC655 are listed below:

- Meets performance requirements for audio on PC99/2001 systems
- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 16-bit Stereo full-duplex CODEC with 48KHz sampling rate

- Compliant with AC'97 Rev 2.3 specifications
  - Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing
  - 14.318MHz -> 24.576MHz PLL to eliminate crystal
  - 12.288MHz BITCLK input
  - Integrated PCBEEP generator to save buzzer
  - Interrupt capability
- Three analog line-level stereo inputs with 5-bit volume control, LINE\_IN, CD, AUX
- High-quality differential CD input
- Two analog line-level mono inputs: PCBEEP, PHONE-IN
- Two software selectable MIC inputs
- Dedicated Front-MIC input for front panel applications (software selectable)
- Boost preamplifier for MIC input
- LINE input shared with surround output; MIC input shared with Center and LFE output
- Built-in 50mW/20ohm amplifier for both Front-out and Surround-Out
- External Amplifier Power Down (EAPD) capability
- Power management and enhanced power saving features
- Supports Power-Off CD function
- Adjustable VREFOUT control
- Supports 48KHz S/PDIF output, complying with AC'97 Rev 2.3 specifications
- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-pin LQFP package
- EAX™ 1.0 and 2.0 compatible
- Direct Sound 3D™ compatible
- A3D™ compatible
- I3DL2 compatible
- HRTF 3D positional audio
- 10-band software equalizer

### 2.5.3 Intel® ICH7-M Low Pin Count (LPC) Interface

The ICH7-M LPC interface complies with the LPC 1.1 specifications. The LPC bus from the ICH7-M is connected to the following components:

- Super I/O chipset

#### 2.5.4 Intel® ICH7-M PCI Interface

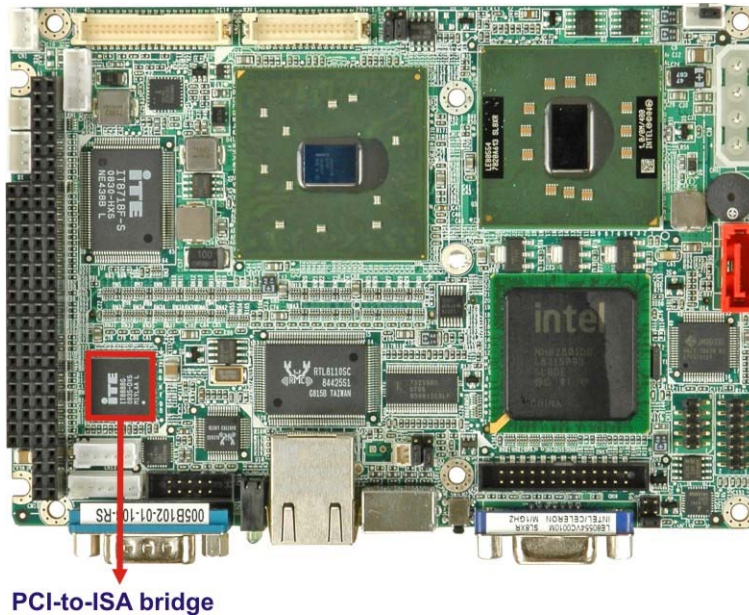
The PCI interface on the ICH7-M is compliant with the PCI Revision 2.3 implementation. Some of the features of the PCI interface are listed below.

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

The PCI bus is connected to a PC/104 connector as shown in the section below.

#### 2.5.5 PCI-to-ISA Bridge

A PC/104 expansion connector on the WAFER-8523 facilitates ISA bus expansion. The PC/104 connector is interfaced to the CPU, through an ITE IT8888F PCI to ISA bridge single function device. The ITE IT8888F is a bridge between the PCI bus and the ISA bus. The 32-bit PCI bus interface on the IT8888F is compliant with PCI Specification v2.1 and supports both PCI Bus Master and Slave. An additional PCI master is interfaced to a PCI-104 expansion slot. The combination of the PCI-104 and PC/104 slots enables PC/104-Plus expansion cards to be added to the system.



PCI-to-ISA bridge

Figure 2-11: PCI-to-ISA-Bridge

Some of the ITE IT8888F features include:

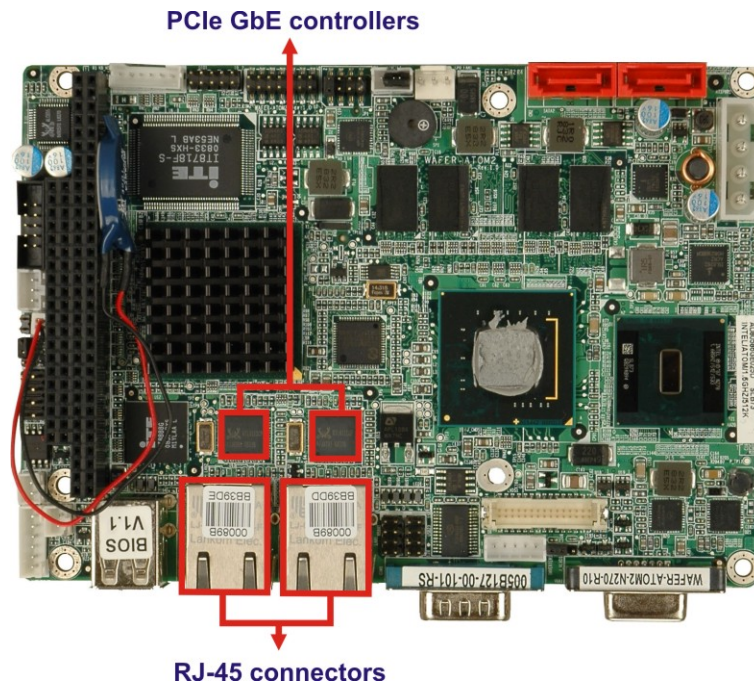
- PCI Interface
- Programmable PCI Address Decoders
- PC/PCI DMA Controller
- Distributed DMA Controller
- ISA Interface
- SM Bus
- One analog line-level mono output: MONO\_OUT
- Power-on Serial Bus Configuration
- Serial IRQ
- Optional FLASH ROM Interface
- Versatile power-on strapping options
- Supports NOGO function
- Single 33 MHz Clock Input
- +3.3V PCI I/F with +5V tolerant I/O buffers
- +5V ISA I/F and core Power Supply

## 2.5.6 Intel® ICH7-M PCIe Bus

The Intel® ICH7-M Southbridge chipset has four PCIe lanes. Two of the four PCIe lanes are interfaced to PCIe GbE controller.

### 2.5.6.1 PCIe GbE Ethernet

Two PCIe lanes are connected to two Realtek RTL8111CP PCIe GbE controllers shown in **Figure 2-12** below.



**Figure 2-12: Realtek RTL8111CP PCIe GbE Controllers**

The Realtek RTL8111CP 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 (10Mbps only) cable. Functions such as crossover detection and auto-correction, polarity correction, adaptive equalization, cross-talk cancellation, echo cancellation, timing recovery, and error correction are implemented to provide robust transmission and reception capabilities at high speeds.

Some of the features of the Realtek RTL8111CP PCIe GbE controllers are listed below.

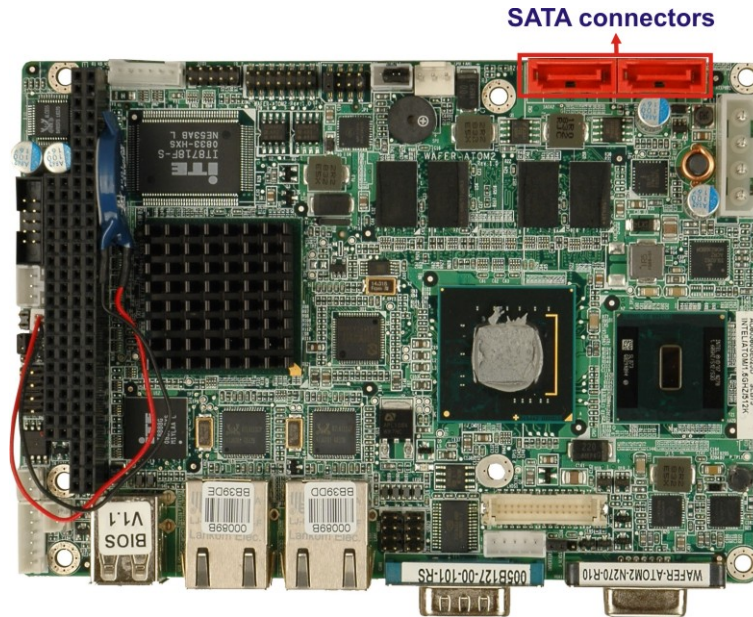
- Integrated 10/100/1000 transceiver
- Auto-Negotiation with Next Page capability
- Supports PCI Express™ 1.1
- Supports pair swap/polarity/skew correction
- Crossover Detection and Auto-Correction
- Wake-on-LAN and remote wake-up support
- Microsoft® NDIS5, NDIS6 Checksum Offload (IPv4, IPv6, TCP, UDP) 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)

### 2.5.7 Intel® ICH7-M Real Time Clock

256 bytes of battery backed RAM is provided by the Motorola MC146818A real time clock (RTC) integrated into the ICH7-M. The RTC operates on a 3V battery and 32.768 KHz crystal. The RTC keeps track of the time and stores system data even when the system is turned off.

### 2.5.8 Intel® ICH7-M SATA Controller

The integrated SATA controller on the ICH7-M Southbridge supports up to four SATA drives with independent DMA operations. Two SATA controllers are connected to two SATA connectors on the WAFER-945GSE2. The SATA connectors are shown in **Figure 2-13**.



**Figure 2-13: SATA Connectors**

SATA controller specifications are listed below.

- Supports four SATA drives
- Supports 1.5 Gb/s data transfer speeds
- Supports Serial ATA Specification, Revision 1.0a

### 2.5.9 Intel® ICH7-M USB Controller

Up to six high-speed, full-speed or low-speed USB devices are supported by the ICH7-M on the WAFER-945GSE2. High-speed USB 2.0, with data transfers of up to 480MB/s, is enabled with the ICH7-M integrated Enhanced Host Controller Interface (EHCI) compliant host controller. USB full-speed and low-speed signaling is supported by the ICH7-M integrated Universal Host Controller Interface (UHCI) controllers.

The six USB ports implemented on the WAFER-945GSE2 are connected to two internal connectors and one external connector. See **Figure 2-14**.



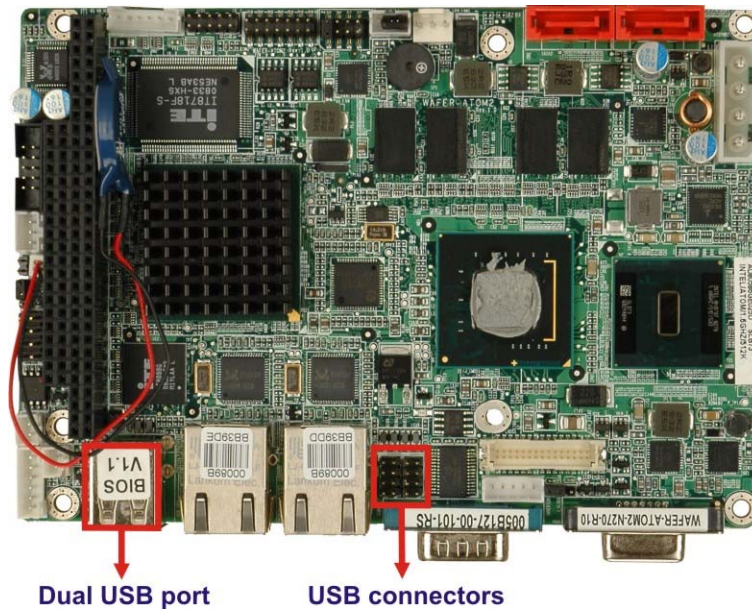


Figure 2-14: Onboard USB Implementation

## 2.6 LPC Bus Components

### 2.6.1 LPC Bus Overview

The SIS964 LPC bus is connected to components listed below:

- Super I/O chipset
- LPC Serial Port Chipset

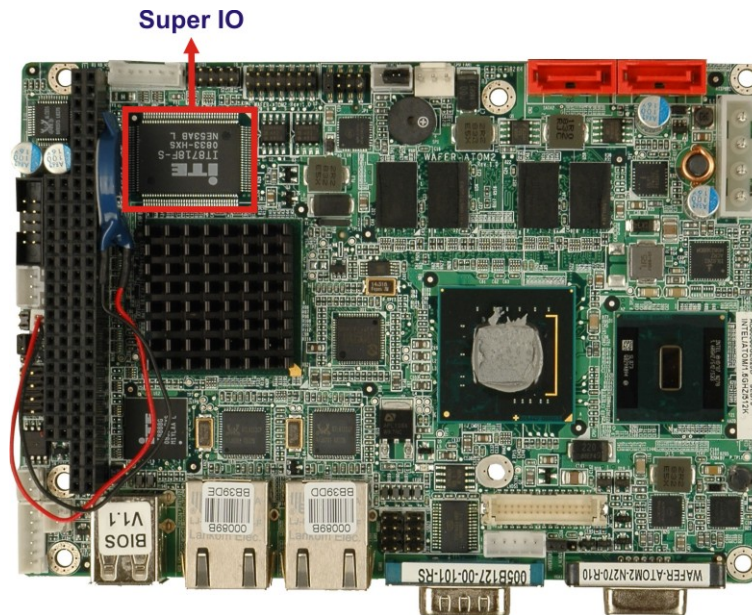
### 2.6.2 BIOS Chipset

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

### 2.6.3 iTE IT8718F Super I/O chipset

The iTE IT8718F Super I/O chipset is connected to the ICH7-M Southbridge through the LPC bus.



**Figure 2-15: 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:

### 2.6.3.1 Super I/O LPC Interface

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

### 2.6.3.2 Super I/O 16C550 UARTs

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

- Two standard serial ports (COM1 and COM2)
- IrDa 1.0 and ASKIR protocols

### 2.6.3.3 Super I/O 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.

### 2.6.3.4 Super I/O Enhanced Hardware Monitor

The Super I/O Enhanced Hardware Monitor monitors two 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.

### 2.6.3.5 Super I/O 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.

### 2.6.3.6 Super I/O 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

## 2.7 Environmental and Power Specifications

### 2.7.1 System Monitoring

Two thermal inputs on the WAFER-945GSE2 Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- System temperature
- CPU temperature

Eight voltage inputs on the WAFER-945GSE2 Super I/O Enhanced Hardware Monitor monitor the following voltages:

- CPU Core
- +1.05V
- +3.3V
- 5.0V
- +12V
- +1.5V
- +1.8V
- 5VSB
- VBAT

The WAFER-945GSE2 Super I/O Enhanced Hardware Monitor also monitors the following fan speeds:

- CPU Fan speed

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 WAFER-945GSE2 are listed below.

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

A heat sink must be installed on the CPU, Northbridge and the front-side onboard memory. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. A heat sink is also mounted on the Southbridge chipset to ensure the operating temperature of the chip remains low.

### 2.7.3 Power Consumption

**Table 2-1** shows the power consumption parameters for the WAFER-945GSE2 running with a 1.6 GHz Intel® Atom™ with 1.0 GB DDR2 memory.

| Voltage | Current |
|---------|---------|
| +5V     | 3.1A    |

**Table 2-1: Power Consumption**



Chapter

3

# Unpacking

---

## 3.1 Anti-static Precautions

---



### WARNING!

Failure to take ESD precautions during the installation of the WAFER-945GSE2 may result in permanent damage to the WAFER-945GSE2 and severe injury to the user.

---

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the WAFER-945GSE2. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the WAFER-945GSE2 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 WAFER-945GSE2, place it on an anti-static pad. This reduces the possibility of ESD damaging the WAFER-945GSE2.
- **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 WAFER-945GSE2 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 WAFER-945GSE2 does not fall out of the box.
- Make sure all the components shown in **Section 3.3** are present.







### 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 WAFER-945GSE2 was purchased from or contact an IEI sales representative directly by sending an email to [sales@iei.com.tw](mailto:sales@iei.com.tw).




#### 3.3.1 Package Contents

The WAFER-945GSE2 is shipped with the following components:

| Quantity | Item and Part Number                              | Image   |
|----------|---|---|
| 1        | WAFER-945GSE2                                     |   |
| 2        | SATA cable<br>(P/N: 32000-062800-RS)              |  |
| 1        | KB/MS cable<br>(P/N: 32000-023800-RS)             |  |
| 1        | Audio cable<br>(P/N: 32000-072100-RS)             |  |
| 1        | Mini jumper pack (2.0mm)<br>(P/N:33100-000033-RS) |  |
| 2        | Plastic intermediate pole for PC/104 (15mm)       |  |







## WAFER-945GSE2 User Manual

|   |   |   |
|---|---|---|
| 2 | Plastic intermediate pole for PC/104 (20mm) |  |
| 1 | Utility CD                                  |  |
| 1 | Quick Installation Guide                    |  |

### 3.3.2 Optional Items

The WAFER-945GSE2 is shipped with the following components:

| Item and Part Number                                       | Image  |
|--|--|
| Dual USB cable (without bracket)<br>(P/N: 32000-070300-RS) |  |
| RS-232/422/485 cable<br>(P/N:32200-026500-RS)              |  |
| ATX power cable<br>(P/N: 32100-052100)                     |  |
| SATA power cable<br>(P/N: 32100-088600-RS)                 |  |



Chapter

4

# Connectors

---

## 4.1 Peripheral Interface Connectors

Section 4.1.1 shows the peripheral interface connector locations. Section 4.2 lists all the peripheral interface connectors seen in Section 4.1.1.

### 4.1.1 WAFER-945GSE2 Layout

Figure 4-1 and Figure 4-2 show the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.

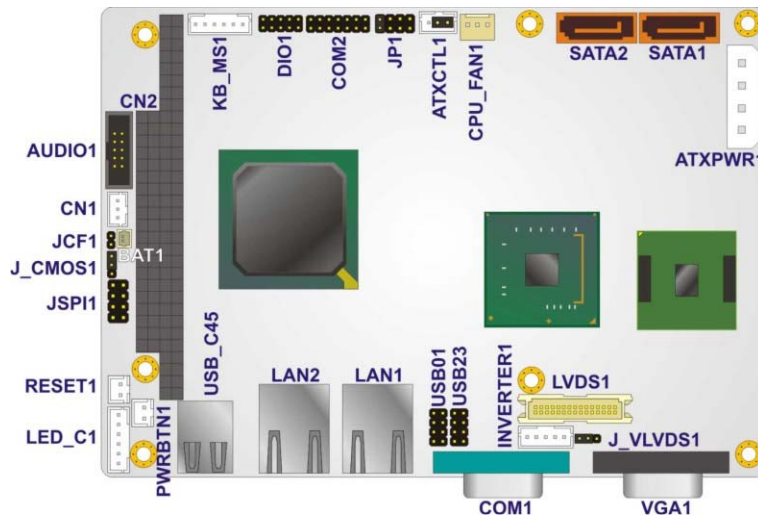


Figure 4-1: Connector and Jumper Locations [Front Side]

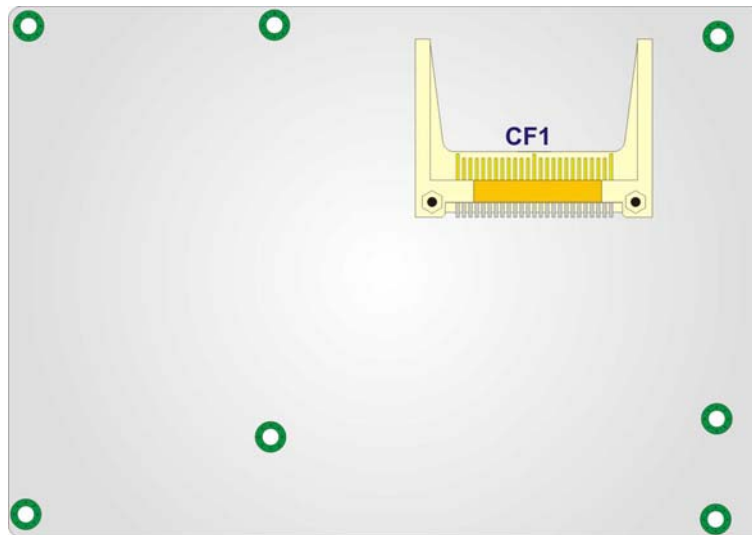


Figure 4-2: Connector and Jumper Locations [solder side]

## 4.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the WAFER-945GSE2. Detailed descriptions of these connectors can be found below.

| Connector                            | Type             | Label     |
|--------------------------------------|------------------|-----------|
| Audio connector                      | 10-pin header    | AUDIO1    |
| ATX power control connector          | 3-pin wafer      | ATXCTL1   |
| ATX power connector                  | 4-pin ATX        | ATXPWR1   |
| Backlight inverter connector         | 5-pin wafer      | INVERTER1 |
| Battery connector                    | 2-pin            | BAT1      |
| CompactFlash® socket                 | 50-pin CF socket | CF1       |
| Digital input/output (DIO) connector | 10-pin header    | DIO1      |
| Fan connector                        | 3-pin wafer      | CPU_FAN1  |
| Keyboard and mouse connector         | 6-pin wafer      | KB_MS1    |
| LED connector                        | 6-pin header     | LED_C1    |
| LVDS connector                       | 30-pin crimp     | LVDS1     |
| Power button connector               | 2-pin wafer      | PWRBTN1   |

|                                      |                 |        |
|--------------------------------------|-----------------|--------|
| Reset button connector               | 2-pin header    | RESET1 |
| RS-232/422/485 serial port connector | 14-pin header   | COM2   |
| Serial ATA (SATA) drive connector    | 7-pin SATA      | SATA1  |
| Serial ATA (SATA) drive connector    | 7-pin SATA      | SATA2  |
| PC/104 connector                     | 104-pin ISA bus | CN2    |
| PC/104 power input connector         | 3-pin           | CN1    |
| USB 2.0 connector                    | 8-pin header    | USB01  |
| USB 2.0 connector                    | 8-pin header    | USB23  |

**Table 4-1: Peripheral Interface Connectors**

### 4.2.1 External Interface Panel Connectors

**Table 4-2** lists the rear panel connectors on the WAFER-945GSE2. Detailed descriptions of these connectors can be found in **Section 4.4** on **page 53**.

| Connector                    | Type          | Label   |
|------------------------------|---------------|---------|
| Ethernet connector           | RJ-45         | LAN1    |
| Ethernet connector           | RJ-45         | LAN2    |
| RS-232 serial port connector | Male DB-9     | COM1    |
| Dual USB port                | USB port      | USB_C45 |
| VGA port connector           | 15-pin female | VGA1    |

**Table 4-2: Rear Panel Connectors**

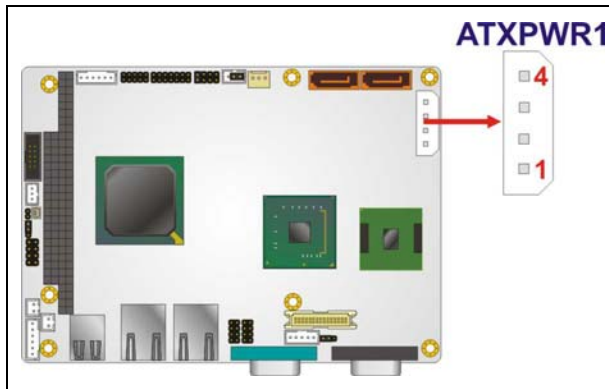
### 4.3 Internal Peripheral Connectors

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 WAFER-945GSE2.

### 4.3.1 ATX Power Connector

- CN Label:**            **ATXPWR1**
- CN Type:**            4-pin AT power connector (1x4)
- CN Location:**        See **Figure 4-3**
- CN Pinouts:**         See **Table 4-3**

The 4-pin ATX power connector is connected to an ATX power supply.



**Figure 4-3: ATX Power Connector Location**

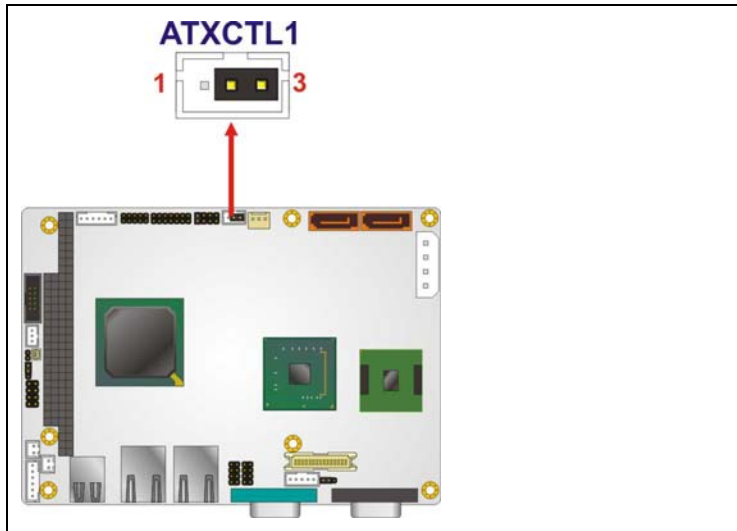
| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | +12V        |
| 2       | GND         |
| 3       | GND         |
| 4       | +5V         |

**Table 4-3: ATX Power Connector Pinouts**

### 4.3.2 ATX Power Supply Enable Connector

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

The ATX power supply enable connector enables the WAFER-945GSE2 to be connected to an ATX power supply. In default mode, the WAFER-945GSE2 can only use an AT power supply. To enable an ATX power supply the AT Power Select jumper must also be configured. Please refer to Chapter 3 for more details.



**Figure 4-4: ATX Power Supply Enable Connector Location**

| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | +5V Standby |
| 2       | GND         |
| 3       | PS-ON       |

**Table 4-4: ATX Power Supply Enable Connector Pinouts**

### 4.3.3 Audio Connector (10-pin)

- CN Label:** AUDIO1
- CN Type:** 10-pin header
- CN Location:** See **Figure 4-5**
- CN Pinouts:** See **Table 4-5**

The 10-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.

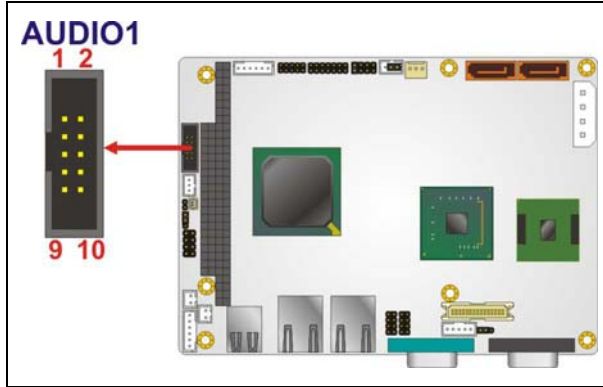


Figure 4-5: Audio Connector Pinouts (10-pin)

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1       | Line out R  | 2       | Line in R   |
| 3       | GND         | 4       | GND         |
| 5       | Line out L  | 6       | Line in L   |
| 7       | GND         | 8       | GND         |
| 9       | Mic in      | 10      | Mic in      |

Table 4-5: Audio Connector Pinouts (10-pin)

#### 4.3.4 Backlight Inverter Connector

- CN Label:** INVERTER1
- CN Type:** 5-pin wafer (1x5)
- CN Location:** See Figure 4-6
- CN Pinouts:** See Table 4-6

The backlight inverter connectors provide the backlights on the LCD display connected to the WAFER-945GSE2 with +12V of power.



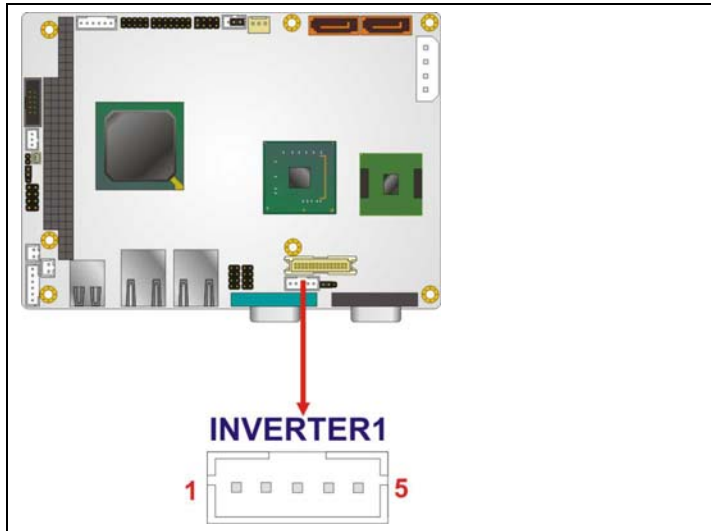


Figure 4-6: Panel Backlight Connector Pinout Locations

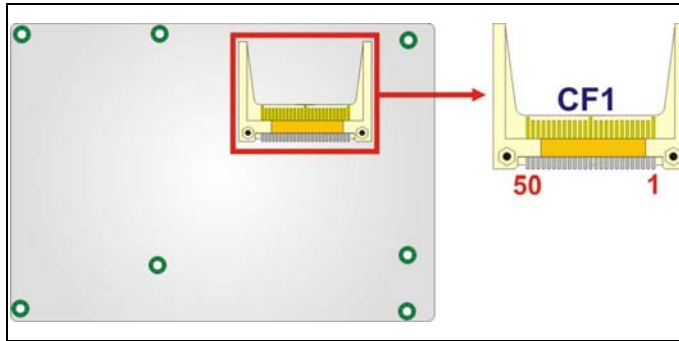
| PIN NO. | DESCRIPTION           |
|---------|-----------------------|
| 1       | LCD Backlight Control |
| 2       | GROUND                |
| 3       | + 12V                 |
| 4       | GROUND                |
| 5       | BACKLIGHT Enable      |

Table 4-6: Panel Backlight Connector Pinouts

#### 4.3.5 CompactFlash® Socket

- CN Label:** CF1
- CN Type:** 50-pin header (2x25)
- CN Location:** See **Figure 4-7**
- CN Pinouts:** See **Table 4-7**

A CF Type I or Type II memory card is inserted to the CF socket on the solder side of the WAFER-945GSE2.


**Figure 4-7: CF Card Socket Location (solder side)**

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1       | GND         | 26      | CD1#        |
| 2       | D3          | 27      | D11         |
| 3       | D4          | 28      | D12         |
| 4       | D5          | 29      | D13         |
| 5       | D6          | 30      | D14         |
| 6       | D7          | 31      | D15         |
| 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      | D0          | 46      | BVD1        |
| 22      | D1          | 47      | D8          |
| 23      | D2          | 48      | D9          |
| 24      | IOCS16#     | 49      | D10         |

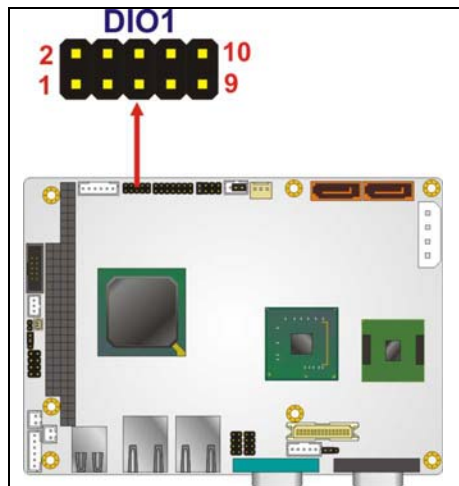
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 25      | CD2#        | 50      | GND2        |

**Table 4-7: CF Card Socket Pinouts**

### 4.3.6 Digital Input/Output (DIO) Connector

- CN Label:** DIO1
- CN Type:** 10-pin header (2x5)
- CN Location:** See **Figure 4-8**
- CN Pinouts:** See **Table 4-8**

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



**Figure 4-8: DIO Connector Location**

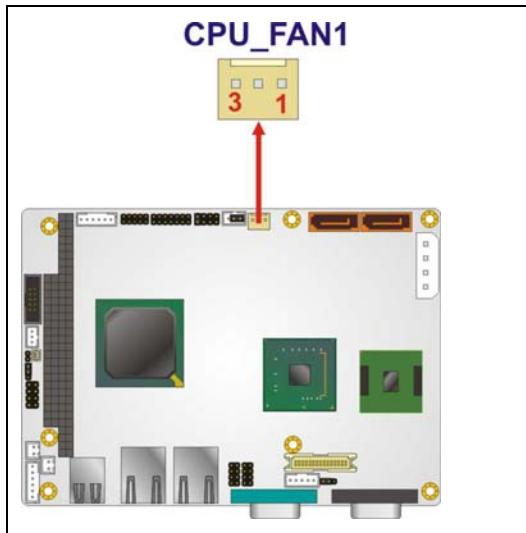
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1       | GND         | 2       | VCC         |
| 3       | Output 3    | 4       | Output 2    |
| 5       | Output 1    | 6       | Output 0    |
| 7       | Input 3     | 8       | Input 2     |
|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

**Table 4-8: DIO Connector Pinouts**

### 4.3.7 Fan Connector (+12V, 3-pin)

- CN Label:** CPU\_FAN1
- CN Type:** 3-pin header
- CN Location:** See **Figure 4-9**
- CN Pinouts:** See **Table 4-9**

The cooling fan connector provides a 12V, 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 4-9: +12V Fan Connector Location**

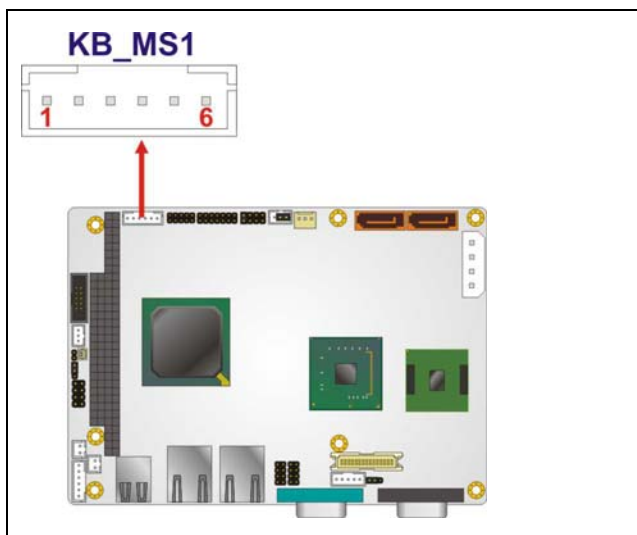
| PIN NO. | DESCRIPTION      |
|---------|------------------|
| 1       | GND              |
| 2       | +12V             |
| 3       | Fan Speed Detect |

**Table 4-9: +12V Fan Connector Pinouts**

### 4.3.8 Keyboard/Mouse Connector

- CN Label:** KB\_MS1
- CN Type:** 6-pin header (1x6)
- CN Location:** See **Figure 4-10**
- CN Pinouts:** See **Table 4-10**

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



**Figure 4-10: Keyboard/Mouse Connector Location**

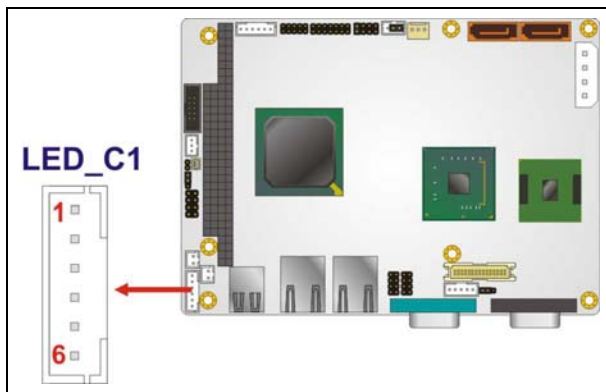
| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | +5V KB DATA |
| 2       | MS DATA     |
| 3       | MS CLK      |
| 4       | KB DATA     |
| 5       | KB CLK      |
| 6       | GROUND      |

**Table 4-10: Keyboard/Mouse Connector Pinouts**

### 4.3.9 LED Connector

- CN Label:** LED\_C1
- CN Type:** 6-pin wafer (1x6)
- CN Location:** See **Figure 4-11**
- CN Pinouts:** See **Table 4-11**

The LED connector connects to an HDD indicator LED and a power LED on the system chassis to inform the user about HDD activity and the power on/off status of the system.



**Figure 4-11: LED Connector Locations**

| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | +5V         |
| 2       | GND         |
| 3       | Power LED+  |
| 4       | Power LED-  |
| 5       | HDD LED+    |
| 6       | HDD LED-    |

**Table 4-11: LED Connector Pinouts**

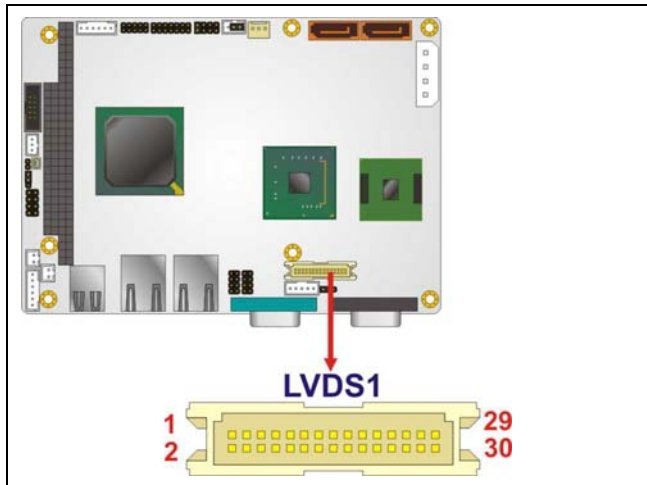
### 4.3.10 LVDS LCD Connector

- CN Label:** LVDS1
- CN Type:** 30-pin crimp (2x10)
- CN Location:** See **Figure 4-12**

# WAFER-945GSE2 User Manual

**CN Pinouts:** See **Table 4-12**

The 30-pin LVDS LCD connector can be connected to single channel or dual channel, 24-bit or 36-bit LVDS panel.



**Figure 4-12: LVDS LCD Connector Pinout Location**

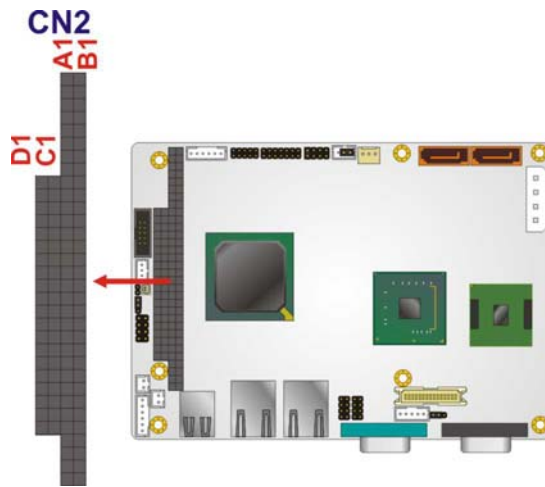
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1       | GND1        | 2       | GND2        |
| 3       | A_Y0        | 4       | A_Y0#       |
| 5       | A_Y1        | 6       | A_Y1#       |
| 7       | A_Y2        | 8       | A_Y2#       |
| 9       | A_CK        | 10      | A_CK#       |
| 11      | NC          | 12      | NC          |
| 13      | GND3        | 14      | GND4        |
| 15      | B_Y0        | 16      | B_Y0#       |
| 17      | B_Y1        | 18      | B_Y1#       |
| 19      | B_Y2        | 20      | B_Y2#       |
| 21      | B_CK        | 22      | B_CK#       |
| 23      | NC          | 24      | NC          |
| 25      | GND5        | 26      | GND6        |
| 27      | VCC_LCD     | 28      | VCC_LCD     |
| 29      | VCC_LCD     | 30      | VCC_LCD     |

**Table 4-12: LVDS LCD Port Connector Pinouts**

### 4.3.11 PC/104 Connector

- CN Label:** CN2
- CN Type:** 104-pin PC/104 slot
- CN Location:** See **Figure 4-13**
- CN Pinouts:** See **Table 4-13** and **Table 4-14**

The PCIe mini card slot enables a PCIe mini card expansion module to be connected to the board. Cards supported include among others wireless LAN (WLAN) cards.



**Figure 4-13: PC/104 Connector**

| PIN | Description | PIN | Description | PIN | Description | PIN | Description |
|-----|-------------|-----|-------------|-----|-------------|-----|-------------|
| A1  | -IOCHK      | A17 | SA14        | B1  | GND         | B17 | -DACK1      |
| A2  | SD7         | A18 | SA13        | B2  | RSTDRV      | B18 | DRQ1        |
| A3  | SD6         | A19 | SA12        | B3  | VCC         | B19 | -REFRESH    |
| A4  | SD5         | A20 | SA11        | B4  | IRQ9        | B20 | BCLK        |
| A5  | SD4         | A21 | SA10        | B5  | NC          | B21 | IRQ7        |
| A6  | SD3         | A22 | SA9         | B6  | DRQ2        | B22 | IRQ6        |
| A7  | SD2         | A23 | SA8         | B7  | NC          | B23 | IRQ5        |
| A8  | SD1         | A24 | SA7         | B8  | -NROWS      | B24 | IRQ4        |
| A9  | SD0         | A25 | SA6         | B9  | +12V        | B25 | IRQ3        |
| A10 | IOCHRDY     | A26 | SA5         | B10 | GND         | B26 | -DACK2      |
| A11 | AEN         | A27 | SA4         | B11 | -SMEMW      | B27 | TC          |



| PIN | Description | PIN | Description | PIN | Description | PIN | Description |
|-----|-------------|-----|-------------|-----|-------------|-----|-------------|
| A12 | SA19        | A28 | SA3         | B12 | -SMEMR      | B28 | BALE        |
| A13 | SA18        | A29 | SA2         | B13 | -IOW        | B29 | VCC         |
| A14 | SA17        | A30 | SA1         | B14 | -IOR        | B30 | ISAOSC      |
| A15 | SA16        | A31 | SA0         | B15 | -DACK3      | B31 | GND         |
| A16 | SA15        | A32 | GND         | B16 | DRQ3        | B32 | GND         |

**Table 4-13: PC/104 Connector Pinouts (1 of 2)**

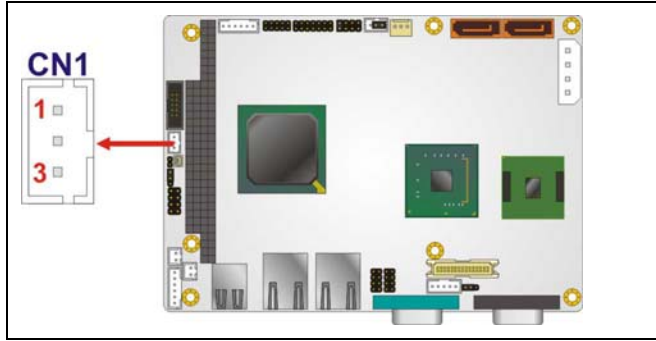
| PIN | Description | PIN | Description | PIN | Description | PIN | Description |
|-----|-------------|-----|-------------|-----|-------------|-----|-------------|
| C1  | GND         | C11 | -MEMW       | D1  | GND         | D11 | -DACK5      |
| C2  | -SBHE       | C12 | SD8         | D2  | -MEMCS16    | D12 | DRQ5        |
| C3  | SA23        | C13 | SD9         | D3  | -IOCS16     | D13 | -DACK6      |
| C4  | SA22        | C14 | SD10        | D4  | IRQ10       | D14 | DRQ6        |
| C5  | SA21        | C15 | SD11        | D5  | IRQ11       | D15 | -DACK7      |
| C6  | SA20        | C16 | SD12        | D6  | IRQ12       | D16 | DRQ7        |
| C7  | SA19        | C17 | SD13        | D7  | IRQ15       | D17 | VCC         |
| C8  | SA18        | C18 | SD14        | D8  | IRQ14       | D18 | -MASTER     |
| C9  | SA17        | C19 | SD15        | D9  | -DACK0      | D19 | GND         |
| C10 | -MEMR       | C20 | NC          | D10 | DRQ0        | D20 | GND         |

**Table 4-14: PC/104 Connector Pinouts (2 of 2)**

### 4.3.12 PC/104 Power Input Connector

- CN Label:** CN1
- CN Type:** 3-pin wafer (1x3)
- CN Location:** See **Figure 4-14**
- CN Pinouts:** See **Table 4-15**

The PC/104 power input connector provides power to the PC/104 expansion module installed on the PC/104 slot.


**Figure 4-14: PC/104 Power Input Connector Pinouts**

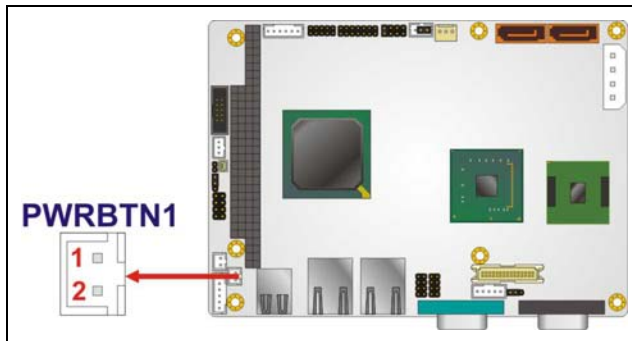
| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | -5V         |
| 2       | GND         |
| 3       | -12V        |

**Table 4-15: PC/104 Power Input Connector Pinouts**

### 4.3.13 Power Button Connector

- CN Label:** PWRBTN1
- CN Type:** 2-pin wafer (1x2)
- CN Location:** See **Figure 4-15**
- CN Pinouts:** See **Table 4-16**

The power button connector is connected to a power switch on the system chassis to enable users to turn the system on and off.


**Figure 4-15: Power Button Connector Location**

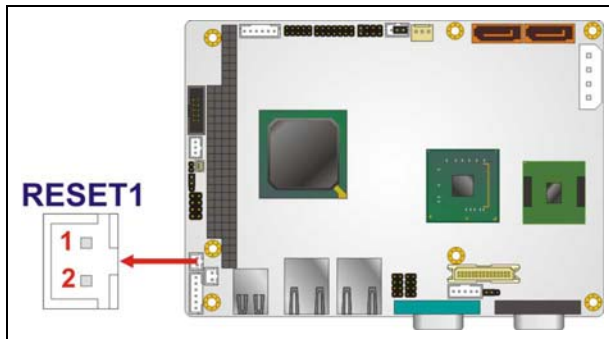
| PIN NO. | DESCRIPTION  |
|---------|--------------|
| 1       | Power Switch |
| 2       | GND          |

**Table 4-16: Power Button Connector Pinouts**

#### 4.3.14 Reset Button Connector

- CN Label:** RESET1
- CN Type:** 2-pin wafer (1x2)
- CN Location:** See **Figure 4-16**
- CN Pinouts:** See **Table 4-17**

The reset button connector is connected to a reset switch on the system chassis to enable users to reboot the system when the system is turned on.



**Figure 4-16: Reset Button Connector Locations**

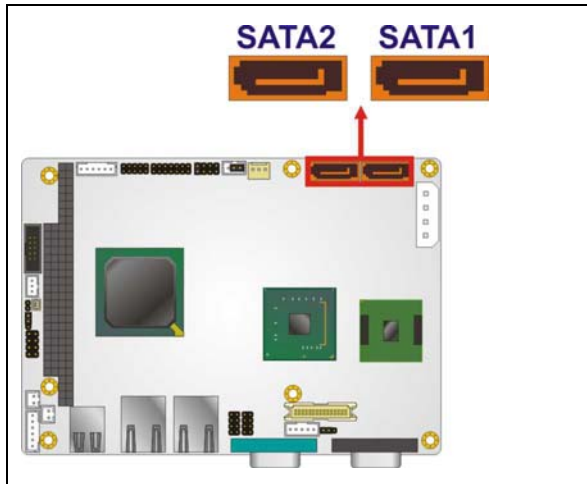
| PIN NO. | DESCRIPTION  |
|---------|--------------|
| 1       | Reset Switch |
| 2       | GND          |

**Table 4-17: Reset Button Connector Pinouts**

### 4.3.15 SATA Drive Connectors

- CN Label:** SATA1, SATA2
- CN Type:** 7-pin SATA drive connectors
- CN Location:** See **Figure 4-17**
- CN Pinouts:** See **Table 4-18**

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 150Mb/s. The SATA drives can be configured in a RAID configuration.



**Figure 4-17: SATA Drive Connector Locations**

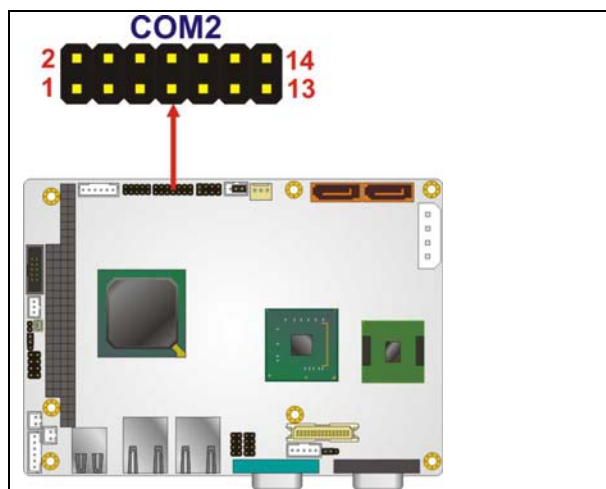
| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | GND         |
| 2       | TX+         |
| 3       | TX-         |
| 4       | GND         |
| 5       | RX-         |
| 6       | RX+         |
| 7       | GND         |

**Table 4-18: SATA Drive Connector Pinouts**

**4.3.16 Serial Port Connector (COM2 ) (RS-232, RS-422 or RS-485)**

- CN Label:** COM2
- CN Type:** 14-pin header (2x7)
- CN Location:** See **Figure 4-18**
- CN Pinouts:** See **Table 4-19**

The 14-pin serial port connector connects to the COM2 serial communications channels. COM2 is a multifunction channel. In default mode COM2 is an RS-232 serial communication channel but, with the COM2 function select jumper, can be configured as either an RS-422 or RS-485 serial communications channel.



**Figure 4-18: COM2 Connector Pinout Locations**

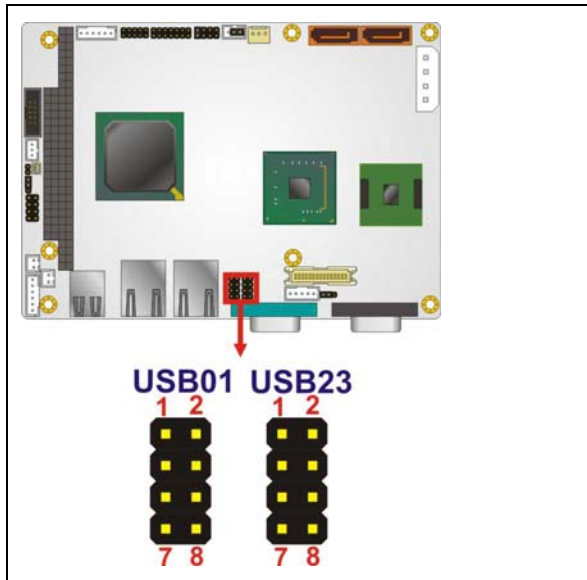
| <b>PIN NO.</b> | <b>DESCRIPTION</b>        | <b>PIN NO.</b> | <b>DESCRIPTION</b>    |
|----------------|---------------------------|----------------|-----------------------|
| 1              | DATA CARRIER DETECT (DCD) | 2              | DATA SET READY (DSR)  |
| 3              | RECEIVE DATA (RXD)        | 4              | REQUEST TO SEND (RTS) |
| 5              | TRANSMIT DATA (TXD)       | 6              | CLEAR TO SEND (CTS)   |
| 7              | DATA TERMINAL READY (DTR) | 8              | RING INDICATOR (RI)   |
| 9              | GND                       | 10             | N/C                   |
| 11             | TXD485+                   | 12             | TXD485#               |
| 13             | RXD485+                   | 14             | RXD485#               |

**Table 4-19: COM2 Connector Pinouts**

### 4.3.17 USB Connectors (Internal)

- CN Label:** USB01 and USB23
- CN Type:** 8-pin header (2x4)
- CN Location:** See **Figure 4-19**
- CN Pinouts:** See **Table 4-20**

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 4-19: USB Connector Pinout Locations**

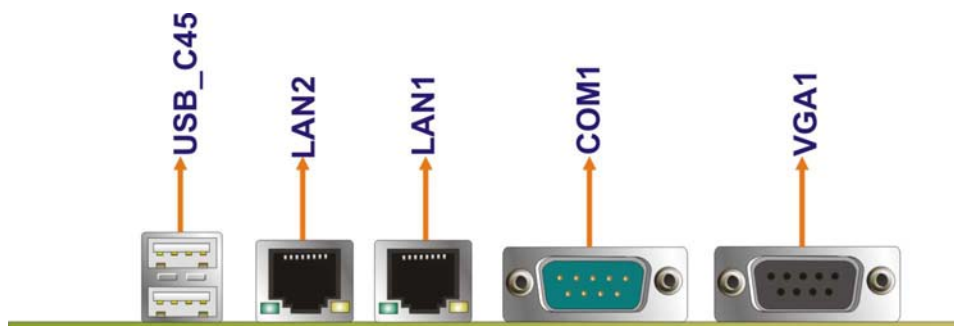
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1       | VCC         | 2       | GND         |
| 3       | DATA-       | 4       | DATA+       |
| 5       | DATA+       | 6       | DATA-       |
| 7       | GND         | 8       | VCC         |

**Table 4-20: USB Port Connector Pinouts**

## 4.4 External Peripheral Interface Connector Panel

Figure 4-20 shows the WAFER-945GSE2 external peripheral interface connector (EPIC) panel. The WAFER-945GSE2 EPIC panel consists of the following:

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



**Figure 4-20: WAFER-945GSE2 External Peripheral Interface Connector**

### 4.4.1 LAN Connectors

**CN Label:** LAN1 and LAN2

**CN Type:** RJ-45

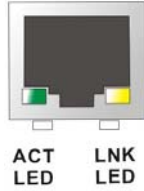
**CN Location:** See **Figure 4-20**

**CN Pinouts:** See **Table 4-21**

The WAFER-945GSE2 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-      |

|   |        |   |        |
|---|--------|---|--------|
| 4 | MDIA1- | 8 | MDIA0+ |
|---|--------|---|--------|

**Table 4-21: LAN Pinouts**

**Figure 4-21: 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 4-22**.

| STATUS | DESCRIPTION | STATUS | DESCRIPTION |
|--------|-------------|--------|-------------|
| GREEN  | Activity    | YELLOW | Linked      |

**Table 4-22: RJ-45 Ethernet Connector LEDs**

#### 4.4.2 Serial Port Connector (COM1)

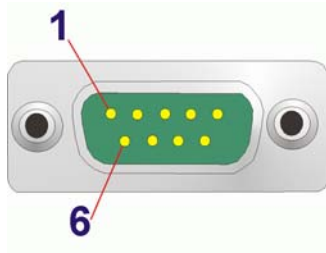
- CN Label:** COM1
- CN Type:** DB-9 connectors
- CN Location:** See **Figure 4-20** (see 2)
- CN Pinouts:** See **Table 4-23** and **Figure 4-22**

The 9-pin DB-9 serial port connectors are connected to RS-232 serial communications devices.

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



**Table 4-23: RS-232 Serial Port (COM 1) Pinouts**



**Figure 4-22: COM1 Pinout Locations**

#### 4.4.3 USB Connectors

- CN Label:** USB
- CN Type:** Dual USB port
- CN Location:** See **Figure 4-20**
- CN Pinouts:** See **Table 4-24**

The WAFER-945GSE2 has two external USB 2.0 ports. The ports connect to both USB 2.0 and USB 1.1 devices.

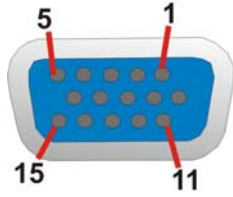
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1       | VCC         | 5       | VCC         |
| 2       | DATA-       | 6       | DATA-       |
| 3       | DATA+       | 7       | DATA+       |
| 4       | GND         | 8       | GND         |

**Table 4-24: USB Port Pinouts**

#### 4.4.4 VGA Connector

- CN Label:** VGA1
- CN Type:** 15-pin Female
- CN Location:** See **Figure 4-20**
- CN Pinouts:** See **Figure 4-23** and **Table 4-25**

The WAFER-945GSE2 has a single 15-pin female connector for connectivity to standard display devices.



**Figure 4-23: 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  | VSYNC       |
| 15  | DDCCLK      |     |             |

**Table 4-25: VGA Connector Pinouts**

Chapter

5

# Installation

---

## 5.1 Anti-static Precautions

---



### WARNING:

Failure to take ESD precautions during the installation of the WAFER-945GSE2 may result in permanent damage to the WAFER-945GSE2 and severe injury to the user.

---

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the WAFER-945GSE2. Dry climates are especially susceptible to ESD. It is therefore critical to strictly adhere to the following anti-static precautions whenever the WAFER-945GSE2, or any other electrical component, is handled.

- **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 WAFER-945GSE2, place it on an anti-static pad. This reduces the possibility of ESD damaging the WAFER-945GSE2.
- **Only handle the edges of the PCB:** When handling the PCB, hold the PCB by the edges.

## Installation Considerations

---



### NOTE:

The following installation notices and installation considerations should be read and understood before the WAFER-945GSE2 is installed. All installation notices should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the WAFER-945GSE2 and injury to the person installing the motherboard.

---

### 5.1.1 Installation Notices

---

**WARNING:**

The installation instructions described in this manual should be carefully followed in order to prevent damage to the WAFER-945GSE2, WAFER-945GSE2 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 WAFER-945GSE2 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 WAFER-945GSE2 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 WAFER-945GSE2 off:
  - When working with the WAFER-945GSE2, 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 WAFER-945GSE2 **DO NOT**:

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

### 5.1.2 Installation Checklist

The following checklist is provided to ensure the WAFER-945GSE2 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 WAFER-945GSE2 is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - SATA drives
  - Power supply
  - USB cable
  - Serial port cable
  - Keyboard and mouse cable
- The following external peripheral devices are properly connected to the chassis:
  - RS-232 serial communications device
  - VGA screen
  - USB devices

## 5.2 Unpacking

When the WAFER-945GSE2 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 contact the WAFER-945GSE2 vendor reseller/vendor where the WAFER-945GSE2 was purchased or contact an IEI sales representative.

## 5.3 CF Card Installation

### 5.3.1 CF Card Installation

**NOTE:**

The WAFER-945GSE2 can support both CF Type I cards and CF Type

---

## WAFER-945GSE2 User Manual

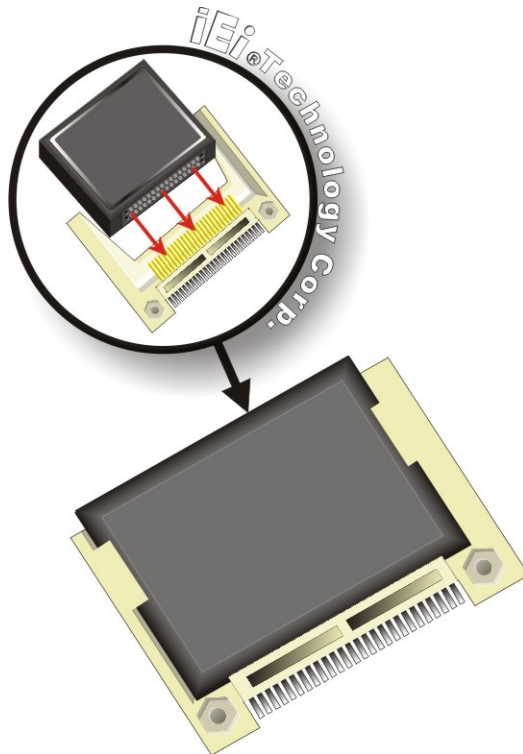
---

II cards. For the complete specifications of the supported CF cards please refer to **Chapter 2**.

---

To install a CF card (Type 1 or Type 2) onto the WAFER-945GSE2, please follow the steps below:

- Step 1: Locate the CF card socket.** Place the WAFER-945GSE2 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 5-1**.



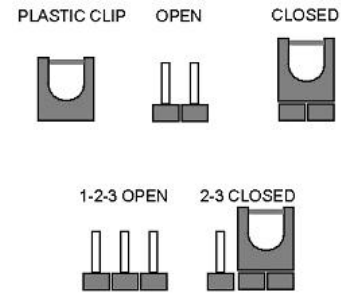
**Figure 5-1: CF Card Installation**

## 5.4 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.



**Figure 5-2: Jumper Locations**

Before the WAFER-945GSE2 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the WAFER-945GSE2 are listed in **Table 5-1**.

| Description               | Label   | Type         |
|---------------------------|---------|--------------|
| AT/ATX power mode setting | ATXCTL1 | 3-pin header |
| CF card setting           | JCF1    | 2-pin header |
| Clear CMOS setup          | J_CMOS1 | 3-pin header |
| COM2 mode setting         | JP1     | 8-pin header |
| LVDS1 voltage select      | J_VLVD1 | 3-pin header |

**Table 5-1: Jumpers**

### 5.4.1 AT/ATX Power Select Jumper Settings



### NOTE:

The AT Power Select Jumper is the same as the ATX Enable connector.



## WAFER-945GSE2 User Manual

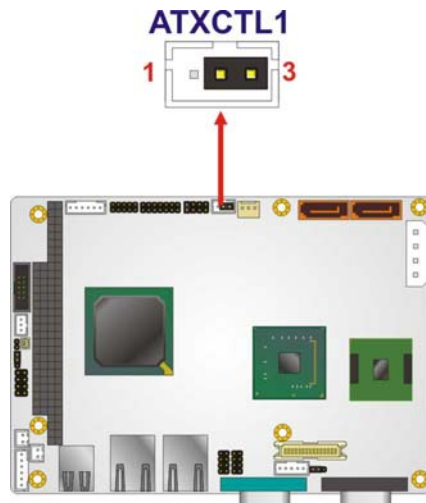
|                         |                       |
|-------------------------|-----------------------|
| <b>Jumper Label:</b>    | <b>ATXCTL1</b>        |
| <b>Jumper Type:</b>     | 3-pin header          |
| <b>Jumper Settings:</b> | See <b>Table 5-2</b>  |
| <b>Jumper Location:</b> | See <b>Figure 5-3</b> |

The AT/ATX Power Select jumper specifies the systems power mode as AT or ATX. Use a jumper cap to short pin 1 - pin 2 on the ATXCTL1 connector to enable the AT Power mode on the system. In the ATX mode use the PS\_ON- and 5VSB cable. AT/ATX Power Select jumper settings are shown in **Table 5-2**.

| AT Power Select | Description   |         |
|-----------------|---------------|---------|
| Short 2 – 3     | Use AT power  | Default |
| OFF             | Use ATX power |         |

**Table 5-2: AT/ATX Power Select Jumper Settings**

The location of the AT Power Select jumper is shown in **Figure 5-3** below.



**Figure 5-3: AT/ATX Power Select Jumper Location**

### 5.4.2 CF Card Setup

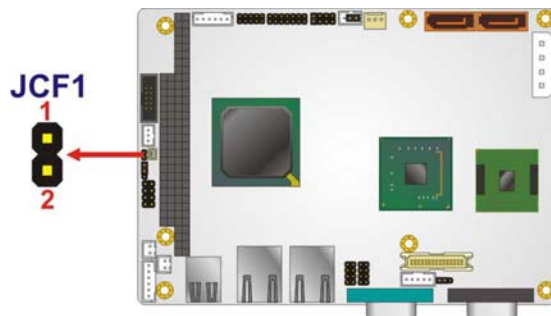
- Jumper Label:** JCF1
- Jumper Type:** 2-pin header
- Jumper Settings:** See **Table 5-3**
- Jumper Location:** See **Figure 5-4**

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 5-3**.

| CF Card Setup | Description |         |
|---------------|-------------|---------|
| OFF           | Slave       | Default |
| Short 1-2     | Master      |         |

**Table 5-3: CF Card Setup Jumper Settings**

The CF Card Setup jumper location is shown in **Figure 5-4**.



**Figure 5-4: CF Card Setup Jumper Location**

### 5.4.3 Clear CMOS Jumper

- Jumper Label:** J\_CMOS1
- Jumper Type:** 3-pin header
- Jumper Settings:** See **Table 5-4**
- Jumper Location:** See **Figure 5-5**

## WAFER-945GSE2 User Manual

If the WAFER-945GSE2 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 5-4**.

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

**Table 5-4: Clear CMOS Jumper Settings**

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

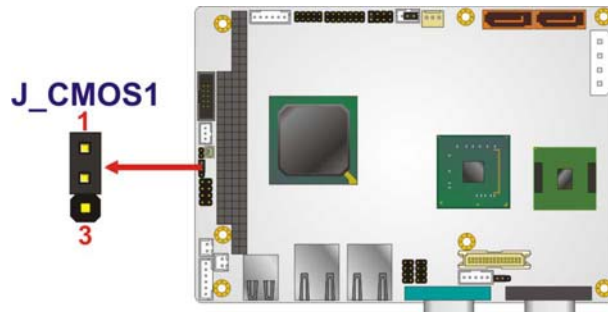


Figure 5-5: Clear CMOS Jumper

#### 5.4.4 COM 2 Function Select Jumper

- Jumper Label:** JP1
- Jumper Type:** 8-pin header
- Jumper Settings:** See Table 5-5
- Jumper Location:** See Figure 5-6

The COM 2 Function Select jumper sets the communication protocol used by the second serial communications port (COM 2) as RS-232, RS-422 or RS-485. The COM 2 Function Select settings are shown in **Table 5-5**.

| COM 2 Function Select  | Description             |         |
|------------------------|-------------------------|---------|
| Short 1-2              | RS-232                  | Default |
| Short 3-4              | RS-422                  |         |
| Short 5-6              | RS-485                  |         |
| Short 5-6<br>Short 7-8 | RS-485 with RTS control |         |

Table 5-5: COM 2 Function Select Jumper Settings

The COM 2 Function Select jumper location is shown in **Figure 5-6**.

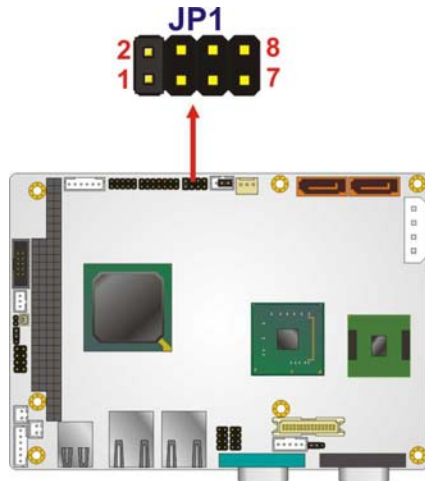


Figure 5-6: COM 2 Function Select Jumper Location

### 5.4.5 LVDS Voltage Selection



**WARNING:**

Permanent damage to the screen and WAFER-945GSE2 may occur if the wrong voltage is selected with this jumper. Please refer to the user guide that came with the monitor to select the correct voltage.

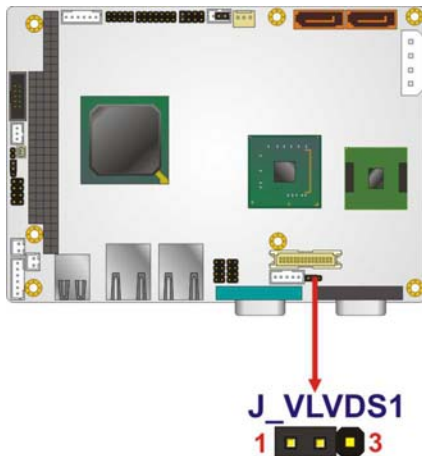
|                         |                       |
|-------------------------|-----------------------|
| <b>Jumper Label:</b>    | <b>J_VLVDS1</b>       |
| <b>Jumper Type:</b>     | 3-pin header          |
| <b>Jumper Settings:</b> | See <b>Table 5-6</b>  |
| <b>Jumper Location:</b> | See <b>Figure 5-7</b> |

The **LVDS Voltage Selection** jumpers allow the LVDS screen voltages to be set. J\_VLVDS1 sets the voltage connected to LVDS1 and J\_VLVDS2 sets the voltage for the screen connected to LVDS2. The **LVDS Voltage Selection** jumper settings are shown in **Table 5-6**.

| LCD Voltage Select | Description |         |
|--------------------|-------------|---------|
| Short 1-2          | +3.3V LVDS  | Default |
| Short 2-3          | +5V LVDS    |         |

**Table 5-6: LVDS Voltage Selection Jumper Settings**

The LVDS Voltage Selection jumper location is shown in **Figure 5-7**.


**Figure 5-7: LVDS Voltage Selection Jumper Pinout Locations**

## 5.5 Chassis Installation

### 5.5.1 Airflow



#### **WARNING:**

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the WAFER-945GSE2 must have air vents to allow cool air to move into the system and hot air to move out.

The WAFER-945GSE2 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

## WAFER-945GSE2 User Manual

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 WAFER-945GSE2 vendor, reseller or an IEI sales representative at [sales@iei.com.tw](mailto:sales@iei.com.tw) or visit the IEI website (<http://www.ieworld.com.tw>) to find out more about the available chassis.

### 5.5.2 Motherboard Installation

To install the WAFER-945GSE2 motherboard into the chassis please refer to the reference material that came with the chassis.

## 5.6 Internal Peripheral Device Connections

### 5.6.1 Peripheral Device Cables

The cables listed in **Table 5-7** are shipped with the WAFER-945GSE2.

| Quantity | Type                     |
|----------|--------------------------|
| 1        | Keyboard and Mouse cable |
| 2        | SATA drive cable         |
| 1        | Audio cable              |
| 1        | RS-232 cable             |

**Table 5-7: IEI Provided Cables**

Some optional items that can be purchased separately and installed on the WAFER-945GSE2 include:

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

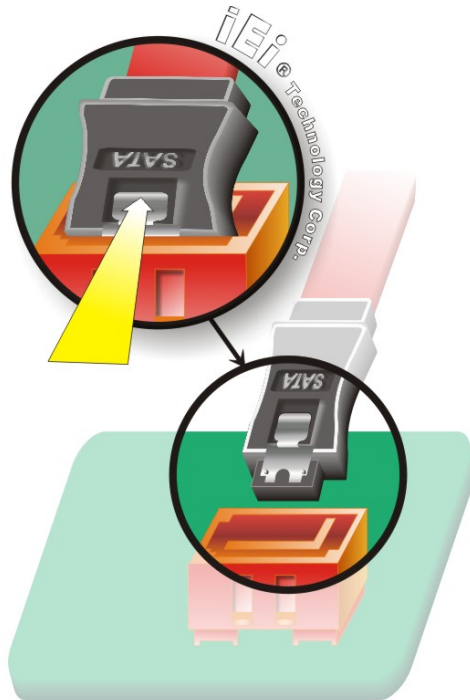
- SATA power cable

### 5.6.2 SATA Drive Connection

The WAFER-945GSE2 is shipped with two SATA drive cables. 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**.



**NOTE:**

The SATA power cable described below is an optional item and must be pre-ordered. The SATA power cable is not shipped with the system.

**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**

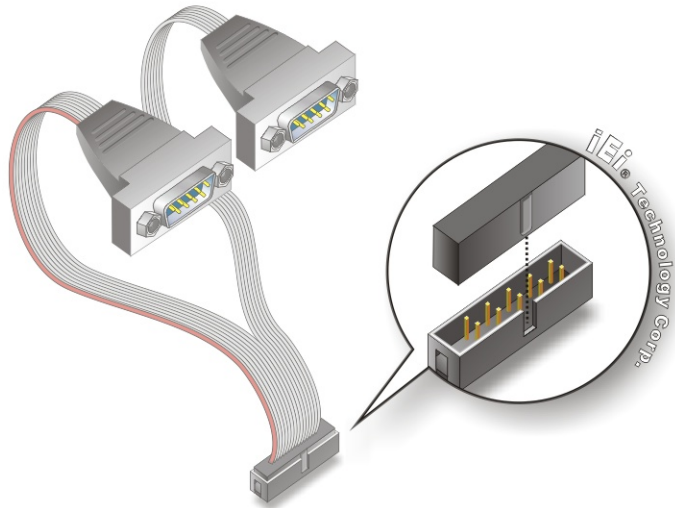
### 5.6.3 Dual RS-232 Cable Connection (w/o bracket) (Optional)

The dual RS-232 cable consists of two connectors attached to two independent cables. Each cable is then attached to a D-sub 9-pin male connector. 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.



**Figure 5-10: Dual RS-232 Cable Installation**

- Step 3: Secure the connectors.** Both single RS-232 connectors have two retention screws that must be secured to a chassis or bracket.
- Step 4: Connect the serial device.** Once the single RS-232 connectors are connected to a chassis or bracket, a serial communications device can be connected to the system.

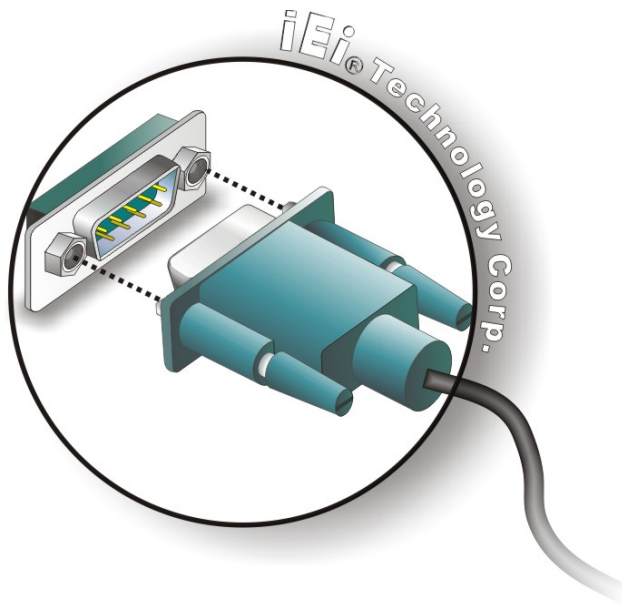
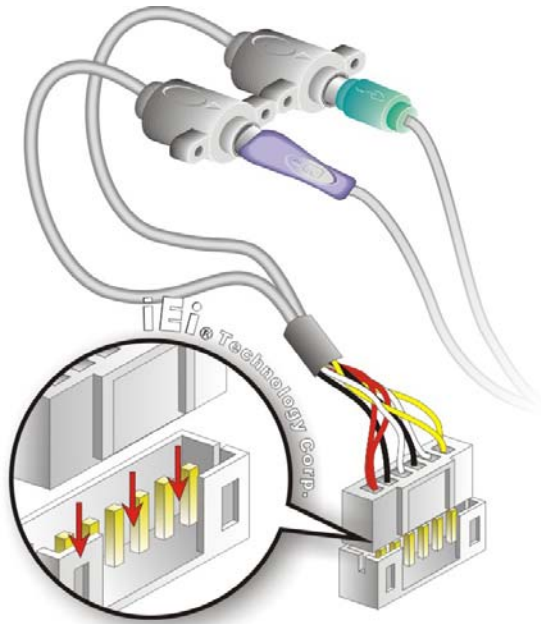


Figure 5-11: Serial Device Connector

#### 5.6.4 Keyboard/Mouse Y-cable Connector

The WAFER-945GSE2 is shipped with a keyboard/mouse Y-cable connector. The keyboard/mouse Y-cable connector connects to a keyboard/mouse connector on the WAFER-945GSE2 and branches into two cables that are each connected to a PS/2 connector, one for a mouse and one for a keyboard. To connect the keyboard/mouse Y-cable connector, please follow the steps below.

- Step 1: Locate the connector.** The location of the keyboard/mouse Y-cable connector is shown in **Chapter 3**.
- Step 2: Align the connectors.** Correctly align pin 1 on the cable connector with pin 1 on the WAFER-945GSE2 keyboard/mouse connector. See **Figure 5-12**.
- Step 3: Insert the cable connectors** Once the cable connector is properly aligned with the keyboard/mouse connector on the WAFER-945GSE2, connect the cable connector to the on-board connectors. See **Figure 5-12**.



**Figure 5-12: Keyboard/mouse Y-cable Connection**

**Step 4:** **Attach PS/2 connectors to the chassis.** The keyboard/mouse Y-cable connector is connected to two PS/2 connectors. To secure the PS/2 connectors to the chassis please refer to the installation instructions that came with the chassis.

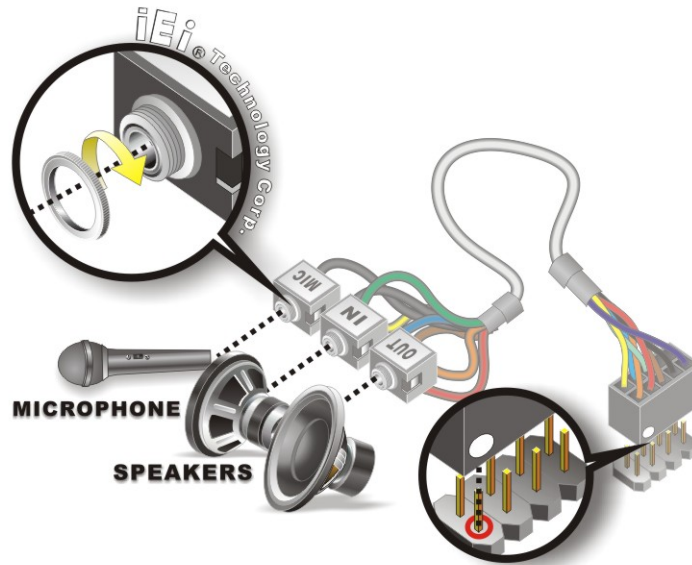
**Step 5:** **Connect the keyboard and mouse.** Once the PS/2 connectors are connected to the chassis, a keyboard and mouse can each be connected to one of the PS/2 connectors. The keyboard PS/2 connector and mouse PS/2 connector are both marked. Please make sure the keyboard and mouse are connected to the correct PS/2 connector.

### 5.6.5 Audio Kit Installation

The Audio Kit that came with the WAFER-945GSE2 connects to the 10-pin audio connector on the WAFER-945GSE2. 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:

## WAFER-945GSE2 User Manual

- Step 1:** **Locate the audio connector.** The location of the 10-pin audio connector is shown in **Chapter 3**.
- Step 2:** **Align pin 1.** Align pin 1 on the on-board connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 5-13**.

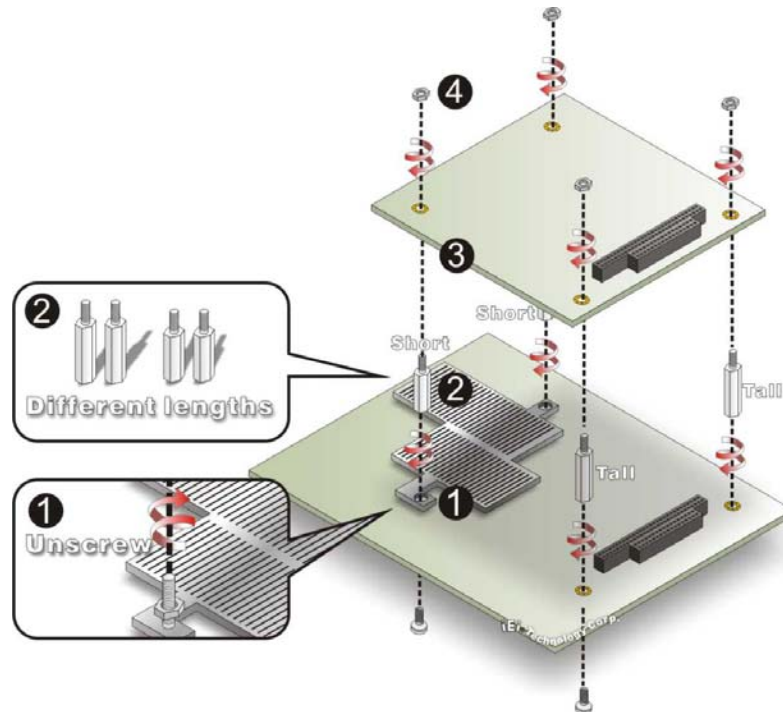


**Figure 5-13: Audio Kit Cable Connection**

- Step 3:** **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.

### 5.6.6 PC/104 Module Installation

The WAFER-945GSE2 has a standard PC/104 connector. To install a PC/104 module please refer to and follow the installation instructions and diagram below:



**Figure 5-14: WAFER-945GSE2 PC/104 module installation**

- Step 1: Remove retention nuts.** Remove the two nuts securing the heatsink and two nuts securing the WAFER-945GSE2 to the chassis.
- Step 2: Attach intermediate poles.** Insert the two short plastic intermediate poles into the bolts securing the heatsink. Insert the two tall plastic intermediate poles.
- Step 3: Align the PC/104 connector.** Align the PC/104 module connector with the corresponding connector on the WAFER-945GSE2 (connector CN2). Gently push the module down to ensure the connectors are properly connected.
- Step 4: Replace the retention nuts.** Screw the four retention nuts onto the intermediate poles to secure the PC/104 module.

### 5.6.7 USB Cable (Dual Port without Bracket) (Optional)

The WAFER-945GSE2 is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

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

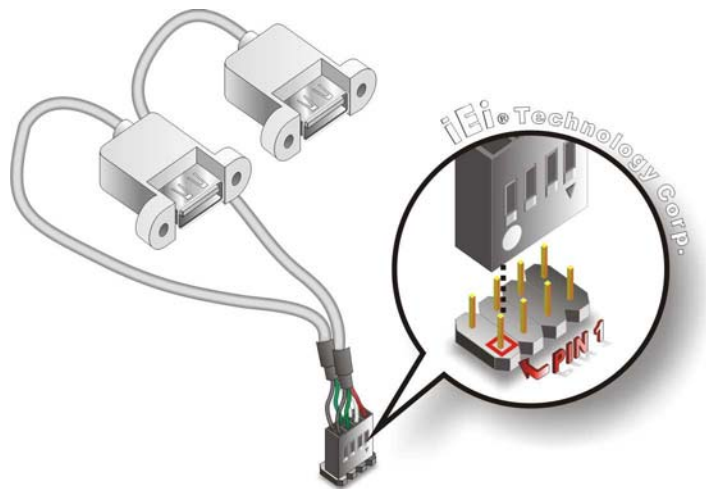
## Chapter 3.

**WARNING:**

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

**Step 6: Align the connectors.** The cable has two connectors. Correctly align pin 1 on each cable connector with pin 1 on the WAFER-945GSE2 USB connector.

**Step 7: Insert the cable connectors.** Once the cable connectors are properly aligned with the USB connectors on the WAFER-945GSE2, connect the cable connectors to the on-board connectors. See **Figure 5-15**.



**Figure 5-15: Dual USB Cable Connection**

**Step 8: Attach the USB connectors to the chassis.** The USB 2.0 connectors each of two retention screw holes. To secure the connectors to the chassis please refer to the installation instructions that came with the chassis.

## 5.7 External Peripheral Interface Connection

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

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

To install these devices, connect the corresponding cable connector from the actual device to the corresponding WAFER-945GSE2 external peripheral interface connector making sure the pins are properly aligned.

### 5.7.1 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 WAFER-945GSE2. See **Figure 5-16**.

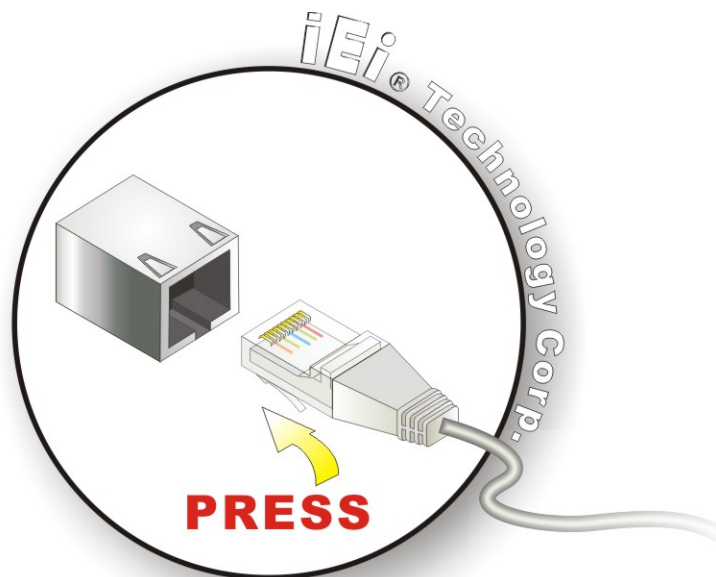


Figure 5-16: LAN Connection



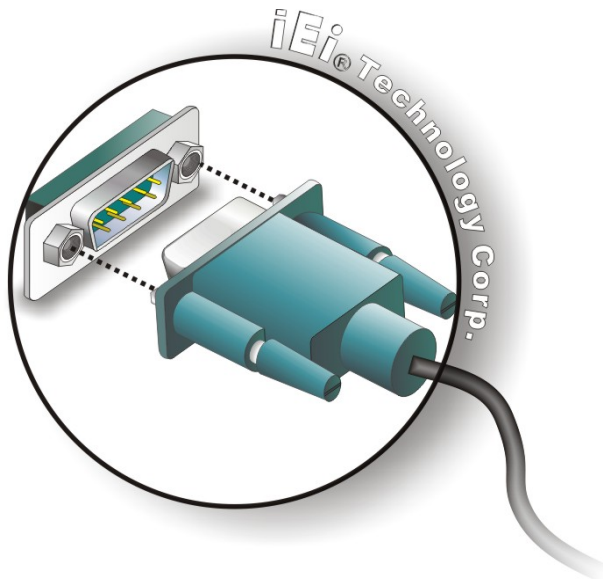
**Step 3:** Insert the LAN cable RJ-45 connector. Once aligned, gently insert the LAN cable RJ-45 connector into the onboard RJ-45 connector.

## 5.7.2 Serial Device Connection

The WAFER-945GSE2 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 WAFER-945GSE2.

**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 5-17**.



**Figure 5-17: 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

### 5.7.3 USB Connection (Dual Connector)

The external USB receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the WAFER-945GSE2.

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

**Step 2:** **Insert a USB plug.** Insert the USB plug of a device into the USB receptacle on the external peripheral interface. See **Figure 5-18**.

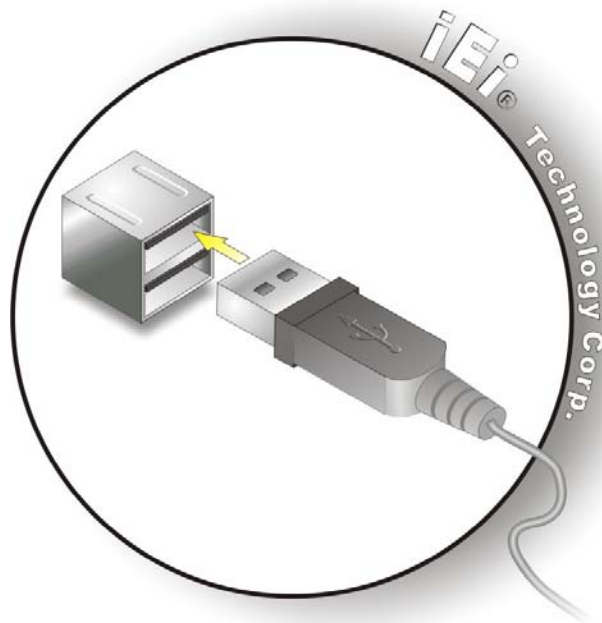


Figure 5-18: USB Connector

### 5.7.4 VGA Monitor Connection

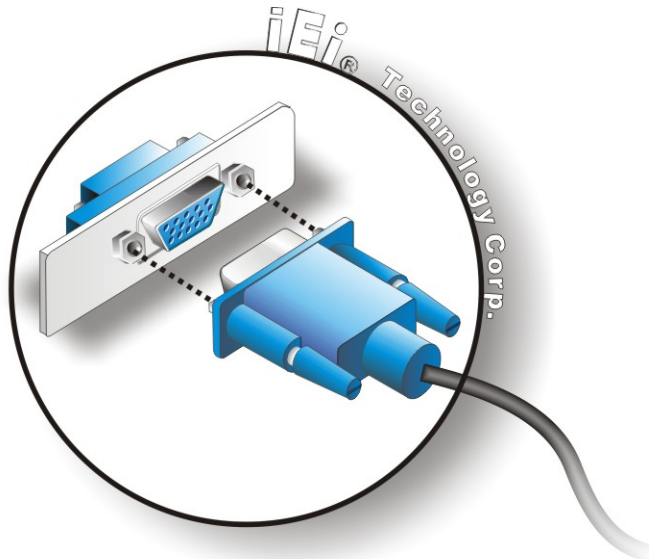
The WAFER-945GSE2 has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the WAFER-945GSE2, please follow the instructions below.

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

## WAFER-945GSE2 User Manual

**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.

**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 WAFER-945GSE2. See **Figure 5-19**.



**Figure 5-19: 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 Screens

---

## 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 below.

| 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<br>Status Page Setup Menu and Option Page Setup Menu --<br>Exit current page and return to Main Menu |
| Page Up key | Increase the numeric value or make changes   |
| Page Dn key | Decrease the numeric value or make changes   |

|            |  |
|------------|--|
| F1 key     | General help, only for Status Page Setup Menu and Option Page Setup Menu |
| 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

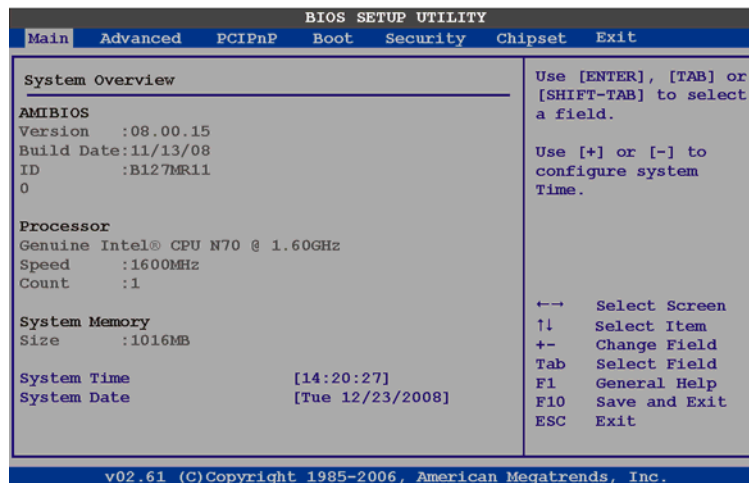
The **menu bar** on top of the BIOS screen has the following main items:

- **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.

## 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:



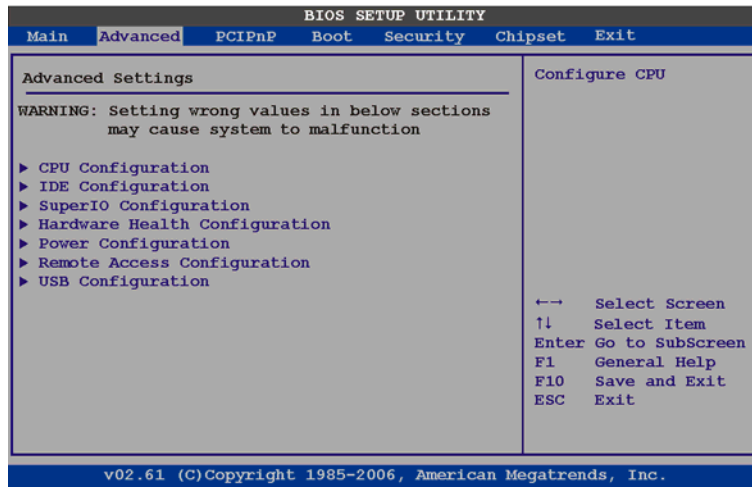
**WARNING:**

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.

---

- CPU Configuration (see **Section 6.3.1**)
- IDE Configuration (see **Section 6.3.2**)
- Super I/O Configuration (see **Section 6.3.3**)
- Hardware Health Configuration (see **Section 6.3.4**)
- Power Configuration (see **Section 6.3.5**)
- Remote Access Configuration (see **Section 6.3.5.2**)
- USB Configuration (see **Section 6.3.7**)

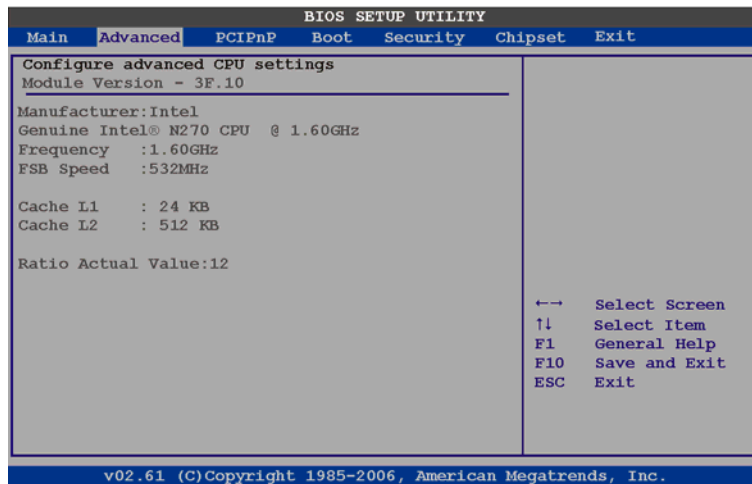




## BIOS Menu 2: Advanced

### 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

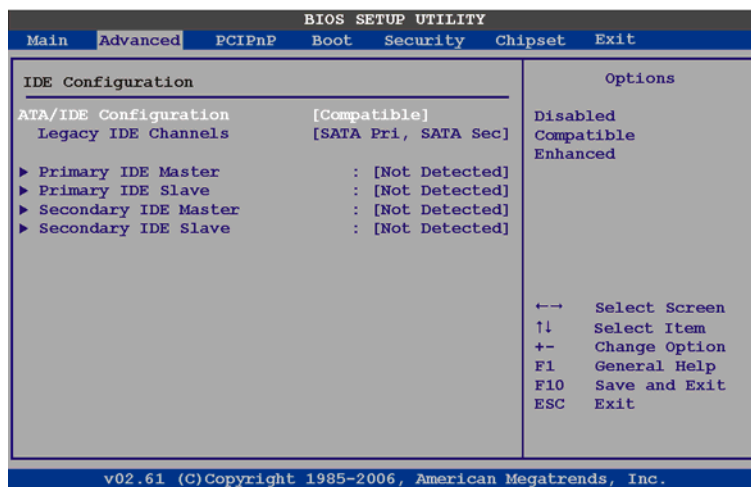
The CPU Configuration menu (BIOS Menu 3) lists the following CPU details:

- **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

### 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.



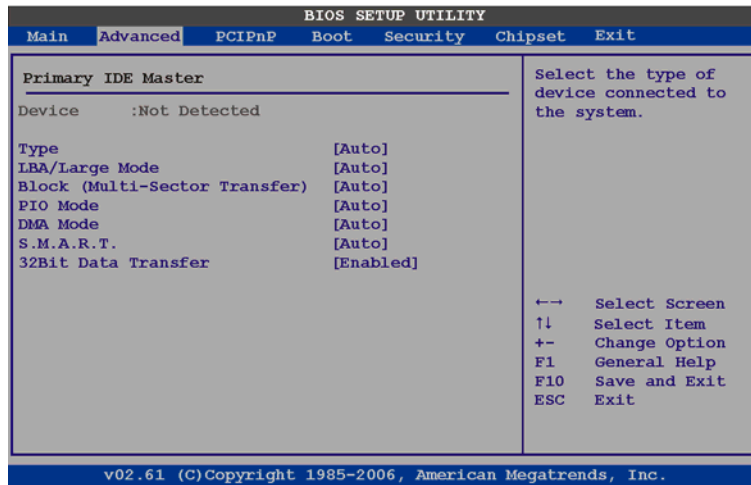
#### BIOS Menu 4: IDE Configuration

##### → 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





### 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**

### → 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 3.3MBps

**→ 1** PIO mode 1 selected with a maximum transfer rate of 5.2MBps

**→ 2** PIO mode 2 selected with a maximum transfer rate of 8.3MBps

**→ 3** PIO mode 3 selected with a maximum transfer rate of 11.1MBps

**→ 4** PIO mode 4 selected with a maximum transfer rate of 16.6MBps  
(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.

## WAFER-945GSE2 User Manual

- **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 2.1MBps
- **SWDMA1**      Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2MBps
- **SWDMA2**      Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3MBps
- **MWDMA0**      Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2MBps
- **MWDMA1**      Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3MBps
- **MWDMA2**      Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6MBps
- **UDMA1**      Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps
- **UDMA1**      Ultra DMA mode 1 selected with a maximum data transfer rate of 25MBps
- **UDMA2**      Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3MBps
- **UDMA3**      Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps (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 66.6MBps (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 99.9MBps (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

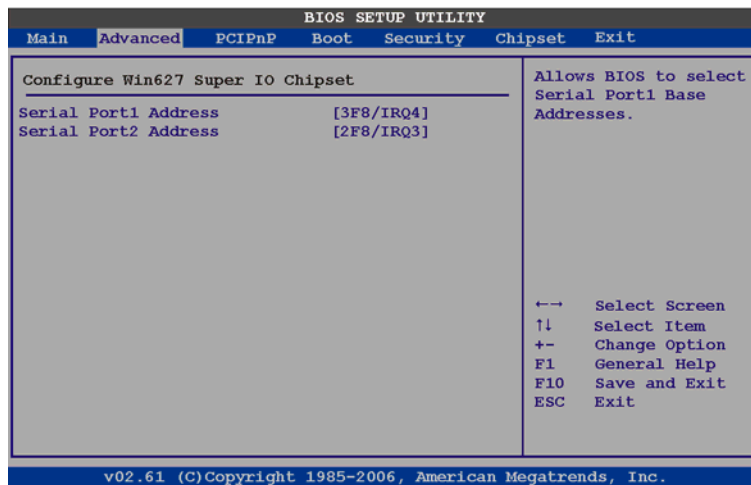
➔ **32Bit Data Transfer [Enabled]**

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 I/O Configuration

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



**BIOS Menu 6: Super I/O Configuration**

➔ **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

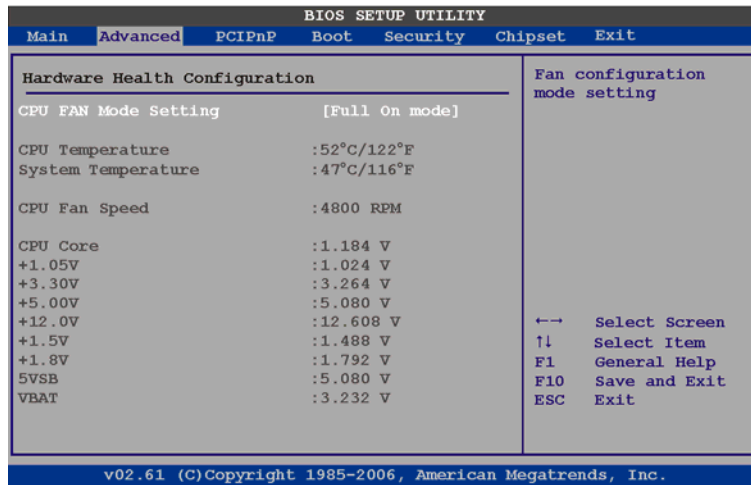
### ➔ **Serial Port2 Address [2F8/IRQ3]**

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

## 6.3.4 Hardware Health Configuration

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



### BIOS Menu 7: Hardware Health Configuration

#### → 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

## WAFER-945GSE2 User Manual

### → 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.

---

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

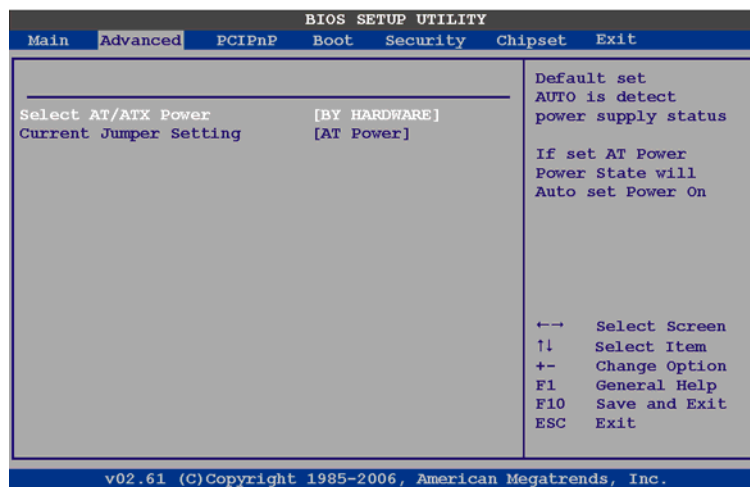
The following system parameters and values are shown. The system parameters that are monitored are:

- **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
- +1.05V
- +3.30V
- +12.0 V
- +1.5V
- +1.8V
- 5VSB
- VBAT

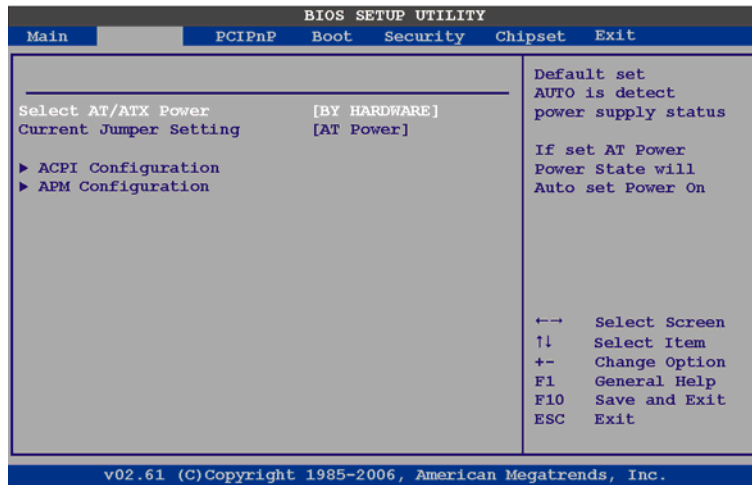
## 6.3.5 Power Configuration

Use the Power Configuration Menu to set select AT or ATX power modes. This menu also displays the current AT/ATX jumper setting.



### BIOS Menu 8: Power Configuration

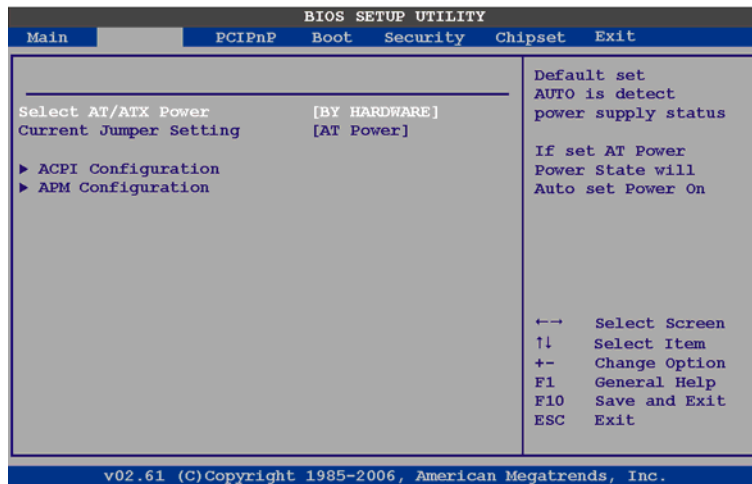
When ATX power is selected the following menu appears (BIOS Menu 9). The Advanced **Power Configuration** menu (BIOS Menu 9) configures the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.



### BIOS Menu 9: Advanced Power Configuration

#### 6.3.5.1 ACPI configuration

The **ACPI Configuration** menu (**BIOS Menu 10**) configures the Advanced Configuration and Power Interface (ACPI).



### BIOS Menu 10: ACPI Configuration

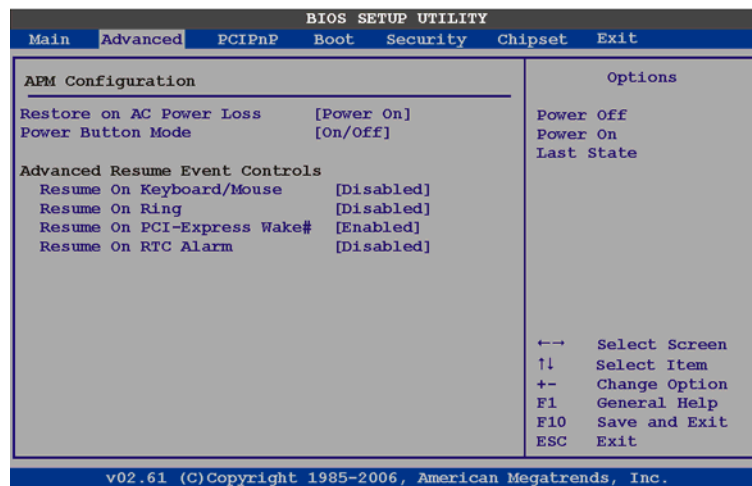
#### → Suspend Mode [S1(POS)]

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.

### 6.3.5.2 APM Configuration

The **APM Configuration** menu (**BIOS Menu 11**) allows the advanced power management options to be configured.



#### BIOS Menu 11: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
- **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:

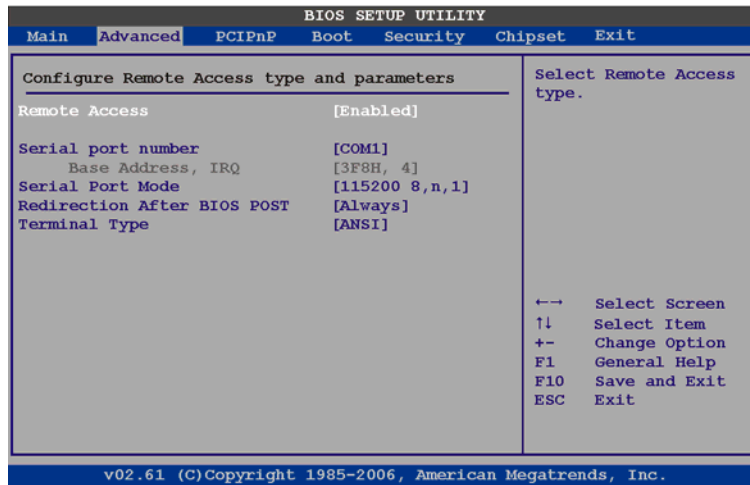
- **RTC Alarm Date (Days)**

- **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 12**) 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 12: Remote Access Configuration [Advanced]

#### → Remote Access [Disabled]

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

- **Disabled**      **DEFAULT**      Remote access is disabled.
- **Enabled**      Remote access configuration options shown below appear:

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

These configuration options are discussed below.

#### → **Serial Port Number [COM1]**

## WAFER-945GSE2 User Manual

Use the **Serial Port Number** option to select the serial port to use 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

**→ 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

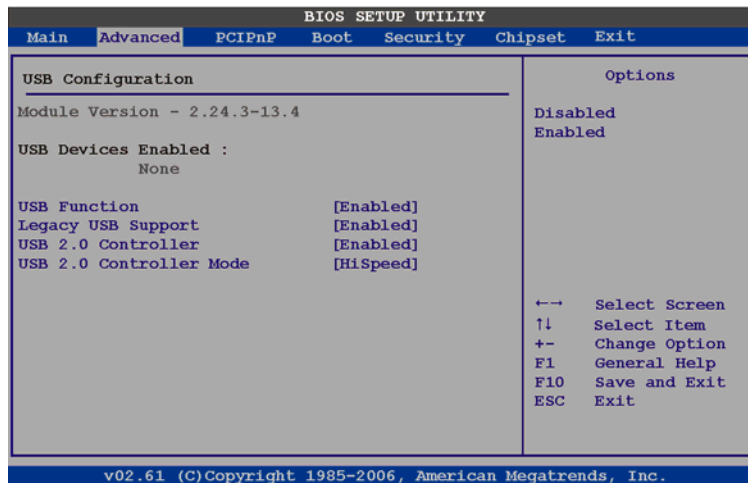
**→ Sredir Memory Display Delay [Disabled]**

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 13**) to read USB configuration information and configure the USB settings.



#### BIOS Menu 13: 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
- ➔ **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 14) to configure advanced PCI and PnP settings.

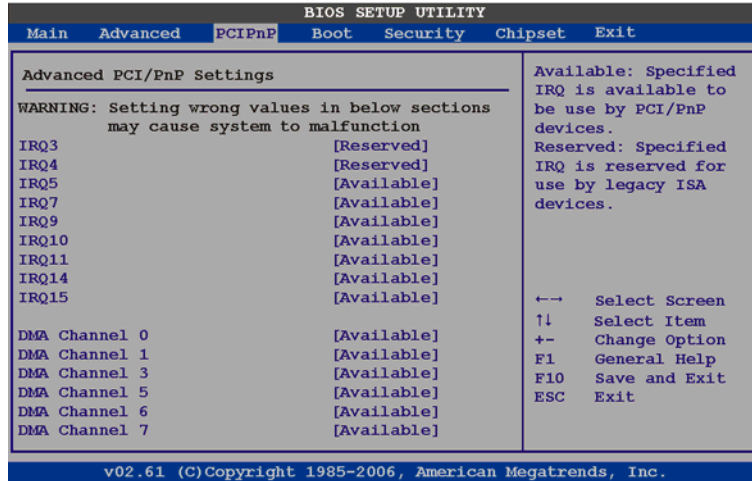


**WARNING:**

Setting wrong values for the BIOS selections in the PCIPnP BIOS

---

menu may cause the system to malfunction.



## BIOS Menu 14: PCI/PnP Configuration

### → IRQ# [Available]

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

- **Available**    **DEFAULT**    The specified IRQ is available to be used by PCI/PnP devices
- **Reserved**                    The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

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

- IRQ 14
- IRQ 15

#### → DMA Channel# [Available]

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

- **Available**     **DEFAULT**     The specified DMA is available to be used by PCI/PnP devices
- **Reserved**                     The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0
- DM Channel 1
- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

#### → Reserved Memory Size [Disabled]

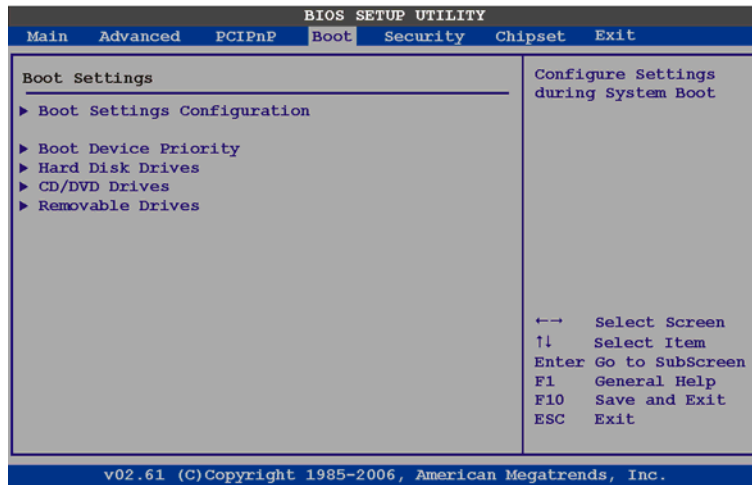
Use the **Reserved Memory Size** BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

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

## 6.5 Boot

Use the Boot menu (BIOS Menu 15) to configure system boot options.

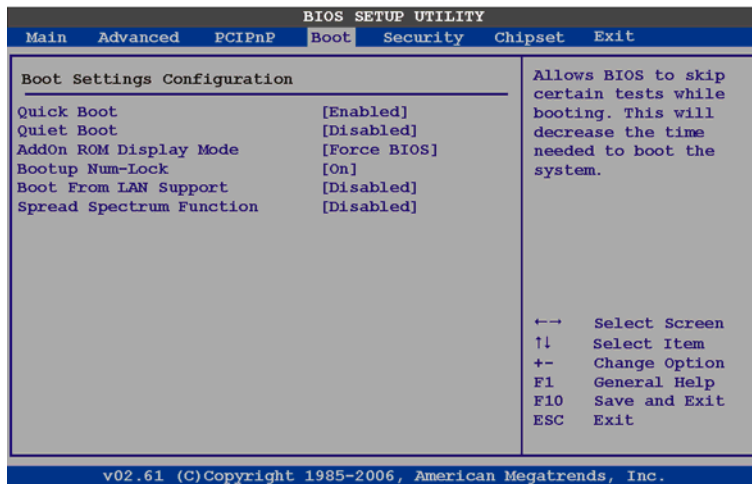




## BIOS Menu 15: Boot

### 6.5.1 Boot Settings Configuration

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



## BIOS Menu 16: 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]

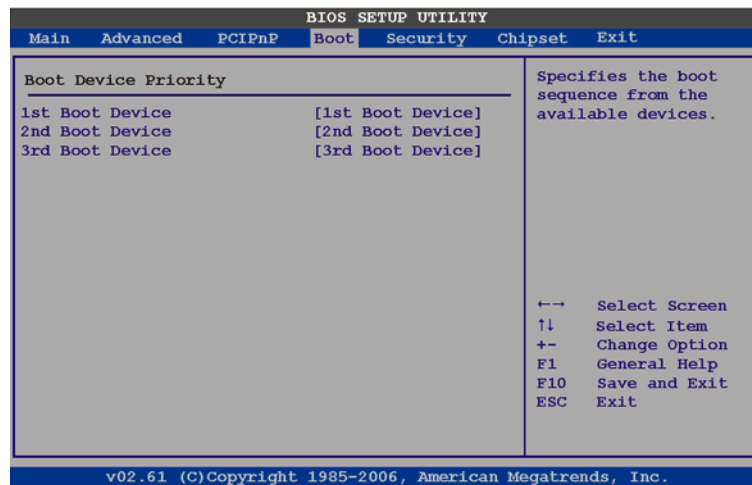
The **BOOT From LAN Support** option enables the system to be booted from a remote system.

- **Disabled**      **DEFAULT**      Cannot be booted from a remote system through the LAN
- **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 17**) to specify the boot sequence from the available devices. The following options are available:

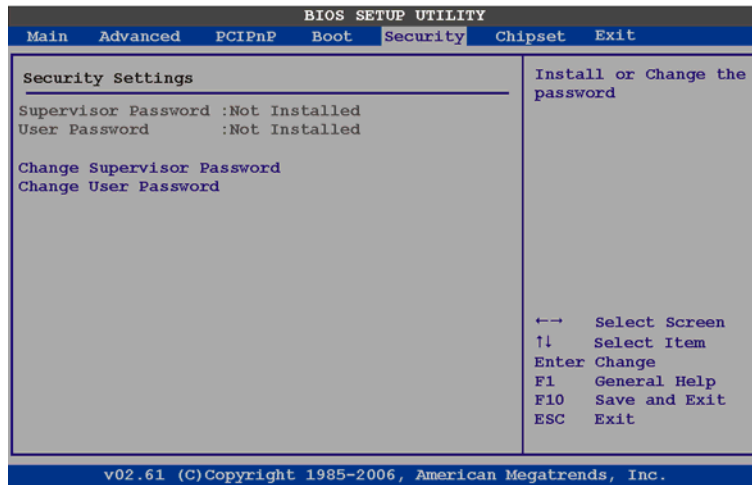
- 1<sup>st</sup> Boot Device
- 2<sup>nd</sup> Boot Device
- 3<sup>rd</sup> Boot Device



**BIOS Menu 17: Boot Device Priority Settings**

## 6.6 Security

Use the Security menu (BIOS Menu 18) to set system and user passwords.



### BIOS Menu 18: 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

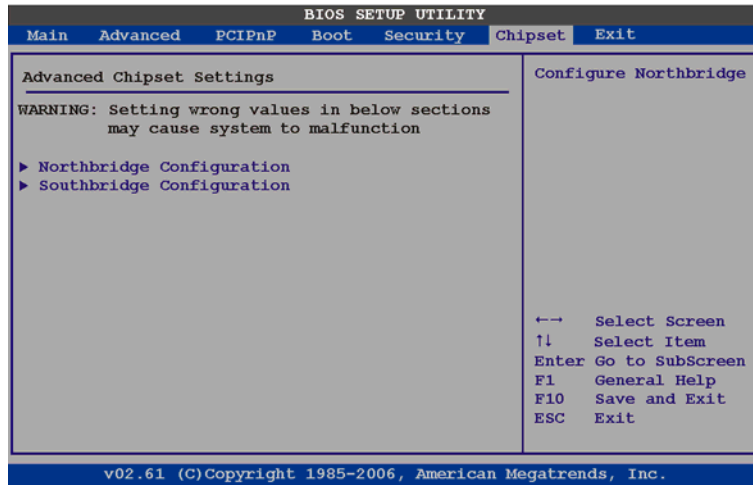
Use the **Chipset** menu (**BIOS Menu 19**) to access the Northbridge and Southbridge configuration menus



### **WARNING!**

Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS

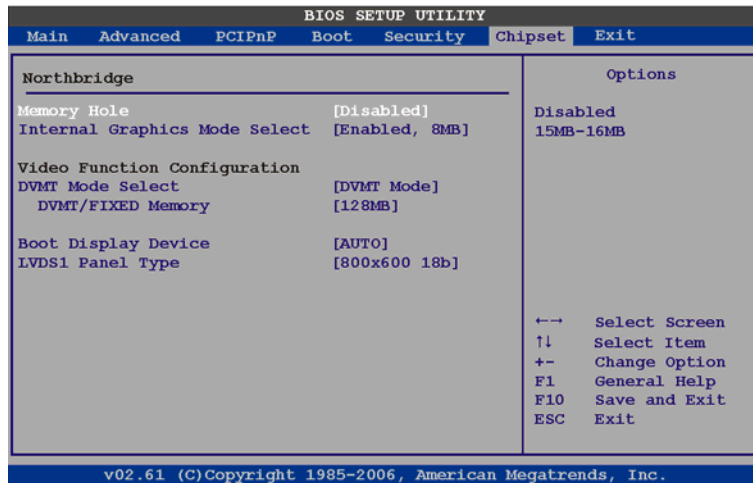
menu may cause the system to malfunction.



## BIOS Menu 19: Chipset

### 6.7.1 Northbridge Chipset Configuration

Use the **Northbridge Chipset Configuration** menu (BIOS Menu 19) to configure the Northbridge chipset settings.



## BIOS Menu 20:Northbridge Chipset Configuration

→ **Memory Hole [Disabled]**

The **Memory Hole** reserves the memory space between 15MB and 16MB 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

➔ **Internal Graphics Mode Select [Enable, 8MB]**

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

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

## WAFER-945GSE2 User Manual

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 128MB. Configuration options are listed below.

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

### → **Boot Display Device [Auto]**

The **Boot Display Device** BIOS option selects the display device the system uses when it boots. The available options are listed below:

- Auto       **DEFAULT**
- CRT
- LFP

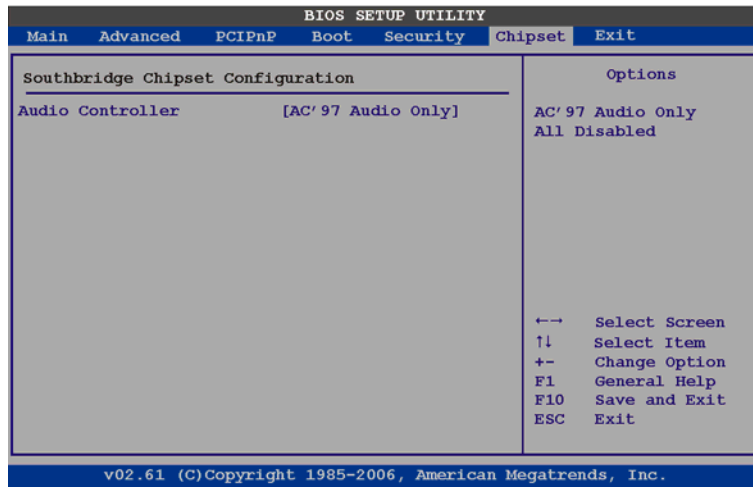
### → **LVDS1 Panel Type**

Use the **LVDS Panel Type** to determine the LCD panel resolution. Configuration options are listed below:

- 640 x 480 18b
- 800 x 480 18b
- 800 x 600 18b
- 1024 x 768 18b
- 1280 x 1024 36b
- 1400 x 1050 36b
- 1440 x 900 36b
- 1600 x 1200 36b
- 1280 x 800 18b

## 6.7.2 Southbridge Configuration

The **Southbridge Configuration** menu (BIOS Menu 21) configures the Southbridge chipset.



### BIOS Menu 21:Southbridge Chipset Configuration

#### → Audio Controller [All Disabled]

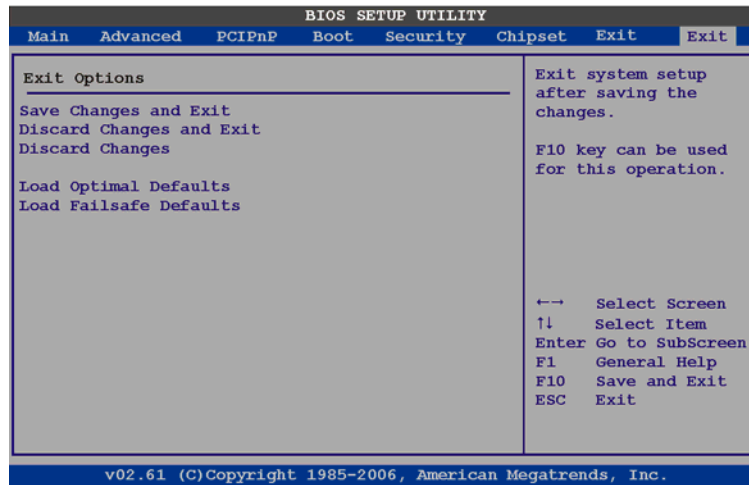
The **Audio Controller** option enables or disables the audio controller.

- **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 22**) to load default BIOS values, optimal failsafe values and to save configuration changes.





## BIOS Menu 22: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 Drivers

---

## 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:

- 7.3 Chipset Driver Installation ..... 123
- 7.4 VGA Driver Installation ..... 127
- 7.5 LAN Driver Installation ..... 131
- 7.6 Audio Driver Installation ..... 134
- 7.7 Intel<sup>®</sup> Matrix Storage Manager Driver Installation ..... 137
- 7.8 iSMM Installation ..... 142

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.



**Figure 7-1: Start Up Screen**

**Step 3:** Click **NANO-ATOM**.

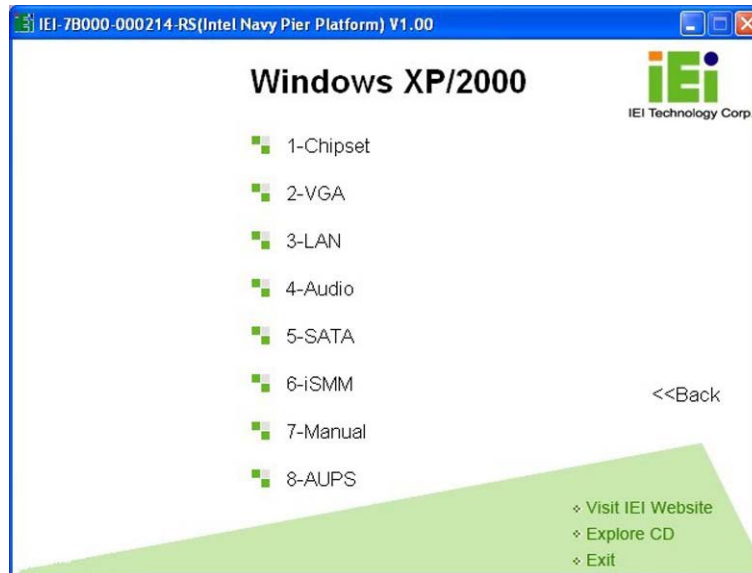
**Step 4:** The screen in **Figure 7-2** appears.



**Figure 7-2: Select Operating System**

**Step 5:** Select the operating system installed on the NANO-ATOM 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:** When the setup files are completely extracted the **Welcome Screen** in **Figure 7-4** appears.



**Figure 7-4: Chipset Driver Welcome Screen**

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

**Step 5:** The license agreement in **Figure 7-5** appears.



**Figure 7-5: Chipset Driver License Agreement**

**Step 6:** Read the License Agreement.

## WAFER-945GSE2 User Manual

**Step 7:** Click the **YES** button to accept the license agreement and continue.

**Step 8:** The Read Me file in **Figure 7-6** appears.



**Figure 7-6: Chipset Driver Read Me File**

**Step 9:** Click **NEXT** to continue.

**Step 10: Setup Operations** are performed as shown in **Figure 7-7**.



Figure 7-7: Chipset Driver Setup Operations

**Step 11:** Once the **Setup Operations** are complete, click the **NEXT** icon to continue.

**Step 12:** The **Finish** screen appears.



Figure 7-8: Chipset Driver Installation Finish Screen



**Step 13:** Select “Yes, I want to restart the computer now” and click the **Finish** icon.

See **Figure 7-8**.

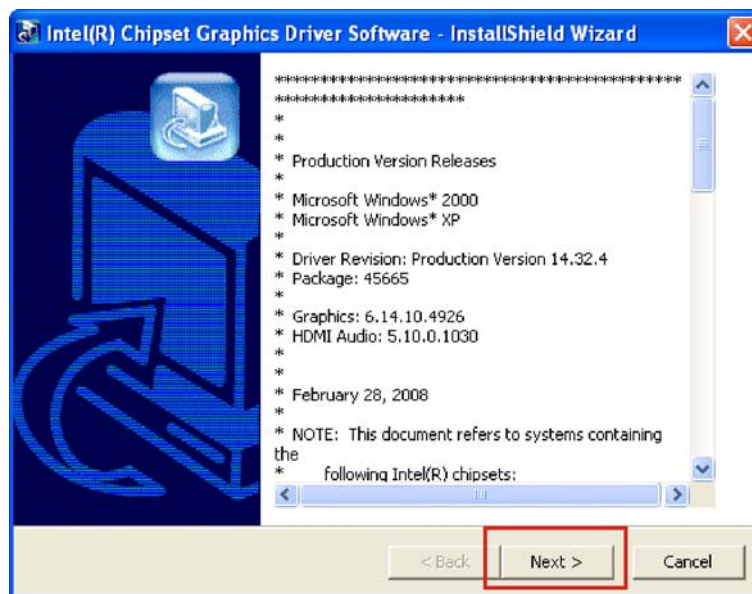
## 7.4 VGA Driver Installation

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 7-9** appears.



**Figure 7-9: VGA Driver Read Me File**

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

**Step 5:** The installation files are extracted. See **Figure 7-10**.

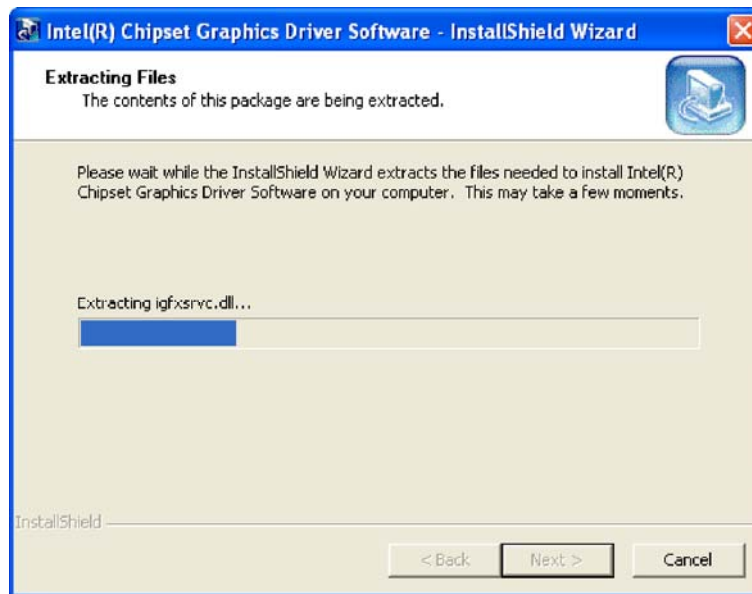


Figure 7-10: VGA Driver Setup Files Extracted

**Step 6:** The **Welcome Screen** in Figure 7-11 appears.



Figure 7-11: VGA Driver Welcome Screen

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

**Step 8:** The license agreement in **Figure 7-12** appears.

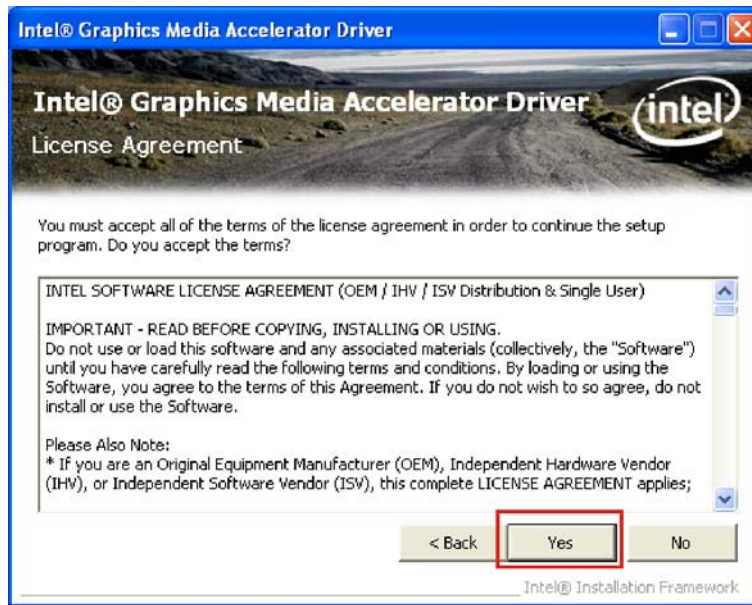


Figure 7-12: VGA Driver License Agreement

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

**Step 10:** Click **YES** to accept the license agreement and continue.

**Step 11:** The Readme file in **Figure 7-13** appears.

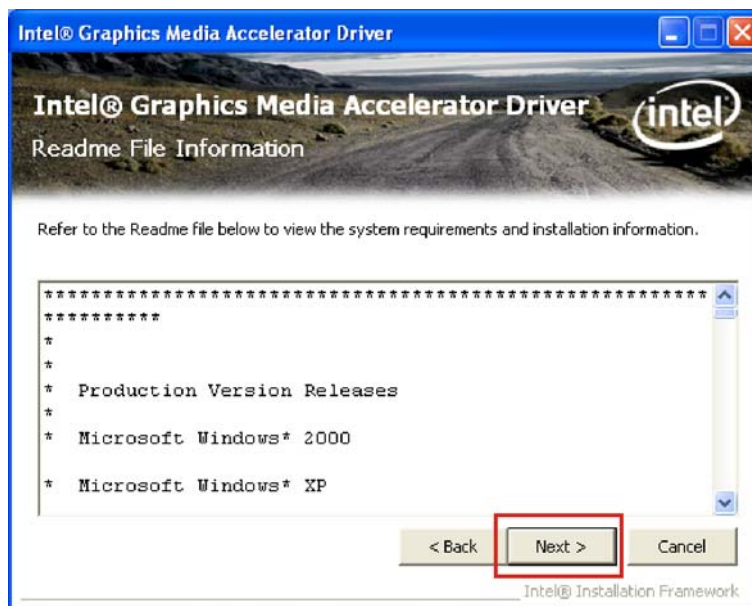


Figure 7-13: VGA Driver Read Me File

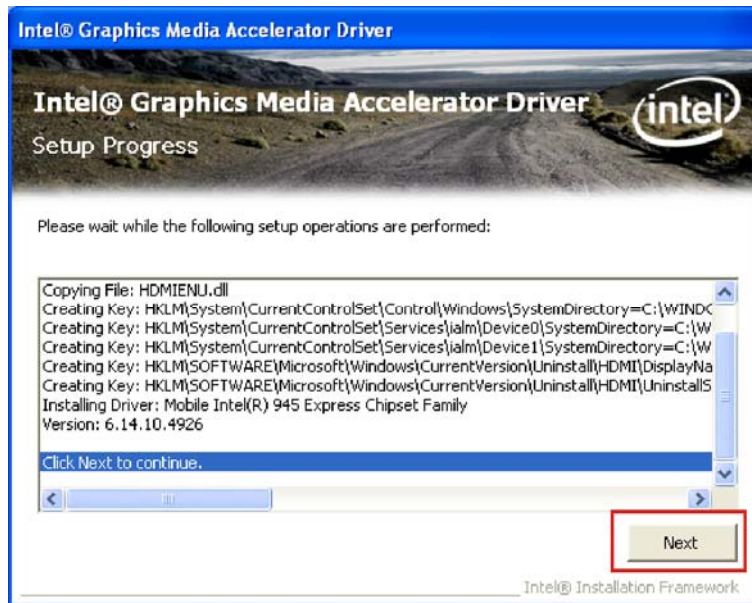
**Step 12:** Click **NEXT** to continue.

**Step 13:** **Setup Operations** are performed as shown in **Figure 7-14**.



**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.



**Figure 7-14:** VGA Driver Setup Operations

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

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

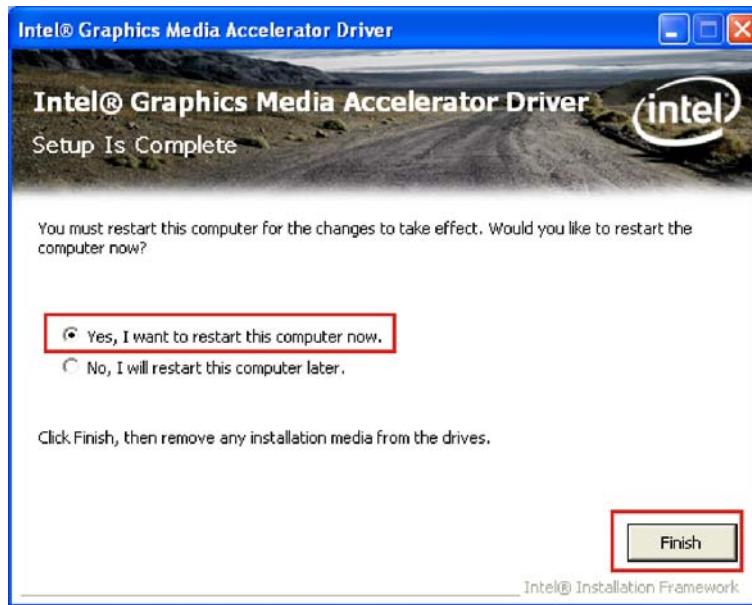


Figure 7-15: VGA Driver Installation Finish Screen

**Step 16:** Select “Yes, I want to restart the computer now” and click **FINISH**. See Figure 7-15.

## 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 7-16** appears.

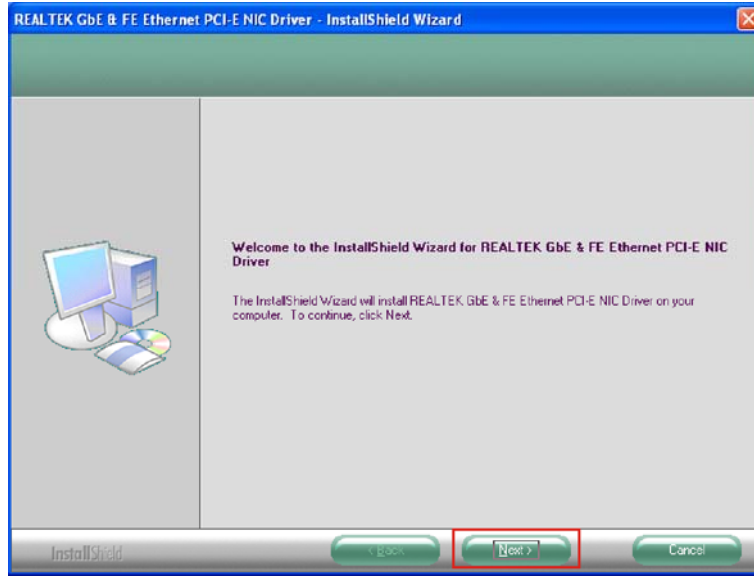


Figure 7-16: LAN Driver Welcome Screen

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

**Step 5:** The **Ready to Install** screen in **Figure 7-17** appears.

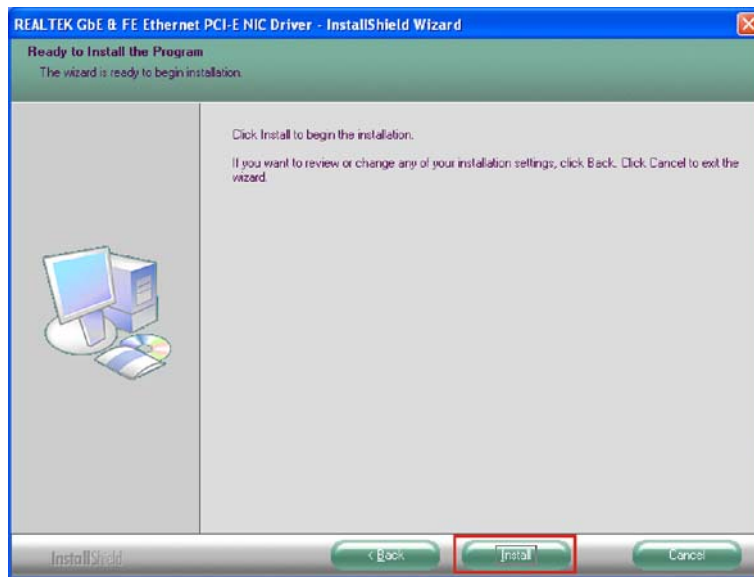


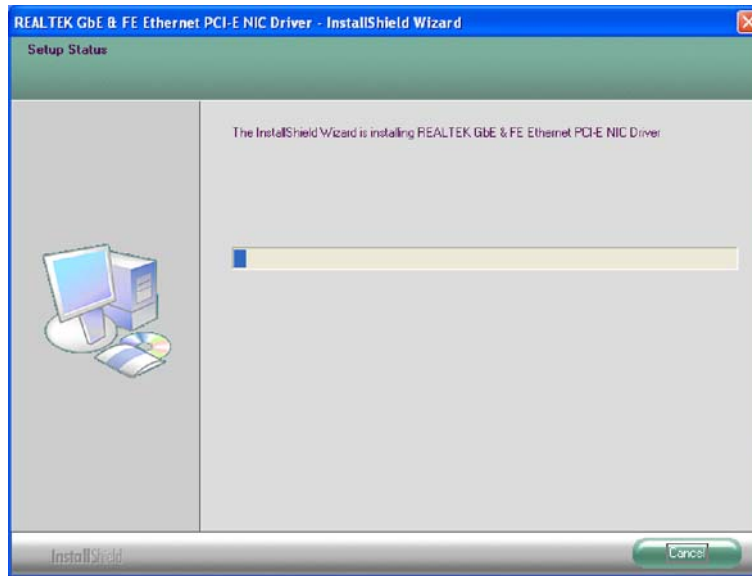
Figure 7-17: LAN Driver Welcome Screen

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

**Step 7:** The program begins to install.

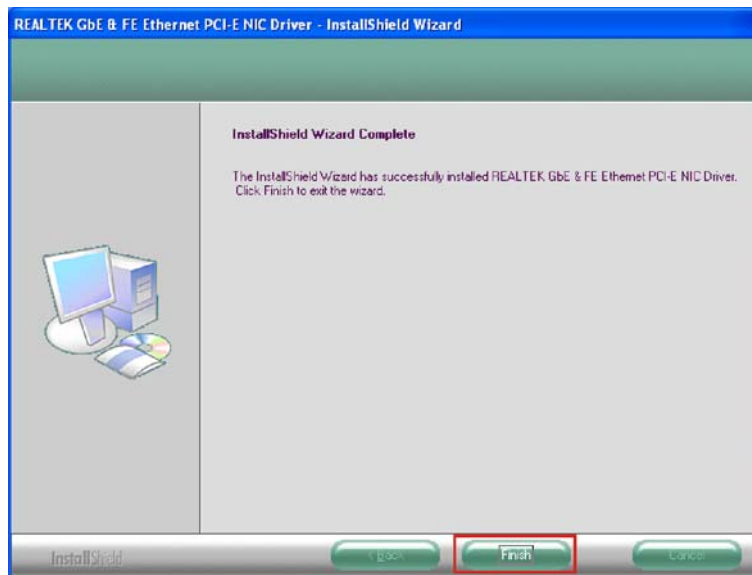
**Step 8:** The installation progress can be monitored in the progress bar shown in

**Figure 7-18.**



**Figure 7-18: LAN Driver Installation**

**Step 9:** When the driver installation is complete, the screen in **Figure 7-19** appears.



**Figure 7-19: LAN Driver Installation Complete**

**Step 10:** Click **FINISH** to exit the InstallShield Wizard (**Figure 7-19**).

## 7.6 Audio Driver Installation

There is no audio driver on the WAFER-945GSE2. To add audio capabilities to the WAFER-945GSE2, connect a HD Audio kit or AC'97 audio kit available from IEI. Follow the installation applicable to the installed audio kit.

### 7.6.1 AC'97 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"

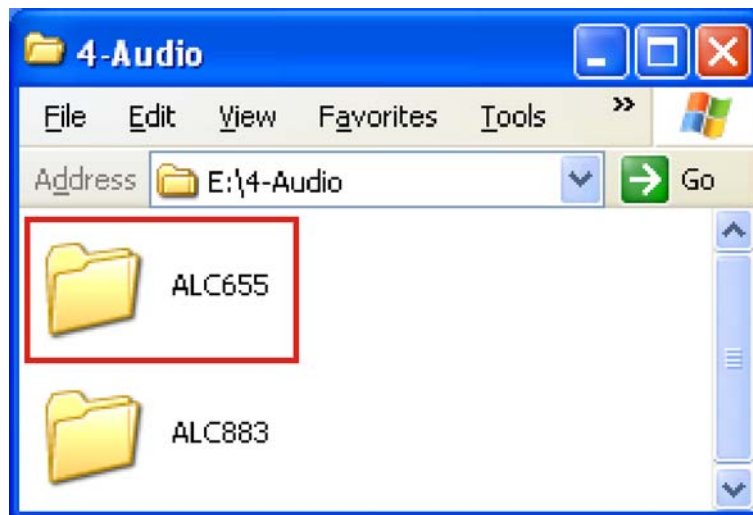


Figure 7-20: AC'97 Audio



**Step 3:** Browse to “E:\4-Audio\ALC665\Windows\Windows 98Gold, 98se, Me, 2000, XP, 2003(32,64 bits)\A3.84” Figure 7-21

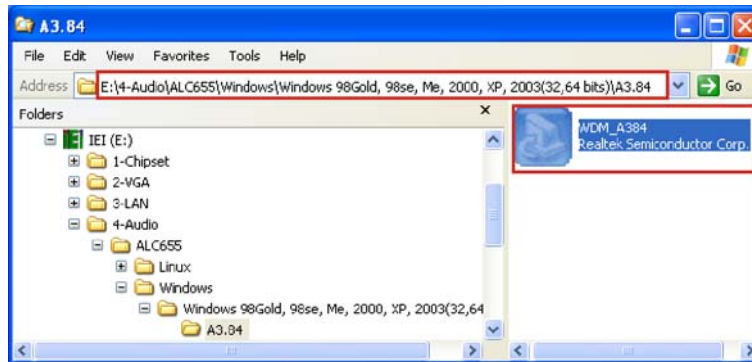


Figure 7-21: AC’97 Audio Driver Options

**Step 4:** Double-click the installation file in Figure 7-21.

**Step 5:** The AC’97 Driver Installation screen in Figure 7-22 appears.

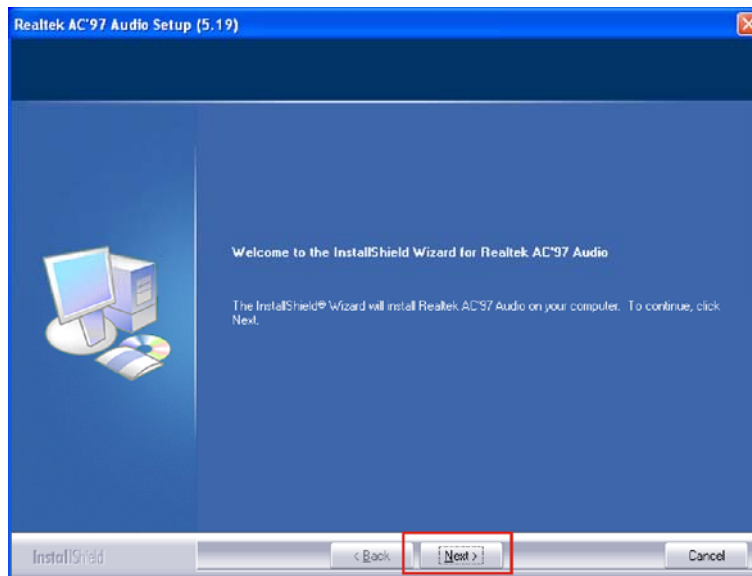


Figure 7-22: AC’97 Driver Installation Welcome Screen

**Step 6:** Click **NEXT** to continue.

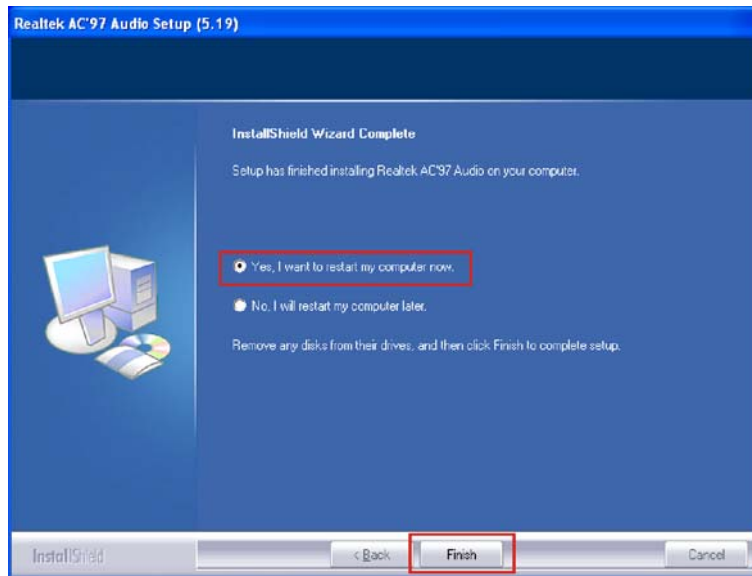
**Step 7:** The Verification window in **Figure 7-23** may appear.



**Figure 7-23: AC'97 Driver Installation Verification**

**Step 8:** Click **CONTINUE ANYWAY**.

**Step 9:** When the driver is installed, the driver installation finish screen in **Figure 7-24** appears.



**Figure 7-24: AC'97 Driver Installation Complete**

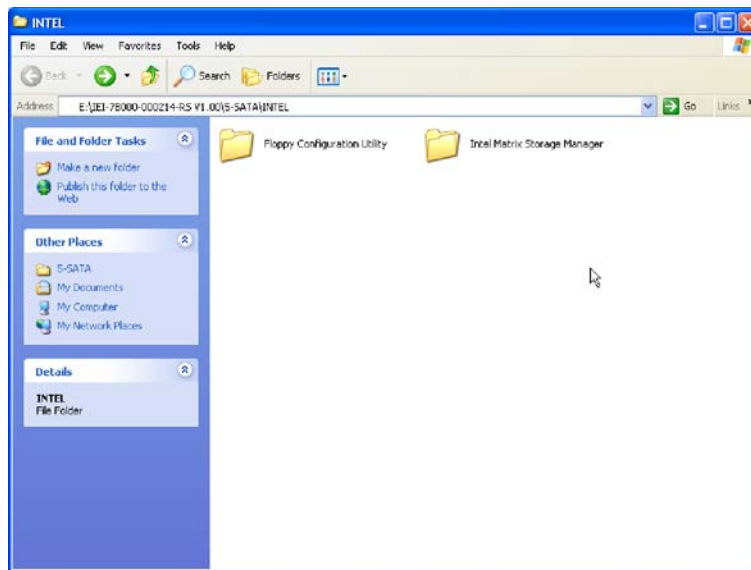
**Step 10:** Select “Yes, I wish to restart my computer now” And click **FINISH** to exit the InstallShield Wizard and restart the computer.

## 7.7 Intel® Matrix Storage Manager Driver Installation

To install the Intel® Matrix Storage Manager driver, please follow the steps below:

**Step 1:** Select **5-SATA** from the list in **Figure 7-1**.

**Step 2:** A new window opens (**Figure 7-25**).



**Figure 7-25: SATA RAID Driver Installation Program**

**Step 3:** Double-click the **Intel® Matrix Storage Manager** folder.

**Step 4:** Double-click the **8.5.0.1032** folder in **Figure 7-26**

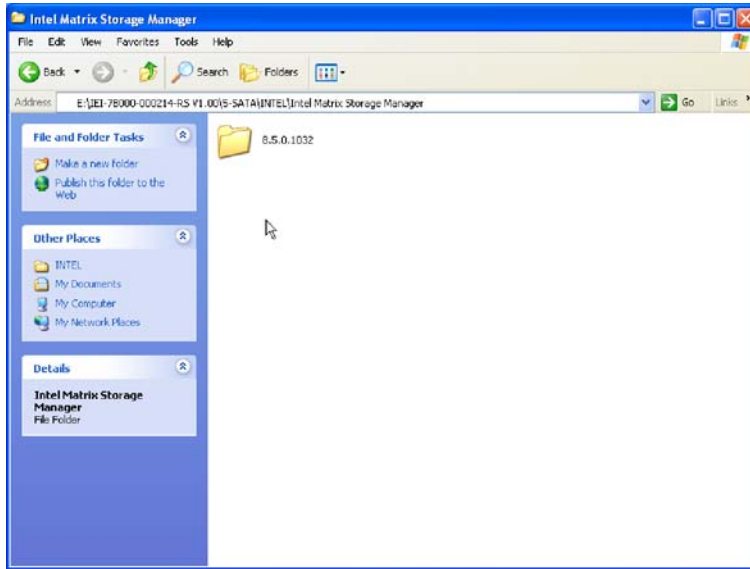


Figure 7-26: SATA RAID Driver Installation Program

**Step 5:** Double-click the IATA85CD.exe program icon in Figure 7-27.

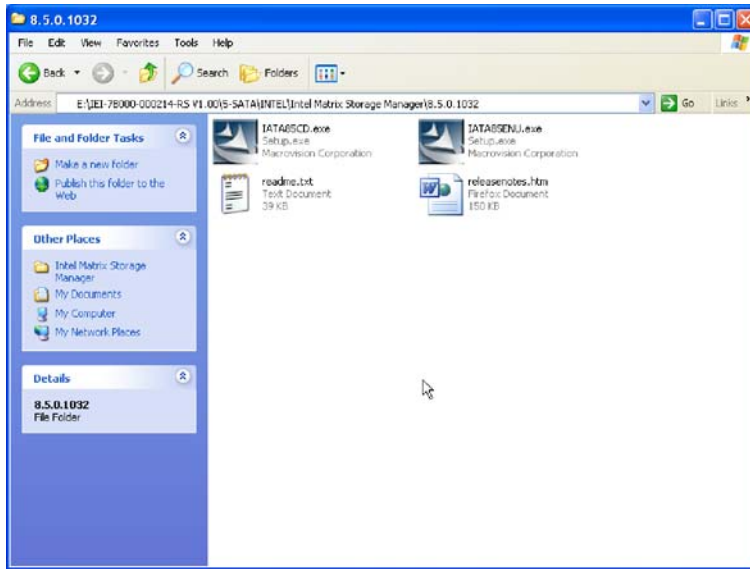


Figure 7-27: SATA RAID Setup Program Icon

**Step 6:** Figure 7-28 shows the InstallShield Wizard preparing to guide the user through the rest of the process.

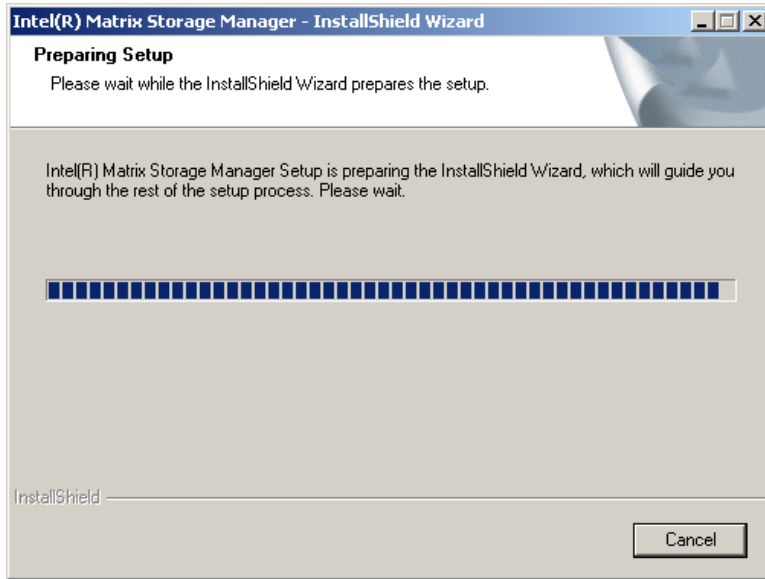


Figure 7-28: InstallShield Wizard Setup Screen

**Step 7:** Figure 7-29 shows the **Matrix Storage Manager** software configuring the installation process.

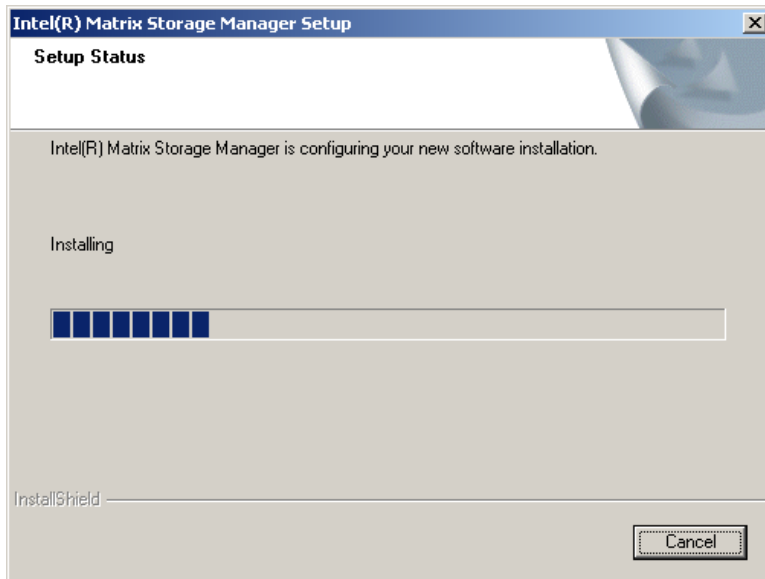
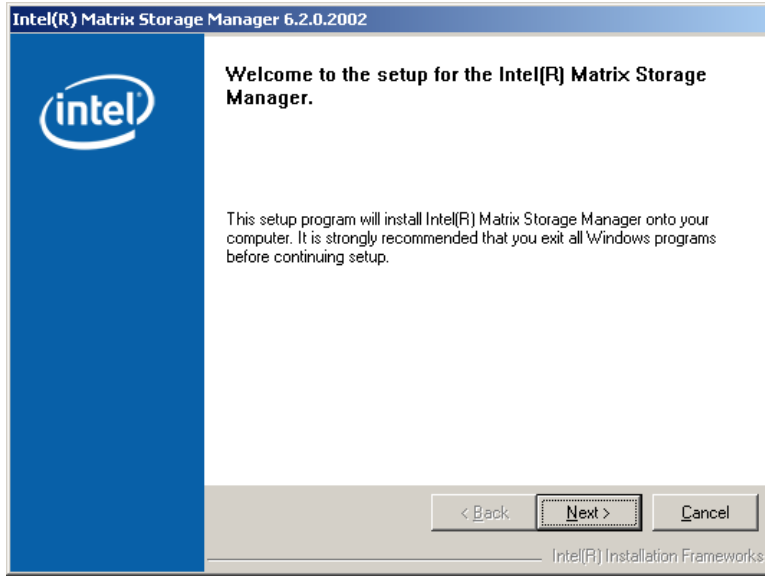


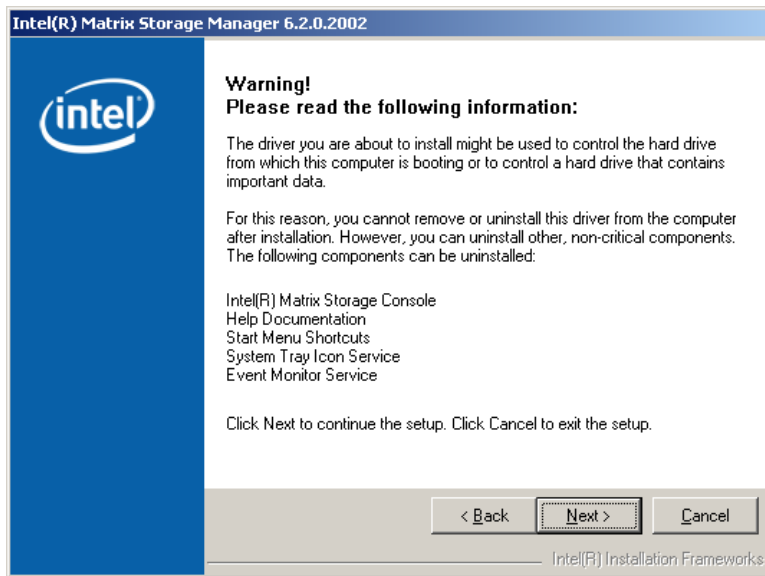
Figure 7-29: Matrix Storage Manager Setup Screen

**Step 8:** Figure 7-30 shows the **Matrix Storage Manager** welcome screen.



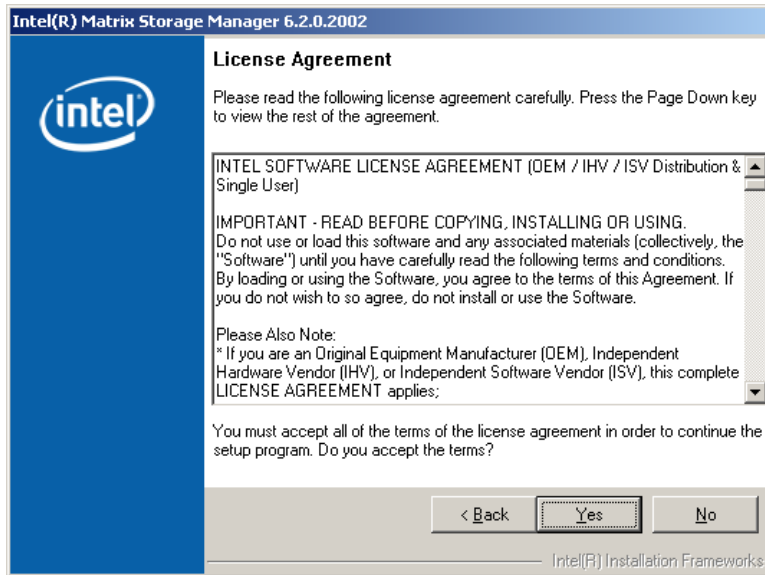
**Figure 7-30: Matrix Storage Manager Welcome Screen**

**Step 9:** Click **NEXT** and a warning appears (**Figure 7-31**). Read the warning carefully and decide whether or not to continue the installation process.



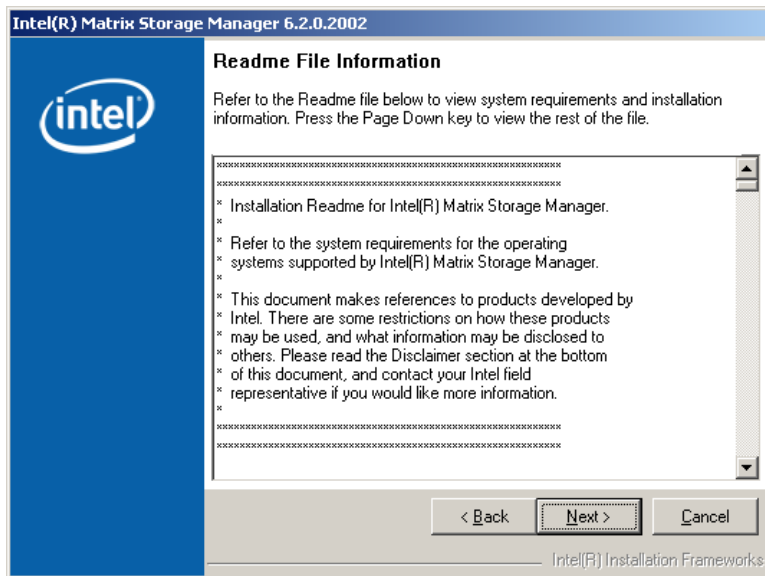
**Figure 7-31: Matrix Storage Manager Warning Screen**

**Step 10:** Click **NEXT** and a license agreement appears (**Figure 7-32**).



**Figure 7-32: Matrix Storage Manager License Agreement**

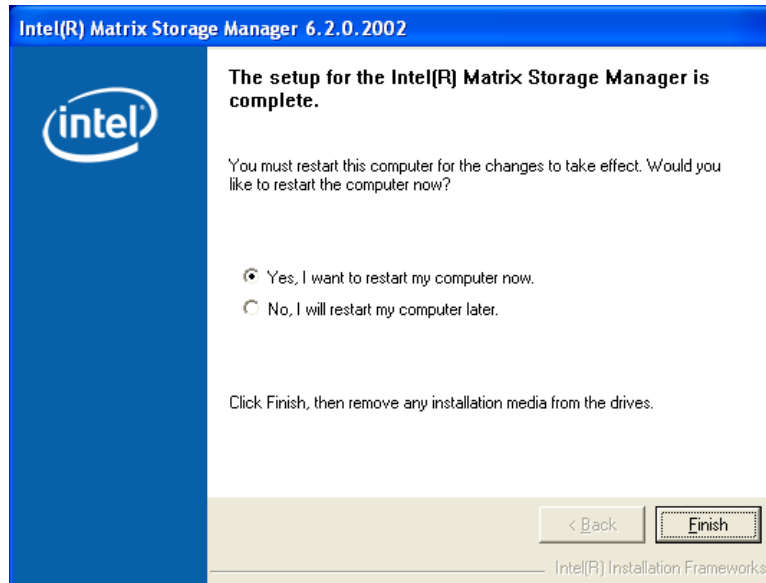
**Step 11:** Read the license agreement. To accept the terms and conditions stipulated in the license agreement shown, click **YES** and the Readme information file shown in **Figure 7-33** appears.



**Figure 7-33: Matrix Storage Manager Readme File**

**Step 12:** Read the Readme file information and click **NEXT**.

**Step 13:** After the driver installation process is complete, a confirmation screen appears (Figure 7-34).



**Figure 7-34: Matrix Storage Manager Setup Complete**

**Step 14:** The confirmation screen offers the option of restarting the computer now or later. For the settings to take effect, the computer must be restarted. Click **FINISH** to restart the computer.

## 7.8 iSMM Installation

The iSMM (Intelligent System Management Module) allows hardware functions to be monitored from within the operating system. The iSMM can be set to sound an alarm when voltages, temperatures or fan speeds rise above or fall below the set limits.

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

**Step 2:** Click “**6-iSMM**”

**Step 3:** The iSMM directory appears. (**Figure 7-35**)



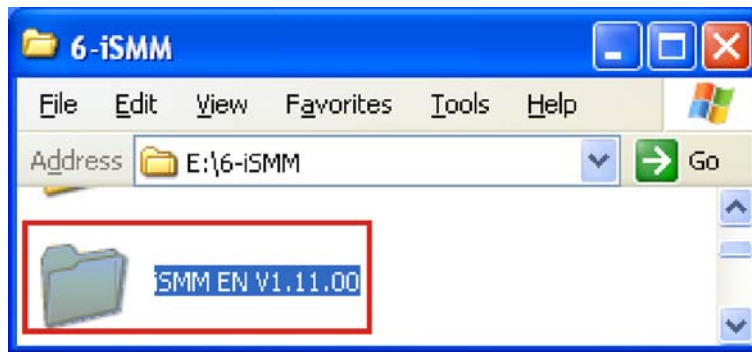


Figure 7-35: iSMM Directory

**Step 4:** Double click the **iSMM EN V1.11.00** directory icon. (Figure 7-35)

**Step 5:** The contents of the directory are displayed. (Figure 7-36)

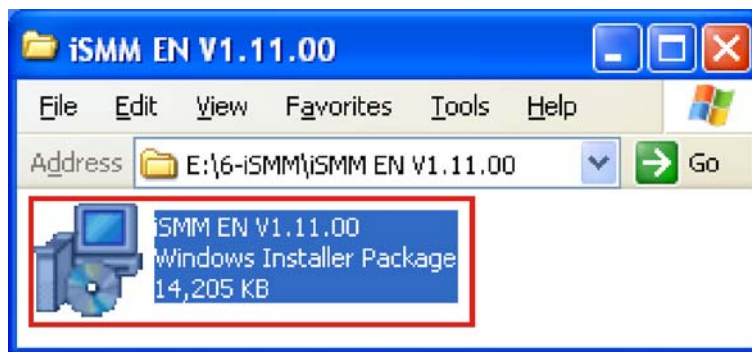
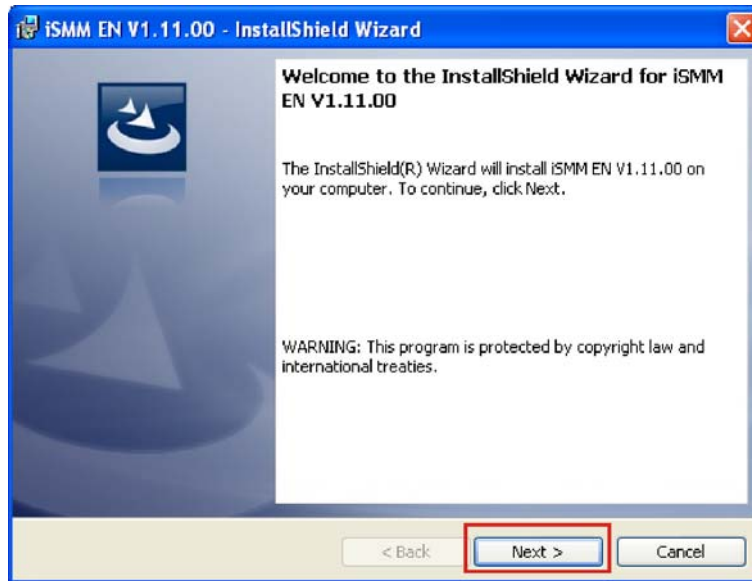


Figure 7-36: iSMM Installation File

**Step 6:** Double click the **iSMM EN V1.11.00** setup file. (Figure 7-36)

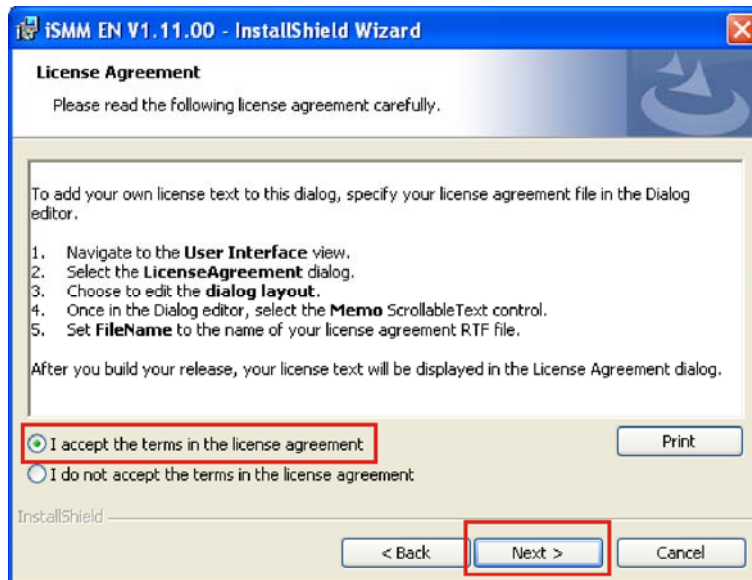
**Step 7:** The iSMM InstallShield Welcome Screen appears. (Figure 7-37)



**Figure 7-37: iSMM InstallShield Welcome Screen**

**Step 8:** Click **NEXT** to continue.

**Step 9:** The **License Agreement** screen appears. (Figure 7-38)

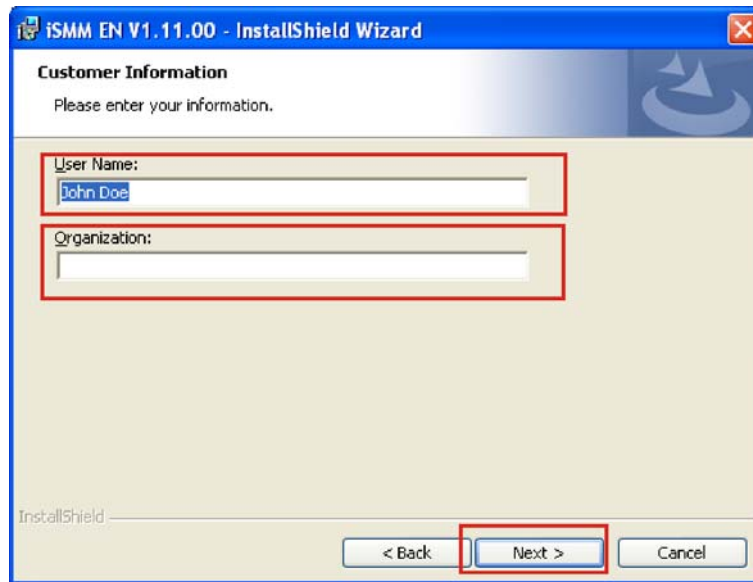


**Figure 7-38: iSMM License Agreement**

**Step 10:** Select “I accept the terms of the license agreement.” (Figure 7-38)

**Step 11:** Click **NEXT** to continue.(Figure 7-38)

**Step 12:** The **Customer Information** screen appears.(Figure 7-39)

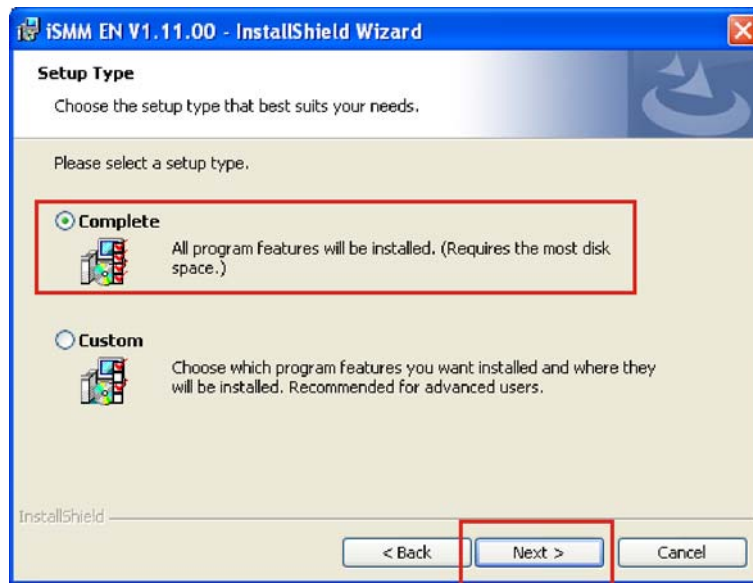


**Figure 7-39: iSMM Customer Information**

**Step 13:** Fill in the “User Name” and “Organization” fields, which will be automatically filled with the settings for the current user.(Figure 7-39)

**Step 14:** Click **Next** to continue.(Figure 7-39)

**Step 15:** The **Setup Type** screen appears. (Figure 7-40)

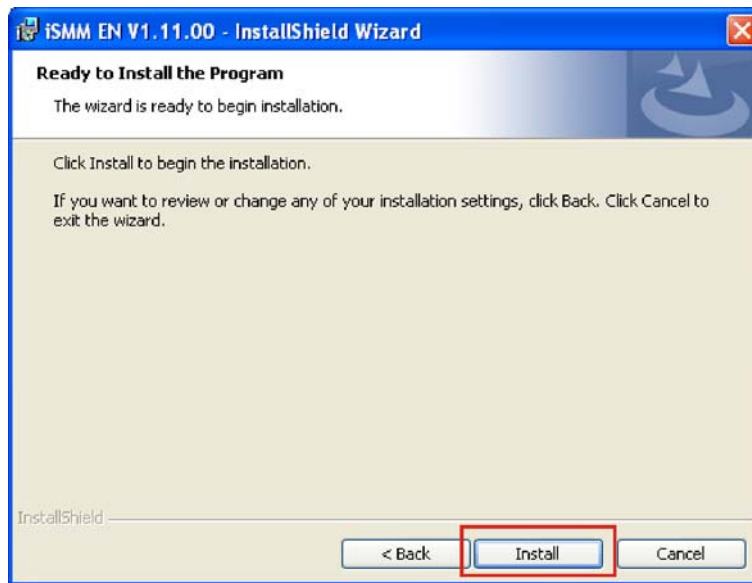


**Figure 7-40:** iSM Setup Type

**Step 16:** Select **“Complete”** (Figure 7-40)

**Step 17:** Click **NEXT** to continue. (Figure 7-40)

**Step 18:** The Installation Confirmation screen appears. (Figure 7-41)



**Figure 7-41: iSMM Installation Confirmation**

**Step 19:** Click **INSTALL** to begin installing the drivers. (Figure 7-41)

**Step 20:** The InstallShield Wizard Completed appears when the drivers are finished installing. (Figure 7-42)

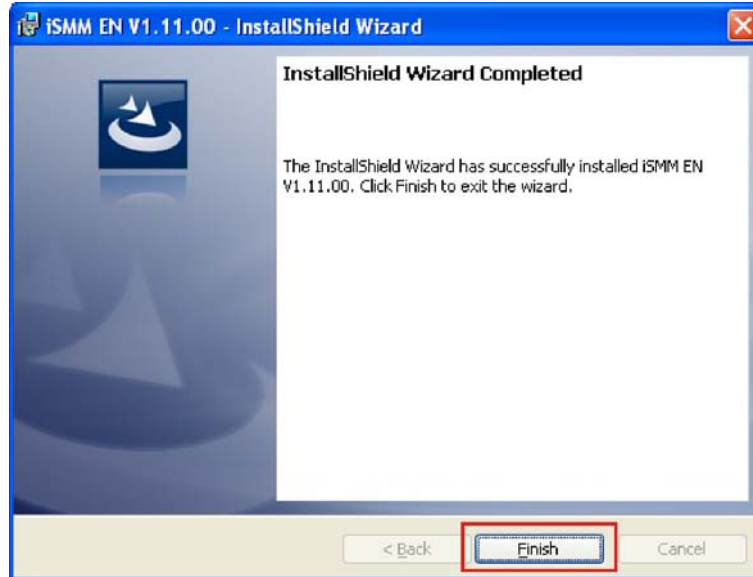


Figure 7-42: iSMM InstallShield Wizard Complete

**Step 21:** Click **FINISH** to exit the installation program.(Figure 7-42)

**Step 22:** The **Restart Confirmation** screen appears.(Figure 7-43)

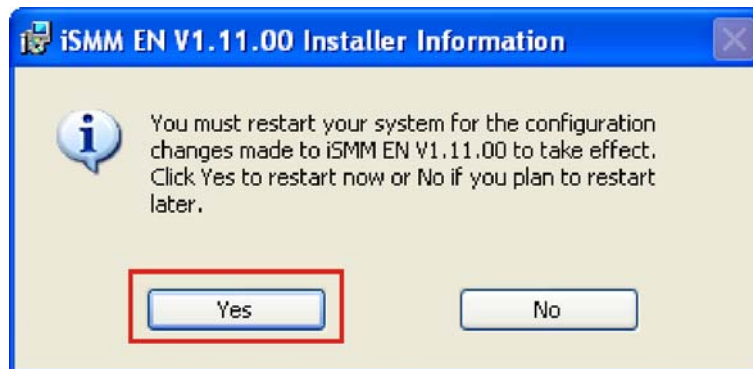


Figure 7-43: iSMM Restart Confirmation

**Step 23:** Select **YES** to restart the system, or **NO** to restart the system manually later.

Appendix

A

# BIOS Options

---

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

|   |            |
|---|------------|
| <b>System Overview .....</b>                          | <b>85</b>  |
| <b>System Time [xx:xx:xx] .....</b>                   | <b>85</b>  |
| <b>System Date [xx/xx/xx] .....</b>                   | <b>86</b>  |
| <b>ATA/IDE Configurations [Compatible] .....</b>      | <b>88</b>  |
| <b>Legacy IDE Channels [PATA Pri, SATA Sec] .....</b> | <b>89</b>  |
| <b>IDE Master and IDE Slave .....</b>                 | <b>89</b>  |
| <b>Auto-Detected Drive Parameters .....</b>           | <b>90</b>  |
| <b>Type [Auto] .....</b>                              | <b>91</b>  |
| <b>ZIP .....</b>                                      | <b>91</b>  |
| <b>LS-120 .....</b>                                   | <b>91</b>  |
| <b>LBA/Large Mode [Auto] .....</b>                    | <b>91</b>  |
| <b>Block (Multi Sector Transfer) [Auto] .....</b>     | <b>92</b>  |
| <b>PIO Mode [Auto] .....</b>                          | <b>92</b>  |
| <b>DMA Mode [Auto] .....</b>                          | <b>92</b>  |
| <b>S.M.A.R.T [Auto] .....</b>                         | <b>93</b>  |
| <b>32Bit Data Transfer [Enabled] .....</b>            | <b>94</b>  |
| <b>Serial Port1 Address [3F8/IRQ4] .....</b>          | <b>94</b>  |
| <b>Serial Port2 Address [2F8/IRQ3] .....</b>          | <b>95</b>  |
| <b>CPU FAN Mode Setting [Full On Mode] .....</b>      | <b>96</b>  |
| <b>CPU Temp. Limit of OFF [000] .....</b>             | <b>97</b>  |
| <b>CPU Temp. Limit of Start [020] .....</b>           | <b>97</b>  |
| <b>CPU Fan Start PWM [070] .....</b>                  | <b>98</b>  |
| <b>Slope PWM [0.5 PWM] .....</b>                      | <b>98</b>  |
| <b>Suspend Mode [S1(POS)] .....</b>                   | <b>100</b> |
| <b>Restore on AC Power Loss [Last State] .....</b>    | <b>101</b> |
| <b>Power Button Mode [On/Off] .....</b>               | <b>101</b> |
| <b>Resume on Keyboard/Mouse [Disabled] .....</b>      | <b>102</b> |
| <b>Resume on Ring [Disabled] .....</b>                | <b>102</b> |
| <b>Resume on PCI-Express WAKE# [Enabled] .....</b>    | <b>102</b> |
| <b>Resume On RTC Alarm [Disabled] .....</b>           | <b>103</b> |
| <b>RTC Alarm Date (Days) .....</b>                    | <b>103</b> |
| <b>System Time .....</b>                              | <b>103</b> |
| <b>Remote Access [Disabled] .....</b>                 | <b>104</b> |



## WAFER-945GSE2 User Manual

|   |     |
|---|-----|
| Serial Port Number .....                          | 104 |
| Serial Port Mode.....                             | 104 |
| Flow Control .....                                | 104 |
| Redirection after BIOS POST.....                  | 104 |
| Terminal Type.....                                | 104 |
| VT-UTF8 Combo Key Support .....                   | 104 |
| Serial Port Number [COM1].....                    | 104 |
| Base Address, IRQ [2F8h,3].....                   | 105 |
| Serial Port Mode [115200 8,n,1].....              | 105 |
| Flow Control [None].....                          | 105 |
| Redirection After BIOS POST [Always] .....        | 106 |
| Terminal Type [ANSI].....                         | 106 |
| VT-UTF8 Combo Key Support [Disabled].....         | 106 |
| Sredir Memory Display Delay [Disabled].....       | 106 |
| USB Functions [Enabled].....                      | 107 |
| USB 2.0 Controller [Enabled].....                 | 107 |
| USB2.0 Controller Mode [HiSpeed].....             | 108 |
| Legacy USB Support [Enabled].....                 | 108 |
| IRQ# [Available].....                             | 109 |
| DMA Channel# [Available] .....                    | 110 |
| Reserved Memory Size [Disabled] .....             | 110 |
| Quick Boot [Enabled] .....                        | 111 |
| Quiet Boot [Disabled] .....                       | 112 |
| AddOn ROM Display Mode [Force BIOS] .....         | 112 |
| Bootup Num-Lock [Off] .....                       | 112 |
| Boot From LAN Support [Disabled] .....            | 113 |
| Change Supervisor Password .....                  | 114 |
| Change User Password.....                         | 114 |
| Memory Hole [Disabled].....                       | 115 |
| Internal Graphics Mode Select [Enable, 8MB] ..... | 116 |
| DVMT Mode Select [DVMT Mode].....                 | 116 |
| DVMT/FIXED Memory .....                           | 116 |
| Boot Display Device [Auto].....                   | 117 |
| LVDS1 Panel Type .....                            | 117 |
| Audio Controller [All Disabled].....              | 118 |



|                               |     |
|-------------------------------|-----|
| Save Changes and Exit .....   | 119 |
| Discard Changes and Exit..... | 119 |
| Discard Changes.....          | 119 |
| Load Optimal Defaults.....    | 119 |
| Load Failsafe Defaults.....   | 119 |

Appendix

**B**

# Terminology

---

|                      |   |
|----------------------|---|
| <b>AC '97</b>        | Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.  |
| <b>ACPI</b>          | Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.  |
| <b>AHCI</b>          | Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.   |
| <b>ATA</b>           | The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.   |
| <b>ARMD</b>          | An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.  |
| <b>ASKIR</b>         | 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. |
| <b>BIOS</b>          | 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   |
| <b>CODEC</b>         | The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.   |
| <b>CompactFlash®</b> | 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.  |
| <b>CMOS</b>          | Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.   |
| <b>COM</b>           | 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.  |
| <b>DAC</b>           | The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.   |
| <b>DDR</b>           | Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.   |

## WAFER-945GSE2 User Manual

|                 |  |
|-----------------|--|
| <b>DMA</b>      | Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.   |
| <b>DIMM</b>     | 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.  |
| <b>DIO</b>      | 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.                                  |
| <b>EHCI</b>     | The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.  |
| <b>EIDE</b>     | Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.   |
| <b>EIST</b>     | 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. |
| <b>FSB</b>      | The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.  |
| <b>GbE</b>      | Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.  |
| <b>GPIO</b>     | General purpose input  |
| <b>HDD</b>      | Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.  |
| <b>ICH</b>      | The Input/Output Control Hub (ICH) is an Intel® Southbridge chipset.   |
| <b>IrDA</b>     | Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.   |
| <b>L1 Cache</b> | The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.  |
| <b>L2 Cache</b> | The Level 2 Cache (L2 Cache) is an external processor memory cache.  |

|                  |   |
|------------------|---|
| <b>LCD</b>       | Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.   |
| <b>LVDS</b>      | Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.  |
| <b>POST</b>      | The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.   |
| <b>RAM</b>       | 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.   |
| <b>SATA</b>      | Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps. |
| <b>S.M.A.R.T</b> | Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.   |
| <b>UART</b>      | Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.  |
| <b>UHCI</b>      | The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.  |
| <b>USB</b>       | The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.   |
| <b>VGA</b>       | 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 WAFER-945GSE2 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 Super I/O GPIO port 1.

| 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    | GP27          | General purpose I/O port 2 bit 7. |
| 4   | Output 2    | GP26          | General purpose I/O port 2 bit 6. |
| 5   | Output 1    | GP25          | General purpose I/O port 2 bit 5. |
| 6   | Output 0    | GP24          | General purpose I/O port 2 bit 4. |
| 7   | Input 3     | GP23          | General purpose I/O port 2 bit 3. |
| 8   | Input 2     | GP22          | General purpose I/O port 2 bit 2  |
| 9   | Input 1     | GP21          | General purpose I/O port 2 bit 1  |
| 10  | Input 0     | GP20          | General purpose I/O port 2 bit 0  |

**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.

|            |                  |                                 |
|------------|------------------|---------------------------------|
| <b>MOV</b> | <b>AX, 6F08H</b> | Sets the digital port as input  |
| <b>INT</b> | <b>15H</b>       | 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.

|            |                  |                                 |
|------------|------------------|---------------------------------|
| <b>MOV</b> | <b>AX, 6F09H</b> | Sets the digital port as output |
| <b>MOV</b> | <b>BL, 09H</b>   |                                 |
| <b>INT</b> | <b>15H</b>       | 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:

| <b>AH – 6FH Sub-function:</b> |   |
|-------------------------------|---|
| 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)

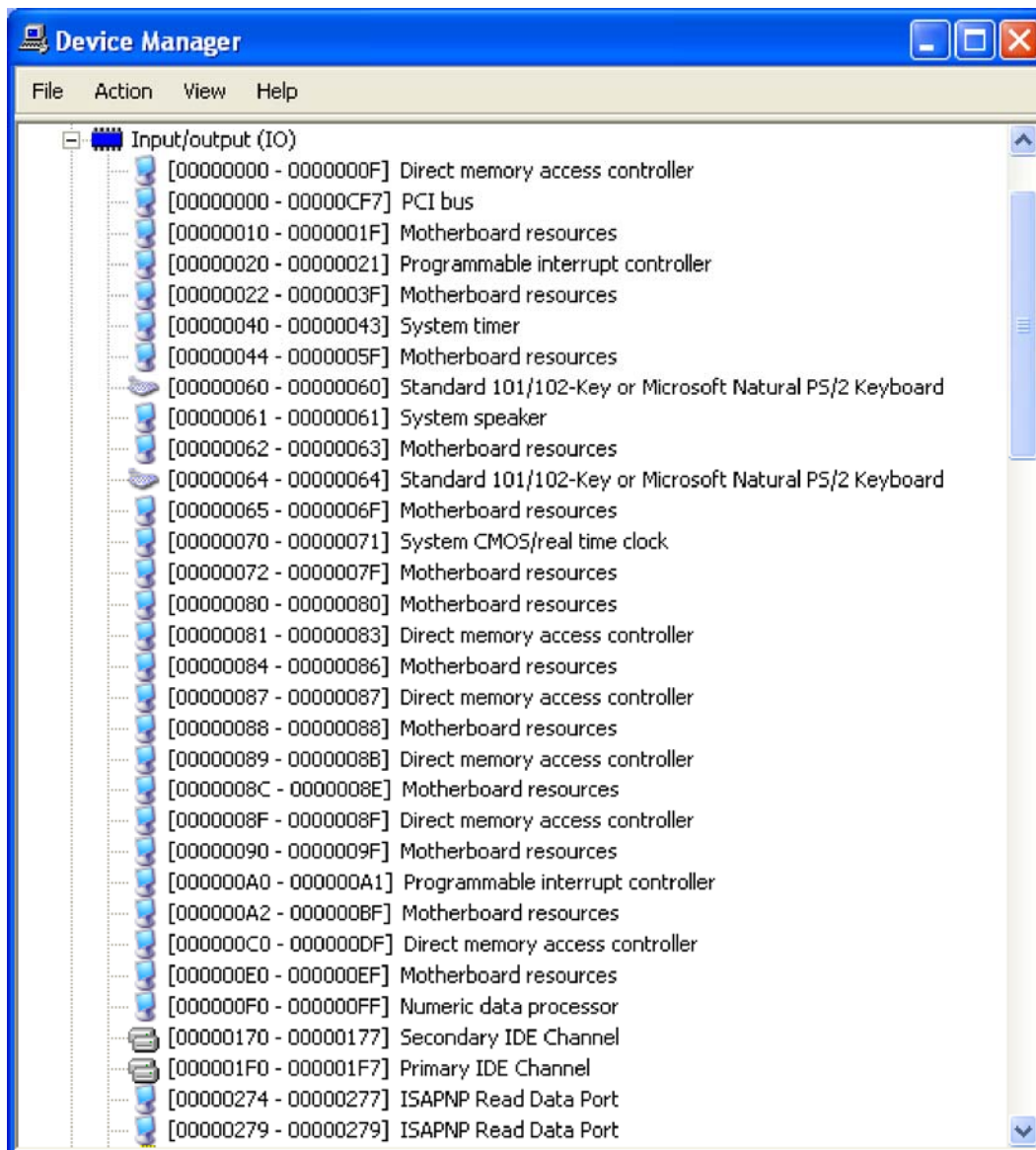
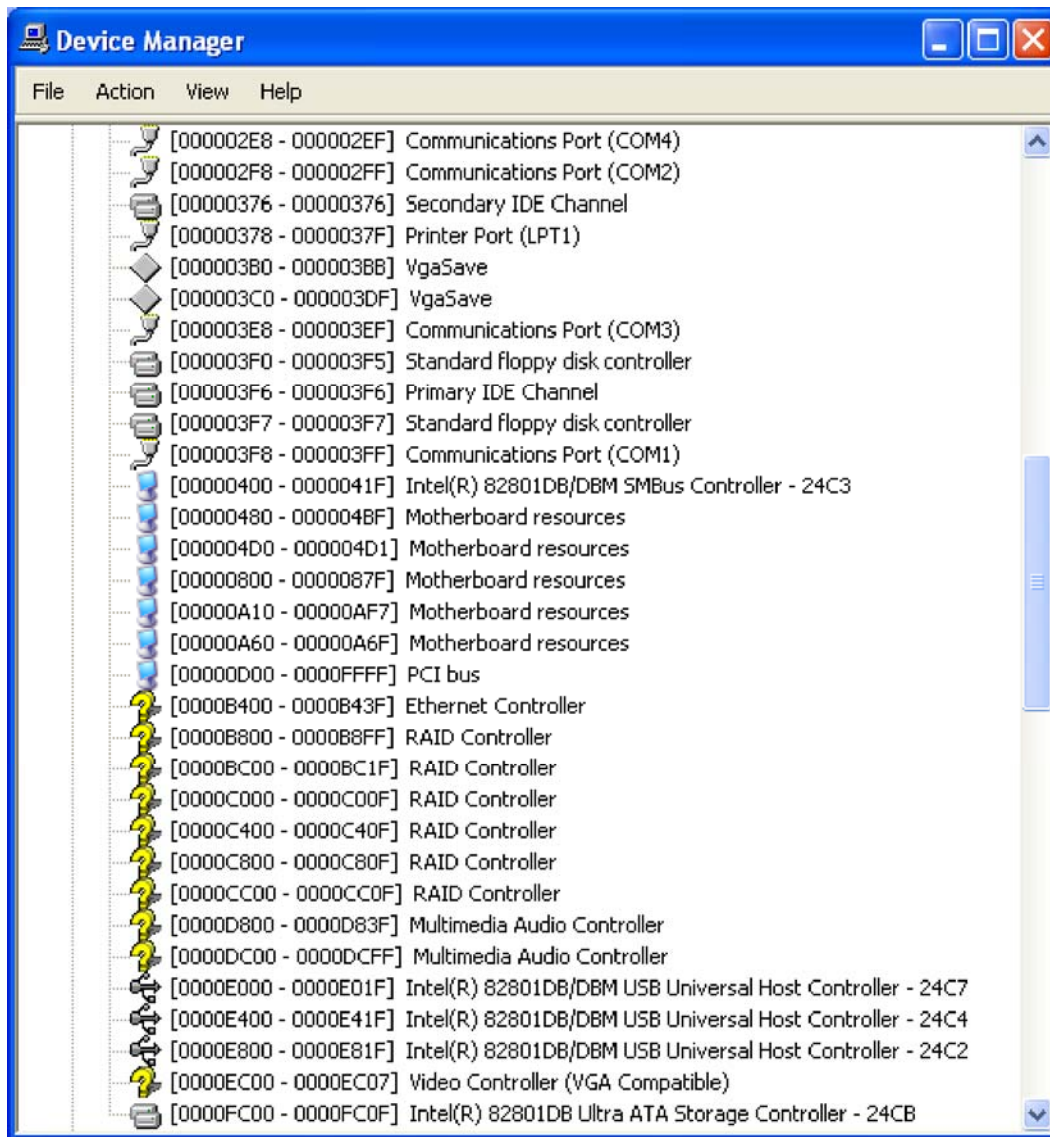


Figure E-2: Input/Output (IO) (1 of 2)



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



### E.3 Interrupt Request (IRQ)

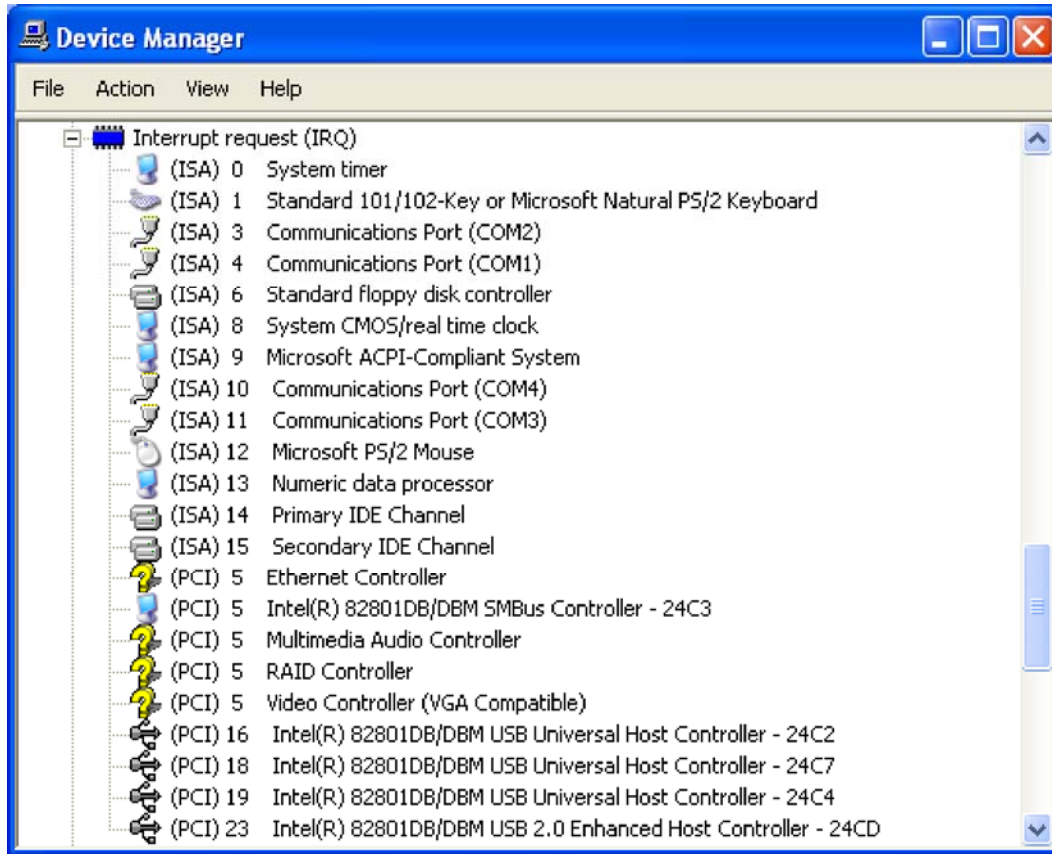
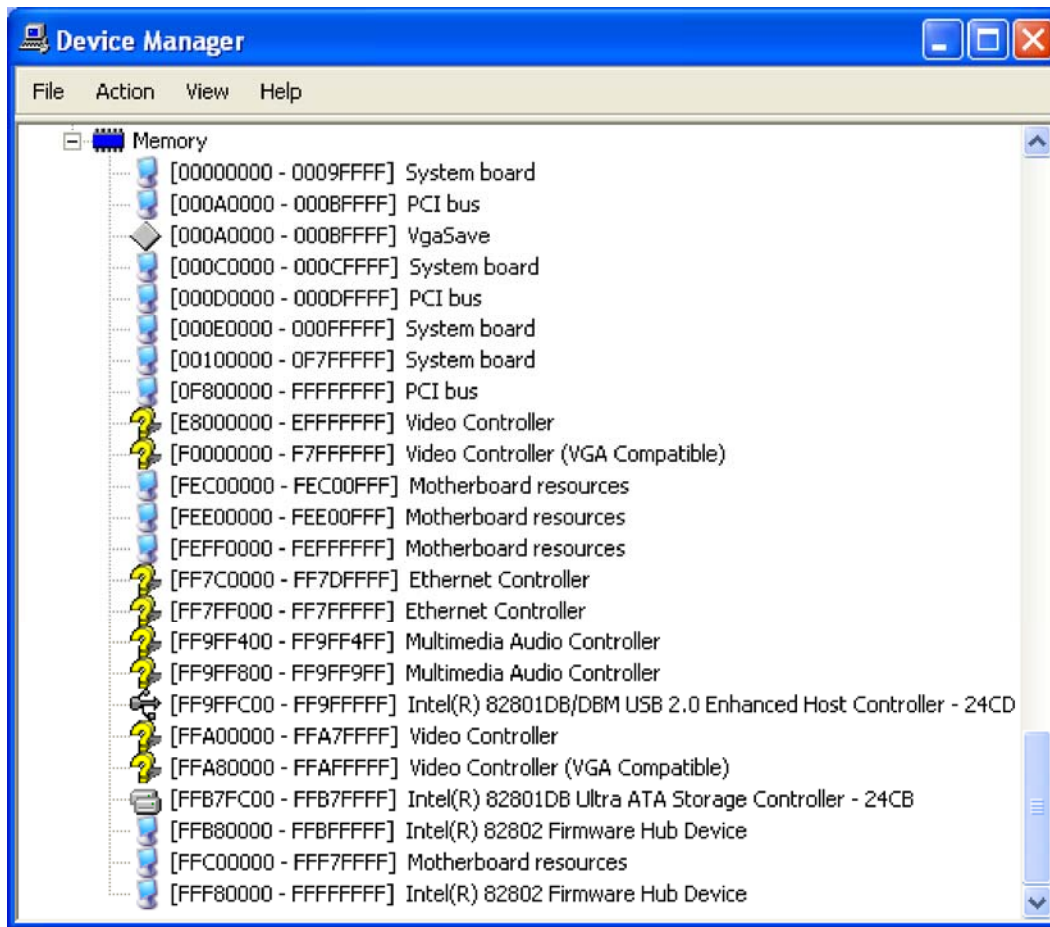


Figure E-4: Interrupt Request (IRQ)

## E.4 Memory



**Figure E-5: Memory**

Appendix

F

# Compatibility

---

**NOTE:**

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the WAFER-945GSE2

## F.1 Compatible Operating Systems

The following operating systems have been successfully run on the WAFER-945GSE2.

- MS-DOS 6.22
- Microsoft Windows XP (32-bit)

## F.2 Compatible Processors

The following Intel® processors have been successfully tested on the WAFER-945GSE2

| CPU              | FSB     | Frequency | L2 Cache |
|------------------|---------|-----------|----------|
| Intel® ATOM® N70 | 533 MHz | 1.6 GHz   | 1MB      |

**Table F-1: Compatible Processors**

### F.3 Compatible Memory Modules



**NOTE:**

The memory modules listed below have been tested on the WAFER-945GSE2 other memory modules that comply with the specifications may also work on the WAFER-945GSE2 but have not been tested.

The following onboard memory modules have been successfully tested on the WAFER-945GSE2.

| Manufacturer | Model No.    | Capacity | Speed | Type |
|--------------|--------------|----------|-------|------|
| Hynix        | HY5PS1G1631C | 1 Gb     |       | DDR  |

**Table F-2: Compatible Memory Modules**



Appendix

G

# Hazardous Materials Disclosure

---

## **G.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) |
| <b>Housing</b>                 | X  | O            | O            | O                            | O                              | X                                     |
| <b>Display</b>                 | X  | O            | O            | O                            | O                              | X                                     |
| <b>Printed Circuit Board</b>   | X  | O            | O            | O                            | O                              | X                                     |
| <b>Metal Fasteners</b>         | X  | O            | O            | O                            | O                              | O                                     |
| <b>Cable Assembly</b>          | X  | O            | O            | O                            | O                              | X                                     |
| <b>Fan Assembly</b>            | X  | O            | O            | O                            | O                              | X                                     |
| <b>Power Supply Assemblies</b> | X  | O            | O            | O                            | O                              | X                                     |
| <b>Battery</b>                 | 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



## WAFER-945GSE2 User Manual

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<br>(Pb) | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(CR(VI)) | 多溴联苯<br>(PBB) | 多溴二苯<br>醚<br>(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。



Appendix

H

# AC'97 Audio Codec

---

### H.1 Introduction

The motherboard comes with an onboard Realtek ALC655 CODEC. The ALC655 is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC that provides three pairs of stereo outputs with 5-bit volume control, a mono output, and multiple stereo and mono inputs, along with flexible mixing, gain, and mute functions.

#### H.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through the phone jacks on the rear panel of the motherboard.

The phone jacks include:

- LINE IN
- LINE OUT
- MIC IN

#### H.1.2 Driver Installation

The driver installation has been described in the driver installation chapter.

After rebooting, the sound effect configuration utility appears in the **Windows Control Panel (Figure H-1)**. If the peripheral speakers are properly connected, sound effects should be heard.

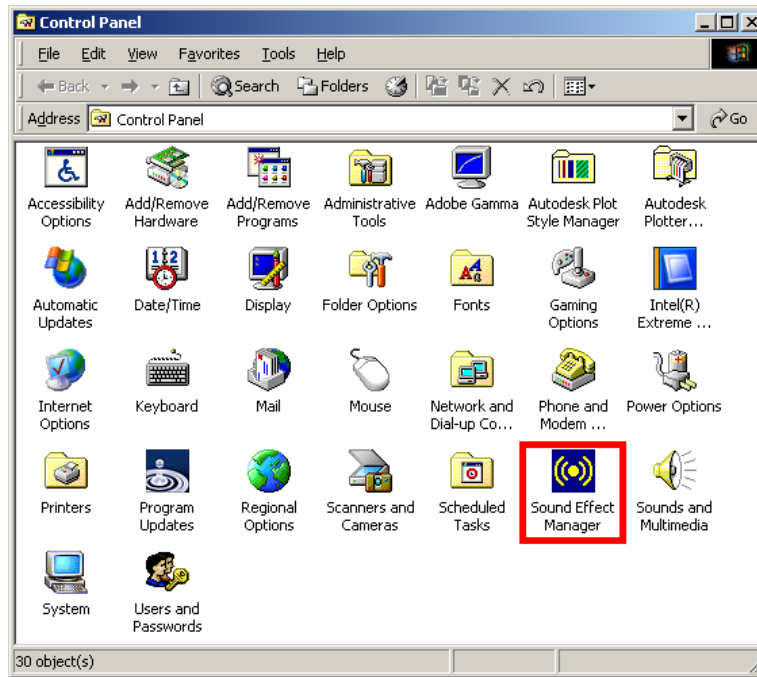


Figure H-1: Control Panel Sound Effect Manager

## H.2 Sound Effect Configuration

### H.2.1 Accessing the Sound Effects Manager

Follow the steps below to access the **Sound Effect Manager**.

**Step 1:** Install the ALC655 audio CODEC driver.

**Step 2:** Click the Sound Effect Manager icon in the system task bar (**Figure H-2**).

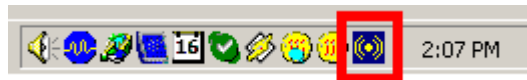


Figure H-2: Sound Effect Manager Icon [Task Bar]

**Step 3:** The sound effect manager appears (**Figure H-3**).

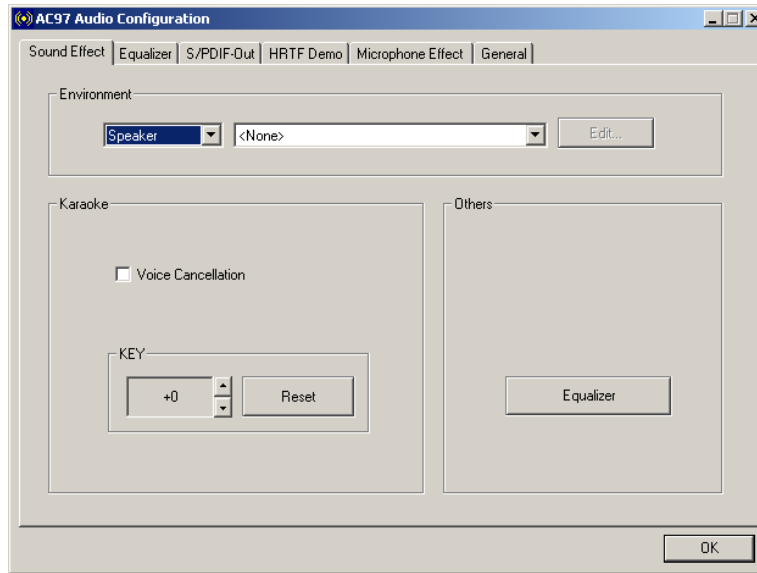


Figure H-3: Sound Effects Manager (ALC655)



**NOTE:**

The Sound Effect Manager shown in **Figure H-3** is for the Realtek ALC655 audio Codec. Different Codecs may have different sound manager appearances.

The following section describes the different configuration options in the Sound Effect Manager.

## H.2.2 Sound Effect Manager Configuration Options

The **Sound Effects Manager** enables configuration of the items listed below. To configure these items click the corresponding menu tab in the **Sound Effects Manager** (**Figure H-3**).



**NOTE:**

The Karaoke Mode is configured in the Sound Effect menu. To access Karaoke configuration settings, click on the Sound Effect menu tab.

- Sound Effect
- Karaoke Mode
- Equalizer
- Speaker Configuration
- Speaker Test
- S/PDIF-In
- S/PDIF-Out
- Connector Sensing
- HRTF Demo
- Microphone Effect
- General

**NOTE:**

Not all Realtek Sound Effect Managers have all the above listed options. The Sound Effect Manager loaded onto the system may only have some of the options listed above.

Below is a brief description of the available configuration options in the **Sound Effects Manager**.

- **Sound Effect** - Select a sound effect from the 23 listed options in the drop down menu. Selected sound effect properties can be edited. Click **EDIT** to edit the sound effect.
- **Karaoke Mode - Karaoke Mode** is accessed in the Sound Effect tab. The **Voice Cancellation** disables the vocal part of the music being played. The **Key adjustment** up or down arrow icons enable users to define a key that fits a certain vocal range.
- **Equalizer Selection** - Preset equalizer settings enable easy audio range settings. Ten frequency bands can be configured.
- **Speaker Configuration** - Multi-channel speaker settings are configured in this menu. Configurable options include:
  - Headphone
  - Channel mode for stereo speaker output
  - Channel mode for 4 speaker output

- Channel mode for 5.1 speaker output
- Synchronize the phone jack switch with speakers settings
- **Speaker Test** - Each speaker connected to the system is tested individually to see if the 4-channel or 6-channel audio operates properly.
- **S/SPDIF-In and S/SPDIF-Out** - S/SPDIF is used to transmit digital and analog audio signals with either a 48 or 44.1kHz sample rate.
- **HRTF Demo** - Adjust HRTF (Head Related Transfer Functions) 3D positional audio before running 3D applications.
- **Microphone Effect** - Microphone noise suppression is enabled in this menu.
- **General** - General information about the installed AC'97 audio configuration utility is listed here.



# Index

---



**4**

4-port RS-232 serial port connector .....4

**A**

ACPI .....99, 100  
 airflow .....68  
 ALC655 .....177  
 anti-static precautions .....29  
     anti-static pad .....29, 58  
     anti-static wristband .....29, 58  
     handling .....29, 58  
     self-grounding .....29, 58  
 AT power select jumper .....37, 62  
     location .....63  
     settings .....63  
 ATX enable connector .....3  
 ATX power connector .....36  
     location and pinouts .....36  
 ATX power connector .....3  
 ATX power supply enable connector .....37  
     location and pinouts .....37  
 audio connector .....3, 37  
     location and pinouts .....37  
 audio kit .....74  
     installation .....74

**B**

backlight inverter connector .....3, 38  
     location and pinouts .....38  
 baseboard .....76

BIOS .. 23, 83, 84, 85, 86, 87, 88, 89, 90, 94,  
 95, 96, 99, 100, 101, 103, 104, 106, 107,  
 108, 109, 110, 111, 112, 113, 114, 115,  
 117, 118, 119

**C**

cables .....69  
     dual port USB .....76  
     dual RS-232 .....71  
     keyboard/mouse Y-cable .....73  
     SATA drive .....70  
     SATA drive power .....70  
 CF card ..... 39, 60  
     installation .....60  
     location and pinouts .....39  
     setup jumper .....64  
     socket .....39  
 CF card setup jumper ..... 4, 64  
     location .....64  
     settings .....64  
 chassis .....68  
     installation .....68  
 chipset ..... 11  
     northbridge ..... 11  
 clear CMOS jumper ..... 4, 64, 65  
     location .....65  
     settings .....65  
 CMOS .....64  
     clear CMOS jumper .....64  
 COM 2 .....51  
     COM 2 function select .....66  
     connector location and pinouts .....51

|                                     |        |
|-------------------------------------|--------|
| RS-232, RS-422 or RS-485 .....      | 51     |
| COM 2 function select jumper .....  | 51, 66 |
| location .....                      | 66     |
| settings .....                      | 66     |
| COM2 port mode setting jumper ..... | 4      |
| CompactFlash.....                   | 39     |
| socket location and pinouts .....   | 39     |
| CompactFlash socket .....           | 3      |
| connectors, external                |        |
| COM 1 serial port .....             | 54     |
| LAN connector.....                  | 53     |
| RJ-45 connector .....               | 53     |
| USB port.....                       | 55     |
| connectors, pinouts and location    |        |
| ATX power .....                     | 36     |
| ATX power supply enable.....        | 36     |
| audio.....                          | 37     |
| backlight inverter .....            | 38     |
| COM4 serial port .....              | 51     |
| COM5 serial port .....              | 51     |
| COM6 serial port .....              | 51     |
| CompactFlash .....                  | 39     |
| digital input/output .....          | 41     |
| fan.....                            | 42     |
| keyboard/mouse.....                 | 43     |
| LED.....                            | 44     |
| LVDS LCD (30-pin).....              | 44     |
| power button.....                   | 48     |
| reset button .....                  | 49     |
| serial port (COM3 to COM6) .....    | 51     |
| USB (internal).....                 | 52     |
| cooling .....                       | 68     |
| airflow .....                       | 68     |
| cooling fan .....                   | 42, 98 |
| CRT.....                            | 117    |

**D**

|   |     |
|---|-----|
| DB-15 connector .....                   | 80  |
| DB-9 connector .....                    | 79  |
| digital input/output connector.....     | 41  |
| location and pinouts.....               | 41  |
| dimensions.....                         | 7   |
| board .....                             | 7   |
| external peripheral interface connector |     |
| panel.....                              | 7   |
| DIO connector.....                      | 3   |
| Drivers                                 |     |
| Intel® Matrix Storage Manager.....      | 137 |
| dual port USB cable.....                | 76  |

**E**

|                                     |        |
|-------------------------------------|--------|
| electrostatic discharge .....       | 29, 58 |
| Enhanced Hardware Monitor .....     | 25     |
| Ethernet                            |        |
| RJ-45 connector .....               | 4      |
| Ethernet connector, external.....   | 53     |
| Ethernet controllers.....           | 53     |
| external peripheral interface ..... | 77     |
| connection .....                    | 77     |
| connectors .....                    | 77     |

**F**

|                            |       |
|----------------------------|-------|
| fan connector .....        | 3, 42 |
| location and pinouts.....  | 42    |
| fan speed controller ..... | 25    |
| FDD.....                   | 94    |
| FSB.....                   | 88    |

## WAFER-945GSE2 User Manual

### H

|                    |    |
|--------------------|----|
| hard disk drives   |    |
| SATA.....          | 50 |
| HDD .....          | 44 |
| activity.....      | 44 |
| indicator LED..... | 44 |

### I

|                             |    |
|-----------------------------|----|
| IDE device .....            | 75 |
| connector.....              | 75 |
| installation checklist..... | 60 |

### J

|                                |    |
|--------------------------------|----|
| jumper                         |    |
| RS-232/422/485 COM2 setup..... | 4  |
| jumper                         |    |
| AT power select.....           | 37 |
| jumper                         |    |
| jumper settings .....          | 62 |
| jumper.....                    | 62 |
| jumper                         |    |
| jumper configuration.....      | 62 |
| jumper                         |    |
| AT power select.....           | 62 |
| jumper                         |    |
| CF card setup.....             | 64 |
| jumper                         |    |
| clear CMOS.....                | 64 |
| jumper                         |    |
| COM 2 function select.....     | 66 |
| jumper                         |    |
| LVDS voltage selection .....   | 67 |

### K

|                                    |    |
|------------------------------------|----|
| keyboard .....                     | 43 |
| keyboard and mouse connector ..... | 3  |
| keyboard controller .....          | 25 |
| keyboard/mouse .....               | 73 |
| cable connection.....              | 73 |
| onboard connector.....             | 73 |
| Y-cable.....                       | 73 |
| keyboard/mouse connector .....     | 43 |
| location and pinouts.....          | 43 |

### L

|                                    |        |
|------------------------------------|--------|
| LAN connection.....                | 78     |
| LAN connector .....                | 53     |
| LCD display.....                   | 38     |
| backlight inverter connector ..... | 38     |
| LED                                |        |
| HDD indicator .....                | 44     |
| power status .....                 | 44     |
| LED connector .....                | 3, 44  |
| HDD indicator LED connector .....  | 44     |
| location and pinouts.....          | 44     |
| power LED connector.....           | 44     |
| LPC bus .....                      | 23     |
| LPC interface .....                | 17, 25 |
| LVDS connector .....               | 3      |
| LVDS display.....                  | 67     |
| voltage select.....                | 67     |
| LVDS LCD connector.....            | 45     |
| location and pinouts.....          | 45     |
| LVDS panel .....                   | 45     |
| 18-bit.....                        | 45     |
| 36-bit.....                        | 45     |

|   |    |
|---|----|
| dual channel .....                          | 45 |
| single channel .....                        | 45 |
| LVDS voltage selection jumper.....          | 67 |
| location .....                              | 68 |
| settings .....                              | 67 |
| LVDS1 panel resolution selection jumper.... | 4  |
| LVDS1 voltage selection jumper.....         | 4  |

**M**

|                   |    |
|-------------------|----|
| motherboard ..... | 69 |
| installation..... | 69 |
| mouse .....       | 43 |

**N**

|                           |    |
|---------------------------|----|
| northbridge chipset ..... | 11 |
|---------------------------|----|

**P**

|                                    |          |
|------------------------------------|----------|
| PC/104 power input connector ..... | 47       |
| location and pinouts .....         | 47       |
| PCI interface .....                | 18       |
| PCIe mini card slot.....           | 46       |
| location and pinouts .....         | 46       |
| PCIe Mini Card slot.....           | 3        |
| peripheral connectors .....        | 35       |
| peripheral device cables.....      | 69       |
| power button connector .....       | 48       |
| location and pinouts .....         | 48       |
| power button connector .....       | 3        |
| Power Button Mode .....            | 101, 102 |
| power supply.....                  | 36, 37   |
| AT power select jumper.....        | 62       |
| AT power supply .....              | 37       |
| ATX power supply .....             | 36, 37   |

|                 |    |
|-----------------|----|
| power LED ..... | 44 |
| PS/2 cable..... | 43 |

**R**

|                                     |            |
|-------------------------------------|------------|
| RAID .....                          | 50         |
| real time clock.....                | 21         |
| reset button connector .....        | 49         |
| location and pinouts.....           | 49         |
| reset button connector .....        | 3          |
| RJ-45 connection.....               | 78         |
| single connector .....              | 78         |
| RJ-45 connector.....                | 53         |
| RJ-45 connector.....                | 54         |
| RJ-45 Ethernet connector.....       | 4          |
| RJ-45 LAN connector .....           | 53         |
| RS-232.....                         | 51, 54, 71 |
| cable connection.....               | 71         |
| COM 1 location and pinouts .....    | 54         |
| COM 2 location and pinouts .....    | 51         |
| COM 3 location and pinouts .....    | 51         |
| COM 4 location and pinouts .....    | 51         |
| connector location and pinouts..... | 51, 54     |
| dual cable .....                    | 71         |
| RS-232 serial port connector .....  | 4          |
| RS-422.....                         | 51         |
| COM 2 location and pinouts .....    | 51         |
| RS-485.....                         | 51         |
| COM 2 location and pinouts .....    | 51         |

**S**

|                         |     |
|-------------------------|-----|
| Safety Precautions..... | 170 |
| SATA                    |     |
| controller.....         | 21  |
| SATA drive.....         | 70  |

## WAFER-945GSE2 User Manual

|                                 |                  |                                      |         |
|---------------------------------|------------------|--------------------------------------|---------|
| cables .....                    | 70               | controller.....                      | 22      |
| connection .....                | 70               | devices .....                        | 52      |
| power cable .....               | 70               | external USB device connection ..... | 80      |
| SATA drive connector .....      | 4, 50            | port.....                            | 52      |
| location and pinouts .....      | 50               | USB 1.1 .....                        | 52      |
| SATA drives.....                | 50               | USB 2.0 .....                        | 52      |
| Serial Device                   |                  | USB 1.1.....                         | 52      |
| connection .....                | 79               | USB 2.0.....                         | 52, 107 |
| serial port .....               | 54               | USB 2.0 port .....                   | 55      |
| serial port connector .....     | 51, 54           | USB cable                            |         |
| location and pinouts .....      | 51, 54           | dual port.....                       | 76      |
| serial ports .....              | 25               | USB connector, internal.....         | 4, 52   |
| Sound Effect Configuration..... | 178              | location and pinouts.....            | 52      |
| Sound Effects Manager .....     | 178              | USB device connection.....           | 80      |
| Super I/O chipset.....          | 24               | dual connector .....                 | 80      |
| system voltages .....           | 95, 98           | USB port .....                       | 55      |
|                                 |                  | USB2.0.....                          | 108     |
| <b>T</b>                        |                  |                                      |         |
| technical specifications.....   | 4                | <b>V</b>                             |         |
| temperature .....               | 95               | VGA .....                            | 80      |
|                                 |                  | VGA connector.....                   | 56      |
| <b>U</b>                        |                  |                                      |         |
| unpacking .....                 | 29               | VGA monitor.....                     | 80      |
| unpacking checklist .....       | 30               | connection .....                     | 80      |
| unpacking precautions .....     | 29               | <b>W</b>                             |         |
| USB .....                       | 52, 76, 107, 108 | warranty validation.....             | 59      |
| cable                           |                  | <b>Y</b>                             |         |
| dual port .....                 | 76               | Y-cable .....                        | 43      |
| cable .....                     | 76               |                                      |         |
| cable .....                     | 76               |                                      |         |
| cable connection .....          | 77               |                                      |         |
| connectors .....                | 76               |                                      |         |