IEI Technology Corp.

WAFER-LUKE

VIA LUKE LVDS 3.5" Low Power/Thermal Motherboard

With Dual SATA, CF II RAID Support and PCI-104

User Manual

Rev. 1.0 September, 2006

RoHS Lead Free

REVISION HISTORY

Title	WAFER-LUKE 3.5" Motherboad	
Revision Number	Description	Date of Issue
1.0	Initial release	September 2006

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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	CompactFlash 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
ICH4	I/O Controller Hub 4
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 Adapter

Chapter

1

Introduction

1.1 WAFER-LUKE Overview

The 3.5" WAFER-LUKE VIA LUKE low power single board computer (SBC) is fully equipped with advanced multi-mode I/Os. The WAFER-LUKE is designed for system manufacturers, integrators, and VARs that want performance, reliability, and quality at a reasonable price.

1.1.1 WAFER-LUKE Models

The WAFER-LUKE series has two models:

- WAFER-LUKE-1G-R10:   1GHz VIA LUKE CPU
- WAFER-LUKE-533-R10:   533MHz VIA LUKE CPU

1.1.2 WAFER-LUKE Applications

The WAFER-LUKE is designed for applications in the following areas:

- Intelligent appliances :
  - Internet fridges
  - Wall-mounted home control devices
  - Intelligent Displays
- All-in-One entertainment system
  - Start hub TV PC living room entertainment center
  - Set on top box
- Mini Mobile Systems
  - Car PC with DVD drive
  - Intelligent portable displays
  - Mobile thin clients Mini Systems
  - Car entertainment centers
  - Mini-PCs
  - Home automation & security systems
  - Point of sale display
  - Automation

1.1.3 WAFER-LUKE Benefits

Some of the WAFER-LUKE benefits include:

- Secure Data with RAID 0 and RAID 1 support
- Easy I/O expansion with PCI-104 socket
- Easily integrated into compact chassis
- Reduced maintenance costs

1.1.4 WAFER-LUKE Features

Some of the WAFER-LUKE features are listed below:

- 3.5" form factor
- RoHS compliant
- Embedded 1GHz or 533MHz VIA LUKE processor
- Dual-independent display functionality
- Dual gigabit Ethernet (GbE) controllers on-board
- Dual 150MB/s SATA channels
- Six USB 2.0 devices on-board
- AC'97 codec Realtek ALC655

1.2 WAFER-LUKE Overview
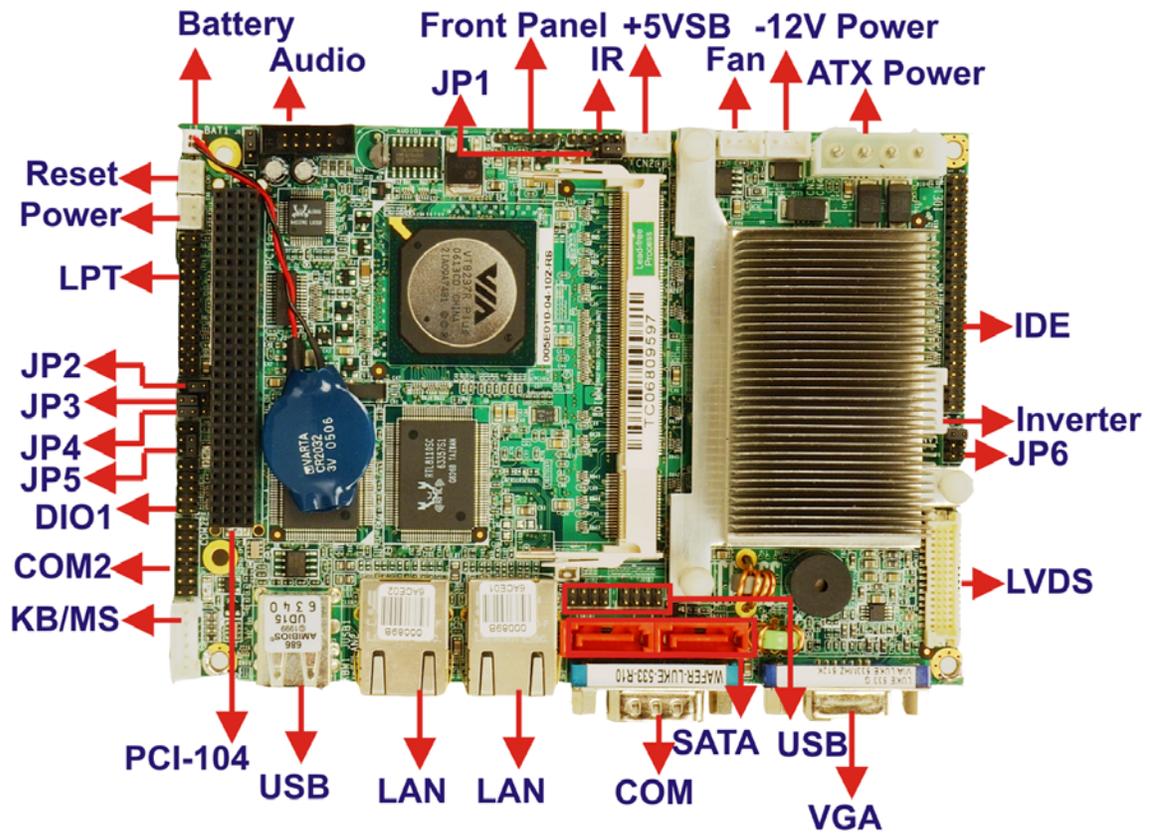
Figure 1-1: WAFER-LUKE Overview

CF Module
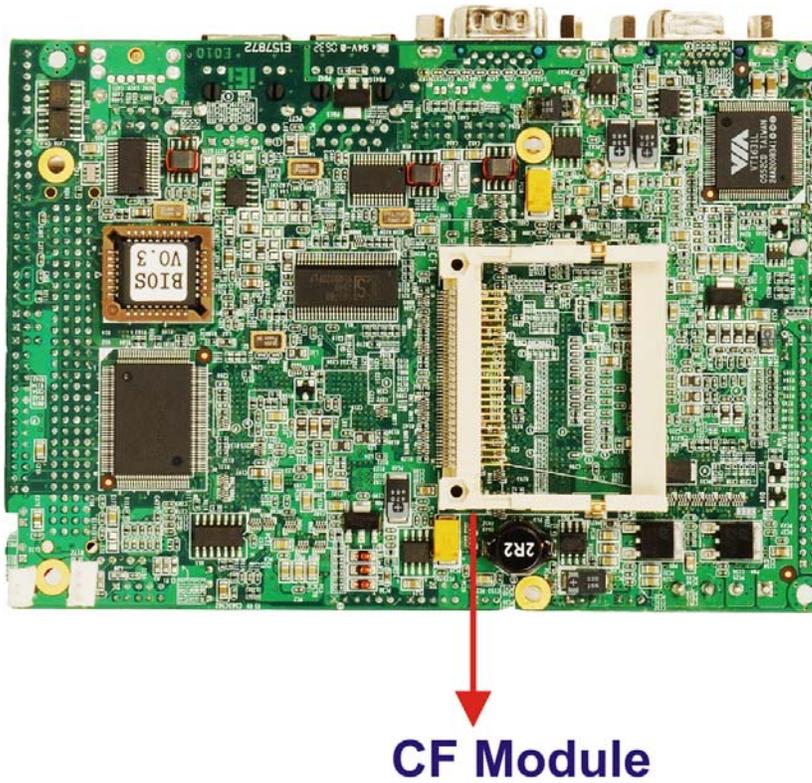
Figure 1-2: WAFER-LUKE Solder Side

1.2.1 WAFER-LUKE Connectors

The WAFER-LUKE has the following connectors on-board:

- 1 x +5VSB and power on connector
- 1 x –12V power connector
- 1 x 4-pin ATX power connector
- 1 x Audio connector
- 1 x CompactFlash connector
- 1 x Fan connectors
- 1 x Front panel connector
- 1 x General purpose input/output connector
- 1 x IDE connector
- 1 x Infrared connector
- 1 x Inverter power connector

- 1 x Keyboard/mouse connector
- 1 x LVDS connector
- 1 x Parallel port (LPT) connector
- 1 x Power switch connector
- 1 x PCI-104 expansion slot
- 1 x Reset switch connector
- 1 x RS-232 or RS-485 serial connector
- 2 x SATA connectors
- 2 x USB connectors for four USB 2.0 devices

The WAFER-LUKE has the following connectors on the board rear panel:

- 2 x Ethernet connectors
- 1 x Serial port connector
- 2 x USB connectors
- 1 x VGA connector

The WAFER-LUKE has the following on-board jumpers:

- Clear CMOS
- CF card setup
- LCD voltage setup
- COM2 setup
- RS-422/485 setup
- RS-232COM2 voltage setup

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1.3 Technical Specifications

1.3.1 WAFER-LUKE Specifications

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

Specification	WAFER-LUKE
Form Factor	3.5" form factor
CPU	Embedded 1GHz VIA LUKE Embedded 533MHz VIA LUKE
System Chipset	VIA VT8237R+
Display	CRT integrated in VIA LUKE
Memory	1 x 200-pin SO-DIMM DDR socket supports 333MHz and 400MHz modules with a maximum capacity of 1GB
BIOS	AMI BIOS
SSD	CompactFlash (CF)
Super I/O	W83697HG
Audio	AC'97 Codec Realtek ALC655
LAN	Dual RTL8110SC for GbE
COM	One RS-232 serial port One RS-232, RS-422, or RS-485 serial port
USB2.0	Six USB 1.1 or USB 2.0 devices supported
SATA	Two 150Mb/sec. SATA drive connectors
Parallel Port	One LPT port connector
KB/MS	One keyboard and mouse connector

Watchdog Timer	Software programmable 1-255 sec. by supper I/O
Digital I/O	8-bit digital I/O, 4-bit input/4-bit output
Expansion	One PCI-104
Power Supply	+5V or +12V AT or ATX power support
Temperature	0ºC - 60ºC
Humidity (operating)	5%~95% non-condensing
Dimensions	146mm x 102mm
Weight (GW/NW)	1200g/650g

Table 1-1: Technical Specifications

Chapter

2

Detailed Specifications

2.1 Overview

This chapter describes the specifications and on-board features of the WAFER-LUKE in detail.

2.2 Dimensions

The dimensions of the board are listed below:

- **Length**:   146 mm
- **Width**:   102 mm

2.3 CPU Support

The WAFER-LUKE CPU card comes with a preinstalled 1GHz or 533MHz, ultra low voltage (ULV) VIA® Luke processor. The new VIA 'Luke' CoreFusion Processing Platform integrates the latest generation VIA Eden-N™ processor with the VIA CN400 Northbridge in a single, low power package.

The Luke CoreFusion processor features include the following:

- **Rich Integration**:- Highly integrated processing and digital media corelogic combination delivers leading performance in a single, power-efficient, space-saving package
- **S3 Graphics Unichrome Pro Graphics Core**:- With an internal data flow equivalent to what is available to the latest AGP 8X graphics cards, Unichrome Pro has separate 128-bit data path between the Northbridge for pixel data flow and texture/command access. Separate 128-bit 2D and 3D graphics engines ensure optimal performance for all multimedia, entertainment, and productivity applications.
- **Flawless Digital Media Playback**:- Unichrome Pro includes native support for the most popular digital video and audio playback through hardware MPEG-2/-4 acceleration and acclaimed VIA Vinyl Audio suite, delivering spectacular playback for entertainment devices.
- **Maximum Display Flexibility**:- Unichrome Pro with its optimized shared memory architecture and high definition video support through the Chromotion CE Video Display Engine, offers a breathtaking visual experience

for the latest HDTV format displays. Support for LVDS and DVI interfaces enables complete flexibility for integration into a wide range of embedded and personal electronics applications

■ **Native Serial ATA**:- The VIA DriveStaion™ Controller Suite with native dual channel Serial ATA controller provides direct support for two 150MB/s Serial ATA devices and the SATAlite™ interface expands support for two additional SATA devices.

2.4 System Chipset

The WAFER-LUKE CPU card has a VIA VT8237R Plus Southbridge onboard. A summary of the available Southbridge features is listed below. For more information on this chipset please visit the VIA website.

- ■ VIA DriveStation™ Controller Suite
  - ○ Serial ATA
    - ● *Full duplex high performance 150MB/s Dual Channel Serial ATA interface*
    - ● *Support for additional two Serial ATA devices through SATALite™ interface*
  - ○ Parallel ATA 133
    - ● *Supports up to four PATA devices*
- ■ VIA Advanced Connectivity Suite
  - ○ USB 2.0 Controller
  - ○ Support for 8 USB 2.0/1.1 ports
    - ● *Network Controller*
  - ○ Enterprise Class 10/100Mbps Fast Ethernet MAC
    - ● *PCI & LPC bus controllers*
- ■ VIA Vinyl™ Audio
  - ○ VIA Vinyl integrated 5.1 surround sound
    - ● *AC '97 audio*
    - ● *VIA Six-TRAC codec*
  - ○ VIA Vinyl Gold onboard 7.1 surround sound
    - ● *24/96 resolution audio*
    - ● *VIA Envy24PT + VIA Six-TRAC Codec + additional DAC*
  - ○ VIA Stylus Audio drivers
    - ● *Integrated Sensaura technology*
    - ● *Full 3D gaming support*

- V-MAP Architecture
  o Ultra V-Link
    - *High throughput 1GB/s South Bridge/North Bridge interconnect*
    - *Supports new generation VIA North Bridges across all processor platforms*
  o 8X V-Link
    - *High speed 533MB/s South Bridge/North Bridge interconnect*
    - *Supports current generation VIA North Bridges across all processor platforms*
  o VIA Hyperion 4in1 Unified Drivers
    - *Optimized system performance and stability*

2.5 Data Flow

Figure 2-1 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.
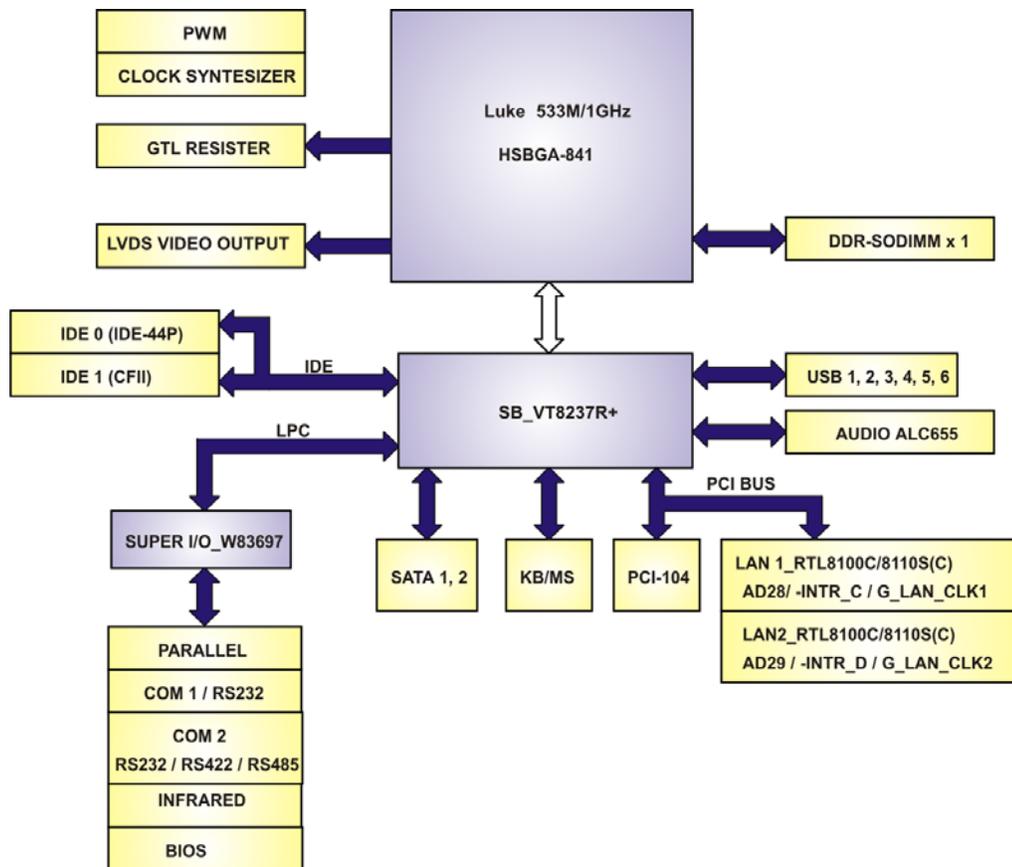
Figure 2-1: Data Flow Block Diagram

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2.6 Graphics Support

The LUKE processor comes with a S3 Chromotion graphics engine. The features listed below are compatible with S3 Graphics' Chrome S20 Series processors:

- Chromotion Video Acceleration:-
  - **WMV9 Motion Compensation H/W Acceleration** – *Reduces CPU utilization when decoding Windows Media Video 9 (WMV9) files.*
  - **MPEG-2 IDCT and Motion Compensation H/W Acceleration** – *Reduces CPU utilization when decoding MPEG2 files.*
- Chromotion Hi-Def™ Support:-
  - **HDTV Formats** – *Supports all 18 DTV ATSC formats.*
  - **Adaptive Per-Pixel De-Interlacing** – *Produces superior image quality for both still and motion images using a high quality De-Interlacing process.*
  - **Video Deblocking** – *Removes blocking artifacts inherent in low bit rate images.*
  - **ChromoVision** – *Displays full screen video on secondary HDTV display while a windows display of the video is on the primary CRT or DVI display.*
  - **ChromoVision Modes with ChromeView Non-Linear Scaling** – *Scales a standard 4:3 image to fill a wide-screen 16:9 display with excellent image quality.*
  - **PanelDrive** – *Eliminates blurring effects with motion video on panel displays by increasing panel response time.*
  - **ChromoColor** – *Provides adjustment controls for the brightness, contrast, hue and saturation of the display of video.*
- Chromotion Video Image Controls:-
  - **ChromoColor Tonal Adjustment** – *Allows fine-tuning of luma values for the video display with controls for black point and white point enhancement.*
  - **ArtisticLicense Effects** – *Allows high quality image enhancements; including Sharpening, Soft Focus, Embossing, and Neon Edge effects.*

2.7 Memory Support

The WAFER-LUKE has one 200-pin SO-DIMM socket and supports one DDR SO-DIMM module with the following specifications:

- **Maximum RAM**: 1GB
- **DIMM Transfer Rates**: 400MHz or 333MHz

2.8 PCI Bus Interface Support

The PCI bus on the WAFER-LUKE CPU card has the following features:

- 33MHz Revision 2.2 is implemented
- Maximum throughput: 133MB/sec
- One PCI REQ/GNT pair can be given higher arbitration priority (intended for external 1394 host controller)
- 64-bit addressing supported

2.9 Ethernet Controller Specifications

2.9.1 Ethernet Controller Overview

The Realtek RTL8110SC Ethernet controller combines a triple-speed IEEE 802.3 compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver, 32-bit PCI bus controller, and embedded memory. The device supports the PCI v2.3 bus interface for host communications with power management and is compliant with the IEEE 802.3 specification for 10/100Mbps Ethernet and the IEEE 802.3ab specification for 1000Mbps Ethernet. They also support an auxiliary power auto-detect function, and will auto-configure related bits of the PCI power management registers in PCI configuration space.

2.9.2 Features

- Integrated 10/100/1000 transceiver
- Auto-Negotiation with Next Page capability
- Supports PCI rev.2.3, 32-bit, 33/66MHz
- Supports pair swap/polarity/skew correction

- Crossover Detection & Auto-Correction
- Wake-on-LAN and remote wake-up support
- Microsoft® NDIS5 Checksum Offload (IP, TCP, UDP) and largesend offload support
- Supports Full Duplex flow control (IEEE 802.3x)
- Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
- Supports IEEE 802.1P Layer 2 Priority Encoding
- Supports IEEE 802.1Q VLAN tagging
- Serial EEPROM
- 3.3/1.8/1.5V signaling, 5V PCI I/O tolerant
- 0.15µm CMOS process
- Transmit/Receive FIFO (8K/64K) support
- Supports power down/link down power saving
- Supports PCI Message Signaled Interrupt (MSI)

2.10 Drive Interfaces

The WAFER-LUKE can support the following drive interfaces.

- 2 x SATA drives
- 2 x IDE devices
- 1 x CF Type I or CF Type II card

2.10.1 SATA Drives

The WAFER-LUKE supports two, first generation SATA drives with transfer rates of up to 150Mb/sec.

2.10.2 IDE HDD Interfaces

The WAFER-LUKE chipset IDE controller supports up to four HDDs with the following specifications:

- Supports PIO IDE transfers up to 16MB/s
- Supports Ultra ATA/133 devices with data transfer rates up to 133MB/s

2.10.3 CompactFlash® Card Support

A standard 3.3mm thick CF Type I or 5mm thick CF Type II card can be inserted into the CompactFlash® slot on the WAFER-LUKE PCB. CompactFlash® cards with data rates up to 66MB/sec and capacities up to 137GB are supported.

2.11 Serial Ports

The WAFER-LUKE has two high-speed UART serial ports. One of the serial ports is RS-232 compliant and one serial port can be configured as RS-232, RS-422, or RS-485. The serial ports have the following specifications.

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

2.12 Real Time Clock

256-byte battery backed CMOS RAM

2.13 System Monitoring

The WAFER-LUKE is capable of self-monitoring various aspects of its operating status including:

- CPU, +3.3V and +5V
- RPM of cooling fans
- CPU and board temperatures (by the corresponding embedded sensors)

2.14 Infrared Data Association (IrDA) Interface

The WAFER-LUKE IrDA supports the following interfaces.

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

If an IrDA port is needed, COM2 must be configured as either SIR or ASKIR mode in the BIOS under **Super IO devices**. Normal RS-232 COM 2 is then disabled.

2.15 USB Interfaces

The WAFER-LUKE supports six USB 2.0 or USB 1.1 devices. Two are connected externally and the remaining four internally.

2.16 BIOS

The WAFER-LUKE uses a licensed copy of AMI BIOS. The features of the flash BIOS used are listed below:

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

Temperature Control

The maximum and minimum operating temperatures for the WAFER-LUKE are listed below.

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

A heat sink must always be installed on the CPU when the system is run. A cooling fan may or may not be required depending on the CPU being used.

2.18 Audio Codec

The WAFER-LUKE has an integrated REALTEK ALC655 CODEC. The ALC655 CODEC is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC designed for PC multimedia systems, including host/soft audio and AMR/CNR-based designs. Some of the features of the codec are listed below.

- Meets performance requirements for audio on PC99/2001 systems
- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 16-bit Stereo full-duplex CODEC with 48KHz sampling rate
- Compliant with AC'97 Rev 2.3 specifications
- Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing
- 14.318MHz -> 24.576MHz PLL to eliminate crystal

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

2.19 Power Consumption

Table 2-1 shows the power consumption parameters for the WAFER-LUKE-1G-R10 when a 1GHz VIA LUKE processor is mounted on the board and 1GB of 333MHz DDR SDRAM is used.

Voltage	Current
+5V	4.67A
+12V	0.04A
+5VSB	0.02A

Table 2-1: Power Consumption 1

Table 2-2 shows the power consumption parameters for the WAFER-LUKE-533-R10 when a 533MHz VIA LUKE processor is mounted on the board and 1GB of 333MHz DDR SDRAM is used.

Voltage	Current
+5V	3.82A
+12V	0.04A
+5VSB	0.02A

Table 2-2: Power Consumption 2

2.20 Packaged Contents and Optional Accessory Items

2.20.1 Package Contents

The WAFER-LUKE is shipped with the following components.

- 1x WAFER-LUKE single board computer
- 1 x ATA33 44P/44P flat cable
- 2 x SATA cables
- 1 x SATA power cable

- 1 x RS-232/422/485 cable

- 1 x KB/MS cable

- 1 x Audio cable

- 1 x Mini jumper pack

- 1 x Utility CD

- 1x Quick Installation Guide

2.20.2 Optional Accessory Items

The items shown in the list below are optional accessory items are purchased separately.

- LPT cable
- USB cable

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

Section 3.1.2 shows peripheral interface connector locations. Section 3.1.2 lists all the peripheral interface connectors seen in Section 3.1.2.

3.1.1 WAFER-LUKE Layout

Figure 3-1 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.
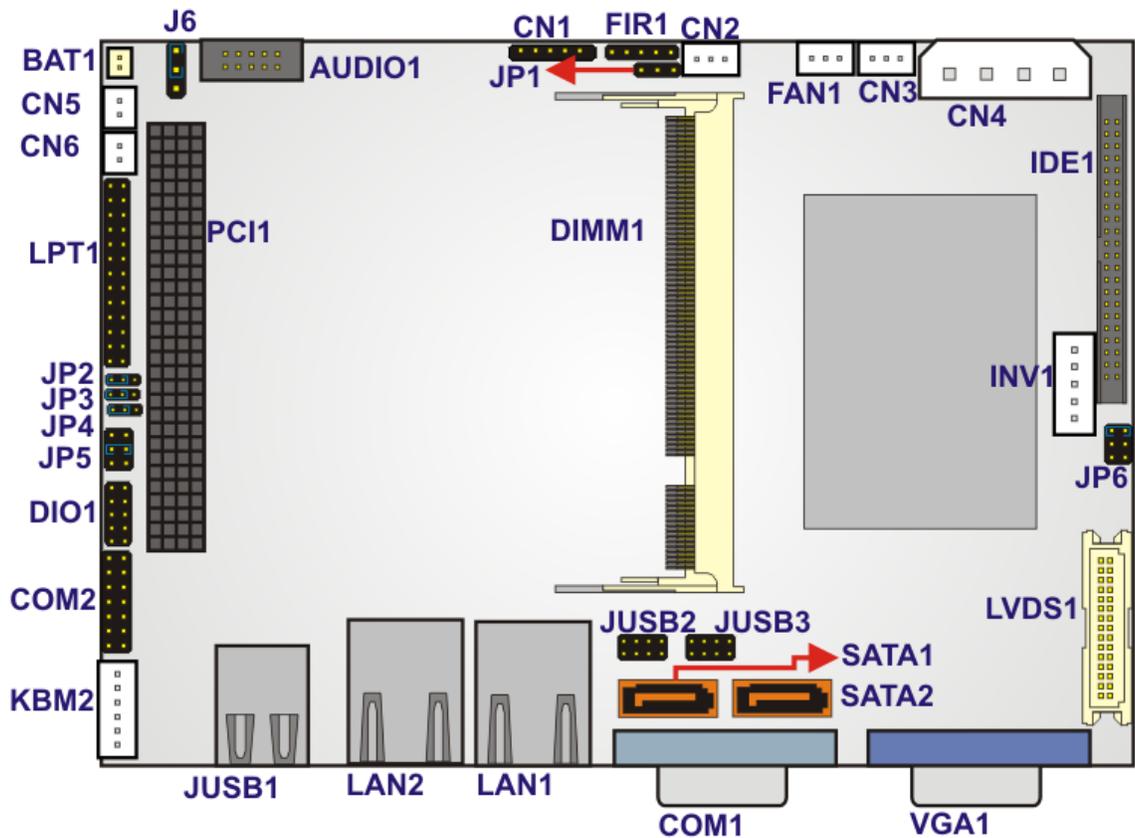
Figure 3-1: Connector and Jumper Locations

IEI® **Technology, Corp.**
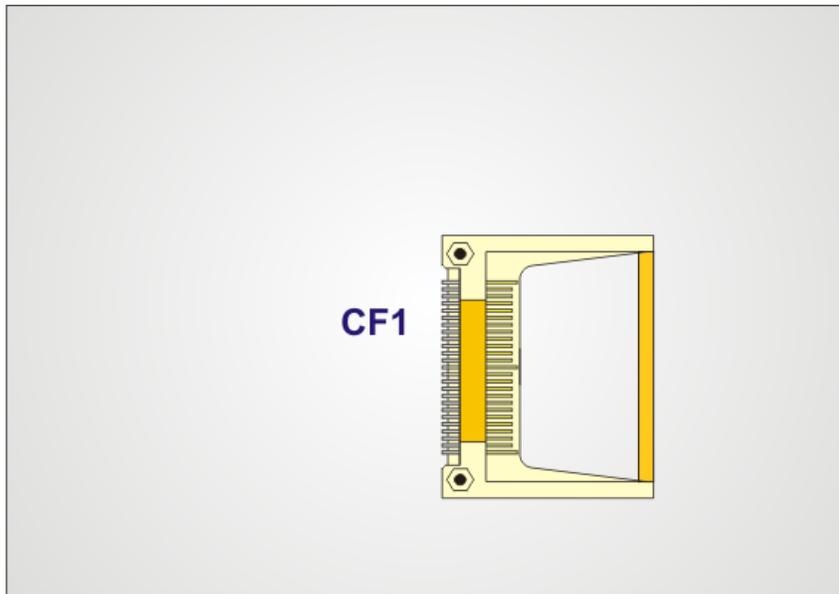
Figure 3-2: Connector and Jumper Locations (Solder Side)

3.1.2 Peripheral Interface Connectors

Table 3-1 shows a list of the peripheral interface connectors on the WAFER-LUKE. Detailed descriptions of these connectors can be found in **Section 3.2** on **page 40**.

Connector	Type	Label
+5VSB and #PS_ON connector	3-pin header	CN2
-12V power connector	3-pin header	CN3
AT power connector	4-pin header	CN4
Audio connector	10-pin header	AUDIO1
CompactFlash (CF) connector	50-pin header	CF1
Fan connector	3-pin header	FAN1
Front panel connector	6-pin header	CN1
GPIO connector	10-pin header	DIO1
IDE Interface connector	44-pin header	IDE1

Infrared (IrDA) connector	5-pin header	FIR1
Inverter power connector	5-pin header	INV1
LCD LVDS connector	30-pin header	LVDS1
Parallel port connector	26-pin header	LPT1
PCI-104 power select	3-pin header	JP2
PCI-104	120-pin slot	PCI1
Power switch connector	2-pin header	CN6
Reset switch connector	2-pin header	CN5
RS-232 or RS-485 serial port connector	14-pin header	COM2
SATA drive connector (150MB/s)	7-pin SATA connector	SATA1
SATA drive connector (150MB/s)	7-pin SATA connector	SATA2
USB connector (USB 1.1 and USB 2.0)	8-pin header	JUSB2
USB connector (USB 1.1 and USB 2.0)	8-pin header	JUSB3

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

Table 3-2 lists the external peripheral interface connectors on the WAFER-LUKE. Detailed descriptions of these connectors can be found in Section 0 on page 63.

Connector	Type	Label
Ethernet connector	RJ-45	LAN2
Ethernet connector	RJ-45	LAN1
RS-232 serial port connector	9-pin male	COM1
USB port	USB port	JUSB1
USB port	USB port	JUSB1

VGA port connector	15-pin female	VGA1

Table 3-2: External peripheral interface connectors

3.1.4 On-board Jumpers

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.
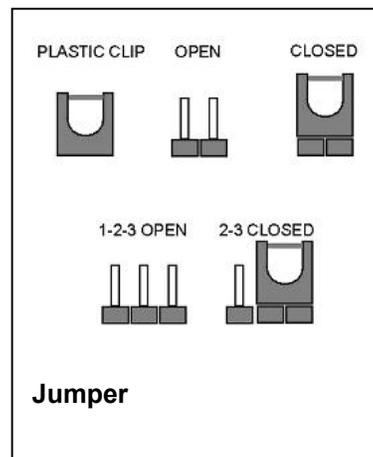
Jumper

Table 3-3 lists the on-board jumpers. Detailed descriptions of these jumpers can be found in **Section 4.5**.

Description	Label	Type
Clear CMOS	J6	3-pin header
CompactFlash setup	JP1	3-pin header
LCD voltage setup	JP6	6-pin header
COM2 RS-232/RS-485 setup	JP3	3-pin header
COM2 RS-422/RS-485 setup	JP4	3-pin header
COM2 RS-232 Voltage setup	JP5	6-pin header

Table 3-3: On-board Jumpers

3.2 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 WAFER-LUKE.

3.2.1 +5VSB PS_ON

CN Label:	**CN2**
CN Type:	3-pin header (1x3)
CN Location:	See **Figure 3-3**
CN Pinouts:	See **Table 3-4**

The PS_ON connector connects to an ATX power supply.
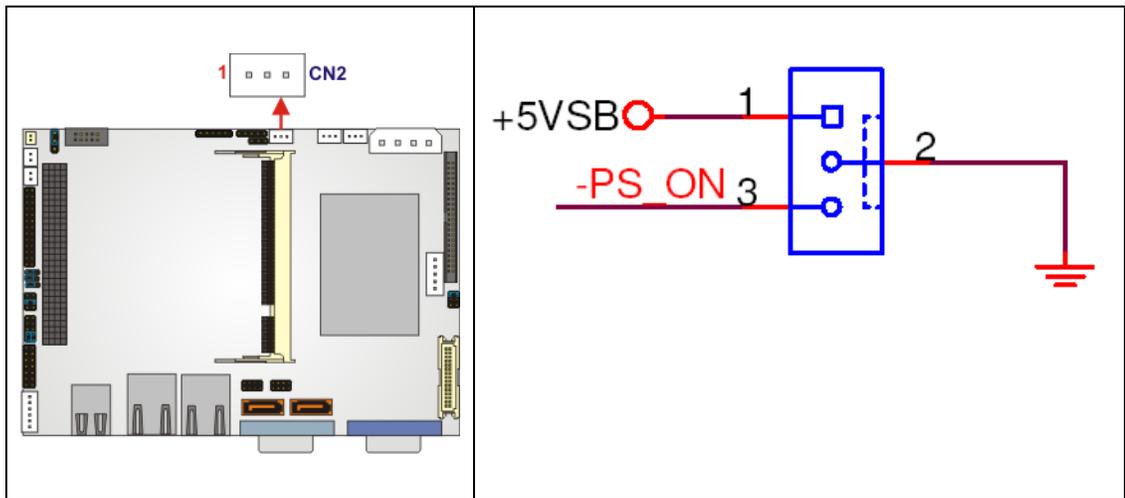
Figure 3-3: +5VSB PS_ON Connector Location

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

Table 3-4: +5VSB PS_ON Connector Pinouts

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3.2.2 –12V Power Connector

CN Label: CN3

CN Type: 3-pin header (1x3)

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

CN Pinouts: See **Table 3-5**

The –12V power connector connects to an ATX power supply.
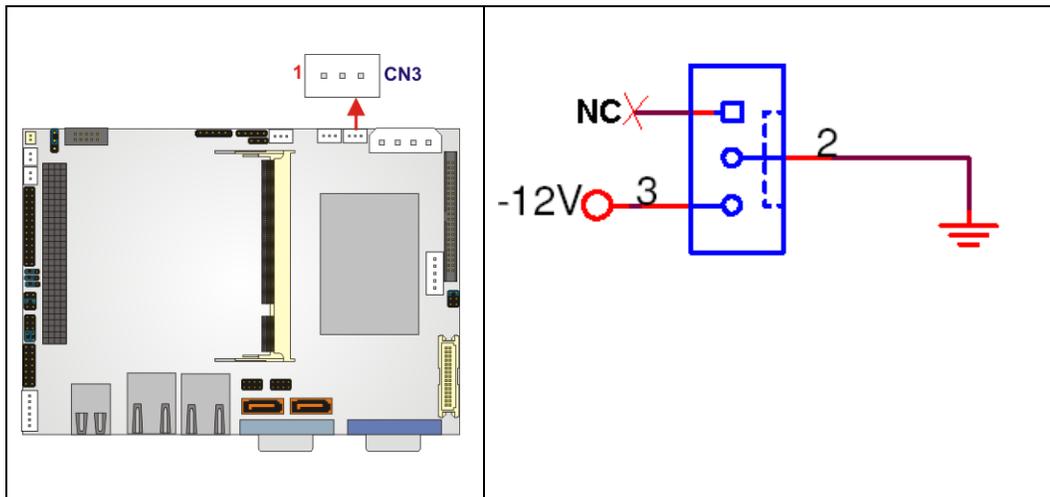
Figure 3-4:–12V Power Connector Location

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

Table 3-5: –12V Power Connector Pinouts

3.2.3 AT Power Connector

CN Label: CN4

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

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

CN Pinouts: See **Table 3-6**

The AT power connector is connected to an ATX power source that powers the system.
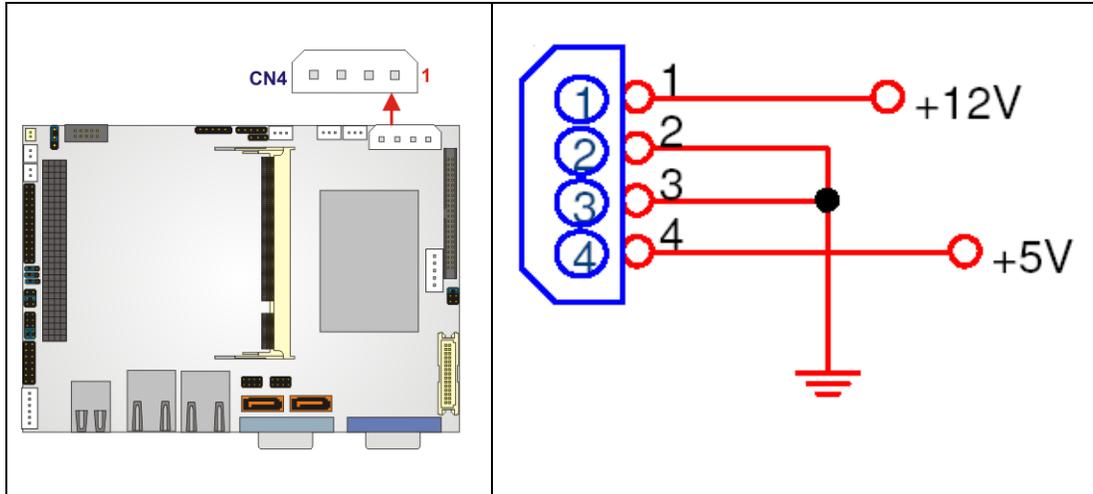
Figure 3-5: AT Power Connector Location

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

Table 3-6: AT Power Connector Pinouts

3.2.4 Audio Connector

CN Label: AUDIO1

CN Type: 10-pin header

CN Location: See **Figure 3-6**

CN Pinouts: See **Table 3-7**

The 10-pin audio connector is connected to external audio devices including speakers an microphones for the input and output of audio signals to and from the system.
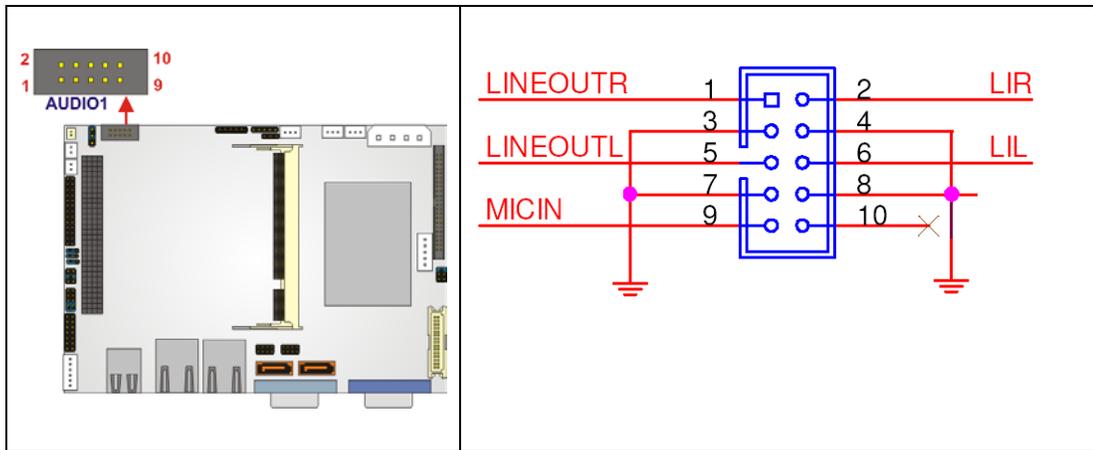
Figure 3-6: Audio Connector Pinouts

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 3-7: Audio Connector Pinouts

3.2.5 CompactFlash Connector

CN Label: **CF1**

CN Type: 50-pin header (2x25)

CN Location: See **Figure 3-7**

CN Pinouts: See **Table 3-8**

A CF Type I or CF Type II memory module is inserted into the CompactFlash connector.
Jumper 1 (JP1) configures the CompactFlash drive as either a slave or master device.
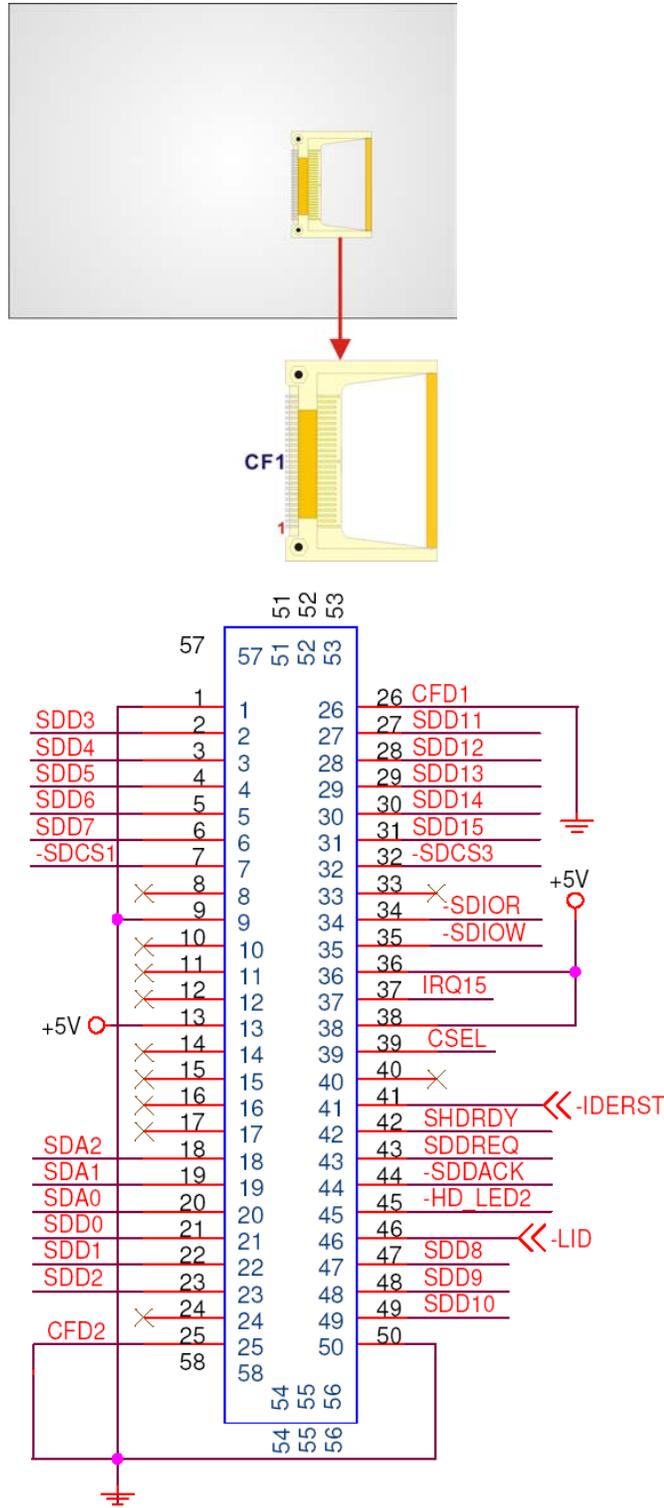
Figure 3-7: CompactFlash Connector Location (Solder Side)

IEI® Technology, Corp.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
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 3-8: CompactFlash Connector Pinouts

3.2.6   Fan Connector

CN Label:	**FAN1**
CN Type:	3-pin header
CN Location:	See **Figure 3-8**
CN Pinouts:	See **Table 3-9**

The CPU cooling fan connector provides a +5V, 500mA current to a CPU cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.
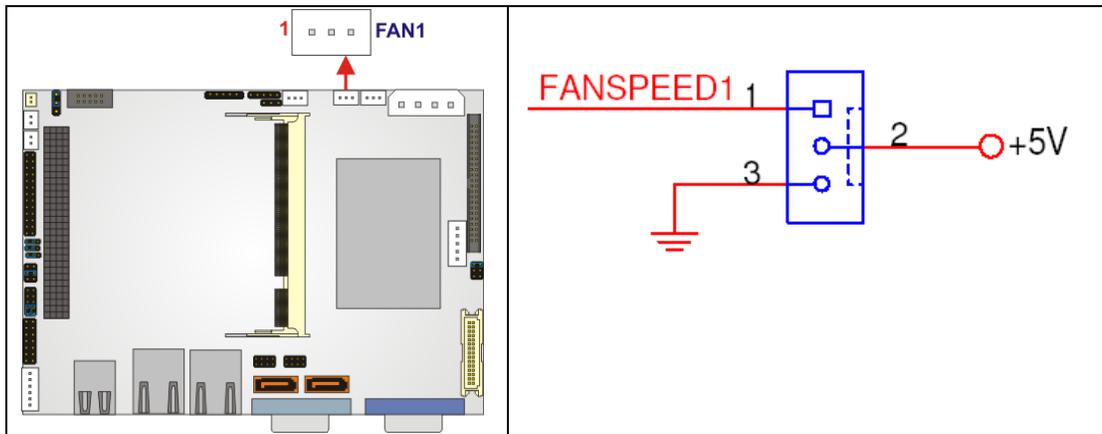
Figure 3-8: Fan Connector Location

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

Table 3-9: Fan Connector Pinouts

3.2.7 Front Panel Connector (6-pin)

CN Label:	**CN1**

CN Type: 6-pin header (1x6)

CN Location: See **Figure 3-9**

CN Pinouts: See **Table 3-10**

The front panel connector (CN1) connects to several external indicators to monitor the motherboard and peripheral devices. These indicators and switches include:

- Power LED
- HDD LED
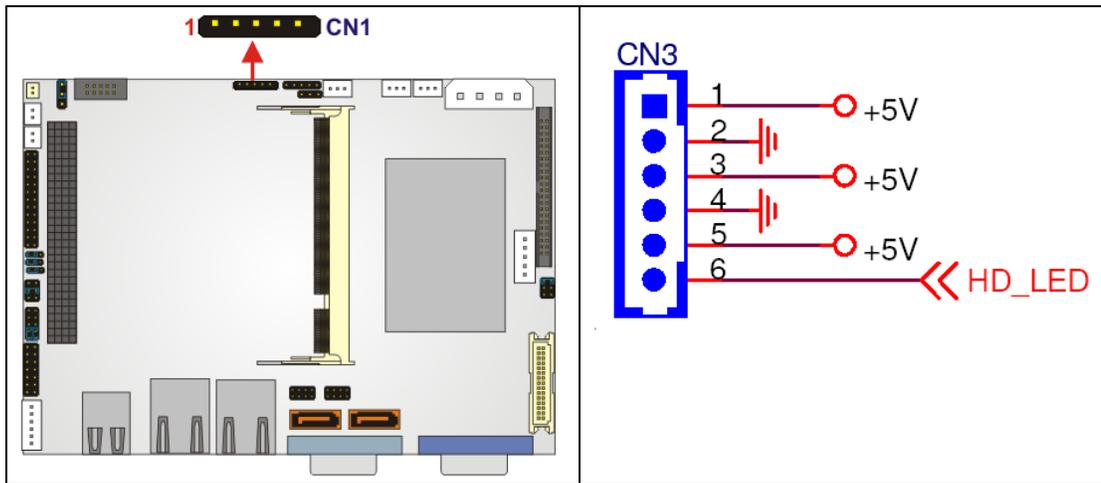
Figure 3-9: Front Panel Connector Pinout Locations

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	3	LED+	HDD LED	5	LED+
	4	LED-		6	LED-

Table 3-10: Front Panel Connector Pinouts

3.2.8 GPIO Connector

CN Label: DIO1

CN Type: 10-pin header (2x5)

CN Location: See **Figure 3-10**

CN Pinouts: See **Table 3-11**

The General Purpose Input Output (GPIO) connector can be connected to external I/O control devices including sensors, lights, alarms and switches.
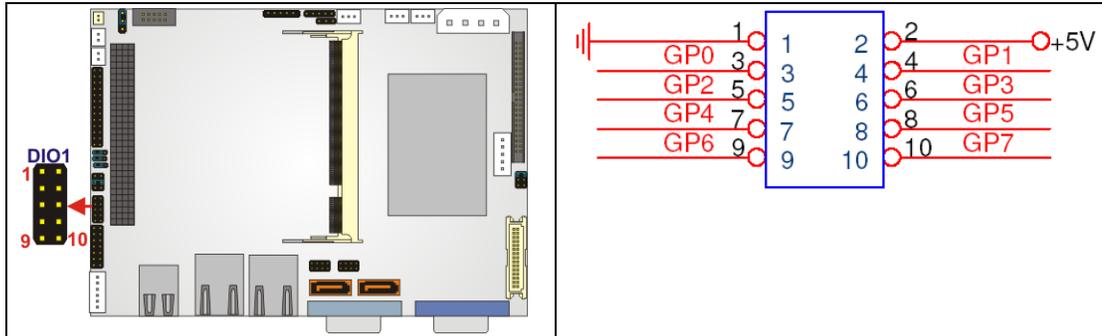
Figure 3-10: GPIO Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+5V
3	GP0	4	GP1
5	GP2	6	GP3
7	GP4	8	GP5
9	GP6	10	GP7

Table 3-11: GPIO Connector Pinouts

3.2.9   IDE Connector

CN Label: IDE1

CN Type: 44-pin header (2x22)

CN Location: See Figure 3-11

CN Pinouts: See Table 3-12

One 44-pin IDE device connector on the WAFER-LUKE motherboard supports connectivity to Ultra ATA/33/66/100 IDE devices with data transfer rates up to 133MB/s.
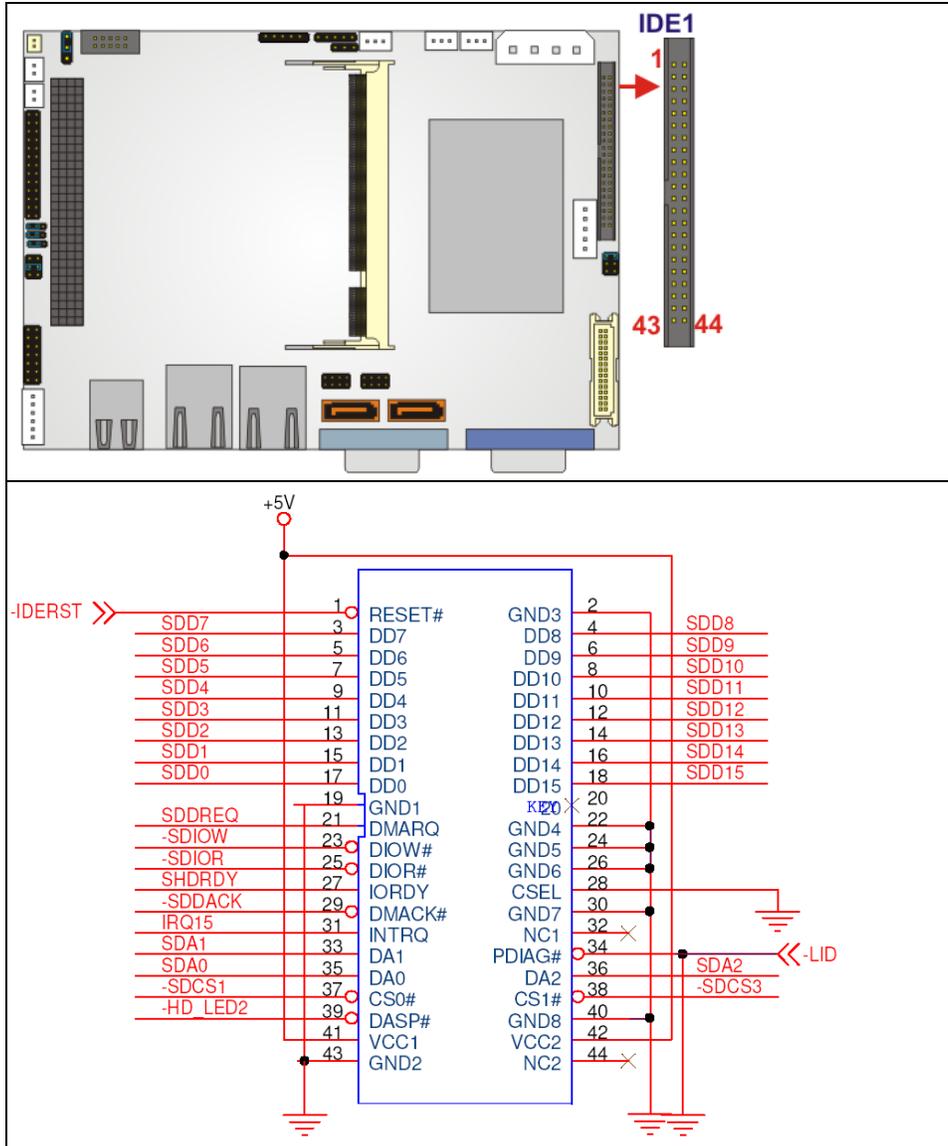
Figure 3-11: IDE Device Connector Location

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
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
41	VCC	42	VCC
43	GROUND	44	N/C

Table 3-12: Secondary IDE Connector Pinouts

3.2.10 IR Interface Connector (5-pin)

CN Label: FIR1

CN Type: 5-pin header (1x5)

CN Location: See **Figure 3-12**

CN Pinouts: See **Table 3-13**

The integrated infrared (IrDA) connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.
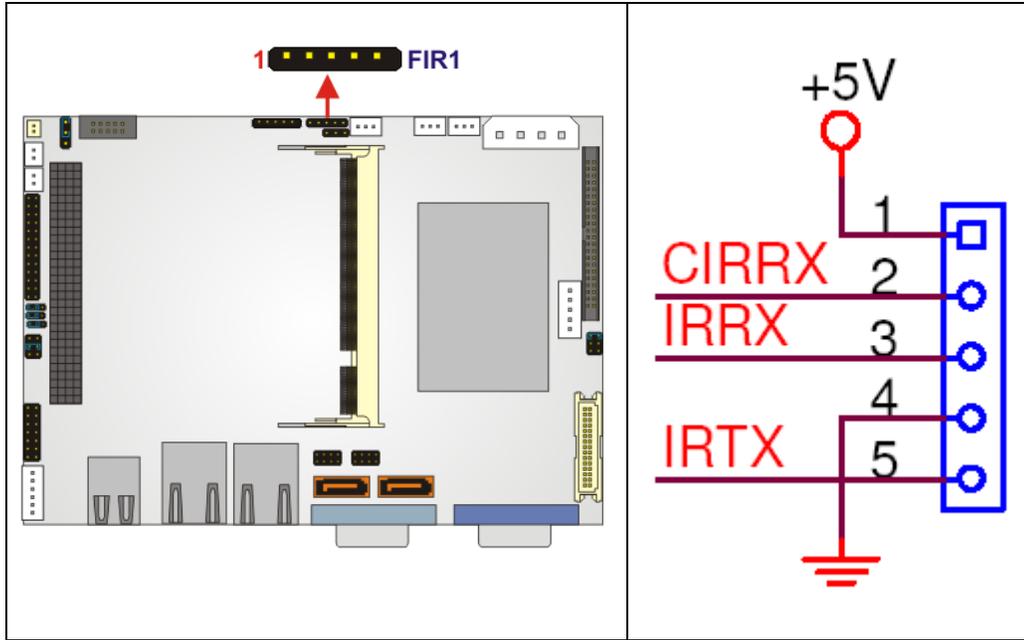
Figure 3-12: IR Connector Pinout Locations

PIN NO.	DESCRIPTION
1	**+5V**
2	**CIRRX**
3	**IRRX**
4	**GND**
5	**IRTX**

Table 3-13: IR Connector Pinouts

3.2.11 Inverter Power Connector

CN Label: INV1

CN Type: 5-pin header (1x5)

CN Location: See **Figure 3-13**

CN Pinouts: See **Table 3-14**

The inverter connector is connected to the LCD backlight.
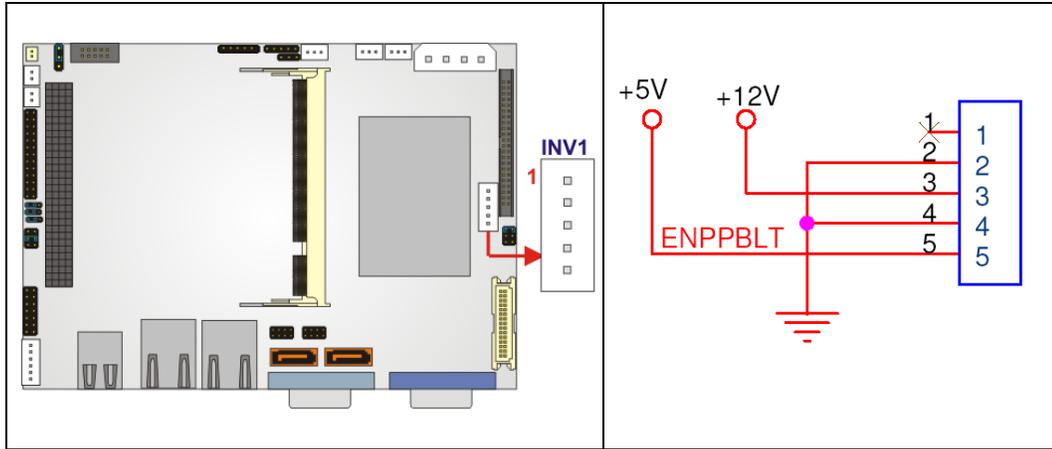
Figure 3-13: Inverter Connector Location

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

Table 3-14: Inverter Power Connector Pinouts

3.2.12 LCD LVDS Connector

CN Label: LVDS1

CN Type: 30-pin header (2x15)

CN Location: See **Figure 3-14**

CN Pinouts: See **Figure 3-14**

The LVDS LCD connector (LVDS1) connects to a one or two channel (18-bit) LVDS panel.
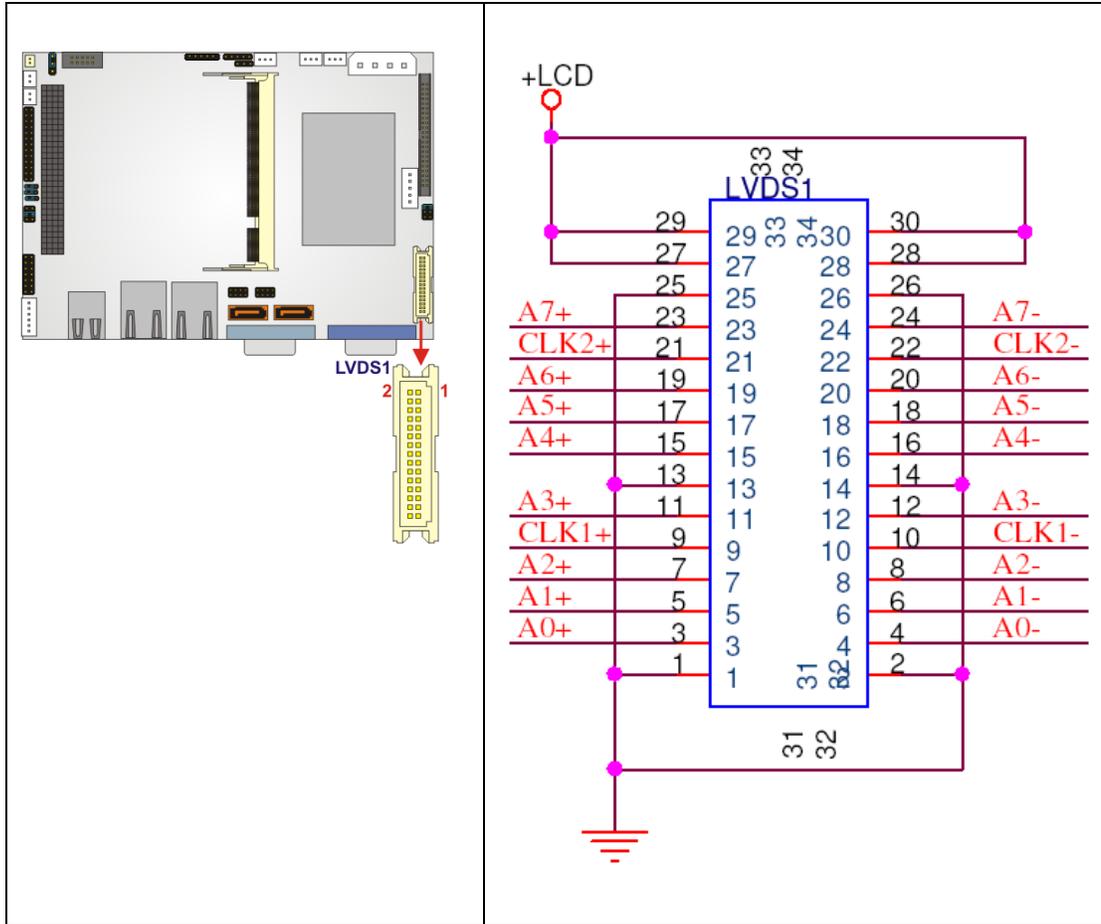
Figure 3-14: LVDS Connector Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	GND
3	A0P	4	A0M
5	A1P	6	A1M
7	A2P	8	A2M
9	CLK1P	10	CLK1M
11	A3P	12	A3M
13	GND	14	GND
15	A4P	16	A4M
17	A5P	18	A5M
19	A6P	20	A6M
21	CLK2P	22	CLK2M

23	A7P	24	A7M
25	GND	26	GND
27	LCD_VDD	28	LCD_VDD
29	LCD_VDD	30	LCD_VDD

Table 3-15: LCD LVDS Connector Pinouts

3.2.13 Parallel Port Connector

CN Label: LPT1

CN Type: 26-pin pin header

CN Location: See Figure 3-15

CN Pinouts: See Table 3-16

The 26-pin pin header connects to a parallel port connector interface or some other parallel port device such as a printer.
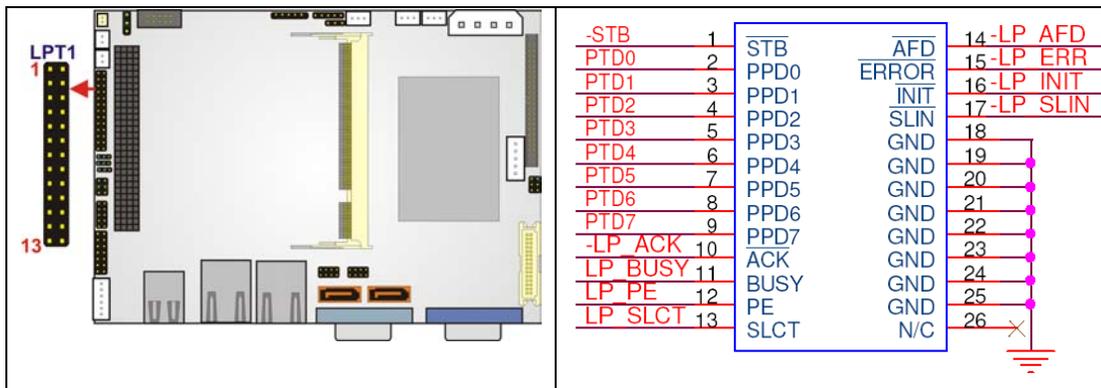
Figure 3-15: Parallel Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	14	AUTO FORM FEED #
2	DATA 0	15	ERROR#
3	DATA 1	16	INITIALIZE
4	DATA 2	17	PRINTER SELECT LN#
5	DATA 3	18	GROUND
6	DATA 4	19	GROUND

7	DATA 5	20	GROUND
8	DATA 6	21	GROUND
9	DATA 7	22	GROUND
10	ACKNOWLEDGE	23	GROUND
11	BUSY	24	GROUND
12	PAPER EMPTY	25	GROUND
13	PRINTER SELECT	26	NC

Table 3-16: Parallel Port Connector Pinouts

3.2.14 PCI-104 Slot

CN Label: **PCI1**

CN Type: 120-pin PCI-104 slot

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

CN Pinouts: See **Table 3-17**

The PCI-104 slot enables a PCI-104 compatible expansion module to be connected to the board.
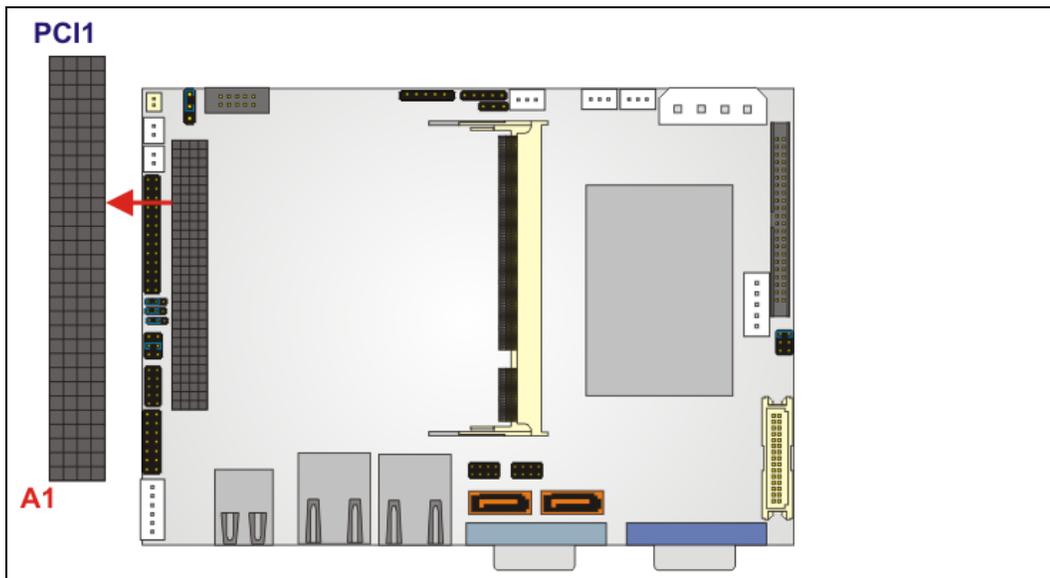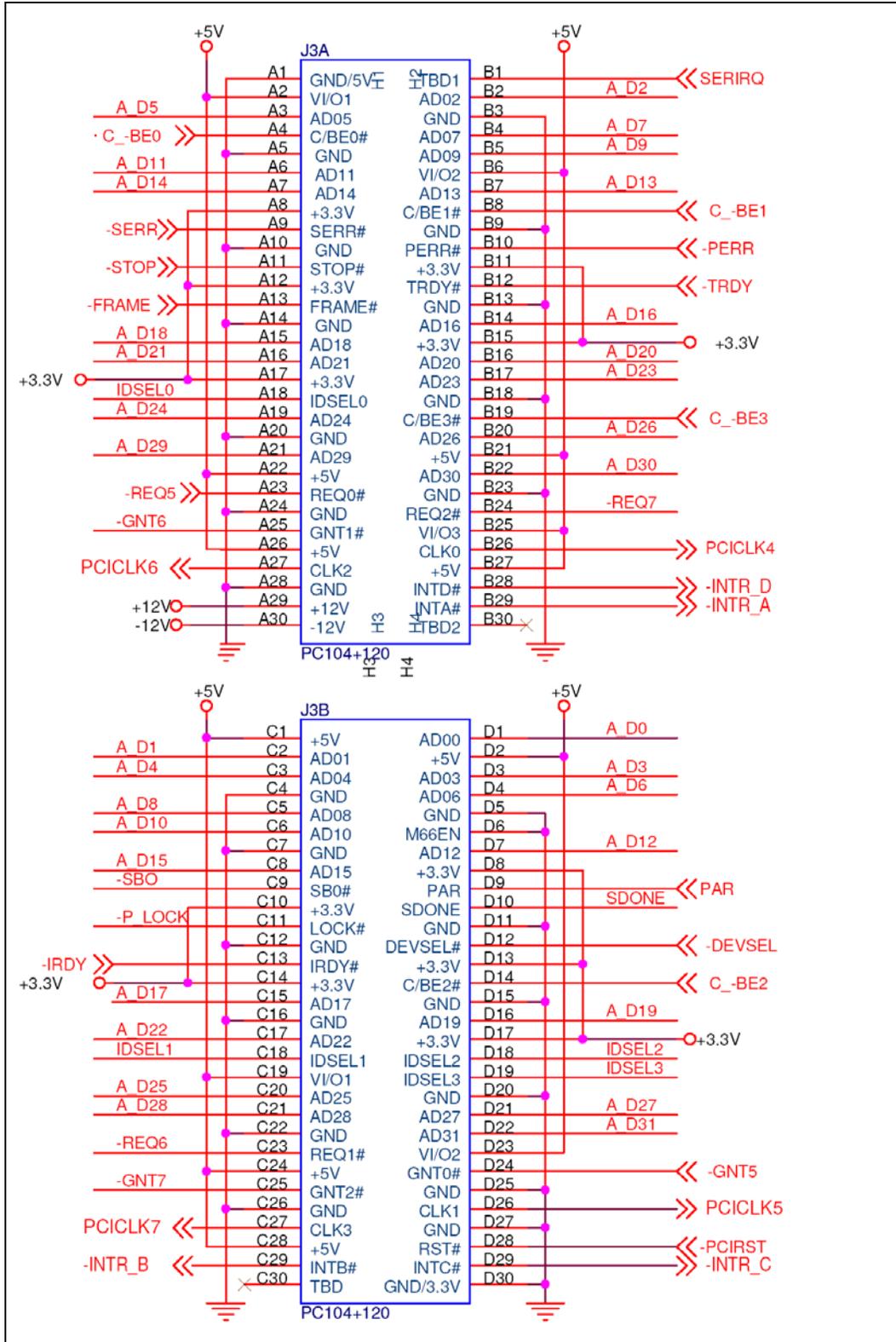
Figure 3-16: PCI-104 Slot Location

Pin No.	Column A	Column B	Column C	Column D
1	GND/5V	TBD1	5V	AD00
2	VI/O1	AD02	AD01	+5V
3	AD05	GND	AD04	AD03
4	C/BE0#	AD07	GND	AD06
5	GND	AD09	AD08	GND
6	AD11	VI/O2	AD10	M66EN
7	AD14	AD13	GND	AD12
8	+3.3V	C/BE1#	AD15	+3.3V
9	SERR#	GND	SB0#	PAR
10	GND	PERR#	+3.3V	SDONE
11	STOP#	+3.3V	LOCK#	GND
12	+3.3V	TRDY#	GND	DEVSEL#
13	FRAME#	GND	IRDY#	+3.3V
14	GND	AD16	+3.3V	C/BE2#
15	AD18	+3.3V	AD17	GND
16	AD21	AD20	GND	AD19
17	+3.3V	AD23	AD22	+3.3V
18	IDSEL0	GND	IDSEL1	IDSEL2
19	AD24	C/BE3#	VI/O1	IDSEL3
20	GND	AD26	AD25	GND
21	AD29	+5V	AD28	AD27
22	+5V	AD30	GND	AD31
23	REQ0#	GND	REQ1#	VI/O2
24	GND	REQ2#	+5V	GNT0#
25	GNT1#	VI/O3	GNT2#	GND
26	+5V	CLK0	GND	CLK1
27	CLK2	+5V	CLK3	GND
28	GND	INTD#	+5V	RST#
29	+12V	INTA#	INTB#	INTC#
30	-12V	TBD2	TBD	GND/3.3V

Table 3-17: PCI-104 Slot Connector Pinouts

3.2.15 Power Switch Connector

CN Label:	**CN6**
CN Type:	2-pin header (1x2)
CN Location:	See **Figure 3-17**
CN Pinouts:	See **Table 3-18**

The power switch connector is connected to the reset button on the external chassis.
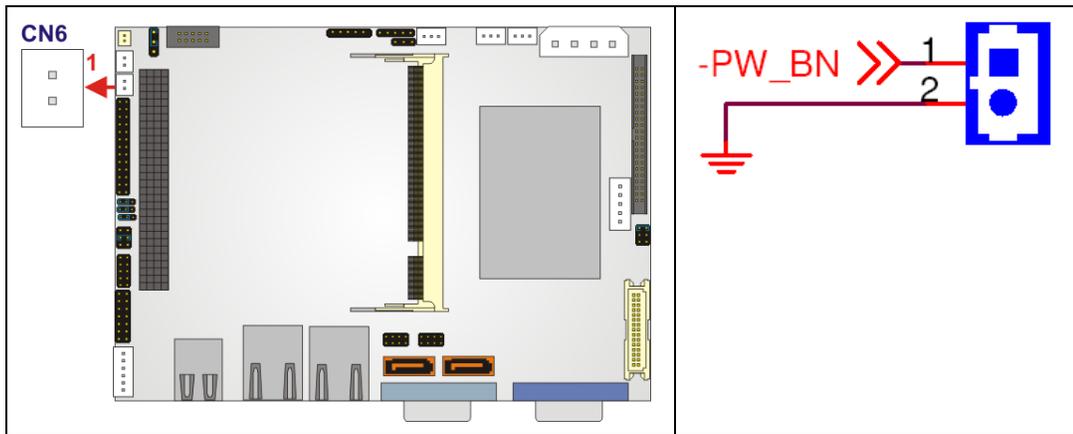
Figure 3-17: Power Switch Connector Locations

PIN NO.	DESCRIPTION
1	Power Switch
2	GND

Table 3-18: Power Switch Connector Pinouts

3.2.16 Reset Button Connector

CN Label:	**CN5**
CN Type:	2-pin header (1x2)
CN Location:	See **Figure 3-18**
CN Pinouts:	See **Table 3-19**

The reset button connector is connected to the reset button on the external chassis.
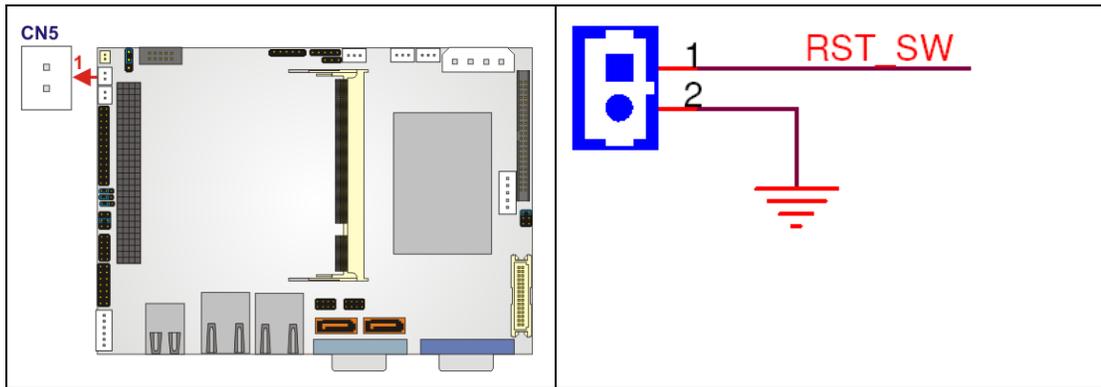
Figure 3-18: Reset Button Connector Locations

PIN NO.	DESCRIPTION
1	RESET
2	GND

Table 3-19: Reset Button Connector Pinouts

3.2.17 RS-232/422/485 Serial Port Connector

CN Label: **COM2**

CN Type: 14-pin header (2x7)

CN Location: See **Figure 3-19**

CN Pinouts: See **Table 3-20**

The COM2 serial port connector connects to an RS-232, RS-422 or RS-485 serial port devices.
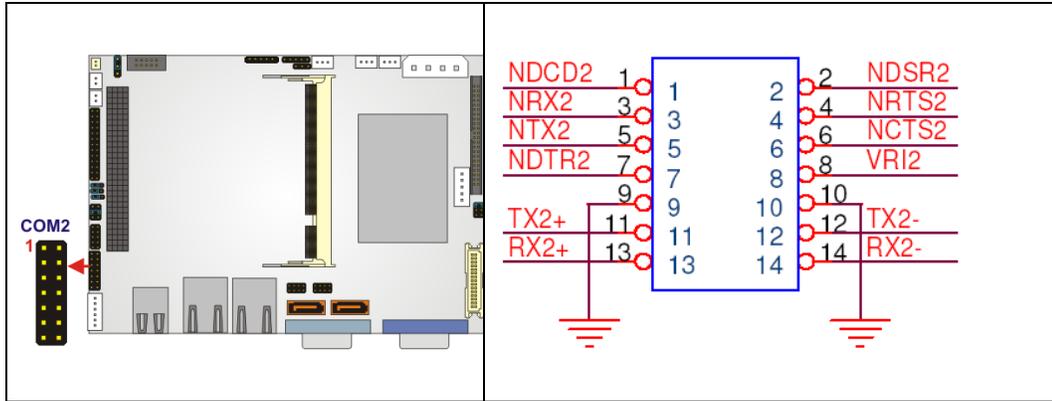
Figure 3-19: RS-232/422/485 Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NDCD2	2	NDSR2
3	NRX2	4	NRTS2
5	NTX2	6	NCTS2
7	NDTR2	8	VRI2
9	GND	10	GND
11	TX2+	12	TX2-
13	RX2+	14	RX2-

Table 3-20: RS-232/RS-485 Serial Port Connector Pinouts

3.2.18 SATA Drive Connectors

CN Label:	**SATA1**, **SATA2**
CN Type:	7-pin SATA drive connectors
CN Location:	See **Figure 3-21**
CN Pinouts:	See **Table 3-22**

The two SATA drive connectors are connected to two, first generation SATA drives. First generation SATA drives transfer data at speeds as high as 150Mb/sec.
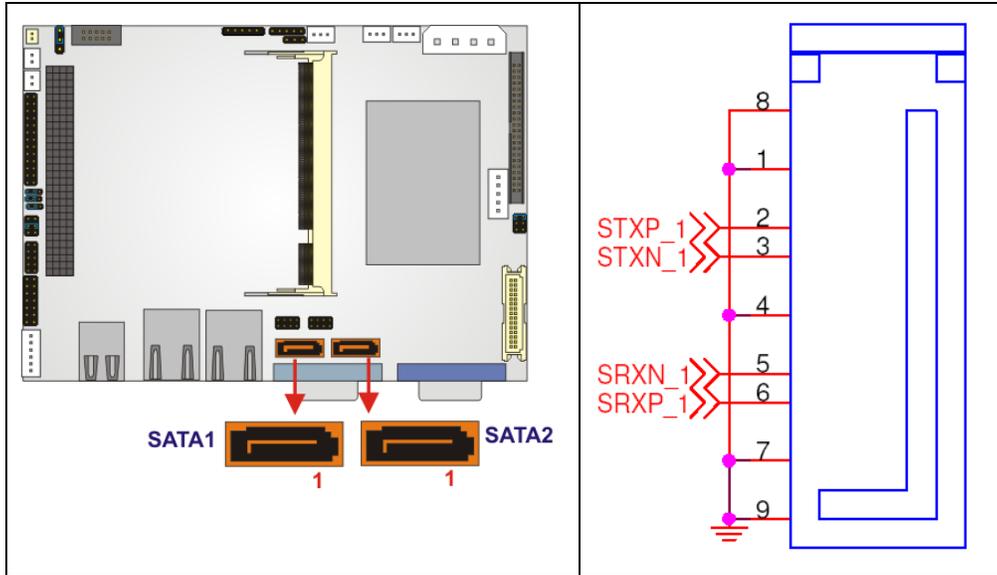
Figure 3-20: SATA Drive Connector Locations

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

Table 3-21: SATA Drive Connector Pinouts

3.2.19 Internal USB Connectors

CN Label:	**JUSB2** and **JUSB3**
CN Type:	8-pin header (2x4)
CN Location:	See **Figure 3-21**
CN Pinouts:	See **Table 3-22**

The two 2x4 USB pin connectors provide connectivity to four USB 2.0 devices. The USB ports are used for I/O bus expansion.
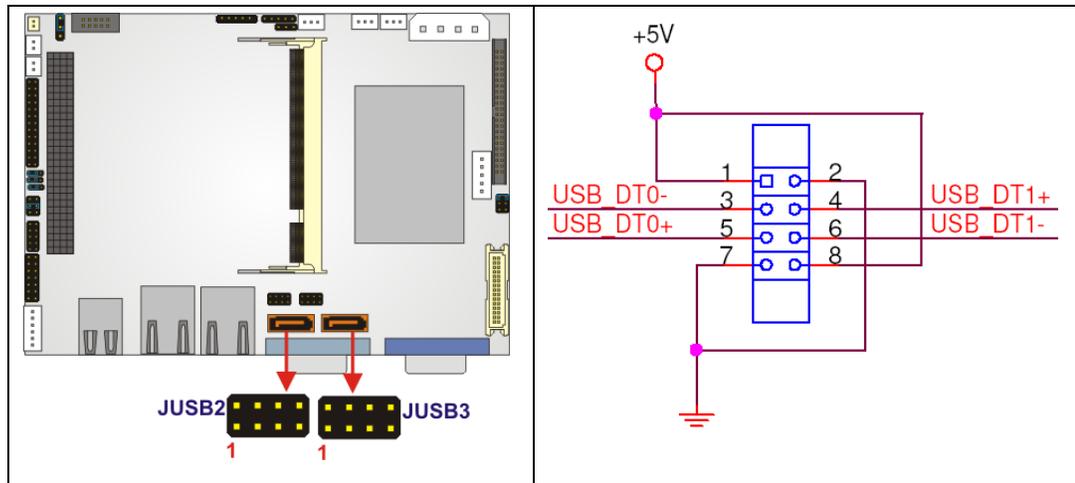
Figure 3-21: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND
3	USB_DT02-	4	USB_DT3+
5	USB_DT02+	6	USB_DT3-
7	GND	8	+5V

Table 3-22: USB Port Connector Pinouts

3.3 External Peripheral Interface Connectors

Figure 3-22 shows the WAFER-LUKE rear panel. The external peripheral interface connectors connect to devices externally when the WAFER-LUKE is installed in a chassis. The external peripheral interface connectors are:

- 2 x USB connectors
- 2 x RJ-45 GbE connector
- 1 x VGA connector
- 1 x Serial port connector
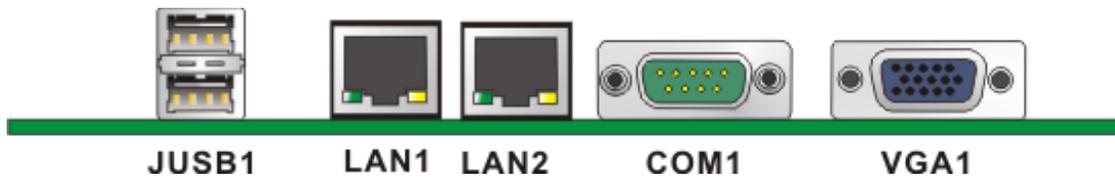
Figure 3-22: WAFER-LUKE CP Rear Panel

3.3.1 VGA connector

CN Label:	**VGA1**
CN Type:	15-pin Female
CN Location:	See **Figure 3-22**
CN Pinouts:	See **Figure 3-23** and **Table 3-23**

A 15-pin VGA connector connects to standard displays.
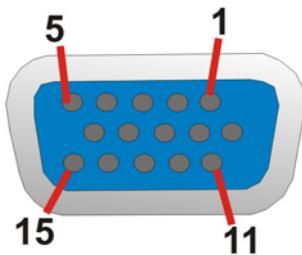
Figure 3-23: VGA Connector

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

Table 3-23: VGA Connector Pinouts

3.3.2 Serial Port Connector

CN Label: **COM1**

CN Type: D-SUB Serial Port Connector

CN Location: See **Figure 3-22**

CN Pinouts: See **Table 3-24** and **Figure 3-24**

The WAFER-LUKE has an RS-232 serial port on the rear panel.
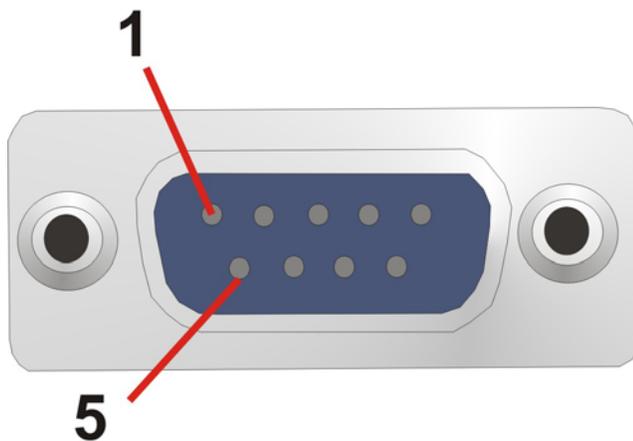
Figure 3-24: COM1 Serial Port Connector

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COM1 pinouts are shown below.

PIN	Description	PIN	Description
1	DCD1	6	DSR1
2	RXD1	7	RTS1
3	TXD1	8	CTS1
4	DTR1	9	RI1
5	GROUND	10	

Table 3-24: COM1 Pinouts

3.3.3 LAN Connector

CN Label: **LAN1** and **LAN2**

CN Type: RJ-45

CN Location: See **Figure 3-22**

CN Pinouts: See **Table 3-25** (RJ-45)

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

PIN	DESCRIPTION
1	TX D1+
2	TX D1-
3	RX D2+
4	Bi D3+
5	Bi D3-
6	RX D2-
7	Bi D4+
8	Bi D4-

Table 3-25: LAN Pinouts
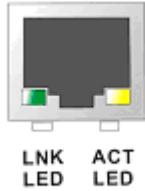
Figure 3-25: RJ-45 Ethernet Connector

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

STATUS	DESCRIPTION	STATUS	DESCRIPTION
GREEN	Linked	YELLOW	Activity

Table 3-26: RJ-45 Ethernet Connector LEDs

3.3.4 USB Connectors

CN Label: JUSB1

CN Type: USB port

CN Location: See **Figure 3-22**

CN Pinouts: See **Table 3-27**

The WAFER-LUKE has a four rear panel USB 2.0 ports. These ports connect to both USB 2.0 and USB 1.1 devices.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USBV3L 5V	2	GND
3	USBP4N	4	USBP5P
5	USBP4P	6	USBP5N
7	GND	8	USBV3L 5V

Table 3-27: USB Port Pinouts

Chapter

4

Installation and Configuration

4.1 Anti-static Precautions

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

- **Wear an anti-static wrist band**: - Wearing a simple anti-static wrist band 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.

4.2 Installation Considerations

NOTE:

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

4.2.1 Installation Notices

Before and during the installation of the WAFER-LUKE motherboard, please **do** the following:

- Read the user manual
  - ○ The user manual provides a complete description of the WAFER-LUKE motherboard, installation instructions and configuration options.

■ Wear an electrostatic discharge cuff (ESD)

o Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the user's body and help to prevent ESD damage.

■ Place the Motherboard on an antistatic pad

o When the Motherboard is installed and configured, place it on an antistatic pad. This helps to prevent potential ESD damage.

■ Turn off all power to the WAFER-LUKE motherboard

o When working with the Motherboard, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the WAFER-LUKEmotherboard **DO NOT:**

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

4.3 Unpacking

NOTE:

If any of the items listed below are missing when the WAFER-LUKE is unpacked, do not proceed with the installation and contact the reseller or vendor Motherboard was purchased from.

4.3.1 Unpacking Precautions

Some components on WAFER-LUKE are very sensitive to static electricity and can be damaged by a sudden rush of power. To protect it from being damaged during the unpacking process, follow these precautions:

- The user should ground themself to remove any static charge before touching the WAFER-LUKE. To ground themselves users can wear a grounded wrist strap at all times or frequently touching any conducting materials that is connected to the ground.
- Handle the WAFER-LUKE by its edges. Do not touch the IC chips, leads or circuitry unneccessarily.

Do not place a PCB on top of an anti-static bag. Only the inside of the bag is safe from static discharge.

4.3.2 Checklist

When WAFER-LUKE is unpacked please make sure the package contains the following items.

- 1x WAFER-LUKE single board computer
- 1 x ATA 33 44P/44P flat cable
- 2 x SATA cables
- 1 x SATA power cable
- 1 x RS-232/422/485 cable
- 1 x KB/MS cable
- 1 x Audio cable
- 1 x Mini jumper pack
- 1x Utility CD
- 1x Quick Installation Guide

If one or more of these items are missing, please contact the reseller or vendor WAFER-LUKE was purchased from and do not proceed any further with the installation.

4.4 WAFER-LUKE Motherboard Installation

 WARNING!

Never run the WAFER-LUKE without an appropriate heatsink and cooler that can be ordered from IEI Technology or purchased separately.

WARNING!

Please note that the installation instructions described in this manual should be carefully followed in order to avoid damage to the WAFER-LUKE components and injury to the user.

WARNING!

When installing electronic components onto the WAFER-LUKE always take the following anti-static precautions in order to prevent ESD damage to the WAFER-LUKE and other electronic components like the CPU and DIMM modules

4.4.1 Preinstalled Components

The components listed below are preinstalled on the WAFER-LUKE.

- CPU
- CPU heat sink

4.4.2 Components to Install

To install the WAFER-LUKE, the following components must be installed or connected to the WAFER-LUKE

- DIMM modules
- Peripheral devices

4.4.3 DIMM Module Installation

4.4.3.1 Purchasing the Memory Module

When purchasing DIMM modules, the following considerations should be taken into account:

- The DIMM module can support a memory chip with a maximum size of 1GB
- The DIMM module can have a of 333MHz or 400MHz

■ The DIMM can be either single-sided or dual-sided.

4.4.3.2 DIMM Module Installation

To install the SO-DIMM module please follow the steps below.

Step 1: Locate the SO-DIMM module connector.

Step 2: Push the SO-DIMM chip into the socket at an angle. (See **Figure 4-1**)

Step 3: Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM module down. (See **Figure 4-1**)

Step 4: Release the arms on the SO-DIMM socket. They clip into place and secure the SO-DIMM module in the socket.
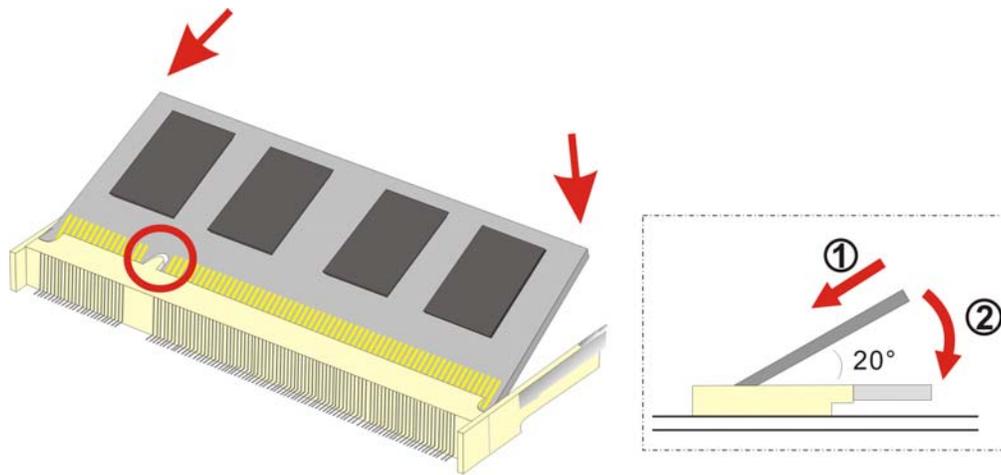
Figure 4-1: SO-DIMM Module Installation

4.4.4 Peripheral Device Connection

Cables provided by IEI that connect peripheral devices to the board are listed in **Table 4-1**. Cables not included in the kit must be separately purchased.

Quantity	Type
1	mini jumper pack
1	ATA 33 44p/44p HDD cable
2	SATA cables

1	SATA power cable
1	RS-232/422/485 cable
1	Keyboard/mouse cable
1	Audio cable

Table 4-1: IEI Provided Cables

4.4.4.1 IDE Disk Drive Connector (IDE1)

The cable used to connect the WAFER-LUKE to the IDE HDD is a standard 44-pin ATA33 flat cable. To connect an IDE device to the WAFER-LUKE follow the instructions below.

Step 1: Find the ATA 33 flat cable in the kit that came with the motherboard.

Step 2: Connect one end of the cable to the IDE1 connector on the motherboard. A keyed pin on the IDE connectors prevents it from being connected incorrectly.

Step 3: Locate the red wire on the other side of the cable that corresponds to the pin 1 connector.

Step 4: Connect the other side of the cable to the HDD making sure that the pin 1 cable corresponds to pin 1 on the connector.

NOTE:

When two EIDE disk drives are connected together, back-end jumpers on the drives must be used to configure one drive as a master and the other as a slave.

4.4.4.2 CompactFlash Connector

To install a CF I OR CF II card, please follow the steps below.

Step 1: Locate the CF module slot.

Step 2: Align the CF module with the CF module slot.

Step 3: Gently insert the module into the slot.

4.4.4.3 Parallel Port Connector (LPT1)

The onboard parallel port connector (LPT1) connects to a printer. The [Product Name] comes with a multi-mode (ECP/EPP/SPP) parallel port. The parallel port interface features a 26-pin flat-cable connector that requires an adapter cable if a traditional DB-25 connector is used. The parallel port interface can be re-assigned to LPT2 or LPT3 through the BIOS configuration utility. Select ECP or EPP DMA mode using the BIOS configuration utility.

4.4.4.4 Audio Interface

AC'97 Audio signals are interfaced through a 12-pin flat-cable connector. The signals include microphone line-in, line-in stereo, line-out stereo and speaker out stereo. An audio 12-pin-to-phone adapter kit is required.

4.4.4.5 COM Port Connectors [COM2]

The WAFER-LUKE provides two serial ports, COM1 is accessed externally and COM2 is accessed on the board. The serial ports facilitate the connection to serial devices or a communications network, e.g., terminal console.

4.5 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
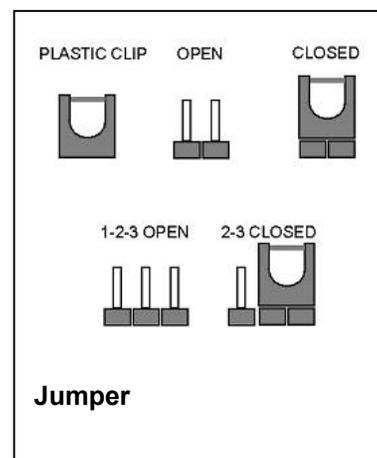
Jumper

jumper.

Before the WAFER-LUKE is installed in the system, the jumpers must be set in accordance with the desired configuration. The WAFER-LUKE motherboard has six on-board jumpers.

Description	Label	Type
Clear CMOS	J6	3-pin header
CompactFlash setup	JP1	3-pin header
LCD voltage setup	JP6	6-pin header
COM2 RS-232/RS-485 setup	JP3	3-pin header
COM2 RS-422/RS-485 setup	JP4	3-pin header
COM2 RS-232 Voltage setup	JP5	6-pin header

Table 4-2: Jumpers

4.5.1 Clear CMOS Jumper

Jumper Label: **J6**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-3**

Jumper Location: See **Figure 4-2**

If the WAFER-LUKE fails to boot due to improper BIOS settings, use this connector to clear the CMOS data and reset 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.

Clear CMOS	DESCRIPTION
Short 1 – 2 (Default)	Keep CMOS Setup
Short 2 – 3	Clear CMOS Setup

Table 4-3: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 4-2** below.
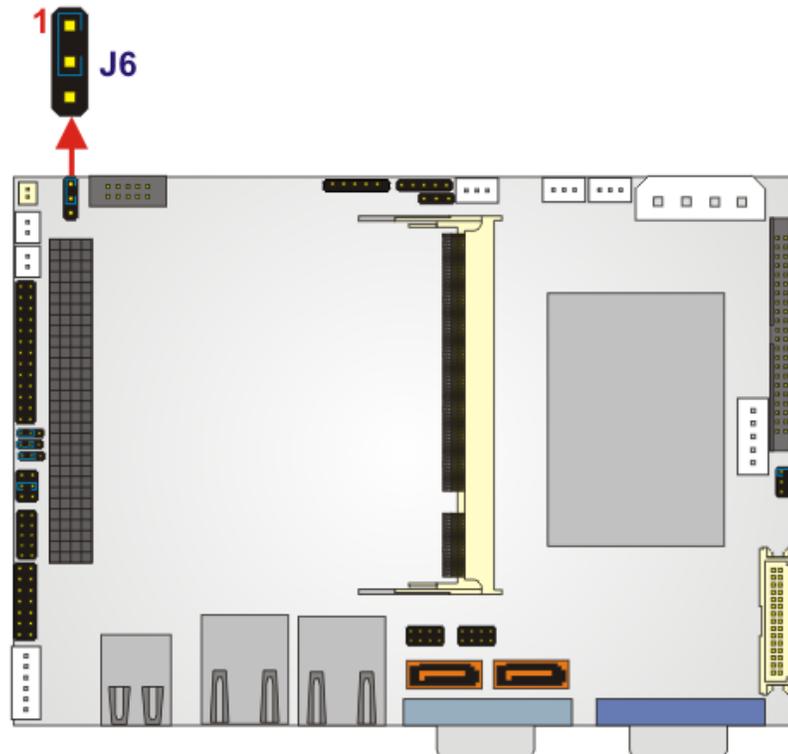
Figure 4-2: Clear CMOS Jumper

4.5.2 CF Card Setup

Jumper Label: JP1

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-4**

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

The CF Card Setup jumper sets the compact flash card as either the slave device or the master device.

JP4	DESCRIPTION
Short 1-2 (Default)	**Slave**
Short 2-3	**Master**

Table 4-4: CF Card Setup Jumper Settings

The CF Card Setup jumper location is shown in Figure 4-3
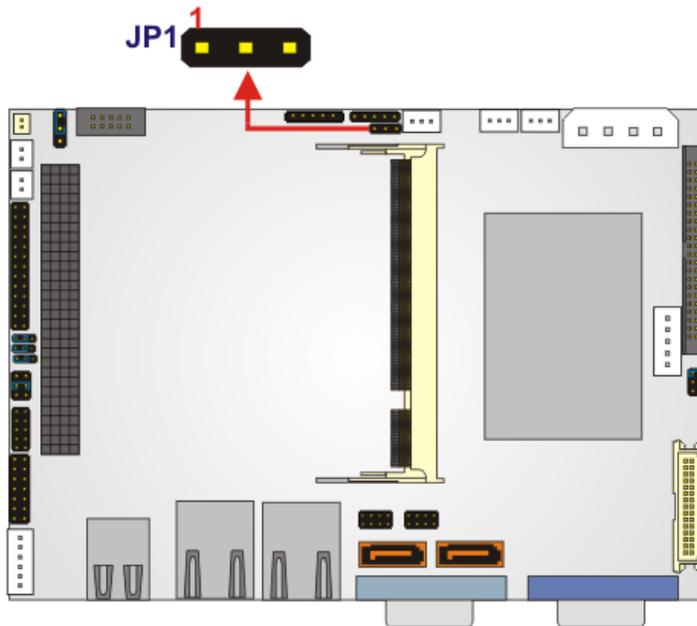
Figure 4-3: CF Card Setup Jumper Pinout Locations

4.5.3 LCD Voltage Setup Jumper

 WARNING:

Making the wrong setting on this jumper may cause irreparable damage to both the motherboard and the LCD screen connected to the onboard connector.

Jumper Label:	JP6
Jumper Type:	6-pin header
Jumper Settings:	See **Table 4-5**
Jumper Location:	See **Figure 4-4**

This jumper allows the user to set the voltage for the LCD panel. Before setting this jumper please refer to the LCD panel user guide to determine the required voltage. After the required voltage is known, make the necessary jumper setting in accordance with the settings shown in **Table 4-5**.

JP3	DESCRIPTION
Short 1-2 (Default)	+3V
Short 3-4	+5V
Short 5-6	+12V

Table 4-5: LCD Voltage Setup Jumper Settings

The LCD Voltage Setup jumper location is shown in **Figure 4-4** below.
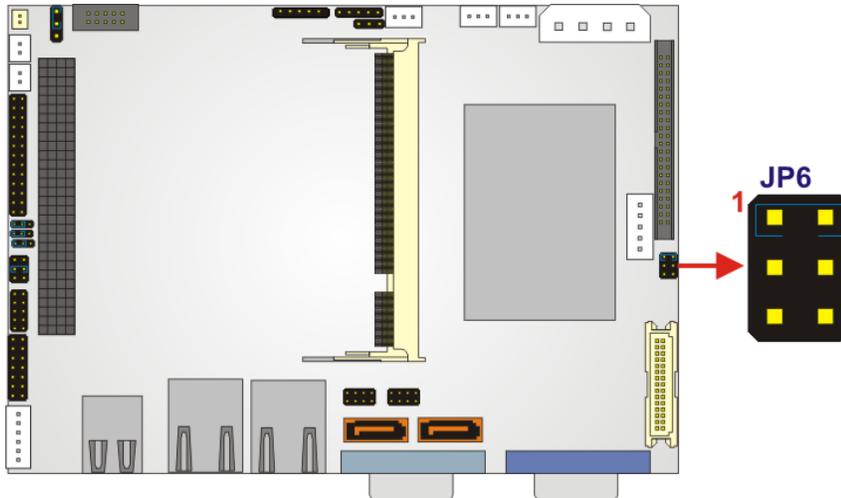
Figure 4-4: LCD Voltage Setup Jumper Pinout Locations

4.5.4 RS-232/485 Setup

Jumper Label:	**JP3** and **JP4**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-6** and **Table 4-7**
Jumper Location:	See **Figure 4-5**

The WAFER-LUKE has two COM2 serial port setup jumpers. The first jumper, JP3 selects whether the serial port is RS-232 or RS-422/485. If the RS-422/485 configuration is set, the second jumper, JP4, sets the serial port as RS-422 or RS-485.

JP3 settings are shown in Table 4-6 and JP4 settings are shown in Table 4-7.

COM 2 Setup	Description	
Short Pin 1 ~ Pin 2	RS-232	Default
Short Pin 2 ~ Pin 3	RS-422/485	

Table 4-6: WAFER-LUKE COM2 Serial Port Setup (JP3)

COM 2 Setup	Description	
Short Pin 1 ~ Pin 2	RS-422	Default
Short Pin 2 ~ Pin 3	RS-485	

Table 4-7: WAFER-LUKE COM2 Serial Port Setup (JP4)

The RS-232/422/485 Setup jumper locations are shown in **Figure 4-5**.
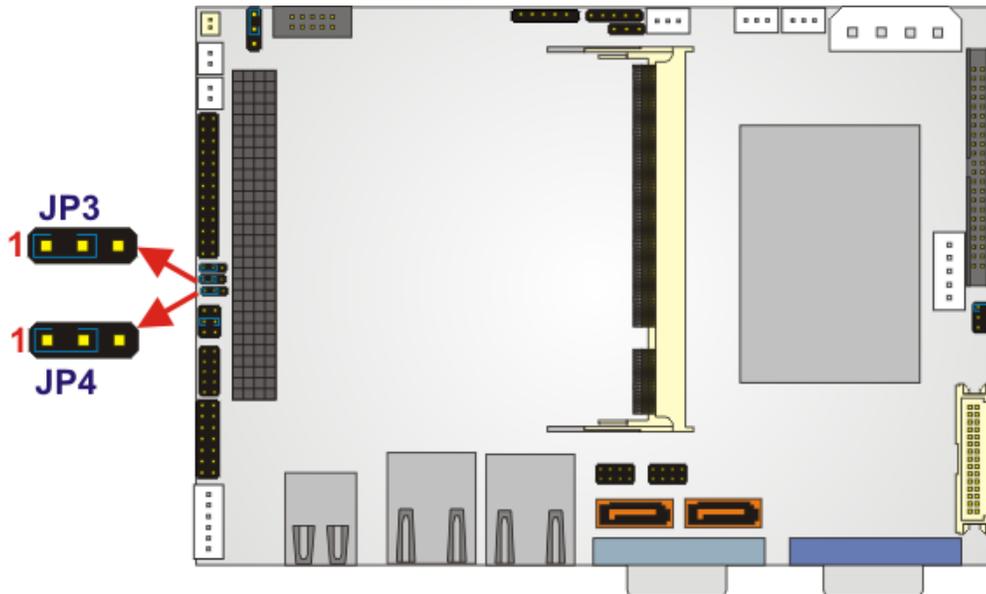
Figure 4-5: COM2 Setup Jumper Pinout Locations

4.5.5 COM2 Voltage Setup Jumper

Jumper Label:	**JP5**
Jumper Type:	6-pin header
Jumper Settings:	See **Table 4-8**
Jumper Location:	See **Figure 4-6**

This jumper allows the user to set the voltage for pin 9 on COM2. Pin 9 is traditionally a ring line but this jumper can set pin 9 to supply 5V or 12V power to a serial device connected to COM2. Make the necessary jumper setting in accordance with the settings shown in **Table 4-8**.

JP5	DESCRIPTION
Short 1 - 2 Short 3 – 4	+5V
Short 4 – 6 (Default)	RI#
Short 2 - 4 Short 3 – 5	+12V

Table 4-8: COM2 Voltage Setup Jumper Settings

The COM2 Voltage Setup jumper location is shown in **Figure 4-6** below.
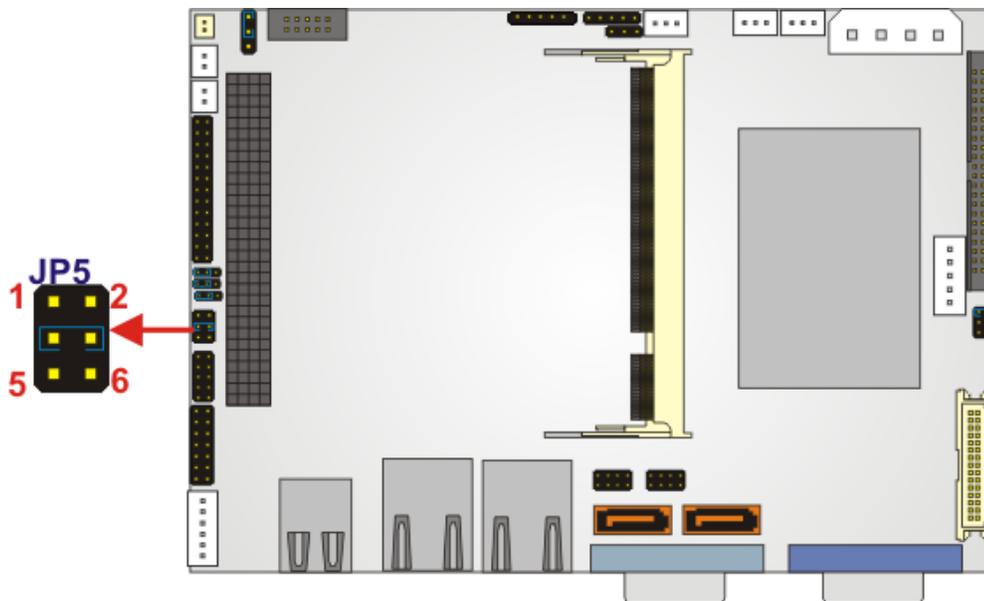
Figure 4-6: COM2 Voltage Setup Jumper Pinout Locations

4.6 Chassis Installation

After the DIMM modules have been installed and after the internal peripheral connectors have been connected to the peripheral devices and the jumpers have been configured, the WAFER-LUKE can be mounted into chassis.

To mount a board into a chassis, please refer to the chassis user guide that came with the product.

4.7 External Peripheral Interface Connectors

4.7.1 LCD Panel Connection

The conventional CRT monitor connector, VGA1, is a 15-pin, female D-SUB connector. Pin assignments can be seen in that can be connected to external monitors.

4.7.2 Ethernet Connection

The rear panel RJ-45 connectors can be connected to an external LAN and communicate with data transfer rates up to 1Gb/s.

4.7.3 USB Connection

The rear panel USB connectors provide easier and quicker access to external USB devices. The rear panel USB connector is a standard connector and can easily be connected to other USB devices.

4.7.4 Serial Connection

The rear panel serial connector provides easy and quick access to external serial devices

IEI® Technology, Corp.

Chapter

5

AMI BIOS Setup

5.1 Introduction

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

5.1.1 Starting Setup

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

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

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

5.1.2 Using Setup

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

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

F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 /F3 key	Change color from total 16 colors. F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

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

5.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the clear CMOS jumper.

5.1.5 BIOS Menu Bar

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

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

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

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.

The **Main** menu gives an overview of the basic system information.

```
                        BIOS SETUP UTILITY
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit

  System Overview                              Use [ENTER], [TAB]
                                               or [SHIFT-TAB] to
  AMIBIOS                                      select a field.
  Version   :08.00.11
  Build Date:09/13/06                          Use [+] or [-] to
  ID        :E010MR03                          configure system Time.

  Processor
  Type    :VIA C3
  Speed   :1000MHz
  Count   :1

  System Memory                                ↔       Select Screen
  Size      :960MB                             ↑↓      Select Item
                                               +-      Change Field
  System Time            [05:20:35]            Tab     Select Field
  System Date            [Sun 07/29/2063]      F1      General Help
                                               F10     Save and Exit
                                               ESC     Exit

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```

BIOS Menu 1: Main

➔ **System Overview**

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

- **AMI BIOS**: Displays auto-detected BIOS information
  - ○ **Version**: Current BIOS version
  - ○ **Build Date**: Date the current BIOS version was made
  - ○ **ID**: Installed BIOS ID
- **Processor**: Displays auto-detected CPU specifications

o **Type**: Names the currently installed processor

o **Speed**: Lists the processor speed

o **Count**: The number of CPUs on the motherboard

■ **System Memory**: Displays the auto-detected system memory.

o **Size**: Lists memory size

The **System Overview** field also has two user configurable fields:

➔ **System Time [xx:xx:xx]**

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

5.3 Advanced

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

 WARNING:

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

■ **CPU Configuration** (see **Section 5.3.1**)

■ **IDE Configuration** (see **Section 5.3.2**)

■ **SuperIO Configuration** (see **Section 5.3.3**)

■ **Hardware Health Configuration** (see **Section 5.3.4**)

■ **ACPI Configuration** (see **Section 5.3.6**)

■ **APM Configuration** (see **Section 5.3.6**)

■ **USB Configuration** (see **Section 5.3.7**)

```
                        BIOS SETUP UTILITY
 Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit

 Advanced Settings                              Options for CPU

 WARNING: Setting wrong values in below sections
          may cause system to malfunction.

 ▶ CPU Configuration
 ▶ IDE Configuration
 ▶ SuperIO Configuration
 ▶ Hardware Health Configuration
 ▶ ACPI Configuration
 ▶ APM Configuration
 ▶ USB Configuration
                                        ↔      Select Screen
                                        ↑↓     Select Item
                                        Enter  Go to Sub Screen
                                        F1     General Help
                                        F10    Save and Exit
                                        ESC    Exit

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```

BIOS Menu 2: Advanced

5.3.1 CPU Configuration

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

```
                    BIOS SETUP UTILITY
   Advanced

Configure advanced CPU settings

Manufacturer:VIA
Brand String:VIA C3
Frequency    :1.00GHz
FSB Speed    :133MHz

Cache L1     :64 KB
Cache L2     :64 KB




                                    ↔    Select Screen
                                    ↑↓   Select Item
                                    F1   General Help
                                    F10  Save and Exit
                                    ESC  Exit




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```
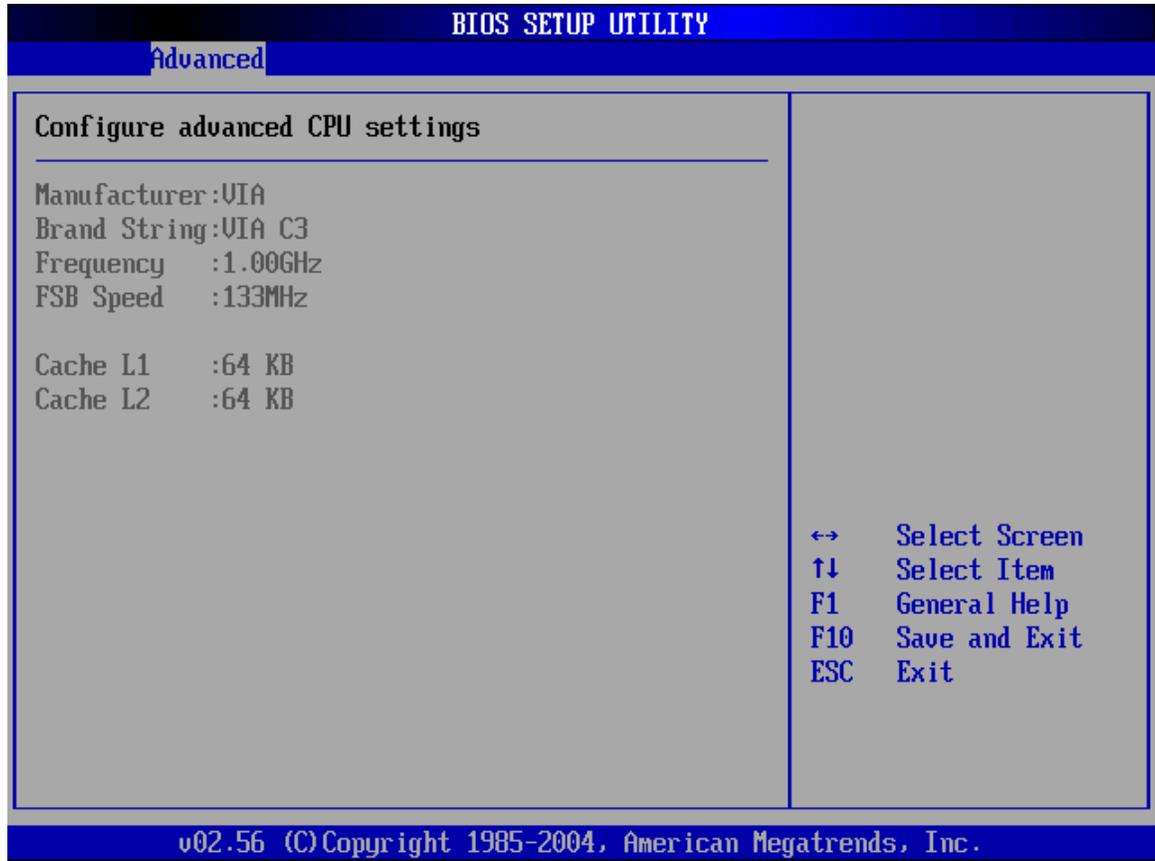
BIOS Menu 3: CPU Configuration

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

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

5.3.2 IDE Configuration

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

```
                    BIOS SETUP UTILITY
   Advanced

IDE Configuration                              DISABLED: disables the
                                               integrated IDE
OnBoard PCI IDE Controller     [Both]          Controller.
                                               PRIMARY: enables only
▶ Primary IDE Master         : [Not Detected]  the Primary IDE
▶ Primary IDE Slave          : [Not Detected]  Controller.
▶ Secondary IDE Master       : [Not Detected]  SECONDARY: enables
▶ Secondary IDE Slave        : [Not Detected]  only the Secondary IDE
▶ Third IDE Master           : [Not Detected]  Controller.
▶ Third IDE Slave            : [Not Detected]  BOTH: enables both IDE
                                               Controllers.

                                               ↔    Select Screen
                                               ↑↓   Select Item
                                               +-   Change Option
                                               F1   General Help
                                               F10  Save and Exit
                                               ESC  Exit

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```

BIOS Menu 4: IDE Configuration

➔ OnBoard PCI IDE Controller [Both]

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

➔ Disabled Prevents the system from using the onboard IDE controller

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

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

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

➔ **IDE Master and IDE Slave**

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

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

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

5.3.2.1 IDE Master, IDE Slave

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

```
                         BIOS SETUP UTILITY
    Advanced

  Primary IDE Master                          Select the type
                                              of device connected
  Device    :Not Detected                     to the system.

  Type                     [Auto]
  LBA/Large Mode           [Auto]
  Block (Multi-Sector Transfer)  [Auto]
  PIO Mode                 [Auto]
  DMA Mode                 [Auto]
  S.M.A.R.T.               [Auto]
  32Bit Data Transfer      [Enabled]

                                         ↔     Select Screen
                                         ↑↓    Select Item
                                         +-    Change Option
                                         F1    General Help
                                         F10   Save and Exit
                                         ESC   Exit


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```

BIOS Menu 5: IDE Master and IDE Slave Configuration

➔   **Auto-Detected Drive Parameters**

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

- **Device**: Lists the device type (e.g. hard disk, CD-ROM etc.)
- **Type**: Indicates the type of devices a user can manually select
- **Vendor**: Lists the device manufacturer
- **Size**: List the storage capacity of the device.
- **LBA Mode**: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- **Block Mode**: Block mode boosts IDE drive performance by increasing the

amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.

- **PIO Mode**: Indicates the PIO mode of the installed device.
- **Async DMA**: Indicates the highest Asynchronous DMA Mode that is supported.
- **Ultra DMA**: Indicates the highest Synchronous DMA Mode that is supported.
- **S.M.A.R.T.**: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
- **32Bit Data Transfer**: Enables 32-bit data transfer.

➔ **Type [Auto]**

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

➔ **Not Installed**   BIOS is prevented from searching for an IDE disk drive on the specified channel.

➔ **Auto**   DEFAULT   The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.

➔ **CD/DVD**   The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.

➔ **ARMD**   This option specifies an ATAPI Removable Media Device. These include, but are not limited to:

➔ **ZIP**

➔ **LS-120**

➔ **LBA/Large Mode [Auto]**

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

➔ **Disabled**   BIOS is prevented from using the LBA mode control on the specified channel.

➔ **Auto** **DEFAULT**   BIOS auto detects the LBA mode control on the specified channel.

➔ **Block (Multi Sector Transfer) [Auto]**

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

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

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

➔ **PIO Mode [Auto]**

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

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

➔ **0**   PIO mode 0 selected with a maximum transfer rate of 3.3MBps

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

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

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

➔ **4** PIO mode 4 selected with a maximum transfer rate of 16.6MBps

(This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

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

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

➔ **SWDMA0** Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1MBps

➔ **SWDMA1** Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2MBps

➔ **SWDMA2** Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3MBps

➔ **MWDMA0** Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2MBps

➔ **MWDMA1** Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3MBps

➔ **MWDMA2** Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6MBps

➔ **UDMA1** Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps

➔ **UDMA1** Ultra DMA mode 1 selected with a maximum data transfer

rate of 25MBps

➔ **UDMA2**   Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3MBps

➔ **UDMA3**   Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **UDMA4**   Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **UDMA5**   Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **S.M.A.R.T [Auto]**

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

➔ **Auto**   DEFAULT   BIOS auto detects HDD SMART support.

➔ **Disabled**   Prevents BIOS from using the HDD SMART feature.

➔ **Enabled**   Allows BIOS to use the HDD SMART feature

➔ **32Bit Data Transfer [Enabled]**

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

➔ **Disabled**   Prevents the BIOS from using 32-bit data transfers.

➔ **Enabled**   DEFAULT   Allows BIOS to use 32-bit data transfers on supported hard disk drives.

5.3.3 Super IO Configuration

The **Super IO Configuration** menu (**BIOS Menu 6**) sets or changes the configurations for the FDD controllers, parallel ports and serial ports.

```
                       BIOS SETUP UTILITY
    Advanced

Configure Win697 Super IO Chipset          Allows BIOS to Select
                                           Serial Port1 Base
Serial Port1 Address       [3F8/IRQ4]      Addresses.
Serial Port2 Address       [2F8/IRQ3]
  Serial Port2 Mode        [Normal]
Parallel Port Address      [378]
  Parallel Port Mode       [Normal]
  Parallel Port IRQ        [IRQ7]
Serial Port3 Address       [3E8]
  Serial Port3 IRQ         [11]
Serial Port4 Address       [2E8]
  Serial Port4 IRQ         [10]
Serial Port5 Address       [2D8]
  Serial Port5 IRQ         [11]           ↔     Select Screen
Serial Port6 Address       [2E0]          ↑↓    Select Item
  Serial Port6 IRQ         [10]           +-    Change Option
                                          F1    General Help
                                          F10   Save and Exit
                                          ESC   Exit


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```

BIOS Menu 6: Super IO Configuration

➔ **Serial Port1 Address [3F8/IRQ4]**

Use the **Serial Port1 Address** option to select the Serial Port 1 base address.

➔ **Disabled** No base address is assigned to Serial Port 1

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

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

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

➔ **Serial Port2 Address [2F8/IRQ3]**

Use the **Serial Port2 Address** option to select the Serial Port 2 base address.

➔ **Disabled** No base address is assigned to Serial Port 2

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

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

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

➔ **Serial Port2 Mode [Normal]**

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

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

IEI® Technology, Corp.

➔ **IrDA**   Serial Port 2 mode is IrDA

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

➔ **Parallel Port Address [Disabled]**

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

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

➔ **378**   Parallel Port I/O port address is 378

➔ **278**   Parallel Port I/O port address is 278

➔ **3BC**   Parallel Port I/O port address is 3BC

➔ **Parallel Port Mode [Normal]**

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

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

➔ **Bi-directional**   Parallel port outputs are 8-bits long. Inputs are
accomplished by reading 4 of the 8 bits on the
status register.

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

➔ **ECP+EPP**   The parallel port operates in the extended
capabilities port (ECP) mode. The ECP mode
supports bi-directional communication between the

system and the parallel port device and the transmission rates between the two are much faster than the Normal mode

The parallel port is also be compatible with EPP devices described above

➔ **Parallel Port IRQ [IRQ7]**

Use the **Parallel Port IRQ** selection to set the parallel port interrupt address.

➔ **IRQ5**   IRQ5 is assigned as the parallel port interrupt address

➔ **IRQ7** DEFAULT   IRQ7 is assigned as the parallel port interrupt address

➔ **Serial Port3 Address [3E8]**

Use the **Serial Port3 Address** option to select the base address for serial port 3.

➔ **Disabled**   No base address is assigned to serial port 3

➔ **3E8** (Default)   Serial port 3 I/O port address is 3E8

➔ **2E8**   Serial port 3 I/O port address is 2E8

➔ **2E0**   Serial port 3 I/O port address is 2E0

➔ **Serial Port3 IRQ [11]**

Use the **Serial Port3 IRQ** selection to set the interrupt address for serial port 3.

➔ **10**   Serial port 3 IRQ address is 10

➔ **11** (DEFAULT)   Serial port 3 IRQ address is 11

➔ **Serial Port4 Address [2E8]**

Use the **Serial Port4 Address** option to select the base address for serial port 4.

➔ **Disabled**   No base address is assigned to serial port 4

➔ **3E8**   Serial port 4 I/O port address is 3E8

➔ **2E8**   (Default)   Serial port 4 I/O port address is 2E8

➔ **2E0**   Serial port 4 I/O port address is 2E0

➔ **Serial Port4 IRQ [10]**

Use the **Serial Port4 IRQ** selection to set the interrupt address for serial port 4.

➔ **10**   (DEFAULT)   Serial port 4 IRQ address is 10

➔ **11**   Serial port 4 IRQ address is 11

➔ **Serial Port5 Address [2E8]**

Use the **Serial Port4 Address** option to select the base address for serial port 5.

➔ **Disabled**   No base address is assigned to serial port 5

➔ **3E8**   Serial port 5 I/O port address is 3E8

➔ **2E8**   (Default)   Serial port 5 I/O port address is 2E8

➔ **2E0**   Serial port 5 I/O port address is 2E0

➔ **Serial Port5 Address [2E0]**

Use the **Serial Port5 IRQ** option to select the interrupt address for serial port 5.

➔ **Disabled**   No base address is assigned to serial port 5

➔ **3E8**   Serial port 5 I/O port address is 3E8

➔ **2E8**   Serial port 5 I/O port address is 2E8

➔ **2E0**   **DEFAULT**   Serial port 5 I/O port address is 2E0

➔ **2D0**   Serial port 5 I/O port address is 2D0

➔ **Serial Port5 IRQ [11]**

Use the **Serial Port5 IRQ** option to select the interrupt address for serial port 5.

➔ **10**   Serial port 5 IRQ address is 10

➔ **11**   DEFAULT   Serial port 5 IRQ address is 11

➔ **Serial Port6 Address [2D8]**

Use the **Serial Port6 IRQ** option to select the interrupt address for serial port 6.

➔ **Disabled**   No base address is assigned to serial port 6

➔ **3E8**   Serial port 6 I/O port address is 3E8

➔ **2E8**   Serial port 6 I/O port address is 2E8

➔ **2E0**   Serial port 6I/O port address is 2E0

➔ **2D8**   DEFAULT   Serial port 6 I/O port address is 2D8

➔ **Serial Port6 IRQ [10]**

Use the **Serial Port6 IRQ** option to select the interrupt address for serial port 6.

➔ **10**   DEFAULT   Serial port 6 IRQ address is 10

➔ **11**   Serial port 6 IRQ address is 11

5.3.4 Hardware Health Configuration

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

```
                    BIOS SETUP UTILITY
        Advanced

Hardware Health Configuration

CPU Temperature               :105°C/221°F
System Temperature            :33°C/91°F

CPU Fan Speed                 :0 RPM

Vcore                         :1.000 V
+3.3Vin                       :3.370 V
+5Vin                         :4.904 V


                                          ↔    Select Screen
                                          ↑↓   Select Item
                                          F1   General Help
                                          F10  Save and Exit
                                          ESC  Exit



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```
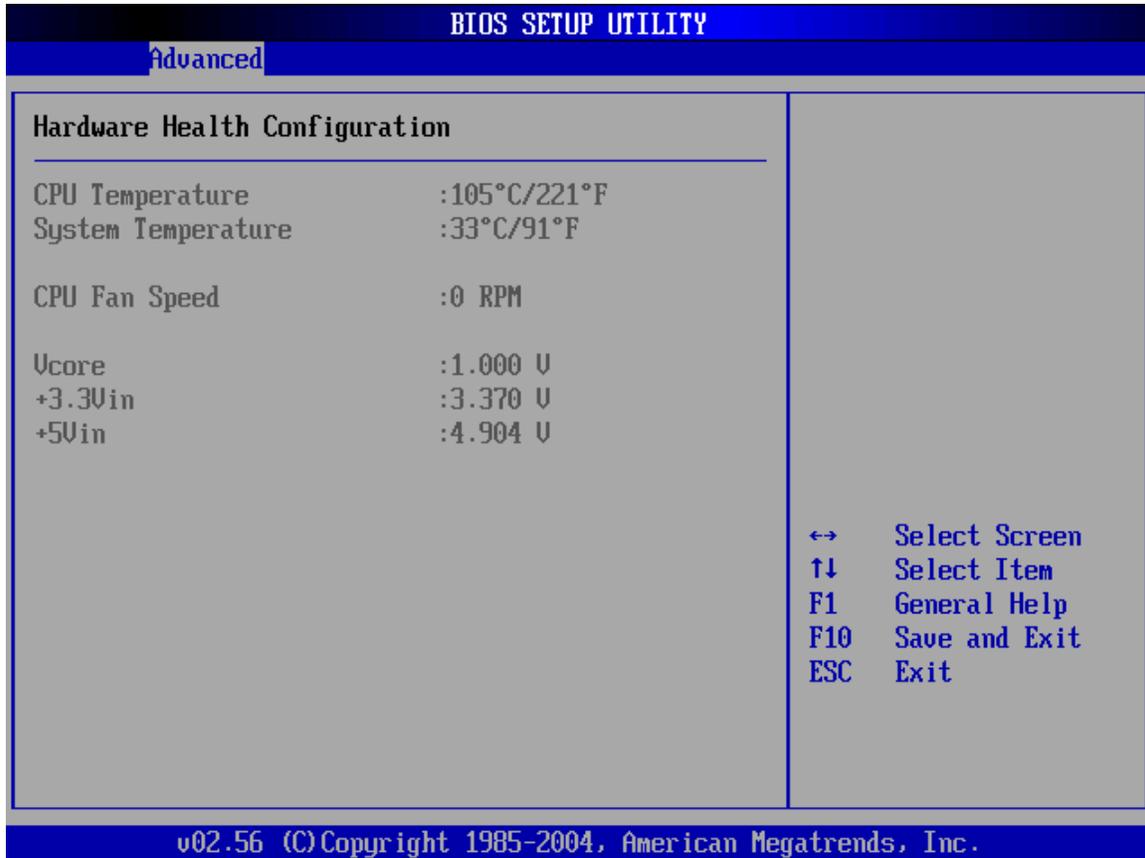
BIOS Menu 7: Hardware Health Configuration

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

- **System Temperatures**: The following system temperatures are monitored
  - ○ CPU Temperature
  - ○ System Temperature

- **Fan Speeds**: The CPU cooling fan speed is monitored.
  - ○ Fan2 Speed

- **Voltages**: The following system voltages are monitored
  - ○ +3.30Vin
  - ○ +5.00Vin

5.3.5 ACPI Configuration

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

```
                      BIOS SETUP UTILITY
      Advanced

ACPI Settings                              Enable / Disable
                                           ACPI support for
ACPI Aware O/S              [Yes]          Operating System.
▶ Advanced ACPI Configuration
                                           ENABLE: If OS
                                           supports ACPI.

                                           DISABLE: If OS
                                           does not support
                                           ACPI.


                                           ↔     Select Screen
                                           ↑↓    Select Item
                                           +-    Change Option
                                           F1    General Help
                                           F10   Save and Exit
                                           ESC   Exit


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```
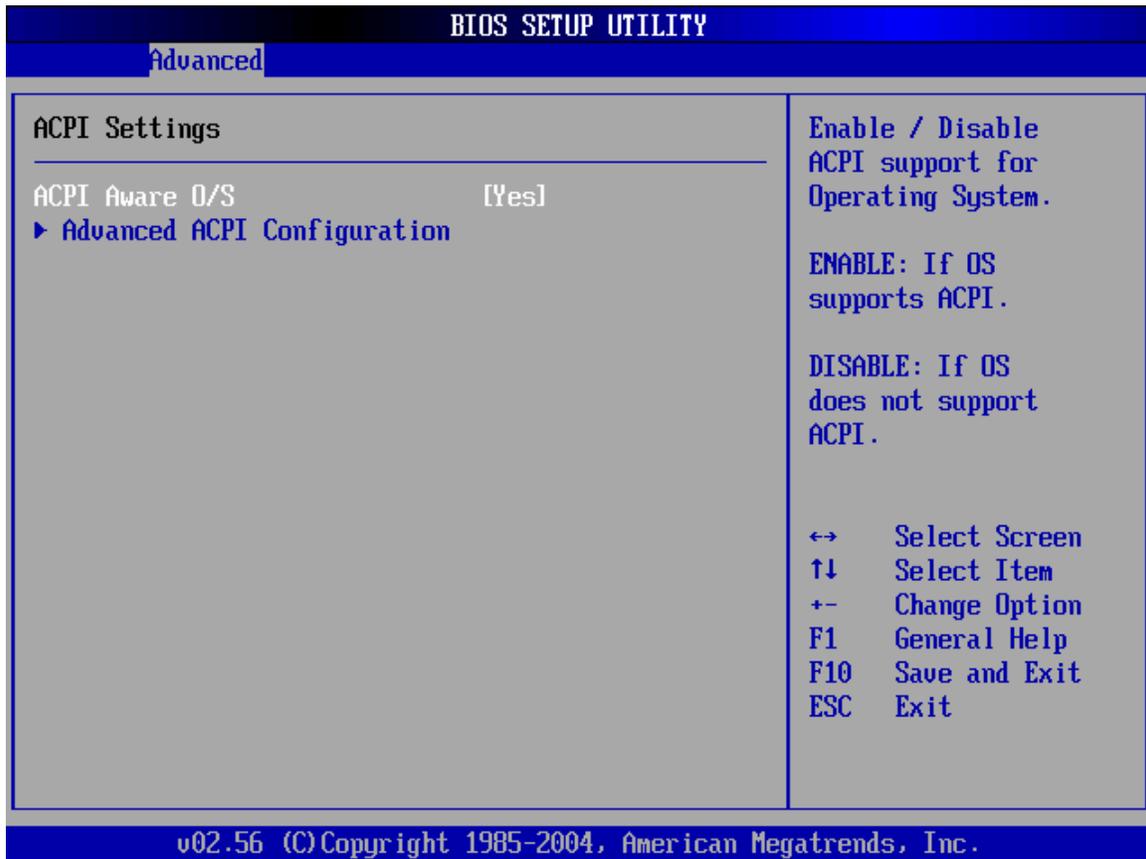
BIOS Menu 8: ACPI Configuration

➔ **ACPI Aware O/S [Yes]**

Use the **ACPI Aware O/S** option to enable the system to configure ACPI power saving options. ACPI can only be implemented if the system OS complies with the ACPI standard. Windows 98, Windows 2000, and Windows XP all comply with ACPI.

➔ **No**   Disables the ACPI support for the OS. This selection should be disabled if the OS does not support ACPI

➔ **Yes** DEFAULT   Enables the ACPI support for the operating system. This selection should be enabled if the OS does support ACPI

5.3.5.1 Advanced ACPI Configuration

Use the **Advanced ACPI Configuration** menu (BIOS Menu 9) to select the ACPI state when the system is suspended.

```
                         BIOS SETUP UTILITY
      Advanced

 Advanced ACPI Configuration                       Enable RSDP pointers
 ─────────────────────────────                     to 64-bit Fixed System
 ACPI 2.0 Features              [No]               Description Tables.




                                                   ↔     Select Screen
                                                   ↑↓    Select Item
                                                   +-    Change Option
                                                   F1    General Help
                                                   F10   Save and Exit
                                                   ESC   Exit

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```
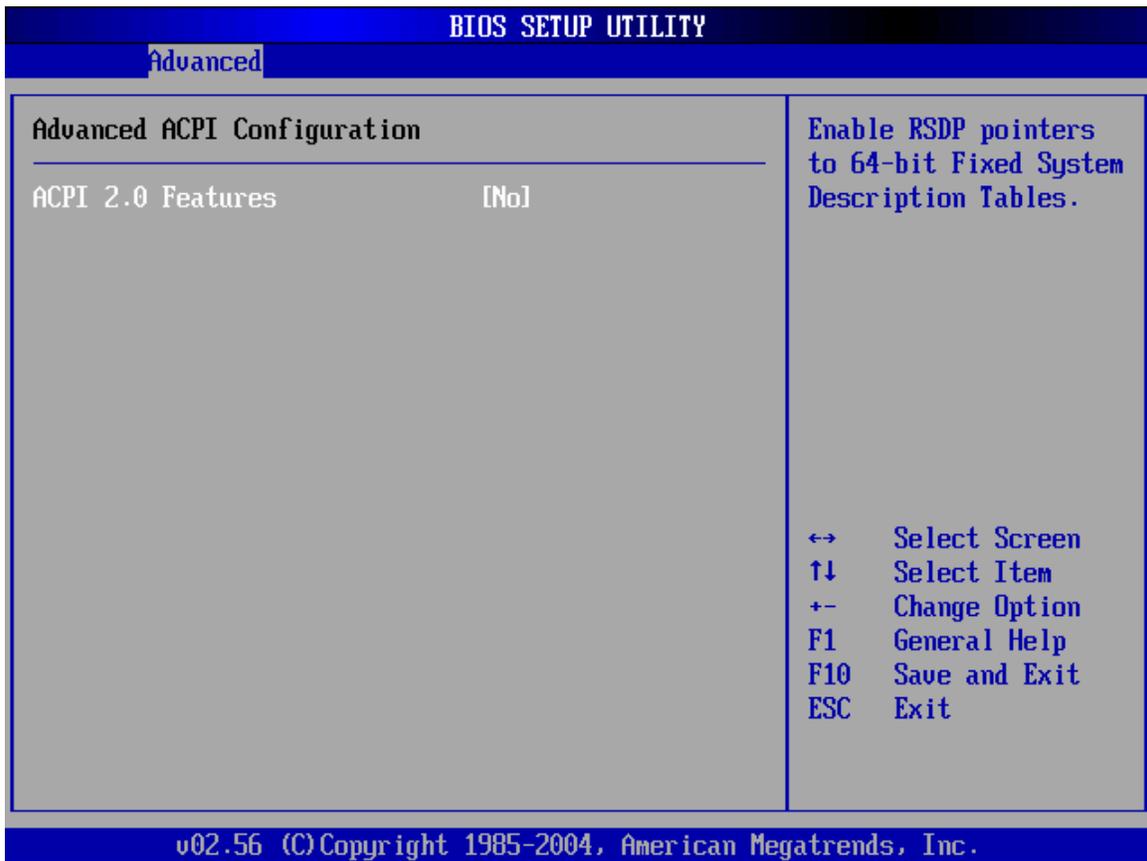
BIOS Menu 9: Advanced ACPI Configuration

➔ **ACPI 2.0 Features**

Use the **ACPI 2.0 Features** option to enable the ACPI (Advanced Configuration and Power Interface) features. By enabling this feature the system RSDP (Root System Description Pointer) is able to obtain physical addresses for other 64-bit fixed system description tables.

➔ **No**   D<small>EFAULT</small>   RSDP pointers to 64-bit fixed systems are not provided to the system

➔ **Yes**   RSDP pointers to 64-bit fixed systems are provided to the system

➔ **ACPI APIC Support [Enabled]**

Use the **ACPI APIC Support** option to add a pointer to an ACPI APIC table in the RSDT (Root System Description Table). The RSDT is an array of pointers that direct the system to the physical addresses of other description tables. The RSDT is the main ACPI table. The RSDP is located in low memory space of the system and provides the physical address of the RSDT. The RSDT itself is identified in memory because it starts with the signature "RSDT."

➔ **Disabled**   Pointers to the APIC APIC table are not be provided in the RSDT

➔ **Enabled**   D<small>EFAULT</small>   Pointers to the APIC APIC table are provided in the RSDT

➔ **AMI OEMB table [Enabled]**

Use the **AMI OEMB table** option to add a pointer to an OEMB table in the RSDT table and the Extended System Description Table (XSDT), which accommodates physical addresses of description headers that are larger than 32-bits. Notice that both the XSDT and the RSDT can be pointed to by the RSDP structure.

➔ · **Disabled** (Default) Pointers to the AMI OEMB table are not provided in the RSDT and the XSDT

➔ **Enabled** Pointers to the AMI OEMB table are provided in the RSDT and the XSDT

➔ **Headless Mode [Disabled]**

Use the **Headless Mode** option to update the ACPI FACP (Fixed ACPI Description Table) to indicate headless operations, i.e. a computer without a monitor, keyboard and mouse.

➔ **Disabled** (Default) The FACP is not updated to indicate headless mode

➔ **Enabled** The FACP is updated to indicate headless mode

5.3.6 APM Configuration

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

```
                        BIOS SETUP UTILITY
   Advanced
┌─────────────────────────────────────────────────┬──────────────────────┐
│                                                  │        Options       │
│ Power Management/APM          [Enabled]          │                      │
│ Power Button Mode             [On/Off]           │ Disabled             │
│ Restore on AC/Power Loss      [Last State]       │ Enabled              │
│ Advanced Monitor Events Controls                 │                      │
│ Display Activity              [Ignore]           │                      │
│ Monitor IRQ3                  [Monitor]          │                      │
│ Monitor IRQ4                  [Ignore]           │                      │
│ Monitor IRQ5                  [Ignore]           │                      │
│ Monitor IRQ7                  [Ignore]           │                      │
│ Monitor IRQ9                  [Ignore]           │                      │
│ Monitor IRQ10                 [Ignore]           │                      │
│ Monitor IRQ11                 [Ignore]           │ ←→   Select Screen   │
│ Monitor IRQ13                 [Ignore]           │ ↑↓   Select Item     │
│ Monitor IRQ14                 [Monitor]          │ +-   Change Option   │
│ Monitor IRQ15                 [Ignore]           │ F1   General Help    │
│                                                  │ F10  Save and Exit   │
│ Advanced Resume Events Controls                  │ ESC  Exit            │
│ Resume On Ring                [Disabled]         │                      │
│ Resume On PME#                [Disabled]         │                      │
└─────────────────────────────────────────────────┴──────────────────────┘
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```

BIOS Menu 10:Advanced Power Management Configuration

➔ **Power Management/APM [Enabled]**

Use the **Power Management/APM** BIOS option to enable access to the advanced power management features. If this option is disabled, the only other option on the screen is the **Power Button Mode**.

➔ **Disabled** Disables the Advanced Power Management (APM) feature

➔ **Enabled** (Default) Enables the APM feature

➔ **Power Button Mode [On/Off]**

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

➔   **On/Off**   (Default)   When the power button is pressed the system is either turned on or off

➔   **Suspend**   When the power button is pressed the system goes into suspend mode

➔   **Restore on AC Power Loss [Power Off]**

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

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

➔   **Power On**   (Default)   The system turns on

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

➔   **Display Activity**

Use the **Display Activity** BIOS option to enable the system to monitor the display device and rouse the system from a suspend or sleep state when activity is detected.

➔   **Ignore**   (Default)   Activity is not monitored on the display

➔   **Monitor**   Activity is not monitored on the display

➔   **Monitor IRQ#**

Use the **Monitor IRQ#** BIOS options to enable the system to monitor specified IRQs and rouse the system from a suspend or sleep state when activity is detected.

➔   **Ignore**   Activity is not monitored on the display

➔   **Monitor**   Activity is not monitored on the display

Activity on the following IRQs can be monitored:

- IRQ3
- IRQ4
- IRQ5
- IRQ7
- IRQ9
- IRQ10
- IRQ11
- IRQ13
- IRQ14
- IRQ15

➔ **Resume on Ring [Disabled]**

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

➔ **Disabled** (Default) Wake event not generated by an incoming call

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

➔ **Resume on PME# [Disabled]**

Use the **Resume on PME#** BIOS option to enable activity on the PCI PME (power management event) controller to rouse the system from a suspend or standby state.

➔ **Disabled** (Default) Wake event not generated by PCI PME controller activity

➔ **Enabled** Wake event generated by PCI PME controller activity

5.3.7 USB Configuration

The **USB Configuration** menu (**BIOS Menu 11**) gives USB configuration information and configures some USB features.

IEI® **Technology, Corp.**

```
                        BIOS SETUP UTILITY
 Advanced

 USB Configuration                            Enables 1.1 USB
                                              host controllers.
 Module Version - 2.24.0-10.4

 USB Devices Enabled :
   2 Drives

 USB 1.1 Ports Configuration   [USB 8 Ports]
 USB 2.0 Ports Enable          [Enabled]
 Legacy USB Support            [Enabled]
 Port 64/60 Emulation          [Disabled]
 USB 2.0 Controller Mode       [HiSpeed]
                                              ←→   Select Screen
 ▶ USB Mass Storage Device Configuration      ↑↓   Select Item
                                              +-   Change Option
                                              F1   General Help
                                              F10  Save and Exit
                                              ESC  Exit

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```

BIOS Menu 11: USB Configuration

➔ **USB Configuration**

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

- Module Version: x.xxxxx.xxxxx

➔ **USB Devices Enabled:**

Lists the USB devices that are enabled on the system

➔ **USB 1.1 Ports Configuration [USB 8 Ports]**

Use the **USB Ports Configuration** BIOS option to specify how many of the USB ports are USB 1.1 compatible.

➔ **Disabled**   None of the ports are USB 1.1 compatible

➔ **USB 2 Ports**   Two ports are USB 1.1 compatible

➔ **USB 4 ports**   Four ports are USB 1.1 compatible

➔ **USB 6 ports**   Six ports are USB 1.1 compatible

➔ **USB 8 ports**   (Default)   Eight ports are USB 1.1 compatible

➔ **USB 2.0 Controller [Enabled]**

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

➔ **Disabled**   USB function disabled

➔ **Enabled**   (Default)   USB function enabled

➔ **Legacy USB Support [Enabled]**

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

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

➔ **Disabled**   Legacy USB support disabled

➔ **Enabled**   DEFAULT   Legacy USB support enabled

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

➔ **Port 64/60 Emulation [Disabled]**

Use the **Port 64/60 Emulation Mode** BIOS option to enable or disable the "Port 60h/64h" trapping option. Port 60h/64h trapping allows the BIOS to provide full PS/2 based legacy

support for the USB keyboard and mouse. This option is useful for Microsoft Windows NT Operating System and for multi-language keyboards. Also this option provides the PS/2 functionalities like keyboard lock, password setting, scan code selection etc to USB keyboards.

➔ **Disabled**   Port 60h/64h trapping option enabled

➔ **Enabled**   (Default)   Port 60h/64h trapping option disabled

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

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

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

➔ **HiSpeed**   DEFAULT   The controller is capable of operating at 480Mb/s
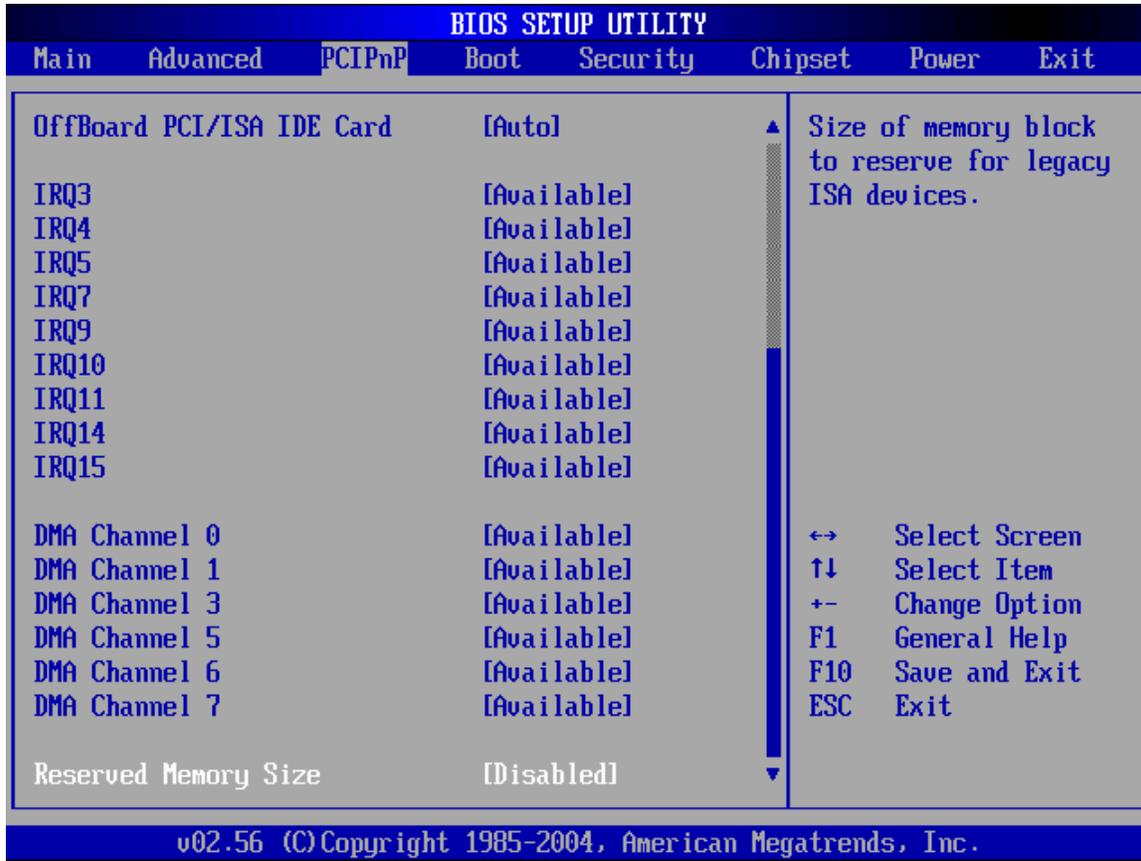
5.4 PCI/PnP

Use the PCI/PnP menu (BIOS Menu 11) to configure advanced PCI and PnP settings.

⚠ **WARNING!**

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

```
                        BIOS SETUP UTILITY
  Main    Advanced   PCIPnP    Boot    Security   Chipset    Power     Exit

 Advanced PCI/PnP Settings                        ▲  │  Clear NVRAM during
                                                     │  System Boot.
 WARNING: Setting wrong values in below sections     │
          may cause system to malfunction.           │
                                                     │
 Clear NVRAM                      [No]                │
 Plug & Play O/S                  [No]                │
 PCI Latency Timer                [64]                │
 Allocate IRQ to PCI VGA          [Yes]              │
 Palette Snooping                 [Disabled]         │
 PCI IDE BusMaster                [Disabled]         │
 OffBoard PCI/ISA IDE Card        [Auto]             │
                                                     │  ↔    Select Screen
 IRQ3                             [Available]        │  ↑↓   Select Item
 IRQ4                             [Available]        │  +-   Change Option
 IRQ5                             [Available]        │  F1   General Help
 IRQ7                             [Available]        │  F10  Save and Exit
 IRQ9                             [Available]        │  ESC  Exit
 IRQ10                            [Available]        │
 IRQ11                            [Available]        ▼  │

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```

BIOS Menu 12: PCI/PnP Configuration

➔ **Clear NVRAM [No]**

Use the **Clear NVRAM** option to specify if the NVRAM (Non-Volatile RAM) is cleared when the power is turned off.

➔ **No**   D<small>EFAULT</small>   System does not clear NVRAM during system boot

➔ **Yes**   System clears NVRAM during system boot

➔ **Plug & Play O/S [No]**

Use the **Plug & Play O/S** BIOS option to specify whether system plug and play devices are configured by the operating system or the BIOS.

➔ **No**   D<small>EFAULT</small>   If the operating system does not meet the Plug and Play

specifications, this option allows the BIOS to configure all the devices in the system.

➔ **Yes** This setting allows the operating system to change the interrupt, I/O, and DMA settings. Set this option if the system is running Plug and Play aware operating systems.

➔ **PCI Latency Timer [64]**

Use the **PCI Latency Timer** option to specify the PCI latency time. The latency time is measured in units of PCI clock cycles for the PCI device latency timer register. Configuration options are:

- 32
- 64   DEFAULT
- 96
- 128
- 160
- 192
- 224
- 248

➔ **Allocate IRQ to PCI VGA [Yes]**

Use the **Allocate IRQ to PCI VGA** option to restrict the system from giving the VGA adapter card an interrupt address.

➔ **Yes** (Default) Assigns an IRQ to a PCI VGA card if card requests IRQ

➔ **No** Does not assign IRQ to a PCI VGA card even if the card requests an IRQ

➔ **Palette Snooping [Disabled]**

Use the **Palette Snooping** option to enable or disable the palette snooping function.

➔ **Disabled** DEFAULT Unless the VGA card manufacturer requires palette

snooping to be enabled, this option should be disabled.

➔ **No/Enab led**   PCI devices are informed that an ISA based Graphics device is installed in the system so the ISA based Graphics card functions correctly. This does not necessarily indicate a physical ISA adapter card. The graphics chipset can be mounted on a PCI card. Always check with the adapter card manual first, before modifying the default settings in the BIOS.

➔ **PCI IDE BusMaster [Disabled]**

Use the **PCI IDE BusMaster** BIOS option to enable or prevent PCI IDE busmastering.

➔ **Disabled** DEFAULT   Busmastering is prevented

➔ **No/Enab led**   IDE controller on the PCI local bus has mastering capabilities

➔ **OffBoard PCI/ISA IDE Card [Auto]**

Use the OffBoard PCI/ISA IDE Card BIOS option to select the OffBoard PCI/ISA IDE Card.

➔ **Auto** DEFAULT   The location of the Off Board PCI IDE adapter card is automatically detected by the AMIBIOS.

➔ **PCI Slot 1**   PCI Slot 1 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 1.

➔ **PCI Slot 2**   PCI Slot 2 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 2.

➔ **PCI Slot 3**   PCI Slot 3 is selected as the location of the OffBoard

PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 3.

➔ **PCI Slot 4**   PCI Slot 4 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 4.

➔ **PCI Slot 5**   PCI Slot 5 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 5.

➔ **PCI Slot 6**   PCI Slot 6 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 6.

➔ **IRQ#   [Available]**

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

➔ **Available**   DEFAULT   The specified IRQ is available to be used by PCI/PnP devices

➔ **Reserved**   The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

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

■ IRQ 15

➔ **DMA Channel# [Available]**

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

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

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

Available DMA Channels are:

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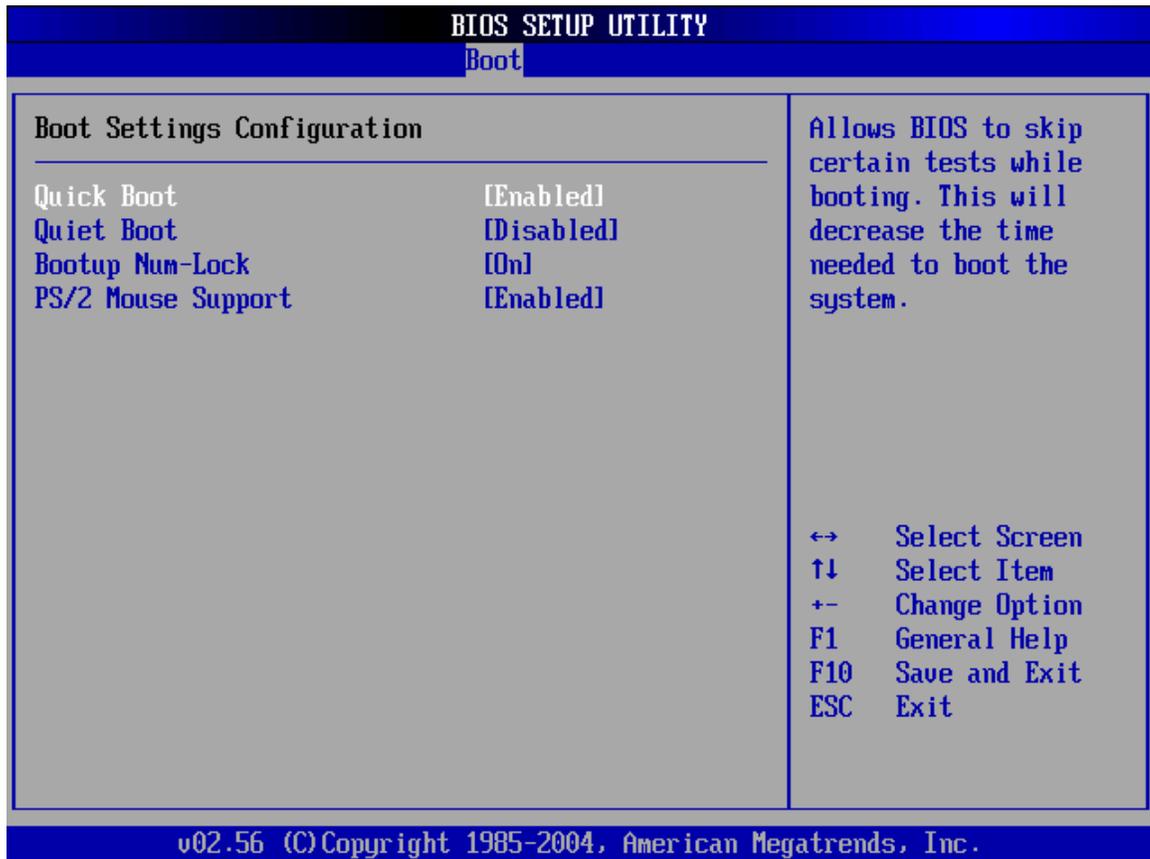■ DM Channel 3
■ DM Channel 5
■ DM Channel 6
■ DM Channel 7

➔ **Reserved Memory Size [Disabled]**

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

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

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

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

➔ **64K** 54KB reserved for legacy ISA devices

5.5 Boot

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

BIOS Menu 13: Boot

5.5.1 Boot Settings Configuration

Use the Boot Settings Configuration menu (BIOS Menu 13) to configure advanced system boot options.

```
                    BIOS SETUP UTILITY
                         Boot

Boot Settings Configuration                    Allows BIOS to skip
                                               certain tests while
Quick Boot            [Enabled]                booting. This will
Quiet Boot            [Disabled]               decrease the time
Bootup Num-Lock       [On]                      needed to boot the
PS/2 Mouse Support    [Enabled]                system.




                                               ←→     Select Screen
                                               ↑↓     Select Item
                                               +-     Change Option
                                               F1     General Help
                                               F10    Save and Exit
                                               ESC    Exit



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```

BIOS Menu 14: Boot Settings Configuration

➔ **Quick Boot [Enabled]**

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

➔ **Disabled**   No POST procedures are skipped

➔ **Enabled**   DEFAULT   Some POST procedures are skipped to decrease the system boot time

➔ **Boot From LAN Support [Disabled]**

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

➔ **Disabled** (Default) Cannot be booted from a remote system through the LAN

➔ **Enabled** (Default) Can be booted from a remote system through the LAN

➔ **Quiet Boot [Disabled]**

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

➔ **Disabled** DEFAULT Normal POST messages displayed

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

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

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

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

➔ **Keep Current** The system displays normal information during system boot.

➔ **Bootup Num-Lock [On]**

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

➔ **Off** Does not enable the keyboard Number Lock automatically. To

use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

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

➔ **PS/2 Mouse Support [Enabled]**

Use the **PS/2 Mouse Support** option adjusts PS/2 mouse support capabilities.

➔ **Disabled** PS/2 mouse support is disabled and prevented from using system resources.

➔ **Enabled** D EFAULT Allows the system to use a PS/2 mouse.

➔ **Auto** The system auto-adjusts PS/2 mouse support.

➔ **Wait For 'F1' If Error [Enabled]**

Use the **Wait For 'F1' if Error** option to specify how the system responds when the system detects an error on boot up.

➔ **Disabled** If there is an error when booting up, the system does not wait for user intervention but continues to boot up in the operating system. Only use this setting if there is a known reason for a BIOS error to appear. An example would be a system administrator must remote boot the system. The computer system does not have a keyboard currently attached.

➔ **Enabled**   DEFAULT   If there is an error during boot up, the system waits for a user to press "F1" and enter the BIOS to rectify the problem. The BIOS can then be adjusted to the correct settings.

➔ **Hit 'DEL' Message Display [Enabled]**

Use the **Hit "DEL" Message Display** option to specify whether the instruction to hit the delete button to enter BIOS during POST appears or not.

➔ **Disabled**   No message displayed during POST

➔ **Enabled**   DEFAULT   Displays "**Press DEL to run Setup**" message in POST

➔ **Interrupt 19 Capture [Disabled]**

Use the **Interrupt 19 Capture** option to allow optional ROMs such as network controllers to trap BIOS interrupt 19.

➔ **Disabled**   DEFAULT   Does not allow optional ROM to trap interrupt 19

➔ **Enabled**   Allows optional ROM to trap interrupt 19

5.5.2 Boot Device Priority

Use the **Boot Device Priority** menu (**BIOS Menu 15**) to specify the boot sequence from the available devices. Possible boot devices may include:

- 1st FLOPPY DRIVE
- HDD
- CD/DVD

```
                    BIOS SETUP UTILITY
                         Boot

Boot Device Priority                        Specifies the boot
                                            sequence from the
1st Boot Device        [USB:MITSUMI USB FD] available devices.
2nd Boot Device        [CD/DVD:PS-TEAC DV-]
3rd Boot Device        [USB:JetFlash TS1GJ] A device enclosed in
                                            parenthesis has been
                                            disabled in the
                                            corresponding type
                                            menu.


                                            ←→    Select Screen
                                            ↑↓    Select Item
                                            +-    Change Option
                                            F1    General Help
                                            F10   Save and Exit
                                            ESC   Exit


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```

BIOS Menu 15: Boot Device Priority Settings

5.5.3 Hard Disk Drives

Use the **Hard Disk Drives** menu to specify the boot sequence of the available HDDs. When the menu is opened, the HDDs connected to the system are listed as shown below:

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

NOTE:

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

The boot sequence from the available devices is selected. If the "**1st Drive**" option is selected a list of available HDDs is shown. Select the first HDD the system boots from. If the "**1st Drive**" is not used for booting this option may be disabled.
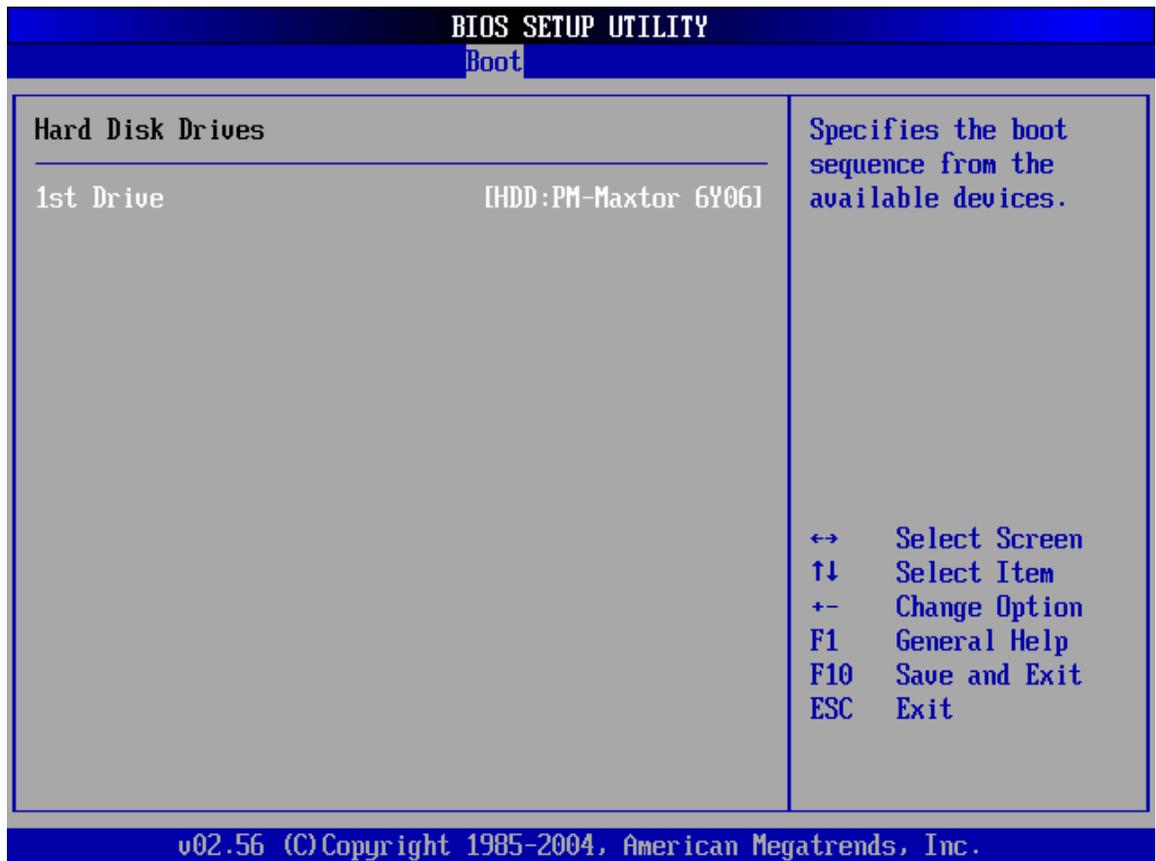
BIOS Menu 16: Hard Disk Drives

5.5.4 Removable Drives

Use the **Removable Drives** menu (**BIOS Menu 17**) to specify the boot sequence of the available FDDs. When the menu is opened, the FDDs connected to the system are listed as shown below:

- 1st Drive   [1st FLOPPY DRIVE]
- 2nd Drive   [2nd FLOPPY DRIVE]

 NOTE:

> Only the drives connected to the system are shown. For example, if only one FDD is connected only "**1st Drive**" is listed.

The boot sequence from the available devices is selected. If the "**1st Drive**" option is selected a list of available FDDs is shown. Select the first FDD the system boots from. If the "**1st Drive**" is not used for booting this option may be disabled.

BIOS Menu 17: Removable Drives

5.5.5 CD/DVD Drives

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

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

 NOTE:

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

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

```
                    BIOS SETUP UTILITY
                         Boot

 CD/DVD Drives                              Specifies the boot
 ──────────────────────────────────────    sequence from the
 1st Drive                [CD/DVD:PS-SONY CD-]  available devices.




                                            ←→    Select Screen
                                            ↑↓    Select Item
                                            +-    Change Option
                                            F1    General Help
                                            F10   Save and Exit
                                            ESC   Exit


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```

BIOS Menu 18: CD/DVD Drives

5.6 Security

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


```
                        BIOS SETUP UTILITY
  Main   Advanced   PCIPnP   Boot   Security   Chipset   Exit

  Security Settings                              Install or Change the
  ─────────────────────────                     password.
  Supervisor Password :Not Installed
  User Password        :Not Installed

  Change Supervisor Password
  Change User Password
  Clear User Password

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

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```

BIOS Menu 19: Security

➔ **Change Supervisor Password**

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

➔ Change User Password

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

➔ Boot Sector Virus Protection [Disabled]

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

➔ **Disabled** (Default) Disables the boot sector virus protection

➔ **Enabled** Enables the boot sector virus protection

5.7 Chipset

Use the **Chipset** menu (**BIOS Menu 20**) to access the NorthBridge and SouthBridge configuration menus

WARNING!

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

```
                        BIOS SETUP UTILITY
  Main    Advanced   PCIPnP    Boot    Security   Chipset   Power    Exit

  Advanced Chipset Settings                        Configure North Bridge
                                                   features.
  WARNING: Setting wrong values in below sections
           may cause system to malfunction.

  ▶ North Bridge Configuration
  ▶ South Bridge Configuration



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

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```

BIOS Menu 20: Chipset

5.7.1 Northbridge VIA CN400 Configuration

The Northbridge VIA CN400 Configuration menu (BIOS Menu 20) configures the Northbridge chipset.
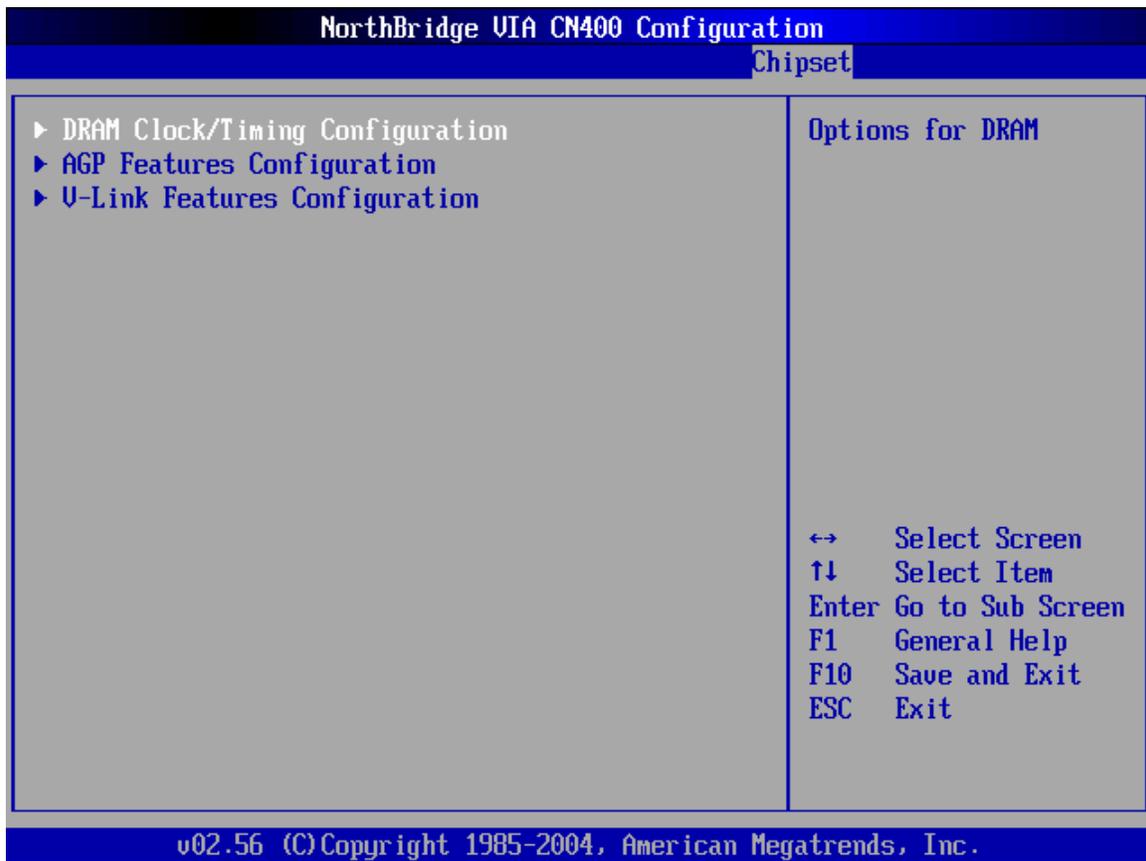
BIOS Menu 21:Northbridge Chipset Configuration

The Northbridge VIA CN400 Configuration BIOS menu has three submenus

- ■ DRAM Clock/Timing Configuration
- ■ AGP Features Configuration
- ■ V-LINK Features Configuration

The **Northbridge VIA CN400** Configuration BIOS menu has a single configurable option:

5.7.1.1 DRAM Clock/Timing Configurations

The DRAM Clock/Timing Configuration menu (BIOS Menu 20) configures the DRAM settings.

```
                 DRAM Frequency/Timing Configuration
                                            Chipset

 DRAM Timing                    [Auto By SPD]          Options

                                                   Manual
                                                   Auto By SPD
                                                   Turbo
                                                   Ultra




                                                   ←→    Select Screen
                                                   ↑↓    Select Item
                                                   +-    Change Option
                                                   F1    General Help
                                                   F10   Save and Exit
                                                   ESC   Exit


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```
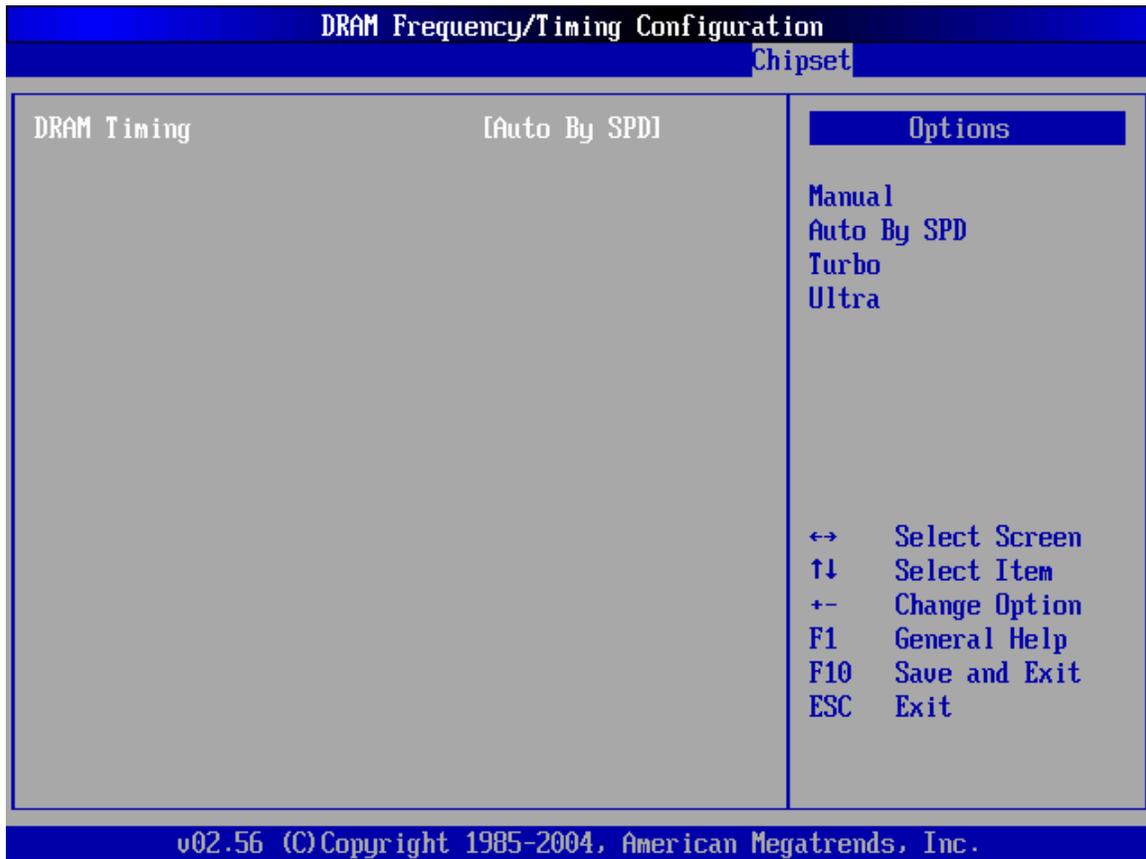
BIOS Menu 22: DRAM Clock/Timing Configuration

➔ **DRAM Frequency [Auto]**

The **DRAM Frequency** option specifies the DRAM frequency or allows the system to automatically detect the DRAM frequency.

➔ **200MHz**   Sets the DRAM frequency to 200MHz

➔ **266MHz**   Sets the DRAM frequency to 266MHz

➔ **333MHz**   Sets the DRAM frequency to 333MHz

➔ **Auto**   (Default)   Automatically selects the DRAM frequency

➔ **DRAM Timing by SPD [Auto by SPD]**

The **Configure DRAM Timing by SPD** determines if the system uses the SPD *(*Serial Presence Detect) EEPROM to configure the DRAM timing. The SPD EEPROM contains all necessary DIMM specifications the including speed of the individual components such as CAS 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 DIMMs on boot-up and then adjust the memory timing parameters accordingly.

➔ **Manual**   DRAM timing parameters can be manually set
using the DRAM sub-items

➔ **Auto by SPD**   (Default)   DRAM timing parameter are set according to
the DRAM Serial Presence Detect (SPD)

➔ **Turbo**

➔ **Ultra**

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

- ◼ SDRAM CAS# Latency [2.5]
- ◼ SDRAM Bank Interleave [Disabled]
- ◼ Precharge to Active (Trp) [4T]
- ◼ Active to Precharge (Tras) [9T]
- ◼ Active to CMD (Trcd) [4T]
- ◼ REF to ACT/REF to REF(Trfc) [15T]
- ◼ ACT (0) ti ACT (1) (Trrd) [3T]

➔ **DRAM Command Rate [2T Command]**

➔ **2T Command**   (Default)

➔   **1T Command**

5.7.1.2 AGP Features Configuration

The AGP Features Configuration menu (BIOS Menu 20) configures the AGP settings.

```
                         AGP Features Configuration
                                                     Chipset

Primary Graphics Adapter          [AGP]                      Options

VGA Frame Buffer Size             [64MB]          PCI
Select Display Device             [CRT]           AGP
Panel Type                        [2 -1024x768x18]




                                                 ↔     Select Screen
                                                 ↑↓    Select Item
                                                 +-    Change Option
                                                 F1    General Help
                                                 F10   Save and Exit
                                                 ESC   Exit

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```

BIOS Menu 23: AGP Features Configuration

➔   **Primary Graphics Adapter [AGP]**

The **Primary Graphics Adapter** selects the graphics adapter the system uses.

➔   **PCI**   (Default)   PCI graphics adapter is used

➔   **AGP**   AGP graphics adapter is used

➔ **VGA Frame Buffer Size [64MB]**

The **VGA Frame Buffer** Size BIOS option sets the memory buffer size for the VGA display. The following buffer sizes can be set:

- None
- 8MB
- 16MB
- 32MB
- 64MB

➔ **Panel Type [07]**

The **Panel Type** option specifies the device the panel type. The user is prompted to enter number between 0 and 15.

5.7.1.3 V-Link Features Configuration

The V-Link Features Configuration menu (BIOS Menu 20) configures the V-Link Features.


```
                    V-Link Features Configuration
                                        Chipset

V-Link mode selection       [Auto]              Options
V-Link 8X Supported         [Enabled]
                                            Auto
                                            Mode 0
                                            Mode 1
                                            Mode 2
                                            Mode 3
                                            Mode 4



                                         ↔    Select Screen
                                         ↑↓   Select Item
                                         +-   Change Option
                                         F1   General Help
                                         F10  Save and Exit
                                         ESC  Exit


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```
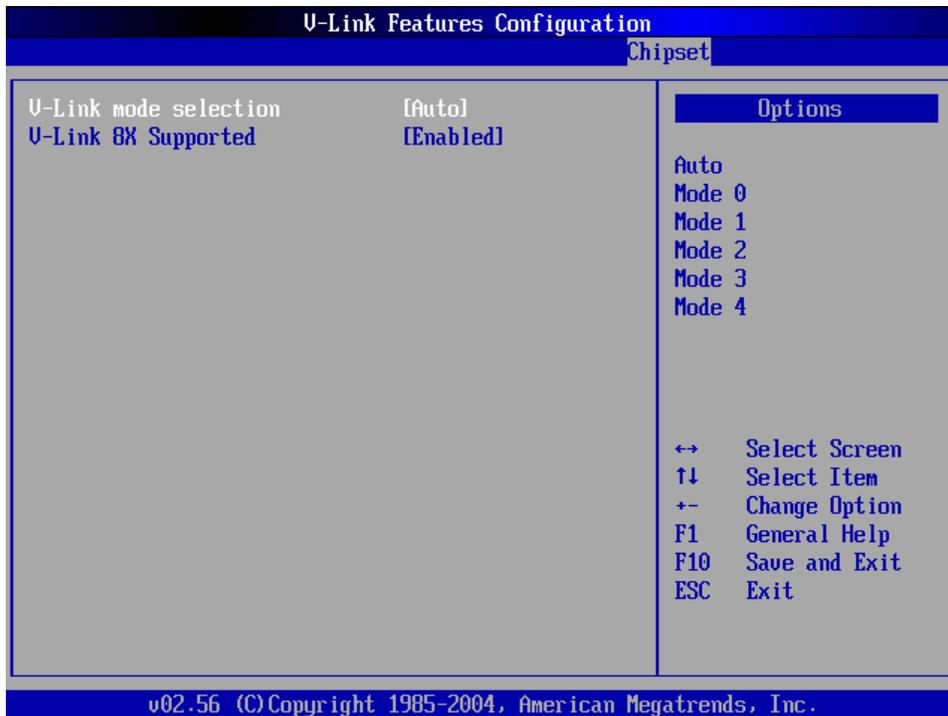
BIOS Menu 24: V-Link Configuration

➔ **V-Link Mode Selection [Auto]**

The **V-Link Mode Selection** controls V-Link bus operation. The following options are available.

- Auto
- Mode 0
- Mode 1
- Mode 2
- Mode 3
- Mode 4

➔ **V-Link Data 8X Supported [Disabled]**

The **V-Link Data 8X Support** controls the data transmission speed between the Northbridge and Southbridge chipsets.

➔ **Disabled**   V-LINK Data 8x transmissions not supported and the transmission speed between the integrated Northbridge and Southbridge decreases.

➔ **Enabled**   (Default)   V-LINK Data 8x transmissions supported and the transmission speed between the integrated Northbridge and Southbridge increases.

5.7.2 SouthBridge Configuration

The **SouthBridge Configuration** menu (BIOS Menu 25) configures the southbridge chipset.

```
                    VIA VT8237 South Chipset Configuration
                                          Chipset
OnBoard SATA-IDE              [SATA]                        Options
OnBoard AC'97 Audio          [Enabled]
Set Spread spectrum Function [Enabled]         Disabled
On Board Lan Function        [Enabled]         SATA
Boot From LAN Support        [Disabled]        RAID




                                               ↔    Select Screen
                                               ↑↓   Select Item
                                               +-   Change Option
                                               F1   General Help
                                               F10  Save and Exit
                                               ESC  Exit


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```
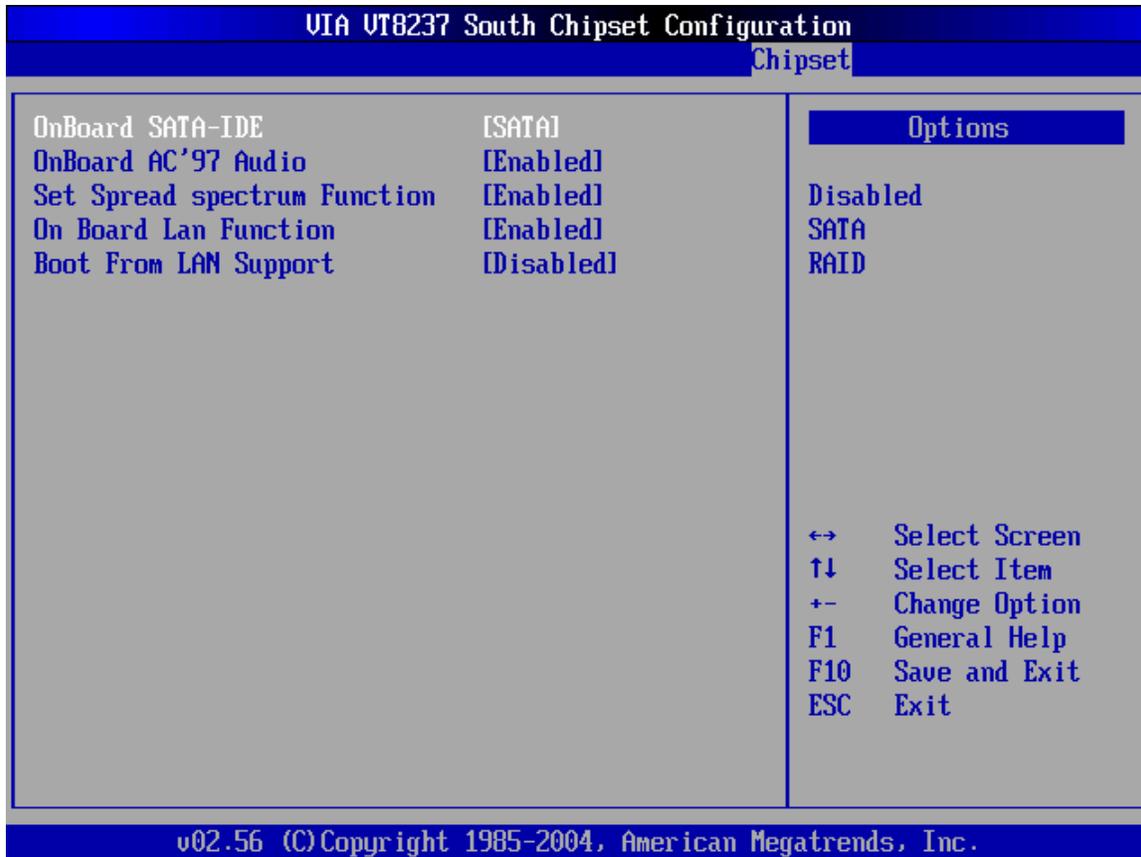
BIOS Menu 25:SouthBridge Chipset Configuration

➔ **Onboard SATA-IDE**

Use the **Onboard SATA-IDE** option to set the onboard SATA controller

➔ **Disabled**   DEFAULT   The onboard SATA controller is disabled

➔ **Native Mode**   The SATA controller is set as an IDE device with an ID at 0181h

➔ **Raid Mode**   The SATA controller is set as a RAID device with an ID at 0181h

➔ **OnBoard AC'97 [Enabled]**

The **OnBoard AC97 Audio** enables or disables the AC'97 CODEC.

➔   **Disabled**   The onboard AC'97 is disabled

➔   **Enabled**   (Default)   The onboard AC'97 automatically detected and enabled

➔   **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

➔   **OnBoard Lan Function [Enabled]**

The **OnBoard Lan Function** option enables or disables the onboard LAN.

➔   **Enabled**   (Default)   The onboard LAN device automatically detected and enabled

➔   **Disabled**   Onboard LAN device manually disabled

➔   **Boot From LAN Function [Disabled]**

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

➔   **Disabled**   (Default)   Cannot be booted from a remote system through the LAN

➔   **Enabled**   (Default)   Can be booted from a remote system through the LAN

5.8 Exit

Use the **Exit** menu (**BIOS Menu 26**) to load default BIOS values, optimal failsafe values and to save configuration changes.

```
                        BIOS SETUP UTILITY
  Main     Advanced    PCIPnP    Boot    Security    Chipset    Exit

  Exit Options                                    Exit system setup
  ─────────────                                   after saving the
                                                  changes.
  Save Changes and Exit
  Discard Changes and Exit                        F10 key can be used
  Discard Changes                                 for this operation.

  Load Optimal Defaults
  Load Failsafe Defaults



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


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```

BIOS Menu 26:Exit

➔ **Save Changes and Exit**

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

➔ **Discard Changes and Exit**

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

➔ **Discard Changes**

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

➔ **Load Optimal Defaults**

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

➔ **Load Failsafe Defaults**

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

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IEI® Technology, Corp.

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

> The contents 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 WAFER-LUKE board has a number of software drivers. All the drivers can be found on the CD that came with the WAFER-LUKE. To install the drivers please follow the instructions in the sections below

6.2 Connecting a CD Drive

To install the drivers onto the system, a CD drive must be connected. The easiest way to do this is with a USB CD drive. The USB CD drive is connected to one of the USB connectors on the front panel. At the same a USB mouse should also be connected to the USB drive so navigation through the CD is simplified. Once the CD drive and mouse have been connected, turn on the system, insert the CD and begin the installation process as described below.

6.3 4-in-1 Driver Installation

To install four drivers all at once, please follow the steps below:

Step 1: Insert the CD into the system that contains the WAFER-LUKE board.

Step 2: Select "WAFER-LUKE". (See **Figure 6-1**)
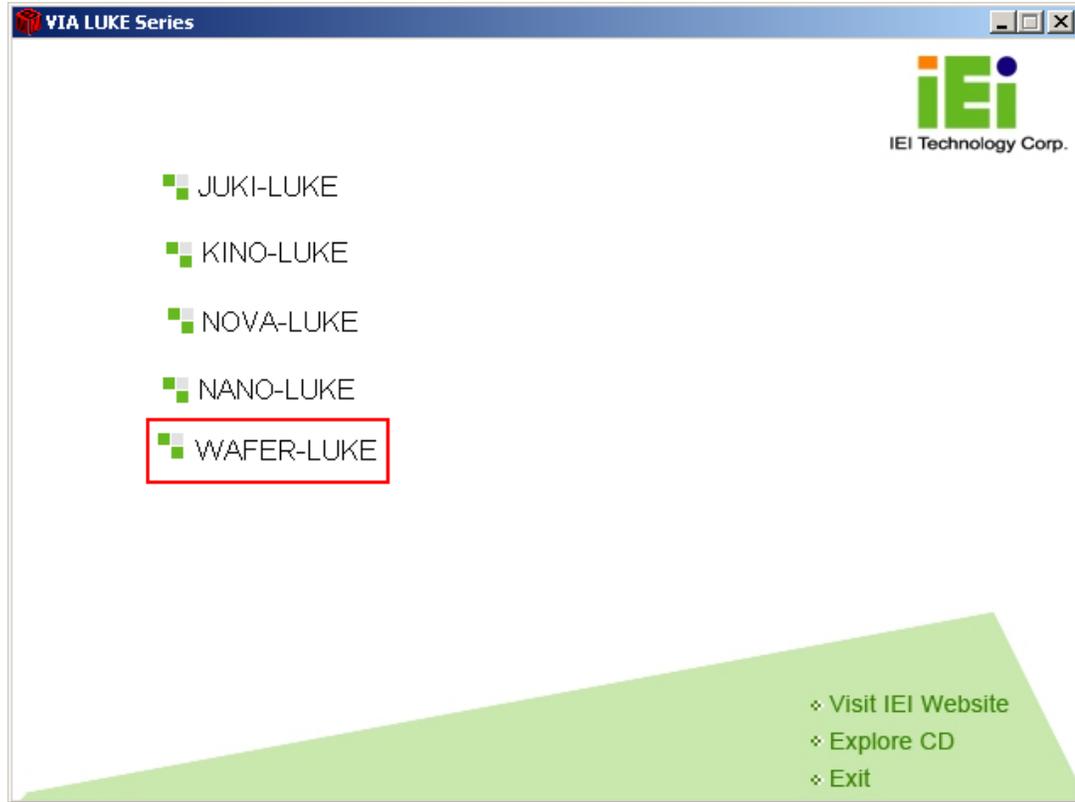
Figure 6-1: Access the WAFER-LUKE Drivers

Step 3: Select the "VIA 4 in 1" option shown in **Figure 6-2**.
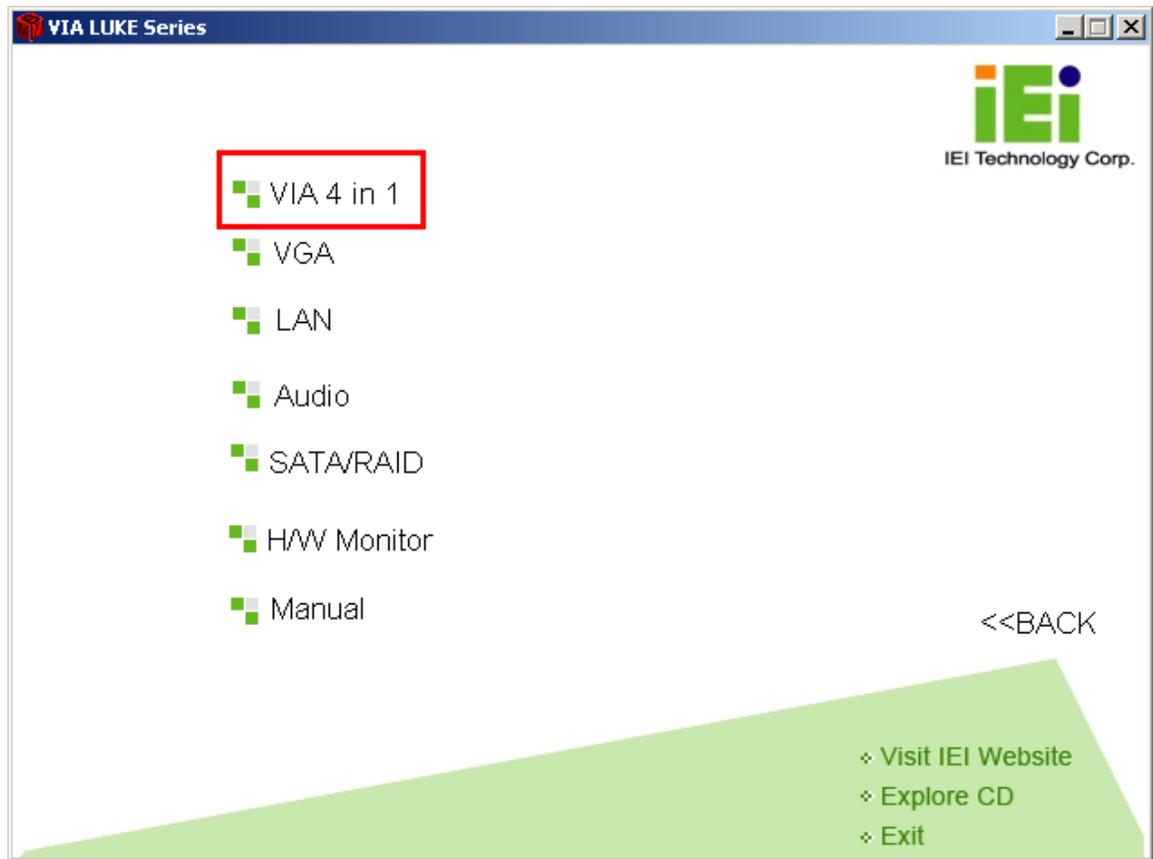
Figure 6-2: Setup Utility Icon

Step 4: Select the "4 in 1" icon shown in **Figure 6-3**.
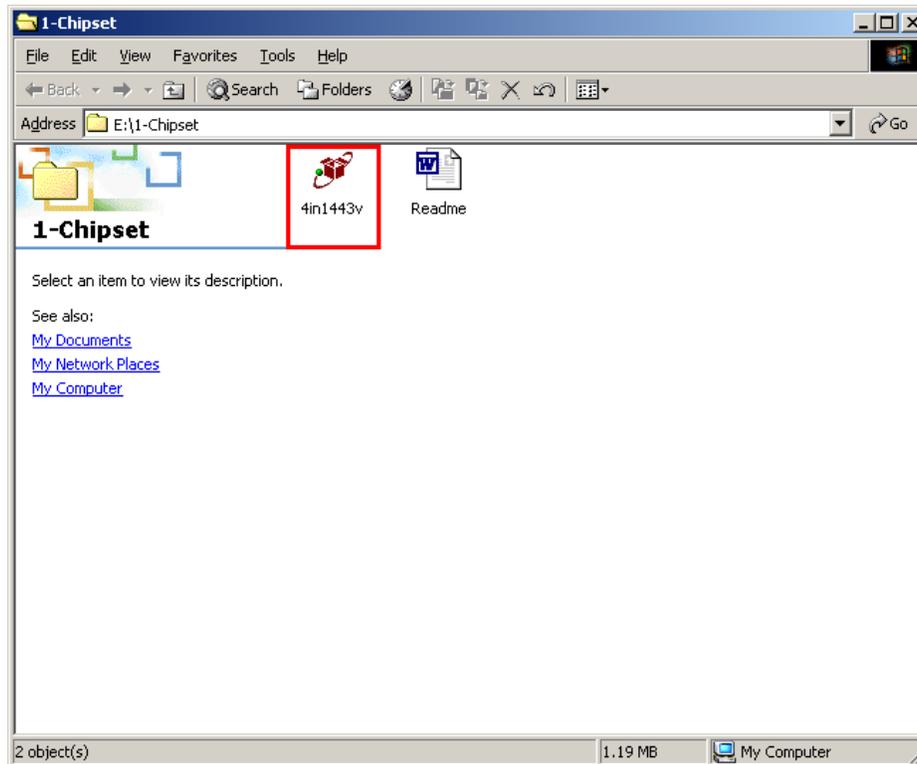
Figure 6-3: 4 in 1 Icon

Step 5: The installation program begins to initialize. After the initialization process a welcome screen shown in **Figure 6-4** appears. Click "**NEXT**" to continue the installation.
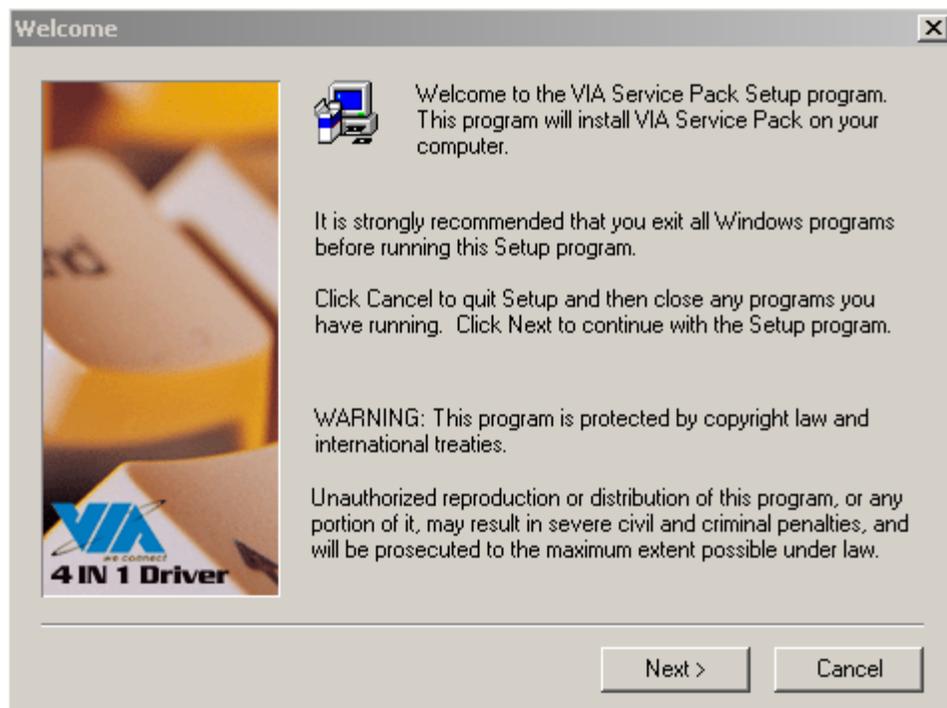
Figure 6-4: VIA Chipset Driver Installation Welcome Screen

Step 6:   The "Readme" in **Figure 6-5** appears. Click "NEXT" to continue the installation.
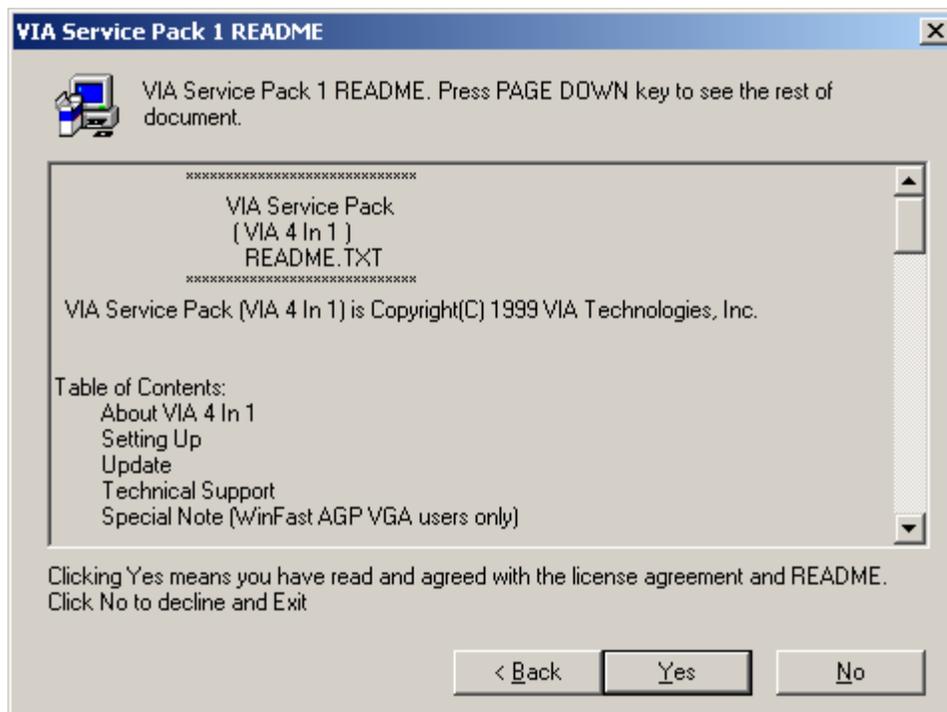
Figure 6-5: Readme Information

Step 7: The user is then prompted to select the installation type. A user can select
"**Normal Installation**" or "**Quick Installation**." (See **Figure 6-6**) Select the
installation type and click "**NEXT**" to continue the installation.
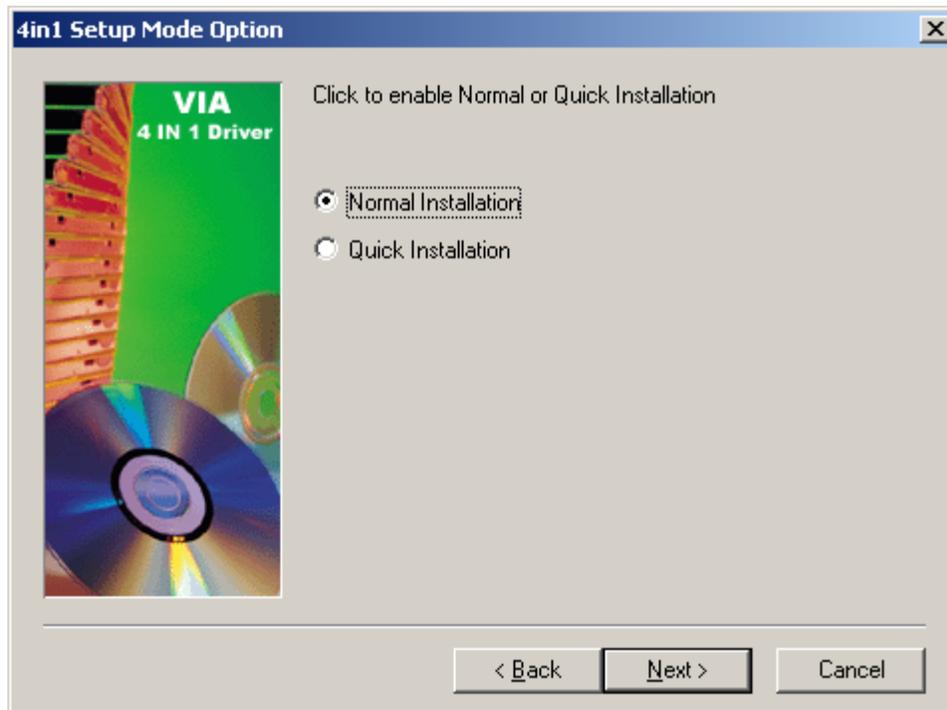
Figure 6-6: VIA Chipset Driver Installation Type

Step 8: The setup then prompts the user (see **Figure 6-7**) to select the drivers that must be installed on the system. There are three drivers:

- VIA PCI IDE Bus Driver
- AGP Driver (AGP3.0 Supported)
- VIA INF Driver 2.20A

Select the drivers that must be installed on the system. Click "**NEXT**" to continue the installation.
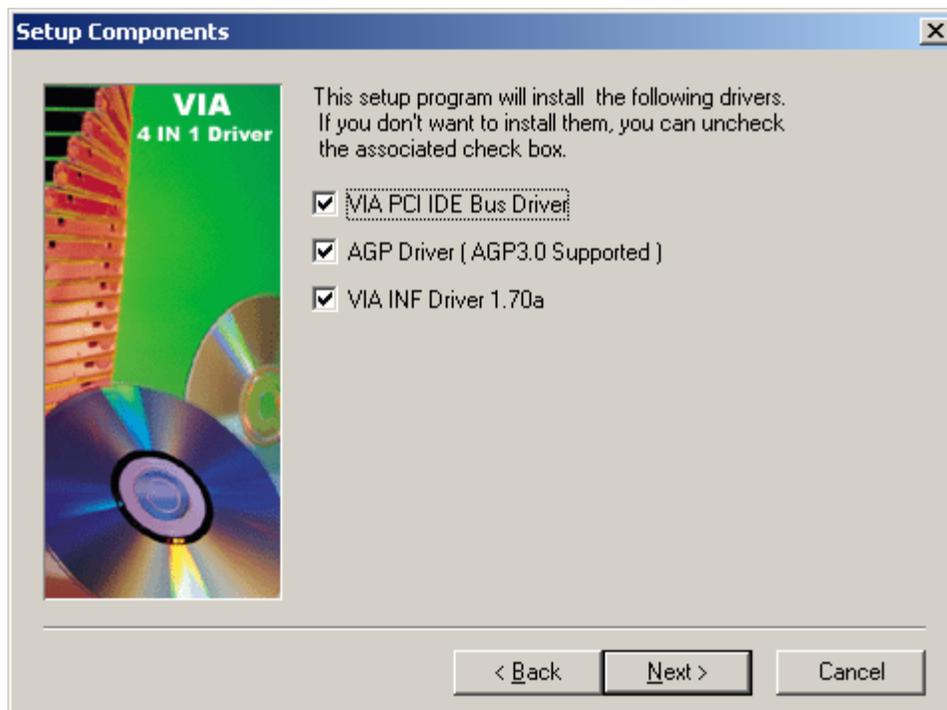
Figure 6-7: Driver Selection

Step 9:   The setup then prompts the user (see **Figure 6-8**) if the VIA PCI IDE Bus Driver

must be installed on the system. Select install or uninstall. Click "**NEXT**" to

continue the installation.
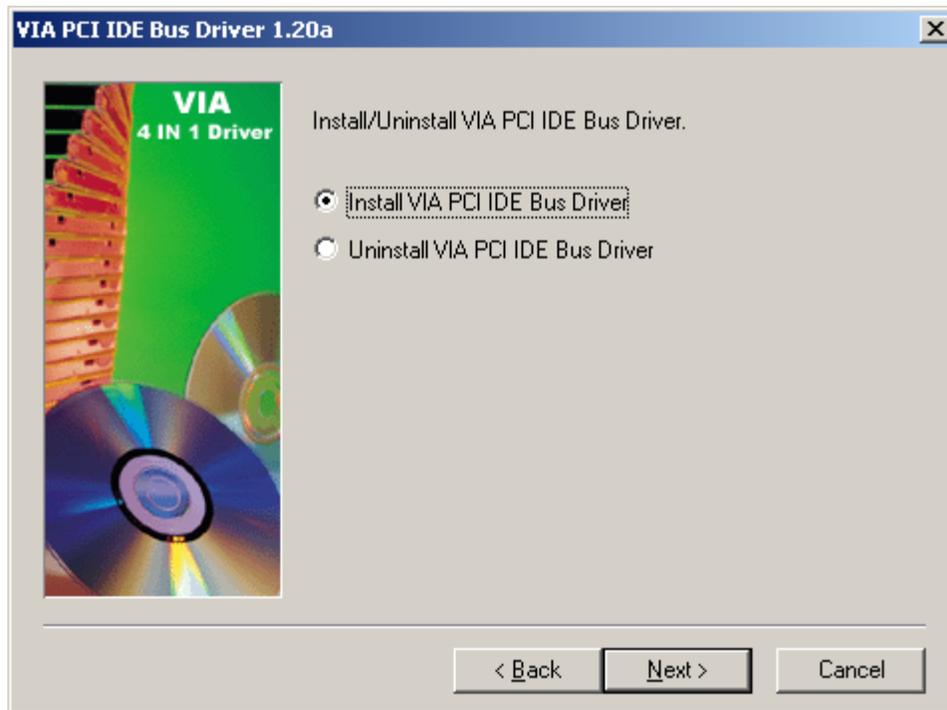
Figure 6-8: VIA PCI IDE Bus Driver Selection

Step 10: In a similar way users are prompted to select if the AGP driver and the IDE driver must be installed. If these drivers must be installed, then select the driver and click "**Next.**"

Step 11: Once all the drivers are selected, 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 6-9**) Select when the computer must be restarted. Click "**OK**" to exit the installation program.
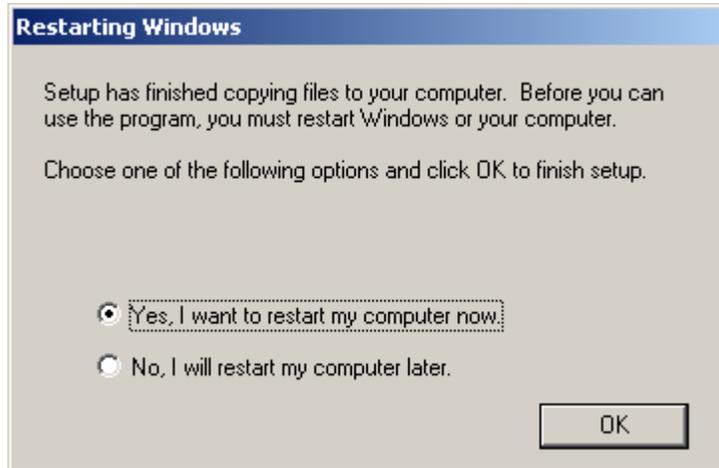
Figure 6-9: Restart the Computer

6.4 RealTek Audio Driver Installation

To install the RealTek LAN driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the WAFER-LUKE board.

Step 2: Select "WAFER-LUKE". (See **Figure 6-22**)

Figure 6-10: Access the WAFER-LUKE Drivers

Step 3: Select the "LAN" option shown in Figure 6-11.
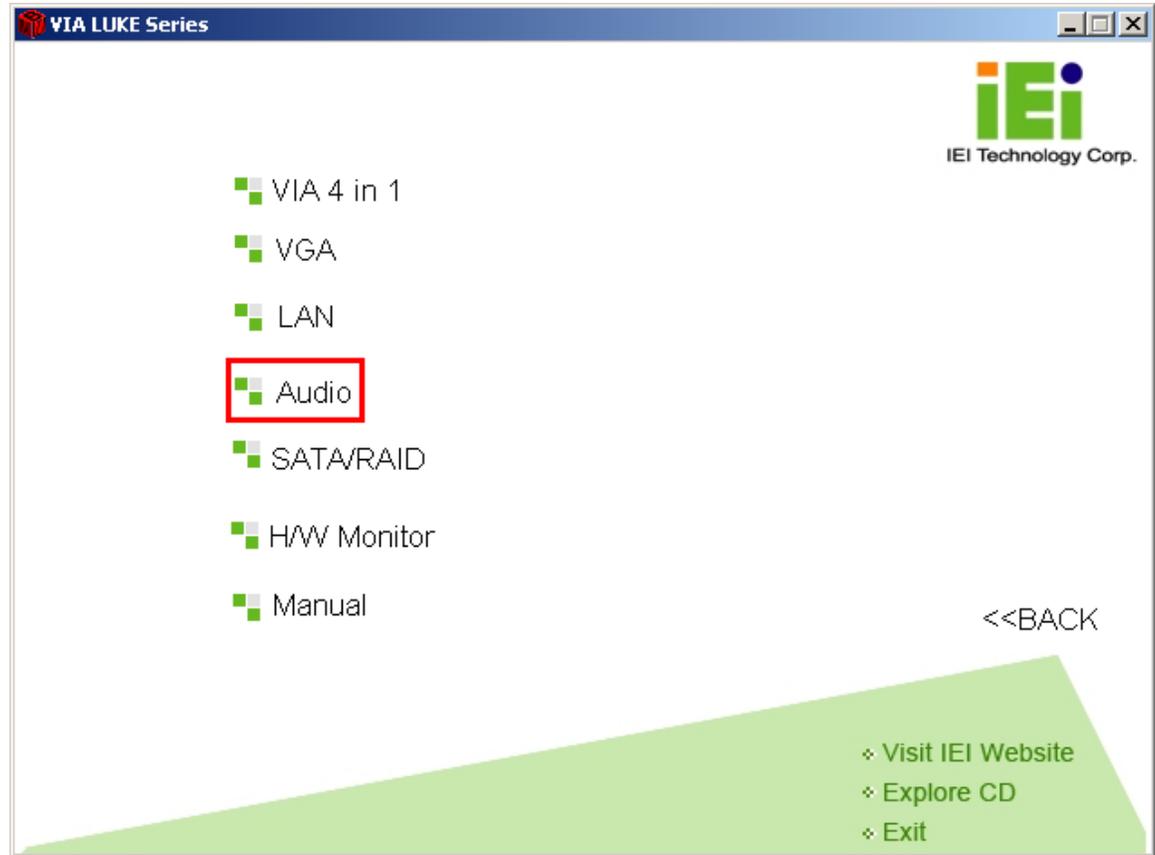
Figure 6-11: Select Audio

Step 4: Select the "RealTek" icon shown in **Figure 6-12**.
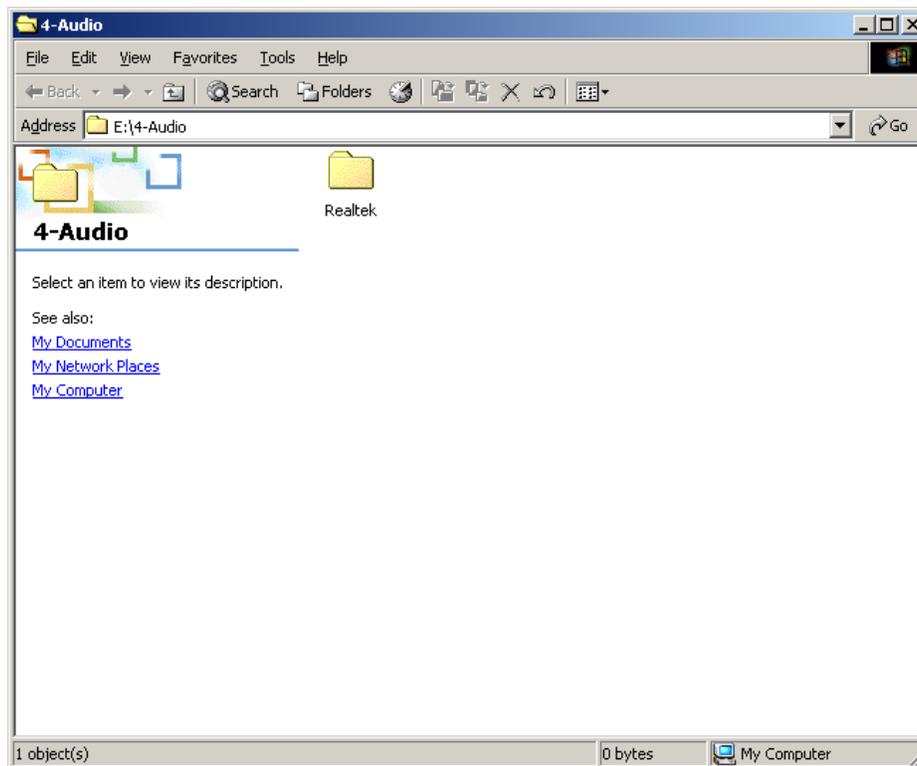
Figure 6-12: RealTek

Step 5: Select the ALC655 Icon shown in **Figure 6-13**.
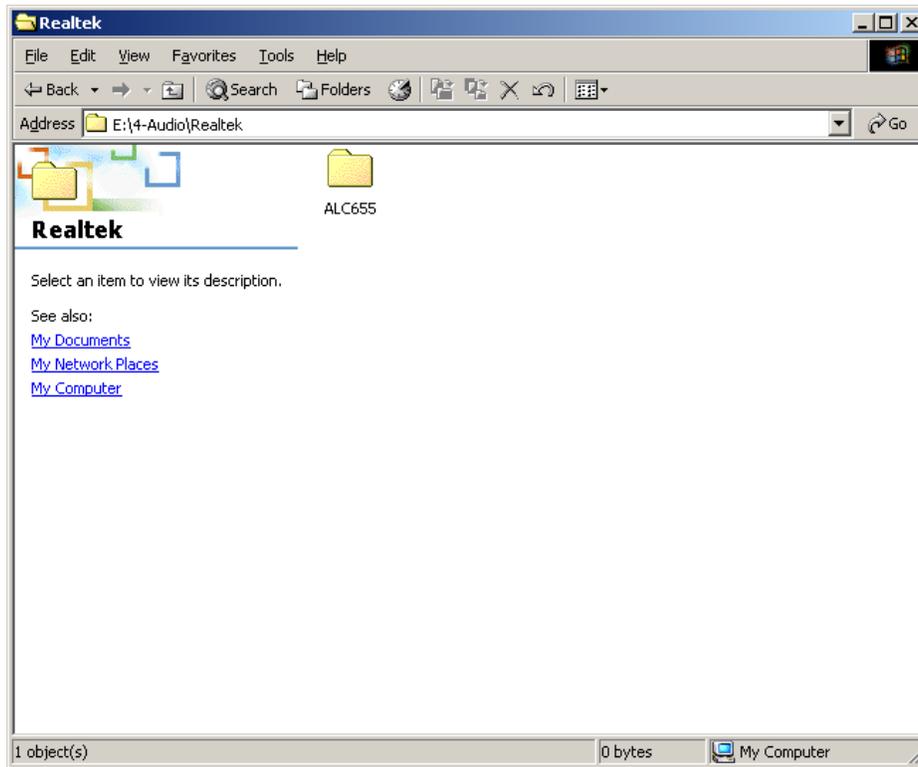
Figure 6-13: ALC655 Icon

Step 6: Select the WDM_A391 icon shown in **Figure 6-14**.
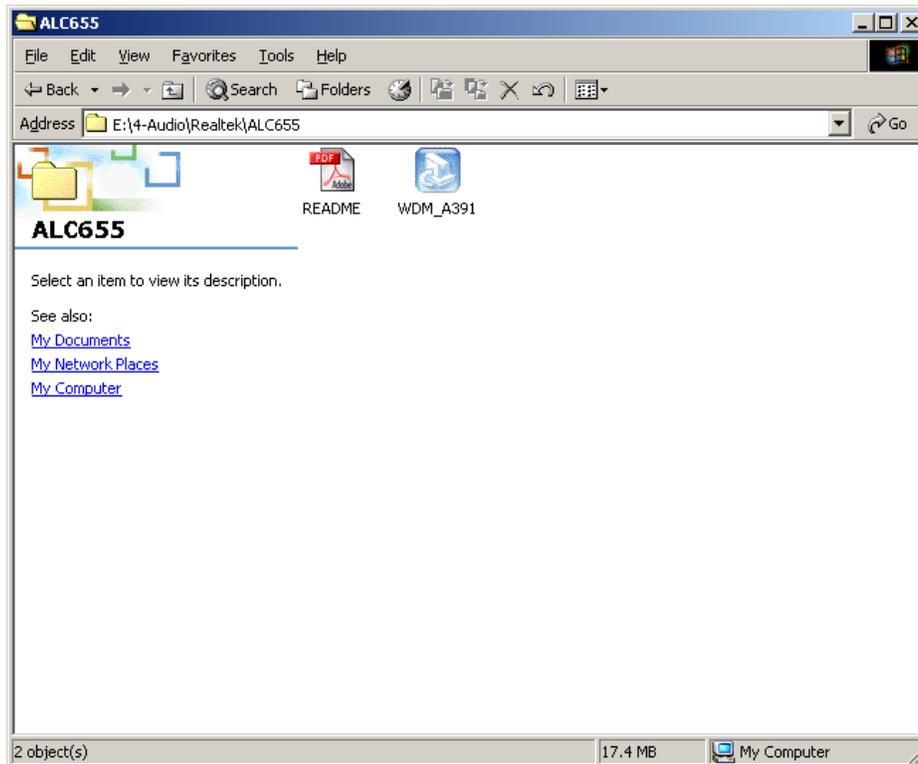
Figure 6-14: Audio Setup Icon

Step 7: Once the double click the **Setup** icon is clicked, the install shield wizard for the audio driver starts. See **Figure 6-15.**

Figure 6-15: Audio Driver Install Shield Wizard Starting

Step 8: The RealTek Audio Setup prepares the install shield to guide you through the rest of the setup process. See **Figure 6-16**.
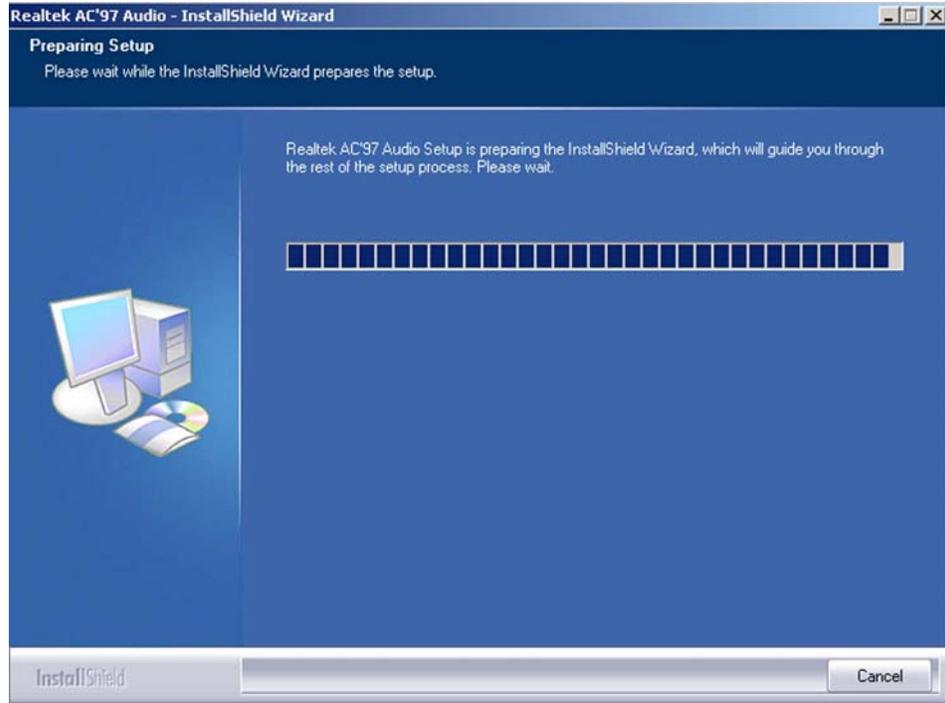
Figure 6-16: Audio Driver Setup Preparation

Step 9: After install shield is prepared, the welcome screen shown in **Figure 6-17**

appears. To continue the installation process, click the "**NEXT**" button. The install

shield starts to configure the new software as shown in **Figure 6-18**.
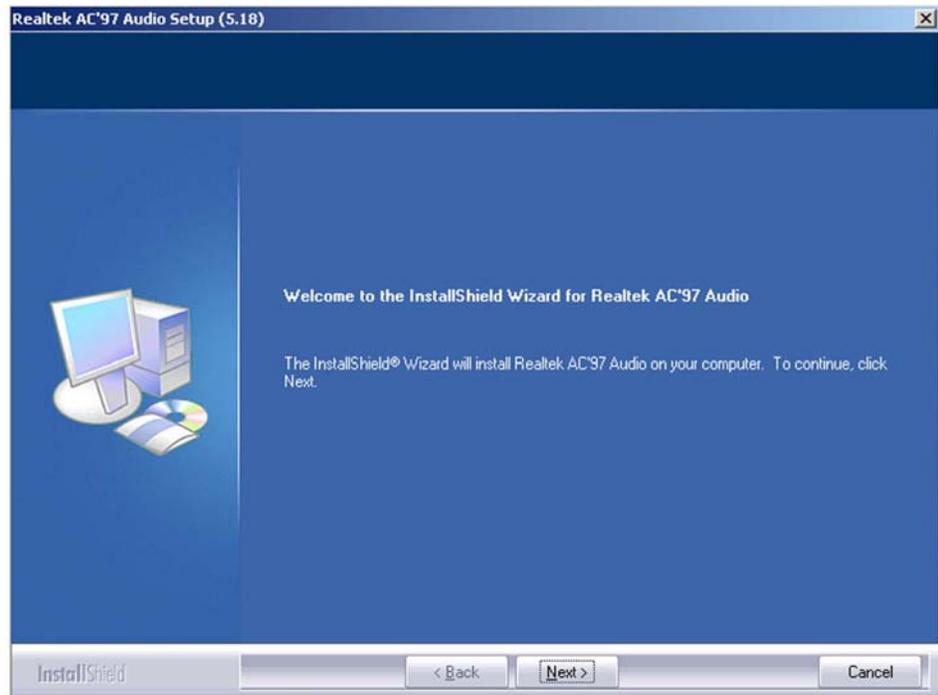
Figure 6-17: Audio Driver Welcome Screen
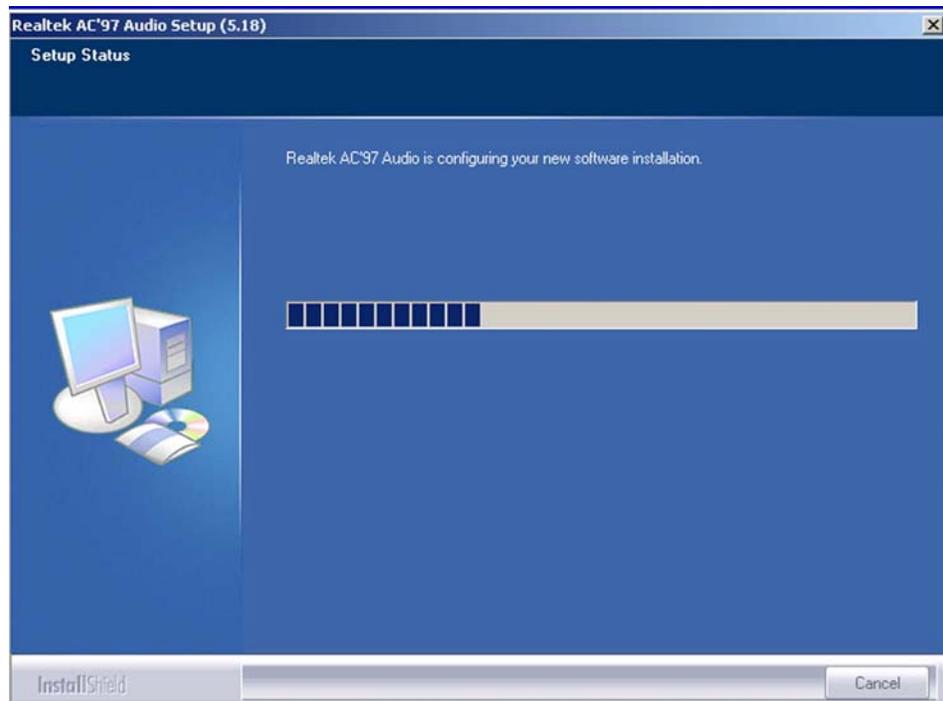
Figure 6-18: Audio Driver Software Configuration

Step 10: At this stage the "**Digital Signal Not Found**" screen shown in **Figure 6-19**

appears. To continue the installation process, click the "**YES**" button. The
installation notice shown below appears.

Figure 6-19: Audio Driver Digital Signal

Step 11: At this stage the clicking the "YES" button in Figure 6-19 appears, the installation
of the driver begins. See Figure 6-20.
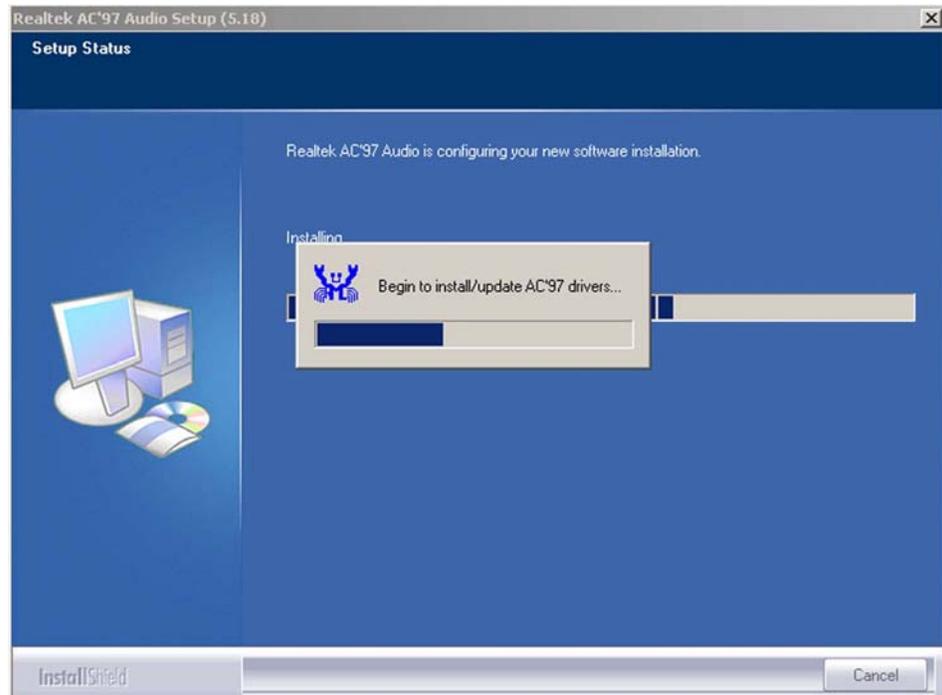
Figure 6-20: Audio Driver Installation Begins

Step 12: After the driver installation process is complete, a confirmation screen shown in

Figure 6-21 appears
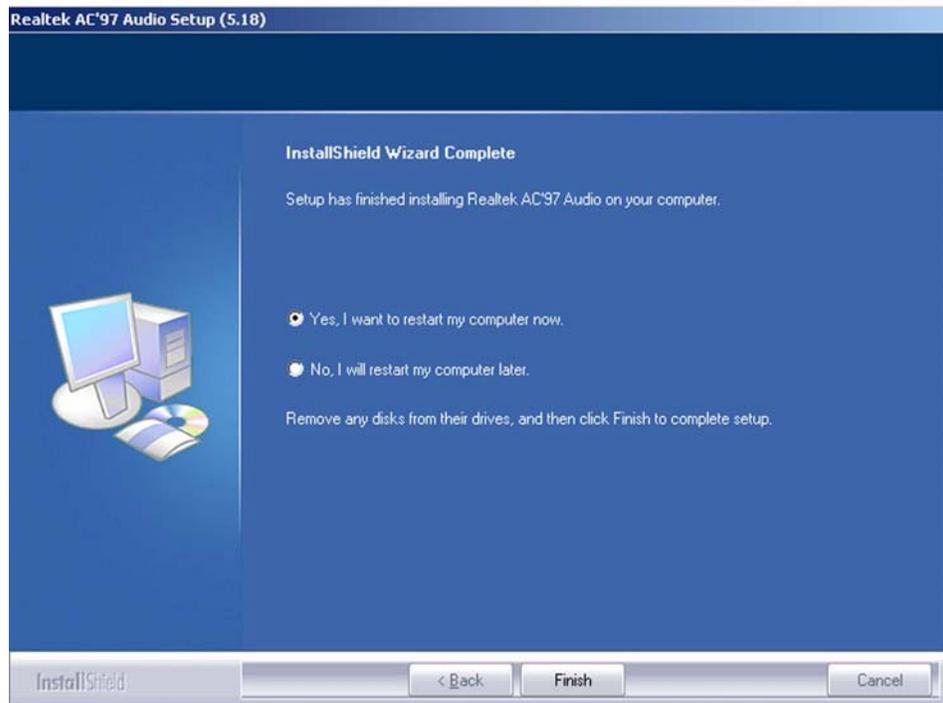
Figure 6-21: Audio Driver Installation Complete

Step 13: The confirmation screen shown in **Figure 6-21** allows you to restart the computer immediately after the installation is complete or to restart the computer later. For the settings to take effect the computer must be restarted. Once you have decided when to restart the computer, click the "**FINISH**" button.

6.5 LAN 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 WAFER-LUKE board.

Step 2: Select "WAFER-LUKE". (See **Figure 6-10**)
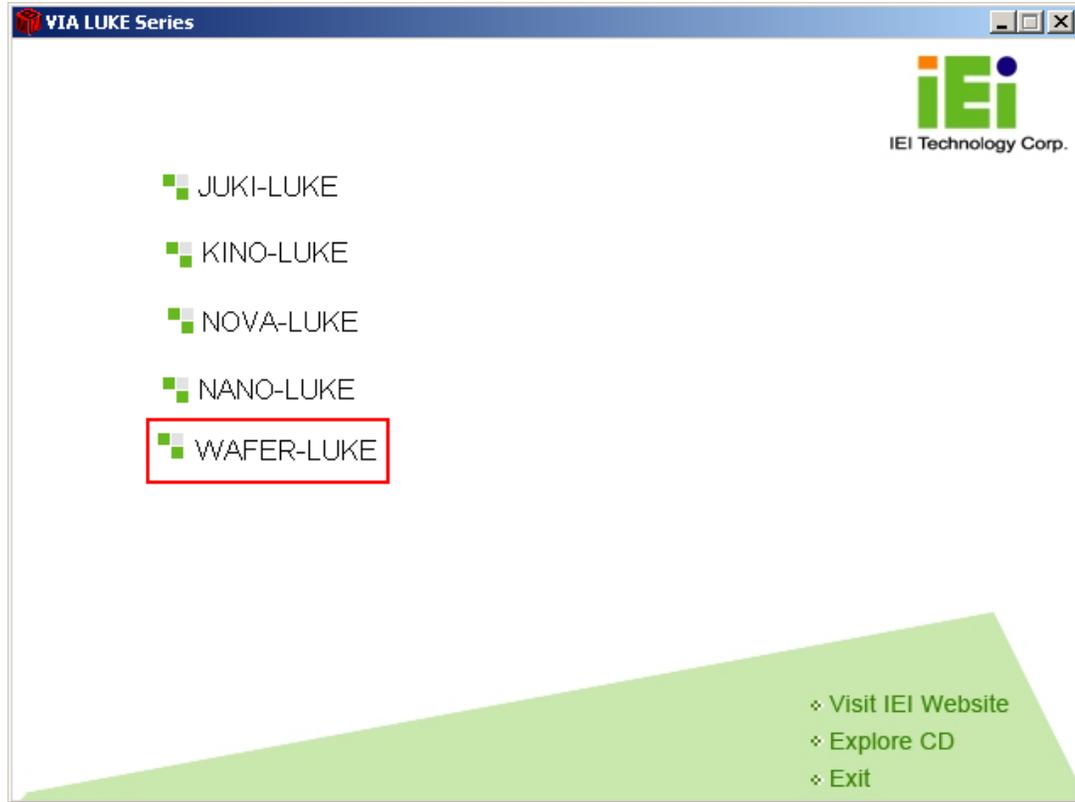
Figure 6-22: Access the WAFER-LUKE Drivers

Step 3:   Select "LAN" in the driver selection screen. See **Figure 6-23**.
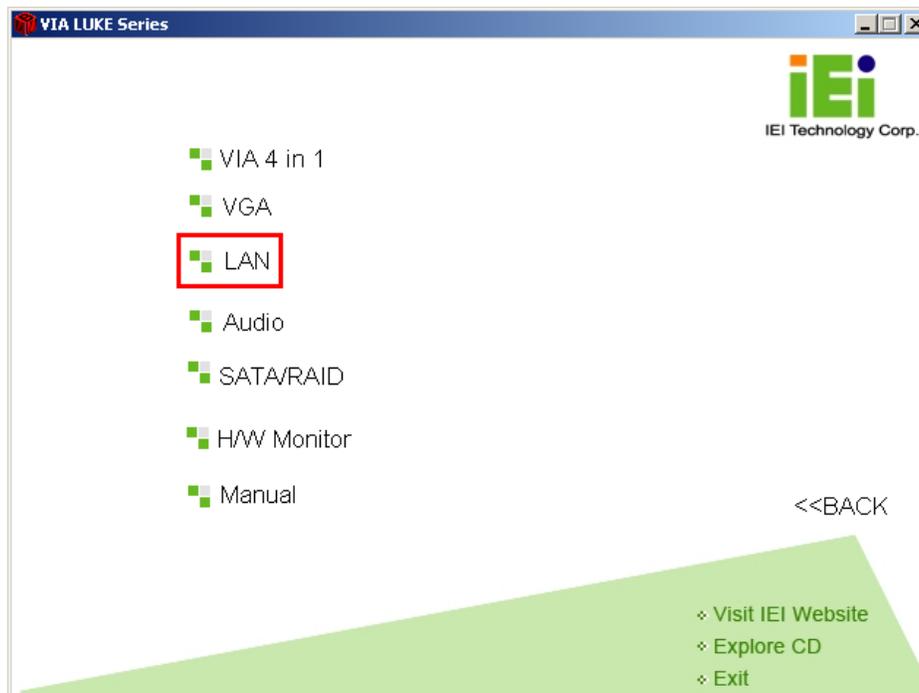
Figure 6-23: LAN Driver Menu Option

Step 4: Select the icon for the OS used in the system. See **Figure 6-24**.
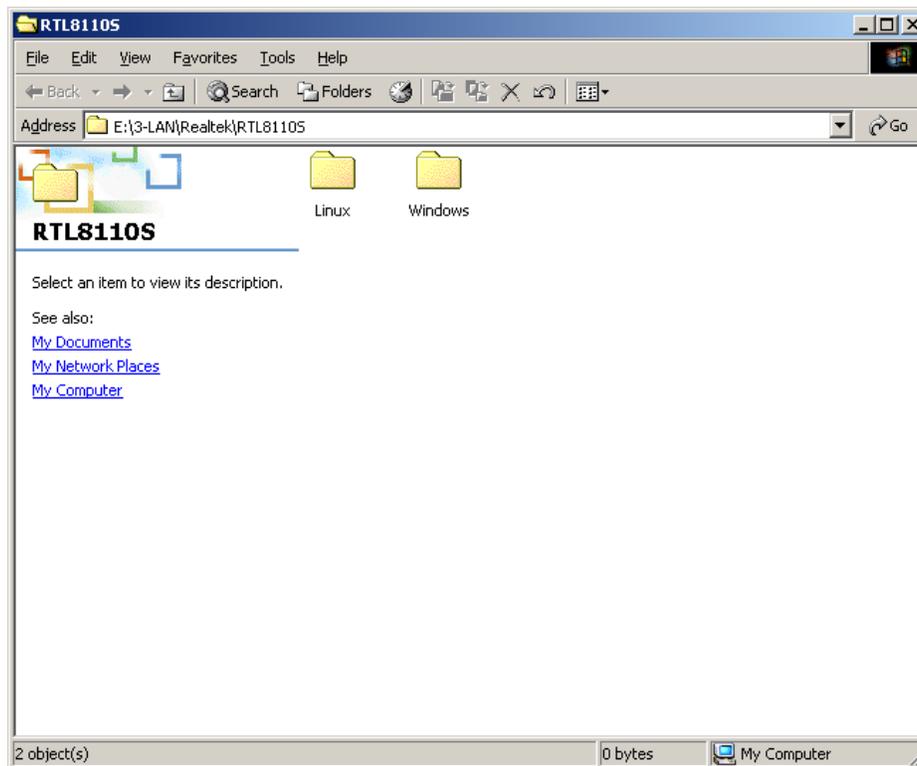
Figure 6-24: OS Icon

Step 5: Select the RealTek Setup Icon shown in **Figure 6-25**.
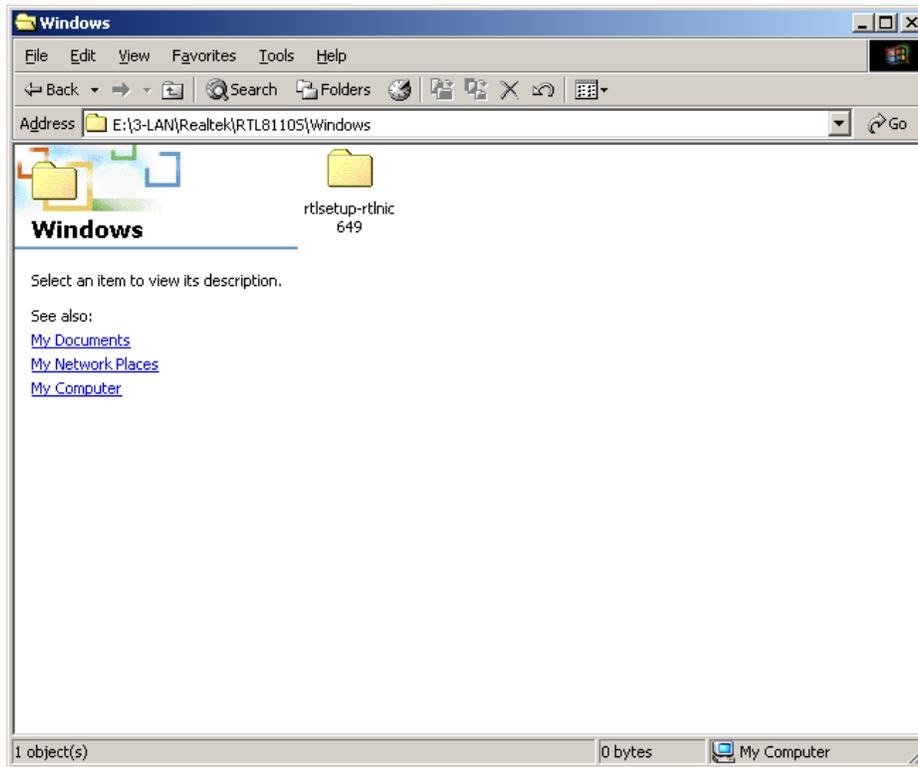
Figure 6-25: RealTek Setup Icon

Step 6: Select the Setup icon shown in **Figure 6-26**.
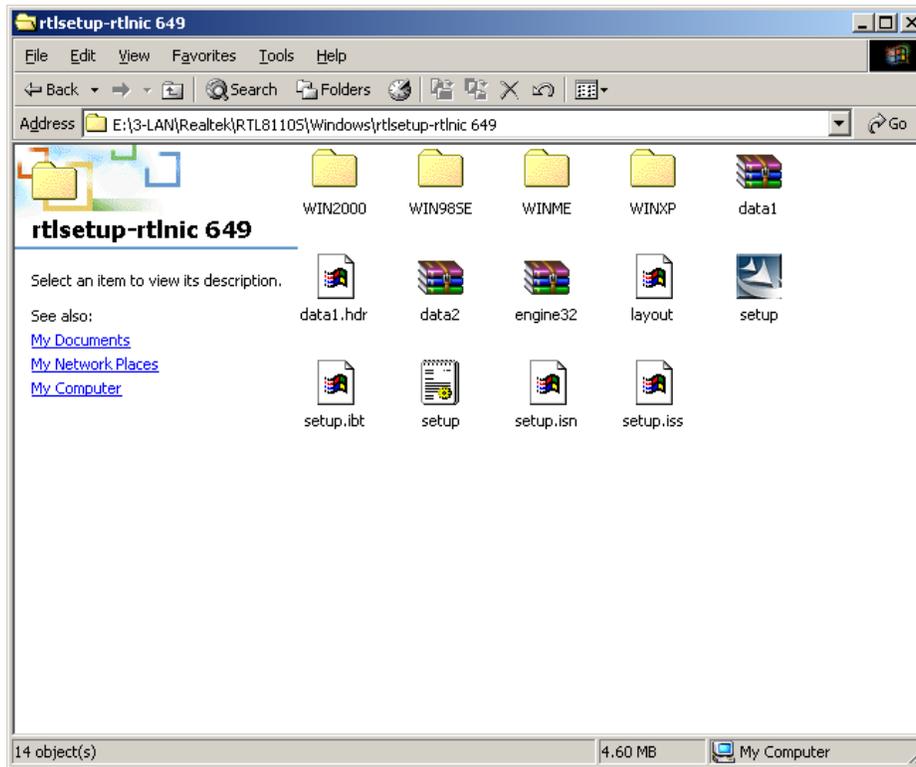
Figure 6-26: LAN Setup Icon

Step 7:   The welcome screen appears. Click "Next" to continue. See **Figure 6-27**.
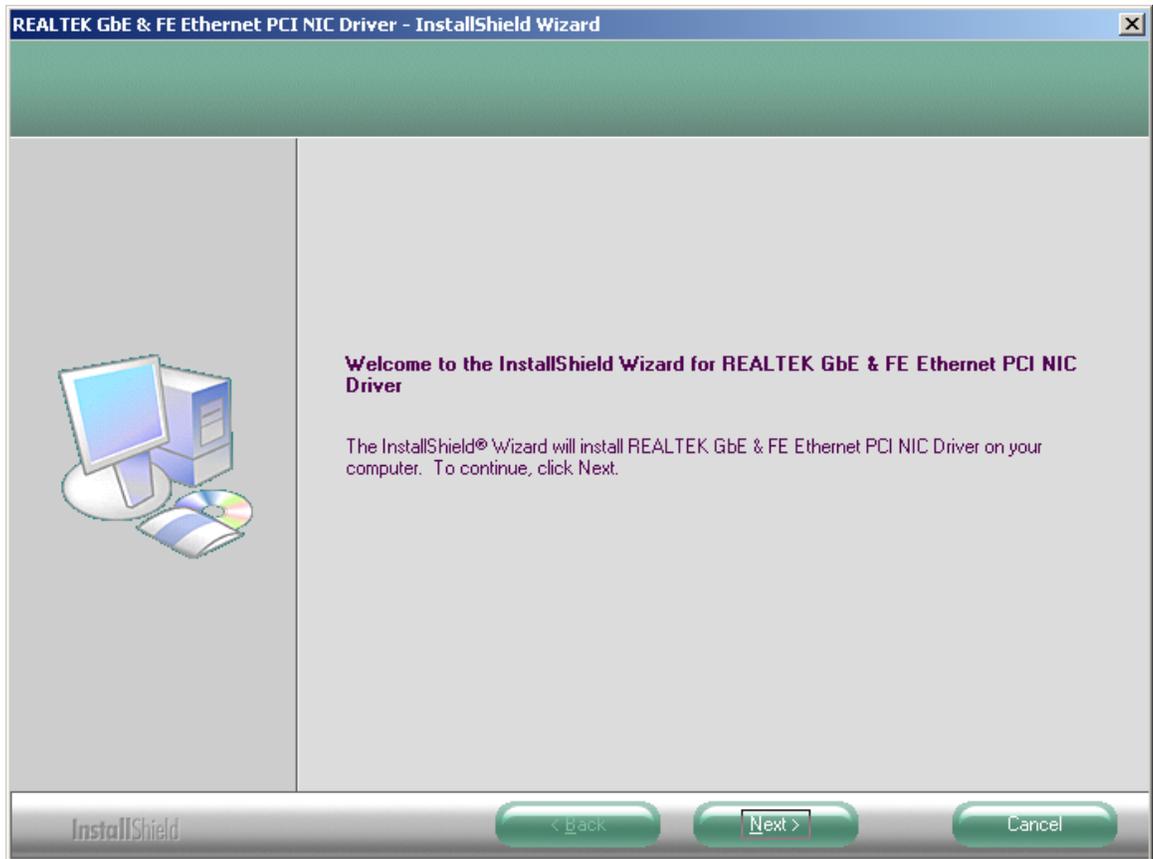
Figure 6-27: LAN Welcome Screen

Step 8: The program is initialized and the Install window appears. Click "Install" to

continue the installation process. See **Figure 6-28**.
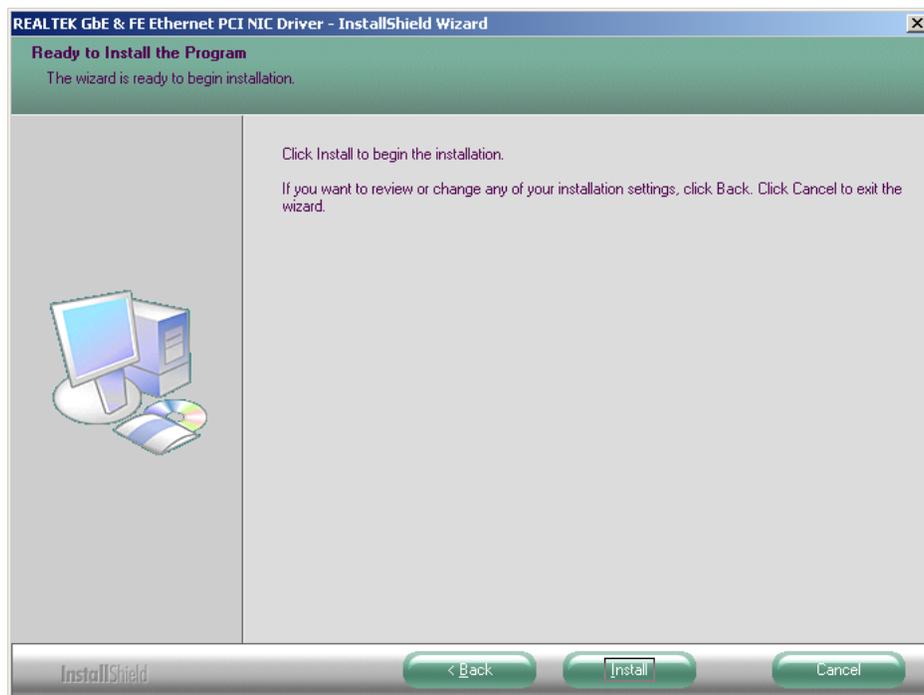
Figure 6-28: Install LAN

Step 9: The driver is installed. See Figure 6-29.
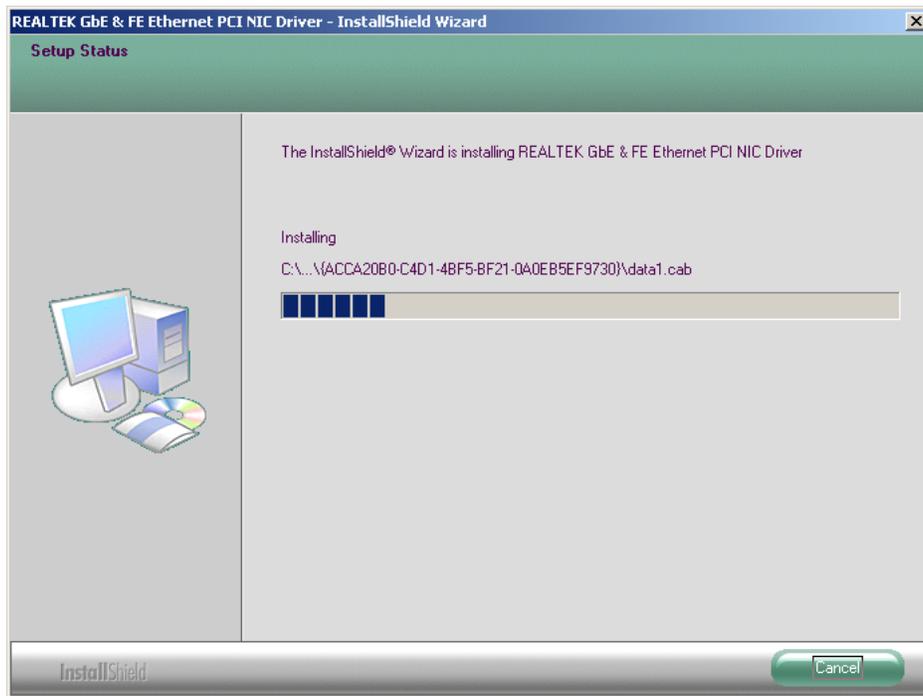
Figure 6-29: LAN Driver Installation

Step 10: The completed installation screen appears. Click "Finish" to exit the program.

See **Figure 6-30**.
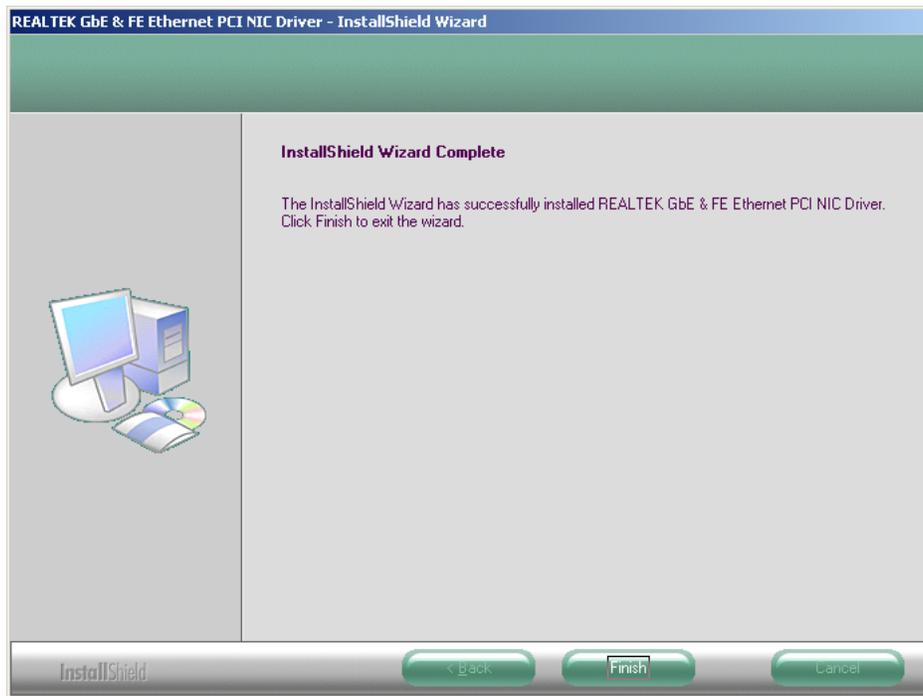
Figure 6-30: Exit LAN Driver Setup

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Appendix

A

BIOS Configuration Options

A.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in **Chapter 5**.

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Appendix

B

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 B-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

C

Address Mapping

C.1 IO 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	Graphics Controller
3C0-3DF	Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table C-1: IO Address Map

C.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 C-2: 1st MB Memory Address Map

C.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 C-3: IRQ Mapping Table

C.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 C-4: IRQ Mapping Table

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Appendix

D

External AC'97 Audio CODEC

D.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.

D.1.1 Accessing the AC'97 CODEC

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

D.1.2 Driver Installation

The driver installation has been described in Chapter 6

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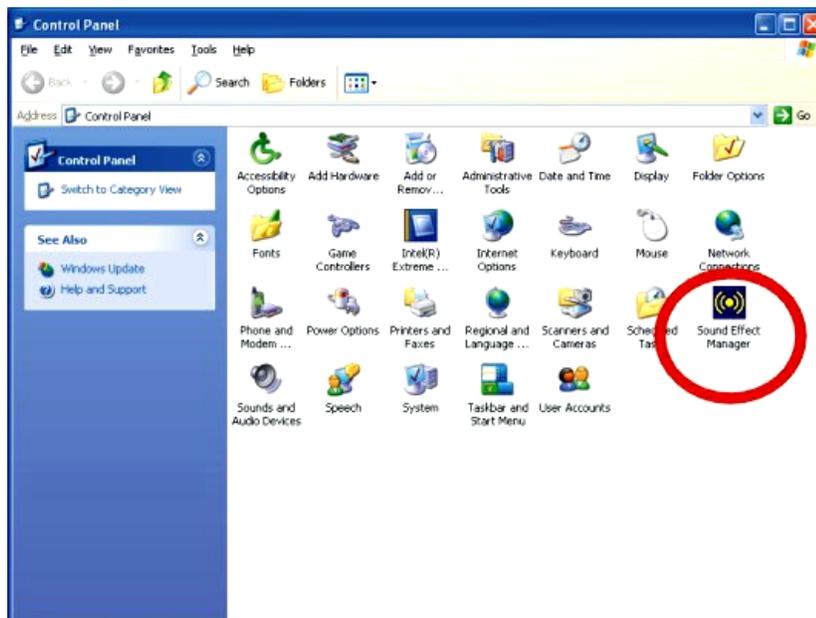
Figure D-1: Sound Effect Manager Control Panel

D.2 Sound Effect Configuration

D.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 **FigureeD-2**), or
- The Sound Effect Manager icon in the Control Panel (**FigureeD-3**).

Figure D-2: Sound Effect Manager Icon [Task Bar]
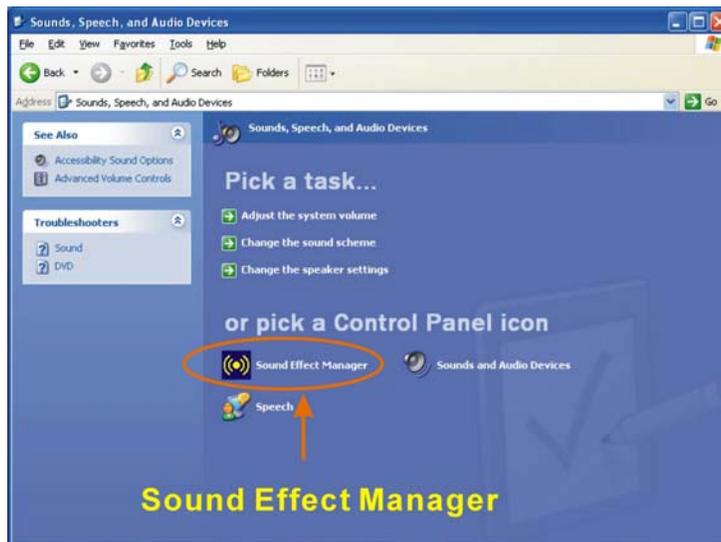
Figure D-3: Sound Effect Manager Icon [Control Panel]

Step 3: The sound effect manager appears. (See **FigureeD-4**)

WAFER-LUKE
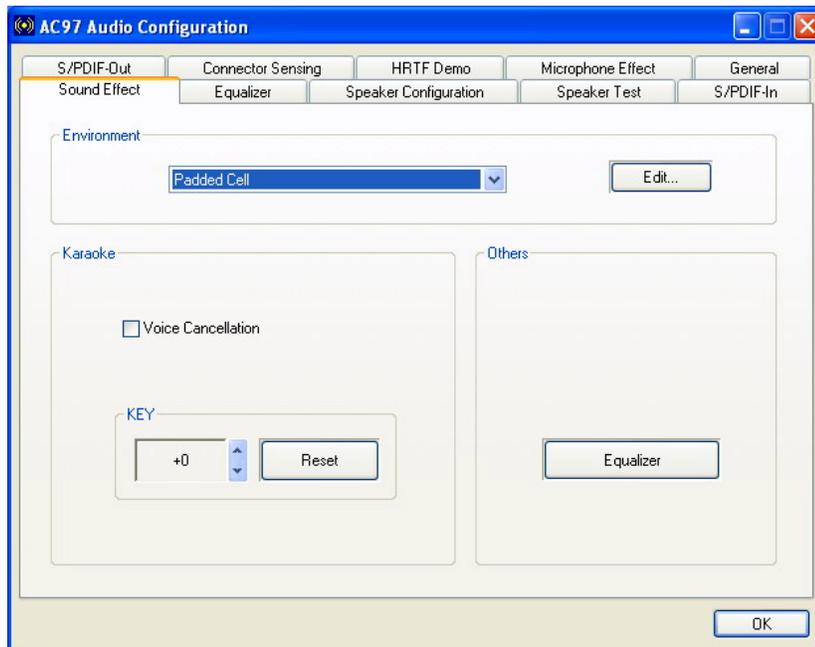
Figure D-4: Sound Effects Manager (ALC655)

![NOTE icon] **NOTE:**

The Sound Effect Manager shown 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.

D.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**.

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:

o Headphone

o Channel mode for stereo speaker output

o Channel mode for 4 speaker output

o Channel mode for 5.1 speaker output

o 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

E

VIA RAID

E.1 Introduction

The VIA SATA RAID can control serial ATA (SATA) disks. VIA RAID is 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.

E.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.

E.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

E.3 Installing the RAID Controller

To install the RAID controller using Windows or a later OS, 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 icon] **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: Make sure the target system is already installed on the floppy drive.

Step 3: Prepare a blank floppy disk

Step 4: Copy all files under \DRVDISK from the driver CD to the floppy disk

Step 5: Power on the target machine and boot from the Boot CD.

Step 6: Press "F6" when the prompt appears on the button line

Step 7: When a request appears asking for the floppy disk to be inserted, insert the prepared floppy disk into the floppy drive and press enter

Step 8: Select the correct items for the OS and RAID controller being installed. Each item shows the matching OS.

E.4 RAID Tool Access

To understand how to use the RAID tool please access the RAID HTML help file from the CD drive that came with the system. Insert the CD into the system and access the following directory.

■   [CD Drive]:\5-SATA RAID\VIA_RAID_V530C\RaidTool\Utility

The file name is "**raid_tool.html**"

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