



IEI Technology Corp.



**MODEL:
KINO-9653**

**Mini-ITX Socket P Motherboard for Intel® Core™2 Duo CPU
2 x VGA, 1 x TV-out, LAN, 2 x SATA, PCIe Mini, HD Audio
CompactFlash®, 6 x USB, RoHS Compliant**

User Manual

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Revision

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Chapter

1

Introduction

1.1 Introduction



Figure 1-1: KINO-9653

The KINO-9653 is a Mini-ITX motherboard. The KINO-9653 has a low-profile design and is designed for fanless use. The KINO-9653 accepts a Socket P Intel® Core™2 Duo processor. The KINO-9653 supports two 533/667 MHz Dual-channel DDR2 SO-DIMM modules up to 2.0 GB each. The KINO-9653 supports multiple video outputs including two VGA ports and a single TV-out connector. Expansion and I/O include a PCIe Mini card slot, High Definition audio, CompactFlash®, two USB ports on the rear panel, four USB ports via pin headers, two SATA ports and a keyboard/mouse connector.

1.2 Benefits

Some of the KINO-9653 motherboard benefits include:

- Staying cool without using a fan
- Powerful visuals with multiple monitors
- Staying connected with both wired and wireless LAN connections
- Very fast running of programs and applications
- Support for durable CompactFlash® cards

KINO-9653 Mini-ITX Motherboard

1.3 Features

Some of the KINO-9653 motherboard features are listed below:

- Mini-ITX
- RoHS compliant
- Socket P
- PCIe Mini card expansion slot
- Supports two dual-channel DDR2 SO-DIMMs
- LAN connector
- Dual SATA
- High Definition audio

1.4 Connectors

The connectors on the KINO-9653 are shown in the figure below.

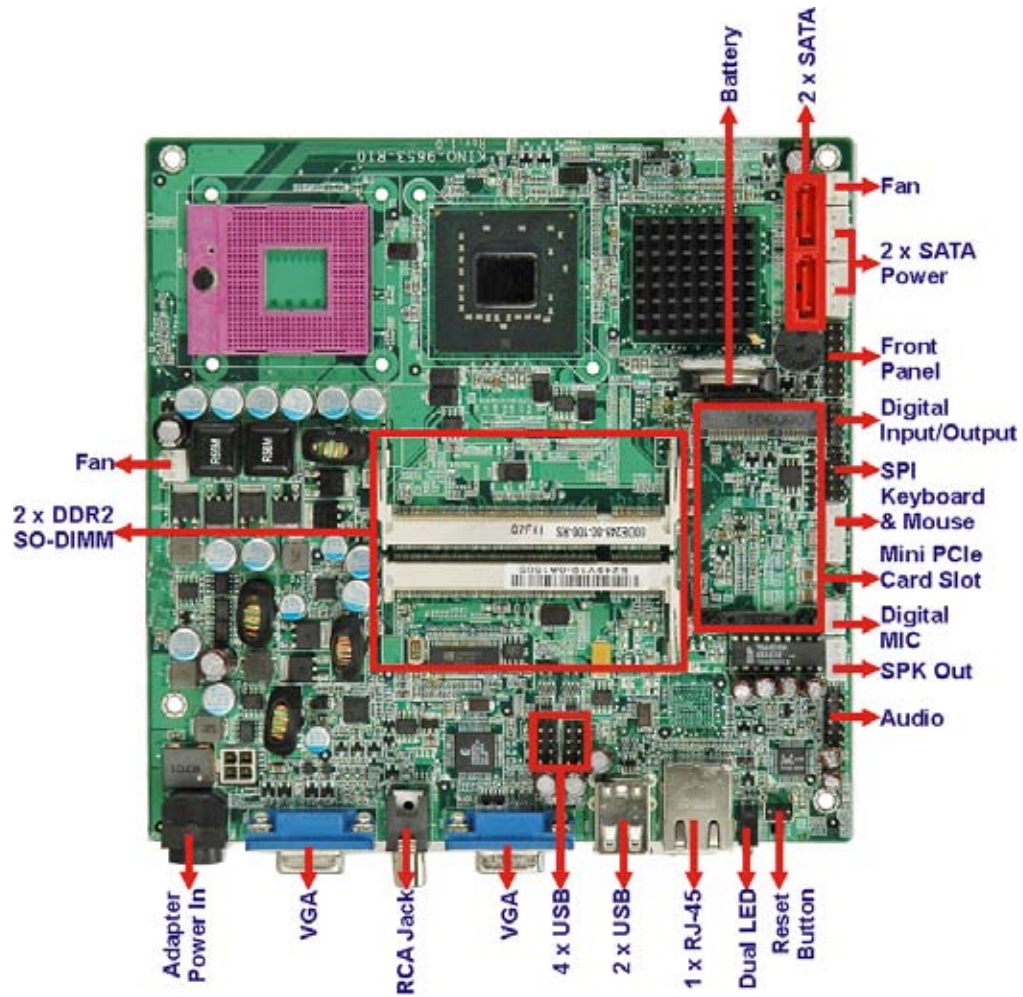


Figure 1-2: Connectors

KINO-9653 Mini-ITX Motherboard

1.5 Dimensions

The main dimensions of the KINO-9653 are shown in the diagram below.

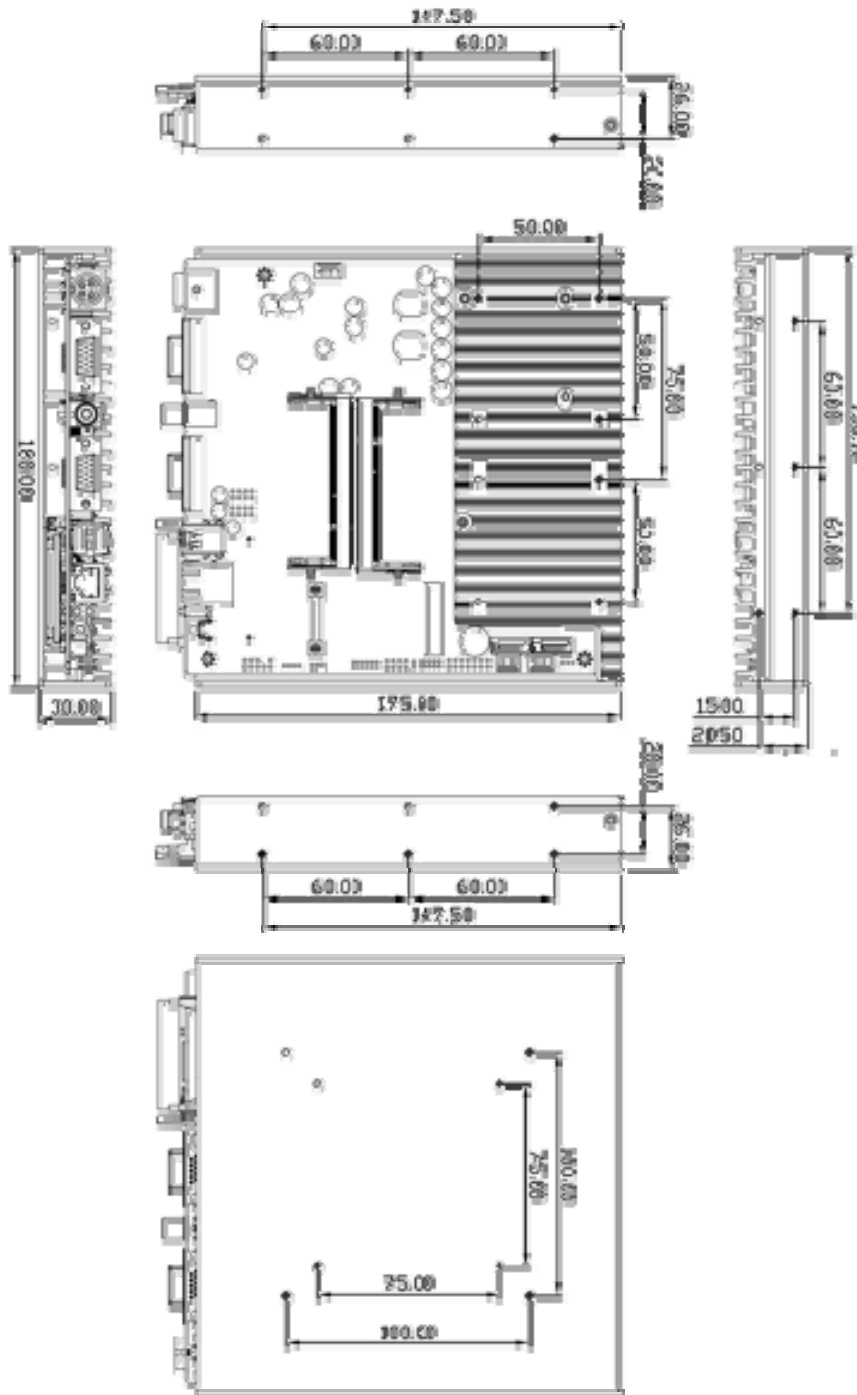


Figure 1-3: KINO-9653 Dimensions (mm)

1.6 Data Flow

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

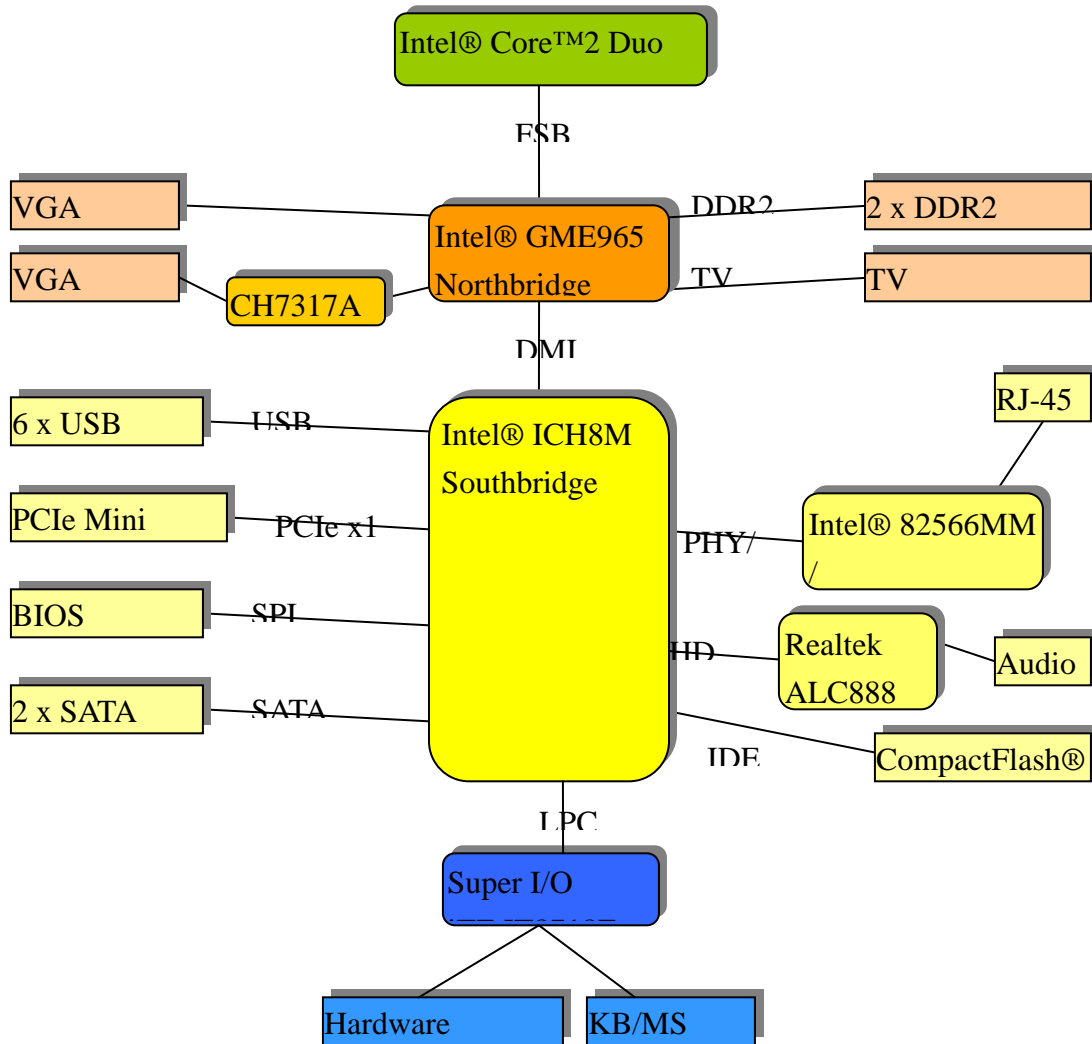


Figure 1-4: Data Flow Diagram

KINO-9653 Mini-ITX Motherboard

1.7 Technical Specifications

KINO-9653 technical specifications are listed in **Table 1-1**.

Specification	KINO-9653
Form Factor	Mini-ITX
CPU	Intel® Core™2 Duo
FSB Speed	533/667/800 MHz
Northbridge	Intel® GME965
Southbridge	Intel® ICH8M
Memory	Two dual-channel 533/667 MHz DDR2 SO-DIMMs up to 2.0 GB each
Display	VGA (from Northbridge) VGA (from Northbridge SDVO through Chrontel CH7317A) TV-out
Storage	2 x SATA 1 x CompactFlash®
LAN	Intel® 82566MM (KINO-9653G) Intel® 82562V (KINO-9653E)
Audio	High Definition Audio
USB	Six USB ports
Super I/O	iTE IT8718F
BIOS	AMI
Keyboard/mouse	6-pin header PS/2
Digital I/O	8-bit (4-bit input, 4-bit output)
Watchdog Timer	Software programmable 1-255 sec. through the super I/O
Power Supply	12 V input through external 4-pin DIN or internal 2x2 connector
DC Output	2 x 4-pin headers providing 5 V for 2.5" SATA drives (mostly)

Specification	KINO-9653
Power Consumption	12 V @ 3.77 A (with 2.2 GHz Intel® Core™2 Duo T7500 and two 1.0 GB 800MHz DDR2 SO-DIMMs)
Temperature	0°C – 60°C (32°F – 140°F)
Humidity	5%~95% non-condensing
Dimensions (WxL)	170 mm x 170 mm
Weight (GW/NW)	1350 g / 650 g

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-9653 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.

KINO-9653 Mini-ITX Motherboard








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-9653 was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

The KINO-9653 is shipped with the following components:

Quantity	Item and Part Number	Image
1	KINO-9653 & heatsink enclosure	
1	Audio cable (P/N: 32000-072103-RS)	
1	Dual USB cable (wo bracket) (P/N: 32000-070301-RS)	
1	KB/MS PS/2 Y-cable (P/N: 32000-023800-RS)	
1	Mini jumper pack (2.0mm) (P/N: 33100-000033-RS)	
2	SATA and power cable (P/N: 32000-106100-RS)	
1	Utility CD	

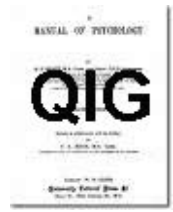
Quantity	Item and Part Number	Image
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The KINO-9653 is shipped with the following components:





Item and Part Number	Image
CPU cooler (P/N: CF-479B-RS)	
PCIe Mini wireless LAN card 802.11b/g (P/N: WMPCIE-V01-RS)	
Adapter (P/N: 63000-FSP096AHB-RS)	
Power cable (P/N:32100-130300-RS)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 KINO-9653 Layout

The figures below show all the connectors and jumpers.

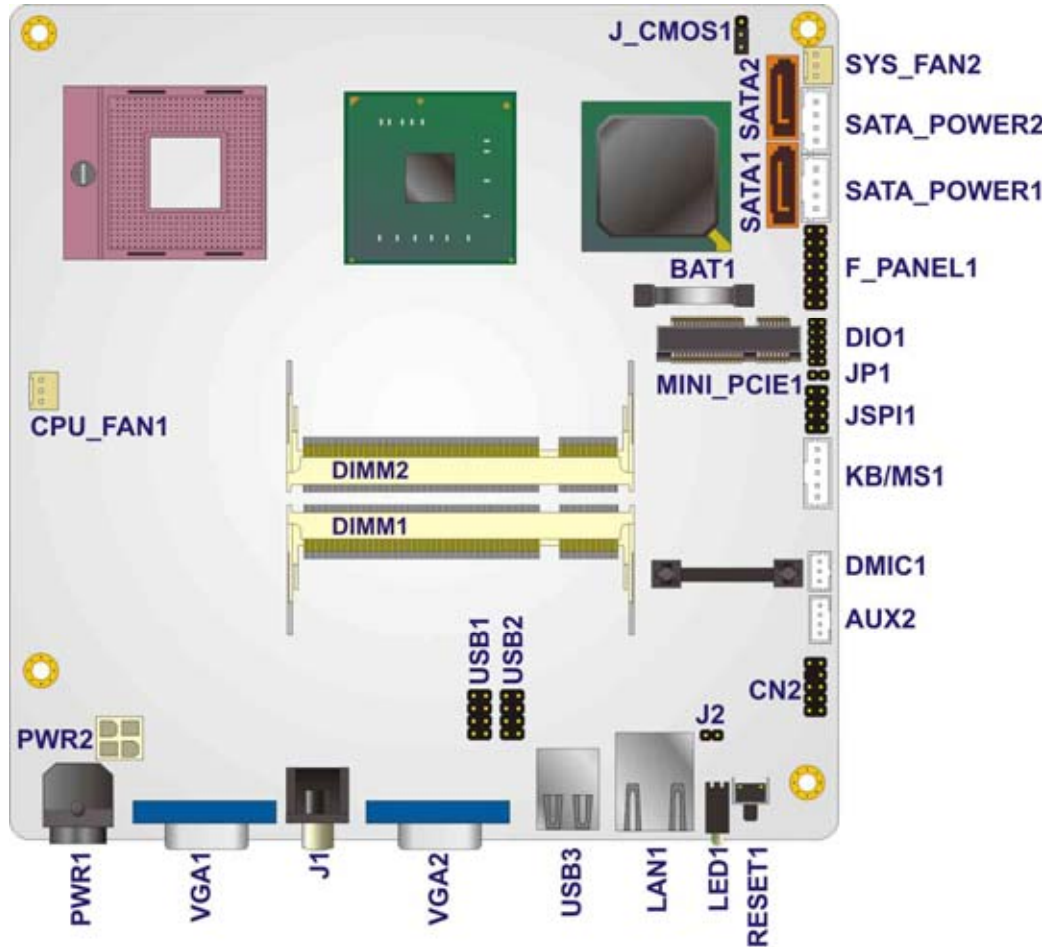


Figure 3-1: Connectors and Jumpers

KINO-9653 Mini-ITX Motherboard

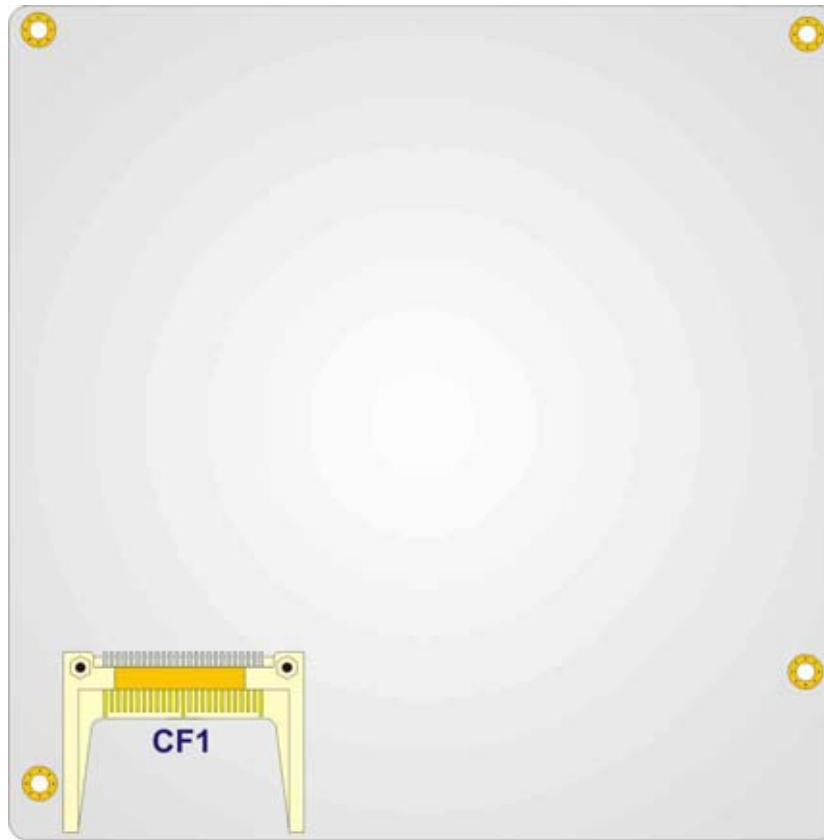


Figure 3-2: Connectors and Jumpers (Solder Side)

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
Audio connector	8-pin header	CN2
Auxiliary audio input	4-pin box header	AUX2
Battery connector	Clip-type	BAT2
CompactFlash® slot	CompactFlash® slot	CF1
CPU fan connector	3-pin wafer	CPU_FAN1
Digital I/O	8-pin header	DIO1
Flash BIOS connector	8-pin header	JSPI1
Front panel connector	14-pin header	F_PANEL1

Connector	Type	Label
Keyboard/mouse connector (PS/2)	6-pin box header	KB/MS1
Memory sockets	SO-DIMM slot	DIMM1, DIMM2
Microphone input	3-pin box header	DMIC1
PCIe Mini card slot	PCIe Mini slot	MINI-PCIE1
Power output	4-pin box header	PWOUT1
SATA connector	SATA connector	SATA1, SATA2
SATA power connector (5 V output)	4-pin box header	SATA_POWER1, SATA_POWER2
System fan connector	3-pin wafer	SYS_FAN2

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

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

Connector	Type	Label
Composite video output	RCA	J1
Ethernet connector	RJ-45	LAN1
USB port	USB port	USB3
Power input DIN	4-pin DIN	PWR1
VGA port connector	15-pin female	VGA1, VGA2

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the KINO-9653.

3.2.1 Audio Connector

CN Label: **CN2**

KINO-9653 Mini-ITX Motherboard

CN Type: 8-pin header (2x4)

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

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

This connector connects to speakers for audio output.

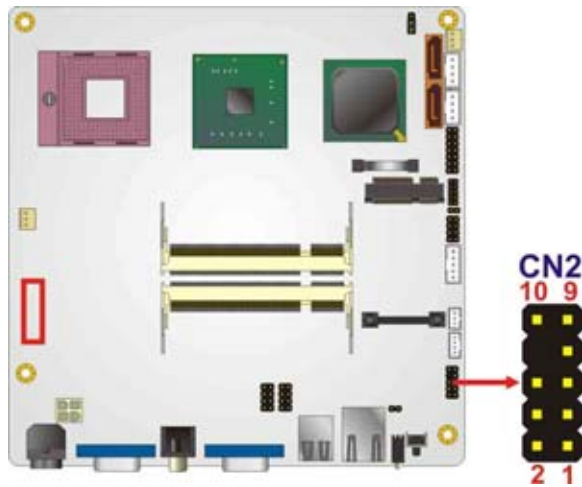


Figure 3-3: Audio Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	E_OUTR	2	EE_OUTR
3	GND	4	GND
5	E_OUTL	6	EE_OUTL
7	GND	8	GND
9	FMIC1R	10	FMIC1L

Table 3-3: Audio Connector Pinouts

3.2.2 Auxiliary Audio Connector

CN Label: AUX2

CN Type: 4-pin header (1x4)

CN Location: See **Figure 3-4**

CN Pinouts: See **Table 3-4**

The auxiliary audio provides stereo audio output.

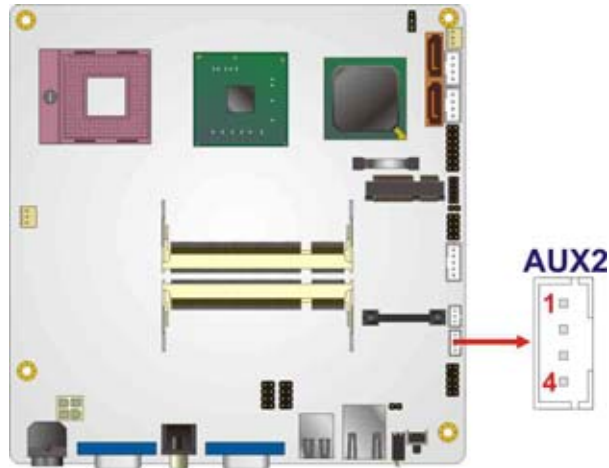


Figure 3-4: Auxiliary Audio Connector Location

To use the auxiliary audio output short pins 1-2 and 5-6 on CN2.

PIN NO.	DESCRIPTION
1	SPK_L
2	GND
3	GND
4	SPK_R

Table 3-4: Auxiliary Audio Connector Pinouts

3.2.3 CompactFlash® Slot

- CN Label:** CF1
- CN Type:** CompactFlash® card slot
- CN Location:** See **Figure 3-5**

A CompactFlash® Type I/II card can be used in this slot.

KINO-9653 Mini-ITX Motherboard

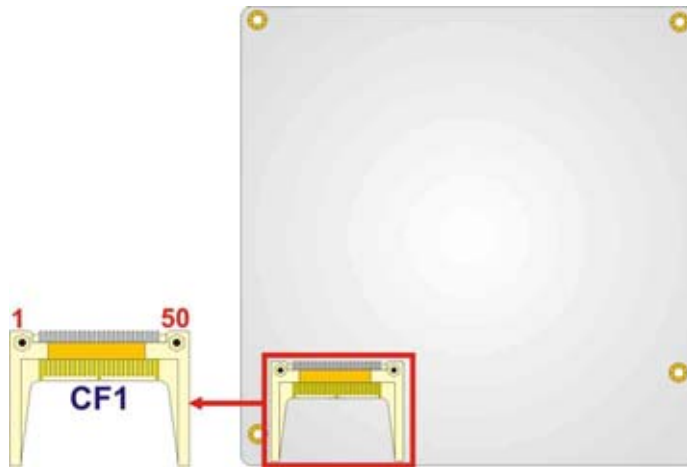


Figure 3-5: CompactFlash® Slot Location

3.2.4 Digital I/O Connector

CN Label:	DIO1
CN Type:	10-pin header
CN Location:	See Figure 3-6
CN Pinouts:	See Table 3-5

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

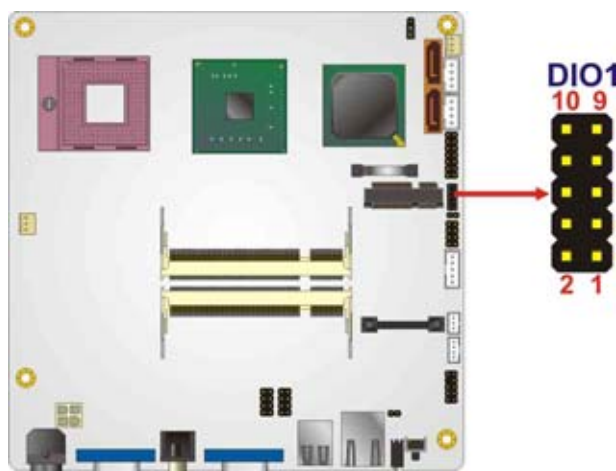


Figure 3-6: Digital I/O Connector Locations

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

Table 3-5: Digital I/O Connector Pinouts

3.2.5 CPU Fan Connector

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

The fan connector attaches to a CPU cooling fan.

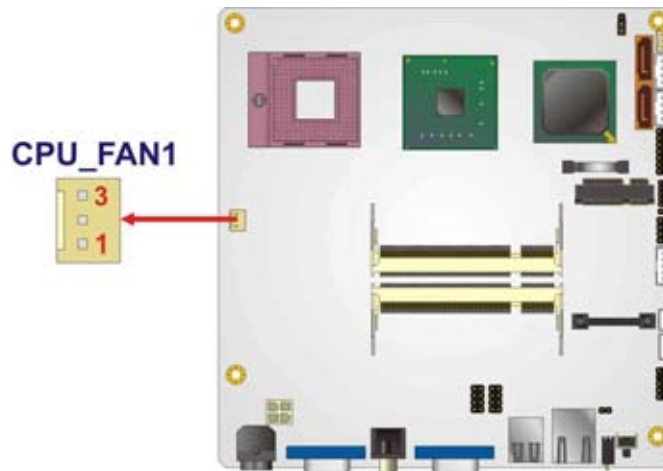


Figure 3-7: CPU Fan Connector Location

PIN NO.	DESCRIPTION
1	FAN_IO
2	12 V

KINO-9653 Mini-ITX Motherboard

PIN NO.	DESCRIPTION
3	GND

Table 3-6: CPU Fan Connector Pinouts

3.2.6 Front Panel Connector

- CN Label:** F_PANEL1
- CN Type:** 14-pin header (2x7)
- CN Location:** See Figure 3-8
- CN Pinouts:** See Table 3-7

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

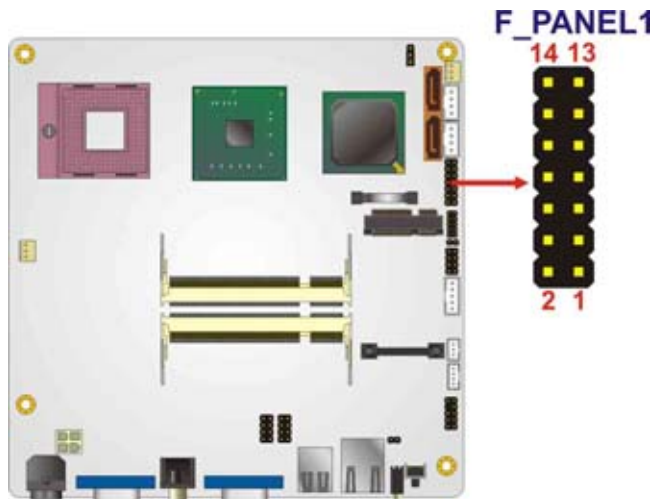


Figure 3-8: Front Panel Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	Power LED+	2	Speaker+
3	N/C	4	N/C
5	Power LED-	6	N/C
7	Power button-	8	Speaker-
9	Power button+	10	N/C

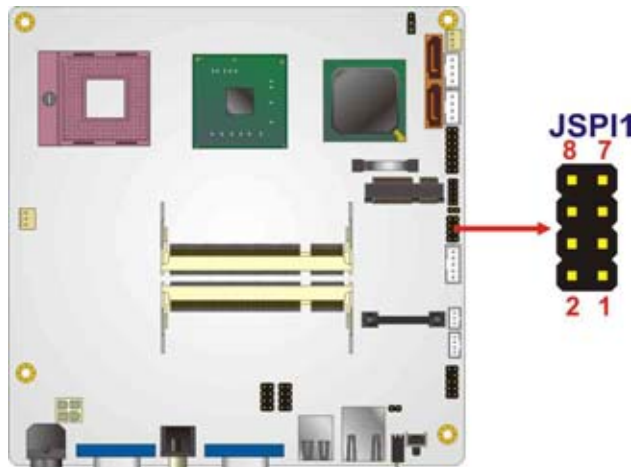
PIN	DESCRIPTION	PIN	DESCRIPTION
11	HDD LED+	12	Reset+
13	HDD LED-	14	Reset-

Table 3-7: Front Panel Connector Pinouts

3.2.7 Flash BIOS Connector

- CN Label:** JSPI1
- CN Type:** 8-pin header (2x4)
- CN Location:** See **Figure 3-9**
- CN Pinouts:** See **Table 3-8**

The flash BIOS connector is for flashing the BIOS.


Figure 3-9: Flash BIOS Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SPI_VCC	2	GND
3	CS#	4	CLOCK
5	SO	6	SI
7	N/C	8	NC

Table 3-8: Flash BIOS Connector Pinouts

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3.2.8 Keyboard/Mouse Connector

- CN Label:** KB/MS1
- CN Type:** 6-pin header (1x6)
- CN Location:** See **Figure 3-10**
- CN Pinouts:** See **Table 3-9**

The keyboard/mouse connector connects to a PS/2 Y-cable that can be connected to a PS/2 keyboard and mouse.

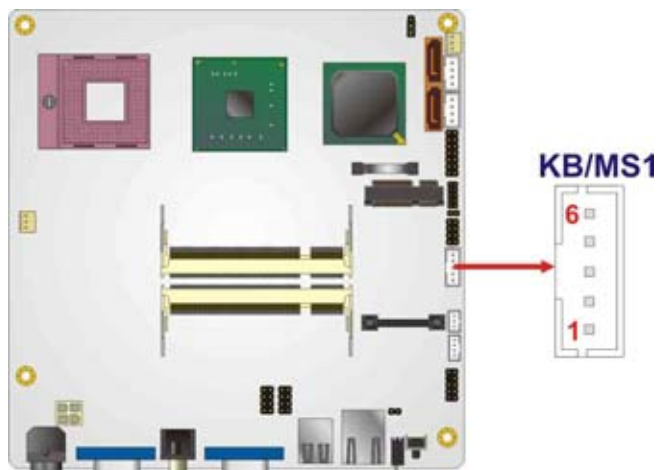


Figure 3-10: Keyboard/Mouse Connector Location

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

Table 3-9: Keyboard/Mouse Connector Pinouts

3.2.9 Microphone Connector

- CN Label:** DMIC1
- CN Type:** 3-pin header (1x3)
- CN Location:** See **Figure 3-11**
- CN Pinouts:** See **Table 3-10**

The microphone connector connects to a microphone.

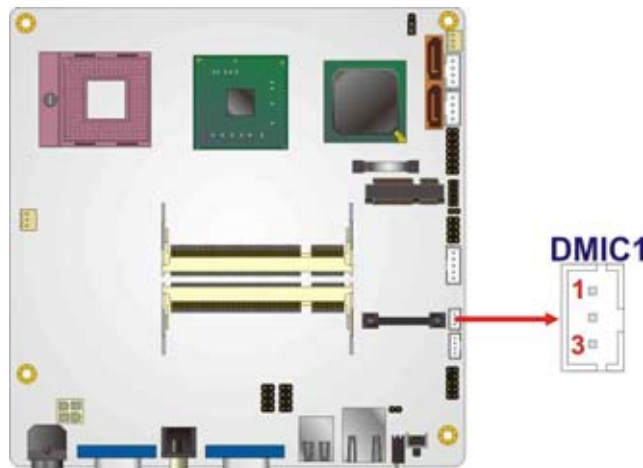


Figure 3-11: Microphone Connector Location

PIN NO.	DESCRIPTION
1	DMIC_CLK
2	DMIC_DATA
3	GND

Table 3-10: Microphone Connector Pinouts

3.2.10 Memory Card Slot

- CN Label:** DIMM1 and DIMM2
- CN Type:** SO-DIMM slot
- CN Location:** See **Figure 3-13**

The SO-DIMM slots are for SO-DIMM memory modules.

KINO-9653 Mini-ITX Motherboard

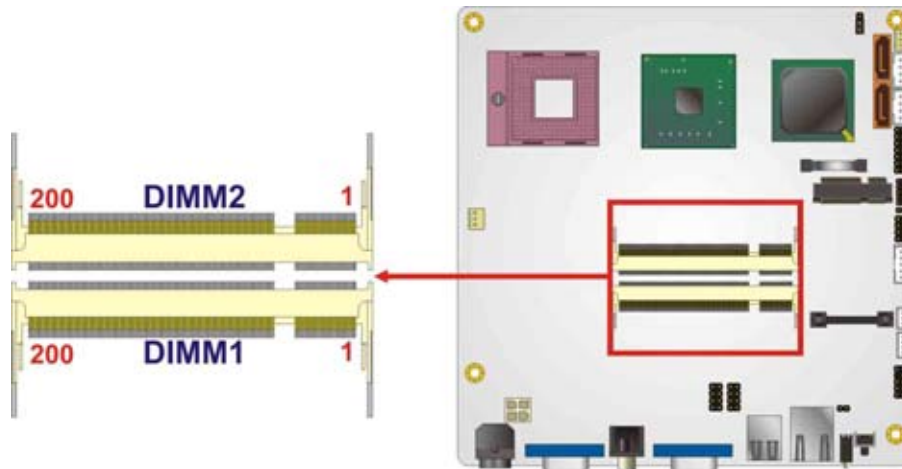


Figure 3-12: Memory Card Slot Location

3.2.11 PCIe Mini Card Slot

- CN Label:** MINI-PCIE1
- CN Type:** PCIe Mini card slot
- CN Location:** See **Figure 3-13**

The PCIe Mini card slot is for installing PCIe Mini expansion cards.

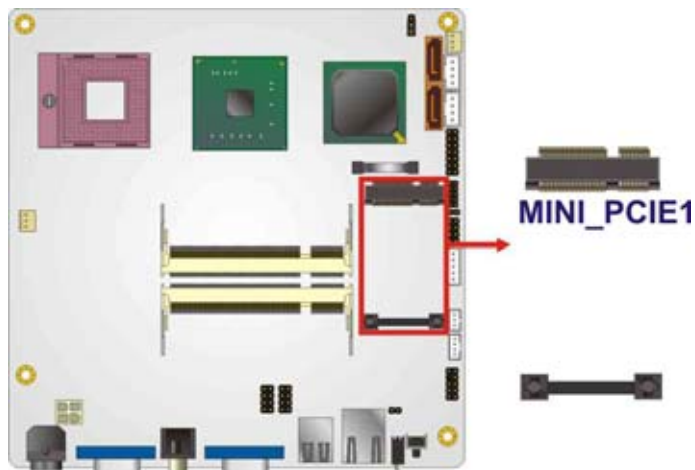


Figure 3-13: PCIe Mini Card Slot Location

3.2.12 Power Input Connector

- CN Label:** PWR2
- CN Type:** 4-pin AT
- CN Location:** See **Figure 3-14**
- CN Pinouts:** See **Table 3-11**

The power input connector is an alternative to the DIN power connector on the rear panel.

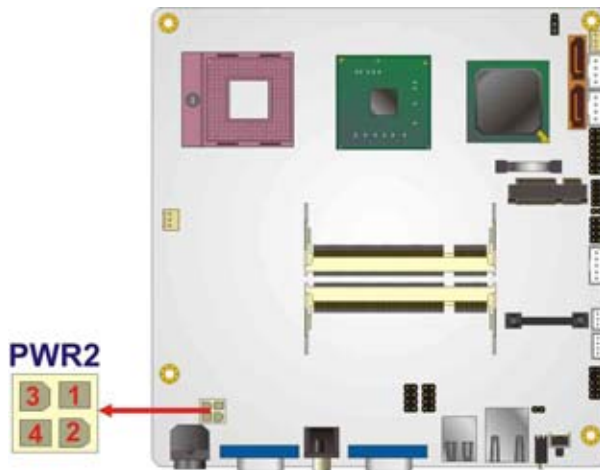


Figure 3-14: Power Input Connector Location

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

Table 3-11: Power Output Connector Pinouts

3.2.13 SATA Drive Connectors

- CN Label:** SATA1 and SATA2
- CN Type:** 7-pin SATA drive connectors

KINO-9653 Mini-ITX Motherboard

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

The SATA drive connectors can be connected to SATA drives.

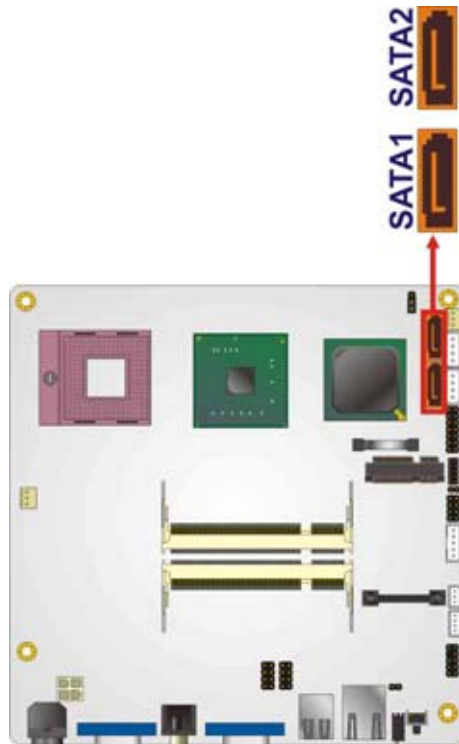


Figure 3-15: SATA Drive Connector Location

3.2.14 SATA Power Connector

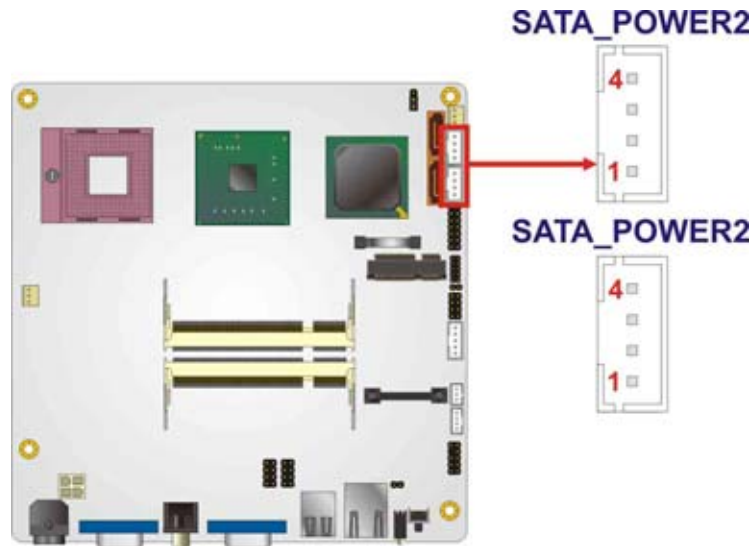
CN Label: SATA_POWER1 and SATA_POWER2

CN Type: 4-pin header

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

CN Pinouts: See **Table 3-12**

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


Figure 3-16: SATA Power Connector Location

PIN	DESCRIPTION
1	12 V
2	GND
3	GND
4	5 V

Table 3-12: SATA Power Connector Pinouts

3.2.15 System Fan Connector

- CN Label:** **SYS_FAN2**
- CN Type:** 3-pin header
- CN Location:** See **Figure 3-17**
- CN Pinouts:** See **Table 3-13**

The fan connector attaches to a cooling fan.

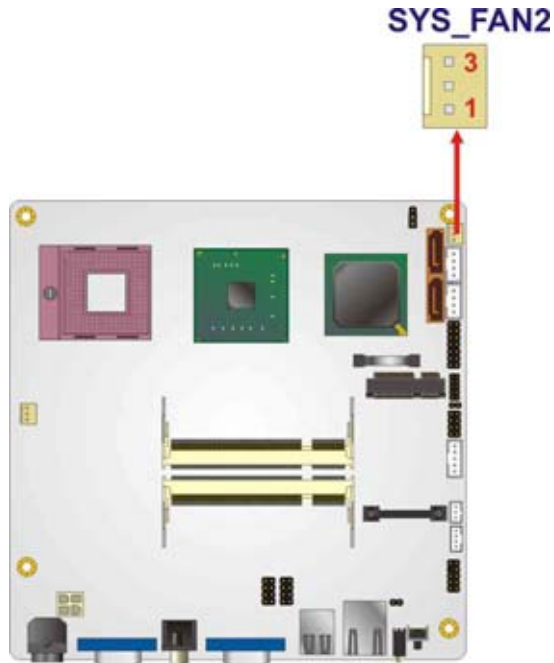


Figure 3-17: System Fan Connector Location

PIN NO.	DESCRIPTION
1	Fan Speed Detect
2	Power +
3	Power -

Table 3-13: System Fan Connector Pinouts

3.3 External Peripheral Interface Connector Panel

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

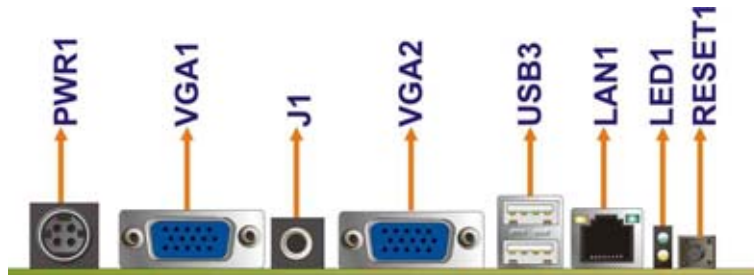


Figure 3-18: External Peripheral Interface Connector

3.3.1 Reset Button

- CN Label:** RESET1
- CN Type:** Button
- CN Location:** See **Figure 3-18**

The reset button will reset the system when pressed.

3.3.2 LAN Connectors

- CN Label:** LAN1
- CN Type:** RJ-45
- CN Location:** See **Figure 3-18**
- CN Pinouts:** See **Table 3-14**

The LAN connectors connect to a local network.

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

Table 3-14: LAN Pinouts

KINO-9653 Mini-ITX Motherboard

3.3.3 USB Connector

- CN Label:** USB3
CN Type: USB port
CN Location: See **Figure 3-18**
CN Pinouts: See **Table 3-15**

The USB connector can be connected to a USB device.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	5 V	2	GND
3	USBP4N	4	USBP5P
5	USBP4P	6	USBP5N
7	GND	8	5 V

Table 3-15: USB Port Pinouts

3.3.4 TV Connector

- CN Label:** J1
CN Type: RCA jack
CN Location: See **Figure 3-18**
CN Pinouts: See **Table 3-16**

The RCA jack connects to a TV.

PIN NO.	DESCRIPTION
1	GND
2	IOCMP

Table 3-16: TV1 Pinouts

3.3.5 VGA Connector

- CN Label:** VGA1 and VGA2

CN Type: 15-pin Female

CN Location: See **Figure 3-18**

CN Pinouts: See **Figure 3-19** and **Table 3-17**

Connects to a monitor that accepts a standard VGA input.

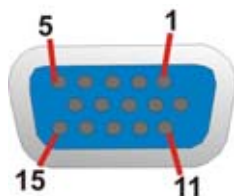


Figure 3-19: VGA Connector

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

Table 3-17: VGA Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions



WARNING:

Failure to take ESD precautions during the installation of the KINO-9653 may result in permanent damage to the KINO-9653 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the KINO-9653. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the KINO-9653, 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-9653, place it on an anti-static pad. This reduces the possibility of ESD damaging the KINO-9653.
- **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.

KINO-9653 Mini-ITX Motherboard



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-9653 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-9653 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-9653 off:
 - When working with the KINO-9653, 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-9653 **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.

4.3 CPU Installation

**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.

**WARNING:**

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

Step 1: Undo the top screws. The screws cannot be removed from the heatsink, loosen until completely loose.(Figure 4-1)

Step 2: Remove the side screws.(Figure 4-1)

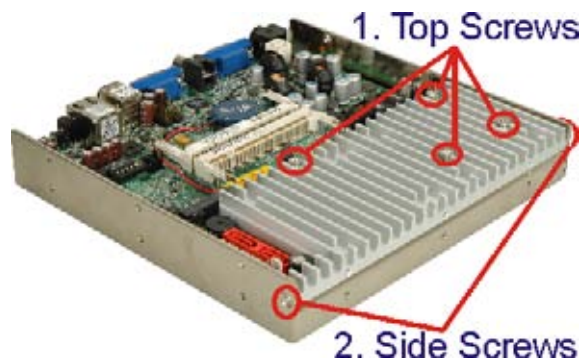


Figure 4-1: Heatsink Removal

Step 3: Unlock the CPU retention screw. Make sure the retention lock is unlocked. See Figure 4-2.

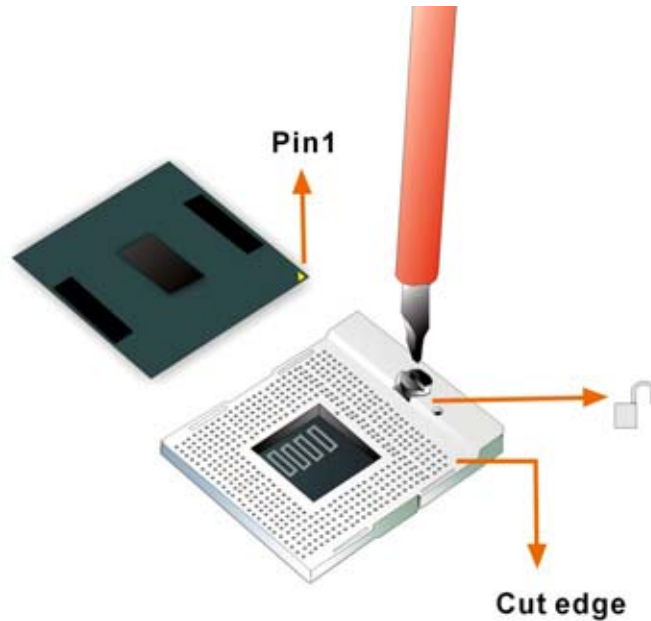


Figure 4-2: Unlocked Retention Screw

- Step 4: Inspect the CPU socket.** Make sure there are no bent pins on the CPU. Remove any debris from the CPU socket using compressed air.
- Step 5: Correctly Orientate the CPU.** Make sure the pins are facing down.
- Step 6: Correctly position the CPU.** Match the Pin 1 mark on the CPU with the marked corner on the CPU socket. See **Figure 4-2**.
- Step 7: Align the CPU pins.** Carefully align the CPU pins with the holes in the CPU socket.
- Step 8: Insert the CPU.** Gently insert the CPU into the socket. If lined up correctly, the CPU will gently drop into the correct position.
- Step 9: Lock the retention screw.** Rotate the retention screw into the locked position. See **Figure 4-3**.

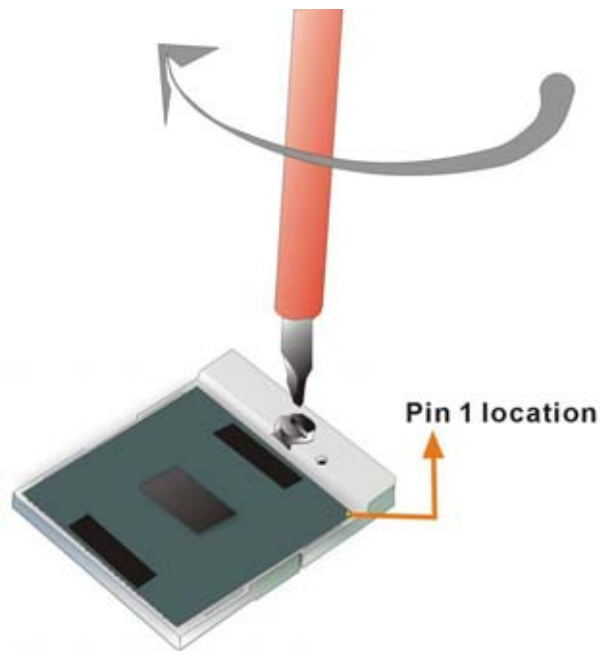


Figure 4-3: Lock CPU Socket Retention Screw

Step 10: Reinstall the heatsink.

Step 11: Install the side screws. Don't tighten completely.

Step 12: Tighten the top screws.

Step 13: Tighten the side screws.

4.4 SO-DIMM Installation

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

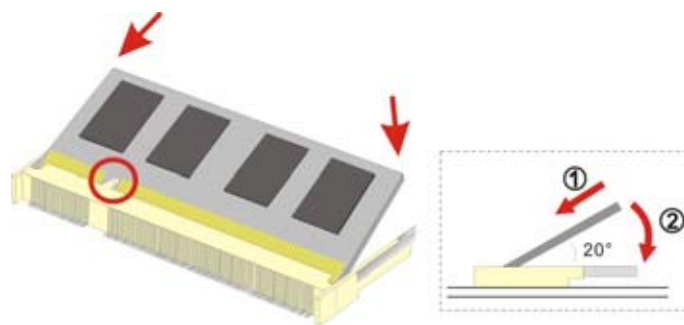


Figure 4-4: SO-DIMM Installation

KINO-9653 Mini-ITX Motherboard

- Step 1:** Locate the SO-DIMM socket. Place the board on an anti-static mat.
- Step 2:** Align the SO-DIMM with the socket. Align the notch on the memory with the notch on the memory socket.
- Step 3:** Insert the SO-DIMM. Push the memory in at a 20° angle. (See **Figure 4-4**)
- Step 4:** Seat the SO-DIMM. Gently push downwards and the arms clip into place. (See **Figure 4-4**)

4.5 CompactFlash® Installation



NOTE:

Both CompactFlash® Type I and Type II cards are supported.

To install the CompactFlash® card, please follow the steps below.

- Step 5:** Locate the CF card socket. Locate the CompactFlash® slot.
- Step 6:** Align the CF card. Align the CompactFlash® card. The label side should be facing away from the board. The grooves on the CompactFlash® slot ensure that the card cannot be inserted the wrong way.
- Step 7:** Insert the CF card. Push until the CompactFlash® card is firmly seated in the slot. See **Figure 4-5**.

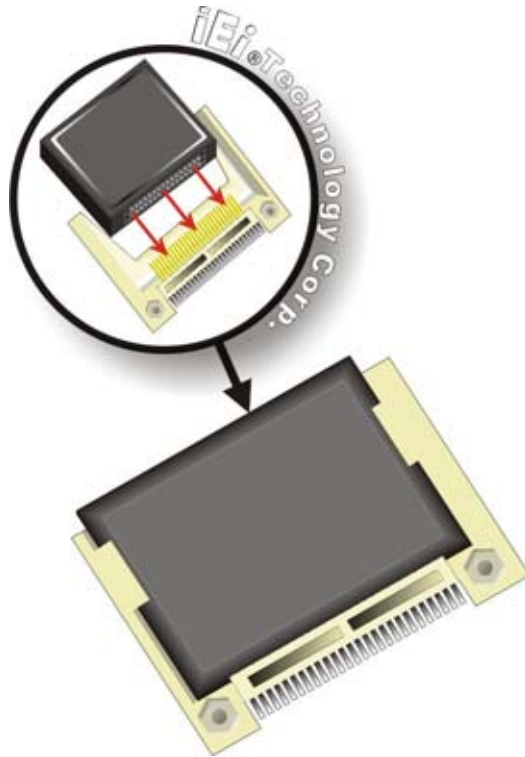


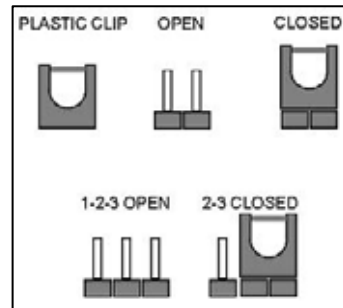
Figure 4-5: CompactFlash® Card Installation

4.6 Jumper Settings



NOTE:

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



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

KINO-9653 Mini-ITX Motherboard

Description	Label	Type
AT/ATX mode setting	JP1	2-pin header
CompactFlash® card setup	J2	2-pin header
Clear CMOS	J_CMOS1	3-pin header

Table 4-1: Jumpers

4.6.1 AT/ATX Power Mode

Jumper Label:	JP1
Jumper Type:	2-pin header
Jumper Settings:	See Table 4-2
Jumper Location:	See Figure 4-6

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

Setting	Description
Open	AT power
Closed	ATX power

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

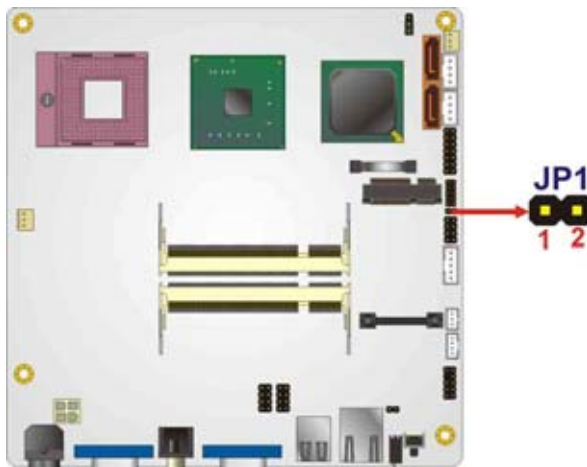


Figure 4-6: AT/ATX Power Mode Jumper Location

4.6.2 CompactFlash® Setup

Jumper Label:	J2
Jumper Type:	2-pin header
Jumper Settings:	See Table 4-3
Jumper Location:	See Figure 4-7

The CompactFlash® slot is connected through an IDE connection. This jumper sets the CompactFlash® card as the master or slave IDE device.

Setting	Description
Open	Slave
Closed	Master

Table 4-3: CompactFlash® Setup Jumper Settings

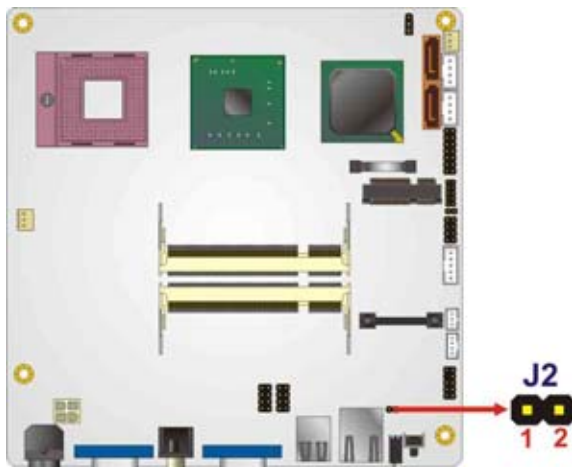


Figure 4-7: CompactFlash® Setup Jumper Location

4.6.3 Clear CMOS Jumper

Jumper Label:	J_CMOS1
Jumper Type:	3-pin header
Jumper Settings:	See Table 4-4
Jumper Location:	See Figure 4-8

KINO-9653 Mini-ITX Motherboard

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

Setting	Description
1-2	Normal
2-3	Clear BIOS

Table 4-4: Clear BIOS Jumper Settings

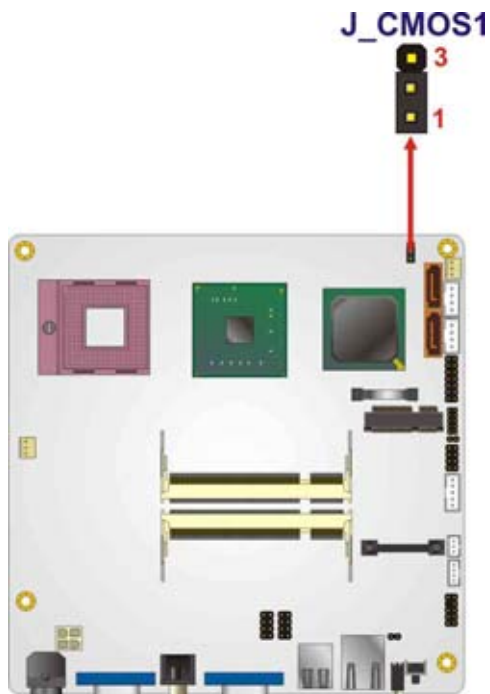


Figure 4-8: Clear BIOS Jumper Location

4.6.4 Audio Kit Installation

The Audio Kit that came with the KINO-9653 connects to the audio connector on the KINO-9653. The audio kit consists of three audio jacks. Mic-in connects to a microphone. Line-in provides a stereo line-level input to connect to the output of an audio device. Line-out, a stereo line-level output, connects to two amplified speakers. To install the audio kit, please refer to the steps below:

Step 8: Locate the audio connector. The location of the 10-pin audio connector is shown in **Chapter 3**.

Step 9: **Align pin 1.** Align pin 1 on the on-board connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 4-9.**

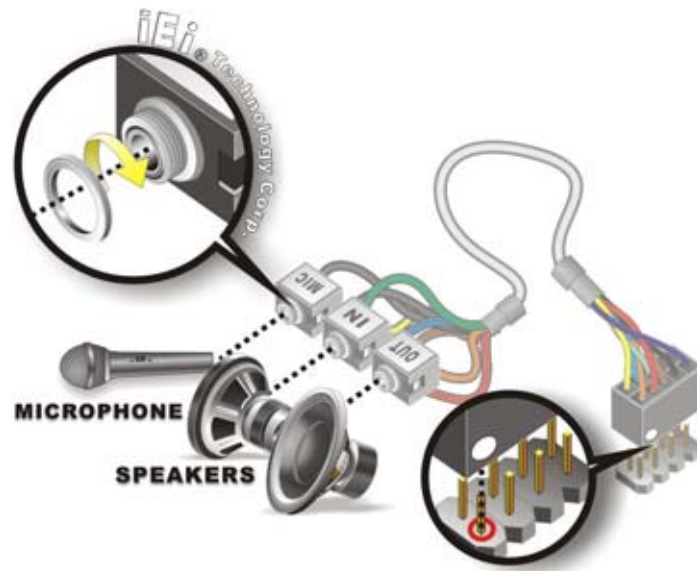


Figure 4-9: Audio Kit Cable Connection

Step 10: **Connect the audio devices.** Connect speakers to the line-out audio jack. Connect the output of an audio device to the line-in audio jack. Connect a microphone to the mic-in audio jack.

4.6.5 Keyboard/Mouse Connector

The KINO-9653 is shipped with a keyboard/mouse Y-cable connector. The keyboard/mouse Y-cable connector connects to a keyboard/mouse connector on the KINO-9653 and branches into two cables that are each connected to a PS/2 connector, one for a mouse and one for a keyboard. To connect the keyboard/mouse Y-cable connector please follow the steps below.

Step 1: **Locate the connector.** The location of the keyboard/mouse Y-cable connector is shown in **Chapter 3.**

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Step 2: Align the connectors. Correctly align pin 1 on the cable connector with pin 1 on the KINO-9653 keyboard/mouse connector. See **Figure 4-10**.

Step 3: Insert the cable connectors Once the cable connector is properly aligned with the keyboard/mouse connector on the KINO-9653, connect the cable connector to the on-board connectors. See **Figure 4-10**.

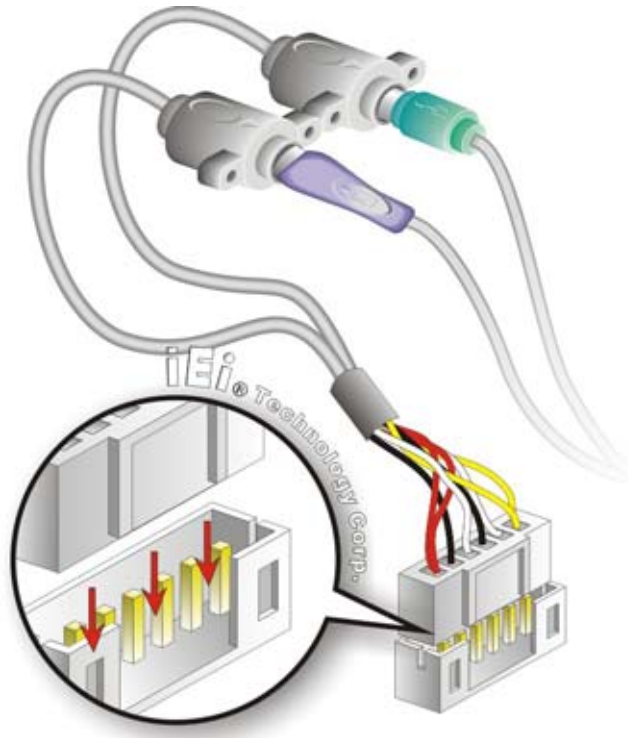


Figure 4-10: Keyboard/mouse Y-cable Connection

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

Step 5: Connect the keyboard and mouse. Once the PS/2 connectors are connected to the chassis, a keyboard and mouse can each be connected to one of the PS/2 connectors. The keyboard PS/2 connector and mouse PS/2 connector are

both marked. Please make sure the keyboard and mouse are connected to the correct PS/2 connector.

4.6.6 PCIe Mini Card Installation

To install the PCIe Mini card, please refer to the diagram and instructions below.

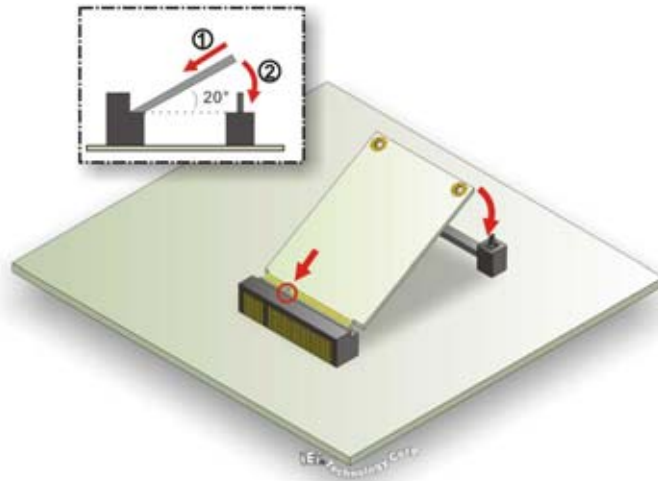


Figure 4-11: PCIe Mini Card Installation

- Step 1:** **Insert into the socket at an angle.** Line up the notch on the card with the notch on the connector. Slide the PCIe Mini card into the socket at an angle of about 20°.
- Step 2:** **Push down until the card clips into place.** Push the other end of the card down until it clips into place on the plastic connector.

4.6.7 SATA Drive Connection

The KINO-9653 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**.

KINO-9653 Mini-ITX Motherboard

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

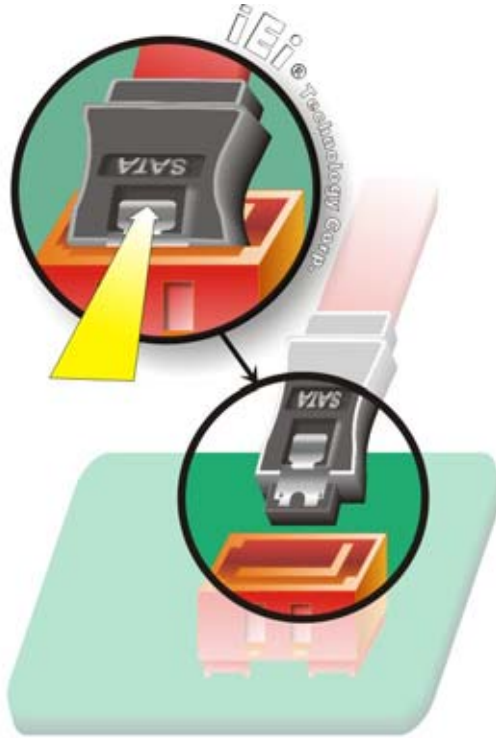


Figure 4-12: SATA Drive Cable Connection

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

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



Figure 4-13: SATA Power Drive Connection

4.6.8 USB Cable (Dual Port without Bracket)

The KINO-9653 is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

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



WARNING:

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

Step 6: **Align the connectors.** The cable has two connectors. Correctly align pin 1 on each cable connector with pin 1 on the KINO-9653 USB connector.

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Step 7: Insert the cable connectors. Once the cable connectors are properly aligned with the USB connectors on the KINO-9653, connect the cable connectors to the on-board connectors. See **Figure 4-14**.

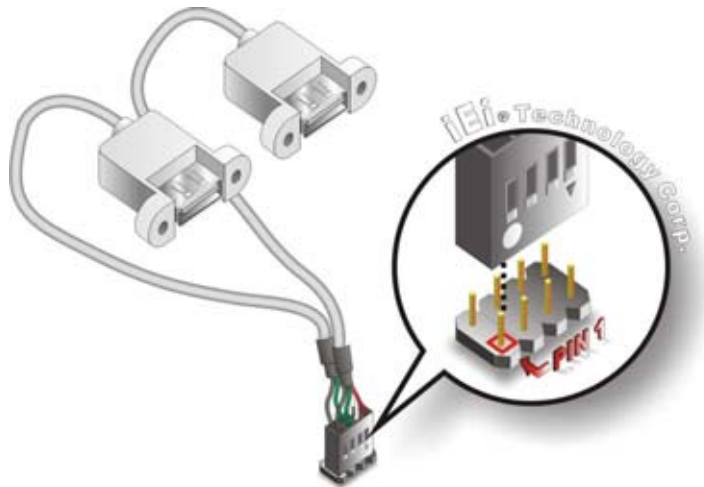


Figure 4-14: Dual USB Cable Connection

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

4.7 External Peripheral Interface Connection

This section describes connecting devices to the external connectors on the KINO-9653.

4.7.1 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-9653. See **Figure 4-15**.

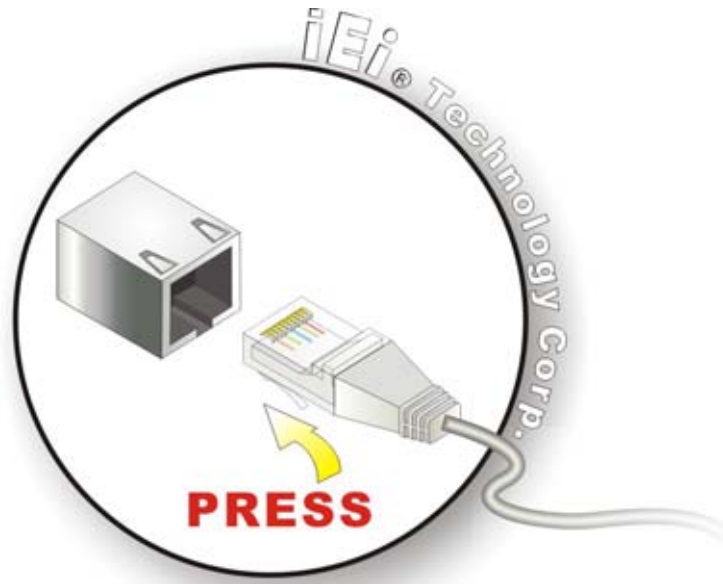


Figure 4-15: LAN Connection

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.

4.7.2 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-9653.

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 4-16**.

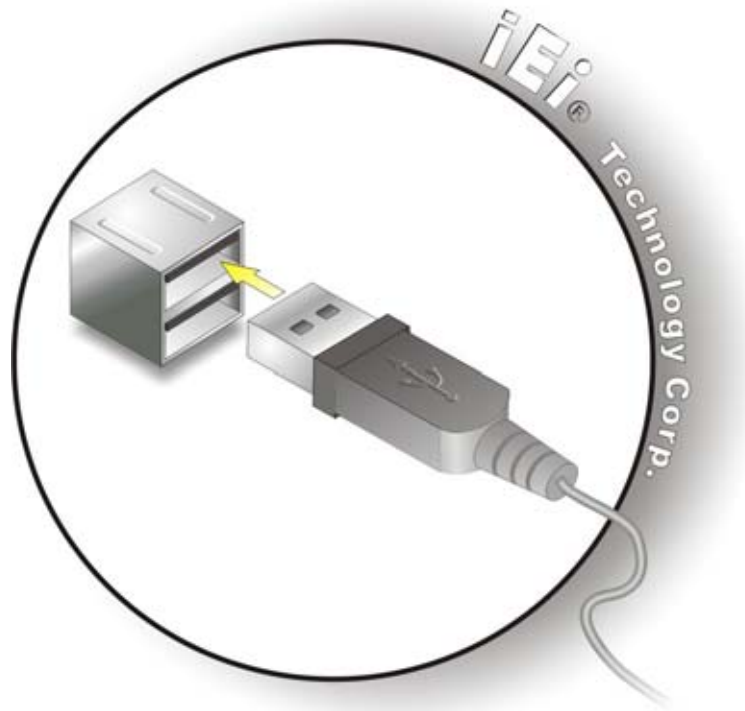


Figure 4-16: USB Connector

4.7.3 VGA Monitor Connection

The KINO-9653 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-9653, please follow the instructions below.

- Step 3:** **Locate the female DB-15 connector.** The location of the female DB-15 connector is shown in **Chapter 3**.
- Step 4:** **Align the VGA connector.** Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.
- Step 5:** **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the KINO-9653. See **Figure 4-17**.

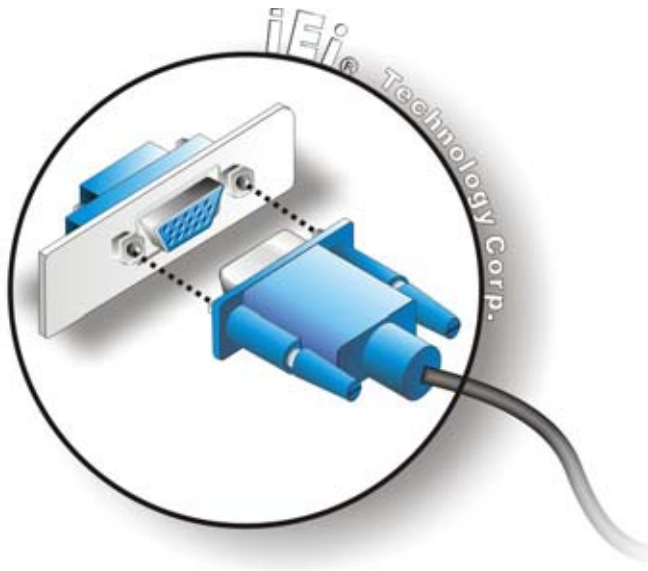


Figure 4-17: VGA Connector

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

Chapter

5

BIOS

5.1 Introduction

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

5.1.1 Starting Setup

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

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

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

5.1.2 Using Setup

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

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

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

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

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

5.1.4 Unable to Reboot After Configuration Changes

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

5.1.5 BIOS Menu Bar

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

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

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

5.2 Main

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

```

BIOS SETUP UTILITY
Main  Advanced  PCIPNP  Boot  Security  Chipset  Power  Exit
-----
System Overview
-----
AMIBIOS
Version      :08.00.14
Build Date   :10/16/08
ID:          :E245MR02

Processor
Intel® Core™2 Duo CPU      T8100 @ 2.10 GHz
Speed        :2100MHz
Count        :1

System Memory
Size         :1016MB

System Time           [13:49:47]
System Time           [Wed 03/04/2008]

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

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```

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

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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.

▪ 5.3.1 CPU Configuration	58
▪ 5.3.2 IDE Configuration.....	62
▪ 5.3.3 Super IO Configuration	70
▪ 5.3.4 Hardware Health Configuration.....	72
▪ 5.3.5 Power Configuration	75
▪ 5.3.6 Remote Access Configuration.....	78
▪ 5.3.7 USB Configuration	79

```

BIOS SETUP UTILITY
Main  Advanced  PCIPNP  Boot  Security  Chipset  Power  Exit
-----
Advanced Settings
-----
WARNING: Setting wrong values in below sections may cause
system to malfunction

> CPU Configuration
> IDE Configuration
> SuperIO Configuration
> Hardware Health Configuration
> Remote Access Configuration
> USB Configuration
> Power Configuration

Configure CPU

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

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```

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 SETUP UTILITY
Main  Advanced  PCIPNP  Boot  Security  Chipset  Power  Exit
-----
Configure Advanced CPU Settings
Module Version:3F.07
-----
Manufacturer :Intel@
Intel® Core™2 Duo CPU      T8100 @ 2.10 GHz
Frequency      :2.10GHz
FSB Speed      :800MHz
Cache L1       : 64KB
Cache L2       : 3072KB
Ratio Actual Value:10.5

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

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```

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

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

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

- Max CUPID Value Limit
- Hyper Threading Function
- CPU TM Function
- Intel® SpeedStep™ tech.
- Clock Spread Spectrum
- Execute Disable Bit
- CPU TM function

- **Max CUPID Value Limit**



NOTE:

If the OS is NT, this value must be set to enabled.

Use the **Max CUPID Value Limit** BIOS option to disable or enable legacy Oses that can support a CPU with extended CUPID functions.

- ➔ **Disabled** **DEFAULT** Disables legacy Oses that cannot support CPUs with extended CUPID functions from booting up
- ➔ **Enabled** Enables legacy Oses that cannot support CPUs with extended CUPID functions to boot up

- **Hardware Prefetcher [Enabled]**

Use the **Hardware Prefetcher** BIOS option to enable the CPU prefetching data feature.

- ➔ **Disabled** Does not allow the Hardware Prefetcher Disable feature to be enabled or disabled.
- ➔ **Enabled** **DEFAULT** Allows the Hardware Prefetcher Disable feature to be either enabled or disabled

- **Adjacent Cache Line Prefetch [Enabled]**

Use the **Adjacent Cache Line Prefetch** BIOS option to enable the CPU prefetching data feature.

- ➔ **Disabled** Does not allow the Adjacent Cache Line Prefetch Disable feature to be enabled or disabled
- ➔ **Enabled** **DEFAULT** Allows the Adjacent Cache Line Prefetch Disable feature to be either enabled or disabled

- **Hyper Threading Function [Disabled]**

Use the Hyper Threading function to enable or disable the CPU hyper threading function.

- ➔ **Disabled** **DEFAULT** Disables the use of hyper threading technology
- ➔ **Enabled** Enables the use of hyper threading technology

- **Clock Spread Spectrum [Disabled]**

Use the **Clock Spread Spectrum** BIOS option to improve CPU EMI issues.

- ➔ **Disabled** **DEFAULT** The clock spread spectrum is disabled
- ➔ **Enabled** The clock spread spectrum is enabled

- **Execute Bit Disable [Enabled]**

Use the **Execute Bit Disable** BIOS function to protect the system from buffer overflow attacks.

- ➔ **Disabled** Code can be executed in any memory area.

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→ **Enabled** **DEFAULT** Code execution in data-only memory pages is prohibited.

- **CPU TM Function [Enabled]**

Use the **CPU TM Function** option to enable or disable the CPU TM function.

→ **Disabled** CPU TM Function disabled

→ **Enabled** **DEFAULT** CPU TM Function enabled

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

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

→ **Disabled** Disables SpeedStep i.e. GV3

→ **Enabled** **DEFAULT** Enables SpeedStep i.e. GV3

- **Intel (R) SpeedStep (tm) tech. [Automatic]**

Use the **Intel (R) SpeedStep (tm) tech.** option to set the CPU speed.

→ **Maximum Speed** CPU speed is set to maximum

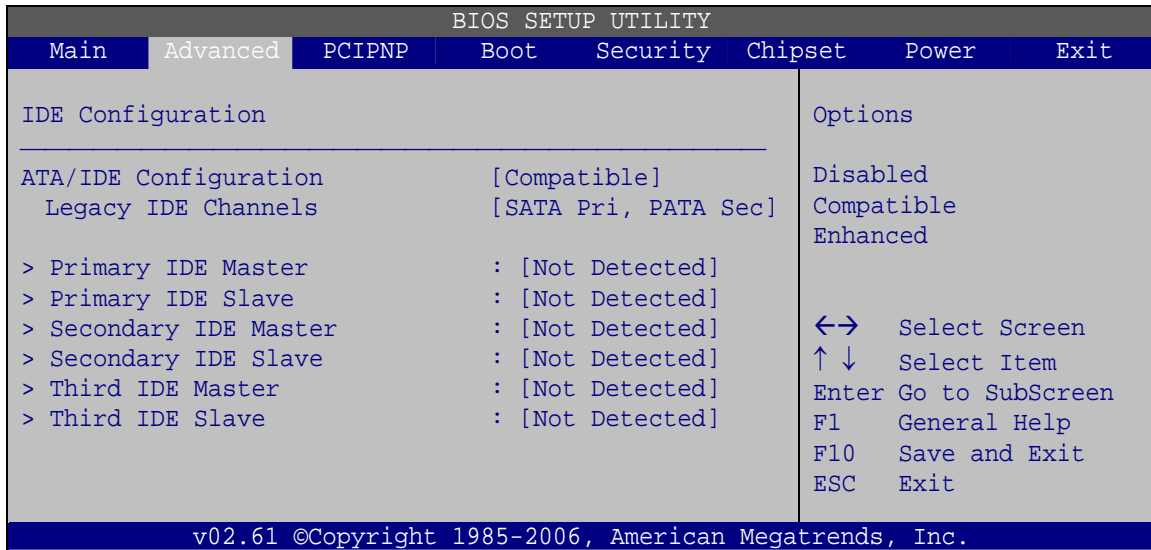
→ **Minimum Speed** CPU speed is set to minimum

→ **Automatic** **DEFAULT** CPU speed is set to automatic

→ **Disabled** CPU speed is disabled

5.3.2 IDE Configuration

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



BIOS Menu 4: IDE Configuration

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

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

- ➔ **Disabled** Disables the on-board ATA/IDE controller.
- ➔ **Compatible** Configures the on-board ATA/IDE controller to be in compatible mode. In this mode, a SATA channel will replace one of the IDE channels. This mode supports up to 4 storage devices.
- ➔ **Enhanced** **DEFAULT** Configures the on-board ATA/IDE controller to be in Enhanced mode. In this mode, IDE channels and SATA channels are separated. This mode supports up to 6 storage devices. Some legacy OS do not support this mode.

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- **Configure SATA as [IDE]**

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

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

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

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

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

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

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

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

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

➔ **PATA Pri., PATA Sec** The IDE drives are enabled on the primary and secondary IDE channels. SATA drives are disabled.

- **OnBoard PCI IDE Controller [Both]**

Use the **OnBoard PCI IDE Controller** BIOS option to specify the IDE channels used by the onboard PCI IDE controller. The following configuration options are available.

➔ **Disabled** Prevents the system from using the onboard IDE controller

➔ **Primary** Only allows the system to detect the Primary IDE channel, including both the Primary Master and the Primary Slave

- ➔ **Secondary** Only allows the system to detect the Secondary IDE channel, including both the Secondary Master and Secondary Slave
- ➔ **Both** **DEFAULT** Allows the system to detect both the Primary and Secondary IDE channels including the Primary Master, Primary Slave, Secondary Master and Secondary Slave.

- **Onboard PCI IDE Mode [Legacy Mode]**

Use the **Onboard PCI IDE Mode** BIOS option to set the running mode for the PCI IDE.

- ➔ **Legacy Mode** **DEFAULT** The PCI IDE mode is the same as the IDE mode
- ➔ **Native Mode** The PCI IDE mode is the native mode

- **Onboard PCI S-ATA Controller**

Use the **Onboard PCI S-ATA Controller** option to set the onboard SATA controller. If the RAID function is going to be used this option must be set in the **RAID** mode.

- ➔ **Disabled** **DEFAULT** The onboard PCI SATA controller is disabled
- ➔ **Native Mode** The SATA controller is set as an IDE device with an ID at 0181h
- ➔ **Raid Mode** The SATA controller is set as a RAID device with an ID at 0181h

- **IDE Master and IDE Slave**

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

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

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- Secondary IDE Slave

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

- **Hard Disk Write Protect [Disabled]**

Use the **Hard Disk Write Protect** BIOS option to protect the hard disks from being overwritten. This menu item is only effective if the device is accessed through the BIOS.

- ➔ **Disabled** **DEFAULT** Allows hard disks to be overwritten
- ➔ **Enabled** Prevents hard disks from being overwritten

- **IDE Detect Time Out (Sec) [35]**

Use the **IDE Detect Time Out (Sec)** BIOS to specify the maximum time (in seconds) the AMI BIOS can search for IDE devices. This allows fine-tuning of the settings to allow for faster boot times. The following configuration options are available.

- 0 seconds
- 5 seconds **DEFAULT**
- 10 seconds
- 15 seconds
- 20 seconds
- 25 seconds
- 30 seconds
- 35 seconds

The best setting to use if the onboard IDE controllers are set to a specific IDE disk drive in the AMIBIOS is “0 seconds” and a large majority of ultra ATA hard disk drives can be detected well within “5 seconds”.

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- **Auto-Detected Drive Parameters**

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

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

- **Type [Auto]**

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

- ➔ **Not Installed** BIOS is prevented from searching for an IDE disk drive on the specified channel.
- ➔ **Auto** **DEFAULT** The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.

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- **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, maximum transfer rate of 3.3 MB/s
 - ➔ **1** PIO mode 1, maximum transfer rate of 5.2 MB/s
 - ➔ **2** PIO mode 2, maximum transfer rate of 8.3 MB/s
 - ➔ **3** PIO mode 3, maximum transfer rate of 11.1 MB/s
 - ➔ **4** PIO mode 4, maximum transfer rate of 16.6 MB/s
- (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

- **DMA Mode [Auto]**

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

- ➔ **Auto** **DEFAULT** BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.
- ➔ **SWDMA0** Single Word DMA mode 0, max transfer of 2.1 MB/s
- ➔ **SWDMA1** Single Word DMA mode 1, max transfer of 4.2 MB/s
- ➔ **SWDMA2** Single Word DMA mode 2, max transfer of 8.3 MB/s
- ➔ **MWDMA0** Multi Word DMA mode 0, max transfer of 4.2 MB/s
- ➔ **MWDMA1** Multi Word DMA mode 1, max transfer of 13.3 MB/s
- ➔ **MWDMA2** Multi Word DMA mode 2, max transfer of 16.6 MB/s
- ➔ **UDMA0** Ultra DMA mode 0, max transfer of 16.6 MB/s
- ➔ **UDMA1** Ultra DMA mode 1, max transfer of 25 MB/s

- ➔ **UDMA2** Ultra DMA mode 2, max transfer of 33.3 MB/s
- ➔ **UDMA3** Ultra DMA mode 3, max transfer of 44 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)
- ➔ **UDMA4** Ultra DMA mode 4, max transfer of 66.6 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)
- ➔ **UDMA5** Ultra DMA mode 5, max transfer of 99.9 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)

- **S.M.A.R.T [Auto]**

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

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

- **32Bit Data Transfer [Enabled]**

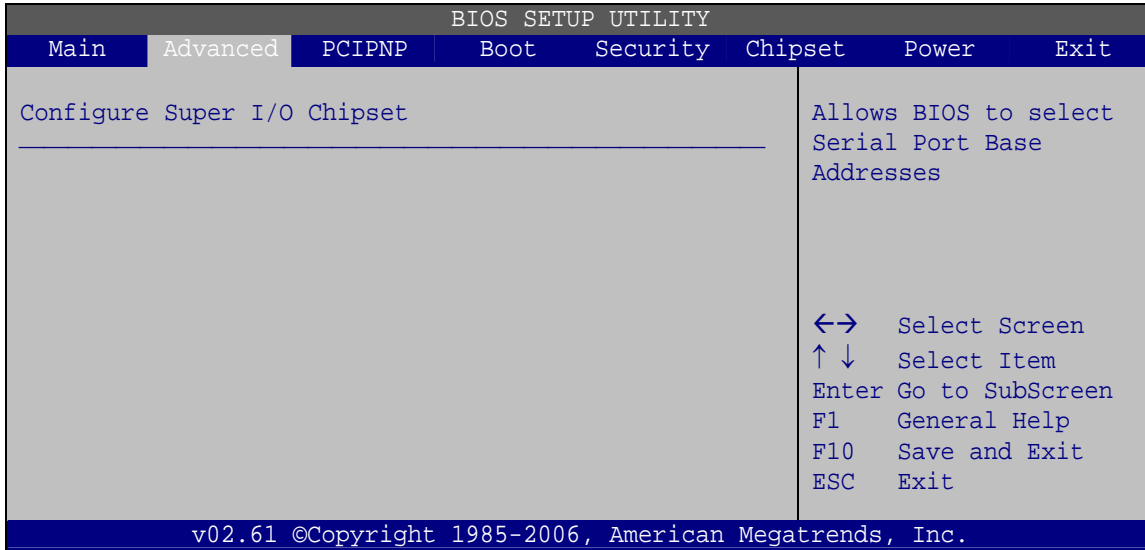
Use the **32Bit Data Transfer** BIOS option to enables or disable 32-bit data transfers.

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

5.3.3 Super IO Configuration

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

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BIOS Menu 6: Super IO Configuration

5.3.4 Hardware Health Configuration

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

BIOS SETUP UTILITY		
Main	Advanced	Exit
Hardware Health Event Monitoring		
CPU_FAN1 Mode Setting	[Full On Mode]	
CPU Temp. Limit of OFF	[000]	
CPU Temp. Limit of Start	[020]	
CPU_FAN1 Start PWM	[070]	
Slope PWM 1	[0.5 PWM]	
SYS_FAN2 Mode Setting	[Full On Mode]	
PWM Temp. Limit of OFF	[000]	
PWM Temp. Limit of Start	[020]	
CPU_FAN1 Start PWM	[070]	
Slope PWM 2	[0.5 PWM]	
CPU Temperature	:32°C/89°F	
PWM Temperature	:33°C/91°F	
System Temperature	:40°C/104°F	
CPU_FAN1 Speed	:4821 RPM	
SYS_FAN1 Speed	:N/A	
SYS_FAN2 Speed	:N/A	
CPU Core	:0.976 V	
+1.80V	:1.792 V	
+3.30V	:3.296 V	
+5.00V	:5.053 V	
+12.0V	:12.160 V	
+1.05V	:1.008 V	
+1.50V	:1.408 V	
5VSB	:1.232 V	
		←→ Select Screen
		↑↓ Select Item
		Enter Go to SubScreen
		F1 General Help
		F10 Save and Exit
		ESC Exit
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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

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➔ **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:

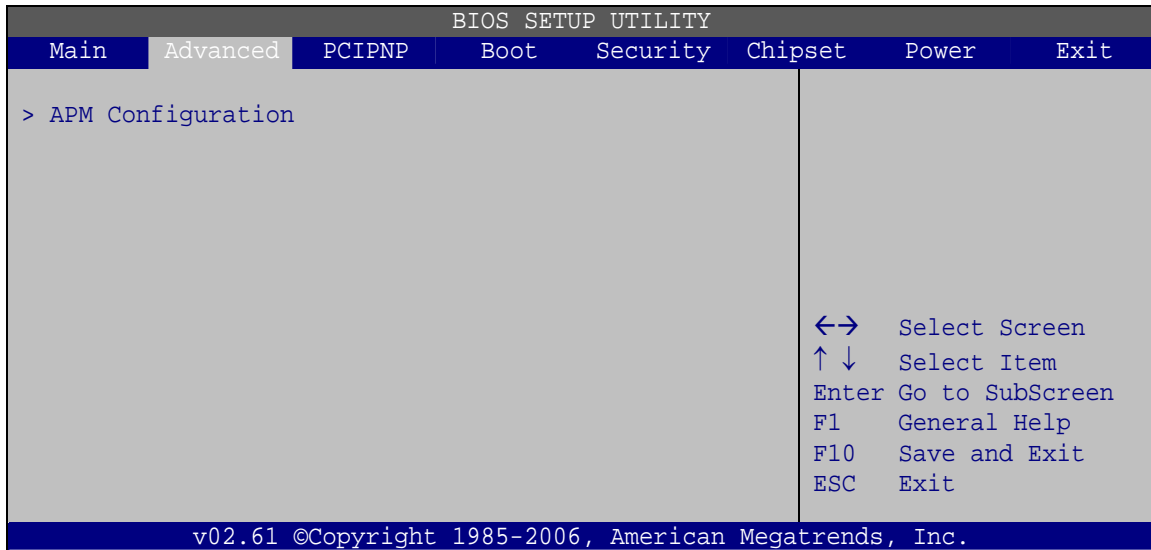
- System Temperatures:
 - CPU temperature
 - PWM temperature
 - System temperature
- Fan Speeds:
 - CPU fan speed
 - System fan speed 1
 - System fan speed 2
- Voltages:
 - CPU Core

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- +1.8V
- +3.30V
- +5.00V
- +12.0V
- +1.05V
- +1.50V
- 5VSB

5.3.5 Power Configuration

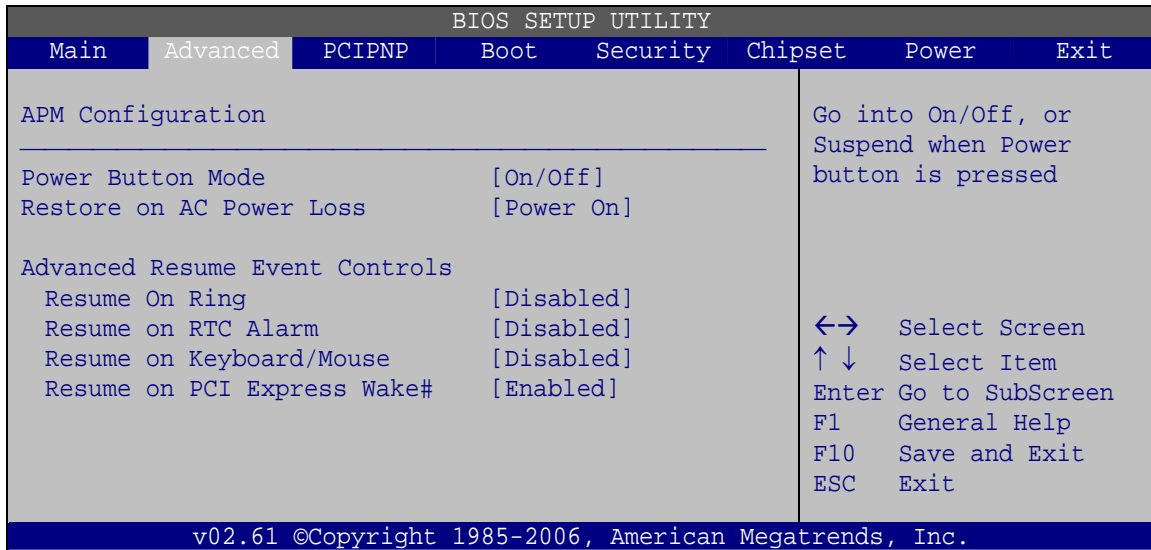
This **Power Configuration** menu (**BIOS Menu 8**) sets power related settings.



BIOS Menu 8: Power Configuration

5.3.5.1 APM Configuration

The **APM Configuration** menu (**BIOS Menu 9**) allows the advanced power management options to be configured.



BIOS Menu 9: APM Configuration

- **Power Button Mode [On/Off]**

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

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

- **Restore on AC Power Loss [Power On]**

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

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➔ **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 Ring [Disabled]**

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

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

➔ **Enabled** Wake event generated by an incoming call

▪ **Resume On RTC Alarm [Disabled]**

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

➔ **Disabled** **DEFAULT** The real time clock (RTC) cannot generate a wake event

➔ **Enabled** If selected, the following appears with values that can be selected:

 RTC Alarm Date (Days)

 System Time

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

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

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

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

➔ **Enabled** Wake event generated by activity on the keyboard or mouse

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

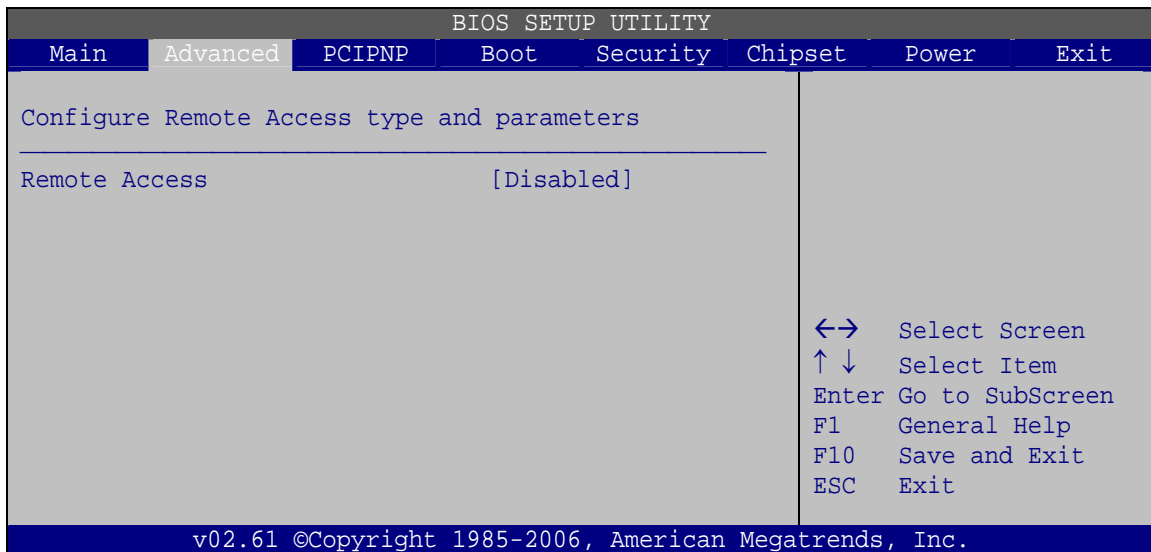
The **Resume on PCI-Express WAKE#** BIOS option specifies if the system is roused from a suspended or standby state when there is activity on the PCI-Express bus.

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

➔ **Enabled** **DEFAULT** Wake event generated by PCI-Express activity

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.

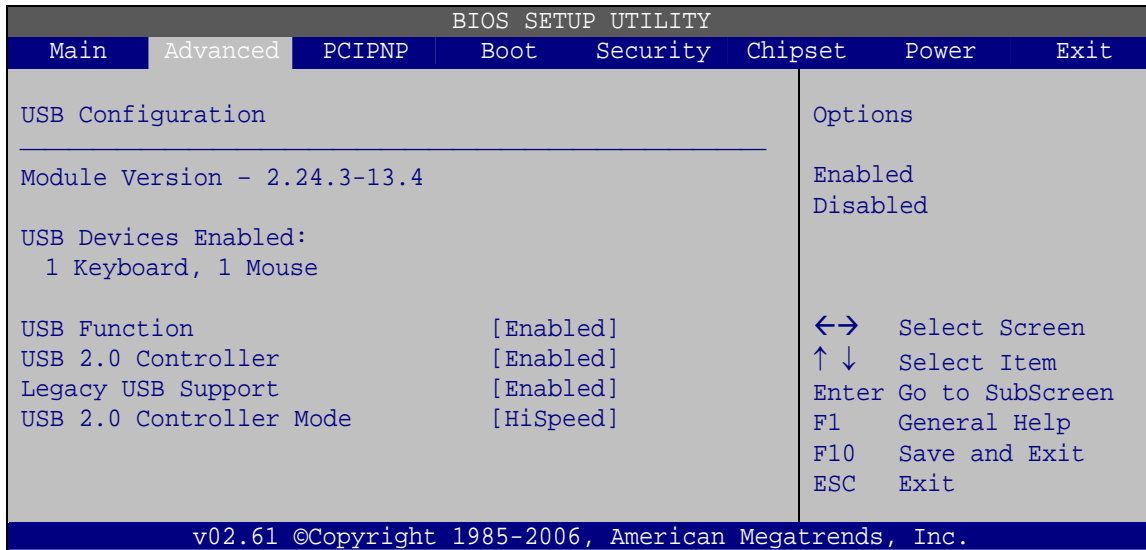


BIOS Menu 10: Remote Access Configuration

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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

- **USB Devices Enabled**

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

- **USB Function [Enabled]**

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

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

- **USB 2.0 Controller [Enabled]**

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

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

- **Legacy USB Support [Enabled]**

This option allows a USB mouse, keyboard or flash disk to be used before the operating system is booted up.

- ➔ **Disabled** Legacy USB support disabled
- ➔ **Enabled** **DEFAULT** Legacy USB support enabled
- ➔ **Auto** Only enabled if a device is attached

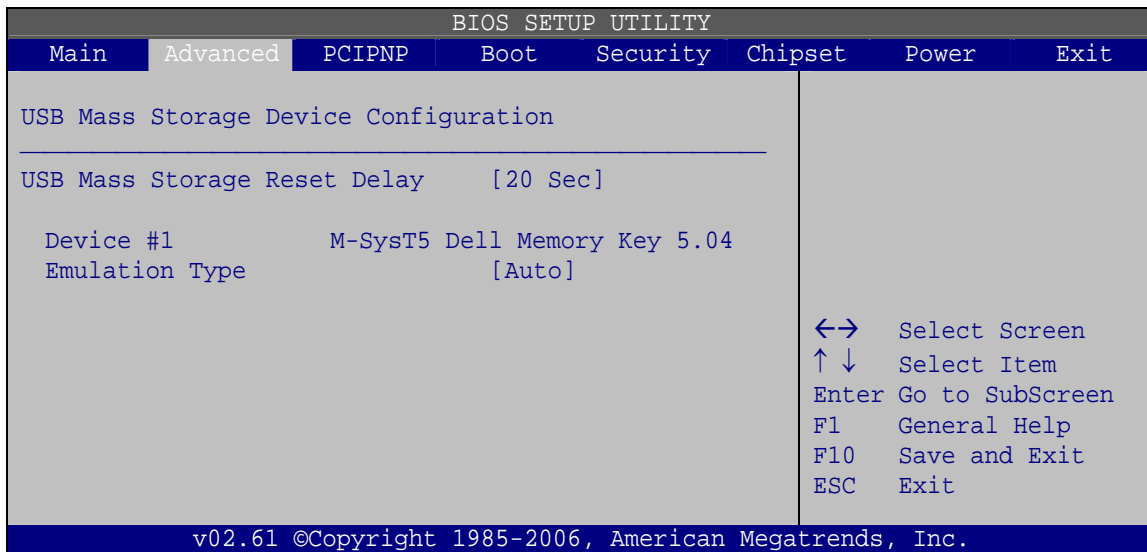
- **USB2.0 Controller Mode [HiSpeed]**

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

5.3.7.1 USB Mass Storage Device Configuration

Use the **USB Mass Storage Device Configuration** menu (**BIOS Menu 12**) to configure USB mass storage class devices.



BIOS Menu 12: USB Mass Storage Device Configuration

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- **USB Mass Storage Reset Delay [20 Sec]**

Use the **USB Mass Storage Reset Delay** option to set the number of seconds POST waits for the USB mass storage device after the start unit command.

- ➔ **10 Sec** POST waits 10 seconds for the USB mass storage device after the start unit command.
- ➔ **20 Sec** **DEFAULT** POST waits 20 seconds for the USB mass storage device after the start unit command.
- ➔ **30 Sec** POST waits 30 seconds for the USB mass storage device after the start unit command.
- ➔ **40 Sec** POST waits 40 seconds for the USB mass storage device after the start unit command.

- **Device ##**

The **Device##** field lists the USB devices that are connected to the system.

- **Emulation Type [Auto]**

Use the **Emulation Type** BIOS option to specify the type of emulation BIOS has to provide for the USB device.

- ➔ **Auto** **DEFAULT** BIOS auto-detects the current USB.
- ➔ **Floppy** The USB device will be emulated as a floppy drive. The device can be either A: or B: responding to INT13h calls that return DL = 0 or DL = 1 respectively.
- ➔ **Forced FDD** Allows a hard disk image to be connected as a floppy image. This option works only for drives formatted with FAT12, FAT16 or FAT32.
- ➔ **Hard Disk** Allows the USB device to be emulated as hard disk responding to INT13h calls that return DL values of 80h or above.

→ CDROM

Assumes the CD-ROM is formatted as bootable media. All the devices that support block sizes greater than 512 bytes can only be booted using this option.

5.4 PCI/PnP

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


WARNING!

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

BIOS SETUP UTILITY							
Main	Advanced	PCIPNP	Boot	Security	Chipset	Power	Exit
Advanced PCI/PnP Settings		Available: Specified IRQ is available to be used by PCI/PnP devices					
WARNING: Setting wrong values in below sections may cause system to malfunction		Reserved: Specified IRQ is reserved for use by legacy ISA devices					
IRQ3			[Reserved]				
IRQ4			[Reserved]				
IRQ5			[Available]				
IRQ7			[Available]				
IRQ9			[Available]				
IRQ10			[Available]				
IRQ11			[Available]				
IRQ14			[Available]				
IRQ15			[Available]				
DMA Channel 0			[Available]				
DMA Channel 1			[Available]				
DMA Channel 3			[Available]				
DMA Channel 5			[Available]				
DMA Channel 6			[Available]				
DMA Channel 7			[Available]				
Reserved Memory Size			[Disabled]				
		←→ 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 13: PCI/PnP Configuration

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- **IRQ# [Available]**

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

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

Available IRQ addresses are:

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

- **DMA Channel# [Available]**

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

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

Available DMA Channels are:

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

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

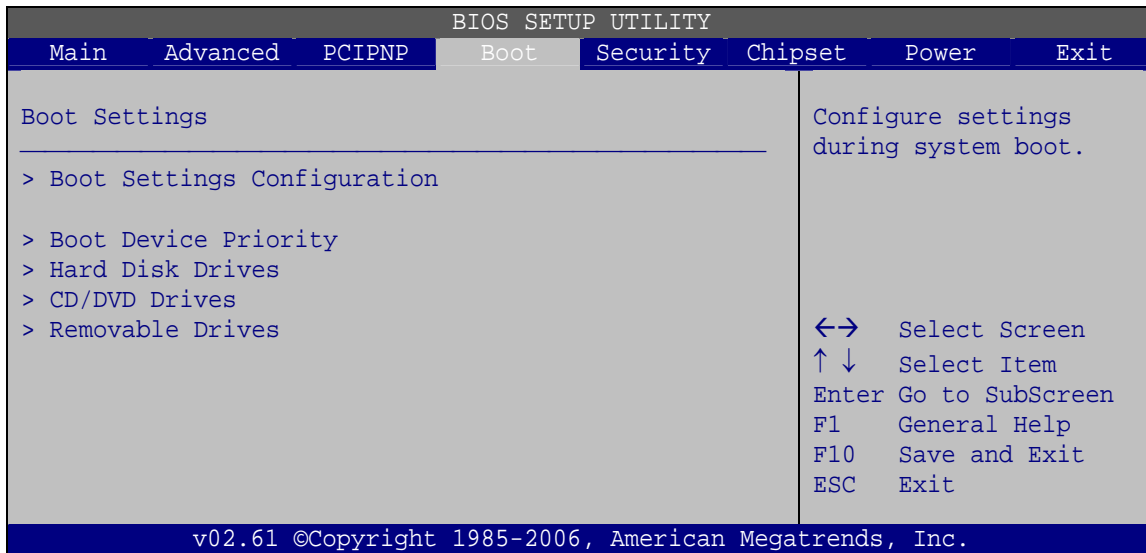
- **Reserved Memory Size [Disabled]**

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

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

5.5 Boot

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

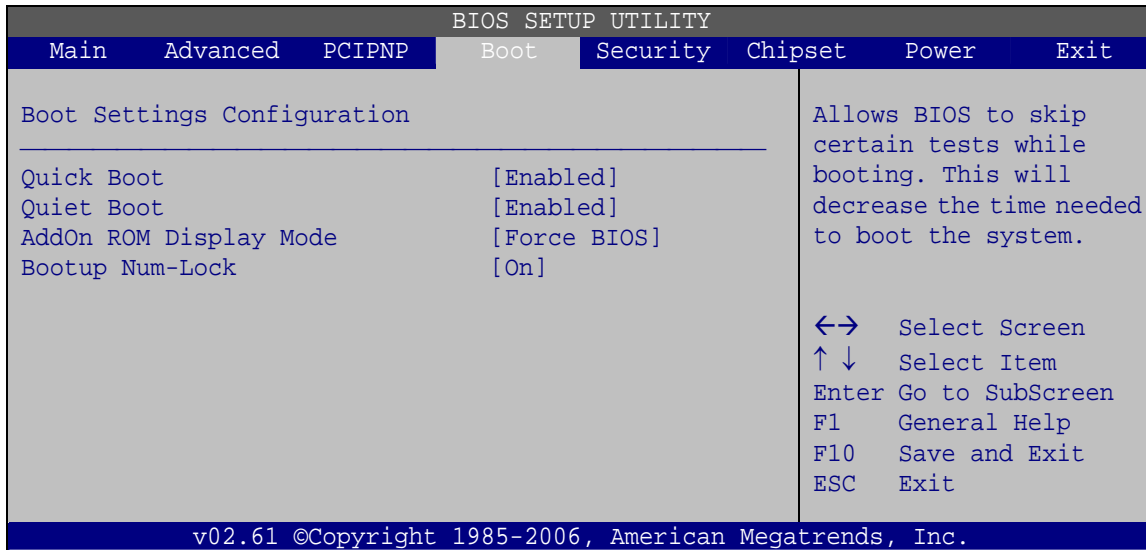


BIOS Menu 14: Boot

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5.5.1 Boot Settings Configuration

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



BIOS Menu 15: Boot Settings Configuration

- **Quick Boot [Enabled]**

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

- ➔ **Disabled** No POST procedures are skipped
- ➔ **Enabled** **DEFAULT** Some POST procedures are skipped to decrease the system boot time

- **Quiet Boot [Disabled]**

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

- ➔ **Disabled** **DEFAULT** Normal POST messages displayed
- ➔ **Enabled** OEM Logo displayed instead of POST messages

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

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

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

- **Bootup Num-Lock [On]**

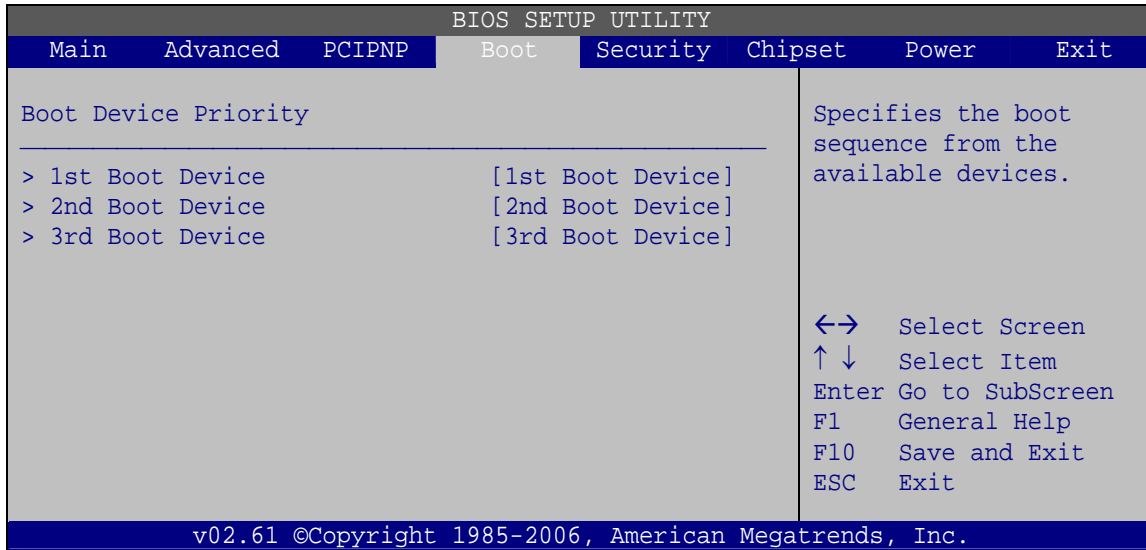
Use the **Bootup Num-Lock** BIOS option to specify if the number lock setting must be modified during boot up.

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

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5.5.2 Boot Device Priority

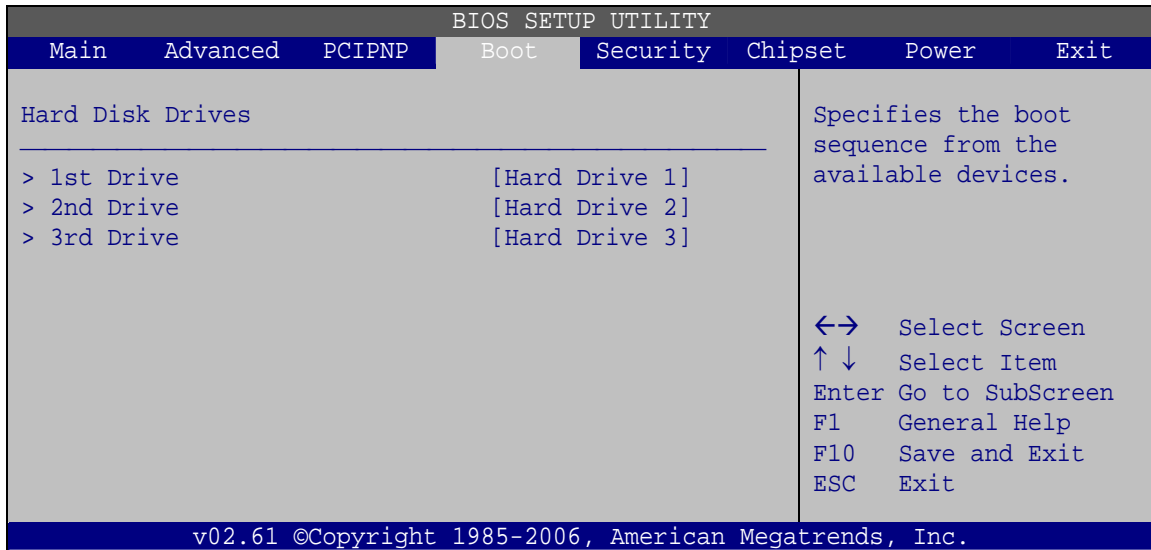
Use the **Boot Device Priority** menu (**BIOS Menu 16**) to specify the boot sequence from the available devices. The drive sequence also depends on the boot sequence in the individual device section.



BIOS Menu 16: Boot Device Priority Settings

5.5.3 Hard Disk Drives

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

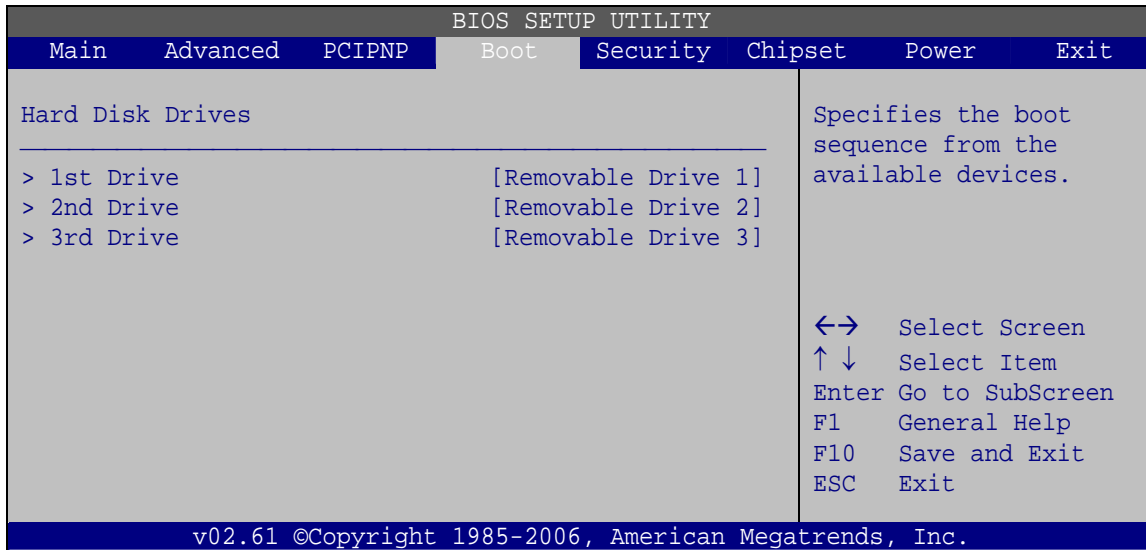


BIOS Menu 17: Hard Disk Drives

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5.5.4 Removable Drives

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



BIOS Menu 18: Removable Drives

5.5.5 CD/DVD Drives

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

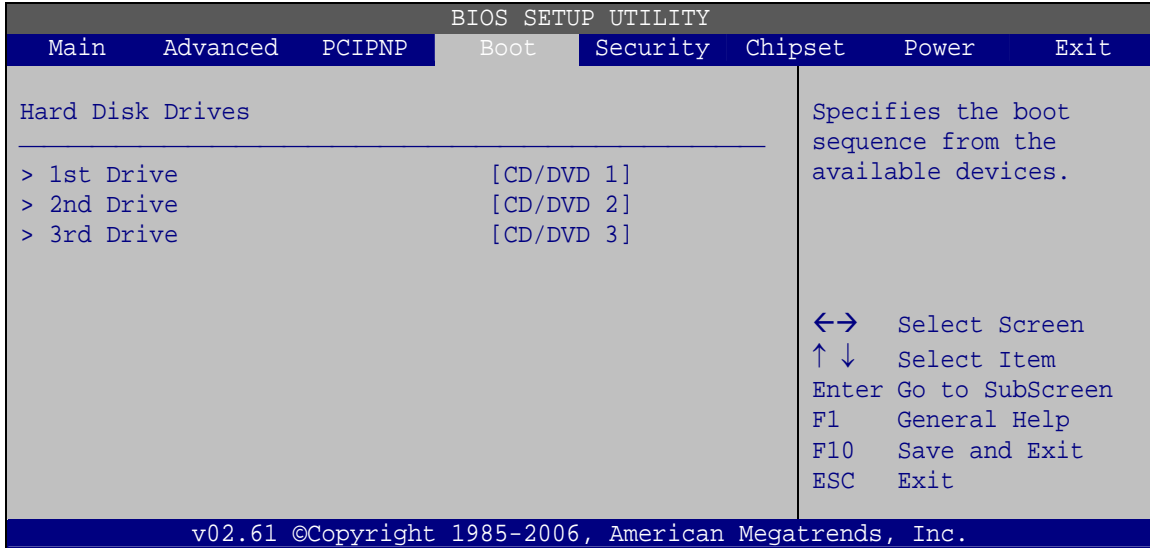
- 1st Drive [CD/DVD: PM-(part ID)]
- 2nd Drive [HDD: PS-(part ID)]
- 3rd Drive [HDD: SM-(part ID)]
- 4th Drive [HDD: SM-(part ID)]



NOTE:

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

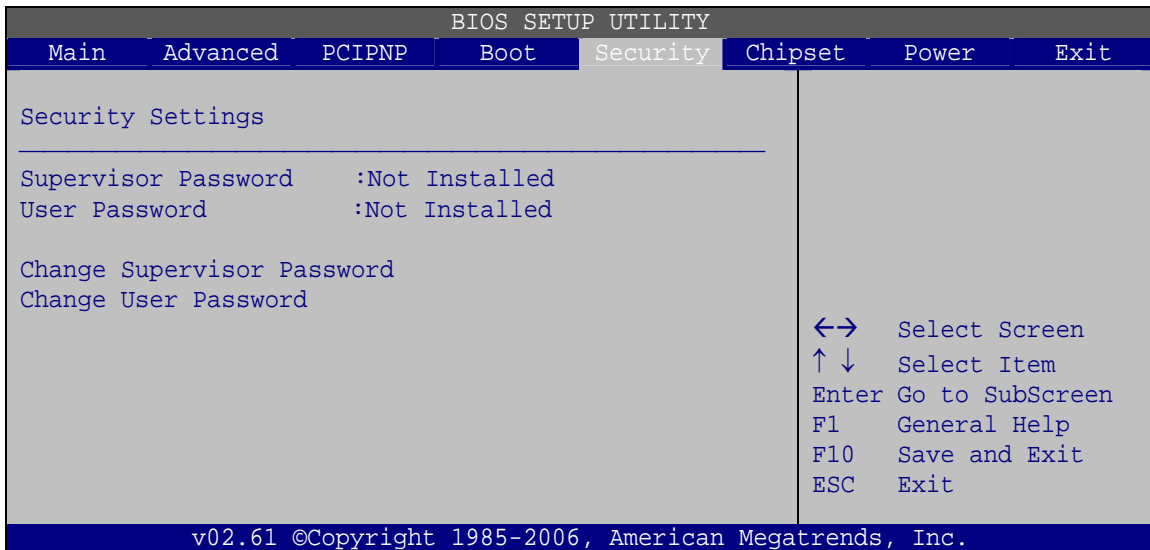
The boot sequence from the available devices is selected. If the “1st Drive” option is selected a list of available CD/DVD drives is shown. Select the first CD/DVD drive the system boots from. If the “1st Drive” is not used for booting this option may be disabled.



BIOS Menu 19: CD/DVD Drives

5.6 Security

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



BIOS Menu 20: Security

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- **Change Supervisor Password**

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

- **Change User Password**

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

- **Clear User Password**

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

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

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

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

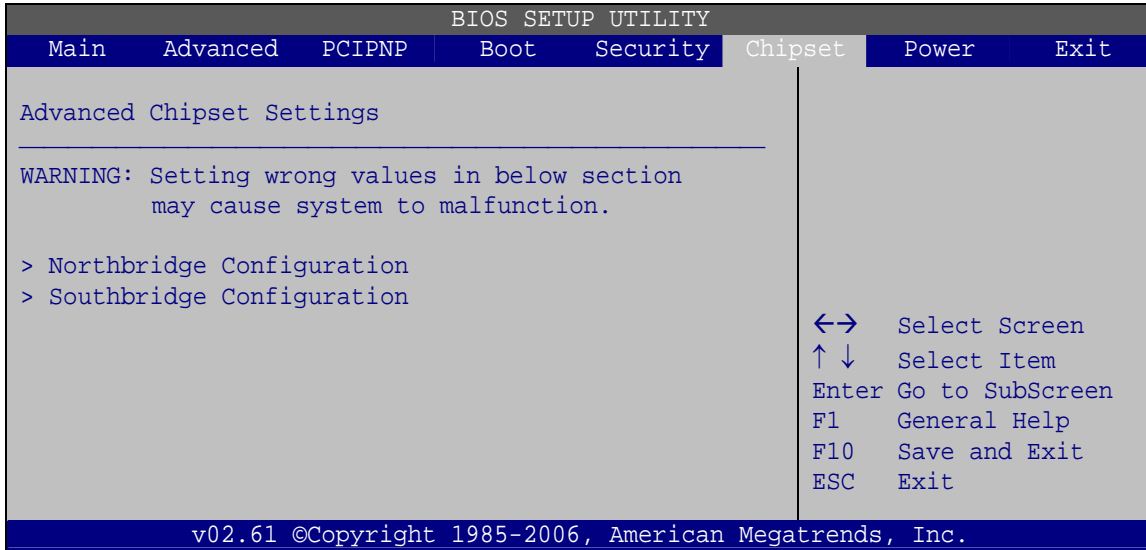
5.7 Chipset

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



WARNING!

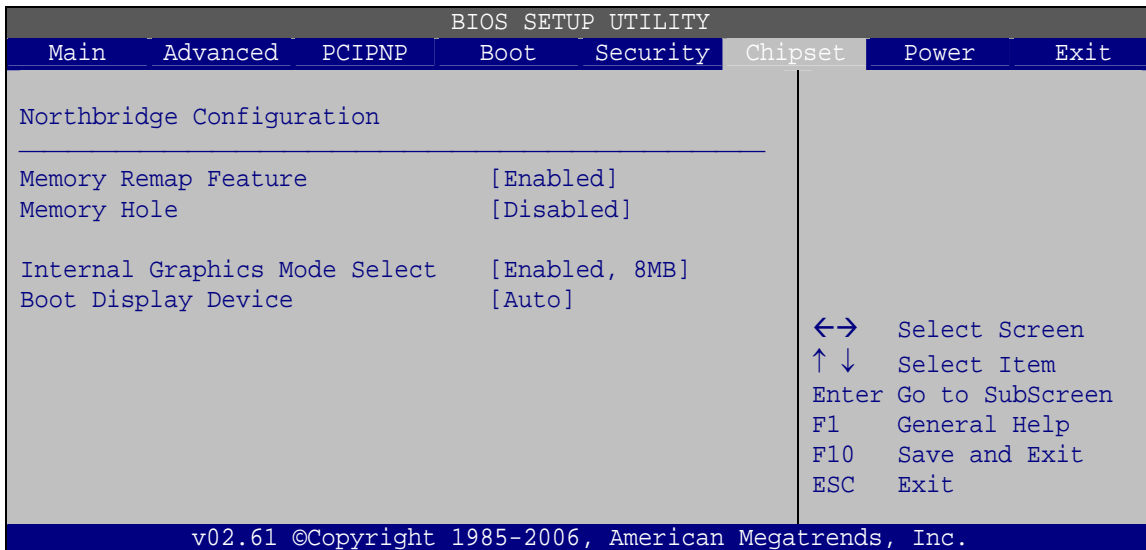
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 21: Chipset

5.7.1 Northbridge Configuration

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



BIOS Menu 22:Northbridge Chipset Configuration

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- **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

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

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

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

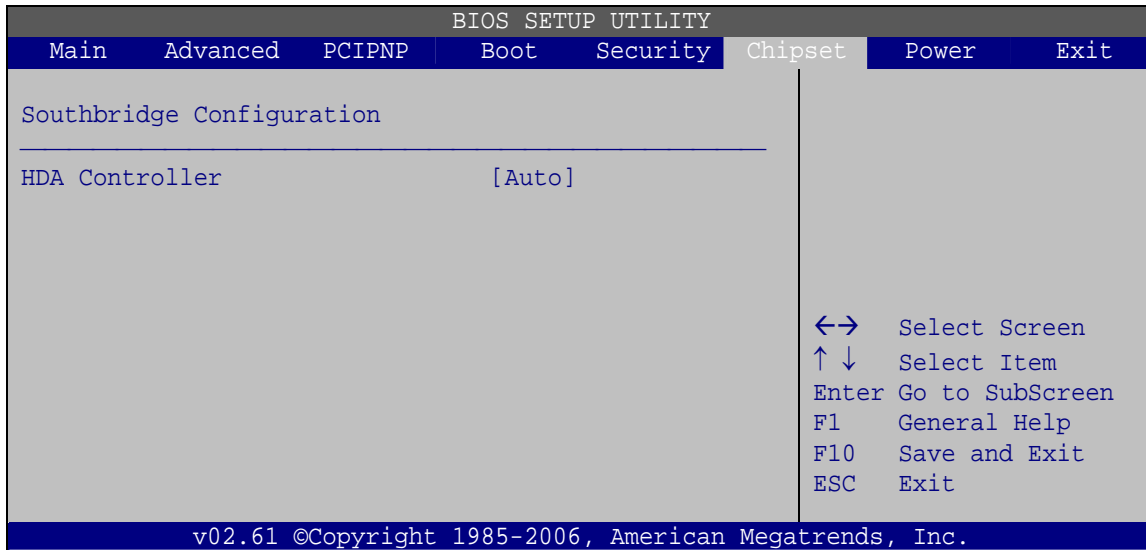
- **Boot Display Device [Auto]**

Determines which display device is used when the system is first booted up.

- Auto **DEFAULT**
- CRT (VGA1)
- TV
- CRT1 (VGA2)

5.7.2 Southbridge Configuration

The **Southbridge Configuration** menu (**BIOS Menu 23**) the Southbridge chipset to be configured.



BIOS Menu 23:Southbridge Chipset Configuration

- **HDA Controller [Enabled]**

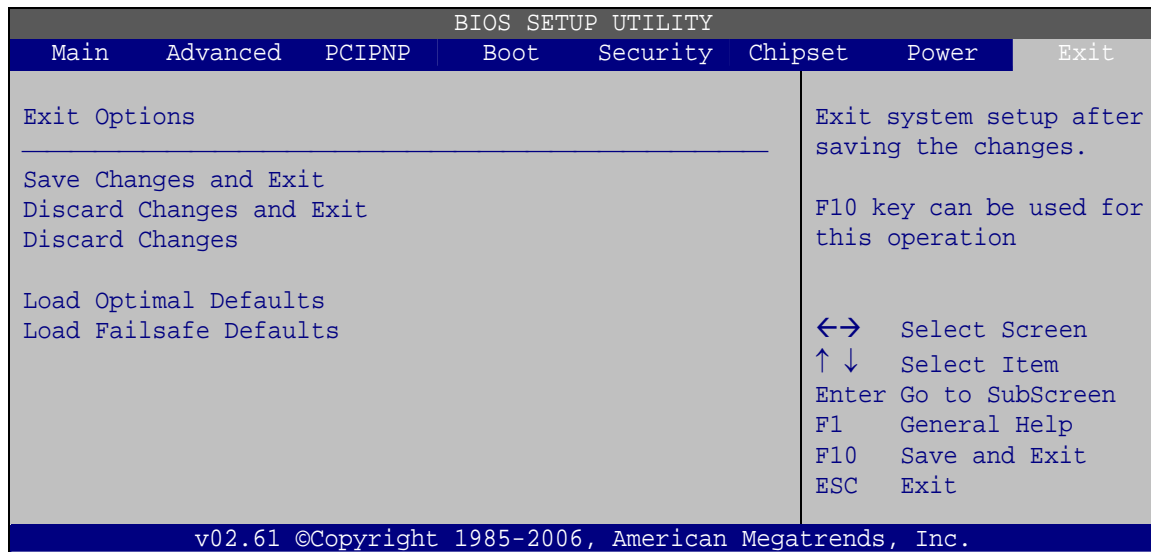
Toggles the High Definition audio chip.

- ➔ **Disabled** All audio disabled
- ➔ **Enabled** **DEFAULT** High Definition audio enabled

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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.

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▪ ATA/IDE Configurations [Compatible]	62
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- Discard Changes.....95
- Load Optimal Defaults.....95
- Load Failsafe Defaults.....96

Appendix

B

Terminology

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

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

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

Appendix

C

Digital I/O Interface

C.1 Introduction

The DIO connector on the KINO-9653 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.



NOTE:

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

C.2 DIO Connector Pinouts

Refer to the connectors section for pinouts.

C.3 Assembly Language Samples

C.3.1 Enable the DIO Input Function

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

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

C.3.2 Enable the DIO Output Function

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

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

Appendix

D

Watchdog Timer


NOTE:

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

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

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

INT 15H:

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

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

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

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

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NOTE:

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

EXAMPLE PROGRAM:

; INITIAL TIMER PERIOD COUNTER

;

W_LOOP:

;

```

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

```

;

; ADD THE APPLICATION PROGRAM HERE

;

```

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

```

```

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

```

;

; EXIT ;



Appendix

E

Compatibility

KINO-9653 Mini-ITX Motherboard



NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the KINO-9653

E.1 Compatible Operating Systems

The following operating systems have been successfully run on the KINO-9653.

- 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-9653

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

Table E-1: Compatible Processors

E.3 Compatible Memory Modules



NOTE:

The memory modules listed below have been tested on the KINO-9653 other memory modules that comply with the specifications may also work on the KINO-9653 but have not been tested.

The following memory modules have been successfully tested on the KINO-9653.

Manufacturer	Capacity	Speed	Type
Transcend	512 MB	533 MHz	DDR2

Table E-2: Compatible Memory Modules

Appendix

F

Hazardous Materials Disclosure

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

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

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

Please refer to the table on the next page.

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

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

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

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

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

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

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