MODEL:
KINO-G45A

Mini-ITX LGA775 Motherboard for Intel® Core™2 Duo/Quad/Extreme CPU, 800/1066/1333MHz FSB, VGA, DVI-D, HDMI, LAN, SATA, PCI, USB, HD Audio, RoHS Compliant

User Manual

Rev. 1.00 – 10 July, 2009
## Revision

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 July, 2009</td>
<td>1.00</td>
<td>Initial release</td>
</tr>
</tbody>
</table>
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.
# Table of Contents

1 INTRODUCTION.......................................................................................................... 1
   1.1 INTRODUCTION........................................................................................................... 2
   1.2 BENEFITS ................................................................................................................... 3
   1.3 FEATURES................................................................................................................... 3
   1.4 CONNECTORS............................................................................................................. 4
   1.5 DIMENSIONS............................................................................................................... 5
   1.6 DATA FLOW ................................................................................................................ 6
   1.7 TECHNICAL SPECIFICATIONS ...................................................................................... 7

2 PACKING LIST............................................................................................................. 9
   2.1 ANTI-STATIC PRECAUTIONS ...................................................................................... 10
   2.2 UNPACKING PRECAUTIONS....................................................................................... 10
   2.3 PACKING LIST............................................................................................................11
   2.4 OPTIONAL ITEMS...................................................................................................... 12

3 CONNECTORS ........................................................................................................... 13
   3.1 PERIPHERAL INTERFACE CONNECTORS................................................................. 14
      3.1.1 KINO-G45A Layout ......................................................................................... 14
      3.1.2 Peripheral Interface Connectors ..................................................................... 14
      3.1.3 External Interface Panel Connectors............................................................... 15
   3.2 INTERNAL PERIPHERAL CONNECTORS ................................................................. 16
      3.2.1 ATX Power Connector ..................................................................................... 16
      3.2.2 Battery Connector ............................................................................................ 17
      3.2.3 CPU Fan Connector ........................................................................................ 18
      3.2.4 CPU Power Input Connector ........................................................................... 19
      3.2.5 Digital I/O Connector ...................................................................................... 19
      3.2.6 Front Panel Connector .................................................................................... 20
      3.2.7 Memory Card Slot............................................................................................ 21
      3.2.8 PCI Card Slot ................................................................................................... 22
      3.2.9 SATA Drive Connectors ...................................................................................23
      3.2.10 S/PDIF Connector ......................................................................................... 23
# KINO-G45A Mini-ITX Motherboard

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2.11 SPI Flash Connector</td>
<td>24</td>
</tr>
<tr>
<td>3.2.12 System Fan Connector</td>
<td>25</td>
</tr>
<tr>
<td>3.2.13 USB Connectors</td>
<td>26</td>
</tr>
<tr>
<td>3.3 External Peripheral Interface Connector Panel</td>
<td>28</td>
</tr>
<tr>
<td>3.3.1 Audio Connector</td>
<td>28</td>
</tr>
<tr>
<td>3.3.2 DVI Connector</td>
<td>29</td>
</tr>
<tr>
<td>3.3.3 HDMI Connector</td>
<td>29</td>
</tr>
<tr>
<td>3.3.4 Keyboard/Mouse Connector</td>
<td>30</td>
</tr>
<tr>
<td>3.3.5 LAN Connector</td>
<td>31</td>
</tr>
<tr>
<td>3.3.6 Serial Port Connectors (COM1)</td>
<td>31</td>
</tr>
<tr>
<td>3.3.7 USB Connector</td>
<td>32</td>
</tr>
<tr>
<td>3.3.8 VGA Connector</td>
<td>33</td>
</tr>
<tr>
<td>4 Installation</td>
<td>34</td>
</tr>
<tr>
<td>4.1 Anti-Static Precautions</td>
<td>35</td>
</tr>
<tr>
<td>4.2 Installation Considerations</td>
<td>35</td>
</tr>
<tr>
<td>4.2.1 Socket LGA775 CPU Installation</td>
<td>37</td>
</tr>
<tr>
<td>4.2.2 Socket LGA775 Cooling Kit Installation</td>
<td>40</td>
</tr>
<tr>
<td>4.2.3 DIMM Installation</td>
<td>42</td>
</tr>
<tr>
<td>4.3 Jumper Settings</td>
<td>43</td>
</tr>
<tr>
<td>4.3.1 AT/ATX Power Mode</td>
<td>43</td>
</tr>
<tr>
<td>4.3.2 Clear CMOS Jumper</td>
<td>44</td>
</tr>
<tr>
<td>4.3.3 SATA Drive Connection</td>
<td>45</td>
</tr>
<tr>
<td>4.3.4 USB Cable (Dual Port) with Slot Bracket</td>
<td>46</td>
</tr>
<tr>
<td>4.4 External Peripheral Interface Connection</td>
<td>48</td>
</tr>
<tr>
<td>4.4.1 Audio Connector</td>
<td>48</td>
</tr>
<tr>
<td>4.4.2 DVI Display Device Connection</td>
<td>49</td>
</tr>
<tr>
<td>4.4.3 LAN Connection</td>
<td>50</td>
</tr>
<tr>
<td>4.4.4 PS/2 Keyboard and Mouse Connection</td>
<td>50</td>
</tr>
<tr>
<td>4.4.5 USB Connection (Dual Connector)</td>
<td>51</td>
</tr>
<tr>
<td>4.4.6 VGA Monitor Connection</td>
<td>52</td>
</tr>
<tr>
<td>4.5 Software Installation</td>
<td>53</td>
</tr>
<tr>
<td>5 BIOS</td>
<td>55</td>
</tr>
<tr>
<td>5.1 Introduction</td>
<td>56</td>
</tr>
</tbody>
</table>
C.2 DIO Connector Pinouts................................................................. 107
C.3 Assembly Language Samples...................................................... 107
  C.3.1 Enable the DIO Input Function........................................... 107
  C.3.2 Enable the DIO Output Function........................................ 107

D WATCHDOG TIMER ........................................................................... 108

E COMPATIBILITY .................................................................................. 111
  E.1 Compatible Operating Systems............................................... 112
  E.2 Compatible Processors ............................................................ 112
  E.3 Compatible Memory Modules................................................... 113

F HAZARDOUS MATERIALS DISCLOSURE........................................... 114
  F.1 Hazardous Materials Disclosure Table for IPB Products Certified as
      RoHS Compliant Under 2002/95/EC Without Mercury ............... 115
# List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1-1</td>
<td>KINO-G45A</td>
<td>2</td>
</tr>
<tr>
<td>Figure 1-2</td>
<td>Connectors</td>
<td>4</td>
</tr>
<tr>
<td>Figure 1-3</td>
<td>KINO-G45A Dimensions (mm)</td>
<td>5</td>
</tr>
<tr>
<td>Figure 1-4</td>
<td>Data Flow Diagram</td>
<td>6</td>
</tr>
<tr>
<td>Figure 3-1</td>
<td>Connectors and Jumpers</td>
<td>14</td>
</tr>
<tr>
<td>Figure 3-2</td>
<td>ATX Power Connector Pinout Locations</td>
<td>16</td>
</tr>
<tr>
<td>Figure 3-3</td>
<td>Battery Connector Location</td>
<td>17</td>
</tr>
<tr>
<td>Figure 3-4</td>
<td>CPU Fan Connector Location</td>
<td>18</td>
</tr>
<tr>
<td>Figure 3-5</td>
<td>CPU Power Input Connector Location</td>
<td>19</td>
</tr>
<tr>
<td>Figure 3-6</td>
<td>Digital I/O Connector Locations</td>
<td>20</td>
</tr>
<tr>
<td>Figure 3-7</td>
<td>Front Panel Connector Location</td>
<td>21</td>
</tr>
<tr>
<td>Figure 3-8</td>
<td>Memory Card Slot Location</td>
<td>22</td>
</tr>
<tr>
<td>Figure 3-9</td>
<td>PCI Card Slot Location</td>
<td>22</td>
</tr>
<tr>
<td>Figure 3-10</td>
<td>SATA Drive Connector Location</td>
<td>23</td>
</tr>
<tr>
<td>Figure 3-11</td>
<td>SPDIF Connector Location</td>
<td>24</td>
</tr>
<tr>
<td>Figure 3-12</td>
<td>SPI Flash Connector</td>
<td>25</td>
</tr>
<tr>
<td>Figure 3-13</td>
<td>System Fan Connector Location</td>
<td>26</td>
</tr>
<tr>
<td>Figure 3-14</td>
<td>USB Connector Pinout Locations</td>
<td>27</td>
</tr>
<tr>
<td>Figure 3-15</td>
<td>External Peripheral Interface Connector</td>
<td>28</td>
</tr>
<tr>
<td>Figure 3-16</td>
<td>Audio Connector</td>
<td>28</td>
</tr>
<tr>
<td>Figure 3-17</td>
<td>PS/2 Pinouts</td>
<td>30</td>
</tr>
<tr>
<td>Figure 3-18</td>
<td>Serial Port Pinouts</td>
<td>32</td>
</tr>
<tr>
<td>Figure 3-19</td>
<td>VGA Connector</td>
<td>33</td>
</tr>
<tr>
<td>Figure 4-1</td>
<td>Intel LGA775 Socket</td>
<td>37</td>
</tr>
<tr>
<td>Figure 4-2</td>
<td>Remove Protective Cover</td>
<td>38</td>
</tr>
<tr>
<td>Figure 4-3</td>
<td>CPU Socket Load Plate</td>
<td>38</td>
</tr>
<tr>
<td>Figure 4-4</td>
<td>Insert the Socket LGA775 CPU</td>
<td>39</td>
</tr>
<tr>
<td>Figure 4-5</td>
<td>Cooling Kits (CF-520 and CF-775A)</td>
<td>40</td>
</tr>
<tr>
<td>Figure 4-6</td>
<td>Securing the Heat sink to the KINO-G45A</td>
<td>41</td>
</tr>
<tr>
<td>Figure 4-7</td>
<td>DIMM Installation</td>
<td>42</td>
</tr>
</tbody>
</table>
KINO-G45A Mini-ITX Motherboard

Figure 4-8: AT/ATX Power Mode Jumper Location.................................................................44
Figure 4-9: Clear BIOS Jumper Location ..............................................................................45
Figure 4-10: SATA Drive Cable Connection........................................................................45
Figure 4-11: SATA Power Drive Connection ......................................................................46
Figure 4-12: Dual USB Cable Connection ..........................................................................47
Figure 4-13: Audio Connector .........................................................................................48
Figure 4-14: DVI Connector .............................................................................................49
Figure 4-15: LAN Connection .........................................................................................50
Figure 4-16: PS/2 Keyboard/Mouse Connector .................................................................51
Figure 4-17: USB Connector ..........................................................................................52
Figure 4-18: VGA Connector ...........................................................................................53
Figure 4-19: Introduction Screen ...................................................................................54
Figure 4-20: Available Drivers .......................................................................................54
List of Tables

Table 1-1: Technical Specifications ................................................................. 8
Table 2-1: Packing List ................................................................................. 12
Table 2-2: Optional Items ........................................................................... 12
Table 3-1: Peripheral Interface Connectors .................................................. 15
Table 3-2: Rear Panel Connectors ................................................................. 15
Table 3-3: ATX Power Connector Pinouts .................................................... 17
Table 3-4: Battery Connector Pinouts .......................................................... 18
Table 3-5: CPU Fan Connector Pinouts ...................................................... 18
Table 3-6: CPU Power Input Connector Pinouts ......................................... 19
Table 3-7: Digital I/O Connector Pinouts .................................................... 20
Table 3-8: Front Panel Connector Pinouts .................................................. 21
Table 3-9: SPDIF Connector Pinouts ............................................................ 24
Table 3-10: SPI Flash Connector ................................................................. 25
Table 3-11: System Fan Connector Pinouts ................................................ 26
Table 3-12: USB Port Connector Pinouts .................................................... 27
Table 3-13: DVI Connector Pinouts ............................................................. 29
Table 3-14: HDMI Pinouts ....................................................................... 30
Table 3-15: PS/2 Connector Pinouts ............................................................ 31
Table 3-16: LAN Pinouts .......................................................................... 31
Table 3-17: Serial Port Pinouts ................................................................. 32
Table 3-18: USB Port Pinouts ................................................................. 32
Table 3-19: VGA Connector Pinouts .......................................................... 33
Table 4-1: Jumpers .................................................................................... 43
Table 4-2: AT/ATX Power Mode Jumper Settings ....................................... 44
Table 4-3: Clear BIOS Jumper Settings .................................................... 44
Table 5-1: BIOS Navigation Keys ............................................................... 57
# BIOS Menus

<table>
<thead>
<tr>
<th>BIOS Menu 1: Main</th>
<th>.......................................................................................................................58</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS Menu 2: Advanced</td>
<td>..............................................................................................................60</td>
</tr>
<tr>
<td>BIOS Menu 3: CPU Configuration</td>
<td>...........................................................................................................60</td>
</tr>
<tr>
<td>BIOS Menu 4: IDE Configuration</td>
<td>.............................................................................................................61</td>
</tr>
<tr>
<td>BIOS Menu 5: IDE Master and IDE Slave Configuration</td>
<td>...........................................................................................................63</td>
</tr>
<tr>
<td>BIOS Menu 6: Super IO Configuration</td>
<td>...............................................................................................................67</td>
</tr>
<tr>
<td>BIOS Menu 7: Hardware Health Configuration</td>
<td>...........................................................................................................69</td>
</tr>
<tr>
<td>BIOS Menu 8: AHCI Configuration</td>
<td>....................................................................................................................72</td>
</tr>
<tr>
<td>BIOS Menu 9: AHCI Port n Configuration Menu</td>
<td>................................................................................................................73</td>
</tr>
<tr>
<td>BIOS Menu 10: Remote Access Configuration</td>
<td>.............................................................................................................74</td>
</tr>
<tr>
<td>BIOS Menu 11: USB Configuration</td>
<td>....................................................................................................................77</td>
</tr>
<tr>
<td>BIOS Menu 12: PCI/PnP Configuration</td>
<td>.......................................................................................................................79</td>
</tr>
<tr>
<td>BIOS Menu 13: Boot</td>
<td>.........................................................................................................................81</td>
</tr>
<tr>
<td>BIOS Menu 14: Boot Settings Configuration</td>
<td>..............................................................................................................81</td>
</tr>
<tr>
<td>BIOS Menu 15: Boot Device Priority Settings</td>
<td>.............................................................................................................84</td>
</tr>
<tr>
<td>BIOS Menu 16: Hard Disk Drives</td>
<td>.........................................................................................................................85</td>
</tr>
<tr>
<td>BIOS Menu 17: Removable Drives</td>
<td>.........................................................................................................................86</td>
</tr>
<tr>
<td>BIOS Menu 18: CD/DVD Drives</td>
<td>..............................................................................................................................87</td>
</tr>
<tr>
<td>BIOS Menu 19: Security</td>
<td>..............................................................................................................................87</td>
</tr>
<tr>
<td>BIOS Menu 20: Chipset</td>
<td>..............................................................................................................................89</td>
</tr>
<tr>
<td>BIOS Menu 21: Northbridge Chipset Configuration</td>
<td>..............................................................................................................89</td>
</tr>
<tr>
<td>BIOS Menu 22: Northbridge Chipset Configuration</td>
<td>.............................................................................................................92</td>
</tr>
<tr>
<td>BIOS Menu 23: Southbridge Chipset Configuration</td>
<td>.............................................................................................................94</td>
</tr>
<tr>
<td>BIOS Menu 24: Exit</td>
<td>...............................................................................................................................97</td>
</tr>
</tbody>
</table>
Chapter 1

Introduction
1.1 Introduction

The KINO-G45A is a Mini-ITX motherboard. It accepts a Socket LGA775 Intel® Core™2 Duo/Quad/Extreme processor and supports two 667/800 MHz Dual-channel DDR2 DIMM modules up to 2.0 GB each. The KINO-G45A supports multiple video outputs including VGA, DVI-D, and HDMI ports. Expansion and I/O include a PCI card slot, High Definition audio, four USB ports on the rear panel, two USB ports via pin headers, six SATA connectors and a keyboard/mouse connector.
1.2 Benefits

Some of the KINO-G45A motherboard benefits include:

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

1.3 Features

Some of the KINO-G45A motherboard features are listed below:

- Mini-ITX
- RoHS compliant
- LGA 775 CPU socket
- PCI card expansion slot
- Supports two dual-channel DDR2 DIMMs
- Gigabit Ethernet connector
- Six SATA connectors
- High Definition audio
- Intel® GMA X4500HD for DX10 and OpenGL 2.0 support
- MPEG-2, WMV9 (VC-1) and H.264 (AVC) support
1.4 Connectors

The connectors on the KINO-G45A are shown in the figure below.

Figure 1-2: Connectors
1.5 Dimensions

The main dimensions of the KINO-G45A are shown in the diagram below.

Figure 1-3: KINO-G45A Dimensions (mm)
1.6 Data Flow

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

Figure 1-4: Data Flow Diagram
1.7 Technical Specifications

KINO-G45A technical specifications are listed in Table 1-1.

<table>
<thead>
<tr>
<th>Specification</th>
<th>KINO-G45A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Factor</td>
<td>Mini-ITX</td>
</tr>
<tr>
<td>CPU</td>
<td>Intel® Core™2 Duo/Quad/Extreme</td>
</tr>
<tr>
<td>FSB Speed</td>
<td>800/1066/1333 MHz</td>
</tr>
<tr>
<td>Northbridge</td>
<td>Intel® G45</td>
</tr>
<tr>
<td>Southbridge</td>
<td>Intel® ICH10</td>
</tr>
<tr>
<td>Memory</td>
<td>Two dual-channel 667/800 MHz DDR2 DIMMs up to 2.0 GB each</td>
</tr>
<tr>
<td>Display</td>
<td>VGA (Intel® G45)</td>
</tr>
<tr>
<td></td>
<td>DVI-D (through Asmedia ASM1442T)</td>
</tr>
<tr>
<td></td>
<td>HDMI (through Asmedia ASM1442T)</td>
</tr>
<tr>
<td>Storage</td>
<td>Six SATA2 connectors</td>
</tr>
<tr>
<td>LAN</td>
<td>Realtek RTL8111CP</td>
</tr>
<tr>
<td></td>
<td>One RJ-45 port</td>
</tr>
<tr>
<td>Audio</td>
<td>Realtek ALC888 HD Audio codec</td>
</tr>
<tr>
<td></td>
<td>One external audio connector</td>
</tr>
<tr>
<td></td>
<td>One SPDIF by internal pin header</td>
</tr>
<tr>
<td>Serial</td>
<td>One RS-232 serial port</td>
</tr>
<tr>
<td>USB</td>
<td>Four USB ports</td>
</tr>
<tr>
<td></td>
<td>Two USB ports by internal pin headers</td>
</tr>
<tr>
<td>Super I/O</td>
<td>iTE IT8718F</td>
</tr>
<tr>
<td>BIOS</td>
<td>AMI</td>
</tr>
<tr>
<td>Keyboard/mouse</td>
<td>PS/2</td>
</tr>
<tr>
<td>Digital I/O</td>
<td>8-bit (4-bit input, 4-bit output)</td>
</tr>
<tr>
<td>Watchdog Timer</td>
<td>Software programmable 1-255 sec. through the super I/O</td>
</tr>
<tr>
<td>Power Supply</td>
<td>ATX Power, AT/ATX mode supported</td>
</tr>
<tr>
<td>Specification</td>
<td>KINO-G45A</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>3.3V @ 0.38A, 5V@ 6.99A, 12V@ 3.54A (Intel E8500 3.16GHz,DDR2 800MHz 2Gb x 2, 3D Mark 2001SE)</td>
</tr>
<tr>
<td>Temperature</td>
<td>0°C – 60°C (32°F – 140°F)</td>
</tr>
<tr>
<td>Humidity</td>
<td>5%~95% non-condensing</td>
</tr>
<tr>
<td>Dimensions (WxL)</td>
<td>170 mm x 170 mm</td>
</tr>
<tr>
<td>Weight (GW/NW)</td>
<td>1100 g / 390 g</td>
</tr>
</tbody>
</table>

Table 1-1: Technical Specifications
Chapter 2

Packing List
2.1 Anti-static Precautions

WARNING!

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

Make sure to adhere to the following guidelines:

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

2.2 Unpacking Precautions

When the KINO-G45A is unpacked, please do the following:

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

⚠️ **NOTE:**

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the KINO-G45A was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

The KINO-G45A is shipped with the following components:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item and Part Number</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>KINO-G45A</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Dual USB cable (with bracket) (P/N: CB-USB02A-RS)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>SATA cable (P/N: 32000-062800-RS)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I/O shielding</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Mini jumper pack (2.0mm) (P/N: 33100-000033-RS)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Utility CD</td>
<td></td>
</tr>
</tbody>
</table>
### Table 2-1: Packing List

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item and Part Number</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Quick Installation Guide</td>
<td></td>
</tr>
</tbody>
</table>

#### 2.4 Optional Items

The KINO-G45A is shipped with the following components:

<table>
<thead>
<tr>
<th>Item and Part Number</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU cooler kit</td>
<td><img src="image1.png" alt="CPU cooler kit" /></td>
</tr>
<tr>
<td>(P/N: CF-520-RS)</td>
<td></td>
</tr>
<tr>
<td>CPU cooler kit</td>
<td><img src="image2.png" alt="CPU cooler kit" /></td>
</tr>
<tr>
<td>(P/N: CF-775A-RS)</td>
<td></td>
</tr>
<tr>
<td>SATA to IDE/CF converter board</td>
<td><img src="image3.png" alt="SATA converter board" /></td>
</tr>
<tr>
<td>(P/N: SAIDE-KIT01-R10)</td>
<td></td>
</tr>
<tr>
<td>SATA power cable</td>
<td><img src="image4.png" alt="SATA power cable" /></td>
</tr>
<tr>
<td>(P/N: 32100-088600-RS)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2-2: Optional Items
Chapter 3

Connectors
3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 KINO-G45A Layout

The figures below show all the connectors and jumpers.

![Connectors and Jumpers](image)

Figure 3-1: Connectors and Jumpers

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

<table>
<thead>
<tr>
<th>Connector</th>
<th>Type</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATX Power</td>
<td>20-pin ATX (2x10)</td>
<td>ATX20</td>
</tr>
<tr>
<td>Battery</td>
<td>2-pin header</td>
<td>BAT1</td>
</tr>
<tr>
<td>CPU fan</td>
<td>4-pin wafer</td>
<td>CPU_FAN1</td>
</tr>
</tbody>
</table>
### Table 3-1: Peripheral Interface Connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Type</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU power</td>
<td>4-pin box header</td>
<td>CPU12V2</td>
</tr>
<tr>
<td>Digital I/O</td>
<td>8-pin header</td>
<td>DIO1</td>
</tr>
<tr>
<td>Flash SPI ROM</td>
<td>8-pin header</td>
<td>JSPI1</td>
</tr>
<tr>
<td>Front panel</td>
<td>10-pin header</td>
<td>F_PANEL1</td>
</tr>
<tr>
<td>Memory card</td>
<td>DIMM slot</td>
<td>DIMM1, DIMM2</td>
</tr>
<tr>
<td>PCI card slot</td>
<td>PCI card slot</td>
<td>PCI1</td>
</tr>
<tr>
<td>SATA</td>
<td>7-pin SATA connector</td>
<td>SATAN1~6</td>
</tr>
<tr>
<td>S/PDIF</td>
<td>5-pin header</td>
<td>SPDIF1</td>
</tr>
<tr>
<td>System fan</td>
<td>3-pin wafer</td>
<td>SYS_FAN1</td>
</tr>
<tr>
<td>USB</td>
<td>8-pin header (2x4)</td>
<td>USB45</td>
</tr>
</tbody>
</table>

### 3.1.3 External Interface Panel Connectors

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

<table>
<thead>
<tr>
<th>Connector</th>
<th>Type</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>Audio jack</td>
<td>AUDIO_CV1</td>
</tr>
<tr>
<td>DVI-D</td>
<td>DVI-D connector</td>
<td>VIDEO1</td>
</tr>
<tr>
<td>Ethernet</td>
<td>RJ-45</td>
<td>LAN1</td>
</tr>
<tr>
<td>HDMI</td>
<td>HDMI port</td>
<td>HDMI1</td>
</tr>
<tr>
<td>Keyboard/Mouse</td>
<td>Dual PS/2</td>
<td>KB_MS1</td>
</tr>
<tr>
<td>RS-232</td>
<td>DB-9</td>
<td>COM1</td>
</tr>
<tr>
<td>USB</td>
<td>USB port</td>
<td>USB_01, USB_C23</td>
</tr>
<tr>
<td>VGA</td>
<td>15-pin female</td>
<td>VIDEO1</td>
</tr>
</tbody>
</table>

### Table 3-2: Rear Panel Connectors
3.2 Internal Peripheral Connectors

The section describes all of the connectors on the KINO-G45A.

3.2.1 ATX Power Connector

CN Label: ATX20  
CN Type: 20-pin ATX (2x10)  
CN Location: See Figure 3-2  
CN Pinouts: See Table 3-3

The ATX power connector connects to an ATX power supply.

![ATX Power Connector](image)

Figure 3-2: ATX Power Connector Pinout Locations

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NC</td>
<td>11</td>
<td>NC</td>
</tr>
<tr>
<td>2</td>
<td>NC</td>
<td>12</td>
<td>-12 V</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>13</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>+5 V</td>
<td>14</td>
<td>PS-ON</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>15</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>+5 V</td>
<td>16</td>
<td>GND</td>
</tr>
</tbody>
</table>
### 3.2.2 Battery Connector

**CN Label:** BAT1  
**CN Type:** 2-pin wafer (1x2)  
**CN Location:** See Figure 3-3  
**CN Pinouts:** See Table 3-4

This is connected to the system battery. The battery provides power to the system clock to retain the time when power is turned off.

Figure 3-3: Battery Connector Location
### Pin Description

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Battery+</td>
</tr>
<tr>
<td>2</td>
<td>Ground</td>
</tr>
</tbody>
</table>

**Table 3-4: Battery Connector Pinouts**

#### 3.2.3 CPU Fan Connector

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

The fan connector attaches to a CPU cooling fan.

**Figure 3-4: CPU Fan Connector Location**

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>+12 V</td>
</tr>
<tr>
<td>3</td>
<td>FAN_Detect</td>
</tr>
<tr>
<td>4</td>
<td>FAN_CTRL</td>
</tr>
</tbody>
</table>

**Table 3-5: CPU Fan Connector Pinouts**
3.2.4 CPU Power Input Connector

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

The CPU power input connector provides power to the CPU.

**Figure 3-5: CPU Power Input Connector Location**

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>12 V</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>12 V</td>
<td></td>
</tr>
</tbody>
</table>

**Table 3-6: CPU Power Input Connector Pinouts**

3.2.5 Digital I/O Connector

**CN Label:** DIO1  
**CN Type:** 10-pin header  
**CN Location:** See Figure 3-6  
**CN Pinouts:** See Table 3-7

**Figure 3-6: Digital I/O Connector Location**
The digital I/O connector provides programmable input and output for external devices. The digital I/O provides 4-bit output and 4-bit input.

![Digital I/O Connector Locations](image)

**Figure 3-6: Digital I/O Connector Locations**

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>2</td>
<td>5 V</td>
</tr>
<tr>
<td>3</td>
<td>Output 3</td>
<td>4</td>
<td>Output 2</td>
</tr>
<tr>
<td>5</td>
<td>Output 1</td>
<td>6</td>
<td>Output 0</td>
</tr>
<tr>
<td>7</td>
<td>Input 3</td>
<td>8</td>
<td>Input 2</td>
</tr>
<tr>
<td>9</td>
<td>Input 1</td>
<td>10</td>
<td>Input 0</td>
</tr>
</tbody>
</table>

**Table 3-7: Digital I/O Connector Pinouts**

### 3.2.6 Front Panel Connector

<table>
<thead>
<tr>
<th>CN Label:</th>
<th>F PANEL1</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN Type:</td>
<td>10-pin header</td>
</tr>
<tr>
<td>CN Location:</td>
<td>See Figure 3-7</td>
</tr>
<tr>
<td>CN Pinouts:</td>
<td>See Table 3-8</td>
</tr>
</tbody>
</table>
The front panel connector connects to the indicator LEDs and buttons on the computer's front panel.

![F_PANEL1](image)

**Figure 3-7: Front Panel Connector Location**

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N/C</td>
</tr>
<tr>
<td>2</td>
<td>Power button+</td>
</tr>
<tr>
<td>3</td>
<td>Power button-</td>
</tr>
<tr>
<td>4</td>
<td>HDD LED+</td>
</tr>
<tr>
<td>5</td>
<td>HDD LED-</td>
</tr>
<tr>
<td>6</td>
<td>Power LED+</td>
</tr>
<tr>
<td>7</td>
<td>Power LED+</td>
</tr>
<tr>
<td>8</td>
<td>Power LED-</td>
</tr>
<tr>
<td>9</td>
<td>Reset+</td>
</tr>
<tr>
<td>10</td>
<td>Reset-</td>
</tr>
</tbody>
</table>

**Table 3-8: Front Panel Connector Pinouts**

### 3.2.7 Memory Card Slot

- **CN Label:** DIMM1 and DIMM2
- **CN Type:** DIMM slot
- **CN Location:** See Figure 3-9

The DIMM slots are for DIMM memory modules.
3.2.8 PCI Card Slot

**CN Label:** PCI1  
**CN Type:** PCI card slot  
**CN Location:** See Figure 3-9

The PCI card slot is for installing PCI expansion cards.
### 3.2.9 SATA Drive Connectors

- **CN Label:** SATA1~6
- **CN Type:** 7-pin SATA drive connectors
- **CN Location:** See Figure 3-10

The SATA drive connectors can be connected to SATA drives.

![Figure 3-10: SATA Drive Connector Location](image)

### 3.2.10 S/PDIF Connector

- **CN Label:** SPDIF1
- **CN Type:** 5-pin header
- **CN Location:** See Figure 3-11
- **CN Pinouts:** See Table 3-9

Use the SPDIF connector to connect digital audio devices to the system.
Table 3-9: SPDIF Connector Pinouts

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VCC AUDIO</td>
</tr>
<tr>
<td>2</td>
<td>NC</td>
</tr>
<tr>
<td>3</td>
<td>SPDIF OUT</td>
</tr>
<tr>
<td>4</td>
<td>GND AUDIO</td>
</tr>
<tr>
<td>5</td>
<td>SPDIF IN</td>
</tr>
</tbody>
</table>

3.2.11 SPI Flash Connector

CN Label: JSPI1  
CN Type: 8-pin header (2x4)  
CN Location: See Figure 3-12  
CN Pinouts: See Table 3-10

The 8-pin SPI Flash connector is used to flash the BIOS.
Figure 3-12: SPI Flash Connector

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VCC</td>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>CS#</td>
<td>4</td>
<td>CLOCK</td>
</tr>
<tr>
<td>5</td>
<td>SO</td>
<td>6</td>
<td>SI</td>
</tr>
<tr>
<td>7</td>
<td>NC</td>
<td>8</td>
<td>NC</td>
</tr>
</tbody>
</table>

Table 3-10: SPI Flash Connector

3.2.12 System Fan Connector

- **CN Label:** SYS_FAN1
- **CN Type:** 3-pin header
- **CN Location:** See Figure 3-13
- **CN Pinouts:** See Table 3-11

The fan connector attaches to a cooling fan.
Figure 3-13: System Fan Connector Location

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>+12 V</td>
</tr>
<tr>
<td>3</td>
<td>Fan_Detect</td>
</tr>
</tbody>
</table>

Table 3-11: System Fan Connector Pinouts

3.2.13 USB Connectors

<table>
<thead>
<tr>
<th>CN Label:</th>
<th>USB45</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN Type:</td>
<td>8-pin header (2x4)</td>
</tr>
<tr>
<td>CN Location:</td>
<td>See Figure 3-14</td>
</tr>
<tr>
<td>CN Pinouts:</td>
<td>See Table 3-12</td>
</tr>
</tbody>
</table>

The USB connectors connect to USB devices. Each pin header provides two USB ports.
### USB Connector Pinout Locations

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VCC</td>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>DATAN-</td>
<td>4</td>
<td>DATAM+</td>
</tr>
<tr>
<td>5</td>
<td>DATAN+</td>
<td>6</td>
<td>DATA1M-</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>8</td>
<td>VCC</td>
</tr>
</tbody>
</table>

Table 3-12: USB Port Connector Pinouts
3.3 External Peripheral Interface Connector Panel

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

![Diagram of EPIC panel]

**Figure 3-15: External Peripheral Interface Connector**

### 3.3.1 Audio Connector

<table>
<thead>
<tr>
<th>CN Label</th>
<th>AUDIO_CV1</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN Type</td>
<td>Audio jack</td>
</tr>
<tr>
<td>CN Location</td>
<td>See Figure 3-15</td>
</tr>
</tbody>
</table>

The audio jacks connect to external audio devices. Each jack supports both input and output signals which are automatically detected. The lime green (top) audio jack does not support input from a microphone.

![Audio jack diagram]

**Figure 3-16: Audio Connector**
3.3.2 DVI Connector

**CN Label:** VIDEO1  
**CN Type:** DVI connector  
**CN Location:** See Figure 3-15  
**CN Pinouts:** See Figure 3-17 and Table 3-13

The 24-pin Digital Visual Interface (DVI) connector connects to high-speed, high-resolution digital displays. The DVI-D connector only supports digital signals.

<table>
<thead>
<tr>
<th>PIN</th>
<th>Signal Name</th>
<th>Pin #</th>
<th>Signal Name</th>
<th>Pin #</th>
<th>Signal Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TMDS Data2-</td>
<td>9</td>
<td>TMDS Data1-</td>
<td>17</td>
<td>TMDS Data0-</td>
</tr>
<tr>
<td>2</td>
<td>TMDS Data2+</td>
<td>10</td>
<td>TMDS Data1+</td>
<td>18</td>
<td>TMDS Data0+</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>11</td>
<td>GND</td>
<td>19</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>N/C</td>
<td>12</td>
<td>N/C</td>
<td>20</td>
<td>N/C</td>
</tr>
<tr>
<td>5</td>
<td>N/C</td>
<td>13</td>
<td>N/C</td>
<td>21</td>
<td>N/C</td>
</tr>
<tr>
<td>6</td>
<td>DDC Clock [SCL]</td>
<td>14</td>
<td>PVDD1</td>
<td>22</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>DDC Data [SDA]</td>
<td>15</td>
<td>GND</td>
<td>23</td>
<td>TMDS Clock +</td>
</tr>
<tr>
<td>8</td>
<td>Analog vertical sync</td>
<td>16</td>
<td>GND</td>
<td>24</td>
<td>TMDS Clock -</td>
</tr>
</tbody>
</table>

Table 3-13: DVI Connector Pinouts

3.3.3 HDMI Connector

**CN Label:** HDMI1  
**CN Type:** HDMI port  
**CN Location:** See Figure 3-15  
**CN Pinouts:** See Table 3-14

The HDMI port connects to a display device with an HDMI input port.
### Table 3-14: HDMI Pinouts

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HDMI_DATA2</td>
<td>13</td>
<td>N/C</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td>14</td>
<td>N/C</td>
</tr>
<tr>
<td>3</td>
<td>HDMI_DATA2#</td>
<td>15</td>
<td>HDMI_SCL</td>
</tr>
<tr>
<td>4</td>
<td>HDMI_DATA1</td>
<td>16</td>
<td>HDMI_SDA</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>17</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>HDMI_DATA1#</td>
<td>18</td>
<td>+5V</td>
</tr>
<tr>
<td>7</td>
<td>HDMI_DATA0</td>
<td>19</td>
<td>HDMI_HPD</td>
</tr>
<tr>
<td>8</td>
<td>GND</td>
<td>20</td>
<td>HDMI_GND</td>
</tr>
<tr>
<td>9</td>
<td>HDMI_DATA0#</td>
<td>21</td>
<td>HDMI_GND</td>
</tr>
<tr>
<td>10</td>
<td>HDMI_CLK</td>
<td>22</td>
<td>HDMI_GND</td>
</tr>
<tr>
<td>11</td>
<td>GND</td>
<td>23</td>
<td>HDMI_GND</td>
</tr>
<tr>
<td>12</td>
<td>HDMI_CLK#</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 3.3.4 Keyboard/Mouse Connector

**CN Label:** KB_MS1  
**CN Type:** Dual PS/2  
**CN Location:** See Figure 3-15  
**CN Pinouts:** See Figure 3-17 and Table 3-15

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

CN Label: LAN1
CN Type: RJ-45
CN Location: See Figure 3-15
CN Pinouts: See Table 3-16

The LAN connector connects to a local network.

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TXA+</td>
<td>5</td>
<td>TXC-</td>
</tr>
<tr>
<td>2</td>
<td>TXA-</td>
<td>6</td>
<td>TXB-</td>
</tr>
<tr>
<td>3</td>
<td>TXB+</td>
<td>7</td>
<td>TXD+</td>
</tr>
<tr>
<td>4</td>
<td>TXC+</td>
<td>8</td>
<td>TXD-</td>
</tr>
</tbody>
</table>

Table 3-16: LAN Pinouts

3.3.6 Serial Port Connectors (COM1)

CN Label: COM1
CN Type: DB-9 connector
CN Location: See Figure 3-15
CN Pinouts: See Table 3-17 and Figure 3-18

The serial port connects to a RS-232 serial communications device.
Table 3-17: Serial Port Pinouts

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
<td>6</td>
<td>DSR</td>
</tr>
<tr>
<td>2</td>
<td>RX</td>
<td>7</td>
<td>RTS</td>
</tr>
<tr>
<td>3</td>
<td>TX</td>
<td>8</td>
<td>CTS</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
<td>9</td>
<td>RI</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3-18: Serial Port Pinouts

3.3.7 USB Connector

**CN Label:** USB_C23  
**CN Type:** USB port  
**CN Location:** See Figure 3-15  
**CN Pinouts:** See Table 3-18

The USB connector can be connected to a USB device.

Table 3-18: USB Port Pinouts

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 V</td>
<td>2</td>
<td>5 V</td>
</tr>
<tr>
<td>3</td>
<td>DATA-</td>
<td>4</td>
<td>DATA-</td>
</tr>
<tr>
<td>5</td>
<td>DATA+</td>
<td>6</td>
<td>DATA+</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>8</td>
<td>GND</td>
</tr>
</tbody>
</table>

Table 3-18: USB Port Pinouts
3.3.8 VGA Connector

CN Label: VIDEO1
CN Type: 15-pin Female
CN Location: See Figure 3-15
CN Pinouts: See Figure 3-19 and Table 3-19

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

Figure 3-19: VGA Connector

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RED</td>
<td>2</td>
<td>GREEN</td>
</tr>
<tr>
<td>3</td>
<td>BLUE</td>
<td>4</td>
<td>NC</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>6</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>8</td>
<td>GND</td>
</tr>
<tr>
<td>9</td>
<td>VCC / NC</td>
<td>10</td>
<td>GND</td>
</tr>
<tr>
<td>11</td>
<td>NC</td>
<td>12</td>
<td>DDC DAT</td>
</tr>
<tr>
<td>13</td>
<td>HSYNC</td>
<td>14</td>
<td>VSYNC</td>
</tr>
<tr>
<td>15</td>
<td>DDCCLK</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3-19: VGA Connector Pinouts
4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the KINO-G45A may result in permanent damage to the KINO-G45A and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the KINO-G45A. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the KINO-G45A 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 KINO-G45A, place it on an anti-static pad. This reduces the possibility of ESD damaging the KINO-G45A.
- **Only handle the edges of the PCB**: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

NOTE:

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

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

Before and during the installation please DO the following:

- Read the user manual:
  - The user manual provides a complete description of the KINO-G45A 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 KINO-G45A 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 KINO-G45A off:
  - When working with the KINO-G45A, 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 KINO-G45A DO NOT:

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.

- Use the product before verifying all the cables and power connectors are properly connected.

- Allow screws to come in contact with the PCB circuit, connector pins, or its components.
4.2.1 Socket LGA775 CPU Installation

**NOTE:**

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

---

**WARNING:**

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

The LGA775 socket is shown in Figure 4-1.

![Figure 4-1: Intel LGA775 Socket](image)

To install the CPU, follow the steps below.

**WARNING:**

DO NOT touch the pins at the bottom of the CPU. When handling the CPU, only hold it on the sides.
Step 1: **Remove the protective cover.** The black protective cover can be removed by pulling up on the tab labeled “Remove”. See Figure 4-2.

![Figure 4-2: Remove Protective Cover](image)

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

![Figure 4-3: CPU Socket Load Plate](image)

Step 3: **Inspect the CPU socket.** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.
Step 4: **Orientate the CPU properly.** The contact array should be facing the CPU socket.

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

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

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

![Figure 4-4: Insert the Socket LGA775 CPU](image)

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

Step 9: **Connect the 12 V power to the board.** Connect the 12 V power from the power supply to the board.
4.2.2 Socket LGA775 Cooling Kit Installation

**WARNING:**

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

![Cooling Kits](image)

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

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

**WARNING:**

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

To install the cooling kit, follow the instructions below.

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

**Step 2:** Properly align the cooling kit. Make sure the four spring screw fasteners can pass through the pre-drilled holes on the PCB.
Step 3: **Mount the cooling kit.** Gently place the cooling kit on top of the CPU. Make sure the four threaded screws on the corners of the cooling kit properly pass through the predrilled holes on the bottom of the PCB.

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

![Figure 4-6: Securing the Heat sink to the KINO-G45A](image)

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

**Step 6:** **Connect the fan cable.** Connect the cooling kit fan cable to the fan connector on the KINO-G45A. Carefully route the cable and avoid heat generating chips and fan blades.
4.2.3 DIMM Installation

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

Figure 4-7: DIMM Installation

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

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

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

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

NOTE:

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

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Label</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT/ATX Auto power setting jumper</td>
<td>JAUTO1</td>
<td>2-pin header</td>
</tr>
<tr>
<td>Clear CMOS jumper</td>
<td>J_CMOS1</td>
<td>3-pin header</td>
</tr>
</tbody>
</table>

Table 4-1: Jumpers

4.3.1 AT/ATX Power Mode

Jumper Label: JAUTO1
Jumper Type: 2-pin header
Jumper Settings: See Table 4-2
Jumper Location: See Figure 4-8

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

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>ATX power</td>
</tr>
<tr>
<td>Closed</td>
<td>AT power</td>
</tr>
</tbody>
</table>

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

![JAUT01](image)

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

#### 4.3.2 Clear CMOS Jumper

- **Jumper Label:** J_CMOS1  
- **Jumper Type:** 3-pin header  
- **Jumper Settings:** See Table 4-3  
- **Jumper Location:** See Figure 4-9

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

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>Normal</td>
</tr>
<tr>
<td>2-3</td>
<td>Clear BIOS</td>
</tr>
</tbody>
</table>

**Table 4-3: Clear BIOS Jumper Settings**
4.3.3 SATA Drive Connection

The KINO-G45A is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

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

**Step 2:** Insert the cable connector. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the on-board SATA drive connector. See Figure 4-10.
Step 3: **Connect the cable to the SATA disk.** Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See Figure 4-11.

Step 4: **Connect the SATA power cable.** Connect the SATA power connector to the back of the SATA drive. See Figure 4-11.

![Figure 4-11: SATA Power Drive Connection](image)

**4.3.4 USB Cable (Dual Port) with Slot Bracket**

The KINO-G45A is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

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

⚠️ **WARNING:**

If the USB pins are not properly aligned, the USB device can burn out.
Step 2: **Align the connectors.** The cable has two connectors. Correctly align pin 1 on each cable connector with pin 1 on the KINO-G45A USB connector.

Step 3: **Insert the cable connectors** Once the cable connectors are properly aligned with the USB connectors on the KINO-G45A, connect the cable connectors to the on-board connectors. See Figure 4-12.

![Figure 4-12: Dual USB Cable Connection](image)

Step 4: **Attach the bracket to the chassis.** The USB 2.0 connectors are attached to a bracket. To secure the bracket to the chassis please refer to the installation instructions that came with the chassis.
4.4 External Peripheral Interface Connection

This section describes connecting devices to the external connectors on the KINO-G45A.

4.4.1 Audio Connector

The audio jacks on the external audio connector enable the KINO-G45A to be connected to a stereo sound setup. Each jack supports both input and output. When connecting a device, the High Definition Audio utility will automatically detect input or output. The lime green (top) audio jack does not support input from a microphone. To install the audio devices, follow the steps below.

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

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

![Figure 4-13: Audio Connector](image)

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

The KINO-G45A has a single female DVI-D connector on the external peripheral interface panel. The DVI-D connector is connected to a digital display device. To connect a digital display device to the KINO-G45A, please follow the instructions below.

Step 4:  **Locate the DVI-D connector.** The location of the DVI-I connector is shown in another chapter.

Step 5:  **Align the DVI-D connector.** Align the male DVI-I connector on the digital display device cable with the female DVI-I connector on the external peripheral interface.

Step 6:  **Insert the DVI-D connector** Once the connectors are properly aligned with the male connector, insert the male connector from the digital display device into the female connector on the KINO-G45A. See Figure 4-14.

![DVI Connector](image)

**Figure 4-14: DVI Connector**

Step 7:  **Secure the connector.** Secure the DVI-D connector from the digital display device to the external interface by tightening the two retention screws on either side of the connector.
4.4.3 LAN Connection

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

**Step 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 KINO-G45A. See Figure 4-15.

![Figure 4-15: LAN Connection](image)

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

4.4.4 PS/2 Keyboard and Mouse Connection

The KINO-G45A has a dual PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is used to connect to a keyboard and mouse to the system. Follow the steps below to connect a keyboard and mouse to the KINO-G45A.
Step 1: Locate the dual PS/2 connector. The location of the dual PS/2 connector is shown in Chapter 3.

Step 2: Insert the keyboard/mouse connector. Insert a PS/2 keyboard or mouse connector into the appropriate PS/2 connector on the external peripheral interface connector. See Figure 4-16.

Figure 4-16: PS/2 Keyboard/Mouse Connector

4.4.5 USB Connection (Dual Connector)

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the KINO-G45A.

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

Step 2: Insert a USB Series "A" plug. Insert the USB Series "A" plug of a device into the USB Series "A" receptacle on the external peripheral interface. See Figure 4-17.
4.4.6 VGA Monitor Connection

The KINO-G45A 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 KINO-G45A, please follow the instructions below.

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

Step 2: Align the VGA connector. Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.

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 KINO-G45A. See Figure 4-18.
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.

4.5 Software Installation

All the drivers for the KINO-G45A are on the CD that came with the system. To install the drivers, please follow the steps below.

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

NOTE:

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

Step 2: The driver main menu appears (Figure 4-19).
Figure 4-19: Introduction Screen

Step 3:  Click KINO-G45A.

Step 4:  A new screen with a list of available drivers appears (Figure 4-20).

Figure 4-20: Available Drivers

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

BIOS
5.1 Introduction

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

5.1.1 Starting Setup

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

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

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

5.1.2 Using Setup

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

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up arrow</td>
<td>Move to previous item</td>
</tr>
<tr>
<td>Down arrow</td>
<td>Move to next item</td>
</tr>
<tr>
<td>Left arrow</td>
<td>Move to the item on the left hand side</td>
</tr>
<tr>
<td>Right arrow</td>
<td>Move to the item on the right hand side</td>
</tr>
<tr>
<td>Esc key</td>
<td>Main Menu – Quit and not save changes into CMOS</td>
</tr>
<tr>
<td></td>
<td>Status Page Setup Menu and Option Page Setup Menu --</td>
</tr>
<tr>
<td></td>
<td>Exit current page and return to Main Menu</td>
</tr>
<tr>
<td>Page Up key</td>
<td>Increase the numeric value or make changes</td>
</tr>
<tr>
<td>Page Dn key</td>
<td>Decrease the numeric value or make changes</td>
</tr>
<tr>
<td>F1 key</td>
<td>General help, only for Status Page Setup Menu and Option Page Setup Menu</td>
</tr>
</tbody>
</table>
### Table 5-1: BIOS Navigation Keys

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>F2 /F3 key</td>
<td>Change color from total 16 colors. F2 to select color forward.</td>
</tr>
<tr>
<td>F10 key</td>
<td>Save all the CMOS changes, only for Main Menu</td>
</tr>
</tbody>
</table>

#### 5.1.3 Getting Help

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

#### 5.1.4 Unable to Reboot After Configuration Changes

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

#### 5.1.5 BIOS Menu Bar

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

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

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

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

### BIOS SETUP UTILITY

<table>
<thead>
<tr>
<th>Main</th>
<th>Advanced</th>
<th>PCIPNP</th>
<th>Boot</th>
<th>Security</th>
<th>Chipset</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Overview</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMIBIOS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Version :08.00.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build Date :06/29/09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ID: :B142MT12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type :Intel® Core™2 CPU 6300 @ 1.86GHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed :1866MHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count :1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Memory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size :990MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[14:20:27]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Tue 05/06/2008]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use [ENTER], [TAB] or [SHIFT-TAB] to select a field.

Use [+]- or [-] to configure system time.

Select Screen

Select Item

Enter Go to SubScreen

F1 General Help

F10 Save and Exit

ESC Exit

v02.61 ©Copyright 1985-2006, American Megatrends, Inc.

**BIOS Menu 1: Main**

#### System Overview

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

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

- **System Time [xx:xx:xx]**
  
  Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

- **System Date [xx/xx/xx]**
  
  Use the **System Date** option to set the system date. Manually enter the day, month and year.

### 5.3 Advanced

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

---

**WARNING!**

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

---

- CPU Configuration (see [Section 5.3.1](#))
- IDE Configuration (see [Section 5.3.2](#))
- Floppy Configuration (see [Section 5.3.3](#))
- Super IO Configuration (see [Section 5.3.3](#))
- Hardware Health Configuration (see [Section 5.3.4](#))
- AHCI Configuration (see [Section 5.3.5](#))
- Remote Access Configuration (see [Section 5.3.6](#))
- USB Configuration (see [Section 5.3.7](#))
### BIOS Menu 2: Advanced

#### 5.3.1 CPU Configuration

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

### BIOS Menu 3: CPU Configuration

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

- **Manufacturer**: Lists the name of the CPU manufacturer
5.3.2 IDE Configuration

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

| BIOS SETUP UTILITY
<table>
<thead>
<tr>
<th>Main</th>
<th>Advanced</th>
<th>PCIPNP</th>
<th>Boot</th>
<th>Security</th>
<th>Chipset</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDE Configuration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SATA#1 Configuration</td>
<td>[Enhanced]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configure SATA#1 as</td>
<td>[IDE]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SATA#2 Configuration</td>
<td>[Enhanced]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- >Primary IDE Master : [Not Detected]
- >Primary IDE Slave : [Not Detected]
- >Secondary IDE Master : [Not Detected]
- >Secondary IDE Slave : [Not Detected]
- >Third IDE Master : [Not Detected]
- >Fourth IDE Master : [Not Detected]

DISABLED: disable the integrated IDE controller.
PRIMARY: enables only the Primary IDE controller.
SECONDARY: enables only the Secondary IDE controller.
BOTH: enables both IDE controllers.

- Select Screen
- Select Item
- Enter Go to SubScreen
- F1 General Help
- F10 Save and Exit
- ESC Exit

BIOS Menu 4: IDE Configuration

- SATA# Configurations [Compatible]

Use the SATA# Configurations option to configure the ATA/IDE controller.
→ **Disabled**

Disables the on-board ATA/IDE controller.

→ **Enhanced DEFAULT**

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

→ **Configure SATA#1 as [IDE]**

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

→ **IDE DEFAULT**

Configures SATA device as normal IDE device.

→ **AHCI**

Configures SATA device as normal AHCI device.

→ **IDE Master and IDE Slave**

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

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

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

### 5.3.2.1 IDE Master, IDE Slave

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

<table>
<thead>
<tr>
<th>Main</th>
<th>Advanced</th>
<th>PCIPNP</th>
<th>Boot</th>
<th>Security</th>
<th>Chipset</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary IDE Master</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device</td>
<td>:Not Detected</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>[Auto]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LBA/Large Mode</td>
<td>[Auto]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block (Multi-Sector Transfer)</td>
<td>[Auto]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIO Mode</td>
<td>[Auto]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMA Mode</td>
<td>[Auto]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.M.A.R.T.</td>
<td>[Auto]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32Bit Data Transfer</td>
<td>[Enabled]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Select the type of device connected to the system

Select Screen
↑↓ Select Item
Enter Go to SubScreen
F1 General Help
F10 Save and Exit
ESC Exit

BIOS Menu 5: IDE Master and IDE Slave Configuration

➔ Auto-Detected Drive Parameters

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

- **Device:** Lists the device type (e.g. hard disk, CD-ROM etc.)
- **Type:** Indicates the type of devices a user can manually select
- **Vendor:** Lists the device manufacturer
- **Size:** List the storage capacity of the device.
- **LBA Mode:** Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- **Block Mode:** Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.
- **PIO Mode:** Indicates the PIO mode of the installed device.
- **Async DMA:** Indicates the highest Asynchronous DMA Mode that is supported.
- **Ultra DMA:** Indicates the highest Synchronous DMA Mode that is supported.
- **S.M.A.R.T.:** Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
32Bit Data Transfer: Enables 32-bit data transfer.

**Type [Auto]**

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

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

**LBA/Large Mode [Auto]**

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

- **Disabled**: BIOS is prevented from using the LBA mode control on the specified channel.
- **Auto [DEFAULT]**: BIOS auto detects the LBA mode control on the specified channel.
Block (Multi Sector Transfer) [Auto]

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

- **Disabled**
  BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.

- **Auto DEFAULT**
  BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported the data transfer to and from the device occurs multiple sectors at a time.

PIO Mode [Auto]

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

- **Auto DEFAULT**
  BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.

- **0**
  PIO mode 0 selected with a maximum transfer rate of 3.3 MB/s

- **1**
  PIO mode 1 selected with a maximum transfer rate of 5.2 MB/s

- **2**
  PIO mode 2 selected with a maximum transfer rate of 8.3 MB/s

- **3**
  PIO mode 3 selected with a maximum transfer rate of 11.1 MB/s

- **4**
  PIO mode 4 selected with a maximum transfer rate of 16.6 MB/s
  (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

DMA Mode [Auto]

Use the DMA Mode BIOS selection to adjust the DMA mode options.
<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto</td>
<td>BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.</td>
</tr>
<tr>
<td>SWDMA0</td>
<td>Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1 MB/s</td>
</tr>
<tr>
<td>SWDMA1</td>
<td>Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2 MB/s</td>
</tr>
<tr>
<td>SWDMA2</td>
<td>Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3 MB/s</td>
</tr>
<tr>
<td>MWDMA0</td>
<td>Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2 MB/s</td>
</tr>
<tr>
<td>MWDMA1</td>
<td>Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3 MB/s</td>
</tr>
<tr>
<td>MWDMA2</td>
<td>Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6 MB/s</td>
</tr>
<tr>
<td>UDMA0</td>
<td>Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6 MB/s</td>
</tr>
<tr>
<td>UDMA1</td>
<td>Ultra DMA mode 1 selected with a maximum data transfer rate of 25 MB/s</td>
</tr>
<tr>
<td>UDMA2</td>
<td>Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3 MB/s</td>
</tr>
<tr>
<td>UDMA3</td>
<td>Ultra DMA mode 3 selected with a maximum data transfer rate of 44 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)</td>
</tr>
<tr>
<td>UDMA4</td>
<td>Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)</td>
</tr>
<tr>
<td>UDMA5</td>
<td>Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)</td>
</tr>
</tbody>
</table>
S.M.A.R.T [Auto]

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

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

32Bit Data Transfer [Enabled]

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

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

5.3.3 Super IO Configuration

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

<table>
<thead>
<tr>
<th>BIOS SETUP UTILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main</td>
</tr>
<tr>
<td>Configure Super I/O Chipset</td>
</tr>
<tr>
<td>Serial Port1 Address [3F8/IRQ4]</td>
</tr>
</tbody>
</table>

Allows BIOS to select Serial Port Base Addresses

Select Screen
Select Item
Enter Go to SubScreen
F1 General Help
F10 Save and Exit
ESC Exit

BIOS Menu 6: Super IO Configuration

v02.61 ©Copyright 1985-2006, American Megatrends, Inc.
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.
5.3.4 Hardware Health Configuration

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

<table>
<thead>
<tr>
<th>BIOS SETUP UTILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main</td>
</tr>
<tr>
<td>Hardware Health Event Monitoring</td>
</tr>
</tbody>
</table>

**CPU_FAN Mode Setting** [Automatic Mode]
- CPU Temp. Limit of OFF [035]
- CPU Temp. Limit of Start [055]
- CPU_FAN1 Start PWM [050]
- Slope PWM 1 [2 PWM]

**System Temperature**
- CPU Temperature: 43°C/109°F
- System Temperature: 33°C/91°F

**Fan Speeds**
- CPU Fan Speed: 4821 RPM
- SYS Fan Speed: 4821 RPM

**Voltages**
- CPU Core: 1.280 V
- +1.10V: 1.088 V
- +3.30V: 3.376 V
- +5.00V: 5.107 V
- +12.0V: 12.288 V
- +1.50V: 1.504 V
- VMEM: 1.904 V
- 5VSB: 5.053 V

**BIOS Menu 7: Hardware Health Configuration**

- **Mode Setting [Full On Mode]**
  - Use the Mode Setting option to configure the second fan.
  - **Full On Mode** [DEFAULT] Fan is on all the time
  - **Automatic mode** The fan adjusts its speed using these settings:
    - Temp. Limit of OFF
    - Temp. Limit of Start
    - Fan Start PWM
    - Slope PWM 1
PWM Manual mode

The fan spins at the speed set in:
- Fan PWM control

Temp. Limit of OFF [000]

**WARNING:**

CPU failure can result if this value is set too high

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

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

Temp. Limit of Start [020]

**WARNING:**

CPU failure can result if this value is set too high

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

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

Start PWM [070]

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

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

Slope PWM [1 PWM]

A bigger value will increase the fan speed in big amounts. A smaller value will increase the speed more gradually.
- 0 PWM
- 1 PWM
- 2 PWM
- 4 PWM
- 8 PWM
- 16 PWM
- 32 PWM
- 64 PWM

CPU Fan PWM Control [070]

This value specifies the speed of the fan.

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

Hardware Health Monitoring

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

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speeds:
  - CPU Fan Speed
  - SYS Fan Speed
- Voltages:
  - CPU Core
  - +1.10 V
  - +3.30 V
  - +5.50 V
  - +12.0 V
  - +1.50 V
  - VMEM
  - 5VSB
5.3.5 AHCI Configuration

NOTE:

Advanced Host Controller Interface (AHCI) is a new programming interface for SATA host controllers. AHCI systems do not have master/slave designation for SATA devices, each device is treated as a master, and hardware-assisted native command queuing.

Use the **AHCI Settings** menu (**BIOS Menu 8**) to report on the auto-detection of devices connected to the onboard SATA drive connectors.

<table>
<thead>
<tr>
<th>AHCI Settings</th>
<th>AHCI CD/DVD Boot Time out [15]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; AHCI Port0 [Not Detected]</td>
</tr>
<tr>
<td></td>
<td>&gt; AHCI Port1 [Not Detected]</td>
</tr>
<tr>
<td></td>
<td>&gt; AHCI Port2 [Not Detected]</td>
</tr>
<tr>
<td></td>
<td>&gt; AHCI Port3 [Not Detected]</td>
</tr>
<tr>
<td></td>
<td>&gt; AHCI Port4 [Not Detected]</td>
</tr>
<tr>
<td></td>
<td>&gt; AHCI Port5 [Not Detected]</td>
</tr>
</tbody>
</table>

**BIOS Menu 8: AHCI Configuration**

**AHCI Port n [Not Detected]**

Use the **AHCI Port n** BIOS option to determine which AHCI (Advanced Host Controller Interface) devices are detected on a specified SATA drive connector. If a device is detected, selecting the BIOS option, e.g. “**AHCI Port 3**” opens a new window.
5.3.5.1 AHCI Port n

Use the **AHCI Port n** configuration menu (**BIOS Menu 9**) to configure the drive connected to SATA connector n.

<table>
<thead>
<tr>
<th>BIOS SETUP UTILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main</strong></td>
</tr>
<tr>
<td>AHCI Port0</td>
</tr>
<tr>
<td>Device :Not Detected</td>
</tr>
<tr>
<td>SATA Port0 : [Auto]</td>
</tr>
</tbody>
</table>

**BIOS Menu 9: AHCI Port n Configuration Menu**

- **SATA Port n [Auto]**
  
  Use the **SATA Port n** option to enable the system to auto-detect the type of drive connected to SATA drive connector n.

- **S.M.A.R.T [Enabled]**
  
  Use the **S.M.A.R.T** option to enable S.M.A.R.T (Self-Monitoring, Analysis, and Reporting Technology) on the drive connected to SATA drive connector n.

  - **Enabled** (DEFAULT) S.M.A.R.T is enabled on the drive connected to SATA drive connector n on the system

  - **Disabled** S.M.A.R.T is disabled on the drive connected to SATA drive connector n on the system
5.3.6 Remote Access Configuration

Use the Remote Access Configuration menu (BIOS Menu 10) 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 SETUP UTILITY](image)

BIOS Menu 10: Remote Access Configuration

- **Remote Access [Disabled]**

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

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

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

These configuration options are discussed below.

- **Serial Port Number [COM1]**

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

  - **COM1** [DEFAULT]
  - System is remotely accessed through COM1
  - **COM2**
  - System is remotely accessed through COM2

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

- **Base Address, IRQ [2F8h,3]**

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

- **Serial Port Mode [115200 8,n,1]**

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

  - 115200 8,n,1 [DEFAULT]
  - 57600 8,n,1
  - 38400 8,n,1
  - 19200 8,n,1
  - 9600 8,n,1
NOTE:

Identical baud rate settings must be set on the host (a management computer running a terminal software) and the slave.

➢ Redirection After BIOS POST [Always]

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

➢ Disabled
   The console is not redirected after POST

➢ Boot Loader
   Redirection is active during POST and during Boot Loader

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

➢ Terminal Type [ANSI]

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

➢ ANSI DEFAULT
   The target terminal type is ANSI

➢ VT100
   The target terminal type is VT100

➢ VT-UTF8
   The target terminal type is VT-UTF8

5.3.7 USB Configuration

Use the USB Configuration menu (BIOS Menu 11) to read USB configuration information and configure the USB settings.
BIOS Menu 11: USB Configuration

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

- **Module Version**: x.xxxxx.xxxxx

- **USB Devices Enabled**: None

- **USB Function** [Enabled]

- **USB 2.0 Controller** [Enabled]

- **Legacy USB Support** [Enabled]

- **USB 2.0 Controller Mode** [HiSpeed]

**USB Function** [Enabled]

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

- **Disabled**: USB function support disabled

- **Enabled**: USB function support enabled

**USB 2.0 Controller** [Enabled]

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

- **Disabled**: USB 2.0 controller disabled

- **Enabled**: USB 2.0 controller enabled
Legacy USB Support [Enabled]

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

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

- **Disabled**
  - Legacy USB support disabled

- **Enabled** [DEFAULT]
  - Legacy USB support enabled

- **Auto**
  - Legacy USB support disabled if no USB devices are connected

USB2.0 Controller Mode [HiSpeed]

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

- **FullSpeed**
  - The controller is capable of operating at 12 Mb/s

- **HiSpeed** [DEFAULT]
  - The controller is capable of operating at 480 Mb/s

5.4 PCI/PnP

Use the PCI/PnP menu (BIOS Menu 12) 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 12: PCI/PnP Configuration

#### IRQ# [Available]

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

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

Available IRQ addresses are:

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

DMA Channel# [Available]

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

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

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

Available DMA Channels are:

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

Reserved Memory Size [Disabled]

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

- **Disabled** DEFAULT
  No memory block reserved for legacy ISA devices

- **16K**
  16 KB reserved for legacy ISA devices

- **32K**
  32 KB reserved for legacy ISA devices

- **64K**
  54 KB reserved for legacy ISA devices
5.5 Boot

Use the **Boot** menu (**BIOS Menu 13**) to configure system boot options.

---

### BIOS Menu 13: Boot

#### 5.5.1 Boot Settings Configuration

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

---

### BIOS Menu 14: 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

Boot From LAN Support [Disabled]

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

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

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

Quiet Boot [Disabled]

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

- **Disabled DEFAULT**
  - Normal POST messages displayed

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

AddOn ROM Display Mode [Force BIOS]

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

- **Force BIOS DEFAULT**
  - The system forces third party BIOS to display during system boot.

- **Keep Current**
  - The system displays normal information during system boot.
Bootup Num-Lock [On]

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

- Off
  Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

- On DEFAULT
  Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

Spread Spectrum Function [Disabled]

The Spread Spectrum Function option can help to improve CPU EMI issues.

- Disabled DEFAULT
  The spread spectrum function is disabled

- Enabled
  The spread spectrum function is enabled
5.5.2 Boot Device Priority

Use the Boot Device Priority menu (BIOS Menu 15) to specify the boot sequence from the available devices. The drive sequence also depends on the boot sequence in the individual device section.

BIOS SETUP UTILITY

Boot Device Priority

> 1st Boot Device [1st Boot Device]
> 2nd Boot Device [2nd Boot Device]
> 3rd Boot Device [3rd Boot Device]

Specifies the boot sequence from the available devices.

←→ Select Screen
↑↓ Select Item
Enter Go to SubScreen
F1 General Help
F10 Save and Exit
ESC Exit

v02.61 ©Copyright 1985-2006, American Megatrends, Inc.

BIOS Menu 15: Boot Device Priority Settings
5.5.3 Hard Disk Drives

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

<table>
<thead>
<tr>
<th>BIOS SETUP UTILITY</th>
<th>Main</th>
<th>Advanced</th>
<th>PCIPNF</th>
<th>Boot</th>
<th>Security</th>
<th>Chipset</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard Disk Drives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 1st Drive</td>
<td></td>
<td></td>
<td></td>
<td>[Hard Drive 1]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 2nd Drive</td>
<td></td>
<td></td>
<td></td>
<td>[Hard Drive 2]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 3rd Drive</td>
<td></td>
<td></td>
<td></td>
<td>[Hard Drive 3]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Specifies the boot sequence from the available devices.

Left/Right-
Select Screen
Up/Down-
Select Item
Enter-Go to SubScreen
F1-General Help
F10-Save and Exit
ESC-Exit

**BIOS Menu 16: Hard Disk Drives**
5.5.4 Removable Drives

Use the **Removable Drives** menu **(BIOS Menu 17)** to specify the boot sequence of the removable drives. Only connected drives are shown.

<table>
<thead>
<tr>
<th>BIOS SETUP UTILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main</td>
</tr>
<tr>
<td>Hard Disk Drives</td>
</tr>
<tr>
<td>&gt; 1st Drive</td>
</tr>
<tr>
<td>&gt; 2nd Drive</td>
</tr>
<tr>
<td>&gt; 3rd Drive</td>
</tr>
</tbody>
</table>

**BIOS Menu 17: Removable Drives**

5.5.5 CD/DVD Drives

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

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

**NOTE:**

Only the drives connected to the system are shown. For example, if only two CDs or DVDs are connected only “1st Drive” and “2nd Drive” are listed.
The boot sequence from the available devices is selected. If the “1st Drive” option is selected a list of available CD/DVD drives is shown. Select the first CD/DVD drive the system boots from. If the “1st Drive” is not used for booting this option may be disabled.

### BIOS Menu 18: CD/DVD Drives

#### 5.6 Security

Use the Security menu (BIOS Menu 19) to set system and user passwords.
→ Change Supervisor Password

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

→ Change User Password

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

→ Clear User Password

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

→ Boot Sector Virus Protection [Disabled]

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

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

5.7 Chipset

Use the **Chipset** menu (BIOS Menu 20) 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.

---
5.7.1 Northbridge Configuration

Use the Northbridge Chipset Configuration menu (BIOS Menu 21) to configure the Northbridge chipset.
Memory Remap Feature [Enabled]

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

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

Memory Hole [Disabled]

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

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

Boots Graphics Adapter [PCI/IGD]

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

- IGD
- PCI/IGD DEFAULT

IGD Graphics Mode Select [Enable, 32 MB]

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

- Disable
- **Enable, 32 MB** DEFAULT
  - 32 MB of memory used by internal graphics device
- **Enable, 64 MB**
  - 64 MB of memory used by internal graphics device
Enable, 128 MB

128 MB of memory used by internal graphics device

Aperture Size Select/Graphic Win Size [256 MB]

Use the **Aperture Size Select/Graphic Win Size** option to select the size of the AGP aperture and the size of the GART (Graphics Address Relocation Table). The aperture is a portion on the PCI memory address range dedicated for use as AGP memory address space and the GART is a translation table that translates the AGP memory addresses into actual addresses. The following options are available.

- 32 MB
- 64 MB
- 128 MB
- 256 MB Default

Share Memory Size [32 MB]

Use the **Share Memory Size** option to set the amount of system memory allocated to the integrated graphics processor when the system boots. The system memory allocated can then only be used as graphics memory, and is no longer available to applications or the operating system. Configuration options are listed below:

- 16 MB
- 32 MB Default
- 64 MB
- 128 MB
- Disabled

5.7.1.1 Video Function Configuration

Use the **Video Function Configuration** menu to configure the video device connected to the system.
BIOS Menu 22: Northbridge Chipset Configuration

- **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 [128 MB]**

  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 depends on operating system and installed DDR2. Configuration options are listed below.
128 MB
256 MB Default
Maximum DVMT

Boot Display Device

Use the **Boot Display Device** option to select the display device used by the system when it boots. Configuration options are listed below.

- Auto
- CRT **DEFAULT**
- HDMI
- EFP

Sec. Display Device

Use the **Sec. Display Device** option to select the second display device used by the system when it boots. This option only appears when HDMI or EFP is set as the boot display device. Configuration options are listed below.

- Disabled
- CRT **DEFAULT**

5.7.2 Southbridge Configuration

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

- **ASF Support** [Enabled]
  
  Use the **ASF Support** BIOS option to control the system's ability to connect to a remote management server.

  - **Disabled**
    
    The system will not communicate with a remote management server.

  - **Enabled** (Default)
    
    The Alert Standard Format (ASF) controller is activated and can communicate with a remote management server.

- **HDA Controller** [Enabled]

  Use the **HDA Controller** option to enable the high definition audio controller.

  - **Disabled**
    
    HDA controller disabled

  - **Enabled** (Default)
    
    HDA controller enabled

- **Suspend Mode** [S1 (POS)]

  Use the **Suspend Mode** option to specify the sleep state the system enters when it is not being used.
- **S1 (POS) DEFAULT**
The system enters S1 (POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

- **S3 (STR)**
System appears off. The CPU has no power; RAM is in slow refresh; the power supply is in a reduced power mode.

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

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

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

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

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

  - **Disabled DEFAULT**
  Wake event not generated by activity on the keyboard or mouse

  - **Resume On Keyboard**
  Wake event generated by activity on the keyboard

  - **Resume On Mouse**
  Wake event generated by activity on the mouse

  - **Enabled**
  Wake event generated by activity on the keyboard or mouse
Resume on PCI-Express WAKE# [Enabled]

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

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

PCIE Ports Configuration [Enabled]

Enable/Disable any of following Onboard RTL111CP LAN PCIe port.

- **Disabled** - The Onboard RTL111CP LAN PCIe port is disabled
- **Enabled** (DEFAULT) - The Onboard RTL111CP LAN PCIe port is enabled

RTL8111CP LAN Boot [Disabled]

Use the RTL8111CP LAN Boot option to enable the system to be booted from a remote system.

- **Disabled** (DEFAULT) - Cannot be booted from a remote system through the LAN
- **Enabled** - Can be booted from a remote system through the LAN

5.8 Exit

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

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

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

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

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

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

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

- System Overview .................................................................58
- System Date [xx/xx/xx] .....................................................59
- SATA# Configurations [Compatible] .................................61
- Configure SATA#1 as [IDE] ................................................62
- IDE Master and IDE Slave ...................................................62
- Auto-Detected Drive Parameters .......................................63
- Type [Auto] ........................................................................64
- LBA/Large Mode [Auto] ...................................................64
- Block (Multi Sector Transfer) [Auto] .................................65
- PIO Mode [Auto] ................................................................65
- DMA Mode [Auto] ..........................................................65
- 32Bit Data Transfer [Enabled] ............................................67
- Serial Port1 Address [3F8/IRQ4] ......................................68
- Mode Setting [Full On Mode] .............................................69
- Temp. Limit of OFF [000] ..................................................70
- Temp. Limit of Start [020] ..................................................70
- Start PWM [070] ............................................................70
- Slope PWM [1 PWM] .......................................................70
- CPU Fan PWM Control [070] .........................................71
- Hardware Health Monitoring .............................................71
- AHCI Port n [Not Detected] ..............................................72
- SATA Port n [Auto] ..........................................................73
- S.M.A.R.T [Enabled] ..........................................................73
- Remote Access [Disabled] ................................................74
- Serial Port Number [COM1] .............................................75
- Base Address, IRQ [2F8h,3] ................................................75
- Serial Port Mode [115200 8,n,1] ........................................75
- Redirection After BIOS POST [Always] ...............................76
- Terminal Type [ANSI] ..........................................................76
- USB Configuration ..........................................................77
- USB Devices Enabled ..........................................................77
<table>
<thead>
<tr>
<th>Feature</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB Function [Enabled]</td>
<td>77</td>
</tr>
<tr>
<td>USB 2.0 Controller [Enabled]</td>
<td>77</td>
</tr>
<tr>
<td>Legacy USB Support [Enabled]</td>
<td>78</td>
</tr>
<tr>
<td>USB2.0 Controller Mode [HiSpeed]</td>
<td>78</td>
</tr>
<tr>
<td>IRQ# [Available]</td>
<td>79</td>
</tr>
<tr>
<td>DMA Channel# [Available]</td>
<td>80</td>
</tr>
<tr>
<td>Reserved Memory Size [Disabled]</td>
<td>80</td>
</tr>
<tr>
<td>Quick Boot [Enabled]</td>
<td>82</td>
</tr>
<tr>
<td>Boot From LAN Support [Disabled]</td>
<td>82</td>
</tr>
<tr>
<td>Quiet Boot [Disabled]</td>
<td>82</td>
</tr>
<tr>
<td>AddOn ROM Display Mode [Force BIOS]</td>
<td>82</td>
</tr>
<tr>
<td>Bootup Num-Lock [On]</td>
<td>83</td>
</tr>
<tr>
<td>Spread Spectrum Function [Disabled]</td>
<td>83</td>
</tr>
<tr>
<td>Change Supervisor Password</td>
<td>88</td>
</tr>
<tr>
<td>Change User Password</td>
<td>88</td>
</tr>
<tr>
<td>Clear User Password</td>
<td>88</td>
</tr>
<tr>
<td>Boot Sector Virus Protection [Disabled]</td>
<td>88</td>
</tr>
<tr>
<td>Memory Remap Feature [Enabled]</td>
<td>90</td>
</tr>
<tr>
<td>Memory Hole [Disabled]</td>
<td>90</td>
</tr>
<tr>
<td>Boots Graphics Adapter [PCI/IGD]</td>
<td>90</td>
</tr>
<tr>
<td>IGD Graphics Mode Select [Enable, 32 MB]</td>
<td>90</td>
</tr>
<tr>
<td>Aperture Size Select/Graphic Win Size [256 MB]</td>
<td>91</td>
</tr>
<tr>
<td>Share Memory Size [32 MB]</td>
<td>91</td>
</tr>
<tr>
<td>DVMT Mode Select [DVMT Mode]</td>
<td>92</td>
</tr>
<tr>
<td>DVMT/FIXED Memory [128 MB]</td>
<td>92</td>
</tr>
<tr>
<td>Boot Display Device</td>
<td>93</td>
</tr>
<tr>
<td>Sec. Display Device</td>
<td>93</td>
</tr>
<tr>
<td>ASF Support [Enabled]</td>
<td>94</td>
</tr>
<tr>
<td>HDA Controller [Enabled]</td>
<td>94</td>
</tr>
<tr>
<td>Suspend Mode [S1(POS)]</td>
<td>94</td>
</tr>
<tr>
<td>Restore on AC Power Loss [Power Off]</td>
<td>95</td>
</tr>
<tr>
<td>Resume on Keyboard/Mouse [Disabled]</td>
<td>95</td>
</tr>
<tr>
<td>Resume on PCI-Express WAKE# [Enabled]</td>
<td>96</td>
</tr>
<tr>
<td>PCIE Ports Configuration [Enabled]</td>
<td>96</td>
</tr>
<tr>
<td>RTL8111CP LAN Boot [Disabled]</td>
<td>96</td>
</tr>
</tbody>
</table>
Save Changes and Exit ................................................................. 97
Discard Changes and Exit............................................................ 97
Discard Changes ........................................................................ 97
Load Optimal Defaults ................................................................ 97
Load Failsafe Defaults ................................................................. 97
Appendix B

Terminology
AC '97  Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.

ACPI  Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.

AHCI  Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.

ATA  The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.

ARMD  An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.

ASKIR  Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude (“volume”) of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.

BIOS  The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user.

CODEC  The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.

CMOS  Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.

COM  COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.

DAC  The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.

DDR  Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.

DMA  Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
**DIMM**
Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.

**DIO**
The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

**EHCI**
The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.

**EIDE**
Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.

**EIST**
Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.

**FSB**
The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.

**GbE**
Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.

**GPIO**
General purpose input

**HDD**
Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.

**ICH**
The Input/Output Control Hub (ICH) is an Intel® Southbridge chipset.

**IrDA**
Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.

**L1 Cache**
The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.

**L2 Cache**
The Level 2 Cache (L2 Cache) is an external processor memory cache.

**LCD**
Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.
<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVDS</td>
<td>Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.</td>
</tr>
<tr>
<td>POST</td>
<td>The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.</td>
</tr>
<tr>
<td>RAM</td>
<td>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.</td>
</tr>
<tr>
<td>SATA</td>
<td>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.</td>
</tr>
<tr>
<td>UART</td>
<td>Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system’s serial communication (COM) ports.</td>
</tr>
<tr>
<td>UHCI</td>
<td>The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.</td>
</tr>
<tr>
<td>USB</td>
<td>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.</td>
</tr>
<tr>
<td>VGA</td>
<td>The Video Graphics Array (VGA) is a graphics display system developed by IBM.</td>
</tr>
</tbody>
</table>
Appendix C

Digital I/O Interface
C.1 Introduction

The DIO connector on the KINO-G45A is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

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

C.2 DIO Connector Pinouts

Refer to the connectors section for pinouts.

C.3 Assembly Language Samples

C.3.1 Enable the DIO Input Function

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

```
MOV AX, 6F08H  ; Sets the digital port as input
INT 15H
```

C.3.2 Enable the DIO Output Function

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

```
MOV AX, 6F09H  ; Sets the digital port as output
MOV BL, 09H
INT 15H
```

Initiates the INT 15H BIOS call
Appendix D

Watchdog Timer
NOTE:

The following discussion applies to DOS environment. IEI support is contacted or the IEI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

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

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

INT 15H:

<table>
<thead>
<tr>
<th>AH – 6FH Sub-function:</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL – 2:</td>
</tr>
<tr>
<td>BL:</td>
</tr>
</tbody>
</table>

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

Compatibility
NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the KINO-G45A.

E.1 Compatible Operating Systems

The following operating systems have been successfully run on the KINO-G45A.

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

E.2 Compatible Processors

The following Intel® Socket 478 processors have been successfully tested on the KINO-G45A.

<table>
<thead>
<tr>
<th>CPU</th>
<th>Model</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel® Core™2 Duo</td>
<td>T7700</td>
<td>2.4 GHz</td>
</tr>
</tbody>
</table>

Table E-1: Compatible Processors
E.3 Compatible Memory Modules

![NOTE:]

The memory modules listed below have been tested on the KINO-G45A. Other memory modules that comply with the specifications may also work on the KINO-G45A but have not been tested.

The following memory modules have been successfully tested on the KINO-G45A.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Capacity</th>
<th>Speed</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transcend</td>
<td>512 MB</td>
<td>533 MHz</td>
<td>DDR2</td>
</tr>
</tbody>
</table>

*Table E-2: Compatible Memory Modules*
Appendix

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

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

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

Please refer to the table on the next page.
### Toxic or Hazardous Substances and Elements

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Toxic or Hazardous Substances and Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lead (Pb)</td>
</tr>
<tr>
<td>Housing</td>
<td>X</td>
</tr>
<tr>
<td>Display</td>
<td>X</td>
</tr>
<tr>
<td>Printed Circuit Board</td>
<td>X</td>
</tr>
<tr>
<td>Metal Fasteners</td>
<td>X</td>
</tr>
<tr>
<td>Cable Assembly</td>
<td>X</td>
</tr>
<tr>
<td>Fan Assembly</td>
<td>X</td>
</tr>
<tr>
<td>Power Supply Assemblies</td>
<td>X</td>
</tr>
<tr>
<td>Battery</td>
<td>O</td>
</tr>
</tbody>
</table>

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

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006
此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

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

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

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。