IEI Technology Corp.

MODEL:

IOWA-MARK

VIA MARK Half-size ISA CPU Card
Integrated Audio, Dual Independent Display
CompactFlash®, IDE, USB 1.1 and RS-232

User Manual

Rev. 1.10 September 2007

RoHS Lead Free

Revision

Date	Version	Changes
September, 2007	1.10	CN25, CN26 and CN27 connectors combined into new CN25 connector
December, 2006	1.00	Initial Release

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Manual Conventions

WARNING!

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

WARNING:

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

CAUTION!

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

CAUTION:

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

NOTE:

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

NOTE:

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

Packing List

NOTE:

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

The items listed below should all be included in the IOWA-MARK package.

- 1 x IOWA-MARK Single Board Computer
- 1 x Audio Cable
- 1 x IDE Cable
- 1 x Keyboard/Mouse Y-cable
- 1 x Mini Jumper Pack
- 1 x Quick Installation Guide (QIG)
- 2 x SATA Cable
- 1 x SATA Power Cable
- 1 x Serial Cable
- 1 x USB Cable
- 1 x Utility CD

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

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List of Tables

BIOS Menus

Glossary

AC '97	Audio Codec 97
ACPI	Advanced Configuration and Power Interface
APM	Advanced Power Management
ARMD	ATAPI Removable Media Device
ASKIR	Shift Keyed Infrared
ATA	Advanced Technology Attachments
BIOS	Basic Input/Output System
CFII	Compact Flash Type 2
CMOS	Complementary Metal Oxide Semiconductor
CPU	Central Processing Unit
Codec	Compressor/Decompressor
COM	Serial Port
DAC	Digital to Analog Converter
DDR	Double Data Rate
DIMM	Dual Inline Memory Module
DIO	Digital Input/Output
DMA	Direct Memory Access
EIDE	Enhanced IDE
EIST	Enhanced Intel SpeedStep Technology
FDD	Floppy Disk Drive
FDC	Floppy Disk Connector
FFIO	Flexible File Input/Output
FIFO	First In/First Out
FSB	Front Side Bus
IrDA	Infrared Data Association
HDD	Hard Disk Drive
IDE	Integrated Data Electronics
I/O	Input/Output
L1 Cache	Level 1 Cache
L2 Cache	Level 2 Cache
LCD	Liquid Crystal Display
LPT	Parallel Port Connector
LVDS	Low Voltage Differential Signaling
MAC	Media Access Controller
OS	Operating System
PCI	Peripheral Connect Interface
PIO	Programmed Input Output
PnP	Plug and Play
POST	Power On Self Test
RAM	Random Access Memory
SATA	Serial ATA
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology
SPD	Serial Presence Detect
S/PDI	Sony/Philips Digital Interface
SDRAM	Synchronous Dynamic Random Access Memory
SIR	Serial Infrared
UART	Universal Asynchronous Receiver-transmitter
USB	Universal Serial Bus
VGA	Video Graphics Array

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Chapter

1

Introduction

1.1 Introduction

The IOWA-MARK is a VIA® MARK based half-size ISA CPU card. The IOWA-MARK has a Front Side Bus (FSB) of 533MHz or 800MHz, has 128MB of RAM on-board and is upgradeable with a further 512MB of SDRAM. Multiple input/output options include VGA, 24-bit TTL and 36-bit dual channel LVDS (18-bits per channel) for video output, a parallel port, two serial ports, an infrared port and 10/100BASE-T Ethernet. The IOWA-MARK supports up to two IDE drives and one floppy drive. Two SATA drives with RAID 0 and RAID 1 capabilities are optional.

1.1.1 IOWA-MARK Models

The IOWA-MARK series has four models:

- IOWA-MARK-533-128MB-R11
- IOWA-MARK-533S-128MB-R11
- IOWA-MARK-800-128MB-R11
- IOWA-MARK-800S-128MB-R11

The specifications for the four models are show in **Table 1-1**.

IOWA-MARK	-533-128MB-R11	-533S-128MB-R11	-800-128MB-R11	-800S-128MB-R11
CPU Speed	533MHz	533MHz	800MHz	800MHz
CRT/LCD	Yes	Yes	Yes	Yes
Onboard Memory	128MB	128MB	128MB	128MB
SATA	No	Yes	No	Yes
Audio	Yes	Yes	Yes	Yes

Table 1-1: IOWA-MARK Model Specifications

1.1.2 IOWA-MARK Benefits

Some of the IOWA-MARK benefits include:

- Power efficient, fanless CPU lowers hardware and operational overhead costs
- ISA expansion options available through compatible IEI backplanes

- Support for both legacy ISA and DMA (direct memory access)
- Multiple display output devices including VGA, TTL and LVDS
- Dual-display support for video output on two monitors
- RAID options include RAID 1 for increased data safety and RAID 0 for improved drive performance for faster data access (on SATA models)
- The VIA® MARK CPU has long-term support until December 2010

1.1.3 IOWA-MARK Features

Some of the IOWA-MARK features are listed below:

- Half-size form factor
- RoHS compliant
- VIA® MARK processor installed
- Dual-display functionality
- Low power consumption (6 Watts)
- One 10/100BASE-T Ethernet controller on-board
- Two SATA channels with transfer rates up to 150Mb/s on-board (only for IOWA-MARK-533S and IOWA-MARK-800S)
- Four USB 1.1 devices supported
- Integrated audio

1.2 IOWA-MARK Overview

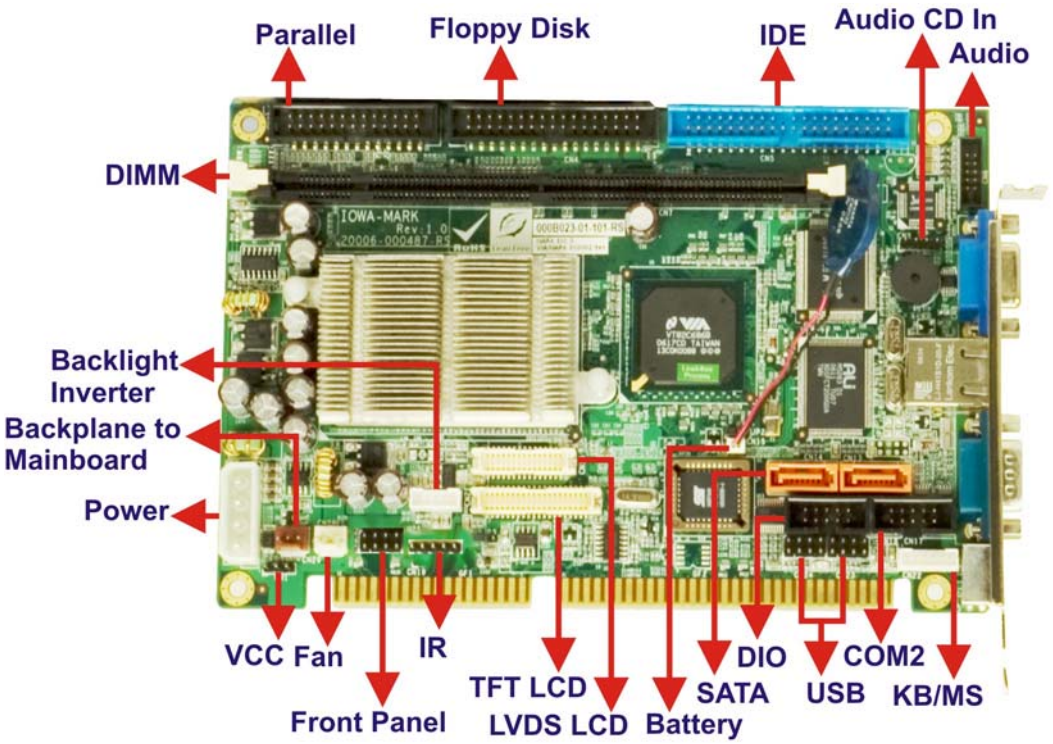

Figure 1-1: IOWA-MARK Overview

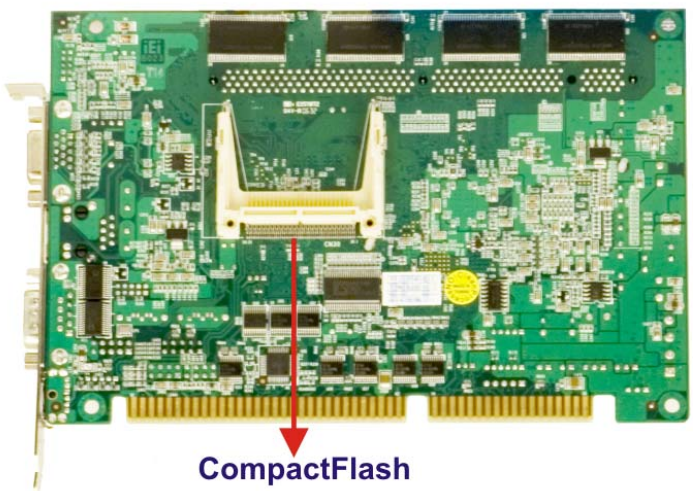

Figure 1-2: IOWA-MARK Solder Side Overview

1.2.1 IOWA-MARK Connectors

The IOWA-MARK has the following connectors on-board:

- 1 x AT power connector
- 1 x Audio connector
- 1 x Backlight inverter connector
- 1 x Backplane to CPU card connector
- 1 x Battery connector
- 1 x CompactFlash socket
- 1 x CD audio header
- 1 x CPU fan connector
- 1 x Digital input/output (DIO) connector
- 1 x Fan connector
- 1 x Floppy disk connector
- 1 x Front panel connector
- 1 x IDE disk drive connector
- 1 x Infrared interface connector
- 1 x 6-pin Keyboard/mouse connector
- 1 x LVDS LCD connector
- 1 x Parallel port connector
- 2 x Serial ATA (SATA) drive connectors (SATA models only)
- 1 x Serial port
- 1 x 168-pin SDRAM DIMM socket
- 1 x TFT LCD connector
- 2 x USB 1.1 connectors

The IOWA-MARK has the following external peripheral interface connectors on the board rear panel

- 1 x Ethernet connector
- 1 x PS/2 keyboard connector
- 1 x Serial port connector
- 1 x VGA connector

The IOWA-MARK has the following on-board jumpers:

- Clear CMOS
- TTL and LVDS voltage selector
- Serial port voltage selector

1.2.2 Technical Specifications

IOWA-MARK technical specifications are listed in **Table 1-2**. Detailed descriptions of each specification can be found in **Chapter 2**.

Specification	IOWA-MARK
Form Factor	Half-size form factor
System CPU	VIA® MARK™ 533MHz or 800MHz
System Chipset	VIA® VT82C686B
Display	VGA 24-bit TTL Dual Channel 36-bit dual channel LVDS (18-bits per channel)
Memory	Supports one 512MB PC100MHz or PC133MHz SDRAM DIMM module
BIOS	Award BIOS
SSD	CompactFlash® (CF) Type II
Audio	AC'97 Codec Realtek ALC655
LAN	10/100BASE-T Ethernet RTL8100C
COM	Two RS-232 serial ports (one internal, one external)
USB	Four USB 1.1 devices supported
IDE	One 40-pin IDE connects to two Ultra ATA33/66/100 devices
Watchdog Timer	Software programmable 1-255 sec. by super I/O

Specification	IOWA-MARK
Digital I/O	One digital input/output connector
Power Supply	+5V, +12V, ATX power support
Temperature	0ºC - 60ºC (32ºF - 140ºF)
Humidity (operating)	5%~95% non-condensing
Dimensions	185mm x 122mm
Weight (GW)	1.0kg

Table 1-2: Technical Specifications

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Chapter

2

Detailed Specifications

2.1 Overview

This chapter describes the specifications and on-board features of the IOWA-MARK in detail.

2.2 Dimensions

2.2.1 Board Dimensions

The dimensions of the board are listed below:

- **Length**: 185mm
- **Width**: 122mm

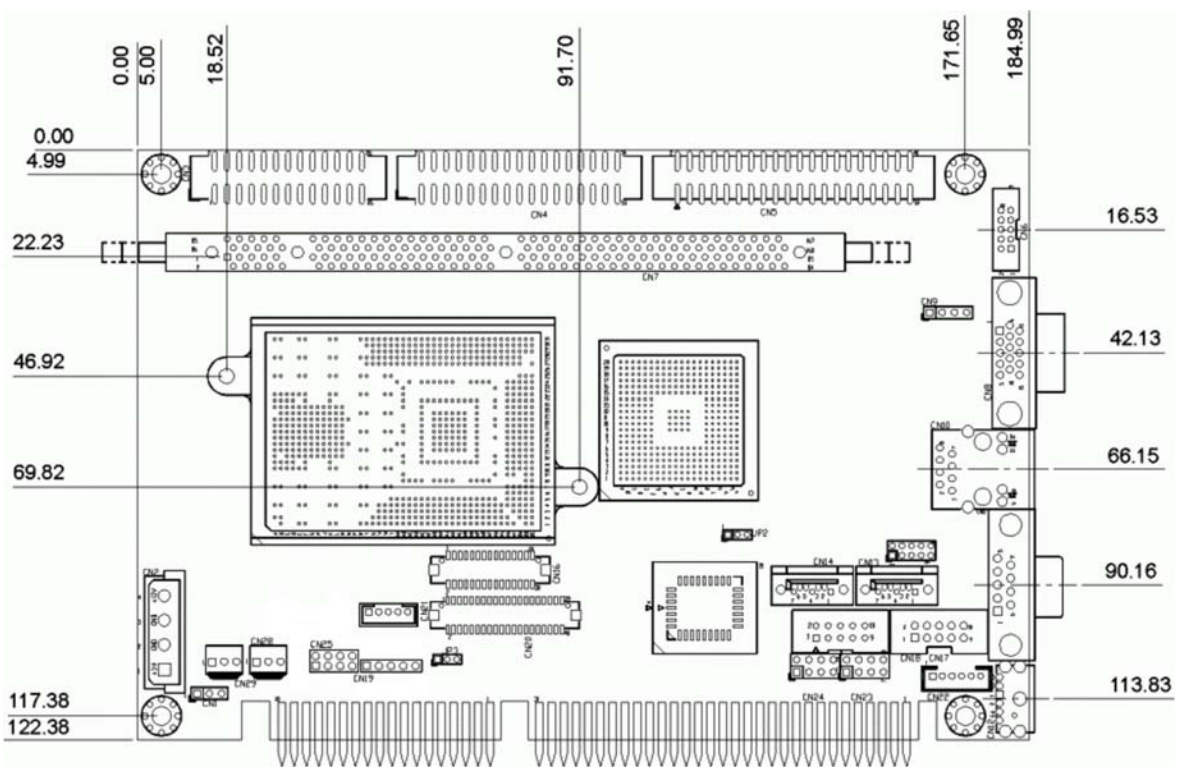

Figure 2-1: IOWA-MARK Dimensions (mm)

2.2.2 External Interface Panel Dimensions

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

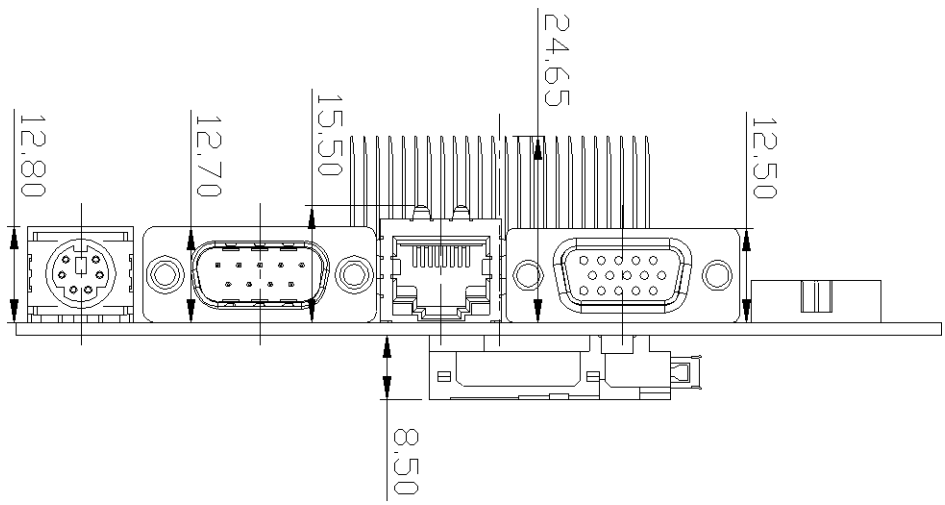

Figure 2-2: External Interface Panel Dimensions (mm)

2.3 Data Flow

The IOWA-MARK motherboard comes with a VIA® MARK CPU and a VIA® VT82C686B system chipset. **Figure 2-3** shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

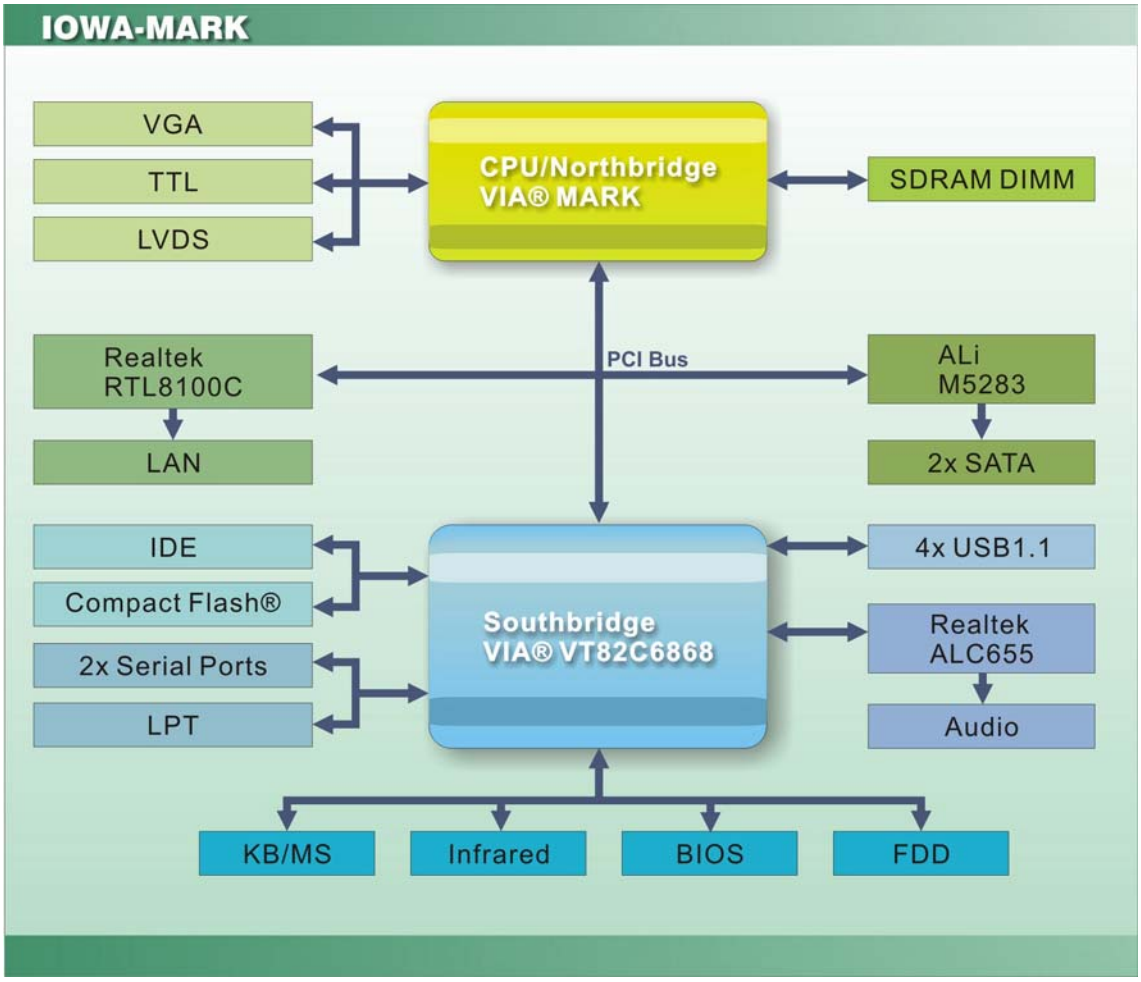

Figure 2-3: Data Flow Block Diagram

2.4 CPU Support

The IOWA-MARK series motherboards all come with a preinstalled 533MHz or 800MHz VIA® MARK CPU.

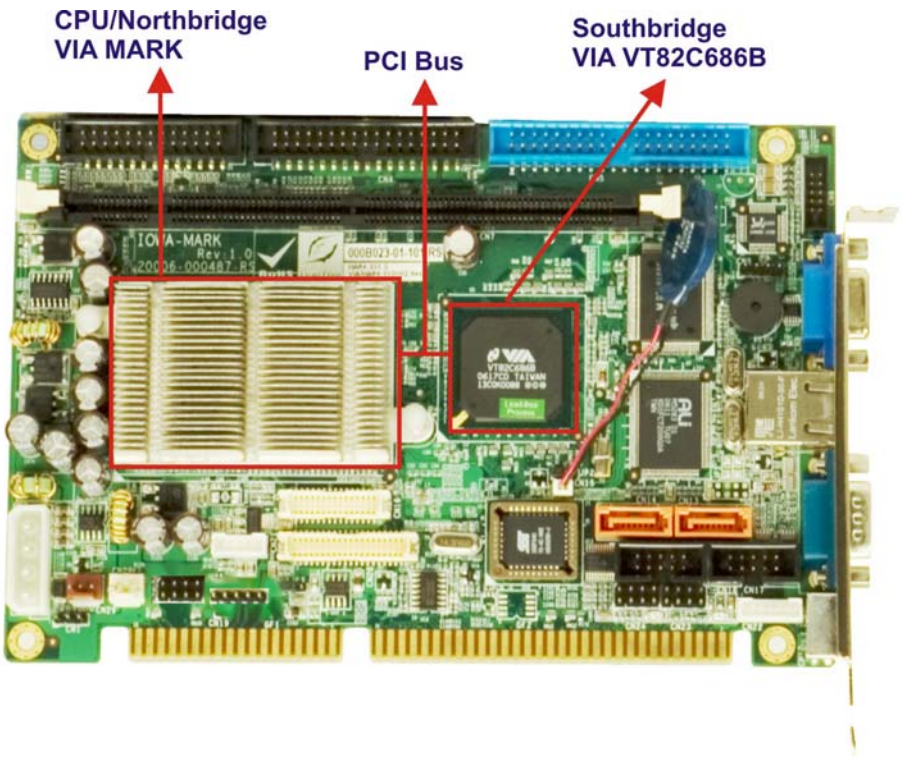

Figure 2-4: IOWA-MARK Overview

2.4.1 VIA® MARK Overview

The specifications for the VIA® MARK are listed below

- 533MHz or 800MHz CPU frequency
- 133MHz FSB frequency
- 6W or 8W maximum thermal design power
- 0.13u process technology
- HSBGA design package
- MMX, SSE and 3DNow 3D instruction sets
- RNG and AES built in security features
- 133MHz SDRAM memory support

- S3 Graphics ProSavage4 integrated graphics
- Integrated LVDS and TFT transmitters
- Dual independent display supported
- ISA support (via backplane)

2.4.2 VIA® MARK Memory Support

The VIA® Mark CoreFusion processor supports a single PC100MHz or PC133MHz SDRAM DIMM module with a maximum memory of 512MB. All the models have 128MB of RAM built in.

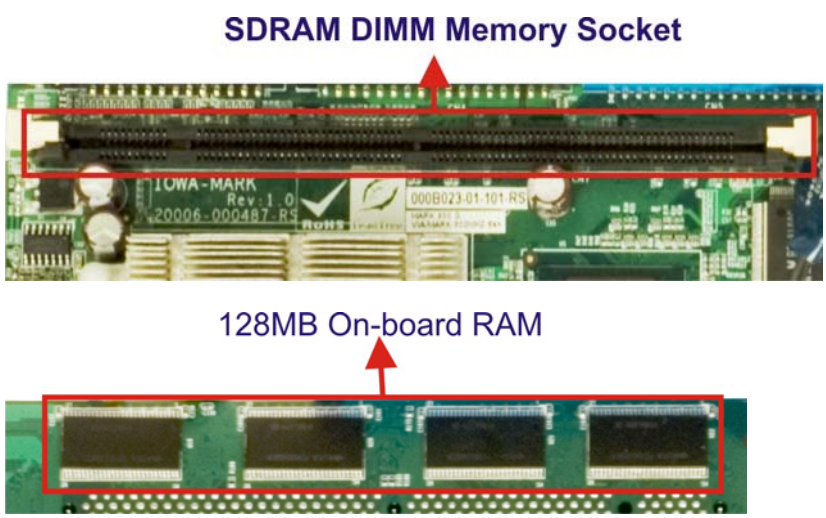

Figure 2-5: IOWA-MARK RAM

2.4.3 VIA® MARK Integration

The VIA® MARK CoreFusion processor has an x86 architecture and combines the VIA® 'Nehemiah' processor core with a feature rich Northbridge in a single package. The VIA® Mark CoreFusion processor offers full legacy support, integrated graphics, a military-grade hardware security engine and unparalleled connectivity.

2.4.4 VIA® MARK S3 Graphics Unichrome Pro Graphics Core

The VIA® Mark CoreFusion has the following graphics and display support.

- Integrated S3 Graphics Unichrome Pro Graphics Core

- Dual independent display support
- An integrated 36-bit dual channel (18-bits per channel) LVDS transmitter
- An integrated 24-bit TFT transmitter
- Display resolutions of up to 1600 x 1200 pixels.

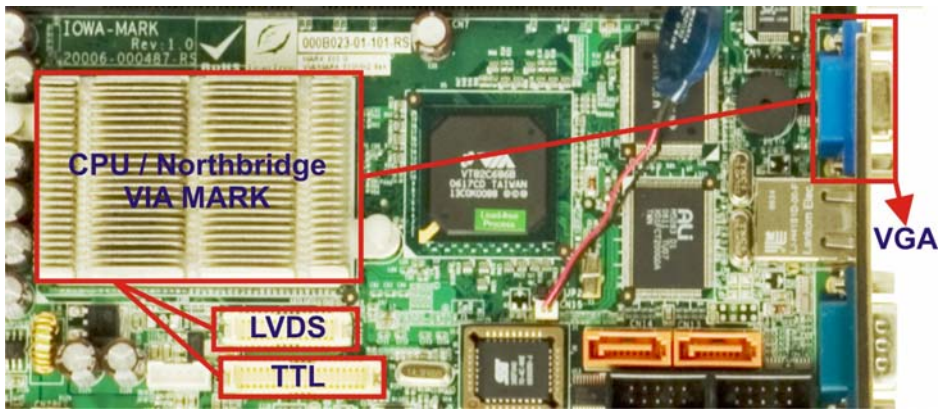

Figure 2-6: IOWA-MARK Video Outputs

2.4.5 VIA® MARK VIA® PadLock Security Engine

The VIA® PadLock Security Engine embedded on the VIA® Mark CoreFusion processor platform integrates an AES cipher engine and a quantum based random number generator to help protect stored and exchanged data.

2.5 System Chipset

The IOWA-MARK series motherboards all have a preinstalled VIA® VT82C686B chipset.

Figure 2-7: VIA® VT82C686B Southbridge

The system chipset features are listed below.

- Integrated AC'97 audio interface
- Integrated MC'97 modem interface
- Integrated Super I/O
- Hardware monitoring capabilities
- USB 1.1 controller

2.5.1 VIA® VT82C686B ATA-6 Controller

The single IOWA-MARK IDE connector supports two ATA-6 HDDs. An ATA-6 (Ultra ATA/100) compliant IDE controller on the VIA® VT82C686B has a maximum transfer rate of 100MB/s. ATA-6 includes advancements in error checking and ATA-6 drives are compatible with future interface additions.

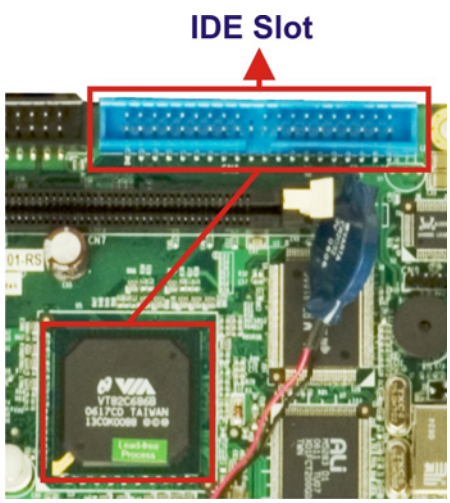

Figure 2-8: IDE Slot

The onboard ATA-6 controller is able to support the following IDE HDDs:

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

Specification	Ultra ATA/100	Ultra ATA/66	Ultra ATA/33
IDE devices	2	2	2
PIO Mode	0 – 4	0 – 4	0 – 4

PIO Max Transfer Rate	16.6 MB/s	16.6 MB/s	16.6 MB/s
DMA/UDMA designation	UDMA 5	UDMA 4	UDMA 2
DMA/UDMA Max Transfer	100MB/s	66MB/s	33MB/s
Controller Interface	5V	5V	5V

Table 2-1: Supported HDD Specifications

2.5.2 VIA® VT82C686B Flash Interface

The IOWA-MARK CompactFlash® socket supports standard CF Type I and CF Type II cards. The chipset flash interface is multiplexed with an IDE interface and can be connected to an array of industry standard NAND Flash or NOR Flash devices.

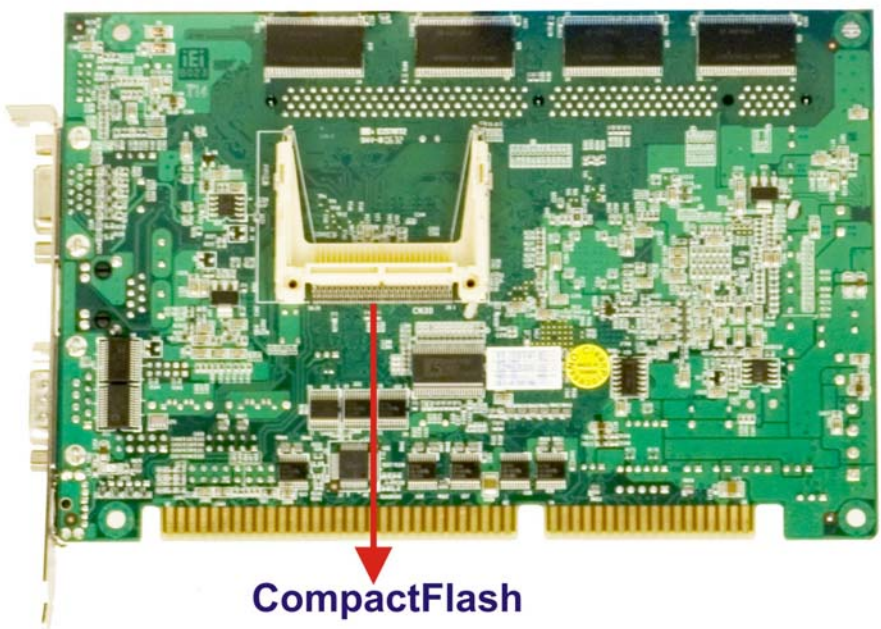

Figure 2-9: CompactFlash® Interface

2.5.3 VIA® VT82C686B Audio Codec 97 (AC'97) Controller

The AC'97 specification v2.3 compliant controller on the chipset is interfaced to a 16-bit full-duplex AC'97 RealTek ALC655 codec. The ALC655 is connected to a 10-pin audio connector. The codec meets performance requirements for audio on PC99/2001 systems.

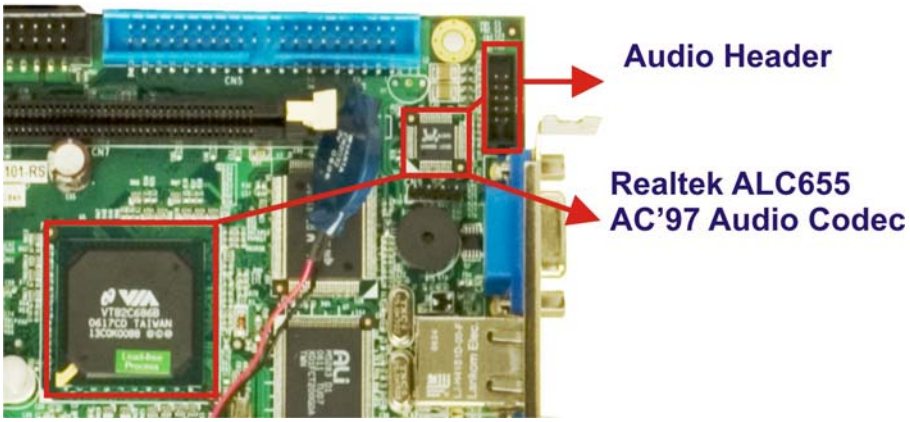

Figure 2-10: Audio Codec and Header

Some of the codec features are listed below.

- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 16-bit Stereo full-duplex CODEC with 48KHz sampling rate
- Complies with AC'97 2.3 specifications
  - Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing
  - 14.318MHz -> 24.576MHz PLL to eliminate crystal
  - 12.288MHz BITCLK input
  - Integrated PCBEEP generator to save buzzer
  - Interrupt capability
- Three analog line-level stereo inputs with 5-bit volume control, LINE_IN, CD, AUX
- High-quality differential CD input
- Two analog line-level mono inputs: PCBEEP, PHONE-IN
- Two software selectable MIC inputs
- Dedicated Front-MIC input for front panel applications (software selectable)
- Boost preamplifier for MIC input
- Built-in 50mW/20ohm amplifier for both Front-out and Surround-Out
- External Amplifier Power Down (EAPD) capability
- Power management and enhanced power saving features
- Supports Power-Off CD function
- Adjustable VREFOUT control
- Supports 48KHz S/PDIF output, complying with AC'97 Rev 2.3 specifications

- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-pin LQFP package
- EAX™ 1.0 & 2.0 compatible
- Direct Sound 3D™ compatible
- A3D™ compatible
- I3DL2 compatible
- HRTF 3D positional audio
- Sensaura™ 3DPA enhancement (optional)
- 10-band software equalizer
- Voice cancellation and key shifting in Karaoke mode
- AVRack® Media Player
- Configuration Panel for improved user convenience

2.5.4 VIA® VT82C686B USB Controller

Four internal USB ports on the IOWA-MARK board are interfaced via the PCI bus to the VIA® VT82C686B chipset USB 1.1 controller. Four USB 1.1 devices can be connected simultaneously to the IOWA-MARK.

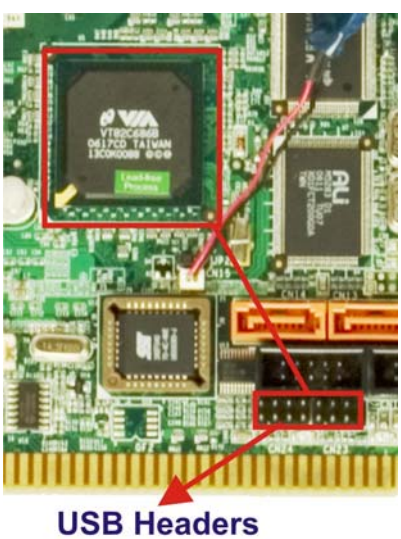

Figure 2-11: USB Headers

2.5.5 VIA® VT82C686B Serial Communications

Two high-speed UART RS-232 serial port connectors, one internal and one external, are connected to the system chipset integrated Super I/O on the chipset.

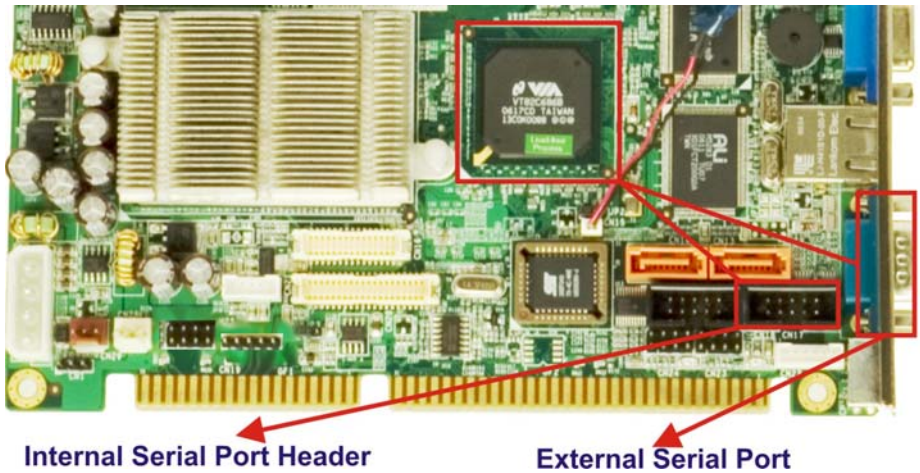

Figure 2-12: Serial Ports

The specifications for the serial ports are listed below.

- 16C550 UART with 16-byte FIFO buffer
- 115.2Kbps transmission rate

2.5.6 VIA® VT82C686B Infrared Interface

A single TX/RX infrared interface connector is connected to the system chipset integrated Super I/O on the chipset.

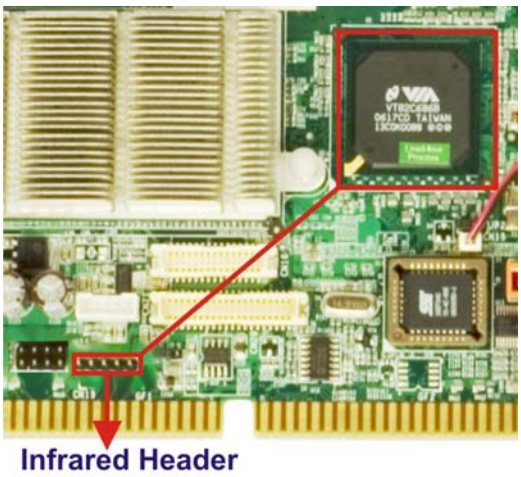

Figure 2-13: Infrared

The following the infrared interfaces are supported.

- Serial Infrared (SIR)
- Shift Keyed Infrared (ASKIR)

2.5.7 VIA® VT82C686B Parallel Port Communications

One internal parallel port connector on the IOWA-MARK board is connected to the VIA® VT82C686B through the integrated Super I/O.

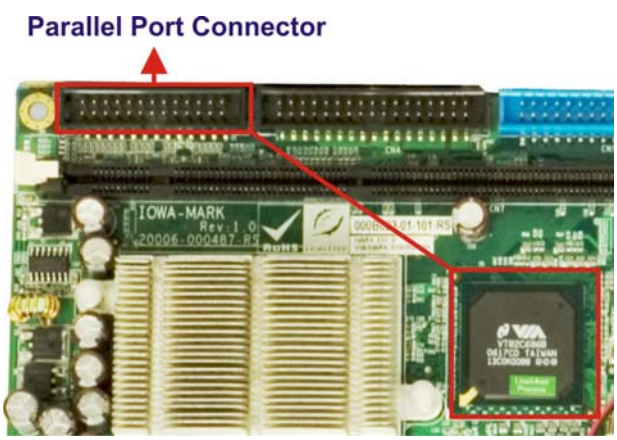

Figure 2-14: Parallel Port

The parallel port is bi-directional and supports the following parallel port modes:

- SPP
- EPP
- ECP

2.5.8 VIA® VT82C686B Keyboard and Mouse

An internal keyboard/mouse connector and an external PS/2 keyboard connector are both connected to the VIA® VT82C686B chipset through the integrated Super I/O. A PS/2 keyboard/mouse Y-cable is shipped with the IOWA-MARK and is connected to the internal keyboard/mouse connector.

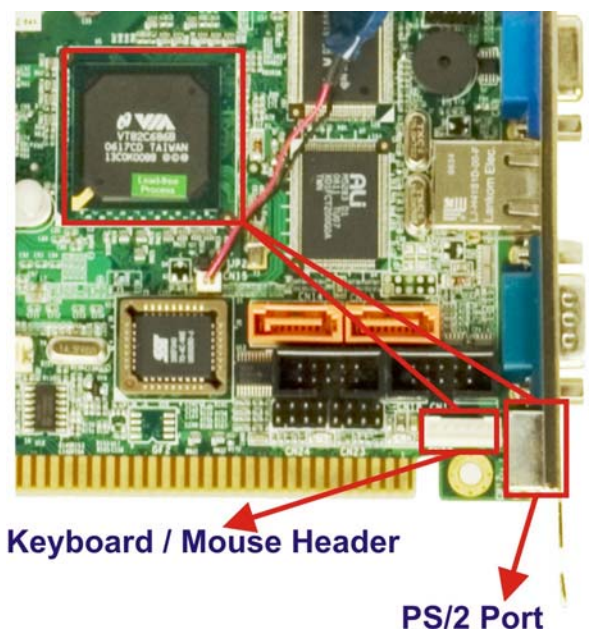

Figure 2-15: Keyboard and Mouse

For more details refer to **Chapter 3** and **Chapter 5**.

2.5.9 VIA® VT82C686B Real Time Clock

The system chipset has a battery backed up 256-byte real-time clock (RTC) with CMOS RAM.

2.5.10 BIOS

The BIOS flash memory chip on the IOWA-MARK has a licensed copy of AWARD BIOS loaded onto it. The BIOS flash memory chip is connected to the VIA® VT82C686B system chipset.

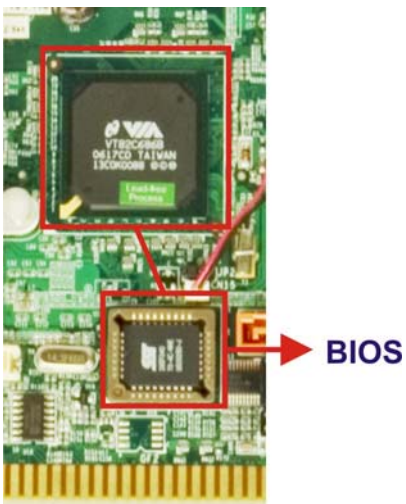

Figure 2-16: BIOS Chipset

The flash BIOS features are listed below:

- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (**P**re-Boot E**x**ecution **E**nvironment) support
- USB booting support

2.6 PCI Bus

2.6.1 Overview

The PCI bus provides a PCI interface between the VIA® MARK and the VIA® VT82C686B. The PCI bus also provides a communication interface between the USB connectors and the USB 1.1 controller on the VIA® VT82C686B. The SATA drives and the single RJ-45 Ethernet connector are also interfaced to the VIA® MARK and VIA® VT82C686B through the PCI bus.

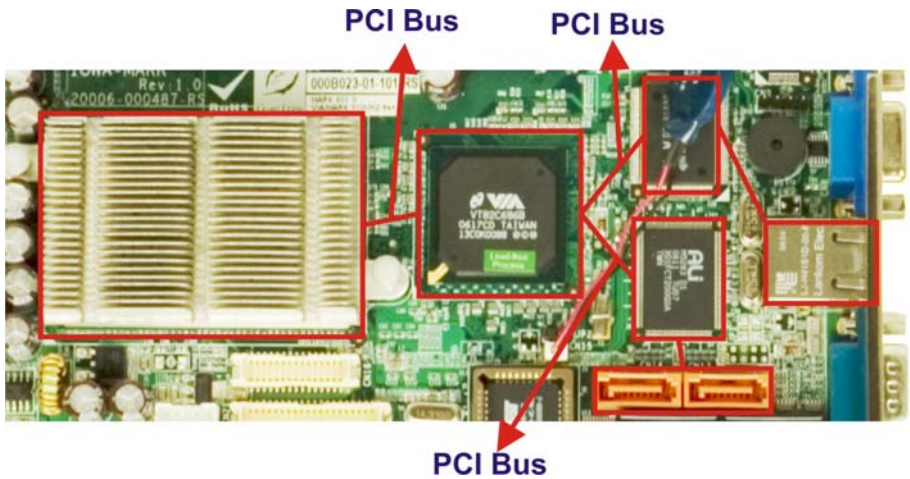

Figure 2-17: PCI Bus

Some of the features of the PCI bus are listed below:

- 33MHz Revision 2.3 is implemented
- Up to six external bus masters are supported
- Maximum throughput: 133MB/sec
- Master devices: Maximum of six with three implemented
- One PCI REQ/GNT pair can be given higher arbitration priority
- 44-bit addressing using the DAC protocol supported

2.6.2 10/100BASE-T Ethernet

A highly integrated and cost-effective single-chip, fast RealTek RTL8100C 10/100BASE-T Ethernet controller is interfaced through first the PCI bus a to the CPU and system chipset. The RealTek RTL8100C controller provides 10Mbps or 100Mbps Ethernet connectivity to the IOWA-MARK.

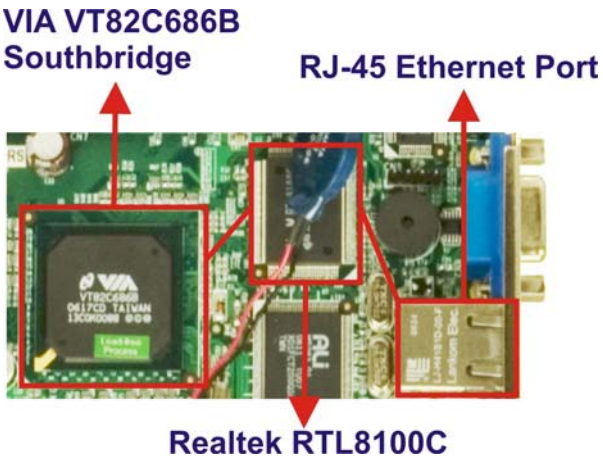

Figure 2-18: Ethernet

Some of the features of the RealTek RTL8100C are listed below.

- 10Mbps and 100Mbps operation
- Supports 10Mbps and 100Mbps N-way auto-negotiation
- Supports 25MHz Crystal or 25MHz OSC as the internal clock source
- Complies with PC99/PC2001 standards
- Supports ACPI power management
- Provides PCI bus master data transfer
- Provides PCI memory space or I/O space mapped data transfer
- Supports PCI clock speed of 16.75MHz-40MHz
- Advanced power saving mode
- Supports Wake-on-LAN and remote wake-up (AMD Magic Packet™, Link Change, and Microsoft® Wake-up frame)
- Half/Full duplex capability
- Supports Full Duplex Flow Control (IEEE 802.3x)
- Provides interface to 93C46 EEPROM to store resource configuration and ID parameters
- Provides PCI clock run pin
- Provides LED pins for network operation status indication
- 2.5/3.3V power supply with 5V tolerant I/Os

2.6.3 SATA Drive Controller (IOWA-MARK-533S and IOWA-MARK-800S)

An ALi M5283 SATA drive controller is connected to two SATA drive connectors and interfaced to the system through the PCI bus.

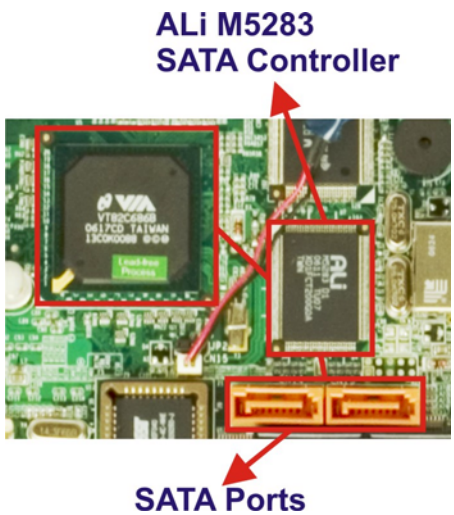

Figure 2-19: SATA

The ALi M5283 SATA drive controller has the following features:

- SATA specification revision 1.0 compliant
- PCI specification revision 2.2 compliant
- PCI Bus Power Management Specification revision 1.1 compliant
- Two independent channels to connect up to two SATA hard drive
- Up to 1.5Gb/s SATA data transfer rate
- Built-in 256 byte FIFO for each SATA port ensures fast read/write operations
- 32bit wide, 66MHz PCI bus supported

2.7 Environmental and Power Specifications

2.7.1 System Monitoring

The IOWA-MARK is capable of self-monitoring various aspects of its operating status including:

- Different component voltages including the CPU, chipset, and battery

- RPM of cooling fans
- CPU and system temperatures (by the corresponding embedded sensors)

2.7.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the IOWA-MARK are listed below.

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

The system is shipped with a preinstalled heat sink. When running the system do not remove the heat sink. If the heat sink is changed, make sure thermal paste is placed on the bottom of the heat sink to facilitate improved heat convection from the CPU surface to the heat sink.

2.7.3 Power Consumption

Table 2-2 shows the power consumption parameters for an IOWA-MARK with a 533MHz CPU onboard and 800MHz CPU onboard.

CPU Speed	Onboard Memory	Voltage	Current
VIA® MARK 800MHz	128MB PC133	+5V	2.99A
		+12V	0.09A
VIA® MARK 533MHz	128MB PC133	+5V	2.81A
		+12V	0.04A

Table 2-2: Power Consumption

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Chapter

3

Unpacking

3.1 Anti-static Precautions

WARNING:

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

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

3.2 Unpacking

3.2.1 Unpacking Precautions

When the IOWA-MARK is unpacked, please do the following:

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

3.3 Unpacking Checklist

NOTE:

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

3.3.1 Package Contents

The IOWA-MARK is shipped with the following components:

Quantity	Item and Part Number	Image
1	IOWA-MARK	
1	Audio cable (**P/N**: 32000-072101-RS)	
1	ATA 66/100 flat cable (**P/N**: 32200-000052-RS)	
1	KB/MS PS/2 Y-cable (**P/N**: 32000-072101-RS)	
1	Single RS-232 cable (**P/N**: 19800-000047-RS)	
2	SATA cable (**P/N**: 32000-062800-RS)	

Quantity	Item and Part Number	Image
1	SATA power cable (**P/N**: 32100-088600-RS)	
1	Dual USB cable (w bracket) (**P/N**:CB-USB02-RS/CB-USB02-60-RS)	
1	Mini jumper pack	
1	Quick installation guide	
1	Utility CD	

Table 3-1: Package List Contents

Chapter

4

Connector Pinouts

4.1 Peripheral Interface Connectors

Section 4.1.2 shows peripheral interface connector locations. **Section 4.1.2** lists all the peripheral interface connectors seen in **Section 4.1.2**.

4.1.1 IOWA-MARK Layout

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

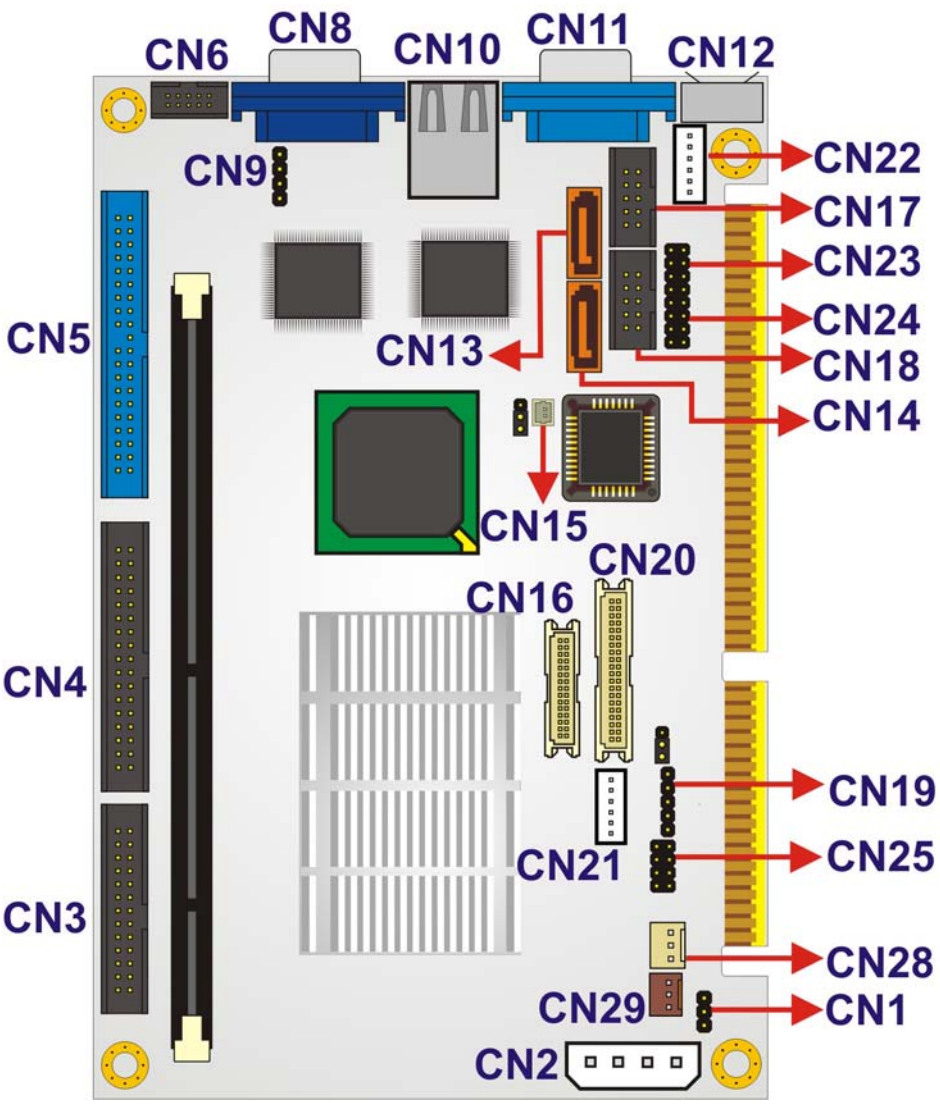

Figure 4-1: Connector and Jumper Locations

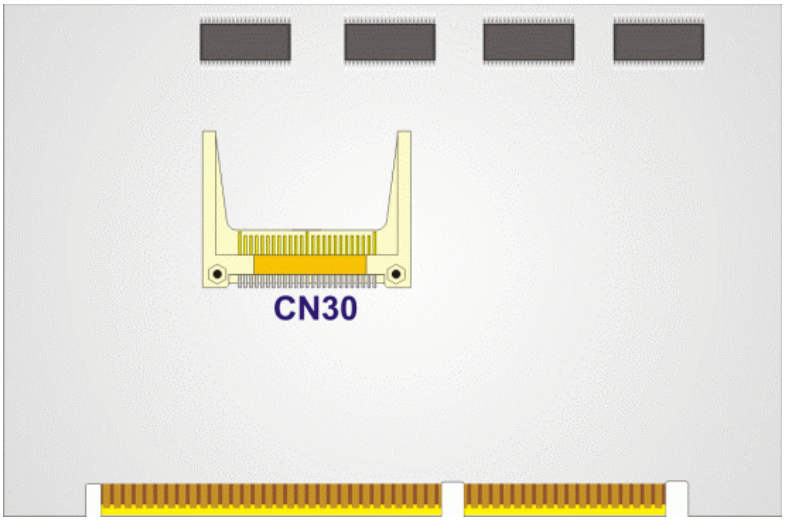

Figure 4-2: Connector and Jumper Locations (Solder Side)

4.1.2 Peripheral Interface Connectors

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

Connector	Type	Label
AT power connector	4-pin header	CN2
Audio CD In connector	4-pin header	CN9
Audio connector	10-pin header	CN6
Battery connector	2-pin header	CN15
Backplane to mainboard connector	3-pin wafer	CN29
Compact Flash (CF) connector	50-pin header	CN30
Digital I/O connector	10-pin header	CN18
Fan connector	3-pin wafer	CN28
Floppy disk connector	34-pin header	CN4

Connector	Type	Label
Front panel connector	8-pin header	CN25
IDE Interface connector	40-pin header	CN5
Infrared interface connector	5-pin header	CN19
Inverter power connector	5-pin wafer	CN21
Keyboard/mouse connector	6-pin wafer	CN22
LVDS LCD connector	30-pin crimp	CN16
Parallel port connector	26-pin header	CN3
Serial port connector (COM 2)	10-pin header	CN17
SATA drive connector	7-pin SATA	CN13
SATA drive connector	7-pin SATA	CN14
TFTLCD connector	40-pin crimp	CN20
USB 1.1 connector	8-pin header	CN23
USB 1.1 connector	8-pin header	CN24
Vcc ISA power connector	3-pin header	CN1

Table 4-1: Peripheral Interface Connectors

4.1.3 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the IOWA-MARK.

Connector	Type	Label
Ethernet connector	RJ-45	CN10
RS-232 serial port connector	9-pin male	CN11
Keyboard/mouse port	PS/2	CN12
VGA port connector	15-pin female	CN8

Table 4-2: Rear Panel Connectors

4.2 Internal Peripheral Connectors

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

4.2.1 AT Power Connector

CN Label: CN2

CN Type: 4-pin AT power connector (1x4)

CN Location: See Figure 4-3

CN Pinouts: See Table 4-3

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

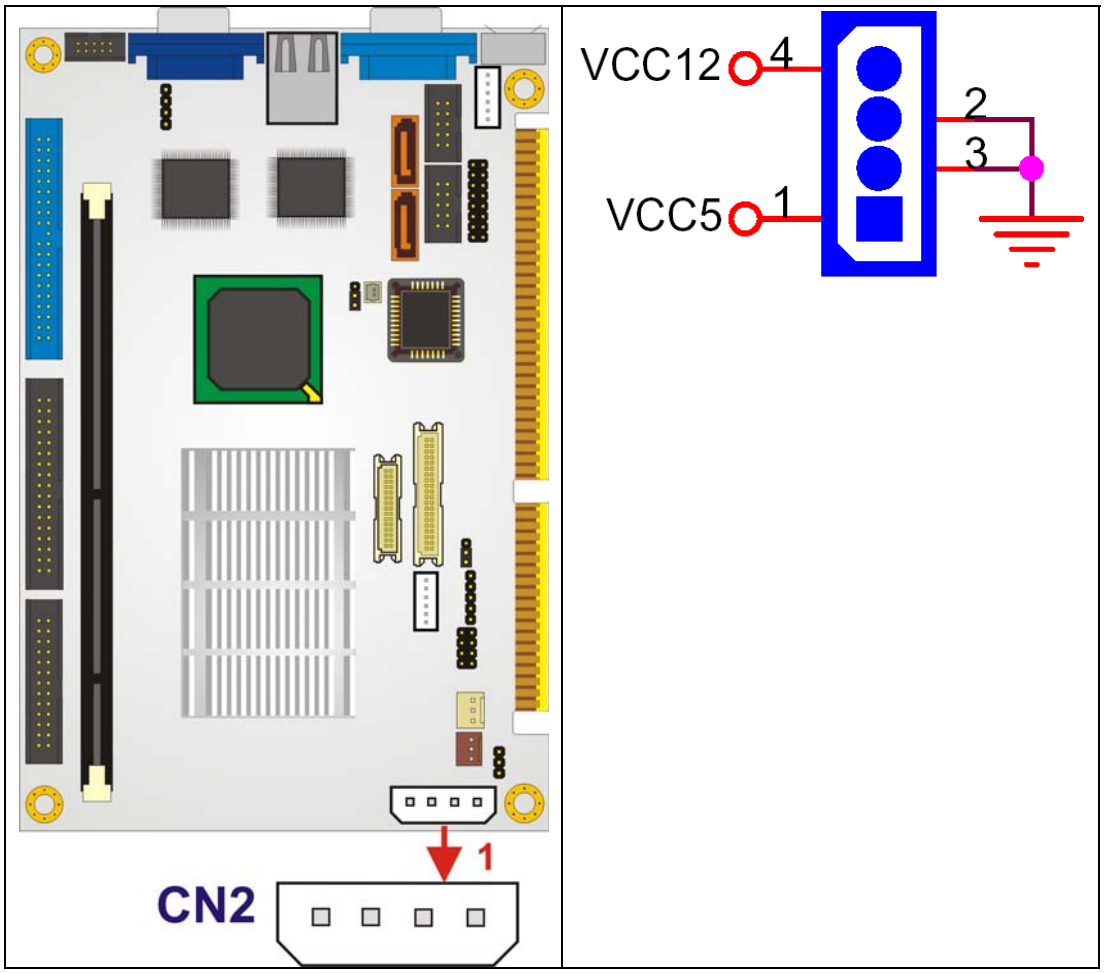

Figure 4-3: AT Power Connector Location

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

Table 4-3: AT Power Connector Pinouts

4.2.2 Audio Connector (10-pin)

CN Label:	CN6
CN Type:	10-pin header
CN Location:	See Figure 4-4
CN Pinouts:	See Table 4-4

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

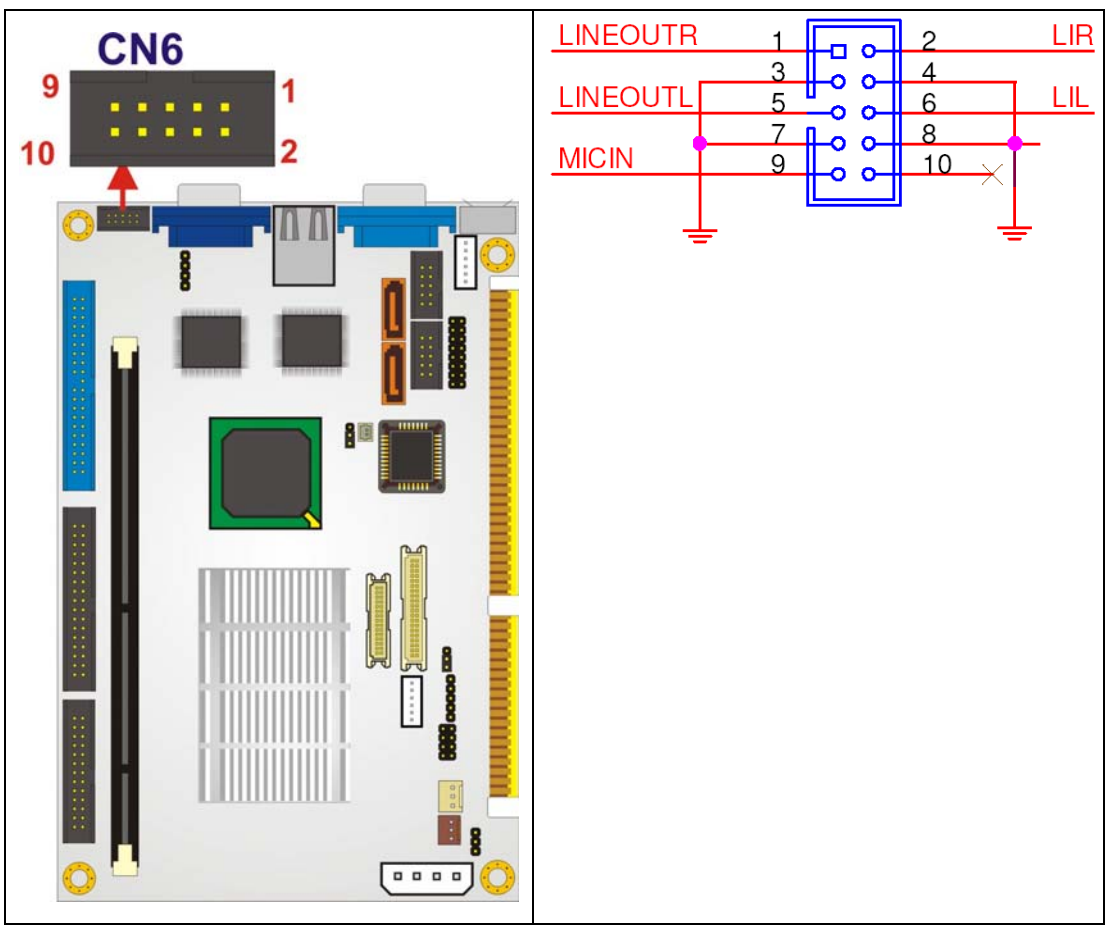

Figure 4-4: Audio Connector Pinouts (10-pin)

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

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

4.2.3 Audio CD In Connector (4-pin)

CN Label: CN9

CN Type: 4-pin header

CN Location: See Figure 4-5

CN Pinouts: See Table 4-5

The 4-pin audio CD in connector is connected to an external audio CD device for the input and output of audio signals from a CD player to the system.

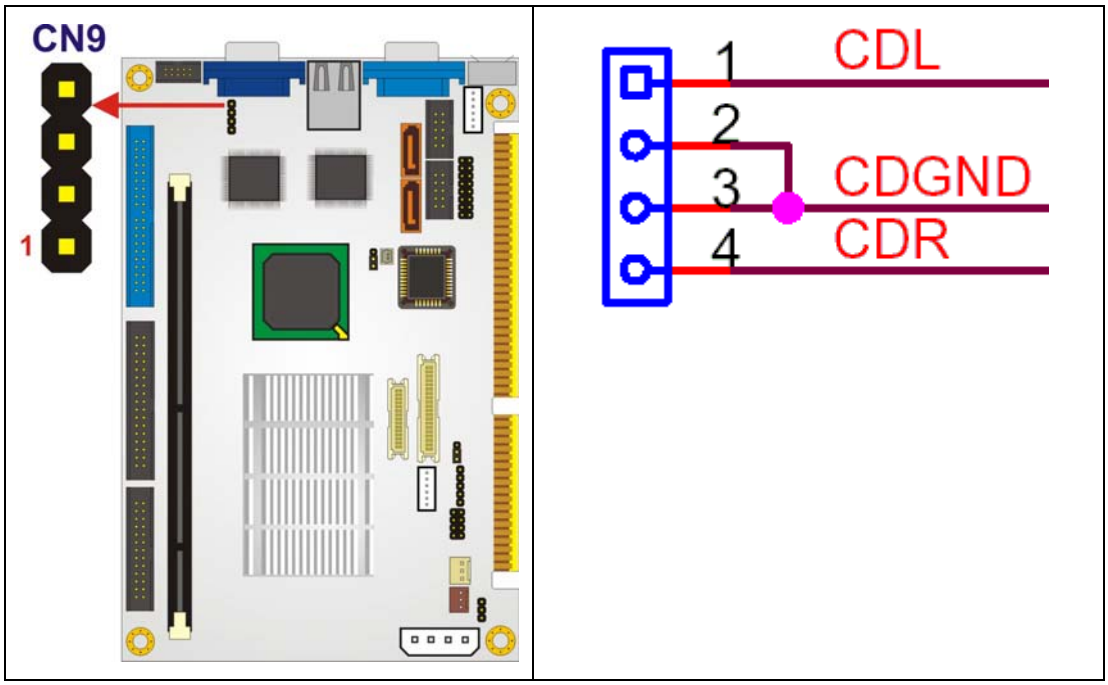

Figure 4-5: Audio CD In Connector Pinouts (4-pin)

PIN NO.	DESCRIPTION
1	CD Signal (Left)
2	Ground
3	Ground
4	CD Signal (Right)

Table 4-5: Audio CD In Connector Pinouts

4.2.4 Backlight Inverter Connector

CN Label: CN21

CN Type: 5-pin wafer (1x5)

CN Location: See Figure 4-6

CN Pinouts: See Table 4-6

The backlight inverter connector provides the backlight on the LCD display connected to the IOWA-MARK with +12V of power.

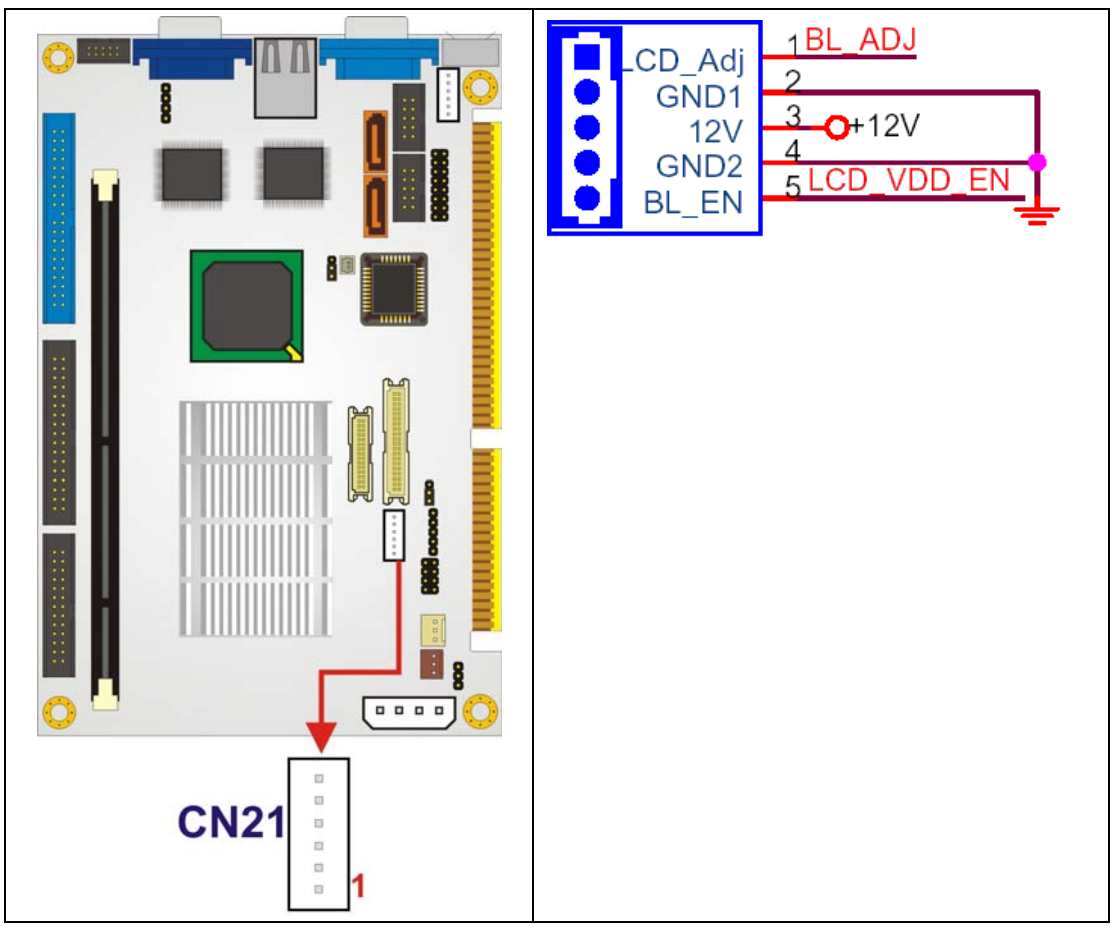

Figure 4-6: Panel Backlight Connector Pinout Locations

PIN NO.	DESCRIPTION
1	Ground
2	Ground
3	+12V
4	Ground
5	LCD Enable

Table 4-6: Panel Backlight Connector Pinouts

4.2.5 Backplane to Mainboard Connector

CN Label: CN29

CN Type: 3-pin wafer (1x3)

CN Location: See Figure 4-7

CN Pinouts: See Table 4-7

The backplane to mainboard connector closes the circuit between the mainboard and the backplane in which it is installed. The backplane should have an ATX connector and be powered by an ATX power supply.

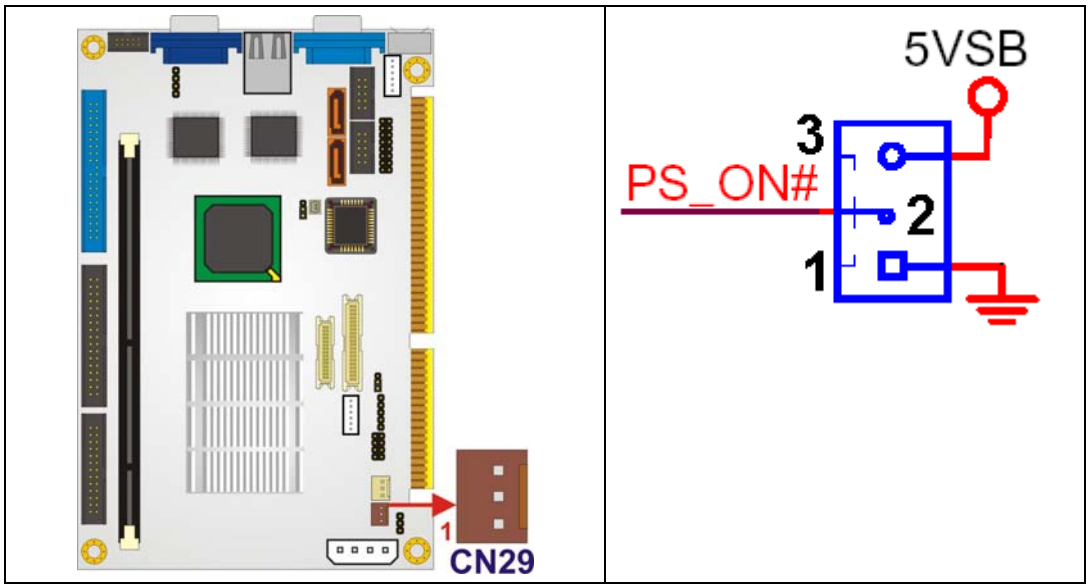

Figure 4-7: Backplane to Mainboard Connector Location

PIN NO.	DESCRIPTION
1	GND
2	PS_ON#
3	5VSB

Table 4-7: Backplane to Mainboard Connector Pinouts

4.2.6 Battery Connector

CN Label: CN15

CN Type: 2-pin wafer (1x2)

CN Location: See Figure 4-8

CN Pinouts: See Table 4-8

The battery connector is connected to a backup battery. The battery connector is also used to reset the CMOS memory if the incorrect BIOS settings have been made and the system cannot boot up.

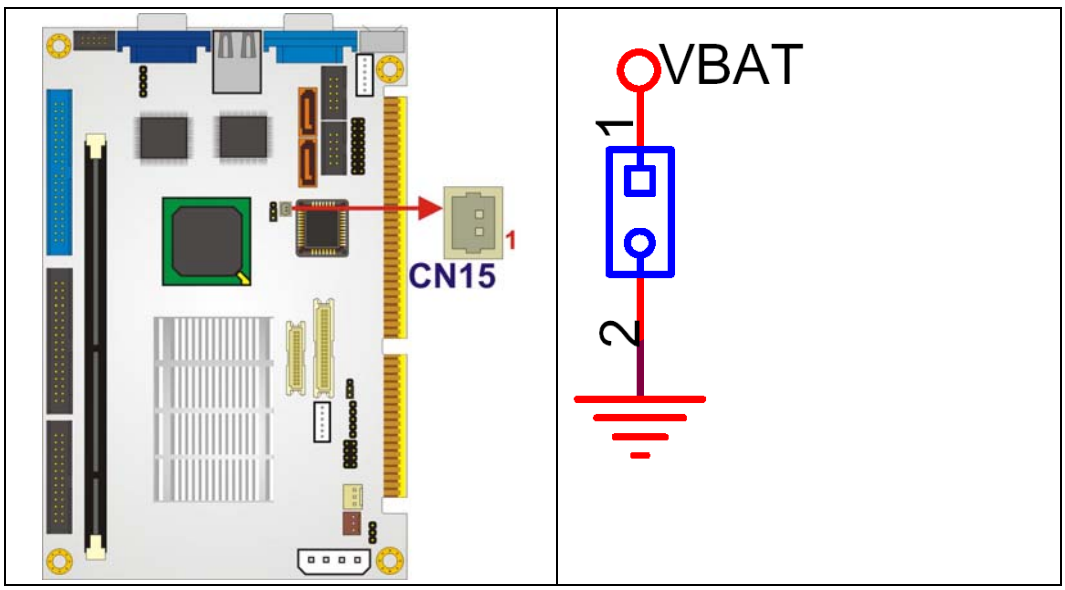

Figure 4-8: Battery Connector Location

PIN NO.	DESCRIPTION
1	Battery+
2	Ground

Table 4-8: Battery Connector Pinouts

4.2.7 Compact Flash Socket

CN Label: CN30 (solder side)

CN Type: 50-pin header (2x25)

CN Location: See Figure 4-9

CN Pinouts: See Table 4-9

A CF Type I or Type II memory card is inserted to the CF socket on the solder side of the IOWA-MARK.

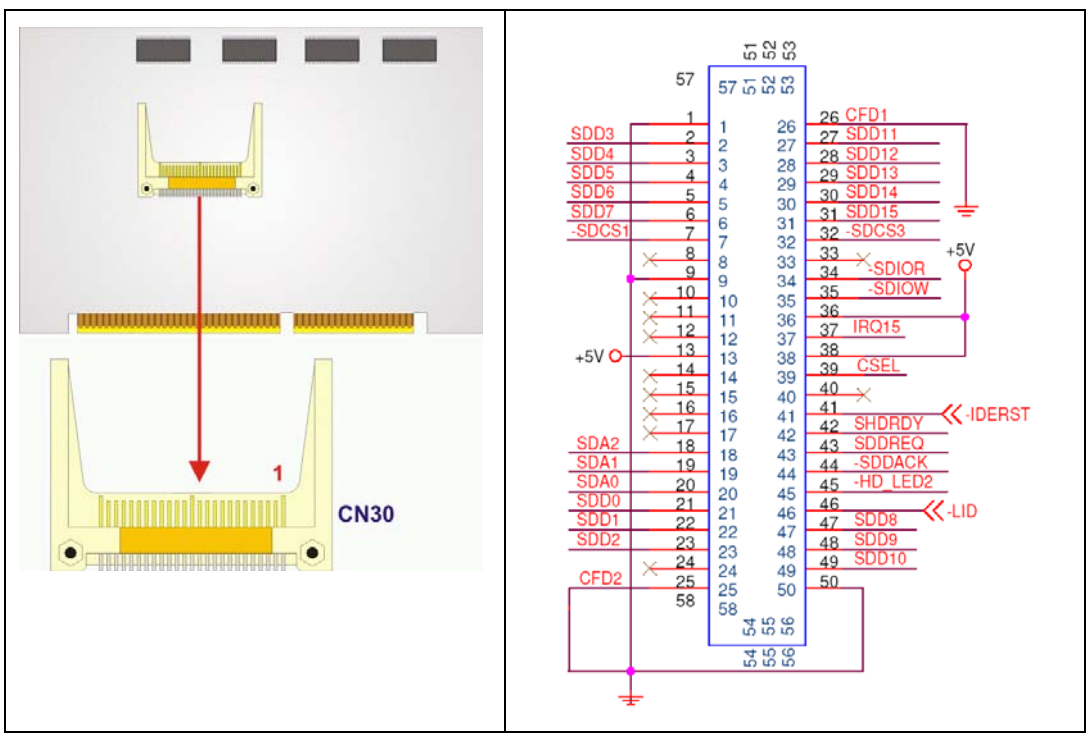

Figure 4-9: CF Card Socket Location

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

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	HDC_CS0#	32	HDC_CS1
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC_COM
12	N/C	37	IRQ15
13	VCC_COM	38	VCC_COM
14	N/C	39	CSEL
15	N/C	40	N/C
16	N/C	41	HDD_RESET
17	N/C	42	IORDY
18	SA2	43	SDREQ
19	SA1	44	SDACK#
20	SA0	45	HDD_ACTIVE#
21	DATA 0	46	66DET
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N/C	49	DATA 10
25	VCC-IN CHECK2	50	GROUND

Table 4-9: CF Card Socket Pinouts

4.2.8 Digital Input/Output (DIO) Connector

CN Label: CN18

CN Type: 10-pin box header (2x5)

CN Location: See Figure 4-10

CN Pinouts: See Table 4-10

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

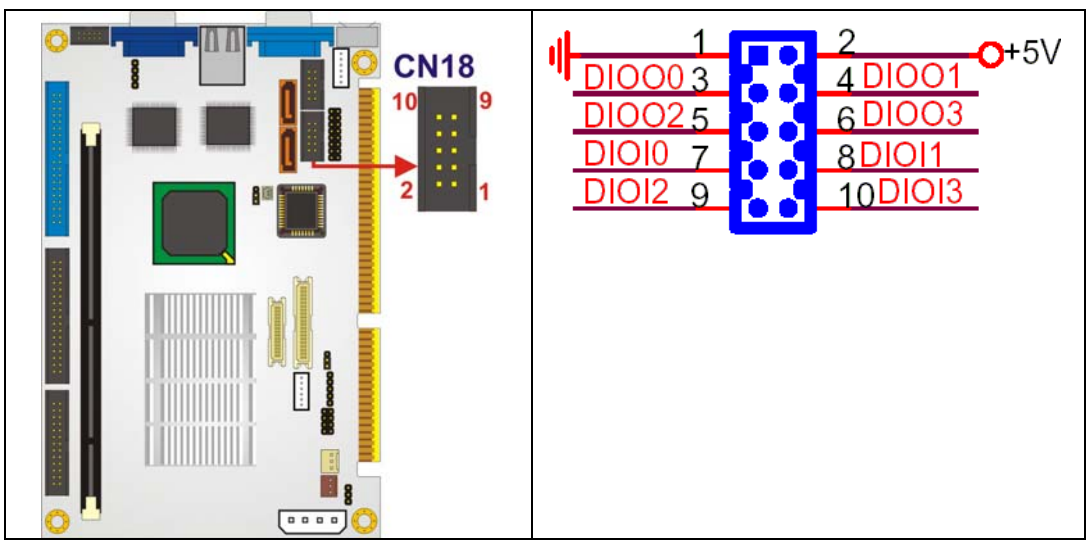

Figure 4-10: DIO Connector Locations

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

Table 4-10: DIO Connector Pinouts

4.2.9 Fan Connector (+5V)

CN Label:	CN28
CN Type:	3-pin header
CN Location:	See Figure 4-11
CN Pinouts:	See Table 4-11

The cooling fan connector provides a 5V, 500mA current to a system cooling fan. The connector has a "rotation" pin to get rotation signals from fans. Please note that only specified fans can issue the rotation signals.

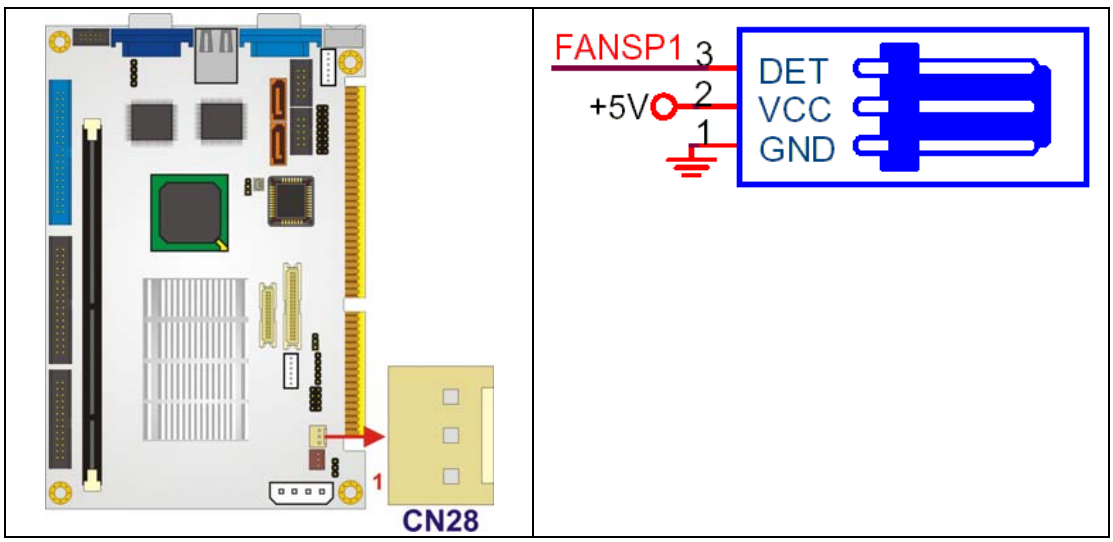

Figure 4-11: +5V Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+5V
3	Fan Speed Detect

Table 4-11: +5V Fan Connector Pinouts

4.2.10 Floppy Disk Connector

CN Label: CN4

CN Type: 34-pin header (2x17)

CN Location: See Figure 4-12

CN Pinouts: See Table 4-12

The floppy disk connector is connected to a floppy disk drive.

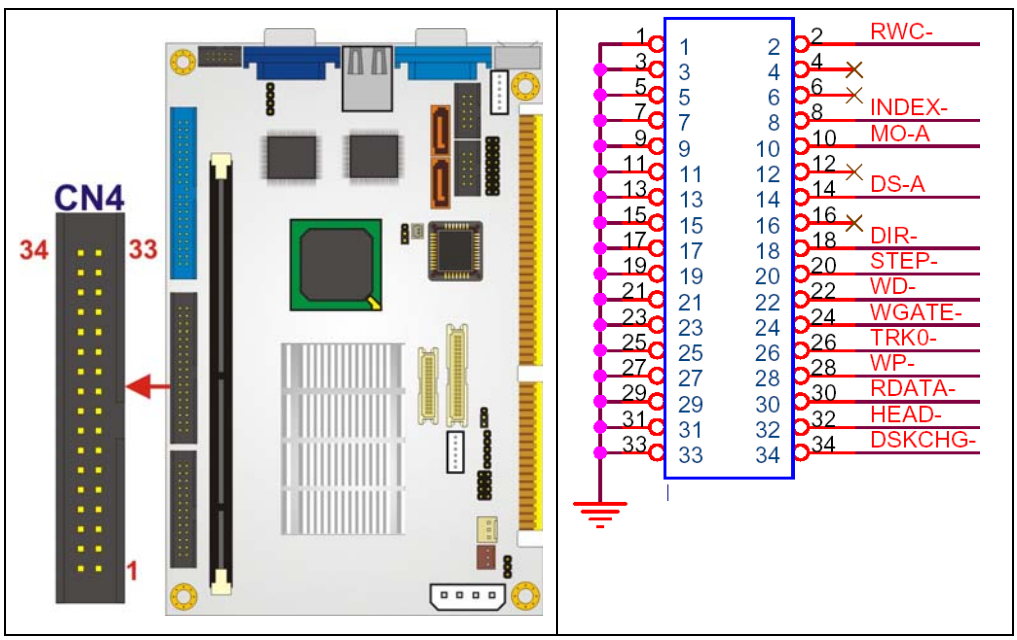

Figure 4-12: 34-pin FDD Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	REDUCE WRITE
3	GND	4	N/C
5	N/C	6	N/C
7	GND	8	INDEX#
9	GND	10	MOTOR ENABLE A#
11	GND	12	DRIVE SELECT B#

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
13	GND	14	DRIVE SELECT A#
15	GND	16	MOTOR ENABLE B#
17	GND	18	DIRECTION#
19	GND	20	STEP#
21	GND	22	WRITE DATA#
23	GND	24	WRITE GATE#
25	GND	26	TRACK 0#
27	GND	28	WRITE PROTECT#
29	GND	30	READ DATA#
31	GND	32	SIDE 1 SELECT#
33	GND	34	DISK CHANGE#

Table 4-12: 34-pin FDD Connector Pinouts

4.2.11 Front Panel Connector (8-pin)

CN Label: CN25

CN Type: 8-pin header (2x4)

CN Location: See Figure 4-17

CN Pinouts: See Table 4-17

The front panel connector connects to the power button, reset button and hard drive LEDs located on the front panel of the chassis.

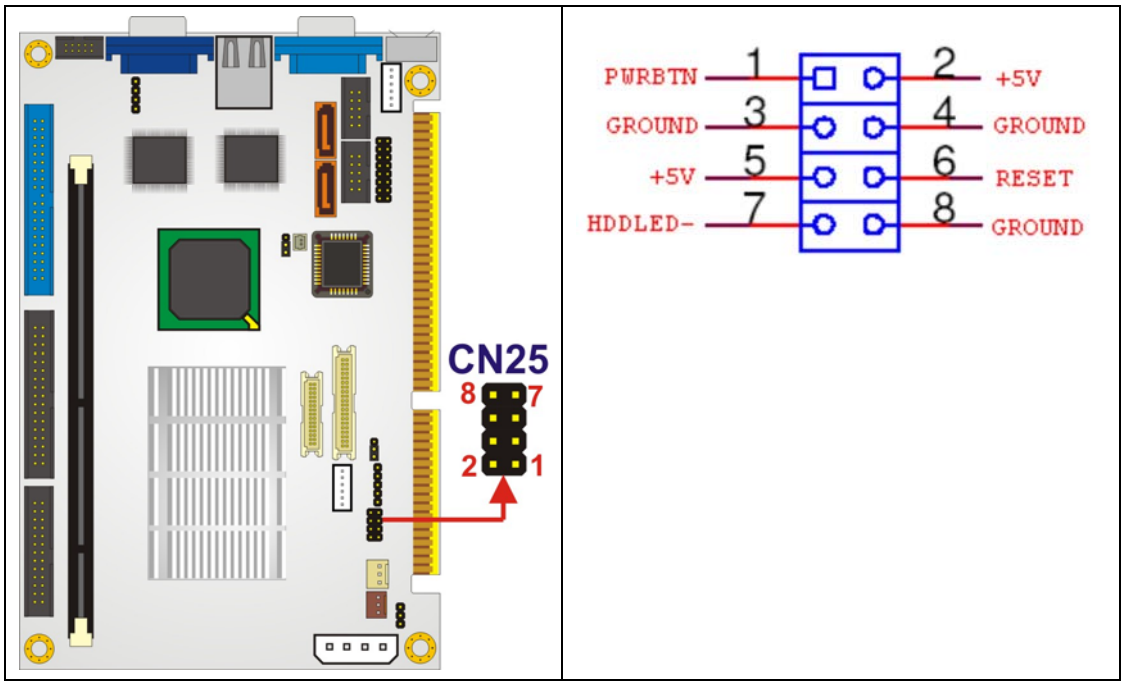

Figure 4-13: Front Panel Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	PWRBTN	2	+5V
3	GROUND	4	GROUND
5	+5V	6	RESET
7	HDDLED-	8	GROUND

Table 4-13: Front Panel Connector Pinouts

4.2.12 IDE Connector (40-pin)

CN Label: CN5

CN Type: 40-pin header (2x20)

CN Location: See Figure 4-14

CN Pinouts: See Table 4-14

One 40-pin IDE device connector on the IOWA-MARK supports connectivity to two hard disk drives.

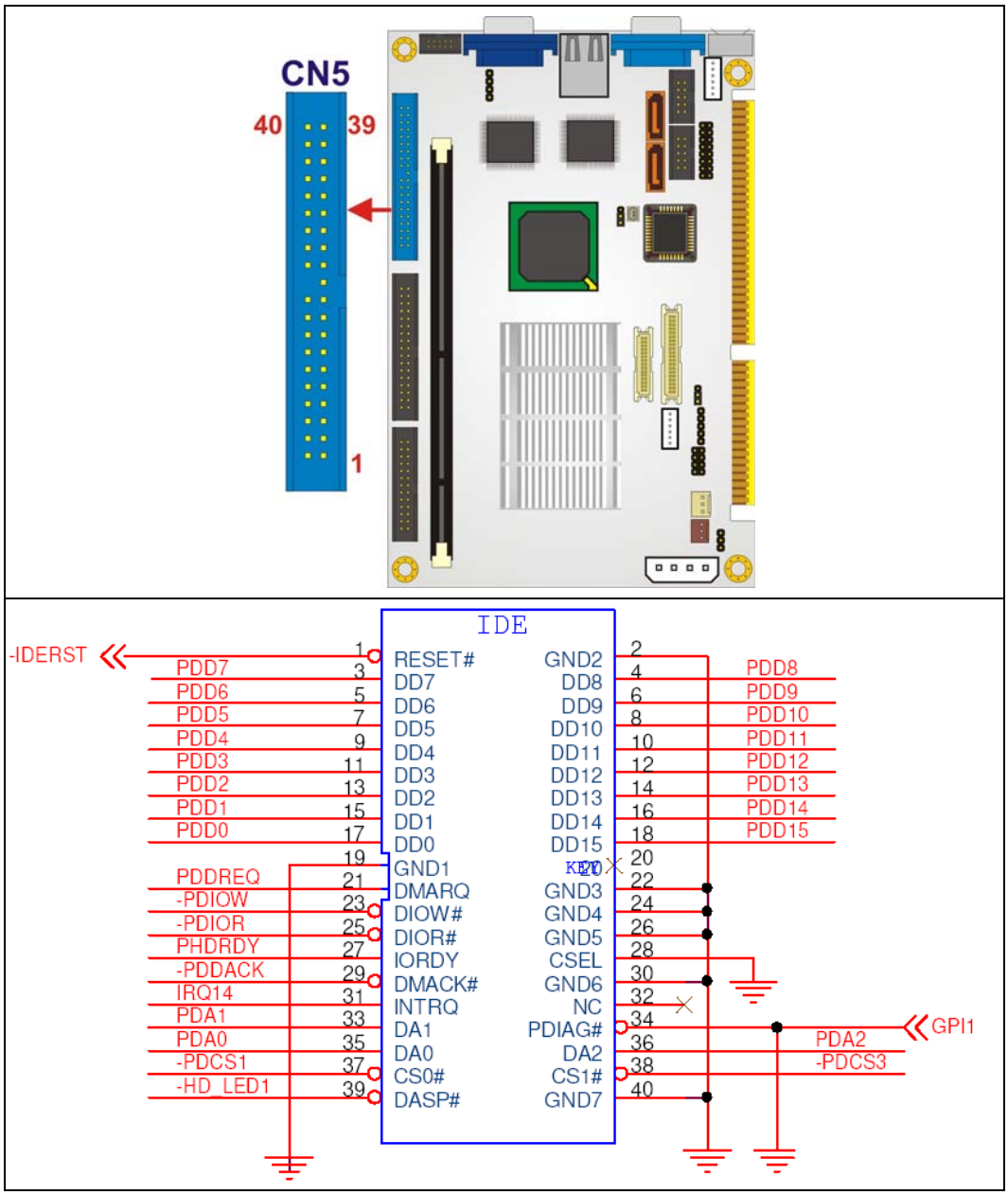

Figure 4-14: IDE Device Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND–DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

Table 4-14: IDE Connector Pinouts

4.2.13 Infrared Interface Connector (5-pin)

CN Label: CN19

CN Type: 5-pin header (1x5)

CN Location: See Figure 4-15

CN Pinouts: See Table 4-15

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

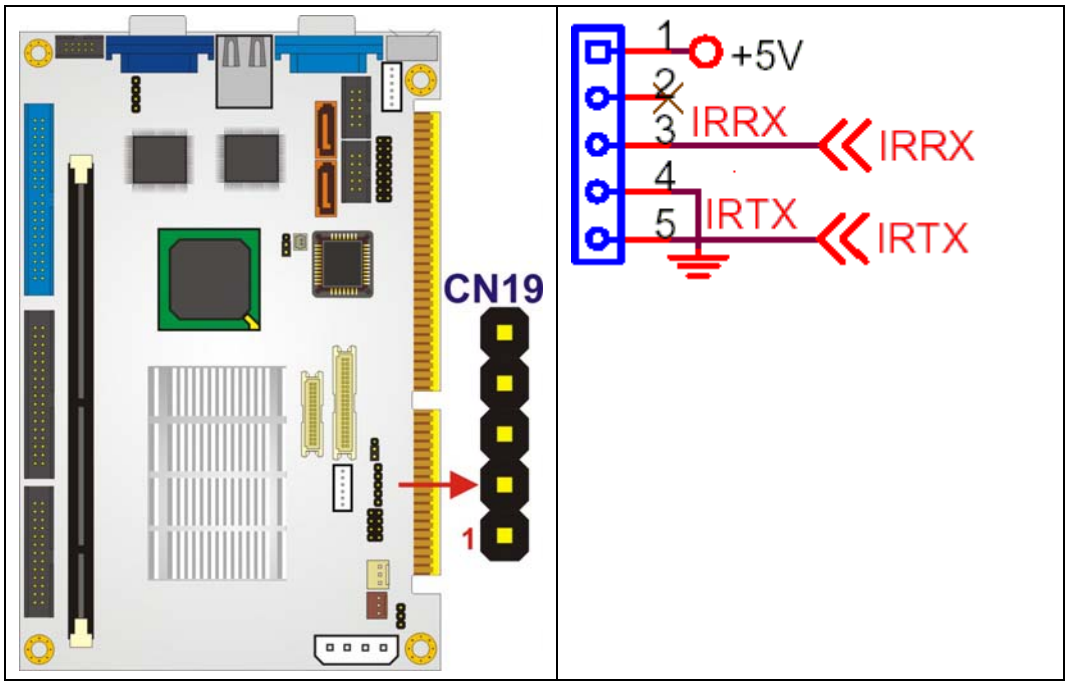

Figure 4-15: Infrared Connector Pinout Locations

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

Table 4-15: Infrared Connector Pinouts

4.2.14 Keyboard/Mouse Connector

CN Label: CN22

CN Type: 6-pin header (1x6)

CN Location: See Figure 4-16

CN Pinouts: See Table 4-16

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

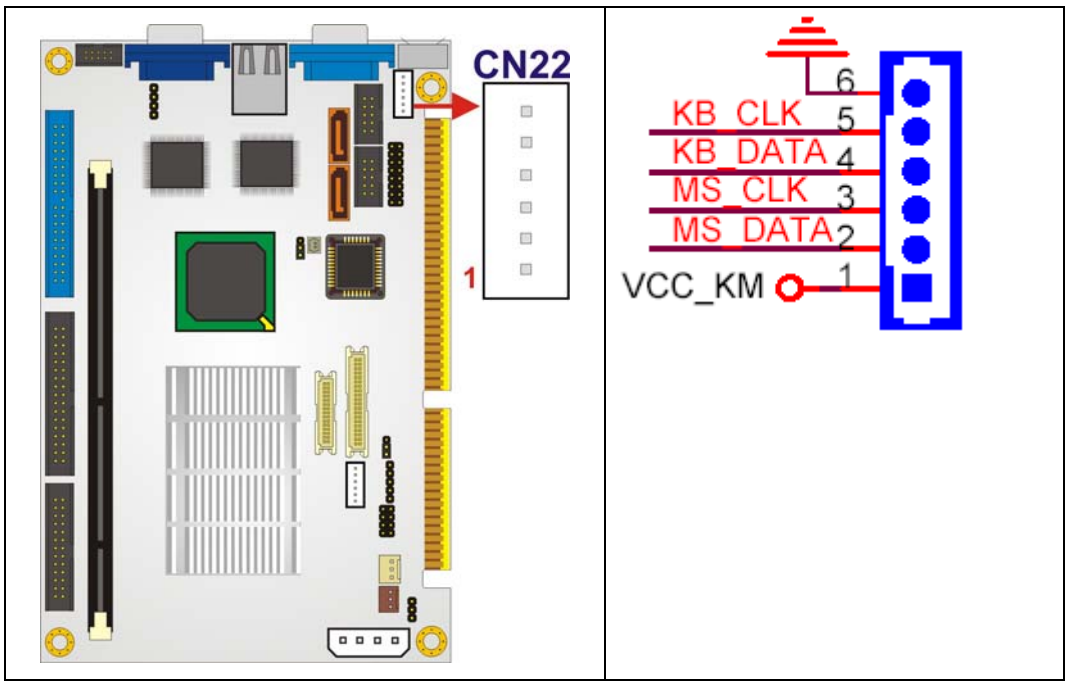

Figure 4-16: Keyboard/Mouse Connector Location

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

Table 4-16: Keyboard/Mouse Connector Pinouts

4.2.15 LVDS LCD Connector

CN Label: CN16

CN Type: 30-pin crimp (2x15)

CN Location: See Figure 4-17

CN Pinouts: See Table 4-17

The 30-pin LVDS LCD connector can be connected to an 18-bit single channel or 36-bit dual channel (18 bits per channel) LVDS panel.

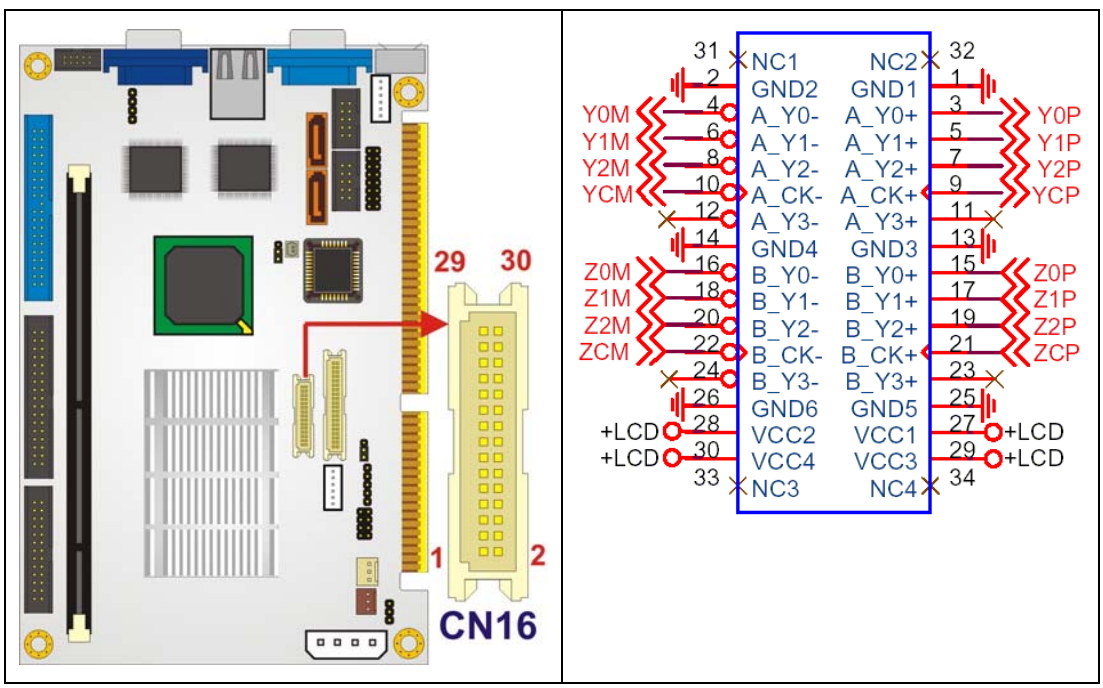

Figure 4-17: LVDS LCD Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	2	GROUND
3	LVDSA_Y0+	4	LVDSA_Y0-
5	LVDSA_Y1+	6	LVDSA_Y1-
7	LVDSA_Y2+	8	LVDSA_Y2-
9	LVDSA_CLK+	10	LVDSA_CLK-

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
11	N/C	12	N/C
13	GROUND	14	GROUND
15	LVDSB_Y0+	16	LVDSB_Y0-
17	LVDSB_Y1+	18	LVDSB_Y1-
19	LVDSB_Y2+	20	LVDSB_Y2-
21	LVDSB_CLK+	22	LVDSB_CLK-
23	N/C	24	N/C
25	GROUND	26	GROUND
27	VCC_LVDS	28	VCC_LVDS
29	VCC_LVDS	30	VCC_LVDS

Table 4-17: LVDS LCD Port Connector Pinouts

4.2.16 Parallel Port Connector

CN Label: CN3

CN Type: 26-pin box header

CN Location: See Figure 4-18

CN Pinouts: See Table 4-18

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

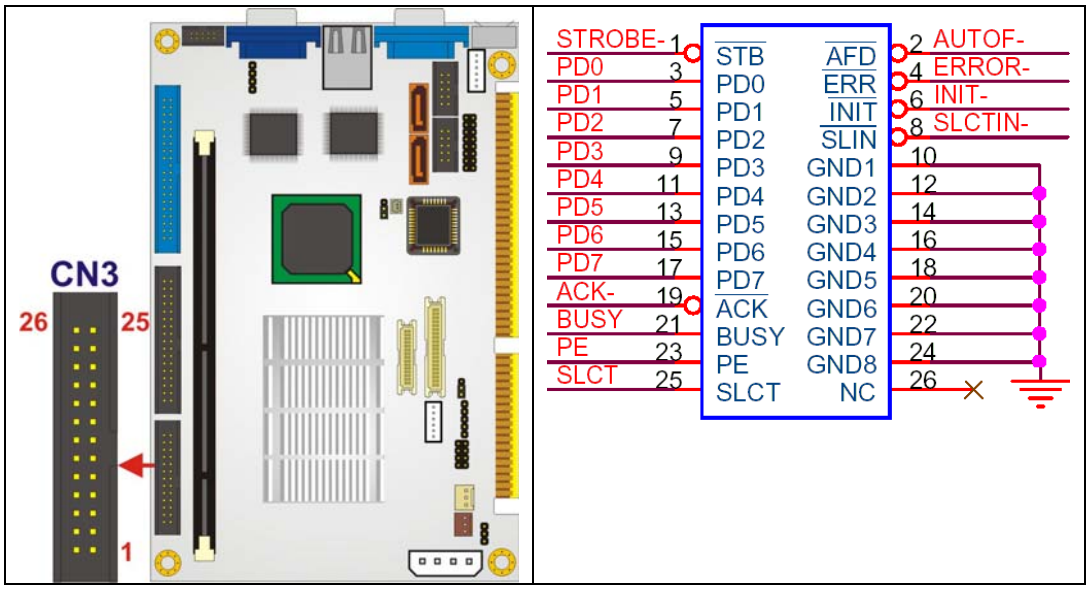

Figure 4-18: Parallel Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	2	AUTO FORM FEED #
3	DATA 0	4	ERROR#
5	DATA 1	6	INITIALIZE
7	DATA 2	8	PRINTER SELECT LN#
9	DATA 3	10	GROUND
11	DATA 4	12	GROUND
13	DATA 5	14	GROUND
15	DATA 6	16	GROUND
17	DATA 7	18	GROUND
19	ACKNOWLEDGE	20	GROUND
21	BUSY	22	GROUND
23	PAPER EMPTY	24	GROUND
25	PRINTER SELECT	26	N/C

Table 4-18: Parallel Port Connector Pinouts

4.2.17 SATA Drive Connectors

CN Label: CN13 and CN14

CN Type: 7-pin SATA drive connectors

CN Location: See Figure 4-19

CN Pinouts: See Table 4-19

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

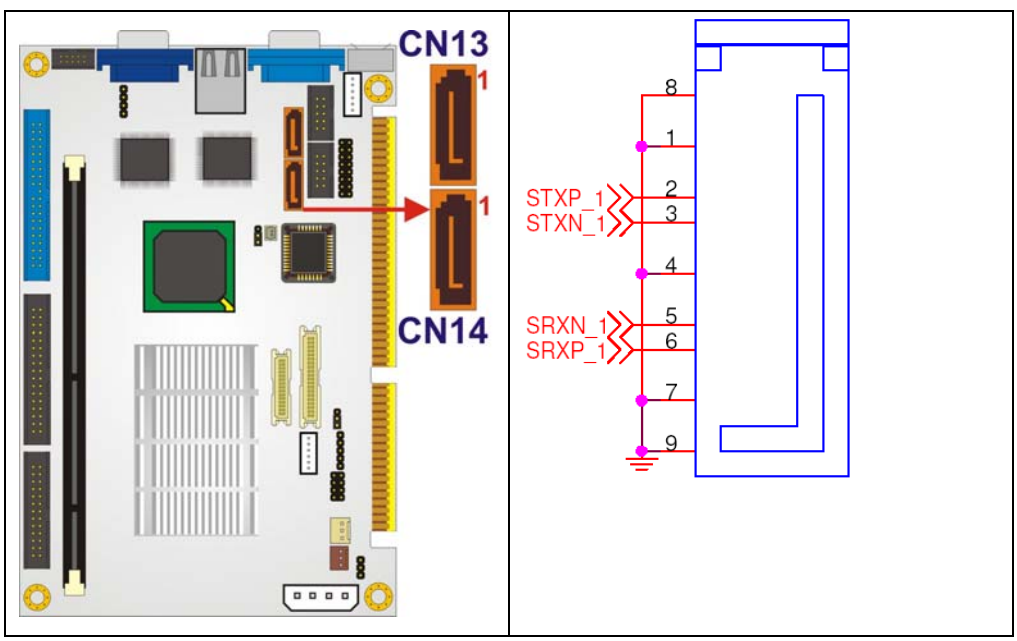

Figure 4-19: SATA Drive Connector Locations

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

PIN NO.	DESCRIPTION
6	RX+
7	GND

Table 4-19: SATA Drive Connector Pinouts

4.2.18 Serial Port Connector (COM 2)

CN Label: CN17

CN Type: 10-pin header (2x5)

CN Location: See Figure 4-20

CN Pinouts: See Table 4-20

The 10-pin serial port connector provides a second RS-232 serial communications channel. The COM 2 serial port connector can be connected to external RS-232 serial port devices.

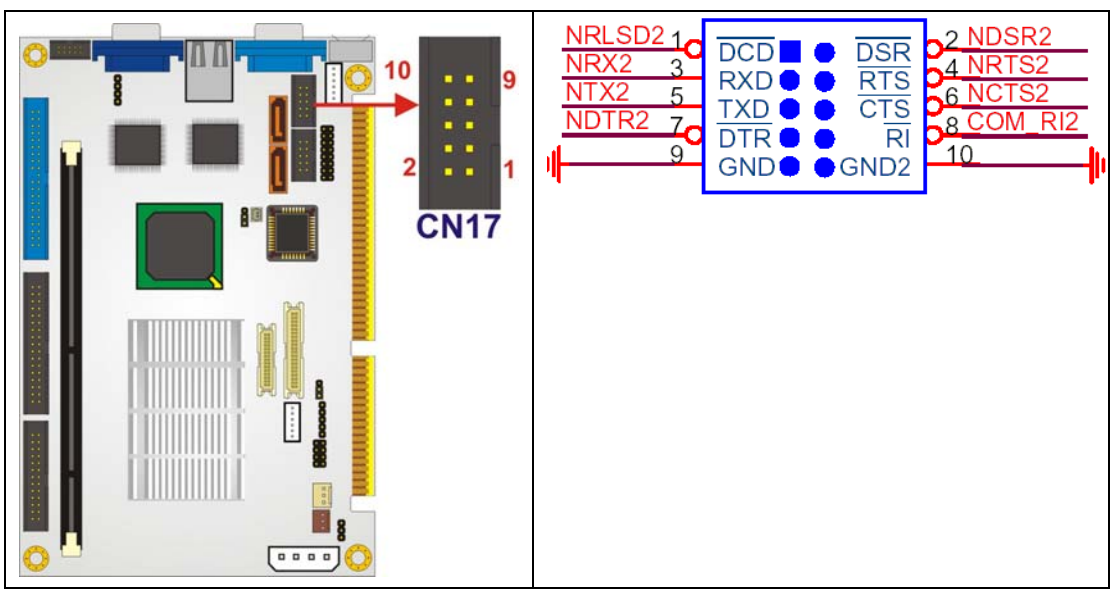

Figure 4-20: COM 2 Connector Pinout Locations

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

Table 4-20: COM 2 Connector Pinouts

4.2.19 TFT LCD Connector

CN Label: CN20

CN Type: 40-pin crimp (2x20)

CN Location: See Figure 4-21

CN Pinouts: See Table 4-21

The 40-pin TFT LCD connector can be connected to an LCD panel directly.

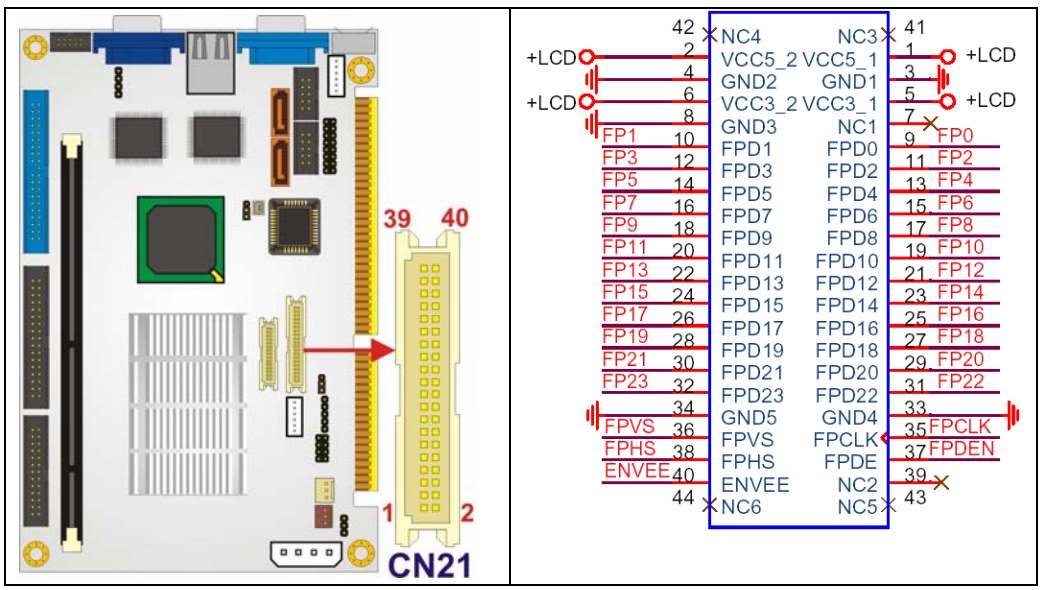

Figure 4-21: TFT LCD Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC_FP	2	VCC_FP
3	GROUND	4	GROUND
5	VCC_FP	6	VCC_FP
7	N/C	8	GROUND
9	B0	10	B1
11	B2	12	B3
13	B4	14	B5
15	B6	16	B7
17	G0	18	G1
19	G2	20	G3
21	G4	22	G5
23	G6	24	G7
25	R0	26	R1
27	R2	28	R3
29	R4	30	R5
31	R6	32	R7
33	GROUND	34	GROUND
35	FPCLK	36	FPVS
37	FPDEN	38	FPHS
39	N/C	40	ENVEE

Table 4-21: TFT LCD Port Connector Pinouts

NOTE:

For 18-bits RGB mapping: (R2 ~ R7 , G2 ~ G7 , B2 ~ B7). For 24-bits RGB mapping: (R0 ~ R7 , G0 ~ G7 , B0 ~ B7)

4.2.20 Internal USB Connectors

CN Label: CN23 and CN24

CN Type: 8-pin header (2x4)

CN Location: See Figure 4-22

CN Pinouts: See Table 4-22

The 2x4 USB pin connectors each provide connectivity to two USB 1.1 ports. Each USB connector can support two USB devices. The USB ports are used for I/O bus expansion.

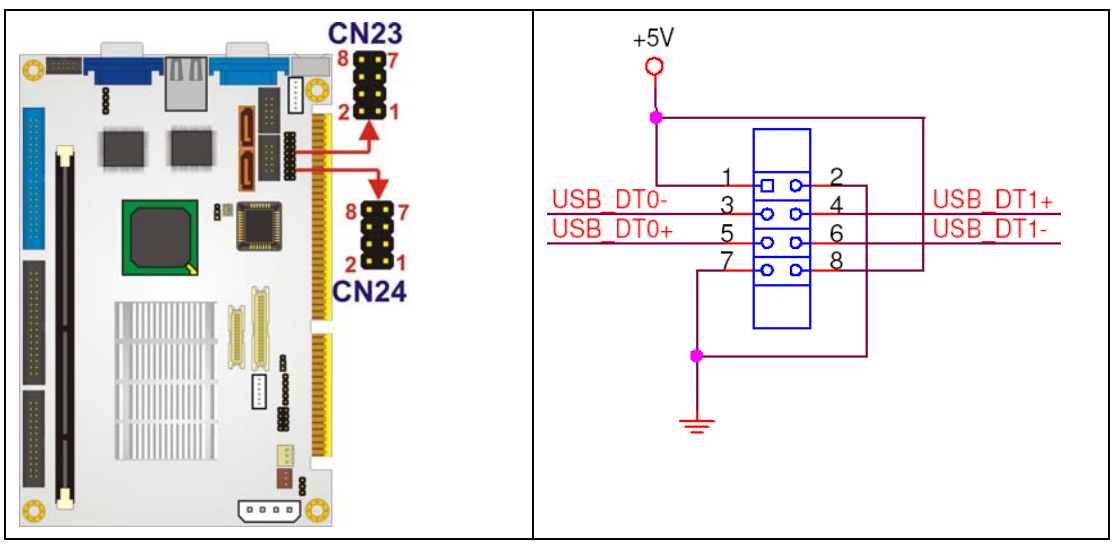

Figure 4-22: USB Connector Pinout Locations

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

Table 4-22: USB Port Connector Pinouts

4.2.21 -VCC Power Connectors

CN Label: CN23 and CN1

CN Type: 3-pin header (1 x 3)

CN Location: See Figure 4-22

CN Pinouts: See Table 4-22

The –VCC power connector provides –5V and –12V power to legacy expansion ISA devices installed on the backplane. The power supply is connected to the –VCC power connecter and transmitted to the ISA devices through the backplane.

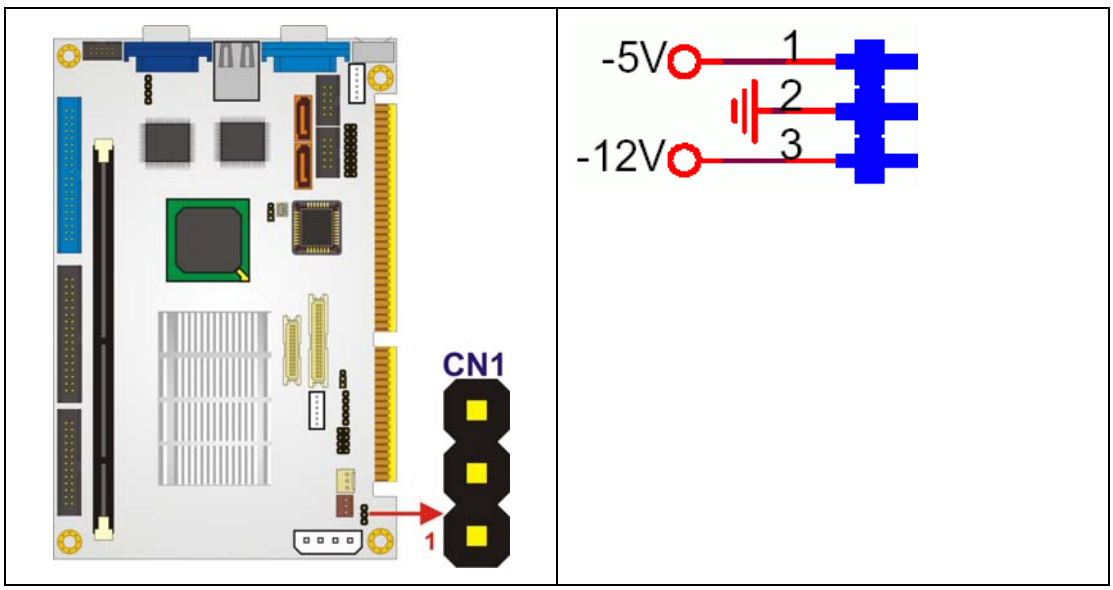

Figure 4-23: -VCC Power Connector Pinout Locations

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

Table 4-23: -VCC Power Connector Pinouts

4.3 External Peripheral Interface Connectors

4.3.1 External Peripheral Interface Connector Overview

The IOWA-MARK external peripheral interface connectors are listed below and shown in Figure 4-24:

- 1 x PS/2 Keyboard/Mouse connector
- 1 x RJ-45 Ethernet connector
- 1 x Serial communications port
- 1 x VGA port

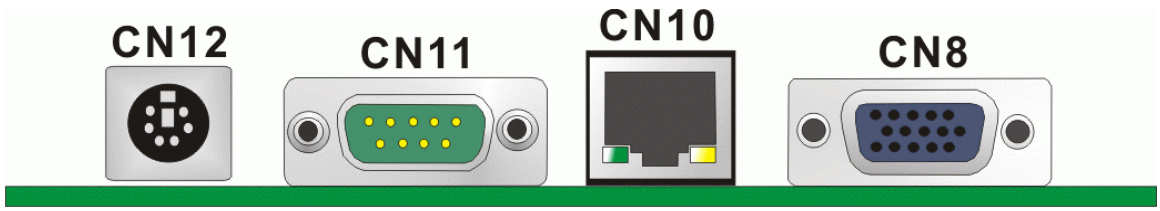

Figure 4-24: IOWA-MARK On-board External Interface Connectors

4.3.2 PS/2 Keyboard/Mouse Connector

CN Label:	CN12
CN Type:	PS/2
CN Location:	See Figure 4-24
CN Pinouts:	See Figure 4-25 and Table 4-24

The PS/2 connector can be connected to a keyboard or mouse.

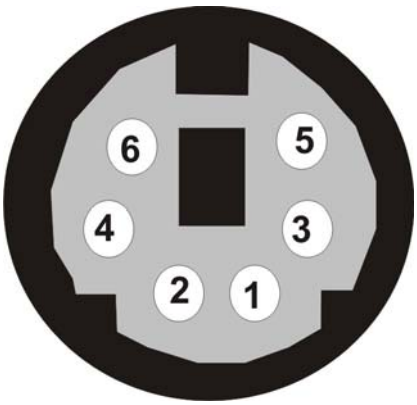

Figure 4-25: PS/2 Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	KB_DATA	7	MS_DATA
2	NC	8	NC
3	GND	9	GND
4	+5V	10	+5V
5	KB_CLOCK	11	MS_CLOCK
6	NC	12	NC

Table 4-24: PS/2 Connector Pinouts

4.3.3 RJ-45 Ethernet Connector

CN Label: CN10

CN Type: RJ-45

CN Location: See Figure 4-24

CN Pinouts: See Table 4-25

The RJ-45 Ethernet connector on the IOWA-MARK provides connectivity to a 10/100 megabit Ethernet connection between the IOWA-MARK and a Local Area Network (LAN) through a network hub.

PIN NO.	DESCRIPTION
1	TX+
2	N/C
3	TX-
4	RX+
5	N/C
6	RX-
7	N/C
8	N/C

Table 4-25: RJ-45 Ethernet Connector Pinouts

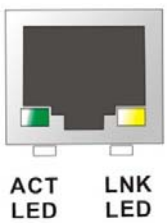

Figure 4-26: J7 Connector

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

SPEED LED		LINK LED	
Status	**Description**	**Status**	**Description**
GREEN	ON: 100MB OFF: 10MB	**YELLOW**	ON: Linked Flashing: Activity

Table 4-26: J7 Connector LEDs

4.3.4 Serial Port Connector (COM 1)

CN Label: CN11

CN Type: DB-9 connector

CN Location: See Figure 4-24

CN Pinouts: See Table 4-27 and Figure 4-27

The 9-pin DB-9 COM 1 serial port connector is connected to RS-232 serial communications devices.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	COM_RI1		

Table 4-27: RS-232 Serial Port (COM 1) Pinouts

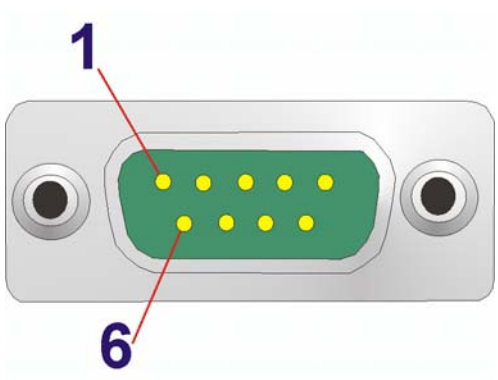

Figure 4-27: COM1 Pinout Locations

4.3.5 VGA Connector

CN Label: CN8

CN Type: DB15

CN Location: See Figure 4-24

CN Pinouts: See Figure 4-28 and Table 4-28

The standard 15-pin female DB15 VGA connector connects to a CRT or LCD monitor directly.

PIN	DESCRIPTION	PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	6	GROUND	11	NC
2	GREEN	7	GROUND	12	DDCDAT
3	BLUE	8	GROUND	13	HSYNC
4	NC	9	NC	14	VSYNC
5	GROUND	10	GROUND	15	DDCCLK

Table 4-28: VGA Connector Pinouts

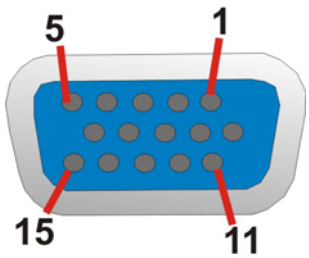

Figure 4-28: VGA Connector

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Chapter

5

Installation

5.1 Anti-static Precautions

WARNING:

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

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

5.2 Installation Considerations

NOTE:

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

5.2.1 Installation Notices

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the IOWA-MARK, IOWA-MARK 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 IOWA-MARK 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 IOWA-MARK 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 IOWA-MARK off**:

- When working with the IOWA-MARK, 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 IOWA-MARK **DO NOT:**

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

5.2.2 Installation Checklist

The following checklist is provided to ensure the IOWA-MARK is properly installed.

- All the items in the packing list are present
- The CPU is installed
- The CPU cooling kit is properly installed
- A compatible memory module is properly inserted into the slot
- The CF Type I or CF Type II card is properly installed into the CF socket
- The jumpers have been properly configured
- The IOWA-MARK is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - Primary and secondary IDE device
  - SATA drives
  - Keyboard and mouse cable
  - Audio kit
  - Power supply
  - USB cable
  - Serial port cable
  - Parallel port cable
- The following external peripheral devices are properly connected to the chassis:
  - VGA screen

- Keyboard
- Mouse
- RS-232 serial communications device
- Parallel port

5.3 Unpacking

5.3.1 Unpacking Precautions

When the IOWA-MARK is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 5.1**.
- Make sure the packing box is facing upwards so the IOWA-MARK does not fall out of the box.
- Make sure all the components in the checklist shown in **Section 3.3** are present.

5.4 DIMM and CompactFlash Card Installation

5.4.1 DIMM Installation

WARNING:

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

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

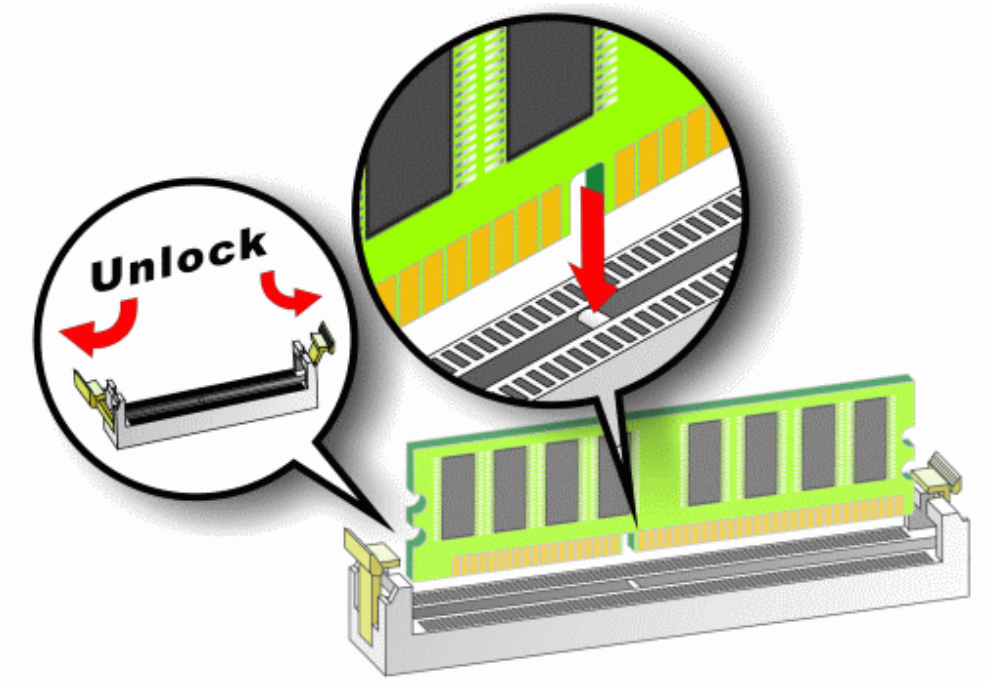


Figure 5-1: Installing a DIMM

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

Step 2: **Align the DIMM with the socket**. The DIMM must be oriented in such a way that the notch in the middle of the DIMM must be aligned with the plastic bridge in the socket. See **Figure 5-1**.

Step 3: **Insert the DIMM**. Once properly aligned, the DIMM can be inserted into the socket. As the DIMM is inserted, the white handles on the side of the socket will close automatically and secure the DIMM to the socket. See **Figure 5-1**.

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

5.4.2 CF Card Installation

NOTE:

The IOWA-MARK can support both CF Type I cards and CF Type II cards. For the complete specifications of the supported CF cards please refer to **Chapter 2**.

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

Step 1: **Locate the CF card socket**. Place the IOWA-MARK on an anti-static pad with the solder side facing up. Locate the CF card.

Step 2: **Align the CF card**. Make sure the CF card is properly aligned with the CF socket.

Step 3: **Insert the CF card**. Gently insert the CF card into the socket making sure the socket pins are properly inserted into the socket. See **Figure 5-2**.

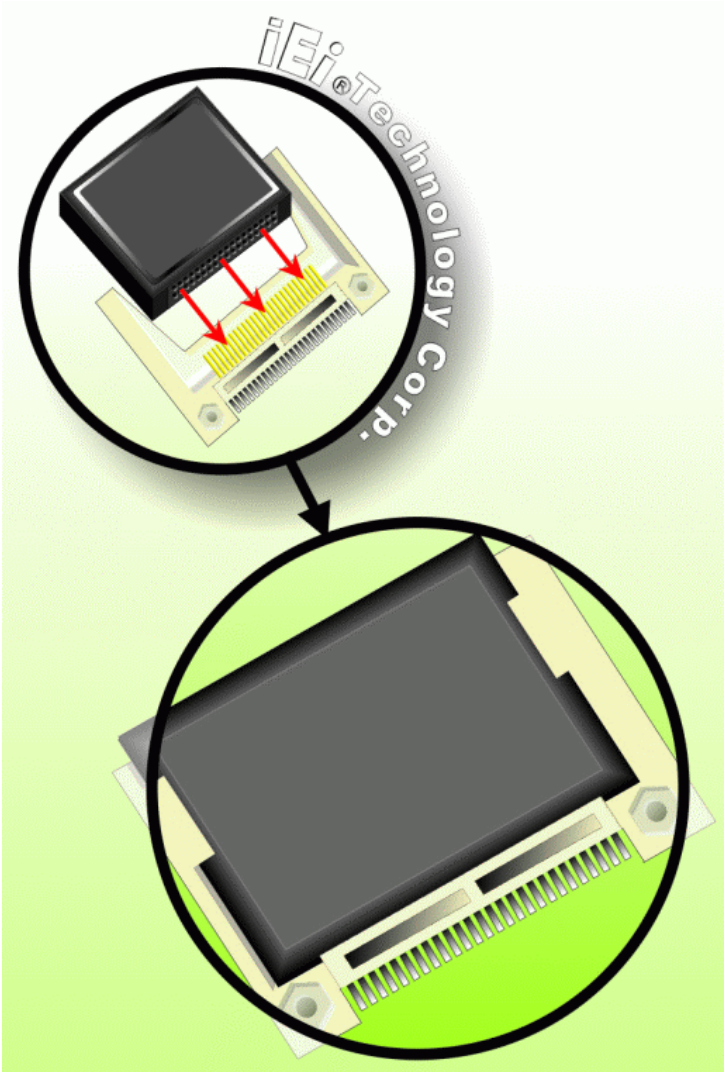
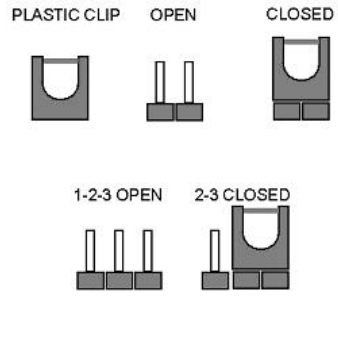


Figure 5-2: CF Card Installation

5.5 Jumper Settings

NOTE:

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



Jumper

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

Description	Label	Type
Serial port voltage selection	JP1	10-pin header
Clear CMOS	JP2	3-pin header
LVDS voltage selection	JP3	3-pin header

Table 5-1: Jumpers

5.5.1 Serial Port Voltage Selection Jumper

Jumper Label: JP1

Jumper Type: 10-pin header

Jumper Settings: See Table 5-2

Jumper Location: See **Figure 5-3**

The serial port voltage selection jumper allows selection of the voltage applied to the serial two serial ports on the IOWA-MARK.

The serial port voltage selector jumper settings are shown in **Table 5-2**.

Connector		Description
CN11	CN17	
Short 1 – 3	Short 2 – 4	12V
Short 3 – 5 Short 5 – 7	Short 4 – 6 Short 6 – 8	5V
Short 7 – 9	Short 8 – 10	Normal

Table 5-2: Clear CMOS Jumper Settings

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

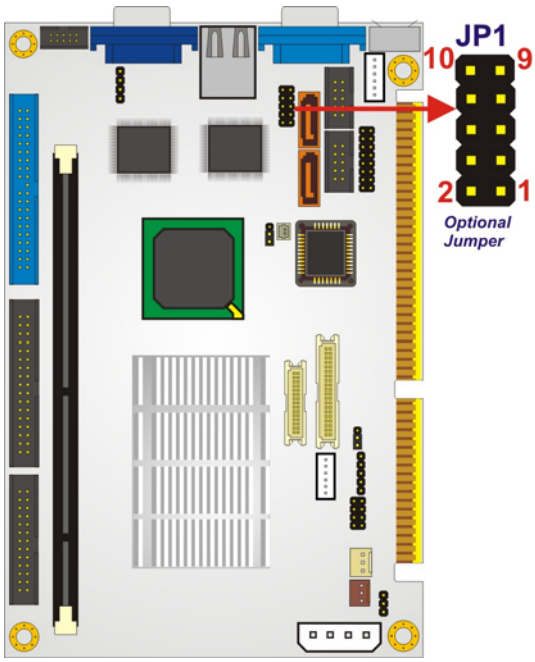


Figure 5-3: Serial port voltage selector

5.5.2 Clear CMOS Jumper

Jumper Label:	JP2
Jumper Type:	3-pin header
Jumper Settings:	See Table 5-3
Jumper Location:	See Figure 5-4

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

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

- Enter the correct CMOS setting

- Load Optimal Defaults
- Load Failsafe Defaults.

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

The clear CMOS jumper settings are shown in **Table 5-2**.

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

Table 5-3: Clear CMOS Jumper Settings

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

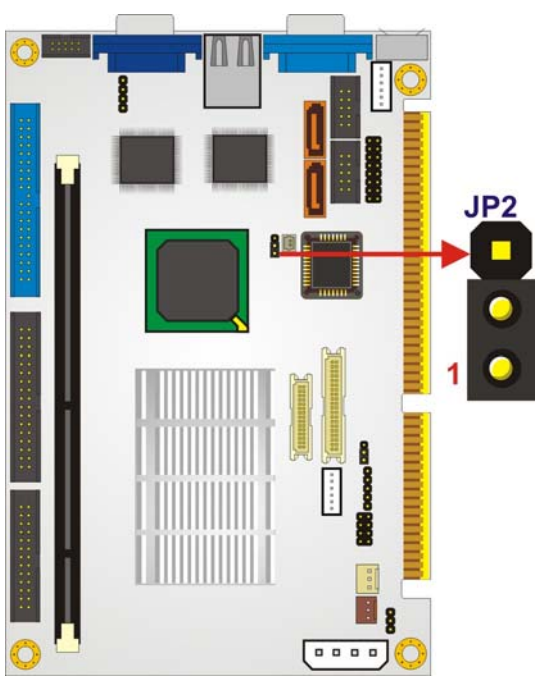


Figure 5-4: Clear CMOS Jumper

5.5.3 TTL and LVDS Voltage Selection

WARNING:

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

Jumper Label: JP3

Jumper Type: 3-pin header

Jumper Settings: See Table 5-4

Jumper Location: See Figure 5-5

The **LVDS Voltage Selection** jumper allows the LVDS screen voltage to be set. The **LVDS Voltage Selection** jumper settings are shown in **Table 5-4**.

AT Power Select	Description	
Short 1-2	+3.3V LVDS	Default
Short 2-3	+5V LVDS	

Table 5-4: LVDS Voltage Selection Jumper Settings

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

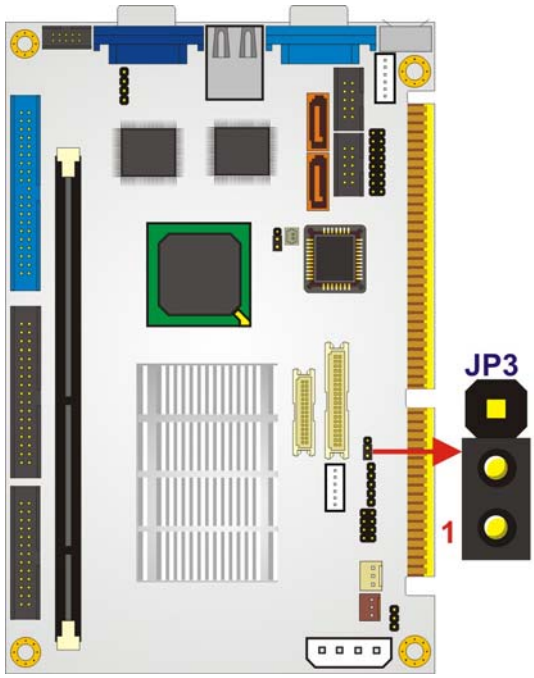


Figure 5-5: LVDS Voltage Selection Jumper Pinout Locations

5.6 Chassis Installation

5.6.1 Airflow

WARNING:

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

The IOWA-MARK must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

NOTE:

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

5.6.2 Backplane Installation

Before the IOWA-MARK can be installed into the chassis, a backplane must first be installed. Please refer to the installation instructions that came with the backplane and the chassis to see how to install the backplane into the chassis.

NOTE:

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

5.6.3 CPU Card Installation

To install the IOWA-MARK CPU card onto the backplane, carefully align the CPU card interface connectors with the corresponding socket on the backplane. To do this, please refer to the reference material that came with the backplane. Next, secure the CPU card to the chassis. To do this, please refer to the reference material that came with the chassis.

5.7 Internal Peripheral Device Connections

5.7.1 Peripheral Device Cables

The cables listed in **Table 5-5** are shipped with the IOWA-MARK.

Quantity	Type
1	Audio cable
1	ATA 66/100 flat cable
1	Single RS-232 cable
1	KB/MS Y cable
2	SATA drive cable
1	SATA drive power cable
1	USB cable

Table 5-5: IEI Provided Cables

5.7.2 ATA Flat Cable Connection

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

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

Step 2: **Insert the connector**. Connect the IDE cable connector to the onboard connector. See **Figure 5-6**. A key on the front of the cable connector ensures it can only be inserted in one direction.

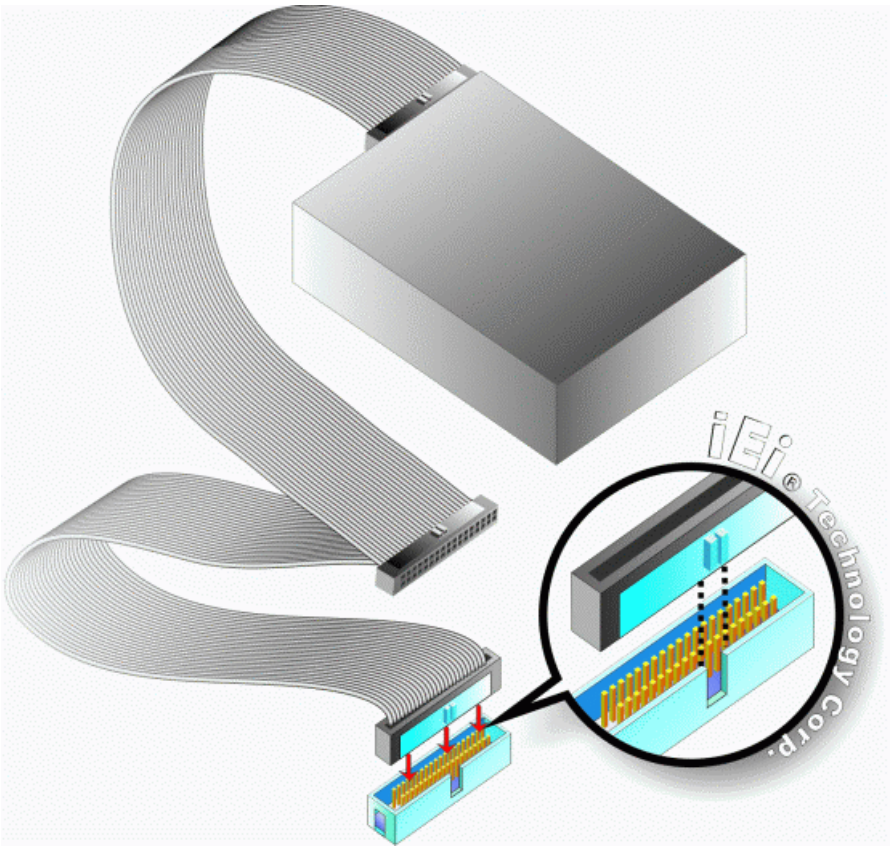


Figure 5-6: IDE Cable Connection

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

5.7.3 Audio Kit Installation

The Audio Kit that came with the IOWA-MARK connects to the 10-pin audio connector on the IOWA-MARK. The audio kit consists of three audio jacks. One audio jack, Mic In, connects to a microphone. The remaining two audio jacks, Line-In and Line-Out, connect to two speakers. To install the audio kit, please refer to the steps below:

Step 1: **Locate the audio connector**. The location of the 10-pin audio connector is shown in **Chapter 3**.

Step 2: **Align pin 1**. Align pin 1 on the onboard connector with pin 1 on the audio kit

connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 5-7**.

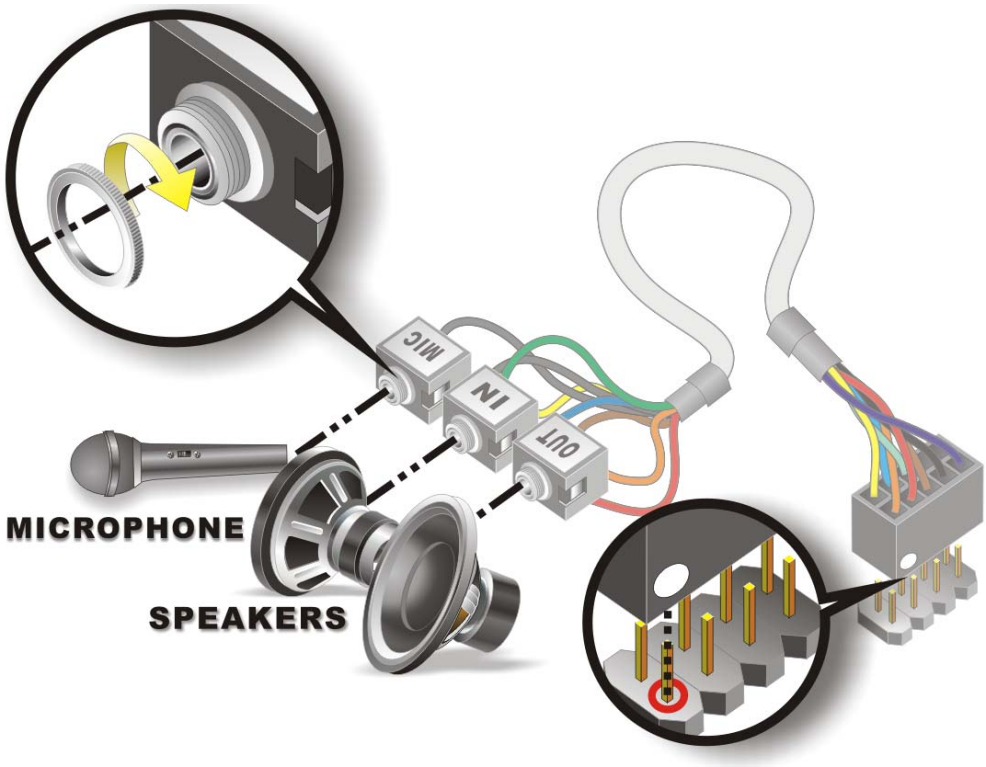


Figure 5-7: IDE Cable Connection

Step 3: **Connect the audio devices**. Connect one speaker to the line-in audio jack, one speaker to the line-out audio jack and a microphone to the mic-in audio jack.

5.7.4 Single RS-232 Cable Connection

The single RS-232 cable consists of one serial port connectors attached to a serial communications cable that is then attached to a D-sub 9 male connector that is mounted onto a bracket. To install the single RS-232 cable, please follow the steps below.

Step 1: **Locate the connector**. The location of the RS-232 connector is shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the connector into the serial port box header.

See **Figure 5-8**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

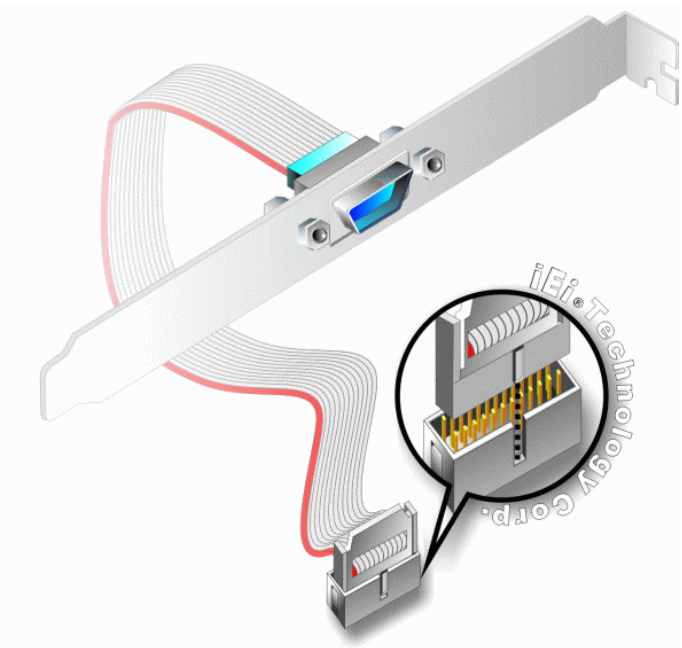


Figure 5-8: Single RS-232 Cable Installation

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

5.7.5 SATA Drive Connection

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

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

Step 2: **Insert the cable connector**. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the onboard SATA drive connector. See **Figure 5-9**.

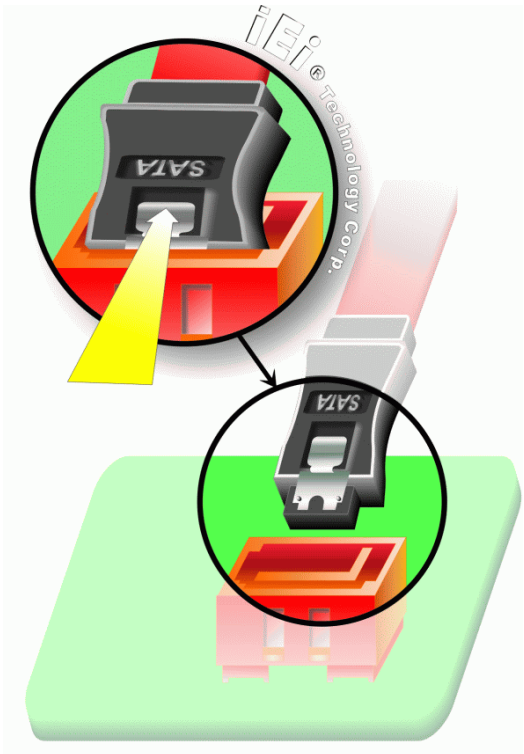


Figure 5-9: SATA Drive Cable Connection

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 5-10**.

Step 4: **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive. See **Figure 5-10**.

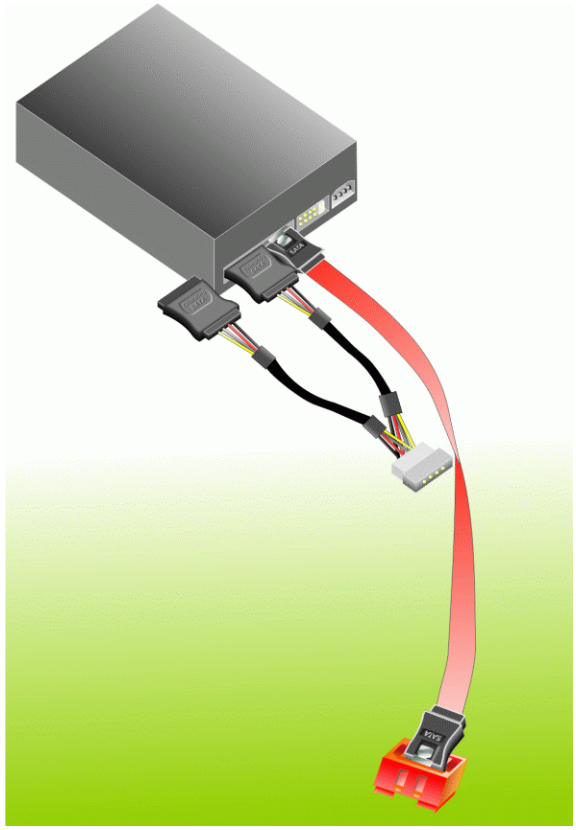


Figure 5-10: SATA Power Drive Connection

5.7.6 USB Cable (Dual Port) with Slot Bracket

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

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

WARNING:

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

Step 2: **Align the connectors**. The cable has two connectors. Correctly align pin 1on

each cable connector with pin 1 on the IOWA-MARK USB connector.

Step 3: **Insert the cable connectors** Once the cable connectors are properly aligned with the USB connectors on the IOWA-MARK, connect the cable connectors to the onboard connectors. See **Figure 5-11**.

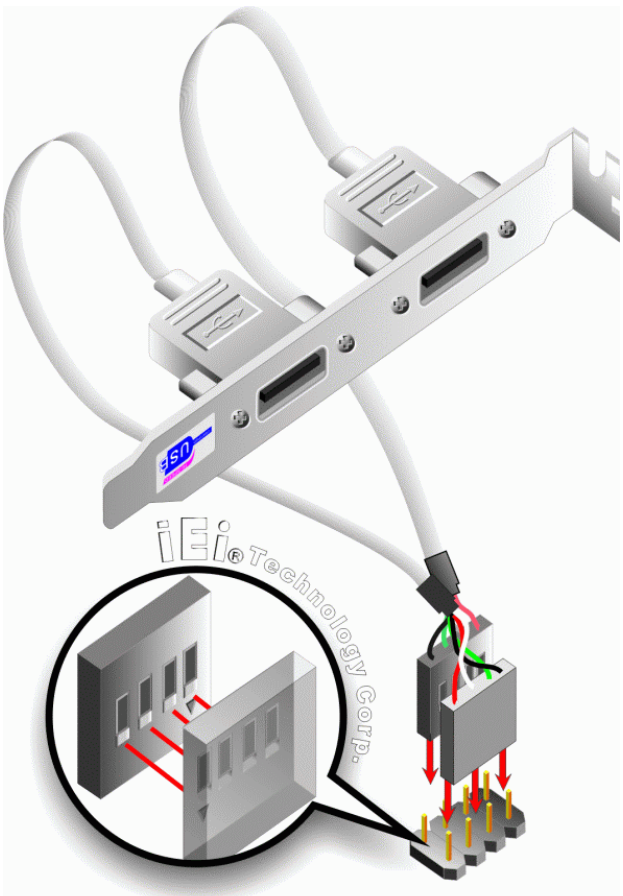


Figure 5-11: Dual USB Cable Connection

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

5.7.7 TFT/LVDS LCD Installation

The IOWA-MARK can be connected to a TFT LCD screen through the 40-pin TTL connector or to an LVDS screen through the LVDS connector. To connect a TFT/LVDS LCD to the IOWA-MARK, please follow the steps below.

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

Step 2: **Insert the cable connector**. Insert the connector from the TTL/LVDS PCB driving board to the TTL/LVDS connector as shown in **Figure 5-12**. When connecting the connectors make sure the pins are properly aligned.

WARNING:

The diagram below is merely for illustration. The configuration and connection of the cables from the TFT/LVDS LCD screen being installed may be different. Please refer to the installation manual that came with the TFT/LVDS LCD screen.

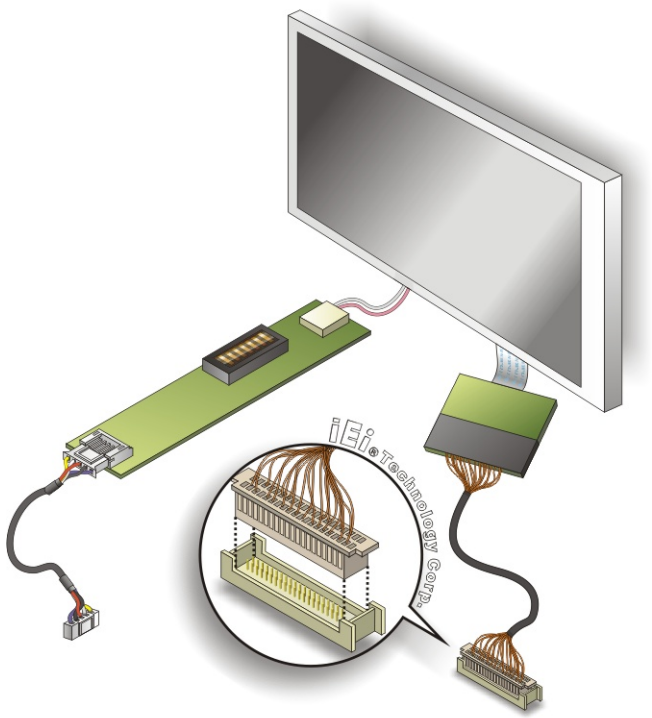


Figure 5-12: TTL/LVDS Connector

Step 3: **Locate the backlight inverter connector.** The location of the backlight inverter connector is shown in **Chapter 3**.

Step 4: **Connect backlight connector**. Connect the backlight connector to the driver TFT/LVDS LCD PCB as shown in **Figure 5-13**. When inserting the cable connector, make sure the pins are properly aligned.

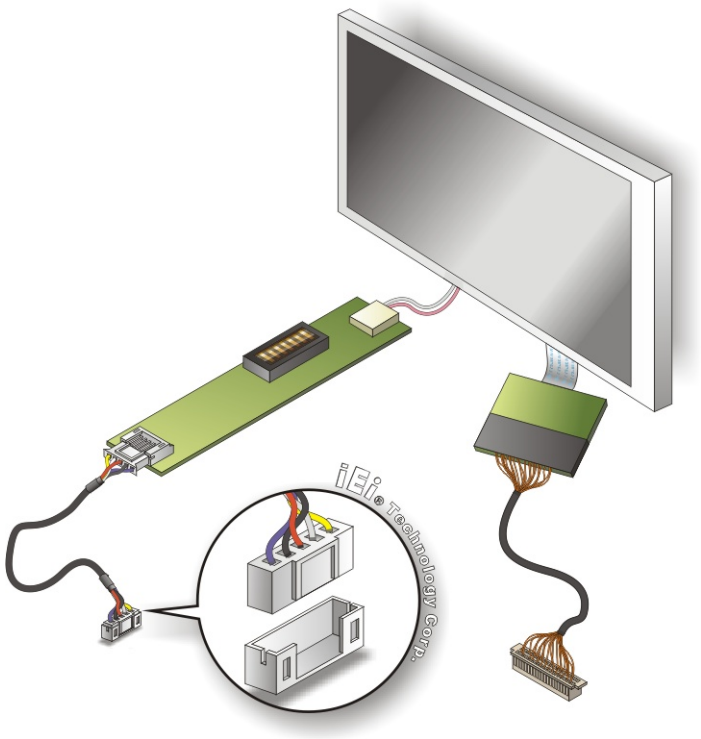


Figure 5-13: Backlight Inverter Connection

5.8 External Peripheral Interface Connection

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

- Serial port devices
- VGA monitors
- Parallel port devices
- RJ-45 Ethernet cable connectors
- Mouse and keyboard

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

5.8.1 VGA Monitor Connection

The IOWA-MARK 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 IOWA-MARK, please follow the instructions below.

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

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

Step 3: **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the IOWA-MARK. See **Figure 5-14**.

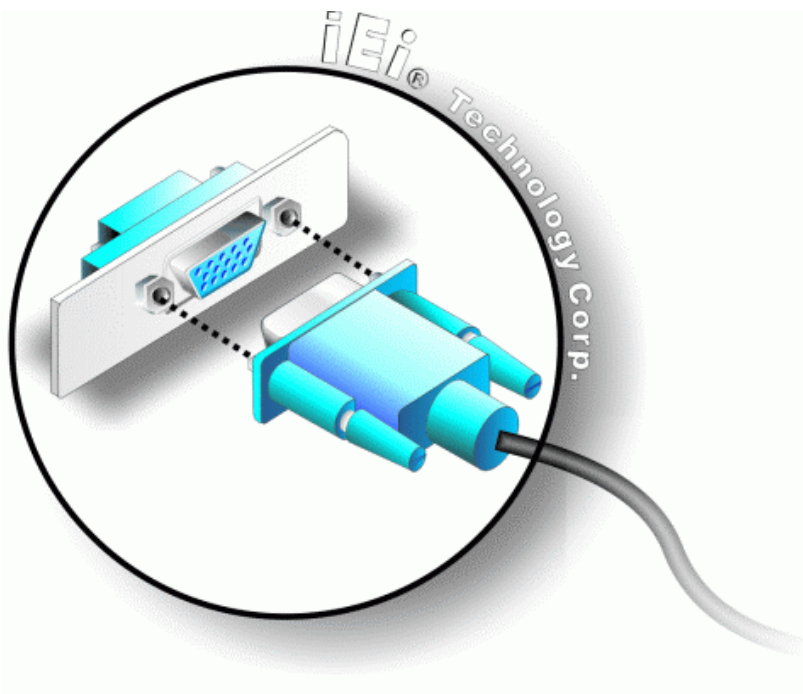


Figure 5-14: VGA Connector

Step 4: **Secure the connector**. Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.

5.8.2 PS/2 Keyboard and Mouse Y-Cable Connection

The IOWA-MARK is shipped with a PS/2 keyboard/mouse Y-cable connector. The keyboard/mouse Y-cable connector connects to a PS/2 keyboard/mouse connector on the IOWA-MARK 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 PS/2 connector**. The location of the PS/2 connector is shown in **Chapter 3**.

Step 2: **Align the PS/2 connector**. Align the PS/2 connector on the Y-cable with the PS/2 connector on the external peripheral interface.

Step 3: **Insert the PS/2 connector** Once the connectors are properly, insert thePS/2 connector from the keyboard into the PS/2 connector on the IOWA-MARK. See **Figure 5-15.**

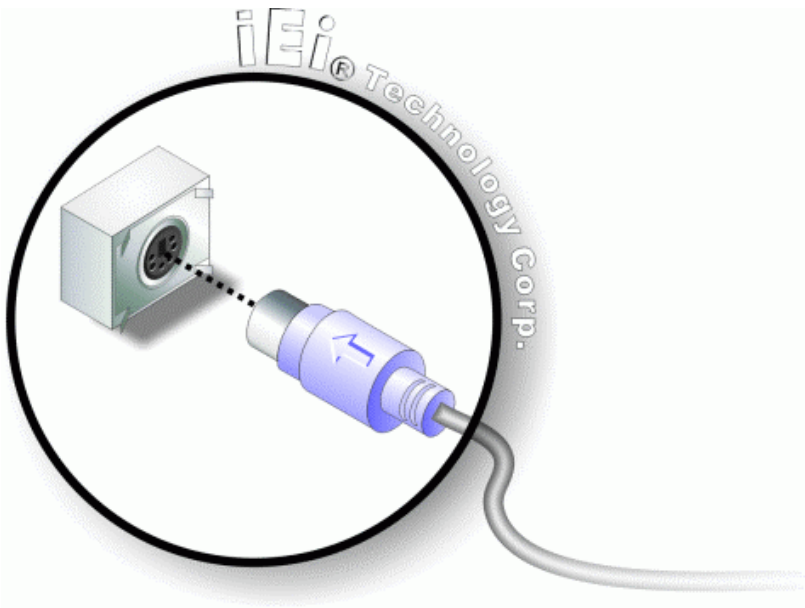


Figure 5-15: PS/2 Connector

Step 4: **Connect the keyboard and mouse**. Connect the keyboard and mouse to the respective PS/2 connector on the Y-cable. Each PS/2 has an embossed image

showing the device the connector must be connected to. If the mouse is connected to the keyboard connector and vice/versa, both the keyboard and mouse do not work.

Chapter

6

AWARD BIOS

6.1 Introduction

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

6.1.1 Starting Setup

The Phoenix Award 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, restart the computer and try again.

6.1.2 Using Setup

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

Key	Function
Up arrow	Move to the item above
Down arrow	Move to the item below
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+/Page up	Increase the numeric value or make changes
-/Page down	Decrease the numeric value or make changes
Esc	Main Menu – Quit and do not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu

Key	Function
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2	Item help
F5	Previous values for the page menu items
F6	Fail-safe defaults for the current page menu items
F7	Optimized defaults for the current page menu items
F9	Menu in BIOS
F10	Save changes and Exit BIOS

Table 6-1: BIOS Navigation Keys

6.1.3 Getting Help

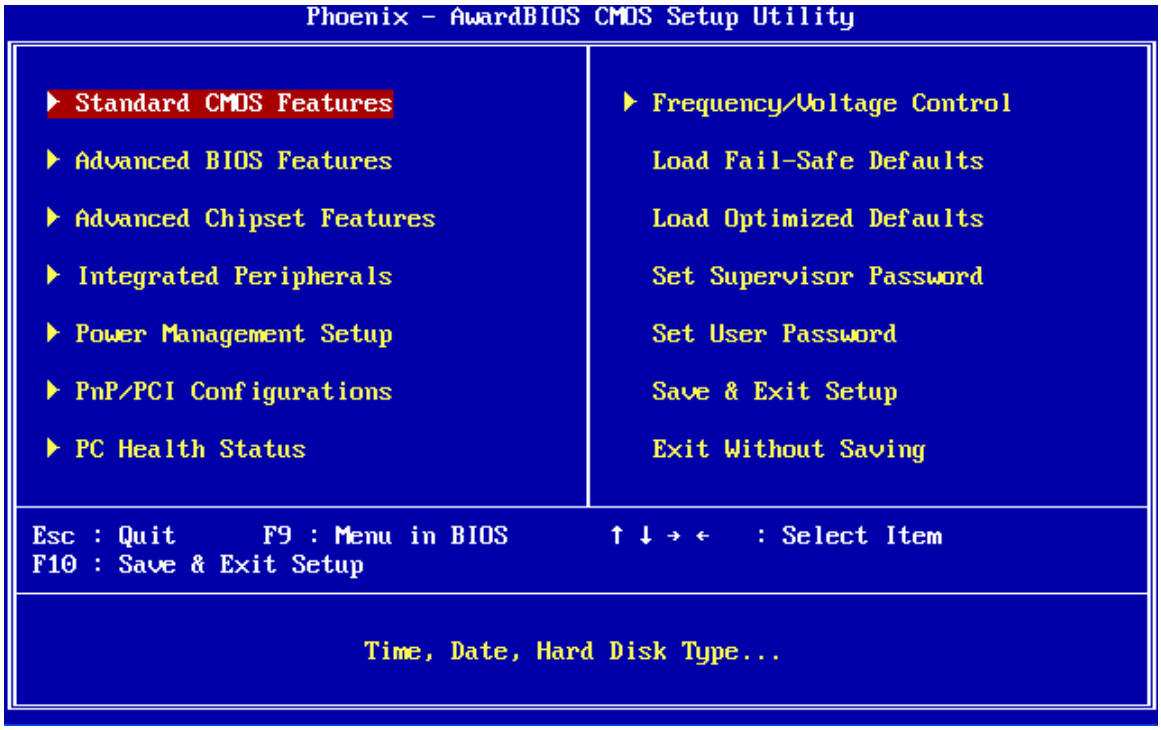
When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

6.1.4 Unable to Reboot After Configuration Changes

If the system cannot be booted after changes are made, restore the CMOS defaults. The CPU card should come with a restore CMOS settings jumper. Refer to **Section 0** for more information.

6.1.5 Main BIOS Menu

Once the BIOS opens, the **Main Menu** (**BIOS Menu 1**) appears.



BIOS Menu 1: Award BIOS CMOS Setup Utility

NOTE:

The following sections will completely describe the menus listed below and the configuration options available to users.

The following menu options are seen in **BIOS Menu 1**.

- **Standard CMOS Features**: Changes the basic system configuration.
- **Advanced BIOS Features**: Changes the advanced system settings.
- **Advanced Chipset Features**: Changes the chipset configuration features.
- **Integrated Peripherals**: Changes the settings for integrated peripherals.
- **Power Management Setup**: Configures power saving options.
- **PnP/PCI Configurations**: Changes the advanced PCI/PnP settings.
- **PC Health Status**: Monitors essential system parameters.
- **Frequency Voltage Control**: Changes the DIMM and CPU clock settings

The following user configurable options are also available in **BIOS Menu 1**:

➔ **Load Fail-Safe Defaults**

Use the **Load Fail-Safe Defaults** option to load failsafe default values for each BIOS parameter in the setup menus. Press **F6** for this operation on any page.

➔ **Load Optimized Defaults**

Use the **Load Optimized Defaults** option to load optimal default values for each BIOS parameter in the setup menus. Press **F7** for this operation on any page.

➔ **Set Supervisor Password**

Use the **Set Supervisor Password** option to set the supervisor password. By default, no supervisor password is set. To install a supervisor password, select this field and enter the password. After this option is selected, a red dialogue box appears with "**Enter Password:** ". Type the password and press **ENTER**. Retype the original password into the "**Confirm Password:** " dialogue box and press **ENTER**. To disable the password, simply press **ENTER** in the "**Enter Password:** " dialogue box, then press any key in the "**Password Disabled !!!**" dialogue box.

➔ **Set User Password**

Use the **Set User Password** option to set the supervisor password. By default no user password is set. To install a user password, select this field and enter the password. After this option is selected, a red dialogue box appears with "**Enter Password:** ". Type the password and press **ENTER**. Retype the original password into the "**Confirm Password:** " dialogue box and press **ENTER**. To disable the password, simply press **ENTER** in the "**Enter Password:** " dialogue box, then press any key in the "**Password Disabled !!!**" dialogue box.

➔ **Save & Exit Setup**

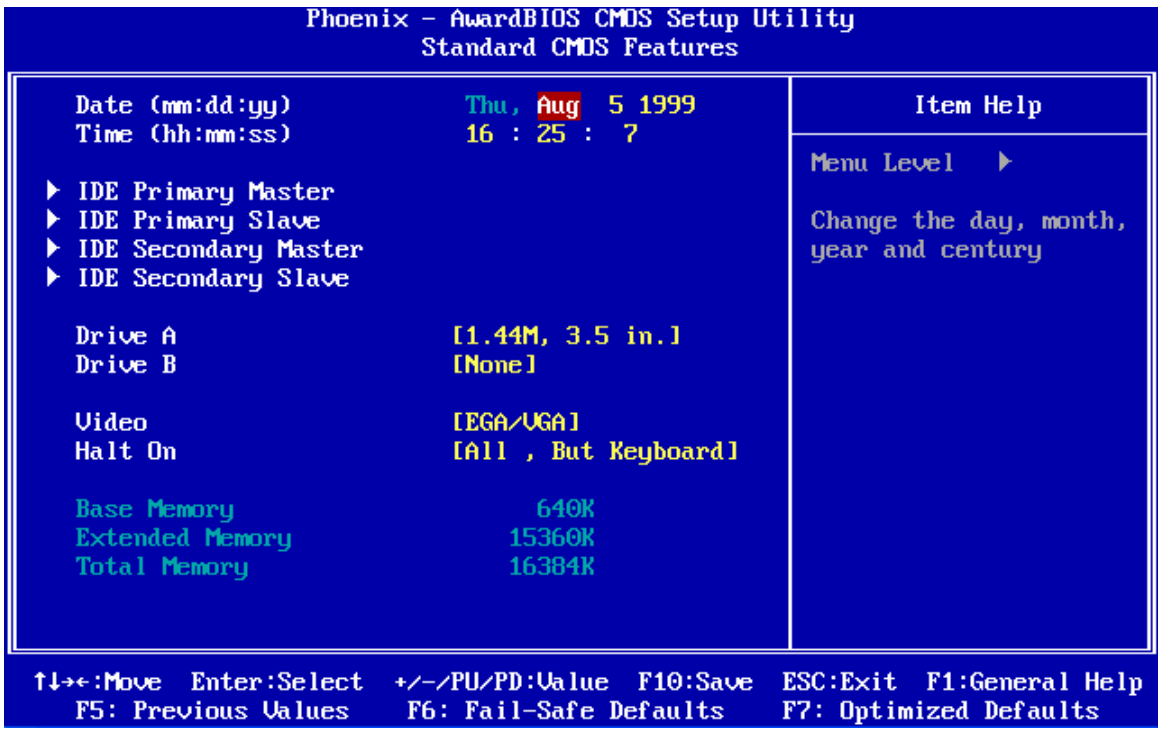
Use the **Save & Exit Setup** option to save any configuration changes made and exit the BIOS menus.

➔ **Exit Without Saving**

Use the **Exit Without Saving** option to exit the BIOS menus without saving any configuration changes.

6.2 Standard CMOS Features

Use the **Standard CMOS Features** BIOS menu (**BIOS Menu 2**) to set basic BIOS configuration options.



BIOS Menu 2: Standard CMOS Features

➔ **Date [Day mm:dd:yyyy]**

Use the **Date** option to set the system date

➔ **Time [hh/mm/ss]**

Use the **Time** option to set the system time.

➔ **IDE Master and IDE Slave**

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

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

IDE device configurations are changed or set in the IDE Configuration menu (**BIOS Menu 3**). If an IDE device is detected, and one of the above listed two BIOS configuration options is selected, the IDE configuration options shown in **Section 6.2.1** appear.

➔ **Drive A [None]**

Use the **Drive A/B** configuration to specify the floppy drive type installed in the system. The floppy drive configuration options are:

- None
- 360K, 5.25 in.
- 1.2M, 5.25 in.
- 720K, 3.5 in.
- 1.44M, 3.5in (Default)
- 2.88M, 3.5 in.

➔ **Video**

Use the **Video** option to select the CRT screen type the system connects to. The video configuration options are:

- EGA/VGA (Default)
- CGA 40
- CGA 80
- MONO

➔ **Halt On [All, But Keyboard]**

Use the **Halt On** option to specify what errors detected during the power up process stop the system.

➔	**All Errors**		Whenever BIOS detects a non-fatal error the system is stopped and the user prompted.
➔	**No Errors**		The system boot is not stopped for any errors that may be detected.
➔	**All, But Keyboard**	(Default)	The system boot does not stop for a keyboard error; it stops for all other errors.
➔	**All, But Diskette**		The system boot does not stop for a disk error; it stops for all other errors.
➔	**All, But Disk/Key**		The system boot does not stop for a keyboard or a disk error; it stops for all other errors.

➔ **Base Memory:**

The **Base Memory** is NOT user configurable. The POST determines the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512K for systems with 512K memory installed, or 640K for systems with 640K or more memory installed.

➔ **Extended Memory**

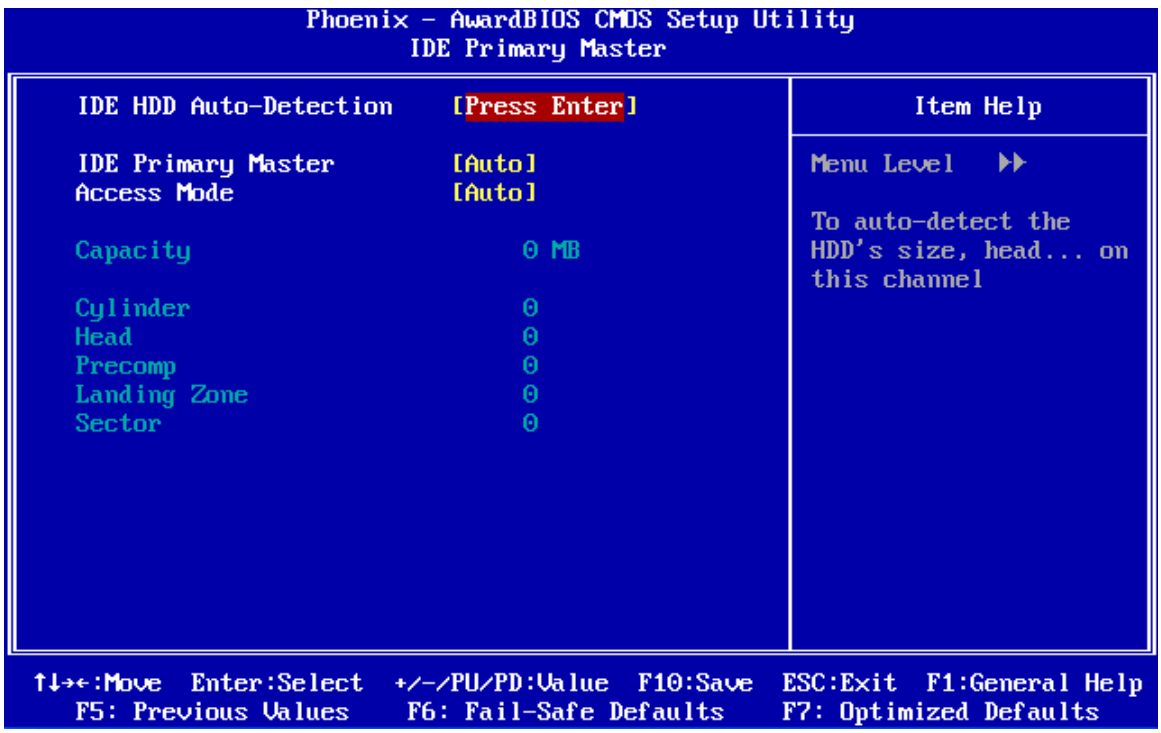
The **Extended Memory** is NOT user configurable. The BIOS determines how much extended memory is present during the POST. This is the amount of memory above 1MB located in the memory address map of the CPU.

➔ **Total Memory**

The **Total Memory** is NOT user configurable.

6.2.1 IDE Primary Master/Slave

Use the **IDE Primary Master/Slave** menu (**BIOS Menu 3**) to set or change the master/slave IDE configurations.



BIOS Menu 3: IDE Channel Master

➔ **IDE HDD Auto-Detection [Press Enter]**

Use the **IDE HDD Auto-Detection** option to enable BIOS to automatically detect the IDE settings. Select **IDE HDD Auto-Detection** and press **ENTER.** BIOS automatically detects the HDD type. Do not set this option manually.

➔ **IDE Primary Master [Auto]**

Use the **IDE Primary Master** option to activate or deactivate the following drive channels:

- Channel 0 Master
- Channel 0 Slave
- Channel 1 Master
- Channel 0 Slave

- **None** — If no drives are connected to the IDE channel select this option. Once set, this IDE channel becomes inaccessible and any drives attached to it are undetected.
- **Auto** (Default) — Setting this option allows the device to be automatically detected by the BIOS.
- **Manual** — Selecting this option allows manual configuration of the device on the IDE channel in BIOS.

➔ **Access Mode [Auto]**

The **Access Mode** option can only be configured if the BIOS configuration option is set to either **Manual** or **Auto**.. Use the **Access Mode** option to determine the hard disk BIOS translation modes. Most systems now use hard drives with large capacities and therefore either the LBA translation mode or auto mode should be selected.

- **CHS** — Select this mode if the HDD capacity is less than 504MB.
- **LBA** — Select this mode if the HDD capacity is more than 8.4GB.
- **Large** — This mode is an extended ECHS mode and while it supports HDDs larger than 504MB, it is not recommended.
- **Auto** (Default) — If you are unsure of what access mode to set, select this option.

➔ **Capacity**

The **Capacity** specification indicates the storage capacity of the HDD installed in the system.

➔ **Cylinder**

The **Cylinder** specification indicates how many cylinders (tracks) are on the HDD installed in the system.

➔ **Head**

The **Head** specification indicates how many logical heads are on the HDD installed in the system.

➔ **Precomp**

The **Precomp** specification indicates on what track the write precompensation begins.

➔ **Landing Zone**

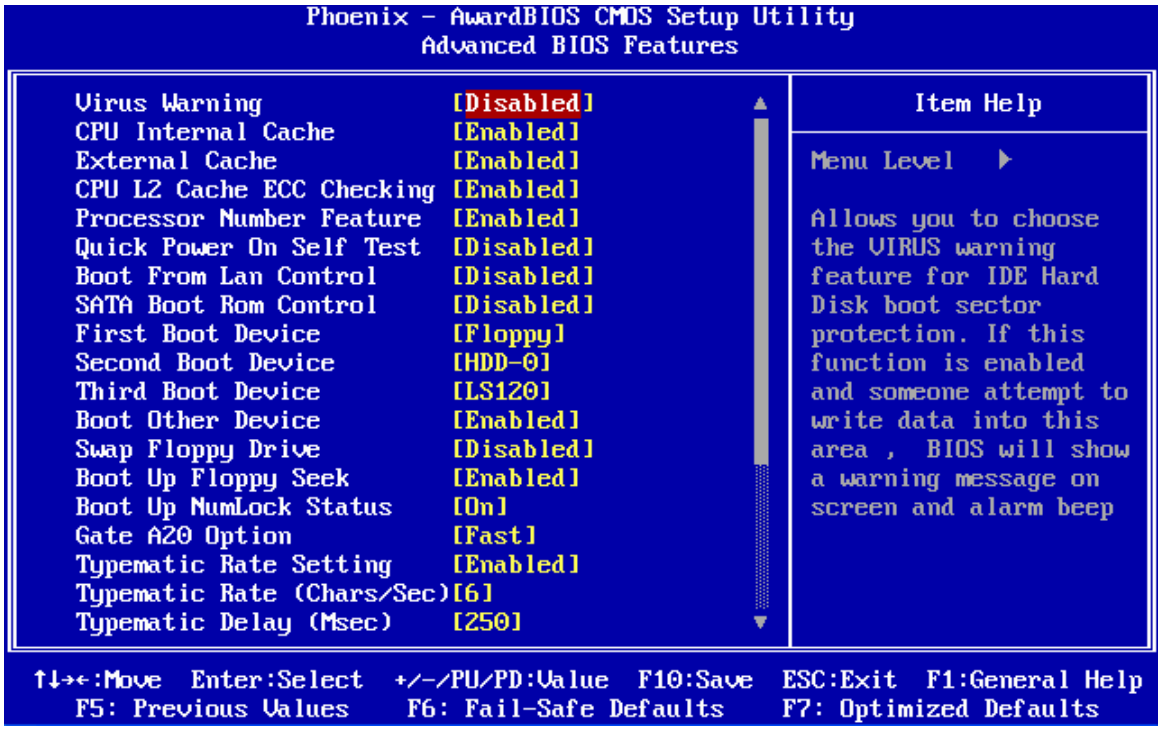
The **Landing Zone** specification indicates where the disk head will park itself after the system powers off.

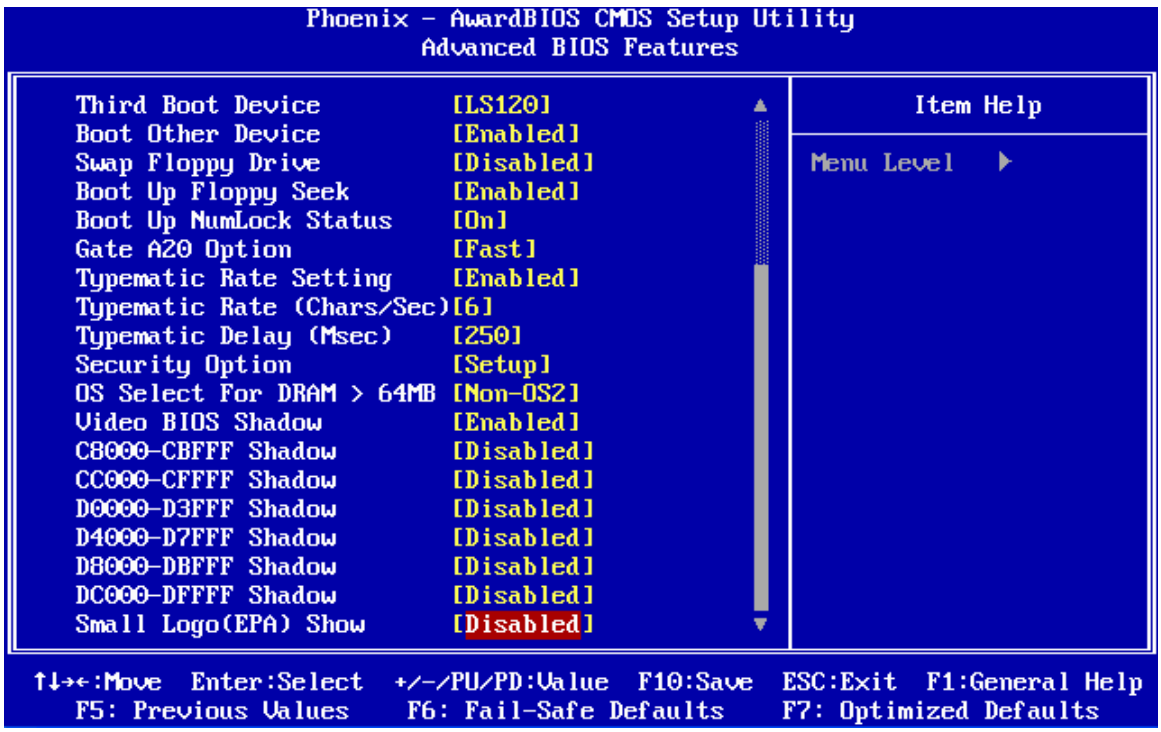
➔ **Sector**

The **Sector** specification indicates how many logical sectors the HDD has been divided into.

6.3 Advanced BIOS Features

Use the **Advanced BIOS Features** menu (**BIOS Menu 4**) to configure the CPU and peripheral device configuration options.





BIOS Menu 4: Advanced BIOS Features

➔ **Virus Warning [Disabled]**

NOTE:

Many disk diagnostic programs can cause the above warning message to appear when the program attempts to access the boot sector table. If you are running such a program, it is recommended that the virus protection function be disabled beforehand.

Use the **Virus Warning** option to enable BIOS to monitor the boot sector and partition table of the HDD for any attempted modification. If a modification attempt is made, the BIOS halts the system and an error message appears. If necessary, an anti-virus program can then be run to locate and remove the virus before any damage is done.

- ➔ **Enabled** — Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or HDD partition table.
- ➔ **Disabled** (Default) — No warning message appears when there is an attempt to access the boot sector or HDD partition table.

➔ **CPU Internal Cache [Enabled]**

Use the **CPU Internal Cache** option to enable or disable the internal CPU cache.

- ➔ **Disabled** — The internal CPU cache is disabled.
- ➔ **Enabled** (Default) — The internal CPU cache is enabled.

➔ **External Cache [Enabled]**

Use the **External Cache** option to enable the system to transfer data from the main DRAM into the cache memory when the CPU requests the transfer.

➔ **Disabled** The CPU cannot access external DRAM.

➔ **Enabled** (Default) The CPU can access external DRAM.

➔ CPU L2 Cache ECC Checking [Enabled]

Use the **CPU L2 Cache ECC Checking** option to enable memory checking when the external cache contains ECC SRAM (Static Random Access Memory).

➔ **Disabled** Memory checking disabled

➔ **Enabled** (Default) Memory checking enabled

➔ Quick Power On Self Test [Enabled]

Use the **Quick Power On Self Test** option to speed up the POST after the computer is turned on. If enabled, BIOS shortens or skips some POST check items.

➔ **Disabled** Normal POST occurs after the computer is turned on.

➔ **Enabled** (Default) Quick POST occurs after the computer is turned on.

➔ Boot From LAN Control [Disabled]

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

➔ **Disabled** (Default) The system cannot be booted from a remote system through the LAN.

➔ **Enabled** The system can be booted from a remote system through the LAN.

➔ SATA Boot ROM Control [Disabled]

Use the **SATA Boot ROM Control** option to configure SATA IDE use in DOS mode.

➔ **Disabled** (Default) Disables SATA IDE use in DOS mode.

➔ **Enabled** Enables SATA IDE use in DOS mode.

➔ Boot Device

Use the **Boot Device** options to select the order of the devices the system boots from. There are three boot device configuration options:

- **First Boot Device** [Default: Floppy]
- **Second Boot Device** [Default: HDD-0]
- **Third Boot Device** [Default: LS-120]

Using the default values, the system first looks for a FDD to boot from. If it cannot find an FDD, it boots from a HDD. If both the FDD and the HDD are unavailable, the system boots from a LS-120 drive.

Boot Device configuration options are:

- Floppy
- LS120
- HDD-0
- SCSI
- CDROM
- HDD-1
- HDD-2
- HDD-3
- ZIP100
- USB-FDD
- USB-ZIP
- USB-CDROM
- USB-HDD
- LAN
- Disabled

➔ **Boot Other Device [Enabled]**

Use the **Boot Other Device** option to determine whether the system uses a second or third boot device if the first boot device is not found.

➔ **Disabled**		The system does not look for second and third boot devices if the first one is not found.
➔ **Enabled**	(Default)	The system looks for second and third boot devices if the first one is not found.

➔ **Swap Floppy Drive**

Use the **Swap Floppy Drive** option to designate drive A as drive B and drive B as drive A.

➔ **Disabled**	(Default)	Cannot designate A or B to a floppy drive without changing the physical connection
➔ **Enabled**		Can designate A or B to a floppy drive without changing the physical connection

➔ **Boot Up Floppy Seek [Enabled]**

Use the **Boot Up Floppy Seek** option to enable the BIOS to determine if the floppy disk drive installed has 40 or 80 tracks during the POST. 360K FDDs have 40 tracks while 760K, 1.2M and 1.44M FDDs all have 80 tracks.

➔ **Disabled**		BIOS does not search for the type of FDD drive by track number. Note that there is no warning message if the drive installed is 360K.
➔ **Enabled**	(Default)	BIOS searches for a FDD to determine if it has 40 or 80 tracks. Note that BIOS cannot tell the difference between 720K, 1.2M or 1.44M drives as they all have 80 tracks.

➔ **Boot Up Numlock Status [On]**

Use the **Boot Up Numlock Status** option to specify the default state of the numeric keypad.

➔ **Off**		The keys on the keypad are not activated.
➔ **On**	(Default)	Activates the keys on the keypad.

➔ **Gate A20 Option [Fast]**

Use the **Gate A20 Option** option to set if the keyboard controller or the chipset controls the Gate A20 switching.

➔ **Normal**		The keyboard controller does the switching.
➔ **Fast**	(Default)	The chipset does the switching.

➔ **Typematic Rate Setting [Disabled]**

Use the **Typematic Rate Setting** configuration option to specify if only one character is allowed to appear on the screen if a key is continuously held down. When this option is enabled, the BIOS reports as before, but it then waits a moment, and, if the key is still held down, it begins to report that the key has been pressed repeatedly. This feature accelerates cursor movement with the arrow keys.

➔ **Disabled**	(Default)	Disables the typematic rate.
➔ **Enabled**		Enables the typematic rate.

➔ **Typematic Rate (Chars/sec) [6]**

The **Typematic Rate** option can only be configured if the **Typematic Rate Setting** is enabled. Use the **Typematic Rate** option to specify the rate keys are accelerated.

➔	**6**	(Default)	6 characters per second
➔	**8**		8 characters per second
➔	**10**		10 characters per second
➔	**12**		12 characters per second
➔	**15**		15 characters per second
➔	**20**		20 characters per second
➔	**24**		24 characters per second
➔	**30**		30 characters per second

➔ **Typematic Delay (Msec) [250]**

The **Typematic Rate** option can only be configured if the **Typematic Rate Setting** is enabled. Use the **Typematic Delay** option to specify the delay time between when a key is first pressed and when the acceleration begins.

➔	**250**	(Default)	250 milliseconds
➔	**500**		500 milliseconds
➔	**750**		750 milliseconds
➔	**1000**		1000 milliseconds

➔ **Security Option [Setup]**

Use the **Security Option** to limit access to both the system and Setup, or just Setup.

➔	**Setup**	(Default)	The system does not boot and access to Setup is denied if the correct password is not entered at the prompt.
➔	**System**		The system boots, but access to Setup is denied if the correct password is not entered at the prompt.

NOTE:

To disable security, select the password setting in the Main Menu. When asked to enter a password, don't type anything, press **ENTER** and the security is disabled. Once the security is disabled, the system boots and Setup can be accessed.

➔ **OS Select For DRAM > 64MB [Non-OS2]**

Use the **OS Select For DRAM > 64MB** option to specify the operating system.

- ➔ **OS2** Specifies the operating system used as OS/2.
- ➔ **Non-OS2** (Default) Select this option when not using the OS/2 operating system.

➔ **Video BIOS Shadow [Enabled]**

Use the **Video Bios Shadow** option to enable video BIOS to be copied to RAM.

- ➔ **Disabled** Video BIOS is not copied to RAM.
- ➔ **Enabled** (Default) Video BIOS is copied to RAM.

➔ **XXXXX-YYYYY Shadow [Disabled]**

Use the **XXXXX-YYYYY Shadow** option to write the contents of the ROM area XXXXX-YYYYY to the same address in the system RAM.

- ➔ **Disabled** (Default) Contents from ROM area XXXXX-YYYYY are not written to the RAM.
- ➔ **Enabled** Contents from ROM area XXXXX-YYYYY are written to the RAM.

➔ **Small Logo (EPA) Show [Disabled]**

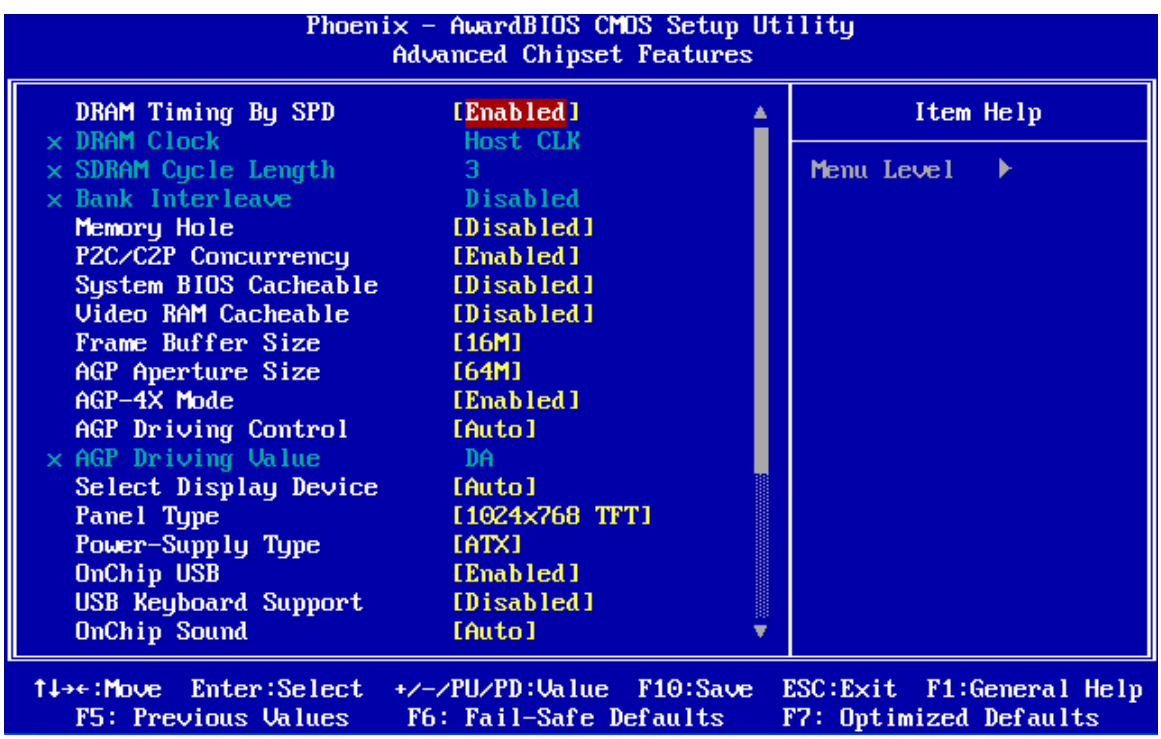
Use the **Small Logo (EPA) Show** option to specify if the Environmental Protection Agency (EPA) logo appears during the system boot-up process. If enabled, the boot up process may be delayed.

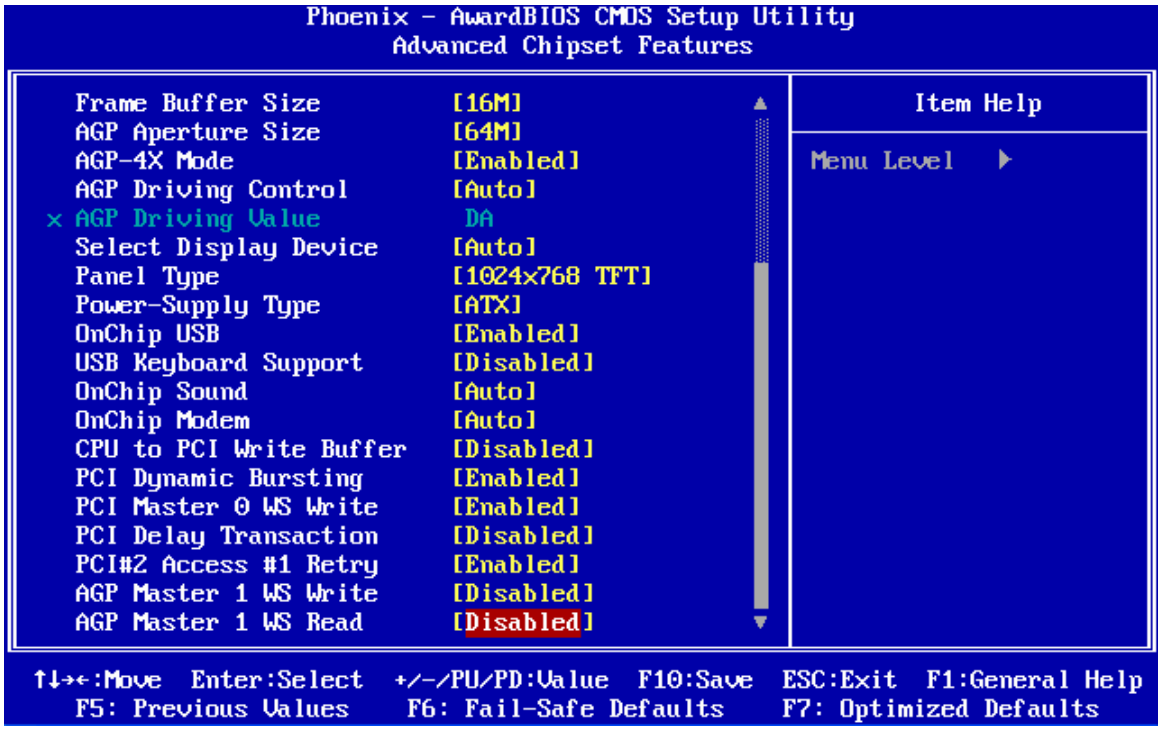
➔ **Disabled** (Default) EPA logo does not appear during boot up.

➔ **Enabled** EPA logo appears during boot up.

6.4 Advanced Chipset Features

Use the **Advanced Chipset Features** menu (**BIOS Menu 5**) to change chipset configuration options.





BIOS Menu 5: Advanced Chipset Features

➔ **DRAM Timing by SPD [Enabled]**

Use the **DRAM Timing by SPD** option to enable the system to use the SPD (Serial Presence Detect) EEPROM to configure the DRAM timing. The SPD EEPROM contains all necessary DIMM specifications including speed of the individual components such as CAS (column array strobe) and bank cycle time as well as valid settings for the module and the manufacturer's code. The SPD enables the BIOS to read the spec sheet of the DIMM on boot-up and then adjust the memory timing parameters accordingly.

➔ **Disabled**		DRAM timing parameters can be manually set using the DRAM sub-items
➔ **Enabled**	(DEFAULT)	DRAM timing parameter are set according to the DRAM Serial Presence Detect (SPD)

If the **Configure DRAM Timing by SPD** option is disabled, the following configuration options appear.

- DRAM Clock
- SDRAM Cycle Length
- Bank Interleave

➔ **DRAM Clock [Host CLK]**

Use the **DRAM Clock** option to select the RAM FSB.

➔ **Host CLK**	(DEFAULT)	RAM FSB is 100MHz
➔ **HCLK-133M**		RAM FSB is 133MHz

➔ **SDRAM Cycle Length [3]**

Use the **SDRAM Cycle Length** option to specify the time delay in clock cycles the system must wait before the SDRAM starts to carry out a read command after the read command is received.

- 2
- 3 (DEFAULT)

➔ **Bank Interleave [Disabled]**

Use the **Bank Interleave** option to specify how multiple modules communicate with each other. Interleaving enables access to a second memory bank when the first memory bank is being accessed. The following configuration options are available:

- Disabled (DEFAULT)
- 2 Bank
- 4 Bank

➔ **Memory Hole [Disabled]**

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

➔ **Disabled** (DEFAULT) Memory is not reserved for ISA expansion cards

➔ **Enabled** Memory is reserved for ISA expansion cards

➔ **P2C/C2P Concurrency [Enabled]**

Use the **P2C/C2P Concurrency** option to enable bi-directional data transmission between the PCI bus and the CPU.

➔ **Disabled** Data between the PCI and CPU can only be transferred in one direction at a time.

➔ **Enabled** (DEFAULT) Data between the PCI and CPU can be transferred in both directions at the same time.

➔ **System BIOS Cacheable [Disabled]**

Use the **System BIOS Cacheable** option to enable caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

➔ **Disabled** (DEFAULT) System BIOS not written to F0000h-FFFFFh

➔ **Enabled** System BIOS is written to F0000h-FFFFFh

➔ **Video RAM Cacheable [Disabled]**

Use the **Video RAM Cacheable** option to enable caching of the video BIOS ROM at C0000h-C7FFFh via the L2 cache.

➔ **Disabled** (DEFAULT) Video BIOS not written to C0000h-C7FFFh

➔ **Enabled** Video BIOS is written to F0000h-FFFFFh

➔ **Frame Buffer Size [16M]**

Use the **Frame Buffer Size** option to specify the amount of memory allocated to the integrated graphics processor when the system boots up. Configuration options are.

- 2M
- 4M
- 8M
- 16M (Default)
- 32M

➔ **AGP Aperture Size [64M]**

Use the **AGP Aperture Size** option to select the size of the AGP aperture. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. **AGP Aperture Size** configuration options are:

- 128M
- 64M (Default)
- 32M
- 16M
- 8M
- 4M

➔ **AGP-4X Mode [Enabled]**

Use the **AGP-4X Mode** to enable AGP 4x support on the system.

➔ **Disabled** AGP only uses the AGP 1x or AGP 2x transfer protocol.

➔ **Enabled** (DEFAULT) AGP uses the AGP 4x

➔ **AGP Driving Control [Auto]**

Use the **AGP Driving Control** option to enable manual or automatic selection of the AGP bus signal strength.

➔ **Auto**	(DEFAULT)	System automatically sets the AGP bus signal strength
➔ **Manual**		The AGP bus signal strength is set manually in the next BIOS configuration option

➔ **AGP Driving Value [DA]**

The **AGP Driving Value** option can only be configured if the **AGP Driving Control** option is set to manual. Use the **AGP Driving Value** option to manually set the strength of the AGP bus signal. If this option is selected, a hexadecimal number must be entered. The higher the hexadecimal number is, the stronger the AGP bus transmission signal is. The maximum and minimum hexadecimal numbers are shown below:

- **MIN**: 0000
- **MAX**: 00FF

➔ **Select Display Device [Auto]**

Use the **Select Display Device** option to specify the display used by the system.

➔ **Auto**	(DEFAULT)	The system automatically detects the display devices connected to the system
➔ **CRT**		A CRT screen is connected to the system
LCD		An LCD display is connected to the system
CRT + LCD		A CRT display and an LCD display are connected to the system simultaneously. This option should be set for dual independent display mode.

➔ **Panel Type [1024 x 768 TFT]**

Use the **Panel Type** option to specify the type of panel connected to the system. Configuration options are below:

- 640 x 480 TFT

- 800 x 600 TFT
- 1024 x 768 TFT
- 1280 x 1024 TFT
- 640 x 480 DSTN
- 800 x 600 DSTN
- 1600 x 1200 DSTN
- 1024 x 768 TFT (DEFAULT)

➔ **Power Supply Type [ATX]**

Use the **Power Supply Type** option to specify whether an AT or ATX power supply is connected to the system.

➔ **AT**		An AT power supply is used.
➔ **ATX**	(DEFAULT)	An ATX power supply is used.

➔ **OnChip USB [Enabled]**

Use the **OnChip USB** option to enable or disable the chipset USB controller.

➔ **Disabled**		Chipset USB controller disabled
➔ **Enabled**	(DEFAULT)	Chipset USB controller enabled

➔ **USB Keyboard Support [Disabled]**

Use the **USB Keyboard Support** option to enable or disable the use of a USB keyboard.

➔ **Disabled**	(DEFAULT)	USB keyboard cannot be used
➔ **Enabled**		USB keyboard can be used

➔ **OnChip Sound [Auto]**

Use the **OnChip Sound** option to enable or disable the chipset codec.

➔ **Auto** (Default) The chipset codec is automatically detected by BIOS.

➔ **Disabled** The chipset codec is disabled.

➔ **OnChip Modem [Auto]**

Use the **OnChip Modem** option to enable or disable the chipset modem controller.

➔ **Auto** (Default) The chipset modem is automatically detected by BIOS.

➔ **Disabled** The chipset modem is disabled.

➔ **OnBoard Audio [Enabled]**

Use the **OnBoard Audio** option to enable or disable the onboard codec.

➔ **Disabled** The onboard codec is disabled.

➔ **Enabled** (Default) The onboard codec is detected and enabled.

➔ **CPU to PCI Write Buffer [Enabled]**

Use the **CPU to PCI Write Buffer** option to enable buffered writes from the CPU to the PCI bus to compensate for the speed differences between the CPU and the PCI bus. When disabled, the writes are not buffered and the CPU must wait until the write is complete before starting another write cycle.

➔ **Disabled** (Default) No buffering when writes from the CPU to the PCI bus occurs

➔ **Enabled** Buffering when writes from the CPU to the PCI bus occurs

➔ **PCI Dynamic Bursting [Enabled]**

Use the **PCI Dynamic Bursting** option to enable every write transaction to go to the write buffer and then allow burstable transactions then burst on the PCI bus and nonburstable transactions do not.

➔ **Disabled**		PCI dynamic bursting does not occur
➔ **Enabled**	(Default)	PCI dynamic bursting does occur

➔ **PCI Master 0 WS Write [Enabled]**

Use the **PCI Master 0 WS Write** option to enable zero wait states when writes to the PCI occur.

➔ **Disabled**		There are no zero wait states when there are writes to the PCI bus
➔ **Enabled**	(Default)	There are zero wait states when there are writes to the PCI bus

➔ **PCI Delay Transaction [Disabled]**

Use the **PCI Delay Transaction** option to support compliance with PCI specification version 2.1. The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles.

➔ **Disabled**	(Default)	System not compliant with PCI specification version 2.1
➔ **Enabled**		System is compliant with PCI specification version 2.1

➔ **PCI #2 Access #1 Retry [Enabled]**

Use the **PCI #2 Access #1 Retry** option to enable the buffer to continue to attempt to write to the buffer until it is successful.

➔ **Disabled** (Default) If the buffer is unable to write to the PCI bus on the first attempt, the buffer is wiped clean and the transaction registered as failed.

➔ **Enabled** The buffer continues to write to the PCI bus until it is successful.

➔ **AGP Master 1 WS Read**

Use the **AGP Master 1 WS Read** option to reduce the time the AGP bus-mastering device waits initiating a read command, to only one wait state. All system memory reads made by the AGP bus master are speeded up.

➔ **Disabled** (Default) AGP Master 1 WS Read is not in effect

➔ **Enabled** AGP Master 1 WS Read is in effect

➔ **AGP Master 1 WS Write**

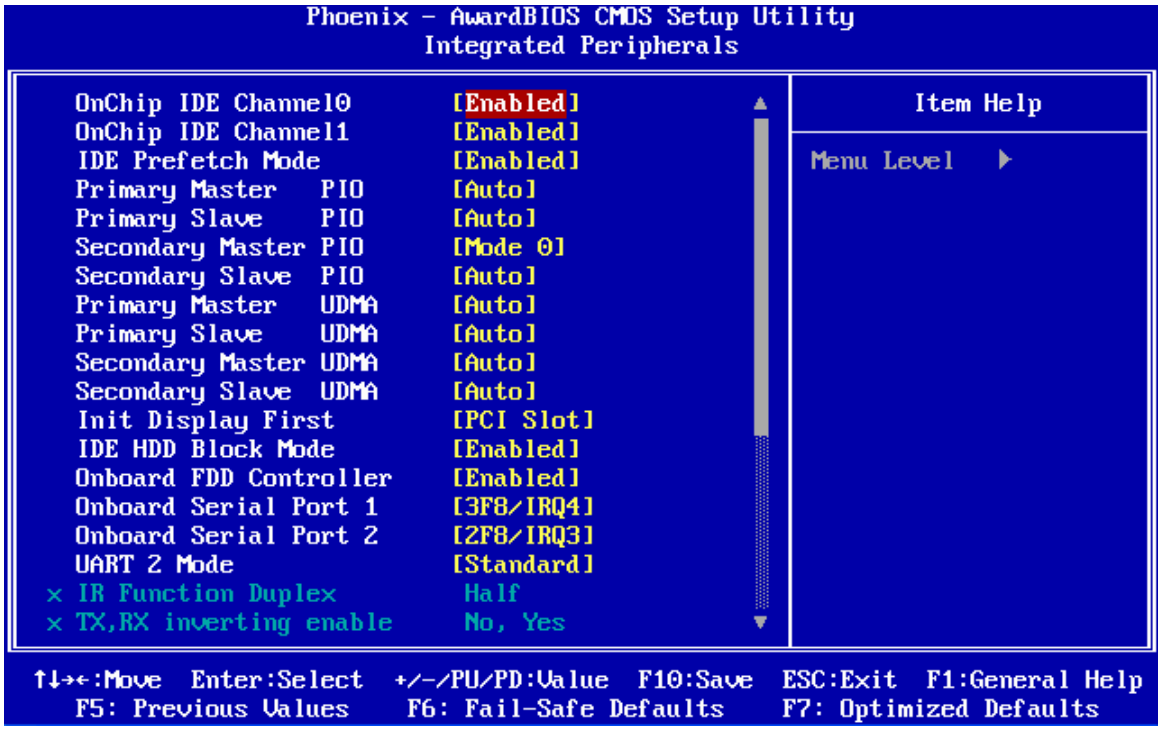
Use the **AGP Master 1 WS Write** option to reduce the time the AGP bus-mastering device waits initiating a write command to only one wait state. All system memory writes made by the AGP bus master are speeded up.

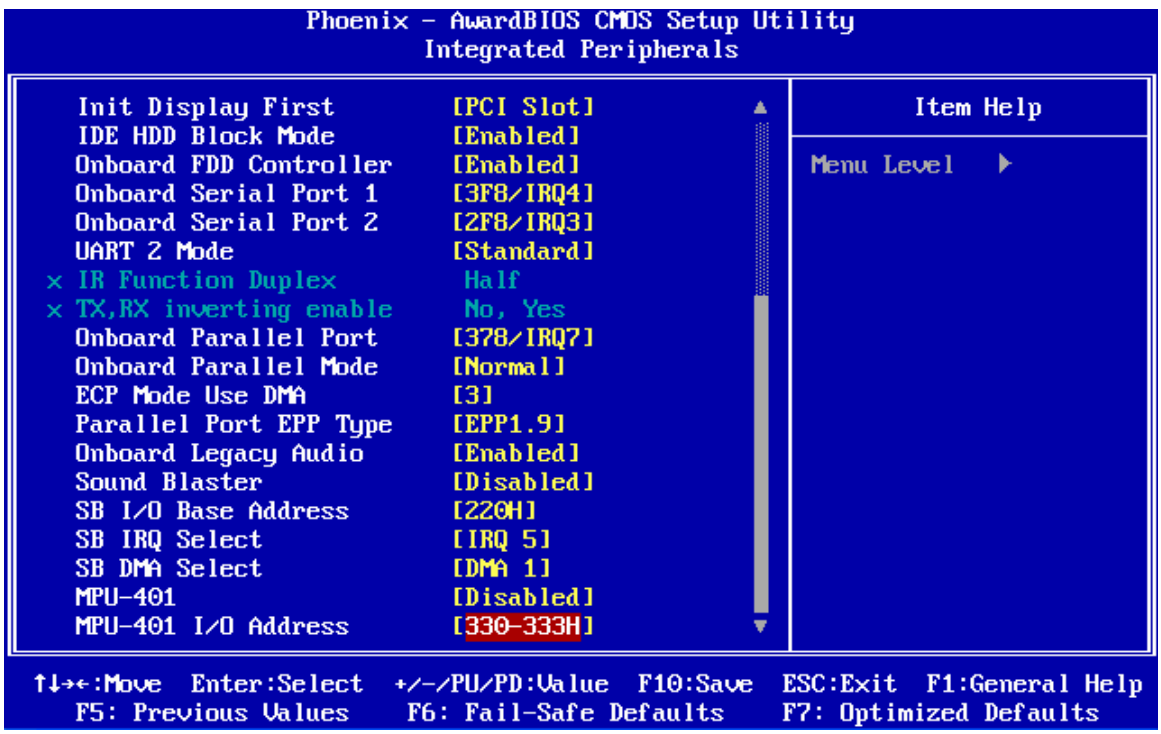
➔ **Disabled** (Default) AGP Master 1 WS Write is not in effect

➔ **Enabled** AGP Master 1 WS Write is in effect

6.5 Integrated Peripherals

Use the **Integrated Peripherals** menu (**BIOS Menu 6**) to change the configuration options for the attached peripheral devices.





BIOS Menu 6: Integrated Peripherals

➔ **On-Chip IDE Channel 0/1 [Enabled]**

Use the **On-Chip IDE Channel 0/1** option to specify if the system uses the integrated primary IDE channel or not.

➔ **Disabled**		The primary IDE channel is not used.
➔ **Enabled**	(Default)	The primary IDE channel is used.

➔ **IDE Prefetch Mode [Enabled]**

Use the **IDE Prefetch Mode** option enable IDE pre-fetching for faster drive access.

➔ **Disabled**		Disable this option if the system IDE devices do not support IDE pre-fetching
➔ **Enabled**	(Default)	Retain the default for faster IDE drive access.

➔ **Drive PIO Mode [Auto]**

Use the **Drive PIO Mode** options below to select the Programmed Input/Output (PIO) mode for the following HDDs:

- Master Drive PIO Mode
- Slave Drive PIO Mode

➔ **Auto**	(Default)	The computer selects the correct mode.
➔ **Mode 0**		PIO mode 0 selected with a maximum transfer rate of 3.3MBps.
➔ **Mode 1**		PIO mode 1 selected with a maximum transfer rate of 5.2MBps.
➔ **Mode 2**		PIO mode 2 selected with a maximum transfer rate of 8.3MBps.
➔ **Mode 3**		PIO mode 3 selected with a maximum transfer rate of 11.1MBps.
➔ **Mode 4**		PIO mode 4 selected with a maximum transfer rate of 16.6MBps.

➔ **IDE UDMA [Auto]**

Use the **IDE UDMA** option below to select the Ultra DMA (UDMA) mode for the following HDDs:

- IDE Primary Master UDMA
- IDE Primary Slave UDMA

➔ **Auto**	(Default)	The computer selects the correct UDMA.
➔ **Disabled**		The UDMA for the HDD device is disabled.

➔ **Init Display First [PCI Slot]**

Use the **Init Display First** option to select the primary display device.

➔ **PCI Slot**	(Default)	The display connected to the PCI slot is the primary display
➔ **AGP**		The AGP display is the primary display

➔ **IDE HDD Block Mode [Enabled]**

If the drive connected to the system supports block mode, use the **IDE HDD Block Mode** option to enable the system to detect the optimal number of block read/writes per sector the system IDE drive can support. Block mode is also called block transfer, multiple commands, or multiple sector read/write.

➔ **Disabled**		Block mode is not supported.
➔ **Enabled**	(Default)	Block mode is supported.

➔ **Onboard FDD Controller [Disabled]**

Use the **Onboard FDD Controller** option to enable or disable the onboard floppy controller. If the system is not connected to a floppy disk or uses an adapter for the FDD, this option can be disabled.

➔ **Disabled** (Default) The FDD controller is disabled.

➔ **Enabled** The FDD controller is enabled.

➔ Onboard Serial Port 1 [3F8/IRQ4]

Use the **Onboard Serial Port 1** option to select the I/O address and IRQ for the onboard serial port 1. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 1** options are:

- Disabled
- 3F8/IRQ4 (Default)
- 2F8/IRQ3
- 3E8/IRQ4
- 2E8/IRQ3

➔ Onboard Serial Port 2 [2F8/IRQ3]

Use the **Onboard Serial Port 2** option to select the I/O address and IRQ for the onboard serial port 2. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 2** options are:

- Disabled
- 3F8/IRQ4
- 2F8/IRQ3 (Default)
- 3E8/IRQ4
- 2E8/IRQ3

➔ UART 2 Mode [Standard]

Use the **UART Mode Select** to select the UART mode for the system.

➔ **Standard** (Default) RS-232C serial port

➔ **HPSIR** IrDA compliant serial infrared port

➔ **ASKIR** Amplitude shift keyed infrared port

➔ **IR Function Duplex [Half]**

Use the **IR Function Duplex** option to enable bi-directional communication between the system infrared port and the external device.

➔ **Full**		Bi-directional communication between system infrared port and the external compliant devices occurs.
➔ **Half**	(Default)	Communication between the system infrared port and the external compliant devices occurs is a single direction at a time only.

➔ **TX, RX Inverting enable [No, Yes]**

Use the **TX, RX Inverting enable** option to invert the transmitted and received signals. The table below lists the configuration options.

BIOS Option	TX (Transmitted)	RX (Received)	Default
No, No	Not inverted	Not Inverted	(Default)
No, Yes	Not Inverted	Inverted	
Yes, No	Inverted	Not Inverted	
Yes, Yes	Inverted	Inverted	

➔ **Onboard Parallel Port [378/IRQ7]**

Use the **Onboard Parallel Port** option to specify a logical LPT port address and corresponding interrupt for the physical parallel port. The **Onboard Parallel Port** options are:

- Disabled
- 3BC/IRQ7
- 378/IRQ7 (Default)
- 278/IRQ5

➔ **Onboard Parallel Mode [Normal]**

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

➔ **EPP** The parallel port operates in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.

➔ **ECP** The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.

➔ **ECP+EPP** The parallel port is compatible with both ECP and EPP devices.

➔ **Normal** (Default)

➔ **ECP Mode Use DMA [3]**

The **ECP Mode Use DMA** option is only available if the **Parallel Port Mode** option is set to ECP mode. Use the **ECP Mode Use DMA** option to specify the DMA channel the parallel port must use in the ECP mode.

➔ **1** The parallel port uses DMA Channel 1 in ECP mode.

➔ **3** (Default) The parallel port uses DMA Channel 3 in ECP mode.

➔ **Parallel Port EPP Type [EPP1.7]**

The **Parallel Port EPP Type** option is only available if the **Parallel Port Mode** option is set to EPP mode. Use the **EPP Mode Select** option to select the parallel port mode standard for the parallel port.

➔ **EPP1.9** EPP 1.9 is selected as the EPP standard.

➔ **EPP1.7** (Default) EPP 1.7 is selected as the EPP standard.

➔ **Onboard Legacy Audio [Enabled]**

Use the **Onboard Legacy Audio** option to enable any legacy audio devices in the system.

➔ **Disabled** Legacy audio devices disabled

➔ **Enabled** (Default) Legacy audio devices enabled

➔ **Sound Blaster [Disabled]**

Use the **Sound Blaster** option to enable the onboard sound blaster.

➔ **Disabled** (Default) Sound blaster disabled

➔ **Enabled** Sound blaster enabled

➔ **SB I/0 Base Address [220H]**

Use the **SB I/O Base Address** option to select the base address for the sound blaster. Address options are listed below.

- 220H (Default)
- 240H
- 260H
- 280H

➔ **SB IRQ Select**

Use the **SB IRQ Select** option to select the IRQ sound blaster. IRQ options are listed below.

- IRQ 5 (Default)
- IRQ 7
- IRQ 9

- IRQ 10

➔ **SB DMA Select [DMA 1]**

Use the **SB DMA Select** option to select the sound blaster DMA (direct memory access) address. DMA address options are listed below.

- DMA 0
- DMA 1 (Default)
- DMA 2
- DMA 3

➔ **MPU-401 [Disabled]**

Use the **MPU-401** option to enable the **MPU-401** (MIDI Processing Unit).

➔ **Disabled** (Default) MPU-401 disabled

➔ **Enabled** MPU-401 enabled

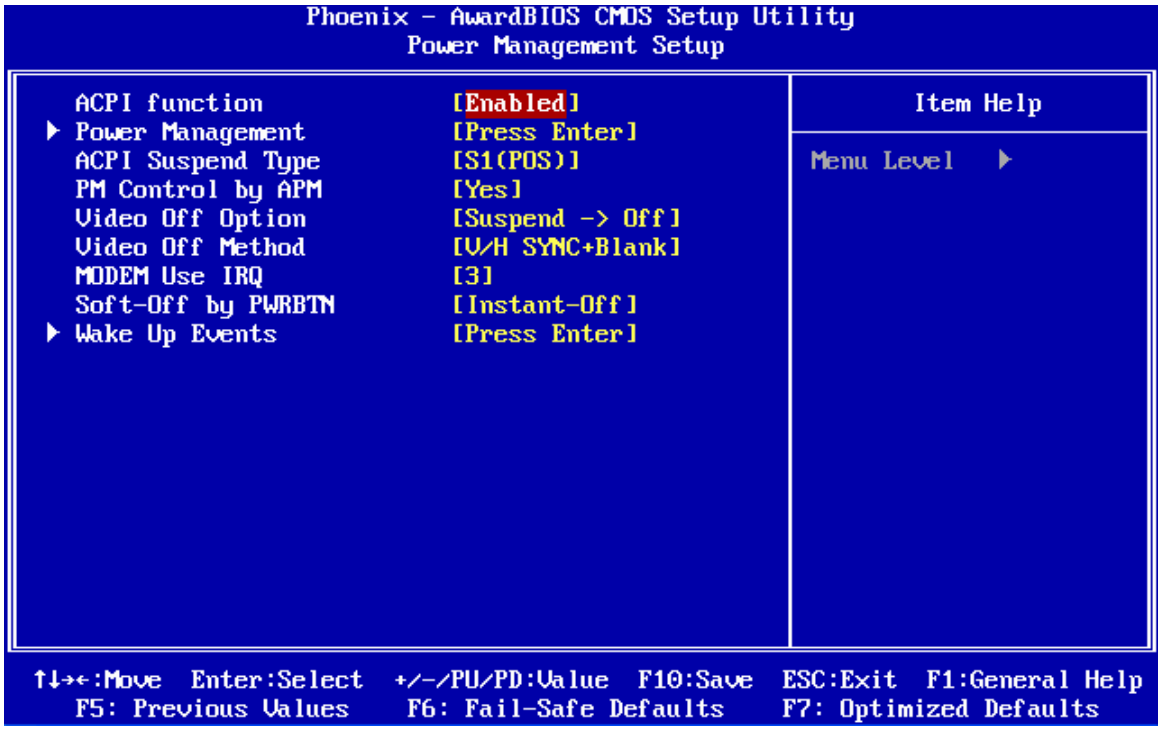
➔ **MPU-401 I/O Address [330 – 333H]**

Use the **MPU-401 I/O Address** option to select the base address for the sound blaster. Address options are listed below.

- 300 – 303H
- 310 – 313H
- 320 – 323H
- 330 – 333H (Default)

6.6 Power Management Setup

Use the **Power Management Setup** menu (**BIOS Menu 7**) to set the BIOS power management and saving features.



BIOS Menu 7: Power Management Setup

➔ **ACPI Function [Enabled]**

Use the **ACPI Function** to enable the ACPI (**Advanced Configuration and Power Interface**) function.

Disabled		ACPI function disabled
Enabled	(Default)	ACPI function enabled

➔ **Power Management [Press Enter]**

Use the **Power Management** option to open new power management menu.

➔ **ACPI Suspend Type [S1(POS)]**

Use the **ACPI Suspend Type** BIOS option to specify the sleep state the system enters when not being used.

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

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

➔ **PM Control by APM [Yes]**

Use the **PM Control by APM** option to specify whether or not the BIOS determines if an APM OS is being run on the system.

➔ **Yes** (Default) The BIOS checks to see if an APM OS is installed. If the OS is not an APM compliant OS, no PM functions are made available.

➔ **No** BIOS enables the PM function

➔ **Video Off Option [Suspend → Off]**

Use the **Video Off Option** option to specify the status of the system display when the system is in a sleep or suspend state.

➔ **Always On** Display never turned off by system BIOS

➔ **Suspend → Off** (Default) Display is off during when the system is in the suspend mode

All Modes → Off Display is off when the system is in the doze, standby or suspend mode

➔ **Video Off Method [Blank Screen]**

Use the **Video Off Method** option to specify what display components are powered off when the system enters a sleep or suspend stat Method.

➔ **Blank Screen**	(Default)	The display screen goes blank when the video is disabled
➔ **V/H SYNC + Blank**		The display screen goes blank and the V-SYNC and H-SYNC signals from VGA cards to the display are turned off when the video is disabled.
DPMS Support		If the system supports the VESA (Video Electronics Association) DPMS (Display Power Management Signaling) select this option. Power management software comes with the display. Use this software to specify the power management options for the display.

➔ **Modem Use of IRQ**

Use **the Modem Use of IRQ** to select the IRQ address for the system modem. The following IRQ addresses are available.

- NA
- 3 (Default)
- 4
- 5
- 7
- 9
- 10
- 11

➔ **Soft-Off by PWR-BTTN [Instant-Off]**

Use the **Soft-Off by PWR-BTTN** option to enabled the system to enter a very low-power-usage state when the power button is pressed.

➔ **Instant-Off** (Default) When the power button is pressed, the system is immediately shutdown.

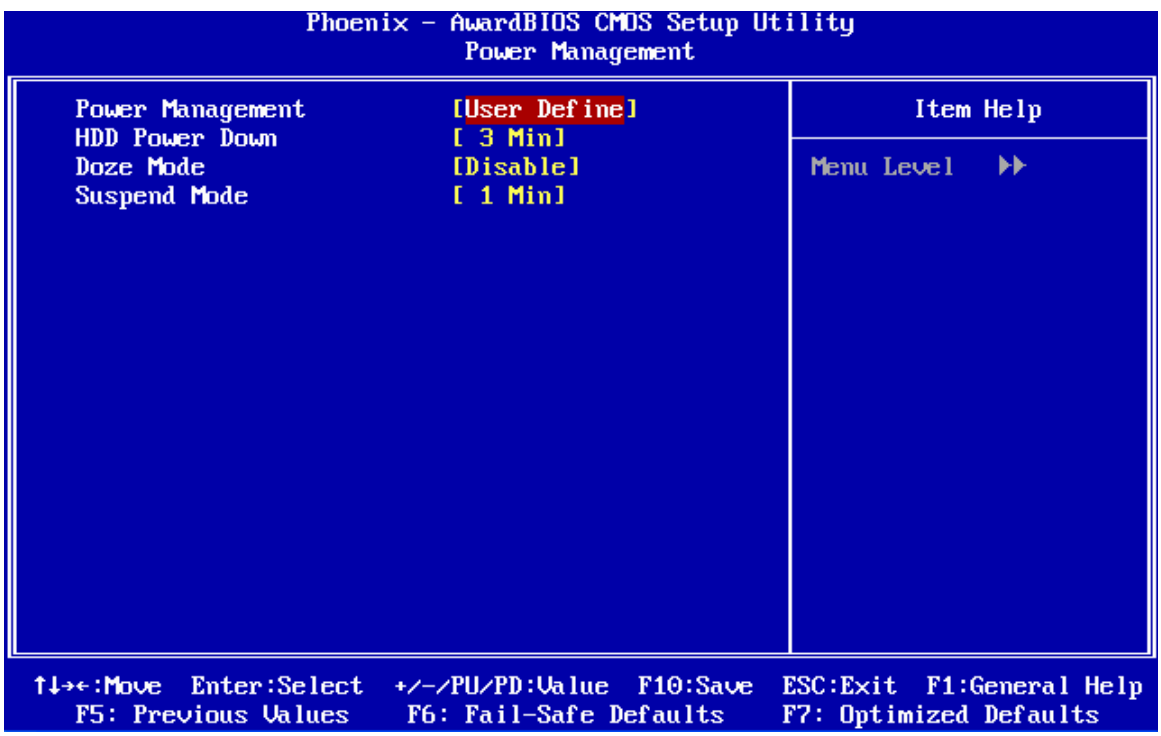
➔ **Delay 4-sec** To shutdown the system the power button must be held down longer than four seconds otherwise the system enters a low power usage state.

➔ **Wake Up Events [Press Enter]**

Use the **Wake Up Events** option to open a new **Wake Up Event** menu. For more details see **Section 6.6.2**.

6.6.1 Power Management

Use the **Power Management** menu (**BIOS Menu 8**) to set the BIOS power management parameters.



BIOS Menu 8: Power Management

➔ **Power Management**

Use the **Power Management** to specify the power management selection methods.

➔ **User Defined**	(Default)	User must define when the system goes into a sleep state or a suspend state
➔ **Min. Saving**		The longest period of time that can be specified before the system enters either the Doze mode or the suspend state. The longest time for either of these is one hour.
➔ **Max. Saving**		The shortest period of time that can be specified before the system enters either the Doze mode or the suspend state. The shortest time for either of these is one minute.

➔ **HDD Power Down [Disabled]**

Use the **HDD Power Down** option to specify how long the computer must wait for no activity before the HDD powers down. If this option is disabled, the HDD does not power down. The following settings can be made.

- Disable (Default)
- 1 Min
- 2 Min
- 3 Min
- 4 Min
- 5 Min
- 6 Min
- 7 Min
- 8 Min
- 9 Min
- 10 Min
- 11 Min

- 12 Min
- 13 Min
- 14 Min
- 15 Min

➔ **Doze Mode [Disabled]**

Use the **Doze Mode** option to enable the CPU to run at a slow speed if the system is unused for a specified period of time (see below). The **Doze Mode** is a power state when an APM/PM enabled OS is installed on the system. If the **Doze Mode** is disabled, the system does not go into a **Doze Mode**. The following settings can be made:

- Disable (Default)
- 1 Min
- 2 Min
- 4 Min
- 6 Min
- 8 Min
- 10 Min
- 20 Min
- 30 Min
- 40 Min
- 1 Hour

➔ **Suspend Mode**

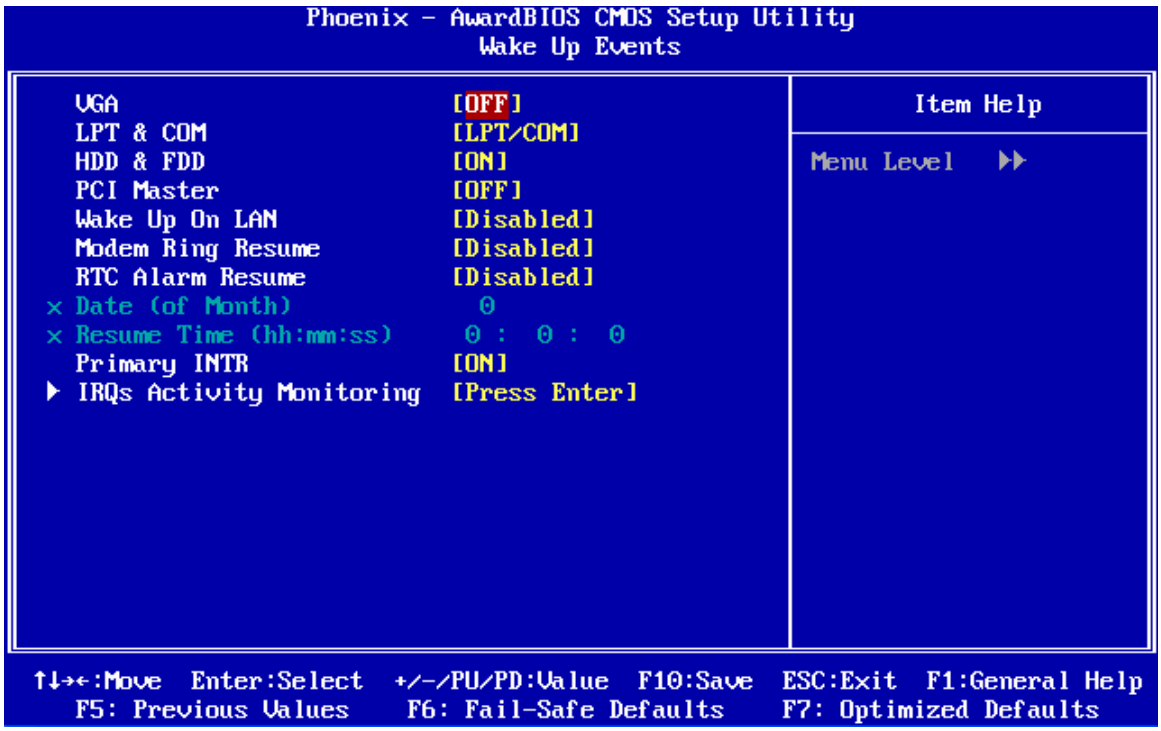
Use the **Suspend Mode** option to enable the CPU to run at a slow speed if the system is unused for a specified period of time (see below). The **Suspend Mode** is a power state when an APM/PM enabled OS is installed on the system. If the **Suspend Mode** is disabled, the system does not go into a **Suspend Mode**. The following settings can be made:

- Disable (Default)
- 1 Min
- 2 Min
- 4 Min

- 6 Min
- 8 Min
- 10 Min
- 20 Min
- 30 Min
- 40 Min
- 1 Hour

6.6.2 Wake Up Events

Use the **Wake Up Events** menu (**BIOS Menu 9**) to specify what components can rouse the system from a suspend or doze state when there is activity on the components.



BIOS Menu 9: Wake Up Events

➔ **VGA [OFF]**

Use the **VGA** option to enable the system to monitor activity on the VGA display and rouse the system from a suspend or doze state when activity on the VGA is detected.

➔ **Off** (Default) The system is not roused from a doze state or suspend state when activity is detected on the VGA.

➔ **On** The system is roused from a doze state or suspend state when activity is detected on the VGA.

➔ LPT & COM [LPT/COM]

Use the **LPT & COM** option to enable the system to monitor activity on the LPT display and serial ports and rouse the system from a suspend or doze state when activity on the LPT display and serial ports is detected.

➔ **None** (Default) The system is not roused from a doze state or suspend state when activity is detected on the LPT display and serial ports.

➔ **LPT** The system is roused from a doze state or suspend state when activity is detected on the LPT port.

➔ **COM** The system is roused from a doze state or suspend state when activity is detected on the COM port.

➔ **LPT/COM** The system is roused from a doze state or suspend state when activity is detected on the LPT port or the COM port.

➔ HDD & FDD [ON]

Use the **HDD & FDD** option to enable the system to monitor activity on the HDD and FDD and rouse the system from a suspend or doze state when activity on the HDD and FDD is detected.

➔ **Off** The system is not roused from a doze state or suspend state when activity is detected on the HDD

and FDD.

➔ **On**	(Default)	The system is roused from a doze state or suspend state when activity is detected on the HDD and FDD.

➔ **PCI Master [OFF]**

Use the **PCI Master** option to enable the system to monitor activity on the PCI master and rouse the system from a suspend or doze state when activity on the PCI master is detected.

➔ **Off**		The system is not roused from a doze state or suspend state when activity is detected on the PCI master.
➔ **On**	(Default)	The system is roused from a doze state or suspend state when activity is detected on the PCI master.

➔ **PCI Master [OFF]**

Use the **PCI Master** option to enable the system to monitor activity on the PCI master and rouse the system from a suspend or doze state when activity on the PCI master is detected.

➔ **Off**		The system is not roused from a doze state or suspend state when activity is detected on the PCI master.
➔ **On**	(Default)	The system is roused from a doze state or suspend state when activity is detected on the PCI master.

➔ **Wake Up On LAN [Disabled]**

Use the **Wake Up On LAN** option to enable activity on the LAN to rouse the system from a suspend or doze state.

➔ **Disabled** (Default) Wake event not generated by LAN activity

➔ **Enabled** Wake event generated by LAN activity

➔ **Modem Ring Resume [Disabled]**

Use the **Modem Ring Resume** option to enable activity on the modem to rouse the system from a suspend or doze state.

➔ **Disabled** (Default) Wake event not generated by modem activity

➔ **Enabled** Wake event generated by modem activity

➔ **RTC Alarm Resume [Disabled]**

Use the **RTC Alarm Resume** option to specify when the computer is 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 will turn itself on from a suspend state when the alarm goes off.

➔ **Primary INTR [ON]**

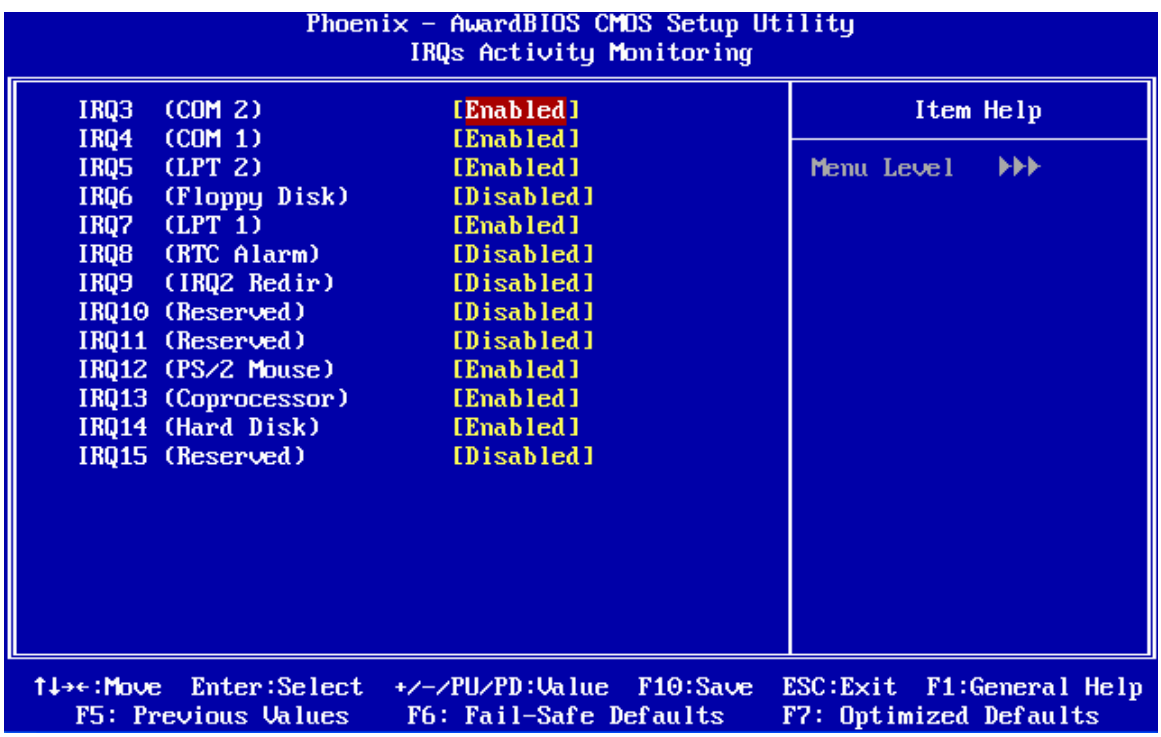
Use the **Primary INTR** option to enable IRQs to be monitored for activity and to be able to rouse the system from a suspend or doze state if the activity is detected.

➔ **Off** IRQs not monitored

➔ **On** (Default) IRQs are monitored.

➔ **IRQs Monitoring Activity [Press Enter]**

To view the **IRQs Monitoring Activity** options press **ENTER**. If the Primary INTR was selected as ON, the IRQs can be monitored and used to generate wake events.



BIOS Menu 10: IRQ Activity Monitoring

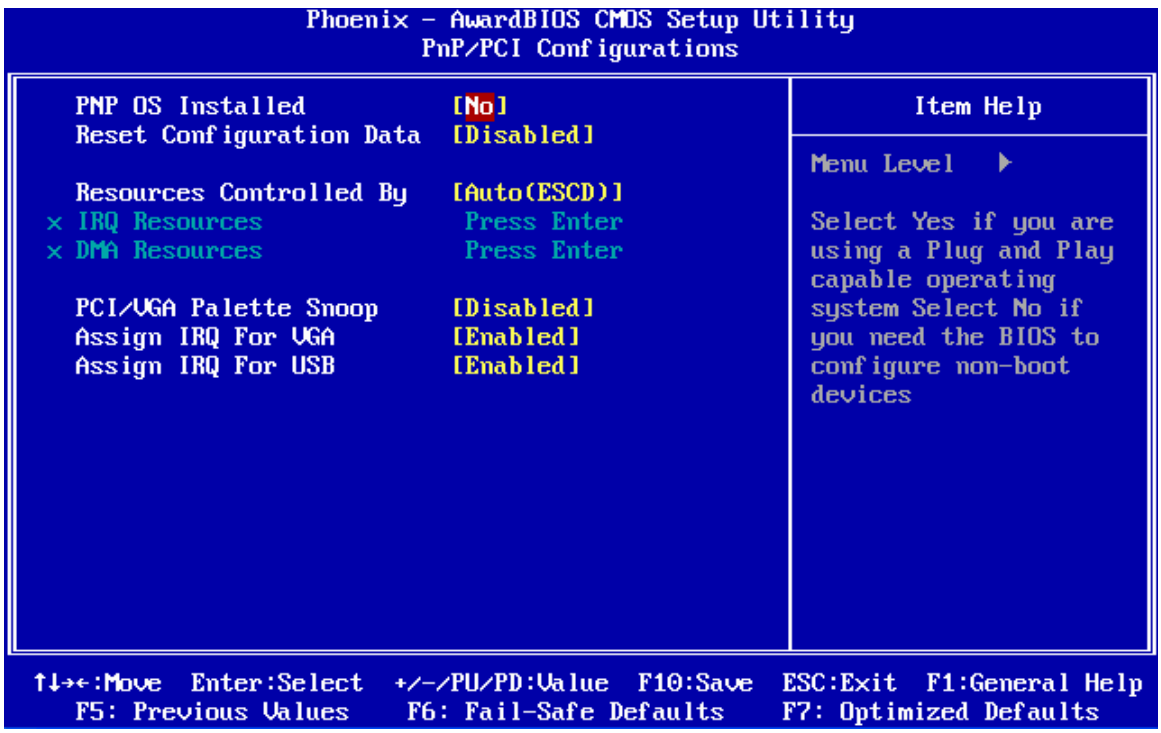
The following IRQs are monitored:

- IRQ3
- IRQ4
- IRQ5
- IRQ6
- IRQ7
- IRQ8
- IRQ9

- IRQ10
- IRQ11
- IRQ12
- IRQ13
- IRQ14
- IRQ15

6.7 PnP/PCI Configurations

Use the **PnP/PCI Configurations** menu (**BIOS Menu 11**) to set the plug and play, and PCI options.



BIOS Menu 11: PnP/PCI Configurations

➔ **PNP OS Installed [No]**

The **PNP OS Installed** option determines whether the Plug and Play devices connected to the system are configured by the operating system or the BIOS.

➔ **No** (Default) If the operating system does not meet the Plug and Play specifications, BIOS configures all the devices in the system.

➔ **Yes** Set this option if the system is running Plug and Play aware operating systems. The operating system changes the interrupt, I/O, and DMA settings.

➔ **Reset Configuration Data [Disabled]**

Use the **Reset Configuration Data** option to reset the Extended System Configuration Data (ESCD) when exiting setup if booting problems occur after a new add-on is installed.

➔ **Disabled** (Default) ESCD will not be reconfigured

➔ **Enabled** ESCD will be reconfigured after you exit setup

➔ **Resources Controlled By [Auto (ESCD)]**

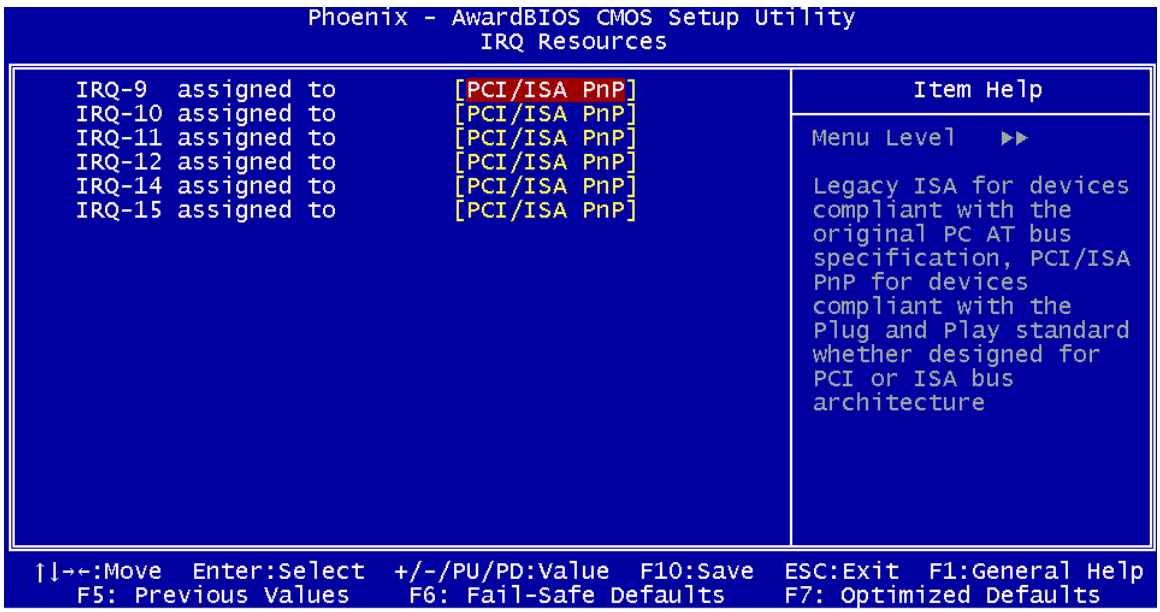
Use the **Resources Controlled By** option to either manually configure all the boot and plug and play devices, or allow BIOS to configure these devices automatically. If BIOS is allowed to configure the devices automatically IRQs, DMA and memory base address fields cannot be set manually.

➔ **Auto(ESCD)** (Default) BIOS automatically configures plug and play devices as well as boot devices.

➔ **Manual** Manually configure the plug and play devices and any other boot devices.

➔ **IRQ Resources [Press Enter]**

The **IRQ Resources** option (**BIOS Menu 12**) can only be selected if the **Resources Controlled By** option is set to **Manual**.



BIOS Menu 12: IRQ Resources

The **IRQ Resources** menu has the following options:

- IRQ-9 assigned to
- IRQ-10 assigned to
- IRQ-11 assigned to
- IRQ-12 assigned to
- IRQ-14 assigned to
- IRQ-15 assigned to

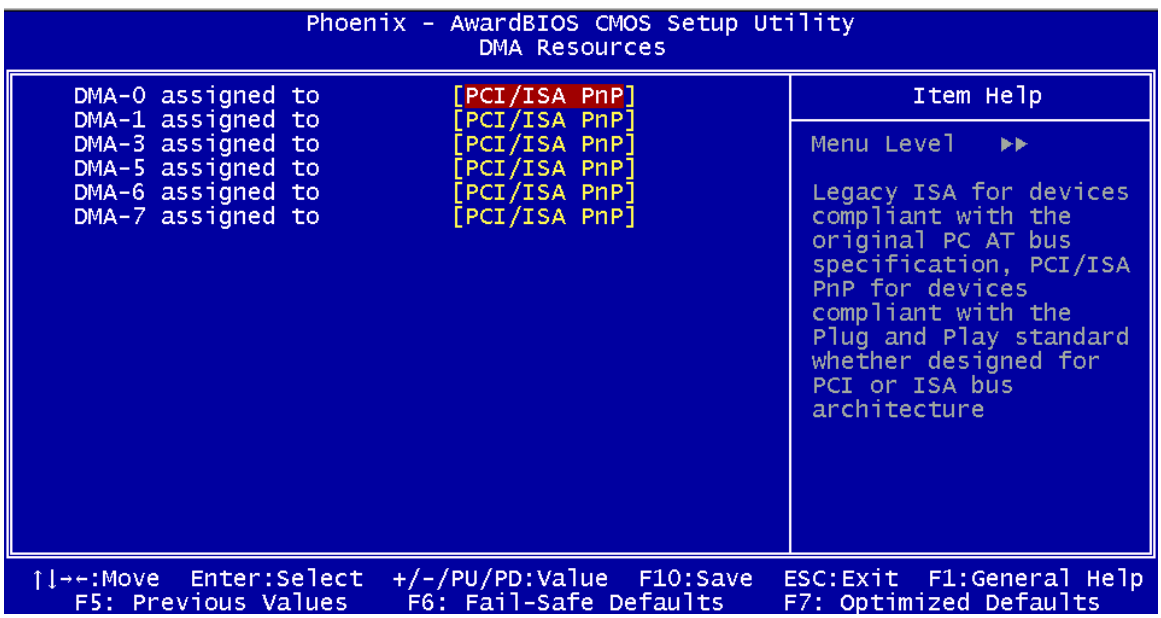
The above options all have the following default options.

➔ **PCI/ISA PnP** The IRQ is reserved by BIOS for PCI and ISA PnP devices.

➔ **Legacy ISA** (Default) The IRQ is assigned to legacy ISA for devices compliant with the original PC AT bus specification, PCI/ISA PNP for devices compliant with the Plug and Play standard whether designed for PCI or ISA bus architecture.

➔ **Memory Resources [Press Enter]**

The **Memory Resources** menu (**BIOS Menu 13**) can only be accessed if the **Resources Controlled By** option is set to **Manual**. Use **Memory Resources** to select a base address and the length for the memory area used by a peripheral that requires high memory.



BIOS Menu 13: Memory Resources

The menu has two configurable options:

- PCI/ISA PnP (Default)
- Legacy ISA

➔ **Reserved Memory Base [N/A]**

The **Reserved Memory Base** option specifies the base address for the peripheral device. The **Reserved Memory Base** options are:

- N/A (Default)
- C800
- CC00
- D000
- D400

- D800
- DC00

➔ **PCI/VGA Palette Snoop [Disabled]**

Use the **PCI/VGA Palette Snoop** option enables the system to determine whether or not some special VGA cards, high-end hardware MPEG decoders and other similar devices are allowed to look at the VGA palette on the video card so these devices can determine what colors are in use. This option is needed *very* rarely and should be left "Disabled" unless a video device specifically requires the setting to be enabled upon installation.

➔ **Disabled**	(Default)	Does not allow the graphics devices to examine the VGA palette on the graphics card.
➔ **Enabled**		Allows the graphics devices to examine the VGA palette on the graphics card.

➔ **Assign IRQ for VGA [Enabled]**

Use the **Assign IRQ for VGA** option to enable the system to allocate an interrupt address to the system VGA display.

➔ **Disabled**		No IRQ is assigned to the VGA
➔ **Enabled**	(Default)	An IRQ is assigned to the VGA

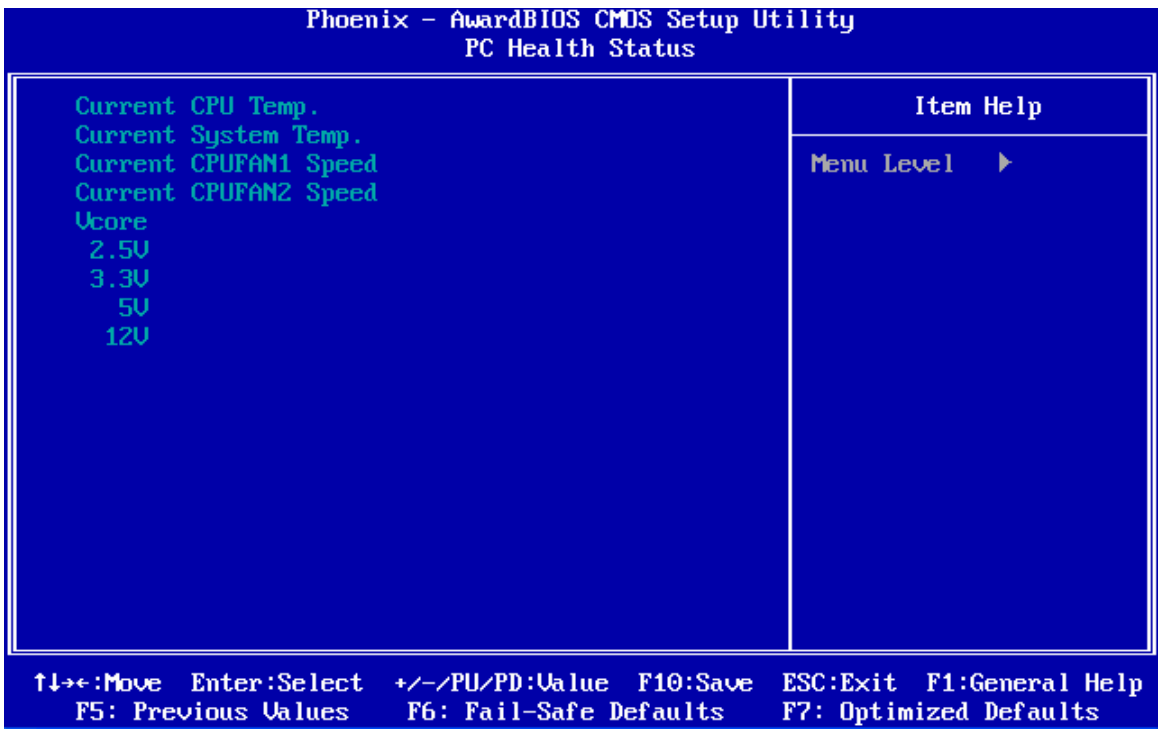
➔ **Assign IRQ for USB [Enabled]**

Use the **Assign IRQ for USB** option to enable the system to allocate an interrupt address to the system USB display.

➔ **Disabled**		No IRQ is assigned to the USB
➔ **Enabled**	(Default)	An IRQ is assigned to the USB

6.8 PC Health Status

The **PC Health Status** menu (**BIOS Menu 14**) has no user configurable options, but shows system operating parameters that are essential to the stable operation of the system.



BIOS Menu 14: PC Health Status

The following system parameters are monitored by the **PC Health Status** menu.

➔ **System Temperature**

The following temperatures are monitored:

- Current CPU Temperature
- Current System Temperature

➔ **Fan Speeds**

The following fan speeds are monitored:

- Current CPUFAN1 Speed
- Current CPUFAN2 Speed

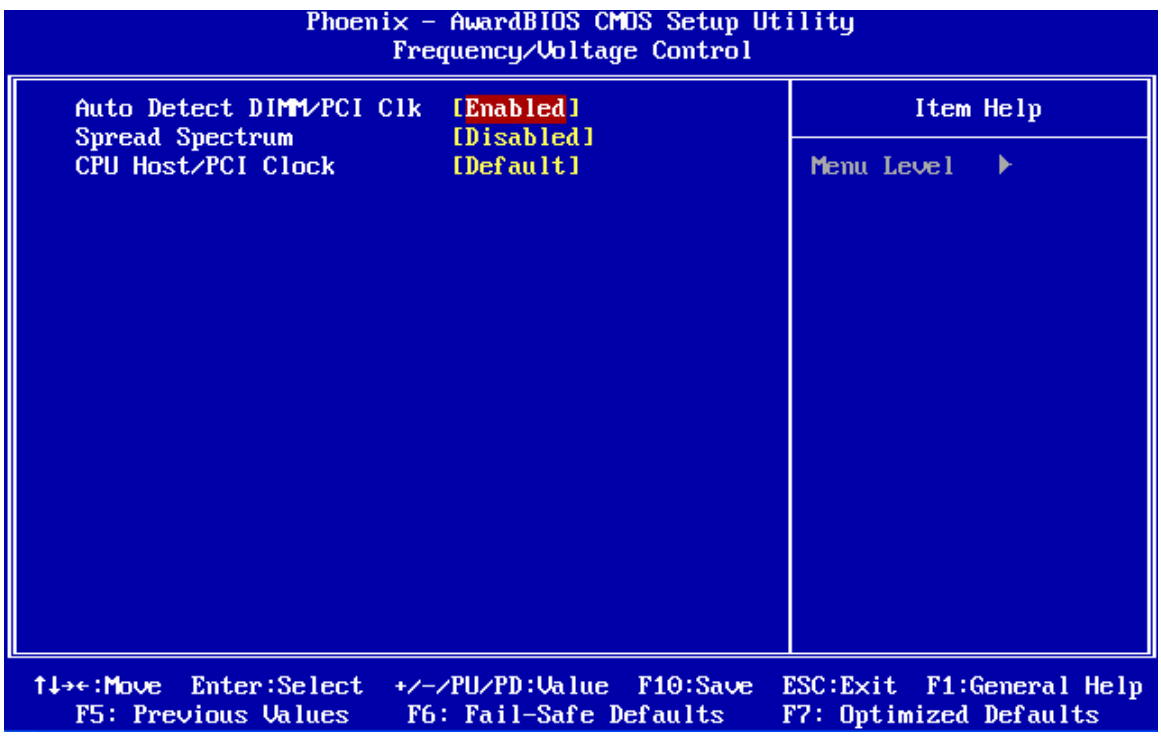
➔ **Voltages**

The following voltages are monitored:

- Vcore
- +2.5 V
- +3.3 V
- +5 V
- +12 V

6.9 Frequency/Voltage Control

Use the **Frequency/Voltage Control** menu (**BIOS Menu 15**) to set the frequency options for the DIMM, PCI and CPU host.



BIOS Menu 15: Frequency/Voltage Control

➔ **Auto Detect DIMM/PCI Clk [Enabled]**

Use the **Auto Detect DIMM/PCI Clk** option to actively reduce EMI (Electromagnetic Interference) and reduce power consumption by turning off unoccupied or inactive expansion slots.

➔ **Disabled**		AGP, PCI and memory slots are not monitored
➔ **Enabled**	(Default)	AGP, PCI and memory slots are monitored and clock signals to all unoccupied and inactive slots are turned off.

➔ **Spread Spectrum [Disabled]**

Use the **Spread Spectrum** option to reduce the EMI. Excess EMI is generated when the system clock generator pulses have extreme values. Spreading the pulse spectrum modulates changes in the extreme values from spikes to flat curves, thus reducing the EMI. This benefit may in some cases be outweighed by problems with timing-critical devices, such as a clock-sensitive SCSI device.

➔ **Disabled**	(Default)	EMI not reduced
➔ **Enabled**		EMI reduced

➔ **CPU Host/PCI Clock [Disabled]**

Use the **CPU Host/PCI Clock** option to select a timing combination for the CPU and the PCI bus. When set to Default, the BIOS uses the actual CPU and PCI bus clock values. Configuration options are below.

- Default (Default)
- 66/33 MHz
- 68/34 MHz
- 75/37 MHz
- 83/41 MHz
- 95/31 MHz

- 100/33 MHz
- 103/34 MHz
- 112/37 MHz
- 124/31 MHz
- 133/33 MHz
- 138/34 MHz
- 140/35 MHz
- 150/37 MHz

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Chapter

7

Software Drivers

7.1 Available Software Drivers

NOTE:

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

The IOWA-MARK motherboard has four software drivers:

- VIA® 4 in 1 Chipset Driver Installation (VIA® Service Pack v4.3)
- RealTek Audio Driver
- RealTek LAN Driver
- The ALi RAID driver is fully described in **Appendix F**.

All four drivers can be found on the CD that came with the motherboard. To install the drivers please follow the instructions in the sections below

7.2 VIA® 4 in 1 Chipset Driver Installation (VIA® Service Pack v4.3)

To install the chipset driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the IOWA-MARK board.

Step 2: Open the "**IOWA-MARK**" folder. Open the "**4in1 Extreme**" subfolder.

Figure 7-1: Access the 4in1_Extreme Folder

Step 3: Click the Setup utility icon shown in **Figure 7-2.**

Figure 7-2: Setup Utility Icon

Step 4: The installation program begins to initialize. After the initialization process a welcome screen shown in **Figure 7-3** appears. Click "**NEXT**" to continue.

Figure 7-3: VIA® Chipset Driver Installation Welcome Screen

Step 5: The "**Readme**" in **Figure 7-4** appears. Click "**NEXT**" to continue.

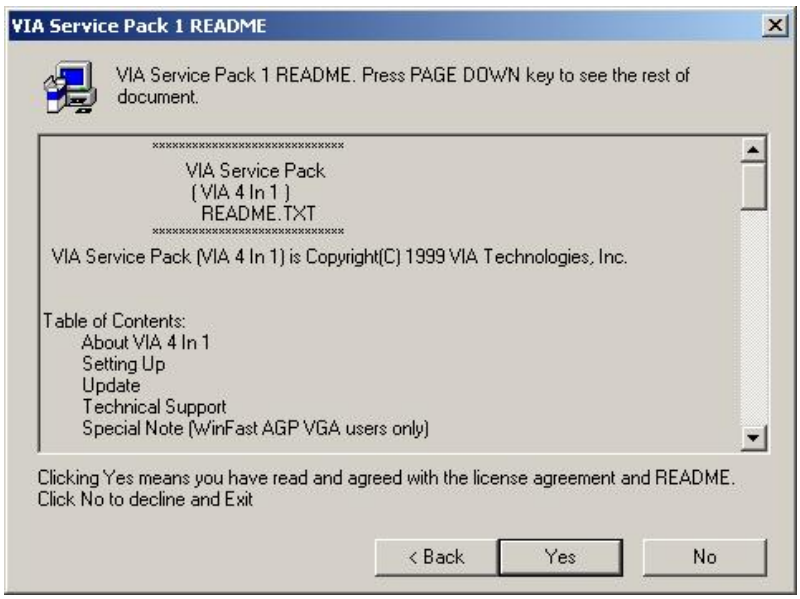

Figure 7-4: Readme Information

Step 6: Select "**Normal Installation**" or "**Quick Installation**." (See **Figure 7-5**) Click "**NEXT**" to continue.

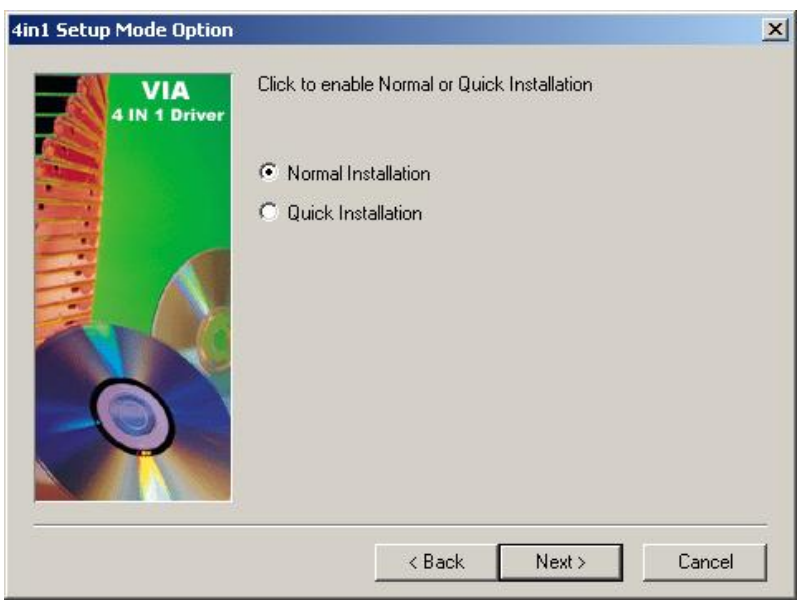

Figure 7-5: VIA® Chipset Driver Installation Type

Step 7: Select the setup components (see **Figure 7-6**) that must be installed in the

system. There are setup components:

- VIA® PCI IDE Bus Driver
- AGP Driver (AGP3.0 Supported)
- VIA® INF Driver 1.70A

Click "**NEXT**" to continue the installation.

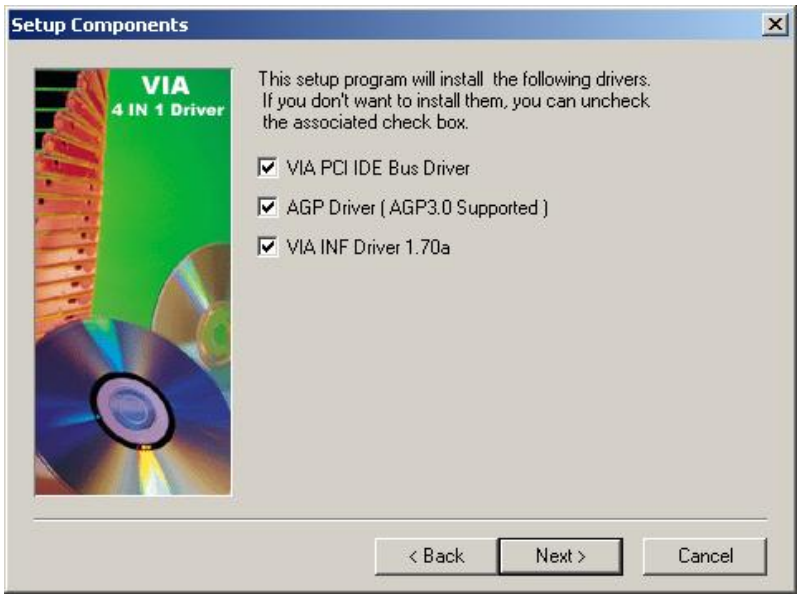

Figure 7-6: Driver Selection

Step 8: The setup then prompts the user (see **Figure 7-7**) if the VIA® PCI IDE Bus Driver must be installed on the system. Select install or uninstall. Click "**NEXT**" to continue.

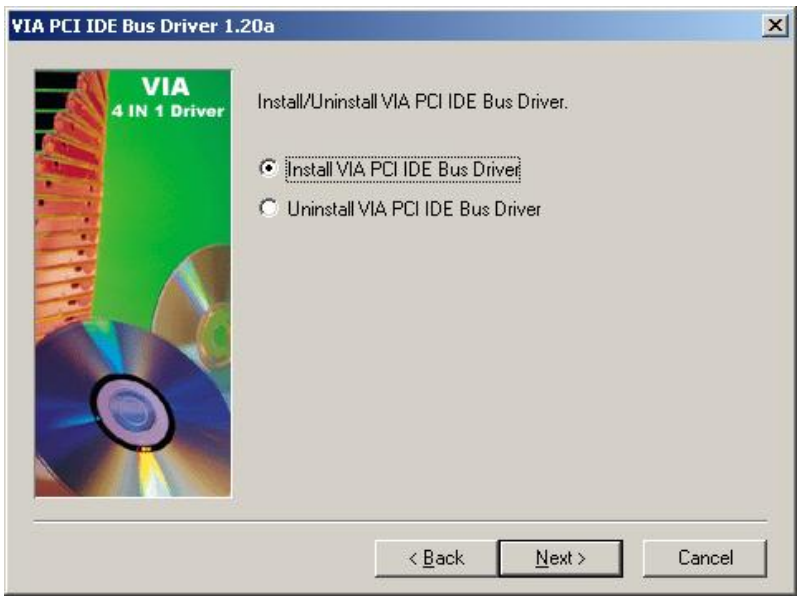

Figure 7-7: VIA® PCI IDE Bus Driver Selection

Step 9: The setup then prompts the user (see **Figure 7-8**) if the AGP driver must be installed on the system. Select install or uninstall. Click "**NEXT**" to continue.

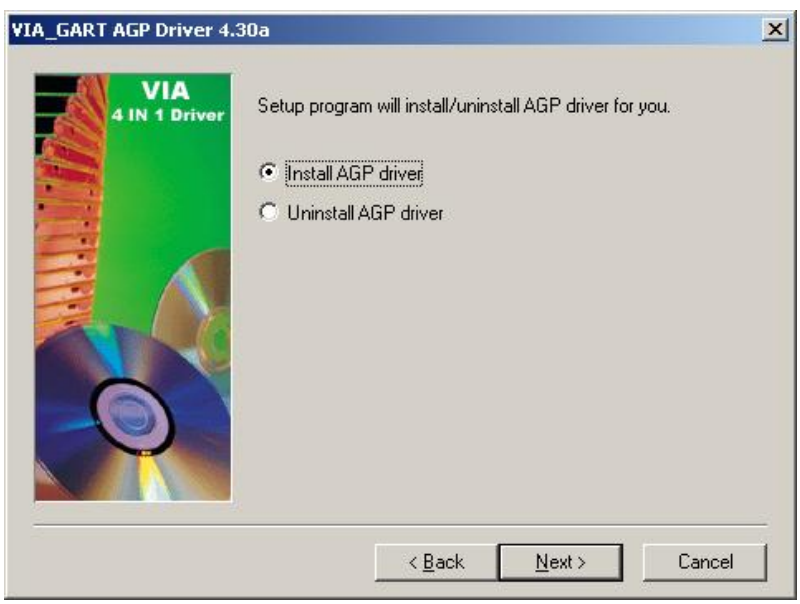

Figure 7-8: AGP Driver Selection

Step 10: The drivers are then installed onto the system. After the installation is complete

the user is prompted to restart the computer now or later. (See **Figure 7-9**) Select when the computer must be restarted. Click "**OK**" to exit the installation program.

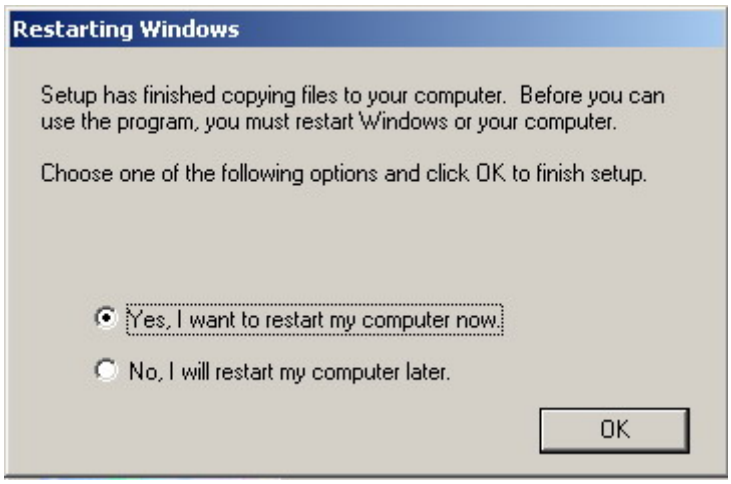

Figure 7-9: Restart the Computer

7.3 RealTek Audio Driver Installation

To install the RealTek AC'97 Audio driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the IOWA-MARK board.

Step 2: Open the "**IOWA-MARK**" folder. Open the "**Audio**" subfolder. (See **Figure 7-10**)

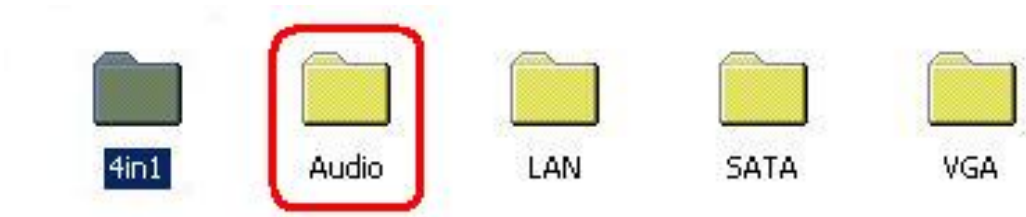

Figure 7-10: Access the Audio Driver Folder

Step 3: Click the Setup utility icon shown in **Figure 7-11**.

Figure 7-11: Setup Utility Icon

Step 4: The install shield wizard for the audio driver starts. See **Figure 7-12.**

Figure 7-12: Audio Driver Install Shield Wizard Starting

Step 5: The RealTek Audio Setup prepares the install shield to guide you through the rest of the setup process. See **Figure 7-13**.

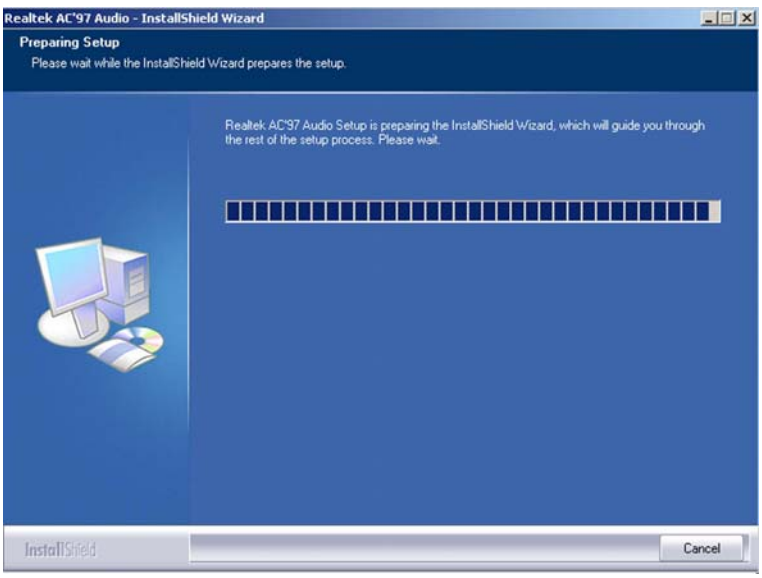

Figure 7-13: Audio Driver Setup Preparation

Step 6: The welcome screen shown in **Figure 7-14** appears. Click the "**NEXT**" button to

continue the installation. The install shield starts to configure the new software as shown in **Figure 7-15**.

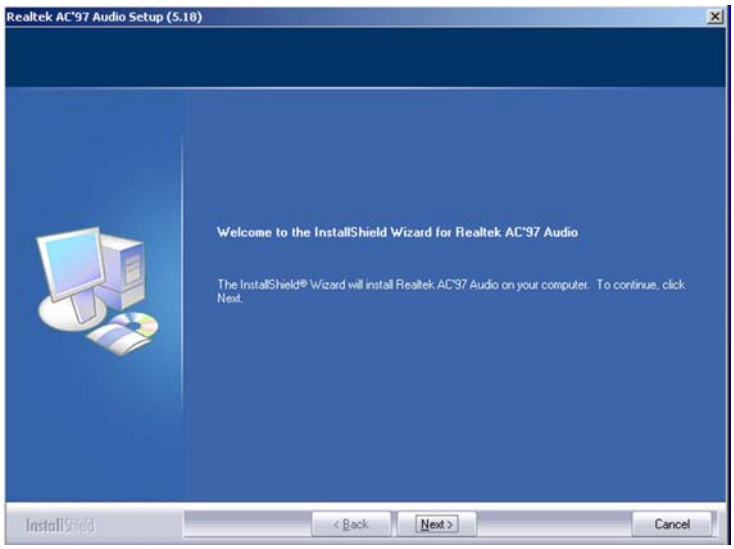

Figure 7-14: Audio Driver Welcome Screen

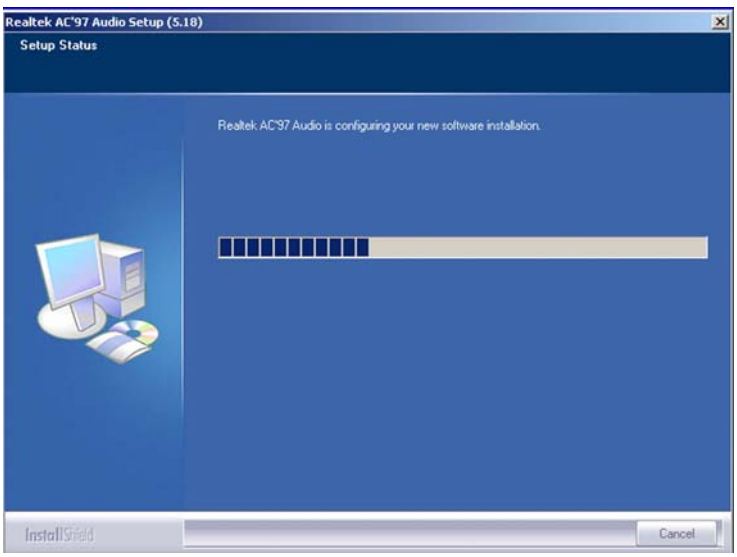

Figure 7-15: Audio Driver Software Configuration

Step 7: The "**Digital Signal Not Found**" screen shown in **Figure 7-16** appears. Click "**YES**" to continue the installation.

Figure 7-16: Audio Driver Digital Signal

Step 8: The installation of the driver begins. See **Figure 7-17**.

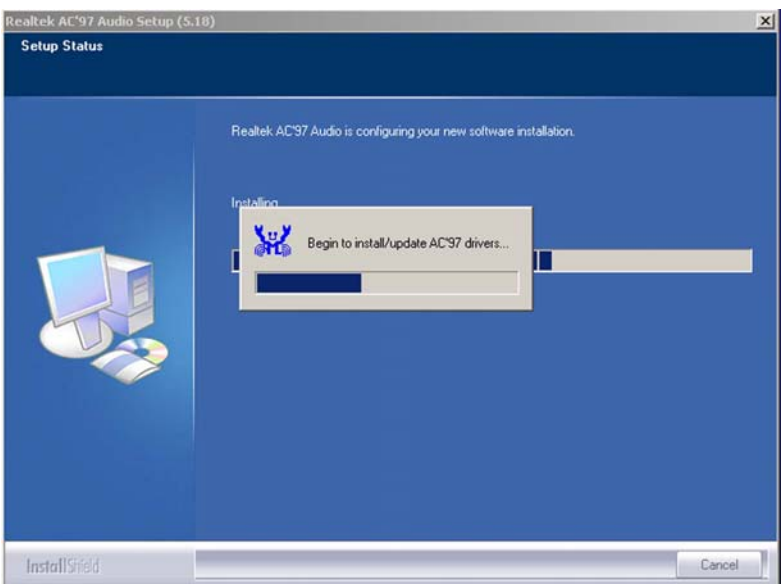

Figure 7-17: Audio Driver Installation Begins

Step 9: After the driver installation process is complete, a confirmation screen shown in **Figure 7-18** appears.

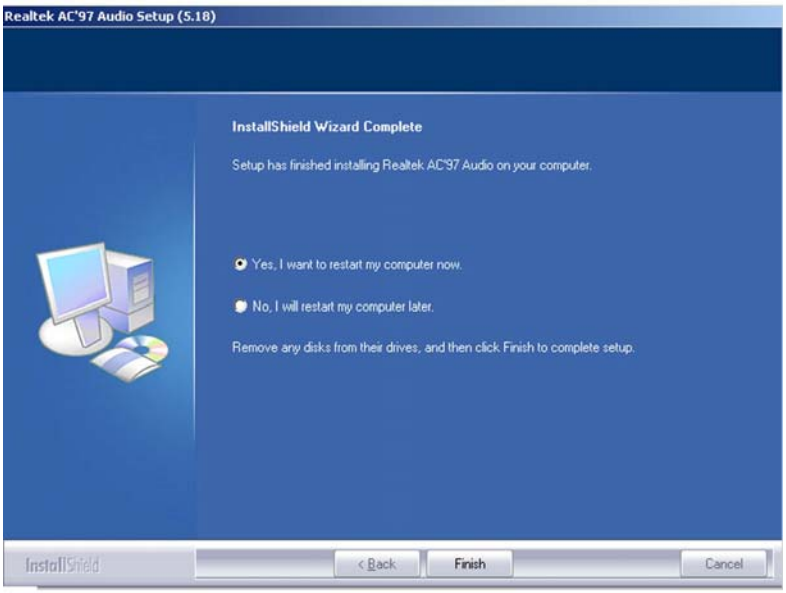

Figure 7-18: Audio Driver Installation Complete

Step 10: Select when the system should be restarted, now or later. (see **Figure 7-18**)

Step 11: Click "**FINISH**" to complete the installation.

7.3.1 LAN Driver Installation

To install the LAN driver, follow the steps below:

Step 1: Insert the CD into the system that contains the IOWA-MARK board.

Step 2: Open the "**IOWA-MARK**" folder. Open the "**LAN**" subfolder. (See **Figure 7-19**)

Figure 7-19: Access the LAN Driver Folder

Step 3: Click the Setup utility icon shown in **Figure 7-20**.

Figure 7-20: Setup Utility Icon

Step 4: Once the **Setup** icon is double clicked, a **Welcome** screen shown in **Figure 7-21** appears.

Figure 7-21: LAN Driver Welcome Screen

Step 5: To continue installing click "**Next.**" The driver is installed and a confirmation screen at the end of the installation appears. (See **Figure 7-22**)

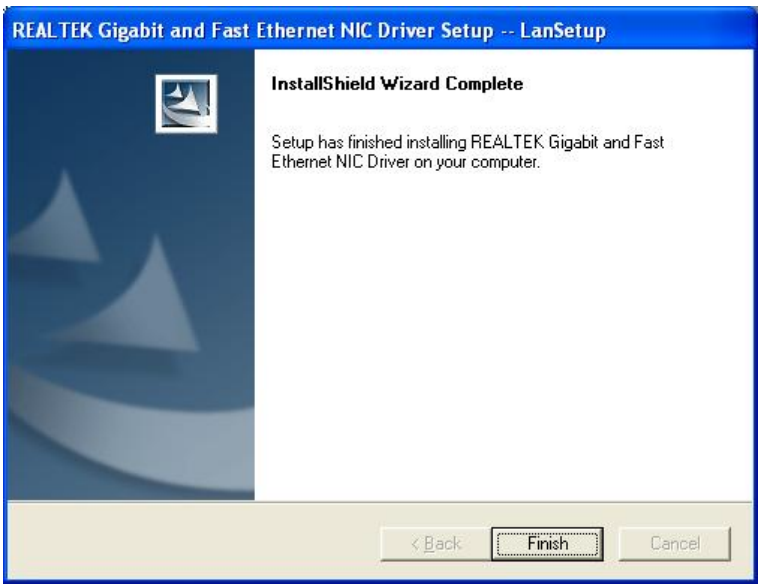

Figure 7-22: LAN Driver Installation Complete

Step 6: Click "**Finish**" to complete the installation.

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Appendix

A

BIOS Options

Chapter

B

DIO Connector

B.1 DIO Interface Introduction

The DIO connector on the IOWA-MARK is interfaced to GIO ports on the Winbond W83627EHG 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 Winbond datasheet for the Winbond W83627EHG Super I/O chipset.

B.2 DIO Connector Pinouts

The following table describes how the DIO connector pins are connected to the Super I/O GPIO port 1.

Pin No	Description	Super I/O Pin	Super I/O Pin Descripton
1	Ground	N/A	N/A
2	VCC	N/A	N/A
3	Output 0	GP14	General purpose I/O port 1 bit 4.
4	Output 1	GP15	General purpose I/O port 1 bit 5.
5	Output 2	GP16	General purpose I/O port 1 bit 6.
6	Output 3	GP17	General purpose I/O port 1 bit 7.
7	Input 0	GP10	General purpose I/O port 1 bit 0.
8	Input 1	GP11	General purpose I/O port 1 bit 1
9	Input 2	GP12	General purpose I/O port 1 bit 2
10	Input 3	GP13	General purpose I/O port 1 bit 3

B.3 Assembly Language Samples

B.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

B.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

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Appendix

C

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 EMI 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 C-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. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

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

NOTE:

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

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT      15H
 ;
; ADD THE APPLICATION PROGRAM HERE
;
        CMP      EXIT_AP, 1     ;is the application over?
        JNE      W_LOOP         ;No, restart the application

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

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Appendix

D

Address Mapping

D.1 Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	AMD Graphics Controller
3C0-3DF	AMD Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table D-1: IO Address Map

D.2 1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

Table D-2: 1st MB Memory Address Map

D.3 IRQ Mapping Table

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	ACPI
IRQ2	Available	IRQ10	LAN
IRQ3	COM2	IRQ11	LAN/USB2.0/SATA
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	SMBus Controller	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Available	IRQ15	Secondary IDE

Table D-3: IRQ Mapping Table

D.4 DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Table D-4: IRQ Mapping Table

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Appendix

E

AC'97 Audio CODEC

E.1 Introduction

The motherboard comes with an on-board Realtek ALC655 CODEC. Realtek ALC655 is a 16-bit, full duplex AC'97 Rev. 2.3 compatible audio CODECwith a sampling rate of 48KHz.

E.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through a connector on the IOWA-MARK motherboard. Connect the audio kit to the connector.

E.1.2 Driver Installation

The driver installation has been described in **Chapter 7.3**.

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

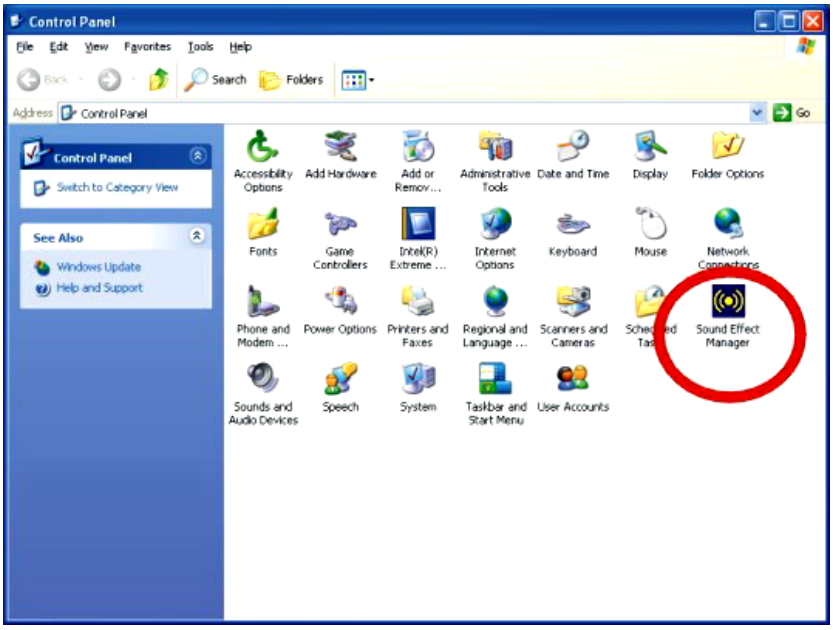


Figure E-1: Sound Effect Manager Control Panel

E.2 Sound Effect Configuration

E.2.1 Accessing the Sound Effects Manager

To access the **Sound Effects Manager**, please do the following:

Step 1: Install the audio CODEC driver.

Step 2: Click either:

- The Sound Effect Manager icon in the Notification Area of the system task bar (see **Figure E-2**), or
- The Sound Effect Manager icon in the Control Panel (**Figure E-3**).

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

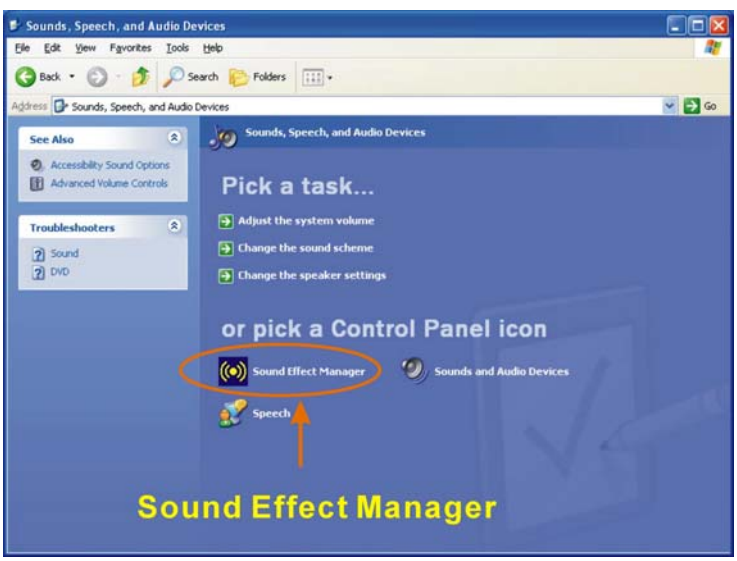


Figure E-3: Sound Effect Manager Icon [Control Panel]

Step 3: The sound effect manager appears.

NOTE:

The Sound Effect Manager shown above is for the RealTek ALC655 audio CODEC. Different CODECs may have different sound manager appearances.

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

E.2.2 Sound Effect Manager Configuration Options

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

NOTE:

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

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

- Microphone Effect
- General

NOTE:

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

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

- ***Sound Effect***:- Select a sound effect from the 23 listed options in the drop down menu. Selected sound effect properties can be edited. To edit the sound effect click "**EDIT**."
- ***Karaoke Mode***:- The **Karaoke Mode** is accessed in the Sound Effect window. The **Voice Cancellation** disables the vocal part of the music being played. The **Key adjustment** up or down arrow icons enables users to define a key that fits a certain vocal range.
- ***Equalizer Selection***:- Preset equalizer settings enable easy audio range settings. Ten frequency bands can be configured.
- ***Speaker Configuration***:- Multi-channel speaker settings are configured in this menu. Configurable options include:
  - Headphone
  - Channel mode for stereo speaker output
  - Channel mode for 4 speaker output
  - Channel mode for 5.1 speaker output
  - Synchronize the phonejack switch with speakers settings
- ***Speaker Test*:-** Each speaker connected to the system is tested individually to see if the 4-channel or 6-channel audio operates properly.
- ***S/PDIF-In & S/PDIF-Out***:- These functions are currently not supported.
- ***Connector Sensing***:- Realtek ALC655 detects if an audio device is plugged into the wrong connector. If an incorrect device is plugged in a warning message appears.

- ***HRTF Demo***:- Adjust HRTF (Head Related Transfer Functions) 3D positional audio here before running 3D applications.
- ***Microphone Effect***:- Microphone noise suppression is enabled in this menu.
- ***General***:- General information about the installed AC'97 audio configuration utility is listed here.

Appendix

F

RAID Setup

F.1 Introduction

The ALi M5283 SATA RAID chipset can control parallel ATA (PATA) and serial ATA (SATA) disks. The ALi controller supports PATA UDMA transfer mode up to mode 6 and SATA 1 disk drives. The ALi M5283 also has a cost-effective RAID functionality that can increase the data read/write speed and provide protection to data by distributing mirrored duplicates of data onto two disk drives (RAID 1).

CAUTION:

A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contingent storage space. The operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

F.1.1 Precautions

One key benefit a RAID configuration brings is that a single hard drive can fail within a RAID array without damaging data. With RAID1 array, a failed drive can be replaced and the RAID configuration restored.

WARNING:

Irrecoverable data loss occurs if a working drive is removed when trying to remove a failed drive. It is strongly recommended to mark the physical connections of all SATA disk drives. Drive locations can be identified by attaching stickers to the drive bays. If a drive member of a RAID array should fail, the failed drive can then be correctly identified.

CAUTION:

Do not accidentally disconnect the SATA drive cables. Carefully route the cables within the chassis to avoid system down time.

F.2 Features and Benefits

- Supports RAID levels 0, 1, and JBOD
- Supports connectivity to two disk drives
- Supported Operating Systems include: Windows 98/Me, Windows 2000 and Windows XP
- Windows-based software for RAID management

F.3 Accessing the ALi RAID Utility

To access the **Ali RAID Utility**, please follow the steps below:

Step 1: **Connect SATA drives to the system**. Connect two SATA drives to the system. Make sure the drives have the same capacity, are the same type and have the same speed.

NOTE:

Make sure the SATA drives are EXACTLY the same when they are configured in a RAID configuration (JBOD, RAID 0 or RAID 1). If they are not the same size, disk drive capacity is sacrificed and overall performance affected.

Step 2: **Enable SATA drives in BIOS**. Enter the **Phoenix Award BIOS** setup program. Next, open the **Advanced BIOS Features** menu. Enable the **SATA BOOT ROM Control BIOS** option. (See **Chapter 6**, **Section 6.3**)

Step 3: **Save and Exit BIOS**. After the **SATA BOOT ROM Control BIOS** option is enabled, save and exit the BIOS.

Step 4: **Reboot the system**. Reboot the system after saving and exiting the BIOS.

Step 5: **Press Ctrl-A**. When the screen in **Figure F-1** appears press Ctrl-A to enter the ALi RAID BIOS setup program.

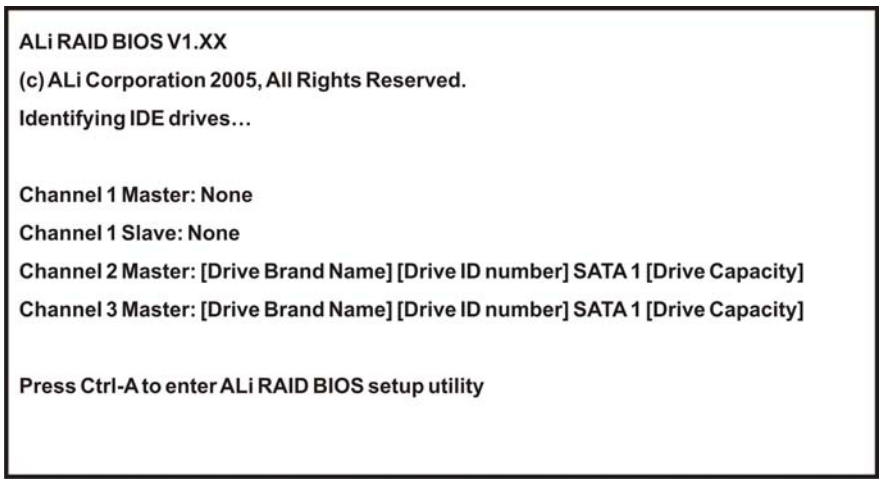


Figure F-1: Accessing ALi RAID BIOS Utility

Step 6: **Delete RAID settings and partitions**. The **RAID BIOS Setup Utility** in **Figure F-2** appears. Before configuring the array select the "**Delete All RAID Setting & Partition**".

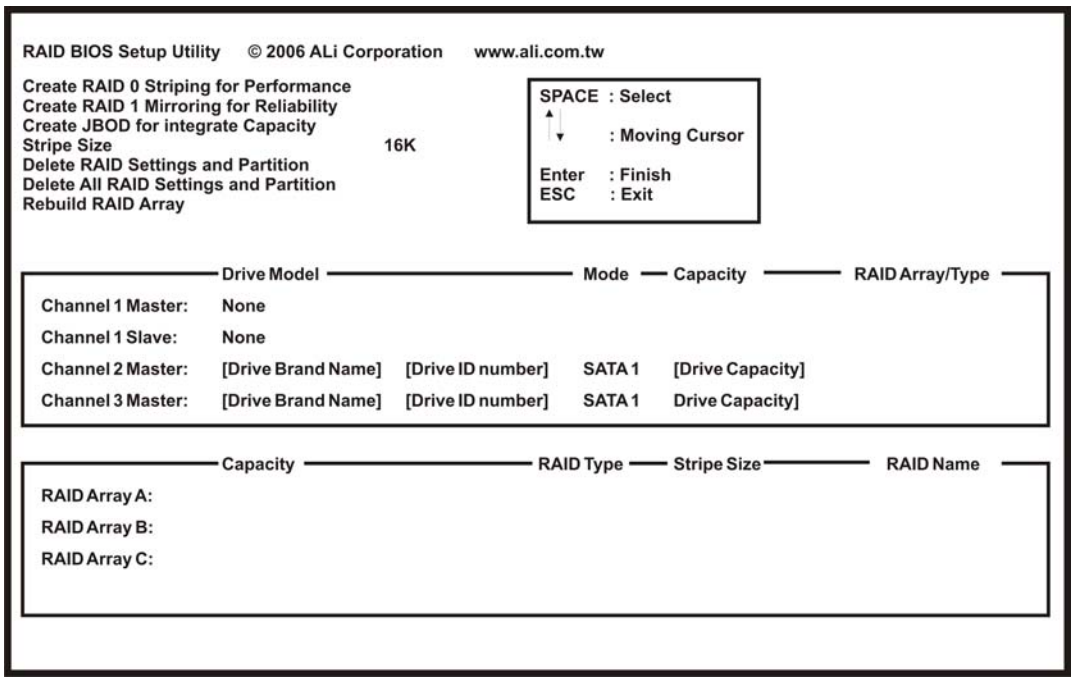


Figure F-2: RAID BIOS Setup Utility

Step 7: **Configure the RAID settings**. Use the **RAID BIOS Setup Utility** in **Figure F-2** to configure the RAID array. Brief descriptions are given below.

Step 8: **Install the OS**. After the RAID array has been configured (see below) install the OS. To do this, please refer to the documentation that came with the OS.

F.4 RAID Options:

F.4.1 Create RAID 0 Striping for Performance

WARNING:

All data previously stored on the member drives of a RAID configuration **are destroyed** during the RAID initialization process. If "used" drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

Step 1: **Select** "**Create RAID 0 Striping for Performance"**. Use the arrow keys to highlight **Create RAID0 Striping for Performance** and press **ENTER**. A flashing 'S' appears on the **Drive Menu** where the member drives to be included in the RAID 0 array can be chosen.

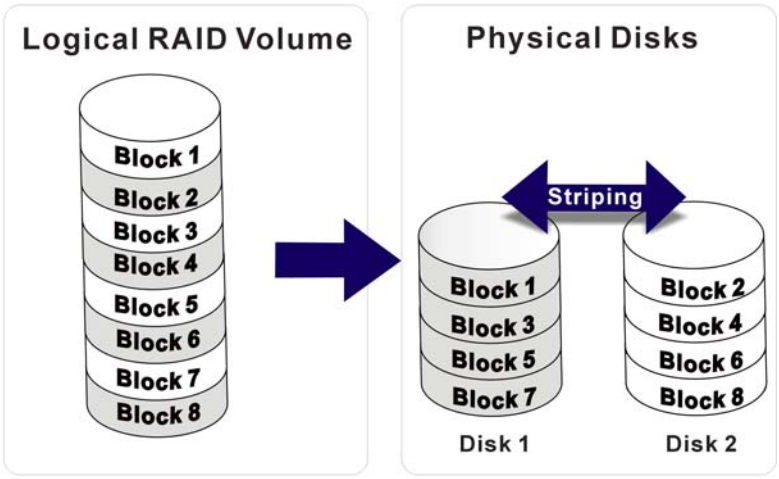
Step 2: **Select RAID array drive members**. Use the space bar to select members of the RAID array. The flashing cursor changes to a lower case 's' once any of the connected disk drives has been selected. Follow the same method to select another member drive.

Step 3: **Confirm**. The **Create RAID0(Y/N)** confirm box appears. Press **Y**.

Step 4: **Name the array**. Enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array.

NOTE:

1. To reduce the chance of losing data, ALi imposes certain limitations on the RAID configuration options. PATA drives connected on the same IDE channel cannot be selected as the members of a RAID 0 array. Avoid mixing PATA and SATA disk drives in a RAID 0 array.
2. Always use disk drives of the same capacity to create a RAID array. The excessive capacity of a larger disk drive cannot be utilized because data stripes are equally distributed across all members of a RAID array.



F.4.2 Create RAID 1 Mirroring for Reliability

WARNING:

All data previously stored on the member drives of a RAID configuration **is destroyed** during the RAID initialization process. If "used" drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

Step 1: **Select** "**Create RAID 1 Striping for Reliability"**. Use the arrow keys to highlight **Create RAID 1 Striping for Reliability** and press **ENTER**. A flashing 'S' appears on the **Drive Menu** where the member drives to be included in the RAID 0 array can be chosen.

Step 2: **Select RAID array drive members**. Use the space bar to select members of the RAID array. The flashing cursor changes to a lower case 's' once any of the connected disk drives has been selected. Follow the same method to select another member drive.

Step 3: **Confirm**. The **Create RAID0(Y/N)** confirm box appears. Press **Y**.

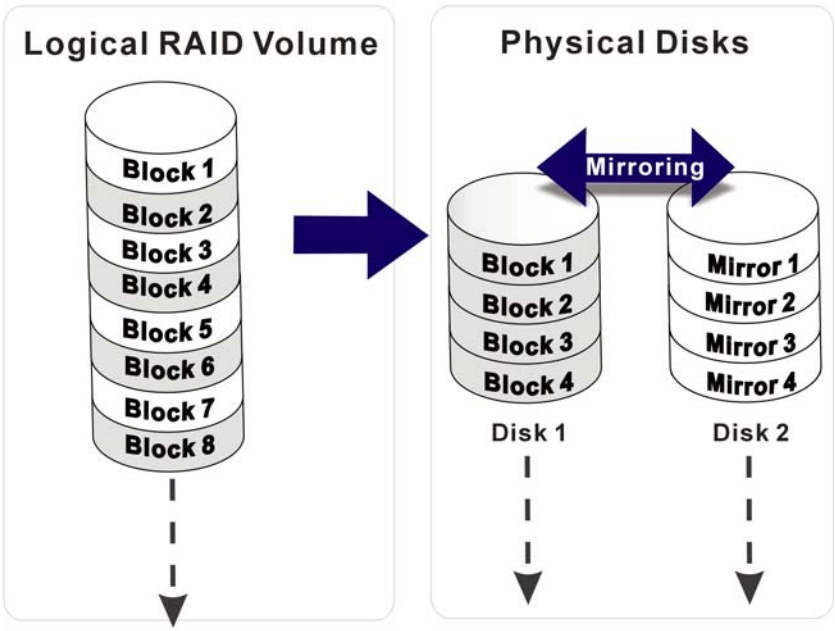
Step 4: **Name the array**. Enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array

Step 5: **View the array**. A prompt appears to proceed with drive copy. The **Source** and **Destination** drives are indicated as “M” and “m” in the **Drive Menu**.

NOTE:

To reduce the chance of losing data, ALi imposes certain limitations on the RAID configuration options. PATA drives connected on the same IDE channel cannot be selected as the members of a RAID 1 array. Avoid mixing PATA and SATA disk drives in a RAID 1 array.

Always use disk drives of the same capacity to create a RAID array. The excessive capacity of a larger disk drive cannot be utilized because data stripes are equally distributed across all members of a RAID array.



F.4.3 Create JBOD for Integrated Capacity

JBOD is defined as “Just a Bunch of Drives.” JBOD provides neither performance gains nor data redundancy.

WARNING:

All data previously stored on the member drives of a RAID configuration **is destroyed** during the RAID initialization process. If “used” drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

Step 1: **Select** “**Create JBOD for Integrated Capacity”**. Use the arrow keys to highlight **Create JBOD for Integrated Capacity** and press **ENTER**. A flashing ‘J’ appears on the **Drive Menu** where the member drives to be included in the JBOD array

can be chosen.

Step 2: **Select RAID array drive members**. Use the space bar to select members of the RAID array. The flashing cursor changes to a lower case ‘s’ once any of the connected disk drives has been selected. Follow the same method to select another member drive.

Step 3: **Confirm**. The **Create RAID 0 (Y/N)** confirm box appears. Press **Y**.

Step 4: **Name the array**. Enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array

NOTE:

To reduce the chance of losing data, ALi imposes certain limitations on the RAID configuration options. Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID1 array. Avoid mixing Parallel-ATA and Serial-ATA disk drives in a RAID1 array.

F.4.4 Stripe Size

Changing the stripe size effects RAID 0 arrays. Configurable options are:

- 64K (default)
- 32K
- 16K
- 8K
- 4K

Select a small stripe size if the I/Os to the hard drives are small and occur randomly. Choose a larger stripe size if the I/Os are mostly large and come in sequential orders, e.g.,

A/V playback and editing applications. The default value should be appropriate for most applications.

F.4.5 Delete RAID Setting & Partition

WARNING:

If a RAID configuration is deleted, all data previously stored on the member drives of the RAID configuration will also be deleted.

Step 1: **Delete a RAID setting**. Use the arrow keys to highlight **Delete RAID Setting & Partition** and press **ENTER**. A flashing 'E' appears at the **Drive Menu** where the member drives to be removed can be chosen.

Step 2: **Confirm Delete**. The **Data on RAID drives will be erased (Y/N)** confirm box appears. Press **Y**.

F.4.6 Delete All RAID Setting & Partition

WARNING:

If a RAID configuration is deleted, all data previously stored on the member drives of the RAID configuration will also be deleted.

Step 1: **Delete RAID Settings**. Use the arrow keys to highlight **Delete All RAID Setting & Partition** and press **ENTER**.

Step 2: **Confirm delete**. The **Data on RAID drives will be erased (Y/N)** confirm box appears. Press **Y**.

F.4.7 Rebuild RAID Array

The **Rebuild RAID Array** option can rebuild a RAID array if a member of a RAID configuration should fail. Neither RAID 0 nor JBOD provides data redundancy. The **Rebuild RAID Array** option only applies to RAID1 arrays and is applicable when a member of a RAID1 configuration has failed.

Step 1: **Select Rebuild Array**. Use the arrow keys to highlight **Rebuild RAID Array** and press **ENTER**. A flashing 'R' appears in the list of existing arrays. The source and destination drives will be displayed.

Step 2: **Confirm rebuild array**. Press **Y** to begin the rebuild process.

NOTE:

A status bar will indicate the rebuild progress. Rebuild consumes considerable system resources and the time required for rebuilding a RAID array may vary depending on the size of stored data, disk drive capacity, and drive performance.

F.4.8 Select Boot Drive

Step 1: **Select the Boot Drive**. Use the arrow keys to highlight **Select Boot Drive** and press **ENTER**. A flashing 'A' appears at the **Drive Menu** where the boot drive can be chosen.

Step 2: **Press ENTER**. Press **ENTER** or the space bar to finish the configuration.

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