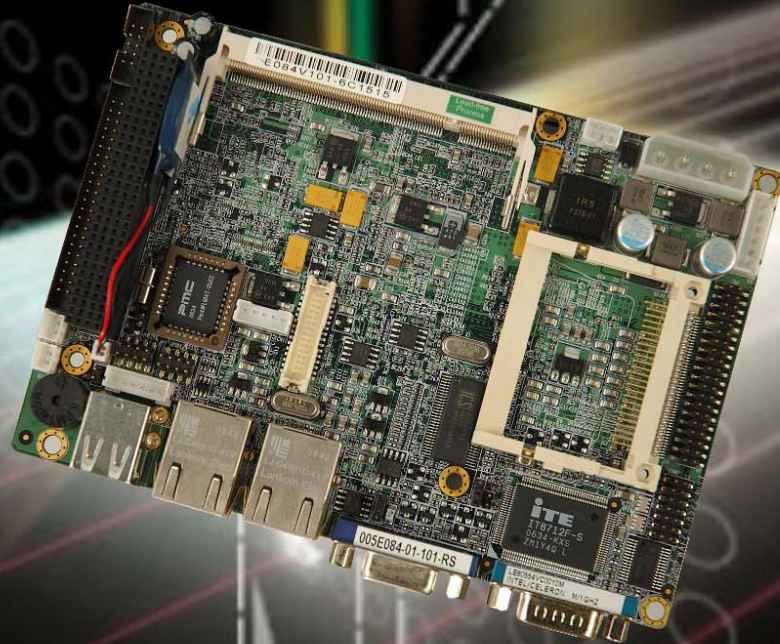




IEI Technology Corp .



MODEL: WAfer-8522

**3.5" SBC with ULV Intel® Celeron® M Processor
VGA/LVDS/TTL, Dual GbE, USB 2.0 and Audio
Fanless Design, Low Power Consumption**

User Manual

Rev. 1.0 March 2007



Revision

MODEL	WAFER-8522 Intel® Celeron® M Motherboard	
Revision Number	Description	Date of Issue
1.0	Initial release	March 2007

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Packing List

**NOTE:**

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the WAFER-8522 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

The items listed below should all be included in the WAFER-8522 package.

- 1 x WAFER-8522 single board computer
- 1 x Enclosure heat sink
- 1 x Audio cable
- 1 x IDE flat cable 44p/44p
- 1 x PS2 keyboard/mouse cable
- 1 x 4 COM port RS-232 cable
- 1 x Mini jumper pack
- 1 x Quick installation guide
- 1 x Utility CD

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

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Glossary

AC '97	Audio Codec 97	IDE	Integrated Data Electronics
ACPI	Advanced Configuration and Power Interface	I/O	Input/Output
APM	Advanced Power Management	ICH4	I/O Controller Hub 4
ARMD	ATAPI Removable Media Device	L1 Cache	Level 1 Cache
ASKIR	Shift Keyed Infrared	L2 Cache	Level 2 Cache
ATA	Advanced Technology Attachments	LCD	Liquid Crystal Display
BIOS	Basic Input/Output System	LPT	Parallel Port Connector
CFII	Compact Flash Type 2	LVDS	Low Voltage Differential Signaling
CMOS	Complementary Metal Oxide Semiconductor	MAC	Media Access Controller
CPU	Central Processing Unit	OS	Operating System
Codec	Compressor/Decompressor	PCI	Peripheral Connect Interface
COM	Serial Port	PIO	Programmed Input Output
DAC	Digital to Analog Converter	PnP	Plug and Play
DDR	Double Data Rate	POST	Power On Self Test
DIMM	Dual Inline Memory Module	RAM	Random Access Memory
DIO	Digital Input/Output	SATA	Serial ATA
DMA	Direct Memory Access	S.M.A.R.T	Self Monitoring Analysis and Reporting Technology
EIDE	Enhanced IDE	SPD	Serial Presence Detect
EIST	Enhanced Intel SpeedStep Technology	S/PDI	Sony/Philips Digital Interface
FFIO	Flexible File Input/Output	SDRAM	Synchronous Dynamic Random Access Memory
FIFO	First In/First Out	SIR	Serial Infrared
FSB	Front Side Bus	UART	Universal Asynchronous Receiver-transmitter
IrDA	Infrared Data Association	USB	Universal Serial Bus
HDD	Hard Disk Drive	VGA	Video Graphics Adapter

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Chapter

1

Introduction

1.1 WAFER-8522 Overview

The WAFER-8522 is a fanless single board computer using the Intel® Celeron® M processor with high performance and low power consumption. The WAFER-8522 is shipped with an enclosure heat sink for maximum heat dissipation. The WAFER-8522 also comes with an expansion PCI-104 slot which allows flexible implementations. The WAFER-8522 supports various peripheral device interfaces, including Ethernet ports, serial ports, USB 2.0 ports and VGA port. Multiple display support adds versatility to the system enabling system integrators and designers increased flexibility in selecting display panel options.

1.1.1 WAFER-8522 Board Variations

Four IEI WAFER-8522 models are available. The models are listed in Table 1-1.

WAFER-8522	CPU	Clock Speed— Ultra Low Voltage	Cashe	FSB	TPM
-1GZ-R10	Intel Celeron M	1 GHz	Zero cache	400 MHz	No
-600-R10	Intel Celeron M	600 MHz	512 KB L2 cache	400 MHz	No
T-1GZ-R10	Intel Celeron M	1 GHz	Zero cache	400 MHz	Yes
T-600-R10	Intel Celeron M	600 MHz	512 KB L2 cache	400 MHz	Yes

Table 1-1: WAFER-8522 Board Variations

1.1.2 WAFER-8522 Applications

The WAFER-8522 is designed for applications in the following areas:

- Kiosks and Point of Sales
- Restaurants
- Human Machine Interface (HMI) applications
- Marine, GPS and transportation applications
- Financial, retail and kiosk applications

1.1.3 WAFER-8522 Benefits

Some of the WAFER-8522 benefits include:

WAFER-8522 Motherboard

- Reduced hardware costs
- Reduced software costs
- Reduced maintenance costs
- Client crash prevention
- Central resource control
- Security protection

1.1.4 WAFER-8522 Features

Some of the WAFER-8522 features are listed below:

- 3.5" form factor
- RoHS compliant
- Fanless design
- ULV Intel® Celeron® M processor installed
- Digital dual-independent display functionality
- Two high performance gigabit Ethernet controllers on-board
- CPU and chipset on the solder side for easy system thermal control
- CompactFlash® card and PCI-104 slot solutions
- Integrated audio
- TPM v1.2 hardware security function supported

1.2 WAFER-8522 Board Overview

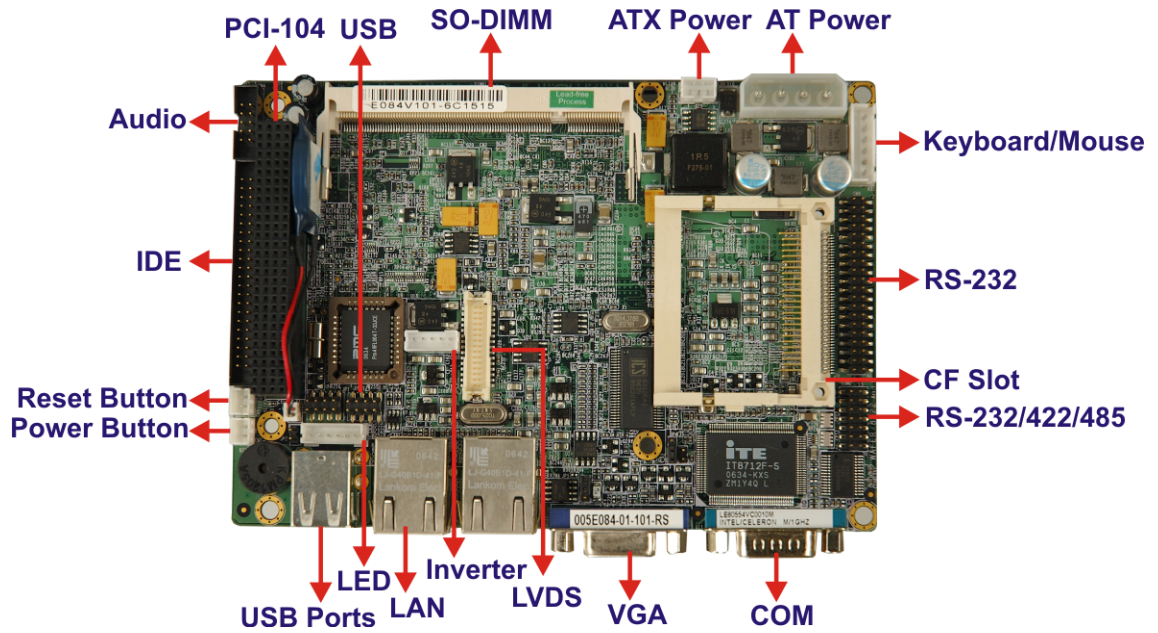


Figure 1-1: WAFER-8522 Overview

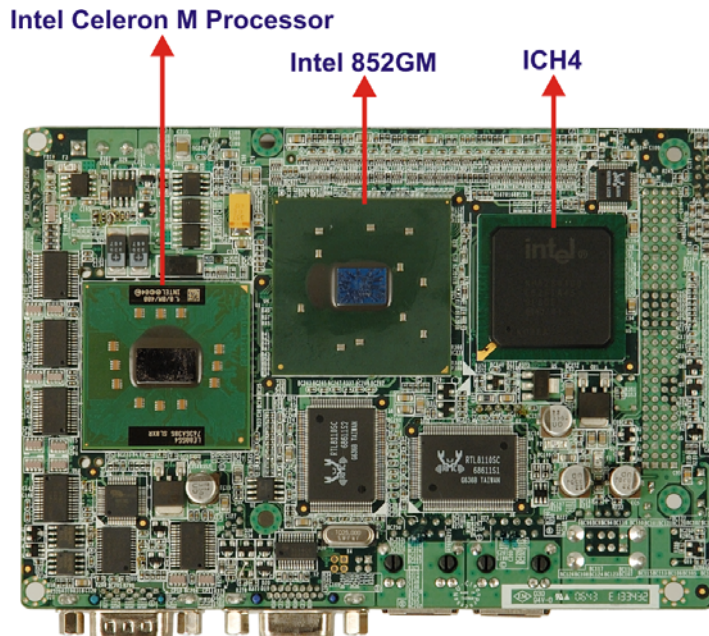


Figure 1-2: WAFER-8522 Solder Side Overview

WAFER-8522 Motherboard

1.2.1 WAFER-8522 Connectors

The WAFER-8522 has the following connectors on-board:

- 1 x AT power connector
- 1 x ATX power connector
- 1 x Audio connector
- 1 x Compact Flash (CF) connector
- 1 x IDE Interface connector
- 1 x Inverter connector
- 1 x Keyboard/mouse connector
- 1 x LED connector
- 1 x PCI-104 connector
- 1 x Power button connector
- 1 x Reset button connector
- 1 x RS-232/422/485 serial port connector
- 1 x RS-232 serial port connector (COM3~COM6)
- 1 x TFT LCD LVDS connector
- 1 x USB connector

The WAFER-8522 has the following connectors on the board rear panel:

- 1 x VGA connector
- 1 x Serial port connector
- 2 x USB 2.0 connectors
- 2 x LAN RJ-45 connectors

The WAFER-8522 has the following on-board jumpers:

- Clear CMOS
- CF Card Setup
- COM Port Jumper Settings
- LCD Voltage Setup
- LCD Panel Resolution Setup

1.2.2 Technical Specifications

WAFER-8522 technical specifications are listed in **Table 1-2**. Detailed descriptions of each specification can be found in **Chapter 2**.

Specification	WAFER-8522
CPU (On-board)	Intel® Celeron M 600Mhz 512K cache / 1.0GHz zero cache
System Chipset	Intel® 852GM + ICH4
Display	CRT integrated in Intel® 852GM Dual channel 18-bit LVDS
Memory	Supports one 200-pin DDR 266 SO-DIMM module up to 1GB
BIOS	AMI BIOS
SSD	CompactFlash® Type II
Audio	AC'97 Codec Realtek ALC655
LAN	Dual Realtek RTL8110SC GbE
COM	Five RS-232 and One RS-232/RS-422/RS-485
USB2.0	Four USB 1.1 or USB 2.0 devices supported
IDE	One 44-pin IDE connects to two Ultra ATA33/66/100 devices
TPM	One TPM v1.2 module (SINOSUN SSX35) onboard
Watchdog Timer	Software programmable 1-255 sec. by supper I/O
IrDA	One IrDA connector
Expansion	One PCI-104 slot
Power Supply	AT/ATX power support

WAFER-8522 Motherboard

Temperature	0°C - 60°C
Humidity (operating)	5%~95% non-condensing
Dimensions	146mm x 102mm
Weight (GW/NW)	700g/175g

Table 1-2: Technical Specifications

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Chapter

2

Detailed Specifications

2.1 Overview

This chapter describes the specifications and on-board features of the WAFER-8522 in detail.

2.2 Dimensions

2.2.1 Board Dimensions

The dimensions of the board are listed below:

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

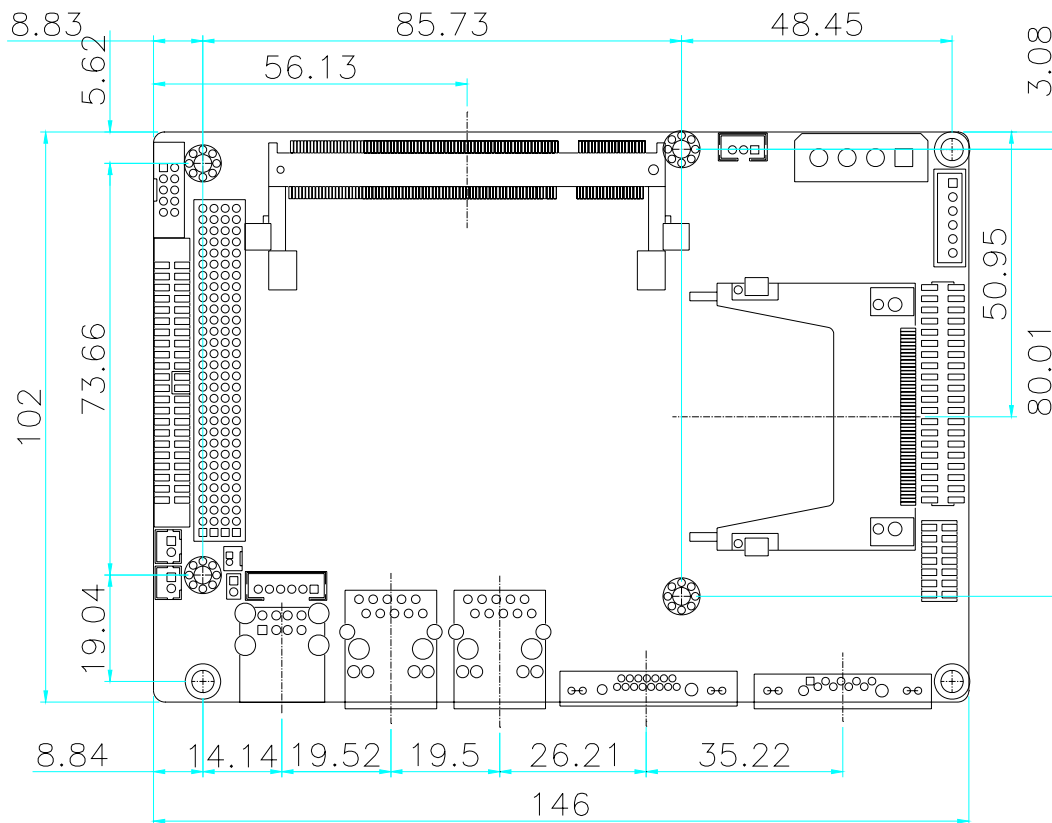


Figure 2-1: WAFER-8522 Dimensions (mm)

WAFER-8522 Motherboard

2.2.2 External Interface Panel Dimensions

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

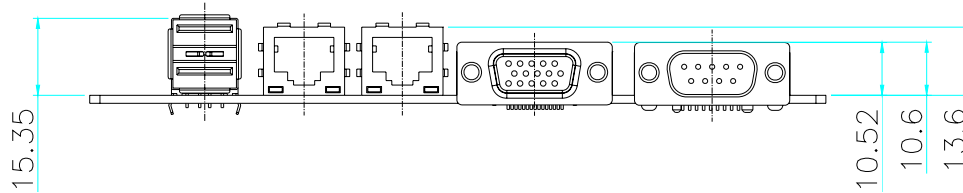
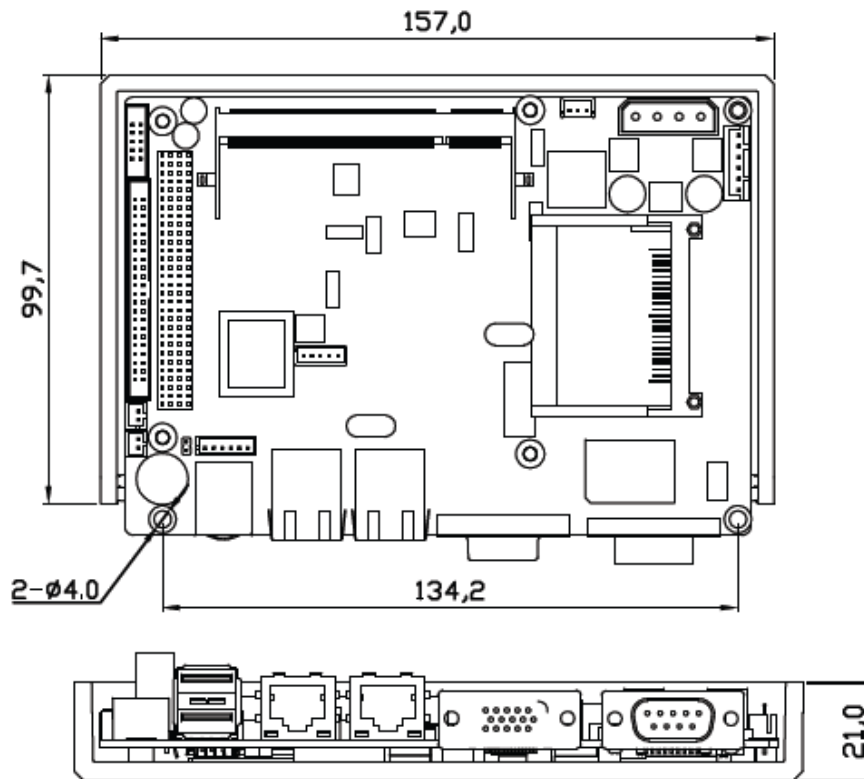


Figure 2-2: External Interface Panel Dimensions (mm)

2.2.3 Enclosure Heat Sink Dimensions

The dimensions of the WAFER-8522 with the enclosure heat sink are shown in **Figure 2-3**.



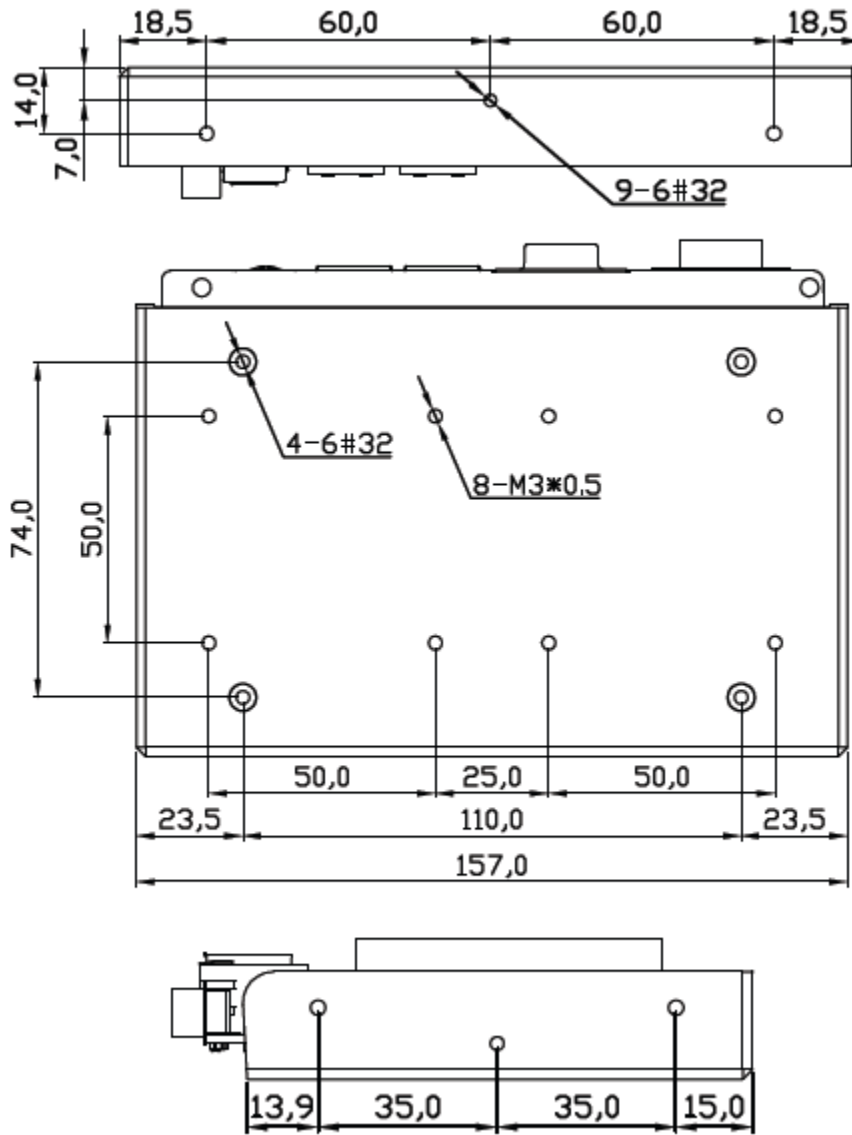


Figure 2-3: Enclosure Heat Sink Dimensions (mm)

WAFER-8522 Motherboard

2.3 Data Flow

The WAFER-8522 motherboard comes with an Intel® Celeron M CPU. **Figure 2-4** shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

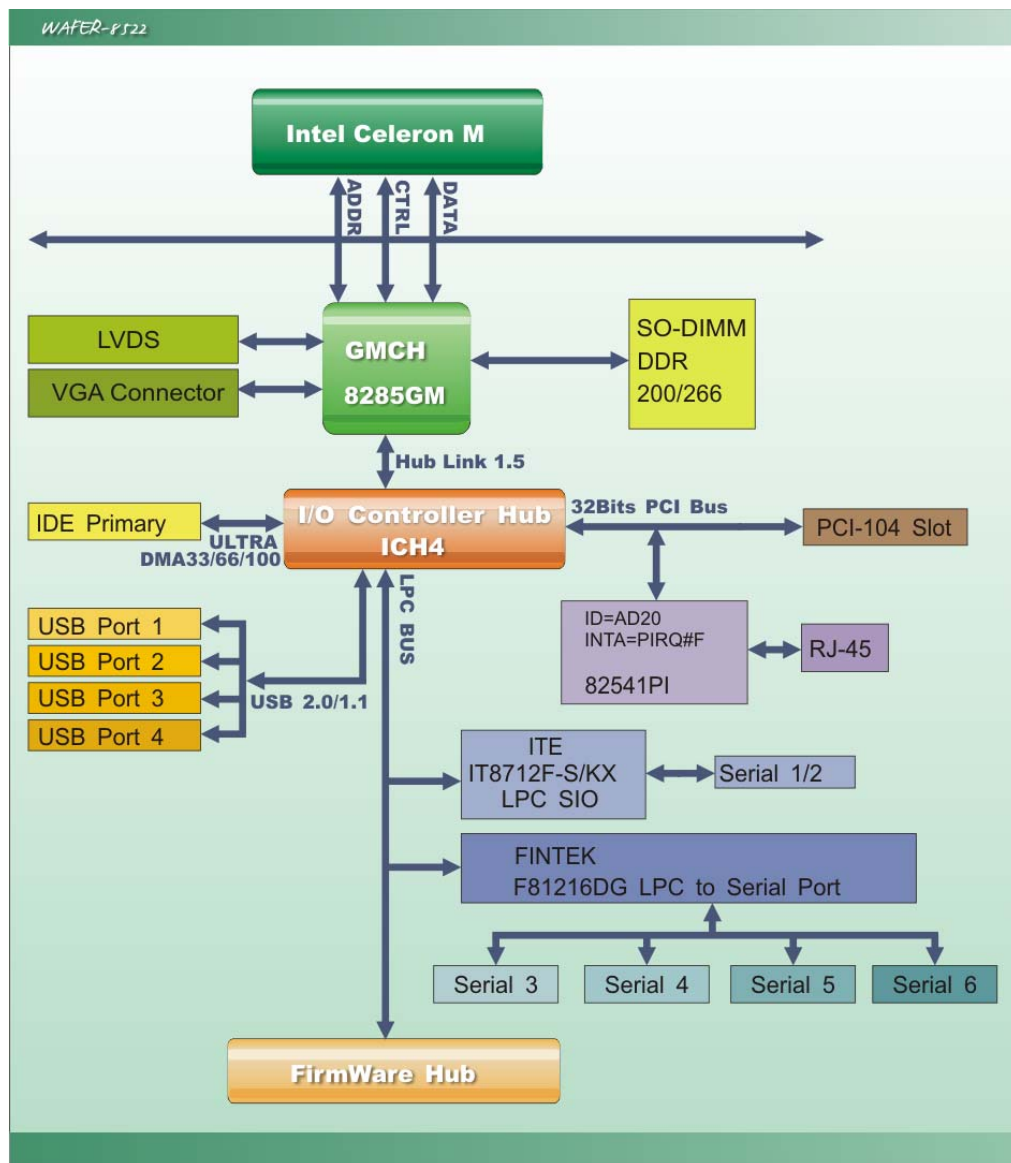


Figure 2-4: Data Flow Block Diagram

2.4 Compatible Processor

2.4.1 CPU Overview

The ULV Intel® Celeron® M processor is installed on the WAFER-8522 motherboard. Specifications for the processors are listed in **Table 2-1** below:

Family	Architecture	Cache	Clock Speed	FSB
ULV Intel® Celeron® M	90 nm	512 KB L2	1.0 GHz	400 MHz
ULV Intel® Celeron® M	90 nm	512 KB L2	600 MHz	400 MHz

Table 2-1: Supported Processors

2.4.2 Intel® Celeron® M

The (ULV) Intel® Celeron® M processor comes with the following features:

- Intel® Streaming SIMD Extensions accelerates 3D graphics performance, video decoding/encoding, and speech recognition.
- Advanced power management features
- Compatible with IA-32 software.
- Advanced branch prediction and data prefetch logic

2.5 Intel® 855GME Chipset Graphics Memory Controller Hub

2.5.1 Intel® 852GM Overview

The Intel® 852GM chipset comes with the following features:

- Supports Intel® NetBurst® micro-architecture
- 400 MHz system bus delivers a high-bandwidth connection between the processor and the platform
- Supports integrated graphics utilizing Intel® Extreme Graphics 2 technology
- Three USB host controllers provide high performance peripherals with 480 Mbps of bandwidth, while enabling support for up to six USB 2.0 ports.
- The latest AC '97 implementation delivers 20-bit audio for enhanced sound quality and full surround-sound capability.

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- LAN Connect Interface (LCI) provides flexible network solutions such as 10/100 Mbps Ethernet and 10/100 Mbps Ethernet with LAN manageability
- Dual Ultra ATA/100 controllers, coupled with the Intel® Application Accelerator supports faster IDE transfers to storage devices
- Intel Application Accelerator software provides additional performance over native ATA drivers by improving I/O transfer rates and enabling faster O/S load time, resulting in accelerated boot times

2.5.2 Intel® 852GM Memory Support

The Intel® 852GM supports one DDR memory module with frequencies up to 266MHz. The WAFER-8522 has one 200-pin DDR SDRAM SO-DIMM socket that supports one 200MHz or 266MHz DDR SO-DIMM memory module with a maximum capacity of 1GB.

2.5.3 Intel® 852GM Internal Graphics Controller

The Intel® Extreme Graphics 2 is integrated on the Intel® 852GM Northbridge chipset. The Intel® Extreme Graphics 2 features are listed below.

- **Enhanced Rapid Pixel and Texel Rendering:** Optimized visual quality and performance from the addition of hardware to support of texel formatting, bicubic filter, color blending accuracy, and video mixing render, resulting in optimized visual quality and performance.
- **Zone Rendering 2 Technology:** Enhances the performance of zone rendering by using larger zones and new commands that improve graphics pipeline efficiency.
- **Dynamic Video Memory Technology v2.0:** Increases total system performance by optimizing the efficiency of AGP dynamic video memory by increasing its size of Video RAM allocation to 96 MB.
- **Enhanced Intelligent Memory Management:** Improves memory bandwidth efficiency and platform performance by improving the memory management arbitration between CPU, system memory and graphics memory.

Intel® Extreme Graphics 2 specifications are listed below:

- Enhanced 2D:

- 256-bit internal path
- 8/16/32bpp
- DirectDraw*, GDI, GDI+
- Anti-aliased text support
- Alpha blending
- Alphas stretch blitter
- Hardware alpha blended RGB cursor
- Color space conversion
- 5x2 overlay support
- Rotate, scale and translate operations
- High-performance 3D:
 - 256-bit internal path
 - 32bpp/ 24ZorW/ 8 Stencil
 - DX7*/DX8*/OGL*1.1
 - DXTn texture compression
 - Up to 4 textures / pixel on a single pass
 - Cubic reflection map
 - Embossed/DOT3 bump mapping
 - Multi-texture
 - DOT3 bump-mapping
 - Point sprites
- Video and Display:
 - DirectShow*/DirectVA*
 - Hardware motion compensation support for DVD playback
 - 4x2 overlay filter
 - 350 MHz DAC frequency
 - Maximum DVO pixel rate of up to 330MP/s
 - Flat panel monitors and TV-out support via AGP Digital Display (ADD) cards
 - 350 MHz DAC for 1800x1440 @ 85Hz max CRT resolution or 2048x1536@60Hz max FP resolution
 - Synchronous display for dual monitor capabilities
 - 350MHz RAMDAC for up to QXGA analog monitor support
 - Dual DVO ports for up to QXGA digital display support
- Multiple display types (LVDS, DVI, TV-out, CRT)

2.6 Intel® 82801DB I/O Controller Hub (ICH4)

2.6.1 Intel® ICH4 Overview

The Intel® ICH4 I/O controller hub comes with the following features:

- PCI Local Bus Specification, Revision 2.2-compliant with support for 33 MHz PCI operations.
- ACPI Power Management Logic Support
- Enhanced DMA controller, Interrupt controller, and timer functions
- Integrated IDE controller supports Ultra ATA100/66/33
- USB host interface with support for 4 USB ports; 3 UHCI host controllers; 1 EHCI high-speed
- USB 2.0 Host controller
- Integrated LAN controller
- System Management Bus (SMBus) Specification, Version 2.0 with additional support for I2C devices
- Supports Audio Codec '97, Revision 2.3 specification
- Low Pin Count (LPC) interface
- Firmware Hub (FWH) interface support
- Alert On LAN* (AOL) and Alert On LAN 2* (AOL2)

2.6.2 Intel® ICH4 IDE Interface

The single WAFER-8522 IDE connector supports two IDE hard disks and ATAPI devices. PIO IDE transfers up to 16MB/s and Ultra ATA transfers of 100MB/s. The integrated IDE interface is able to support the following IDE HDDs:

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

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

Specification	Ultra ATA/100	Ultra ATA/66	Ultra ATA/100
IDE devices	2	2	2
PIO Mode	0 – 4	0 – 4	0 – 4
PIO Max Transfer Rate	16.6 MB/s	16.6 MB/s	16.6 MB/s
DMA/UDMA designation	UDMA 3 - 4	UDMA 3 – 4	UDMA 2
DMA/UDMA Max Transfer	100MB/s	66MB/s	33MB/s
Controller Interface	5V	5V	5V

Table 2-2: Supported HDD Specifications

2.6.3 Intel® ICH4 Compact Flash Interface

The WAFER-8522 CompactFlash socket supports standard CF Type II cards. The chipset flash interface is multiplexed with an IDE interface and can be connected to an array of industry standard NAND Flash or NOR Flash devices.

2.6.4 Intel® ICH4 Audio Codec 97 (AC'97) Controller

The WAFER-8522 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,

WAFER-8522 Motherboard

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

2.6.5 Intel® ICH4 USB Controller

Two external USB ports on the WAFER-8522 board are interfaced to the chipset USB controller. Four USB 1.1 or USB 2.0 devices can be connected simultaneously to the WAFER-8522. The chipset USB controller has the following specifications:

- 4 USB ports
- USB 1.1 and USB 2.0 compliant

- 3 Universal Host Controller Interface (UHCI) controllers
- High-speed, full-speed and low-speed capable

2.6.6 Intel® ICH4 PCI Interface

The PCI interface on the ICH4 is compliant with the PCI Revision 2.2 implementation.

Some of the features of the PCI interface are listed below.

- PCI Revision 2.2 compliant
- 33MHz
- 5V tolerant PCI signals (except PME#)
- Integrated PCI arbiter supports up to six PCI bus masters

2.6.7 Intel® ICH4 Low Pin Count (LPC) Interface

The ICH4 LPC interface complies with the LPC 1.0 specifications. The LPC bus from the ICH4 is connected to the following components:

- BIOS chipset
- Super I/O chipset

2.6.8 BIOS

The BIOS flash memory chip on the WAFER-8522 has a licensed copy of AMI BIOS loaded onto it. The BIOS flash memory chip is connected to the chipset via the LPC bus.

The flash BIOS features are listed below:

- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (Pre-Boot Execution Environment) support
- USB booting support

2.7 PCI Bus Components

2.7.1 PCI Bus Overview

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The PCI bus controller on the ICH4 is compliant with PCI Revision 2.2 specifications and has a 33MHz PCI clock. The components listed below are all connected to the PCI bus:

- PCI-104 socket
- Realtek RTL8110SC GbE interface

2.7.2 GbE Ethernet

A highly integrated and cost-effective single-chip, fast RealTek RTL8110SC GbE Ethernet controller is interfaced through first the PCI bus to the CPU and system chipset. The RealTek RTL8110SC controller provides 10Mbps, 100Mbps or 1000Mbps Ethernet connectivity to the WAFER-8522. Some of the features of the RealTek RTL8110SC are listed below.

- Integrated 10/100/1000 transceiver
- Auto-Negotiation with Next Page capability
- Supports PCI rev.2.3, 32-bit, 33/66MHz
- Supports CLKRUNB and MiniPCI v1.0
- 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
- 3.3V signaling, 5V PCI I/O tolerant
- Transmit/Receive FIFO (8K/64K) support
- Supports power down/link down power saving
- Supports PCI Message Signaled Interrupt (MSI)

2.7.3 PCI-104 Slot

The PCI-104 socket supports PCI-104 modules that are compliant with PCI Specification, Revision 1.0. The PCI-104 modules are easily installed into the socket. The standard PCI-104 modules are 95.89mm wide, 90.17mm long.

2.8 LPC Bus Components

2.8.1 LPC Bus Overview

The LPC bus is connected to components listed below:

- BIOS chipset
- Super I/O chipset

2.8.2 BIOS Chipset

The BIOS chipset has a licensed copy of AMI BIOS installed on the chipset. Some of the BIOS features are listed below:

- AMI Flash BIOS
- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (Pre-boot Execution Environment) support
- USB booting support

2.8.3 Super I/O Chipset

The iTE IT8712F Super I/O chipset is connected to the ICH4 through the LPC bus. The iTE IT8712F is an LPC interface-based Super I/O device that comes with Environment Controller integration. Some of the features of the iTE IT8712F chipset are listed below:

- LPC Interface
- PC98/99/2001, ACPI and LANDesk Compliant
- Enhanced Hardware Monitor
- SmartGuardian Controller
- Single +5V Power Supply

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- Two 16C550 UARTs for serial port control
- One IEEE 1284 Parallel Port
- Keyboard Controller
- Watchdog Timer
- Serial IRQ Support
- Vbat & Vcch Support
- Single +5V Power Supply

Some of the Super I/O features are described in more detail below:

2.8.3.1 Super I/O 16C550 UARTs

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

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

Another chipset connected to the LPC bus provided connectivity to another four serial port connectors (COM3, COM4, COM5 and COM6).

2.8.3.2 Super I/O Keyboard Controller

The Super I/O keyboard controller can execute the 8042 instruction set. Some of the keyboard controller features are listed below:

- The 8042 instruction is compatible with a PS/2 keyboard and PS/2 mouse
- Gate A20 and Keyboard reset output
- Supports multiple keyboard power on events
- Supports mouse double-click and/or mouse move power on events

2.9 TPM Module

The WAFER-8522 has one SINOSUN SSX35 TPM v1.2 module on-board. Some of the TPM module features are listed below:

- Fully compatible with TCG v1.2 Specifications
- SINOSUN 8-bit CPU core
- Embedded 16KB secure data FLASH memory and 16KB RAM

- 128KB program FLASH memory supporting online update of firmware
- RSA engine supports up to 2048 bits RSA algorithm
- Embedded SHA-1 algorithm engine

2.10 Environmental and Power Specifications

2.10.1 System Monitoring

Three thermal inputs on the WAFER-8522 Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- System temperature
- Temperature Sensor #1

Eight voltage inputs on the WAFER-8522 Super I/O Enhanced Hardware Monitor monitor the following voltages:

- CPU Core
- VCC
- +3.3V
- +5.0V
- +1.5V
- VBAT

The WAFER-8522 Super I/O Enhanced Hardware Monitor also monitors the CPU fan speeds.

2.10.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the WAFER-8522 are listed below.

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

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks

WAFER-8522 Motherboard

are also mounted on the northbridge and southbridge chipsets to ensure the operating temperature of these chips remain low.

2.10.3 Power Consumption

Table 2-3 shows the power consumption parameters for the WAFER-8522 when an Intel® Celeron® M 1.0GHz CPU is running with one 1GB 400MHz DDR SDRAM memory module.

Voltage	Current
5V	3.43A
12V	0.13A

Table 2-3: Power Consumption

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Chapter

3

Unpacking

3.1 Anti-static Precautions



WARNING:

Failure to take ESD precautions during the installation of the WAFER-8522 may result in permanent damage to the WAFER-8522 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the WAFER-8522. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the WAFER-8522, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- **Wear an anti-static wristband:** - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- **Self-grounding:**- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- **Use an anti-static pad:** When configuring the WAFER-8522, place it on an anti-static pad. This reduces the possibility of ESD damaging the WAFER-8522.
- **Only handle the edges of the PCB:-** When handling the PCB, hold the PCB by the edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the WAFER-8522 is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 3.1**.
- Make sure the packing box is facing upwards so the WAFER-8522 does not fall out of the box.
- Make sure all the components shown in **Section 3.3** are present.

3.3 Unpacking Checklist








NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the WAFER-8522 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

3.3.1 Package Contents

The WAFER-8522 is shipped with the following components:

Quantity	Item	Image
1	WAFER-8522 single board computer	
1	Enclosure heat sink	
1	Audio cable	
1	IDE flat cable 44p/44p	
1	PS2 keyboard/mouse cable	





1	4 COM port RS-232 cable	
1	Mini jumper pack	
1	Quick installation guide	
1	Utility CD	

Table 3-1: Package List Contents

Chapter

4

Connector Pinouts

4.1 Peripheral Interface Connectors

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

4.1.1 WAFER-8522 Layout

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

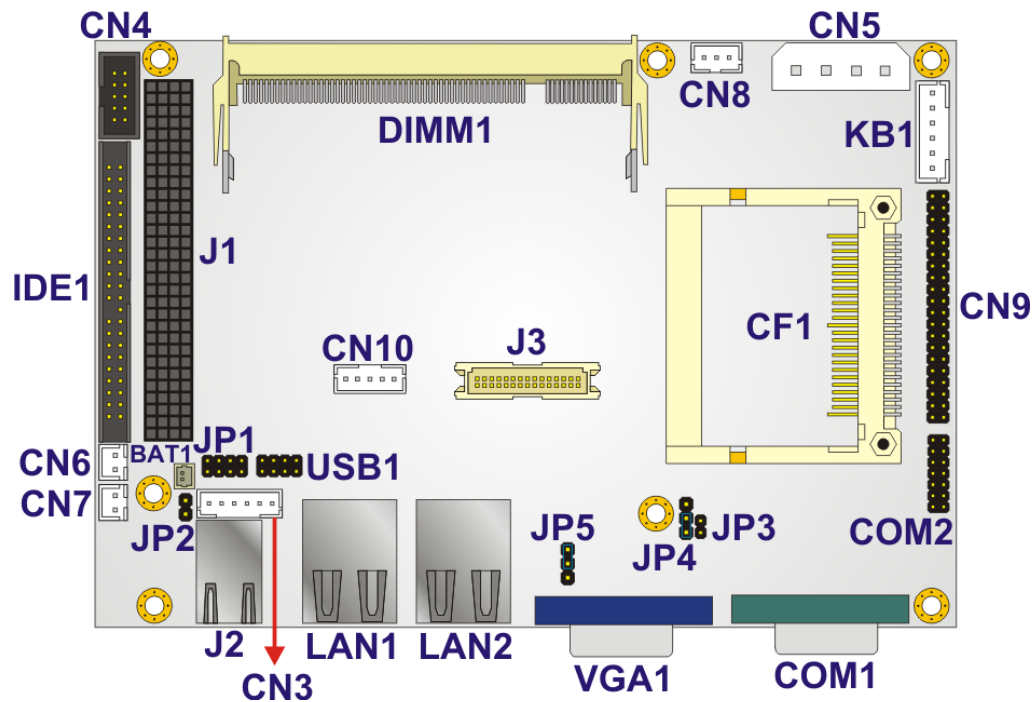


Figure 4-1: Connector and Jumper Locations

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the WAFER-8522. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
AT power connector	4-pin wafer connector	CN5
ATX power connector	3-pin wafer connector	CN8
Audio connector	10-pin box header	CN4
Compact Flash (CF) connector	50-pin CF slot	CF1
IDE Interface connector	44-pin box header	IDE1
Inverter connector	5-pin wafer connector	CN10
Keyboard/mouse connector	6-pin wafer connector	KB1
LED connector	6-pin header	CN3
PCI-104 connector	PCI-104 slot	J1
Power button connector	2-pin wafer connector	CN7
Reset button connector	2-pin wafer connector	CN6
RS-232/422/485 serial port connector	14-pin header	COM2
RS-232 serial port connector (COM3~COM6)	40-pin header	CN9
TFT LCD LVDS connector	30-pin crimp connector	LVDS1
USB connector	8-pin header	USB1

Table 4-1: Peripheral Interface Connectors

4.1.3 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the WAFER-8522. Detailed descriptions of these connectors can be found in **Section 4.2.15** on **page 54**.

Connector	Type	Label
Ethernet connectors	RJ-45 connector	LAN1, LAN2

RS-232 serial port connector	DB-9 connector	COM1
USB ports	USB port	J2
VGA port connector	15-pin female	VGA1

Table 4-2: Rear Panel Connectors

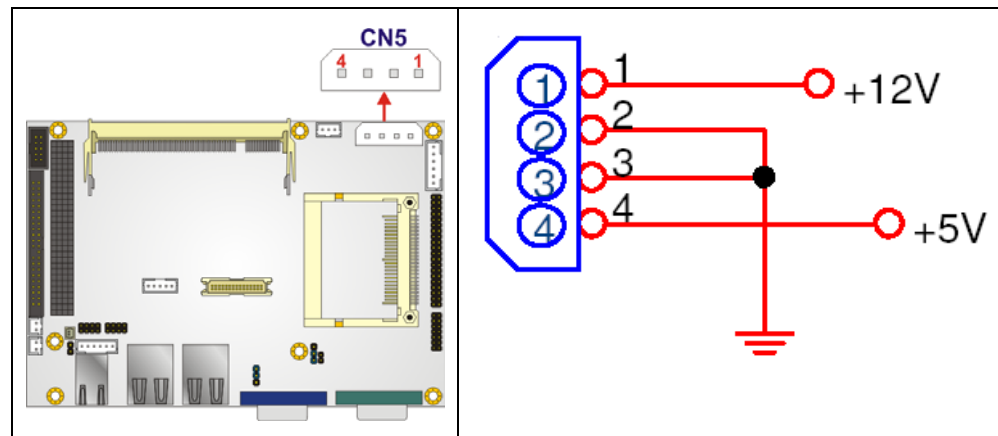
4.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the WAFER-8522.

4.2.1 AT Power Connector

- CN Label:** CN5
- CN Type:** 4-pin wafer connector (1x4)
- CN Location:** See **Figure 4-2**
- CN Pinouts:** See **Table 4-3**

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


Figure 4-2: AT Power Connector Location

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

Table 4-3: AT Power Connector Pinouts

4.2.2 ATX Power Connector

- CN Label:** CN8
- CN Type:** 3-pin wafer connector (1x3)
- CN Location:** See Figure 4-3
- CN Pinouts:** See Table 4-4

The 3-pin ATX power connector is connected to an ATX power supply.

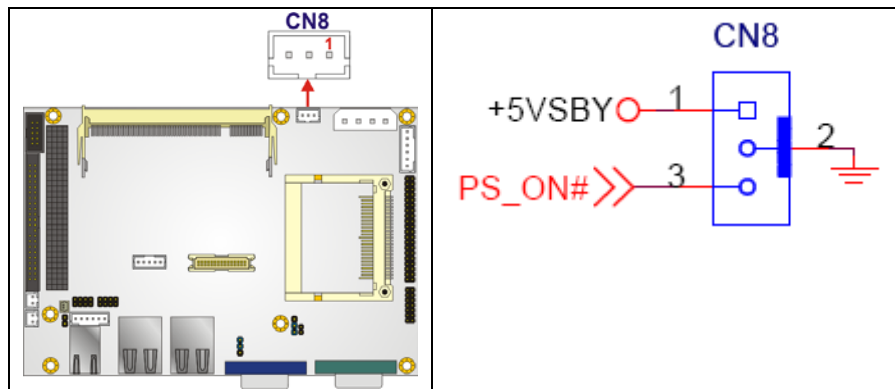


Figure 4-3: ATX Power Connector Location

PIN NO.	DESCRIPTION
1	+5V_SB
2	GROUND

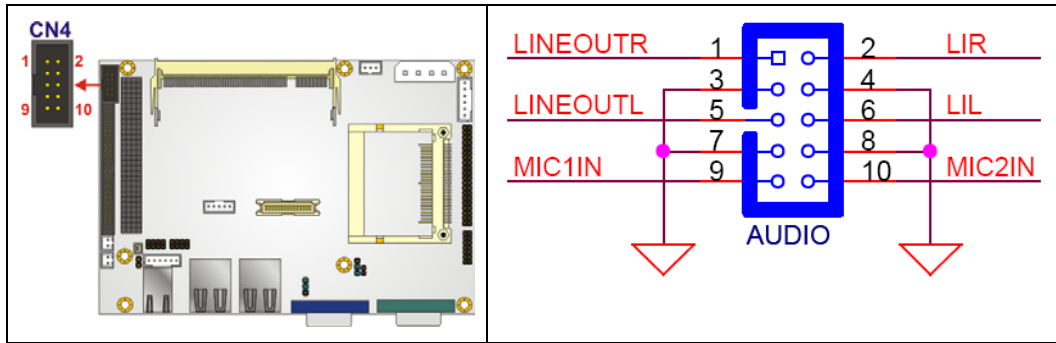
3	PS_ON
---	-------

Table 4-4: ATX Power Connector Pinouts

4.2.3 Audio Connector

- CN Label:** CN4
- CN Type:** 10-pin box header (2x5)
- CN Location:** See Figure 4-4
- CN Pinouts:** See Table 4-5

The 10-pin audio connector is connected to speakers the output of audio signals from the system.


Figure 4-4: Audio Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LINEOUT_R	2	LINEIN_R
3	GROUND	4	GROUND
5	LINEOUT_L	6	LINEIN_L
7	GROUND	8	GROUND
9	MIC1IN	10	MIC2IN

Table 4-5: Audio Connector Pinouts

4.2.4 Compact Flash Socket

- CN Label:** CF1
- CN Type:** 50-pin CF slot (2x25)
- CN Location:** See Figure 4-5
- CN Pinouts:** See Table 4-6

A CF Type II memory card is inserted to the CF socket of the WAFER-8522.

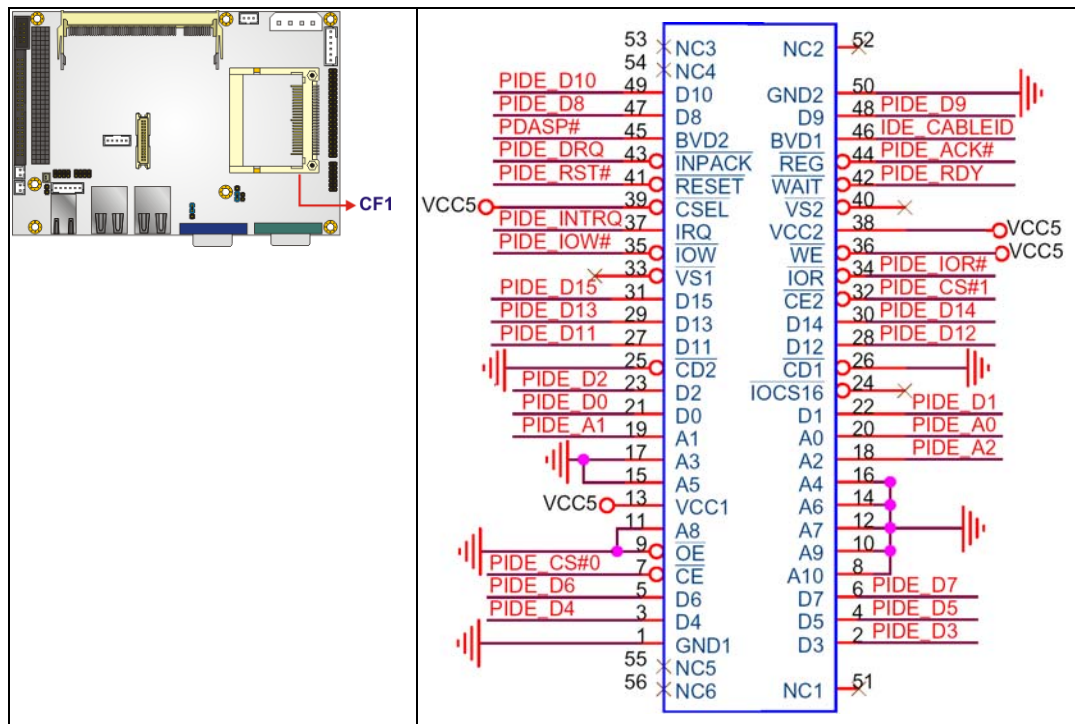


Figure 4-5: CF Card Socket Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	GROUND

2	D3	27	D11
3	D4	28	D12
4	D5	29	D13
5	D6	30	D14
6	D7	31	D15
7	CS1#	32	CS3#
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC
12	N/C	37	IRQ15
13	VCC	38	VCC
14	N/C	39	MASTER/SLAVE
15	N/C	40	N/C
16	N/C	41	RESET#
17	N/C	42	IORDY
18	A2	43	DMARQ
19	A1	44	DMACK#
20	A0	45	ACTIVE#
21	D0	46	PDIAG#
22	D1	47	D8
23	D2	48	D9
24	N/C	49	D10
25	GROUND	50	GROUND

Table 4-6: CF Card Socket Pinouts

4.2.5 IDE Connector

- CN Label:** IDE1
- CN Type:** 44-pin box header (2x22)
- CN Location:** See Figure 4-6
- CN Pinouts:** See Table 4-7

WAFER-8522 Motherboard

One 44-pin IDE device connector on the WAFER-8522 supports connectivity to two hard disk drives.

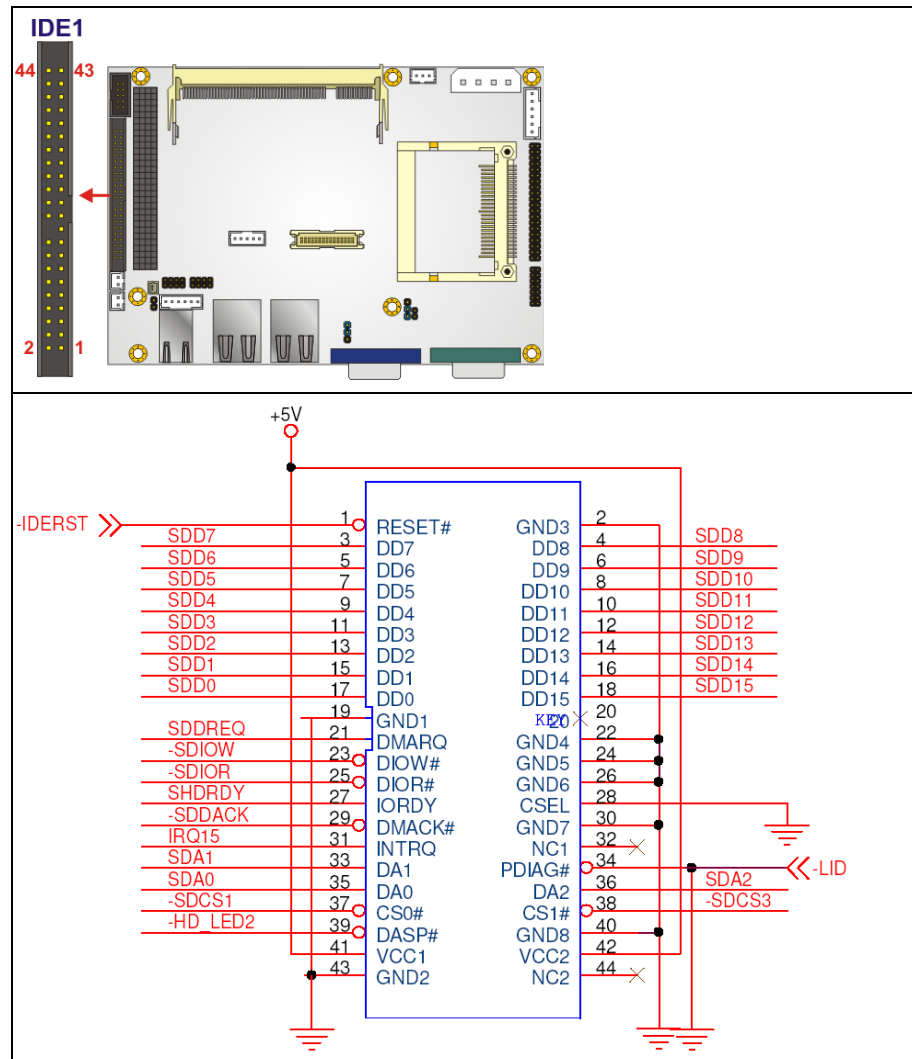


Figure 4-6: IDE Device Connector Location

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	DMARQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IORDY	28	BALE
29	DMACK#	30	GROUND
31	INTERRUPT	32	N/C
33	SA1	34	PDIAG
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND
41	+5V	42	+5V
43	GROUND	44	N/C

Table 4-7: IDE Connector Pinouts

4.2.6 Inverter Power Connector

- CN Label:** CN10
- CN Type:** 5-pin wafer connector (1x5)
- CN Location:** See **Figure 4-7**
- CN Pinouts:** See **Table 4-8**

The inverter connector is connected to the LCD backlight.

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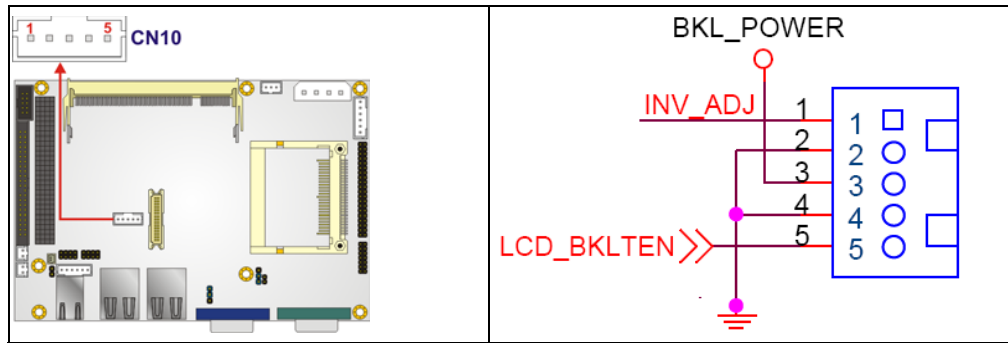


Figure 4-7: Inverter Connector Location

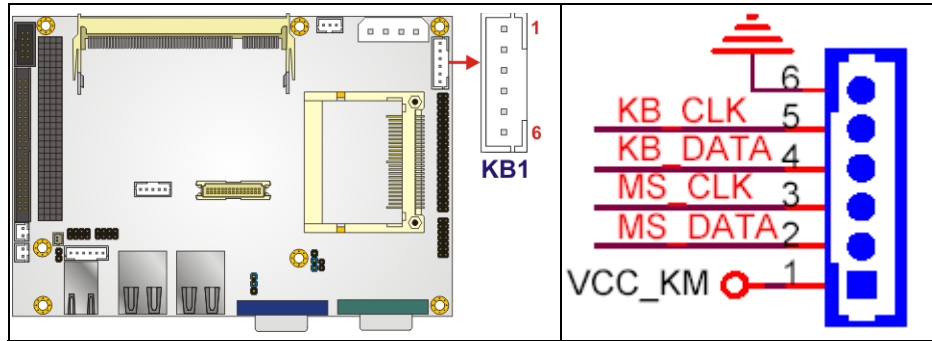
PIN NO.	DESCRIPTION
1	INV_ADJ
2	GND
3	+12V
4	GND
5	(H)ON/OFF(L)

Table 4-8: Inverter Power Connector Pinouts

4.2.7 Keyboard/Mouse Connector

- CN Label:** KB1
- CN Type:** 6-pin wafer connector (1x6)
- CN Location:** See Figure 4-8
- CN Pinouts:** See Table 4-9

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


Figure 4-8: Keyboard/Mouse Connector Location

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

Table 4-9: Keyboard/Mouse Connector Pinouts

4.2.8 LED Connector

- CN Label:** CN3
- CN Type:** 6-pin header (1x6)
- CN Location:** See **Figure 4-9**
- CN Pinouts:** See **Table 4-10**

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

WAFER-8522 Motherboard

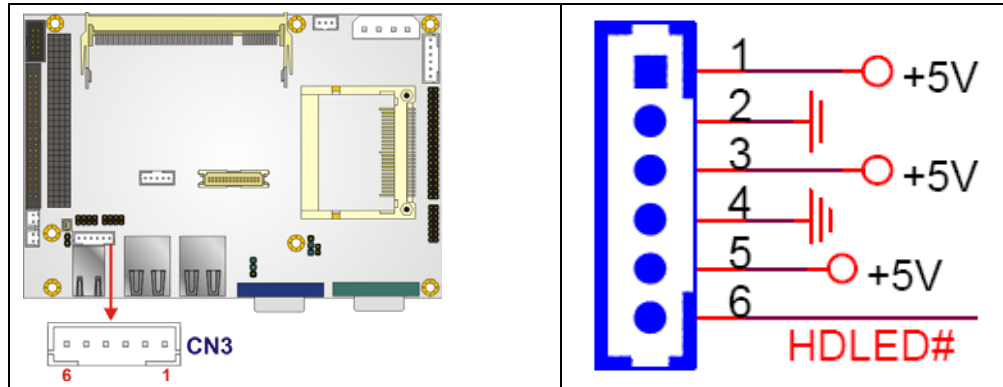


Figure 4-9: LED Connector Locations

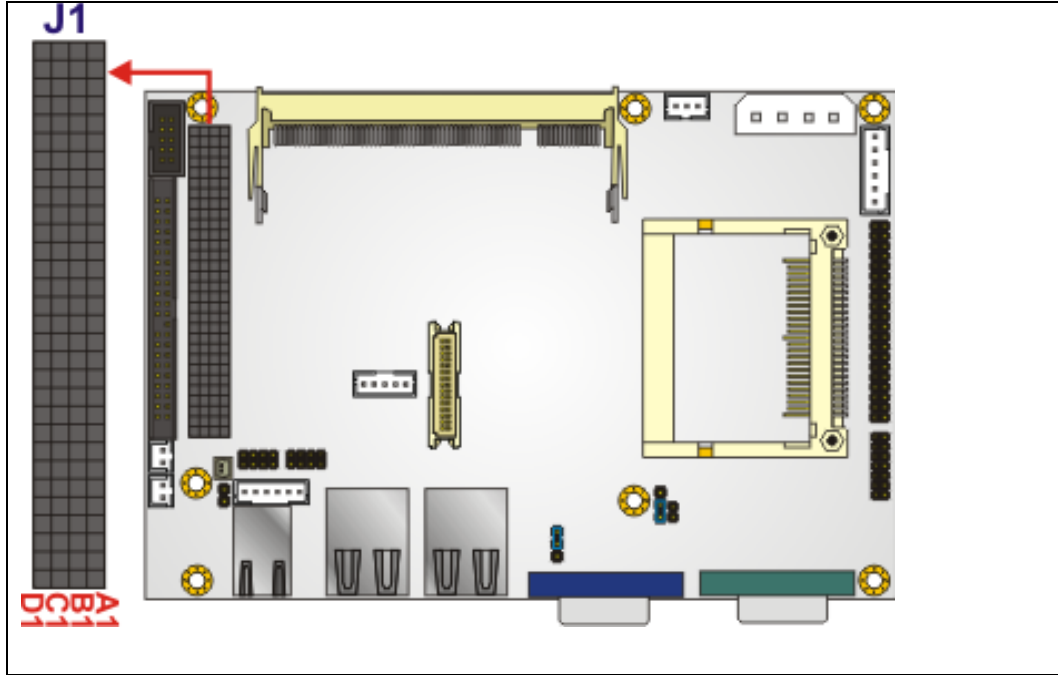
PIN NO.	DESCRIPTION
1	+5V
2	GROUND
3	+5V
4	GROUND
5	HDLED+
6	HDLED-

Table 4-10: LED Connector Pinouts

4.2.9 PCI-104 Slot

- CN Label:** J1
- CN Type:** 120-pin PCI-104 slot
- CN Location:** See **Figure 4-10**
- CN Pinouts:** See **Table 4-11**

The PCI-104 slot enables a PCI-104 compatible expansion module to be connected to the board.



WAFER-8522 Motherboard

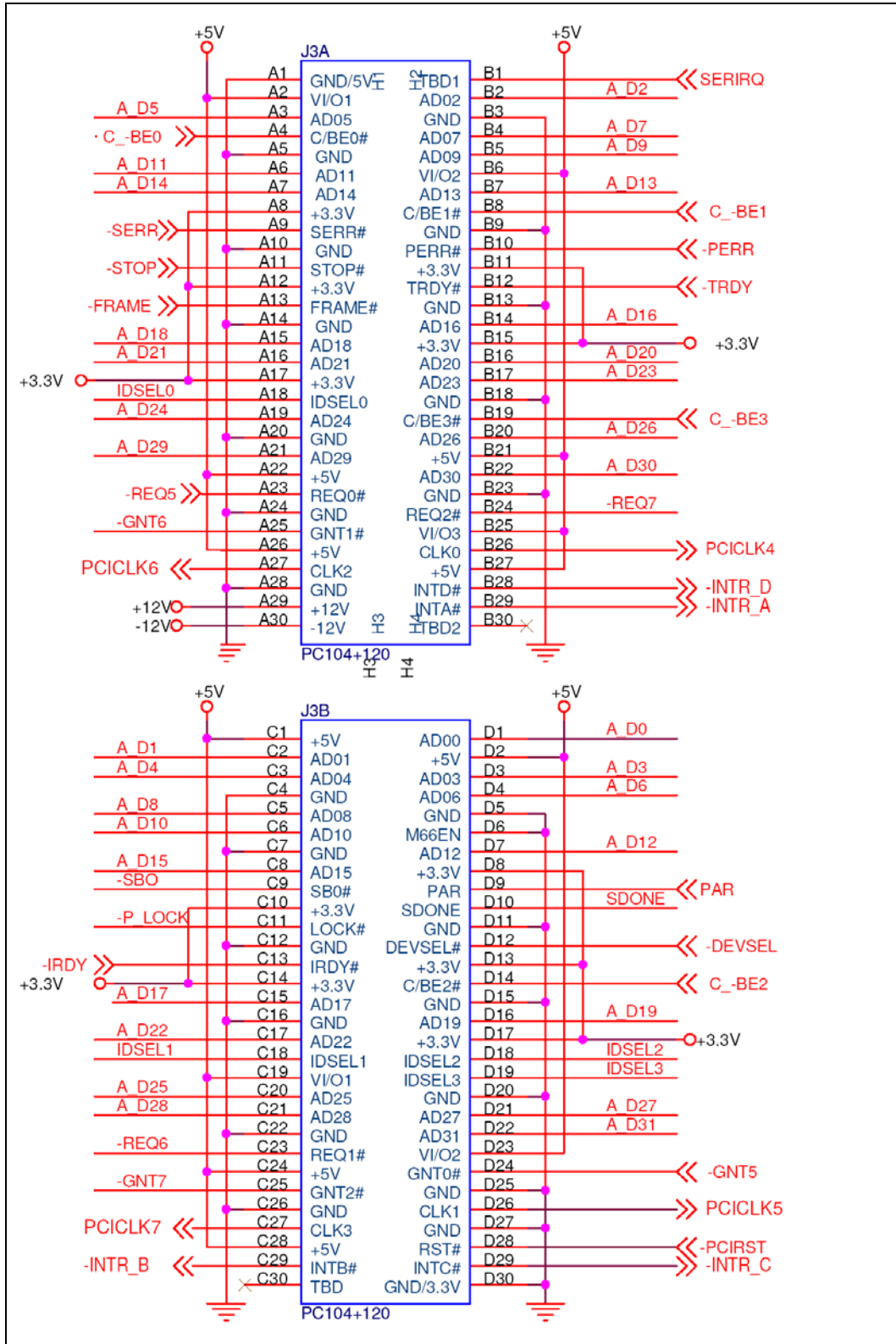


Figure 4-10: PCI-104 Slot Location

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	SBO#	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

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28	GND	INTD#	+5V	RST#
29	+12V	INTA#	INTB#	INTC#
30	-12V	TBD2	TBD	GND/3.3V

Table 4-11: PCI-104 Slot Connector Pinouts

4.2.10 Power Button Connector

- CN Label:** CN7
- CN Type:** 2-pin wafer connector (1x2)
- CN Location:** See Figure 4-11
- CN Pinouts:** See Table 4-12

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

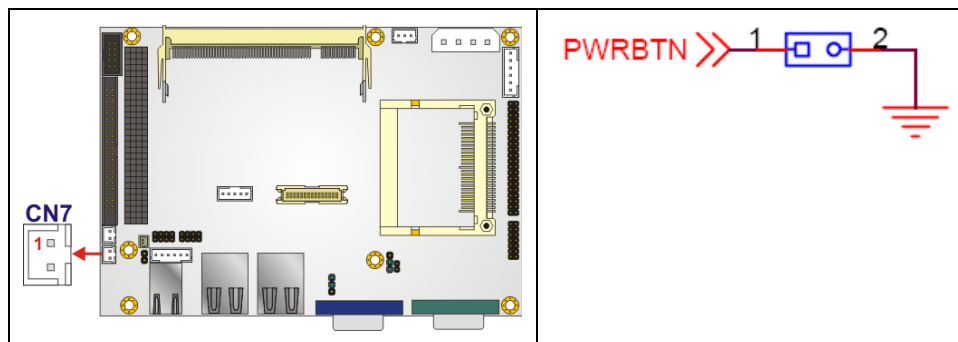


Figure 4-11: Power Button Connector Location

PIN NO.	DESCRIPTION
1	Button+
2	Button-

Table 4-12: Power Button Connector Pinouts

4.2.11 Reset Button Connector

- CN Label:** CN6
- CN Type:** 2-pin wafer connector (1x2)
- CN Location:** See **Figure 4-12**
- CN Pinouts:** See **Table 4-13**

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

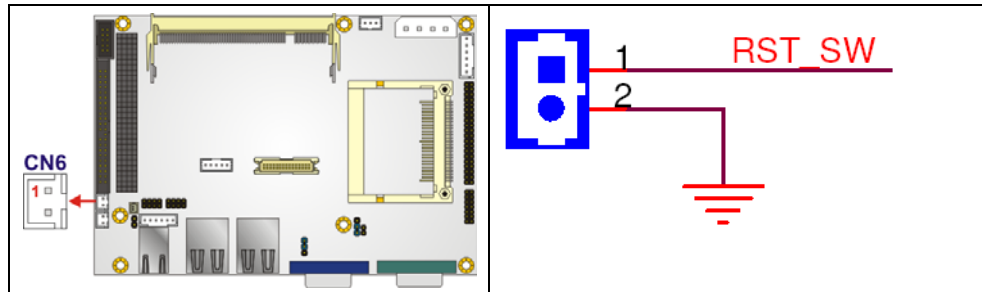


Figure 4-12: Reset Button Connector Locations

PIN NO.	DESCRIPTION
1	RESET#
2	GROUND

Table 4-13: Reset Button Connector Pinouts

4.2.12 Serial Port Connector (RS-232/422/485)

- CN Label:** COM2
- CN Type:** 14-pin header (2x7)
- CN Location:** See **Figure 4-13**
- CN Pinouts:** See **Table 4-14**

The serial port connectors connect to RS-232, RS-422 or RS-485 serial port device.

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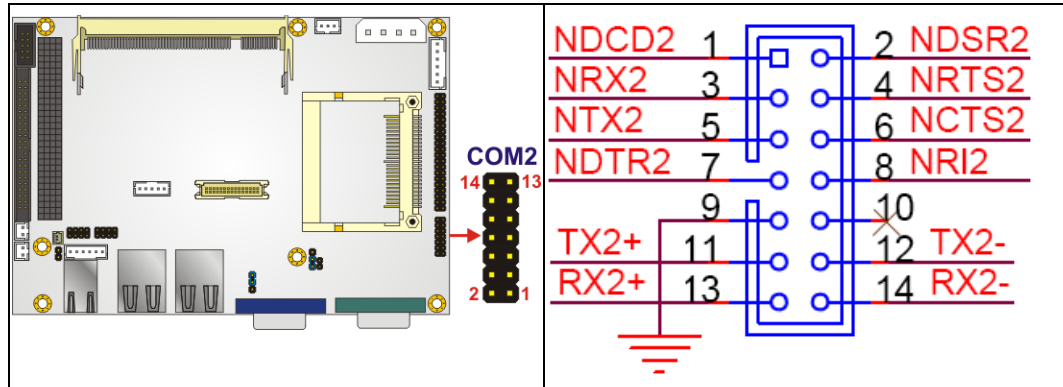


Figure 4-13: Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND
11	(RS422/485) TX+	12	(RS422/485) TX-
13	(RS422) RX+	14	(RS422) RX-

Table 4-14: RS-232/422/485 Serial Port Connector Pinouts

4.2.13 Serial Port Connector (COM 3, COM 4, COM 5 and COM 6)

CN Label: CN9

CN Type: 40-pin header (2x20)

CN Location: See Figure 4-14

CN Pinouts: See Table 4-15

The 40-pin serial port connector contains the following four serial ports, COM 3, COM 4, COM 5 and COM 6. All four serial ports are RS-232 serial communications channels. The serial port locations are specified below.

- COM 3 is located on pin 1 to pin 10

- COM 4 is located on pin 11 to pin 20
- COM 5 is located on pin 21 to pin 30
- COM 6 is located on pin 31 to pin 40

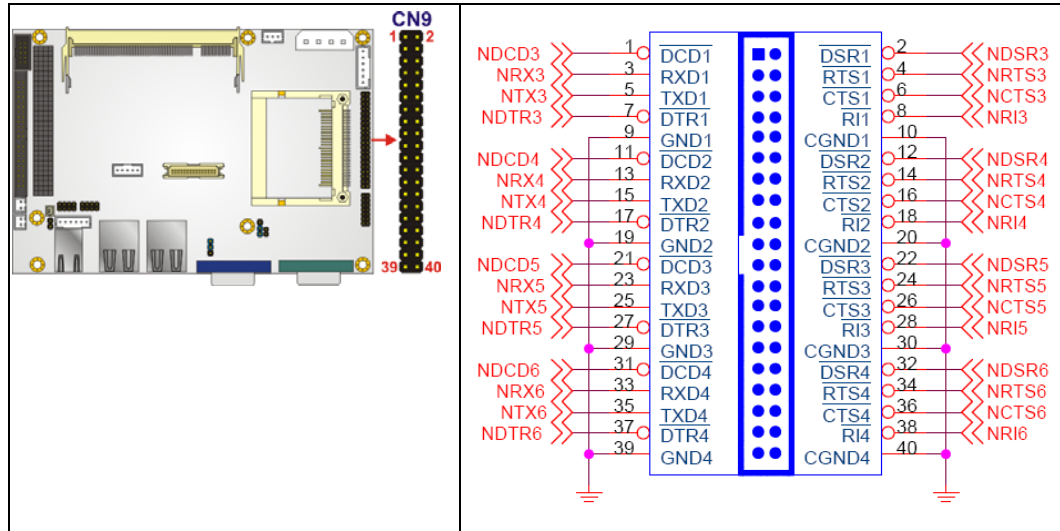


Figure 4-14: RS-232 Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD_COM3	2	DSR_COM3
3	RXD_COM3	4	RTS_COM3
5	TXD_COM3	6	CTS_COM3
7	DTR_COM3	8	RI_COM3
9	GND	10	GND
11	DCD_COM4	12	DSR_COM4
13	RXD_COM4	14	RTS_COM4
15	TXD_COM4	16	CTS_COM4
17	DTR_COM4	18	RI_COM4
19	GND	20	GND
21	DCD_COM5	22	DSR_COM5
23	RXD_COM5	24	RTS_COM5
25	TXD_COM5	26	CTS_COM5
27	DTR_COM5	28	RI_COM5
29	GND	30	GND

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31	DCD_COM6	32	DSR_COM6
33	RXD_COM6	34	RTS_COM6
35	TXD_COM6	36	CTS_COM6
37	DTR_COM6	38	RI_COM6
39	GND	40	GND

Table 4-15: RS-232 Serial Port Connector Pinouts

4.2.14 TFT LCD LVDS Connector

- CN Label:** J3
- CN Type:** 30-pin crimp connector (2x15)
- CN Location:** See Figure 4-15
- CN Pinouts:** See Table 4-16

The 30-pin TFT LCD LVDS can be connected to a TFT LCD screen directly.

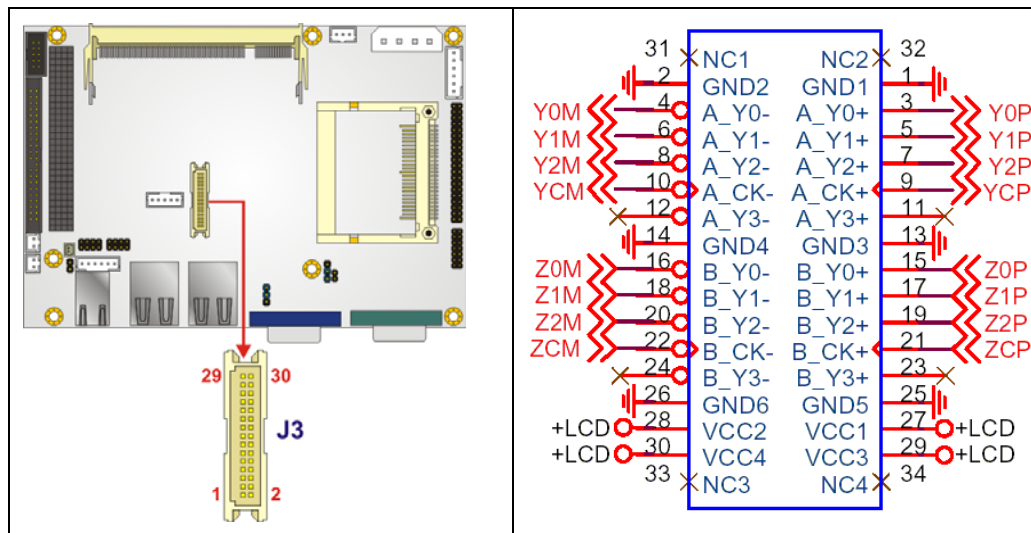


Figure 4-15: TFT LCD LVDS Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND

3	Rin0+	4	Rin0-
5	Rin1+	6	Rin1-
7	Rin2+	8	Rin2-
9	CLK1+	10	CLK1-
11	Rin3+	12	Rin3-
13	GND	14	GND
15	Rin4+	16	Rin4-
17	Rin5+	18	Rin5-
19	Rin6+	20	Rin6-
21	CLK2+	22	CLK2-
23	Rin7+	24	Rin7-
25	GND	26	GND
27	LCD_VDD	28	LCD_VDD
29	LCD_VDD	30	LCD_VDD

Table 4-16: TFT LCD LVDS Port Connector Pinouts

4.2.15 Internal USB Connectors

- CN Label:** USB1
- CN Type:** 8-pin header (2x4)
- CN Location:** See **Figure 4-16**
- CN Pinouts:** See **Table 4-17**

One 2x4 pin connector provides connectivity to two USB 2.0 ports. The USB ports are used for I/O bus expansion.

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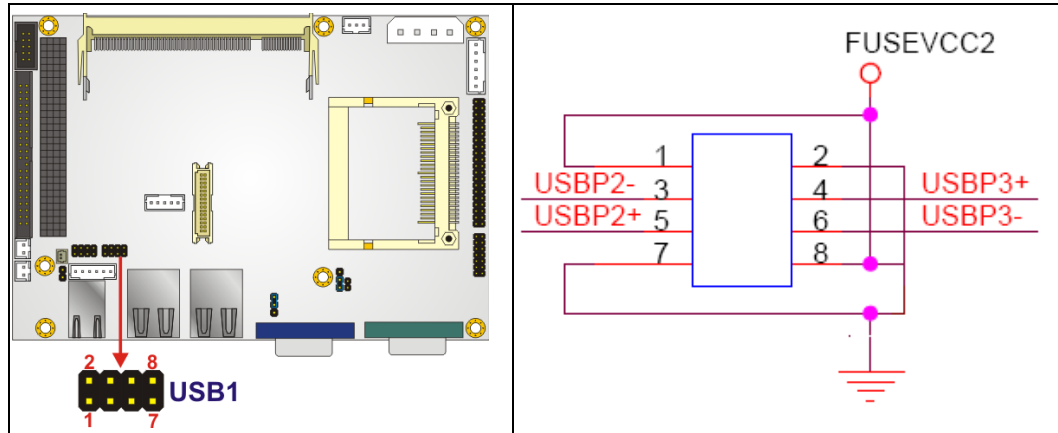


Figure 4-16: Internal USB Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GROUND
3	DATA0-	4	DATA0+
5	DATA0+	6	DATA0-
7	GROUND	8	VCC

Table 4-17: Internal USB Connector Pinouts

4.3 External Peripheral Interface Connectors

4.3.1 External Peripheral Interface Connector Overview

The WAFER-8522 external peripheral interface connectors are listed below and shown in Figure 4-17:

- 2 x RJ-45 Ethernet connector
- 1 x Serial communications port
- 2 x USB combo ports
- 1 x VGA port



Figure 4-17: WAFER-8522 On-board External Interface Connectors

4.3.2 RJ-45 Ethernet Connector

CN Label: LAN1 and LAN2

CN Type: RJ-45

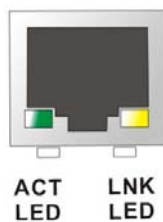
CN Location: See Figure 4-17

CN Pinouts: See Table 4-18

The RJ-45 Ethernet connector on the WAFER-8522 provides connectivity to a GbE Ethernet connection between the WAFER-8522 and a Local Area Network (LAN) through a network hub.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TX0+	5	TX2-
2	TX0-	6	TX1-
3	TX1+	7	TX3+
4	TX2+	8	TX3-

Table 4-18: RJ-45 Ethernet Connector Pinouts



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Figure 4-18: LAN Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 4-19**.

SPEED LED		ACT/LINK LED	
STATUS	DESCRIPTION	STATUS	DESCRIPTION
OFF	10Mbps connection	OFF	No link
ORANGE	100Mbps connection	YELLOW	Linked
GREEN	1Gbps connection	BLINKING	Data Activity

Table 4-19: RJ-45 Ethernet Connector LEDs

4.3.3 Serial Port Connector (COM1)

CN Label: COM1

CN Type: DB-9 connector

CN Location: See **Figure 4-17**

CN Pinouts: See **Table 4-20** and **Figure 4-19**

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

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTX
4	DTR	9	RI
5	GND		

Table 4-20: RS-232 Serial Port (COM 1) Pinouts

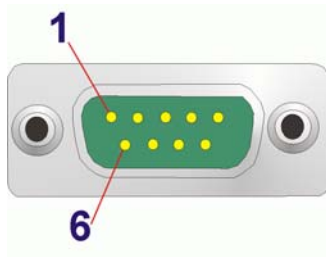


Figure 4-19: Serial Port Pinout Locations

4.3.4 USB Combo Ports

- CN Label:** J2
- CN Type:** USB Combo port
- CN Location:** See **Figure 4-17**
- CN Pinouts:** See **Table 4-21**

The two USB combo ports provide connectivity to USB devices. The USB port support both USB 1.1 and USB 2.0.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USBVCC0	5	USBVCC1
2	USBP0-	6	USBP1-
3	USBP0+	7	USBP1+
4	USBGND0	8	USBGND1

Table 4-21: USB Connector Pinouts

4.3.5 VGA Connector

- CN Label:** VGA1
- CN Type:** DB15
- CN Location:** See **Figure 4-17**

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CN Pinouts: See **Figure 4-20** and **Table 4-22**

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

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

Table 4-22: VGA Connector Pinouts

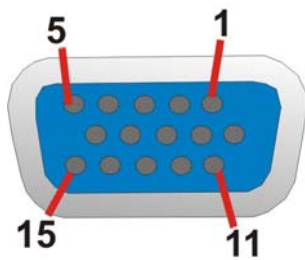


Figure 4-20: VGA Connector

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Chapter

5

Installation

5.1 Anti-static Precautions



WARNING:

Failure to take ESD precautions during the installation of the WAFER-8522 may result in permanent damage to the WAFER-8522 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the WAFER-8522. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the WAFER-8522, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband:*** - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding:***- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** When configuring the WAFER-8522, place it on an anti-static pad. This reduces the possibility of ESD damaging the WAFER-8522.
- ***Only handle the edges of the PCB:-:*** When handling the PCB, hold the PCB by the edges.

5.2 Installation Considerations



NOTE:

The following installation notices and installation considerations should be read and understood before the WAFER-8522 is installed. All installation notices pertaining to the installation of the WAFER-8522 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the WAFER-8522 and injury to the person installing the motherboard.

5.2.1 Installation Notices



WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the WAFER-8522, WAFER-8522 components and injury to the user.

Before and during the installation please DO the following:

- **Read the user manual:**
 - The user manual provides a complete description of the WAFER-8522 installation instructions and configuration options.
- **Wear an electrostatic discharge cuff (ESD):**
 - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- **Place the WAFER-8522 on an antistatic pad:**
 - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- **Turn all power to the WAFER-8522 off:**

- When working with the WAFER-8522, 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-8522 DO NOT:

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

5.2.2 Installation Checklist

The following checklist is provided to ensure the WAFER-8522 is properly installed.

- All the items in the packing list are present (see **Chapter 4**)
- A compatible memory module is properly inserted into the slot (see **Chapter 2**)
- The CF Type II card is properly installed into the CF socket
- The jumpers have been properly configured
- The WAFER-8522 is installed into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
 - Audio kit
 - Power supply
 - Serial port cables
- The following external peripheral devices are properly connected to the chassis:
 - VGA screen
 - RS-232 serial communications device
 - USB devices

5.3 SO-DIMM Module Installation and CF Card Installation

5.3.1 SO-DIMM Installation



WARNING:

Using incorrectly specified SO-DIMM may cause permanently damage the WAFER-8522. Please make sure the purchased SO-DIMM complies with the memory specifications of the WAFER-8522. SO-DIMM specifications compliant with the WAFER-8522 are listed in **Chapter 2**.

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

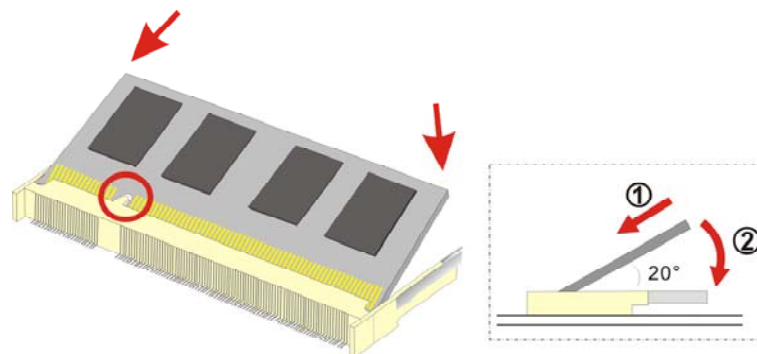


Figure 5-1: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket.** Place the WAFER-8522 on an anti-static pad with the solder side facing up.

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

Step 3: Insert the SO-DIMM. Push the SO-DIMM chip into the socket at an angle. (See

Figure 5-1)

- Step 4: Open the SO-DIMM socket arms.** Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM down. (See **Figure 5-1**)
- Step 5: Secure the SO-DIMM.** Release the arms on the SO-DIMM socket. They clip into place and secure the SO-DIMM in the socket.

5.3.2 CF Card Installation



The WAFER-8522 can support CF Type II cards. For the complete specifications of the supported CF cards please refer to **Chapter 2**.

To install a CF Type II card onto the WAFER-8522, please follow the steps below:

- Step 1: Locate the CF card socket.** Place the WAFER-8522 on an anti-static pad and locate the CF card.
- Step 2: Align the CF card.** Make sure the CF card is properly aligned with the CF socket.
- Step 3: Insert the CF card.** Gently insert the CF card into the socket making sure the socket pins are properly inserted into the socket. See **Figure 5-2**.

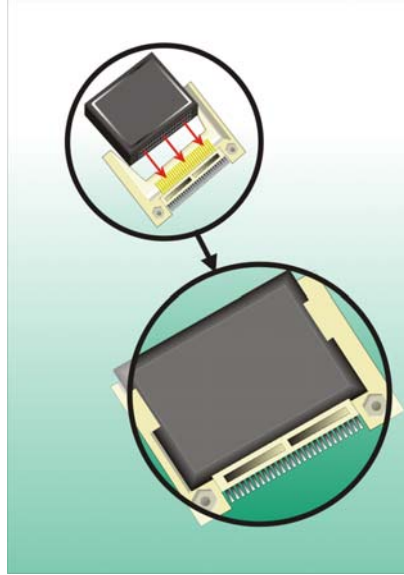


Figure 5-2: CF Card Installation

5.3.3 Mounting the WAFER-8522 Embedded Module

The WAFER-8522 embedded module has a standard PCI-104 connector on the front side. Baseboards can be designed by the end user, customized by IEI, or purchased from IEI. For more information visit the IEI website (www.ieiworld.com) or contact an IEI sales representative.

To install the module, follow the instructions below.

Step 1: Remove the four retention screws that secure the WAFER-8522 to the enclosure heat sink.

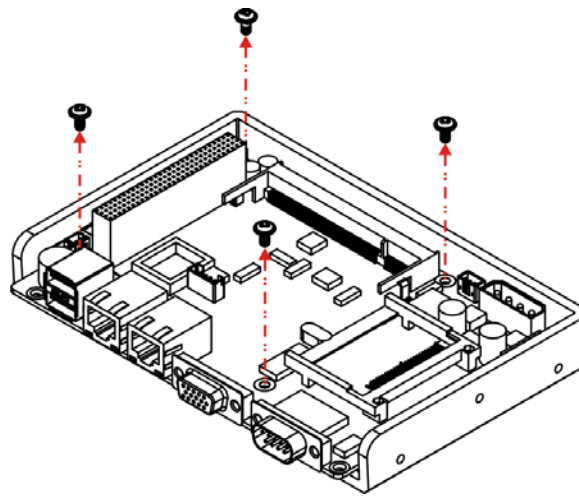


Figure 5-3: Enclosure Heat Sink Retention Screws

Step 2: Insert four hexagonal copper pillars (M3*25mm) to the retention screw holes.

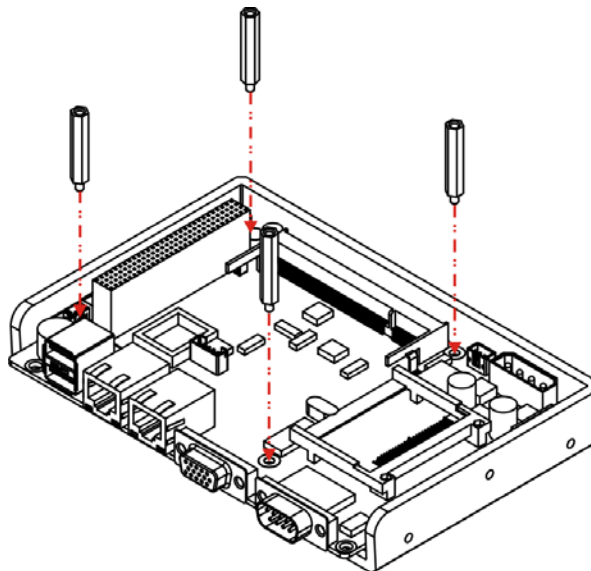


Figure 5-4: PCI-104 Module Installation (Hexagonal Copper Pillars)

Step 3: Align the PCI-104 connector with the corresponding connector on a compatible module.

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Step 4: Gently push the embedded module down to ensure the connectors are properly connected. Align the retention screw holes in the PCI-104 module with the copper pillars.

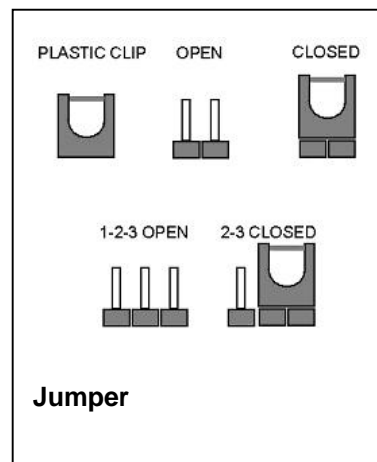
Step 5: Re-insert the four previously removed retention screws into the PCI-104 module.

5.4 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.



Before the WAFER-8522 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the WAFER-8522 are listed in **Table 5-1**.

Description	Label	Type
CF card setup	JP3	2-pin header
Clear CMOS	JP2	2-pin header
COM port select	JP4	3-pin header
LCD voltage select	JP5	3-pin header
LCD panel resolution select	JP1	8-pin header

Table 5-1: Jumpers

5.4.1 CF Card Setup Jumper Settings

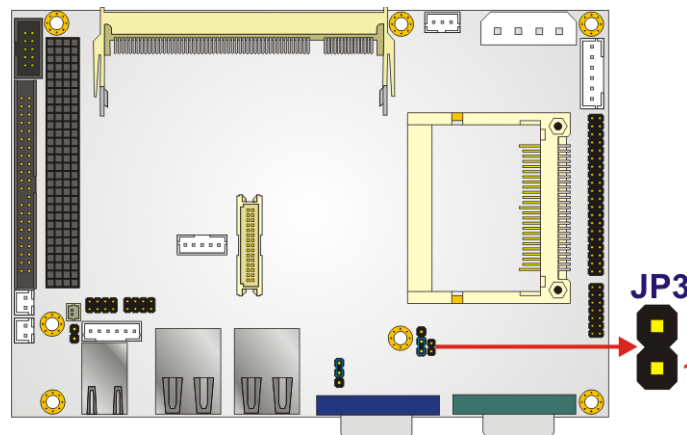
- Jumper Label:** JP3
- Jumper Type:** 2-pin header
- Jumper Settings:** See Table 5-2
- Jumper Location:** See Figure 5-5

The CF Card Setup jumper sets the compact flash card as either the slave device or the master device. Make the necessary jumper setting in accordance with the settings shown in Table 5-2.

CF Card Setup	Description	
Short	Master	Default
Open	Slave	

Table 5-2: CF Card Setup Jumper Settings

The location of the CF Card Setup jumper is shown in **Figure 5-5** below.



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Figure 5-5: CF Card Setup Jumper Location

5.4.2 Clear CMOS Jumper

Jumper Label:	JP2
Jumper Type:	2-pin header
Jumper Settings:	See Table 5-3
Jumper Location:	See Figure 5-6

If the WAFER-8522 fails to boot due to improper BIOS settings, the CMOS can be cleared using the battery connector. Disconnect the battery from the connector for a few seconds then reconnect the battery. The CMOS should be cleared.

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

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

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

The clear CMOS jumper settings are shown in **Table 5-3**.

Clear CMOS	Description	
Open	Keep CMOS Setup	Default
Short	Clear CMOS Setup	

Table 5-3: JP2 Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 5-6** below.

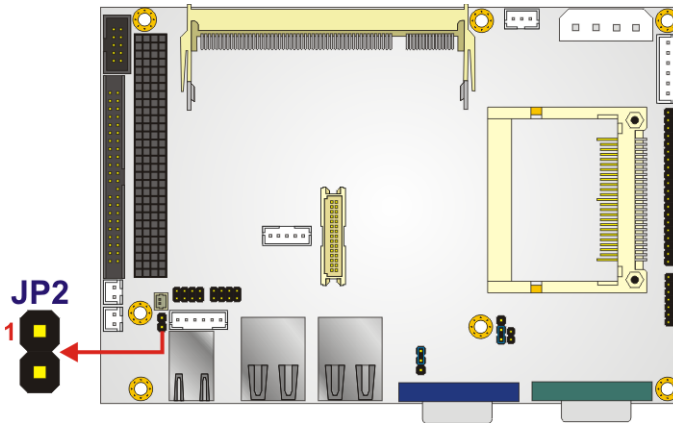


Figure 5-6: JP2 Clear CMOS Jumper

5.4.3 COM Port Setting Jumper

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

The JP4 jumper sets the communication protocol used by the second serial communications port (COM 2) as RS-232, RS-422 or RS-485. The COM Port Setting jumper selection options are shown in **Table 5-4**.

JP4	Description	
Short 1-2	RS-232	Default
Short 2-3	RS-422/485	

Table 5-4: COM Port Setting Jumper Settings

The COM Port Setting jumper location is shown in **Figure 5-7** below.

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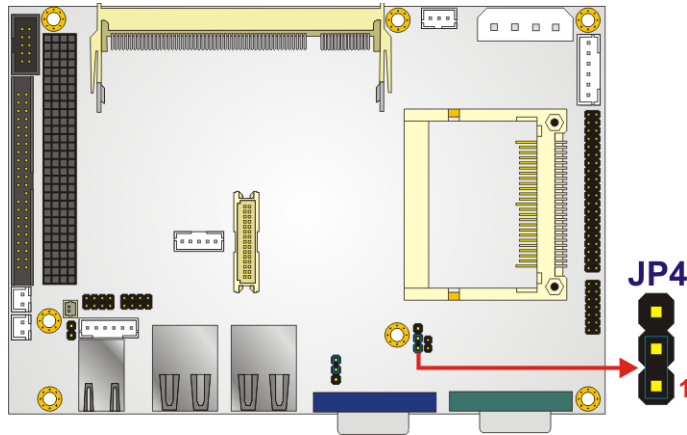


Figure 5-7: COM Port Setting Jumper Location

5.4.4 LCD Voltage Selection



WARNING:

Permanent damage to the screen and WAFER-8522 may occur if the wrong voltage is selected with this jumper. Please refer to the user guide that came with the monitor to select the correct voltage.

- Jumper Label:** JP5
- Jumper Type:** 3-pin header
- Jumper Settings:** See Table 5-5
- Jumper Location:** See Figure 5-8

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

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

Table 5-5: LCD Voltage Selection Jumper Settings

The LCD Voltage Selection jumper location is shown in **Figure 5-8**.

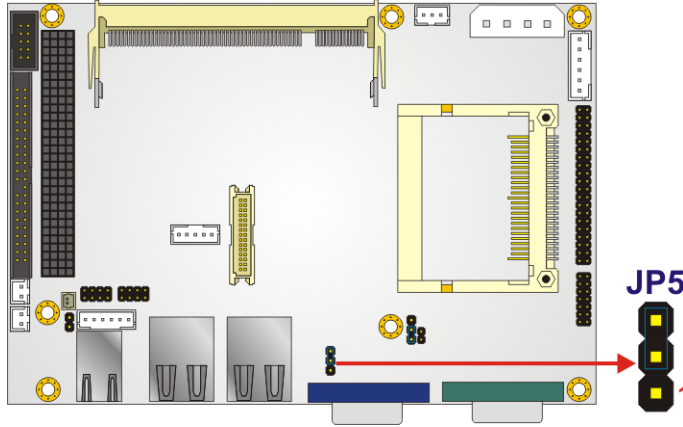


Figure 5-8: LCD Voltage Selection Jumper Location

5.4.5 LCD Resolution Selection

- Jumper Label:** JP1
- Jumper Type:** 8-pin header
- Jumper Settings:** See **Table 5-6**
- Jumper Location:** See **Figure 5-9**

Use the LCD Resolution jumper to select the resolution of the LCD. The LCD Resolution settings are shown in **Table 5-6**.

PIN NO.				Description
7-8	5-6	3-4	1-2	
Open	Open	Open	Open	For BIOS Setting
Open	Open	Open	Short	Type 0: 640x480 18-bit
Open	Open	Short	Open	Type 1: 800x600 18-bit
Open	Open	Short	Short	Type 2: 1024x768 18-bit
Open	Short	Open	Open	Type 3: 1280x1024 48-bit
Open	Short	Open	Short	Type 4: 1400x1050 48-bit

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Open	Short	Short	Open	Type 5: 1400x1050 36-bit
Open	Short	Short	Short	Type 6: 1600x1200 48-bit
Short	Open	Open	Open	Type 7: 1280x768 18-bit
Short	Open	Open	Short	Type 8: 1600x1050 48-bit
Short	Open	Short	Open	Type 9: 1920x1200 36-bit
Short	Open	Short	Short	Type 10: 1024x768 24-bit
Short	Short	Open	Open	Type 11: Reserved
Short	Short	Open	Short	Type 12: Reserved
Short	Short	Short	Open	Type 13: Reserved
Short	Short	Short	Short	Type 14: Reserved

Table 5-6: LCD Resolution Jumper Settings

The LCD resolution jumper location is shown in **Figure 5-9**.

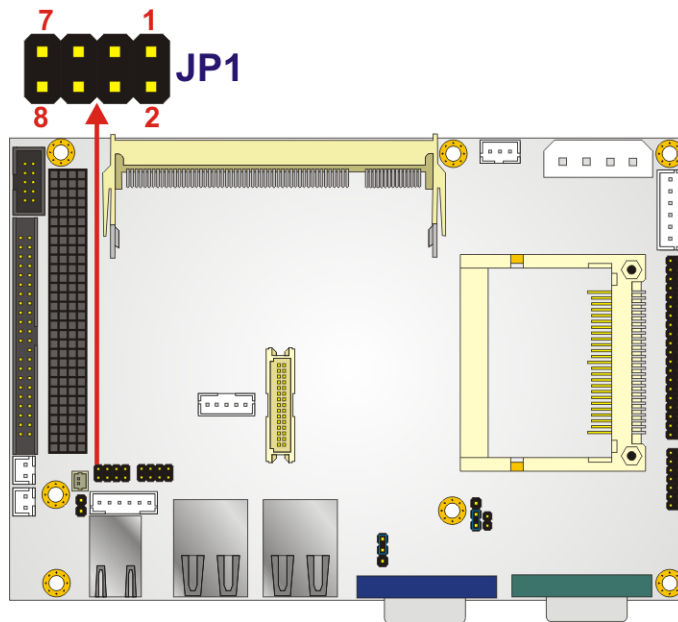


Figure 5-9: LCD Resolution Jumper Location

5.5 Chassis Installation

5.5.1 Airflow



WARNING:

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the WAFER-8522 must have air vents to allow cool air to move into the system and hot air to move out.

The WAFER-8522 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

5.5.2 Motherboard Installation

To install the WAFER-8522 motherboard into the chassis please refer to the reference material that came with the chassis.

5.6 Internal Peripheral Device Connections

5.6.1 Peripheral Device Cables

The cables listed in **Table 5-7** are shipped with the WAFER-8522.

Quantity	Type
1	Audio cable
1	IDE flat cable 44p/44p
1	4 COM port RS-232 cable
1	PS2 Keyboard/Mouse cable

Table 5-7: IEI Provided Cables

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5.6.2 ATA Flat Cable Connection

The IDE flat cable connects to the WAFER-8522 to one or two IDE devices. To connect an IDE HDD to the WAFER-8522 please follow the instructions below.

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

Step 2: Insert the connector. Connect the IDE cable connector to the onboard connector. See Figure 5-10. A key on the front of the cable connector ensures it can only be inserted in one direction.

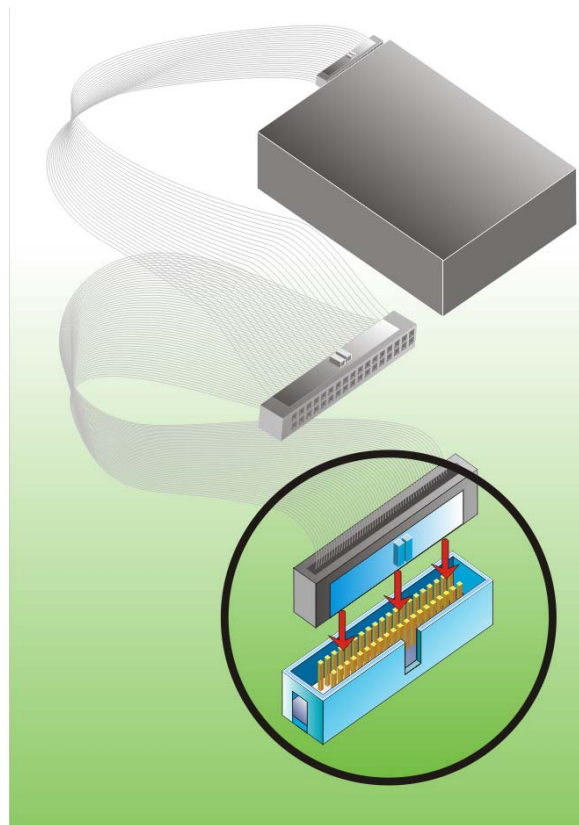


Figure 5-10: IDE Cable Connection

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

5.6.3 Audio Kit Installation

The Audio Kit that came with the WAFER-8522 connects to the 10-pin audio connector on the WAFER-8522. The audio kit consists of three audio jacks. One audio jack, Mic In, connects to a microphone. The remaining two audio jacks, Line-In and Line-Out, connect to two speakers. To install the audio kit, please refer to the steps below:

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

Step 2: Align pin 1. Align pin 1 on the onboard connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 5-11**.

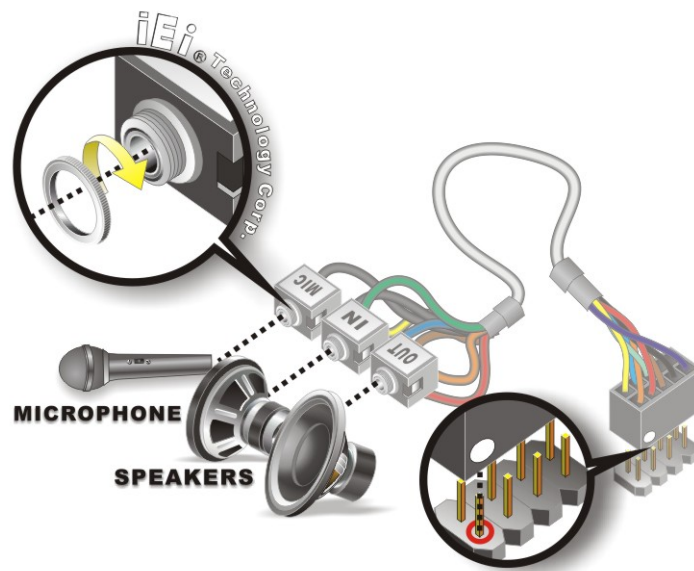


Figure 5-11: IDE Cable Connection

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

5.6.4 Keyboard/Mouse Y-cable Connector

The WAFER-8522 is shipped with a keyboard/mouse Y-cable connector. The keyboard/mouse Y-cable connector connects to a keyboard/mouse connector on the WAFER-8522 and branches into two cables that are each connected to a PS/2 connector, one for a mouse and one for a keyboard. To connect the keyboard/mouse Y-cable connector please follow the steps below.

- Step 1: Locate the connector.** The location of the keyboard/mouse Y-cable connector is shown in **Chapter 3**.
- Step 2: Align the connectors.** Correctly align pin 1 on the cable connector with pin 1 on the WAFER-8522 keyboard/mouse connector. See **Figure 5-12**.
- Step 3: Insert the cable connectors** Once the cable connector is properly aligned with the keyboard/mouse connector on the WAFER-8522, connect the cable connector to the onboard connectors. See **Figure 5-12**.

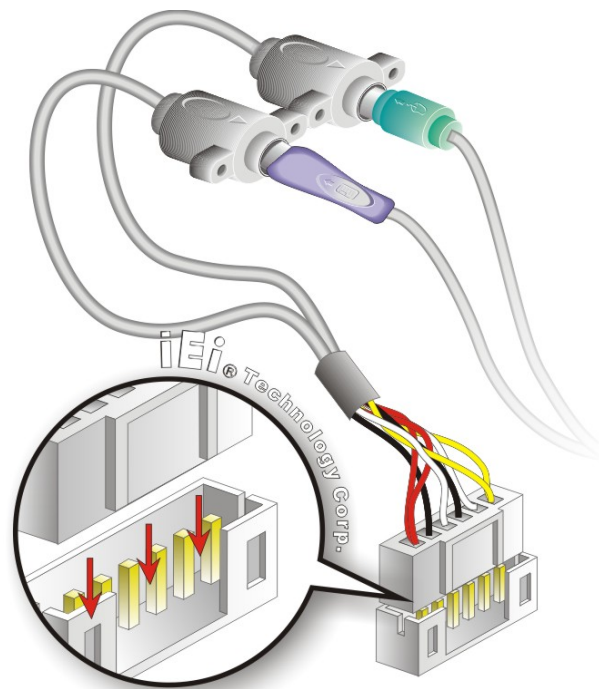


Figure 5-12: Keyboard/mouse Y-cable Connection

- Step 4: Attach PS/2 connectors to the chassis.** The keyboard/mouse Y-cable connector is connected to two PS/2 connectors. To secure the PS/2 connectors to the chassis please refer to the installation instructions that came with the chassis.
- Step 5: Connect the keyboard and mouse.** Once the PS/2 connectors are connected to the chassis, a keyboard and mouse can each be connected to one of the PS/2 connectors. The keyboard PS/2 connector and mouse PS/2 connector are both marked. Please make sure the keyboard and mouse are connected to the correct PS/2 connector.

5.6.5 Four Serial Port Connector Cable

The WAFER-8522 is shipped with one four serial port connector cable. The four serial port connector cable connects four serial port connectors on the cable to the 40-pin serial port connectors on the WAFER-8522. To connect the four serial port connector cable please follow the steps below.

- Step 1: Locate the serial port connector.** The location of the 40-pin serial port connector is shown in **Chapter 3**.
- Step 2: Align the connectors.** Correctly align pin 1 on the cable connector with pin 1 on the WAFER-8522 40-pin serial port connector. See **Figure 5-12**.
- Step 3: Insert the cable connectors** Once the cable connector is properly aligned with the 40-pin serial port connector on the WAFER-8522, connect the cable connector to the onboard connectors. See **Figure 5-12**.

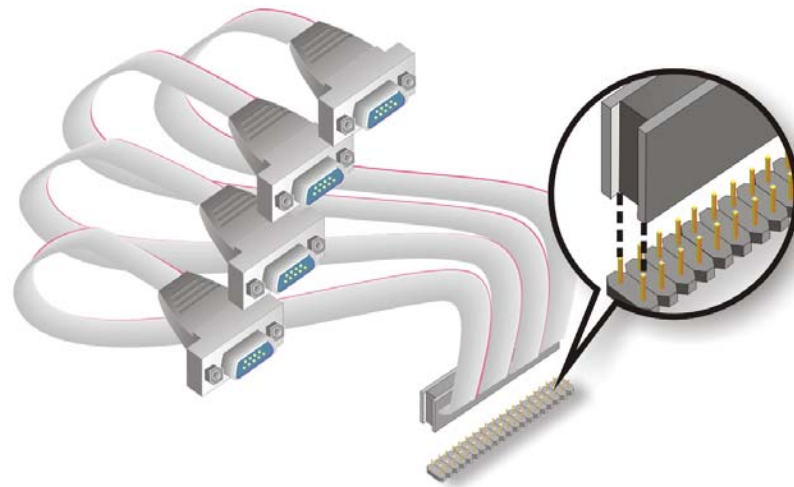


Figure 5-13: Four Serial Port Connector Cable Connection

Step 4: Attach DB-9 serial port connectors to the chassis. The four DB-9 serial port connectors can be inserted into four preformed holes in the chassis. Once, inserted the DB-9 connectors should be secured to the chassis with the retention screws.

5.7 External Peripheral Interface Connection

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

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

To install these devices, connect the corresponding cable connector from the actual device to the corresponding WAFER-8522 external peripheral interface connector making sure the pins are properly aligned.

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Chapter

6

AMI BIOS

6.1 Introduction

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

6.1.1 Starting Setup

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

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

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

6.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **Esc** to quit. Navigation keys are shown 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
“+” key	Increase the numeric value or make changes

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

Table 6-1: BIOS Navigation Keys

6.1.3 Getting Help

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

6.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in **Chapter 5, Section 5.4.2**.

6.1.5 BIOS Menu Bar

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

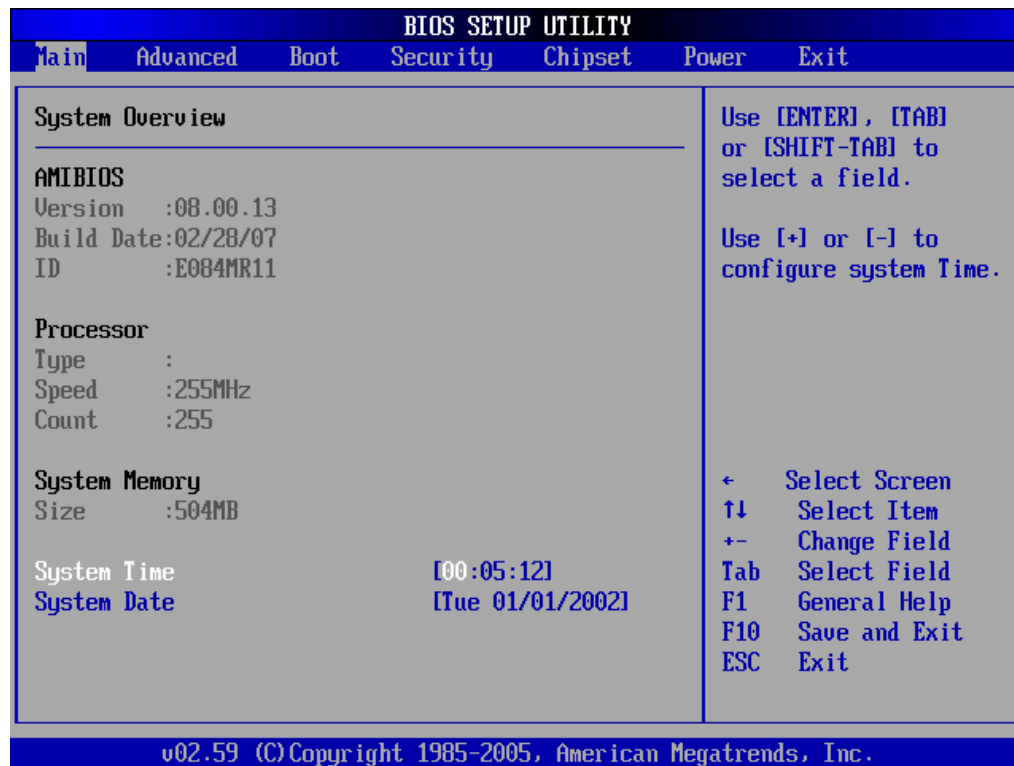
- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
-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

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

6.2 Main

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

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



BIOS Menu 1: Main

→ System Overview

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

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

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- **Type:** Names the currently installed processor
- **Speed:** Lists the processor speed
- **Count:** The number of CPUs on the motherboard
- **System Memory:** Displays the auto-detected system memory.
 - **Size:** Lists memory size

The System Overview field also has two user configurable fields:

→ **System Time [xx:xx:xx]**

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

→ **System Date [xx/xx/xx]**

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

6.3 Advanced

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

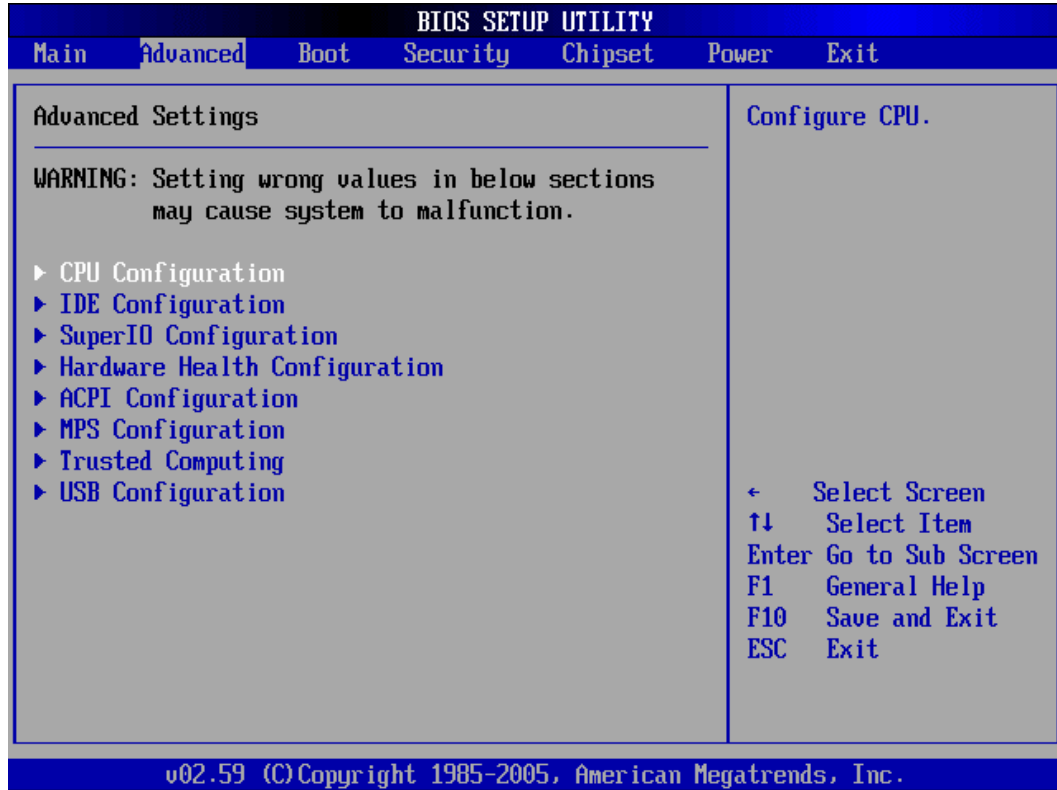


WARNING:

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

- CPU Configuration (see **Section 6.3.1**)
- IDE Configuration (see **Section 6.3.2**)
- SuperIO Configuration (see **Section 6.3.3**)
- Hardware Health Configuration (see **Section 0**)
- MPS Configuration (see **Section 6.3.5**)

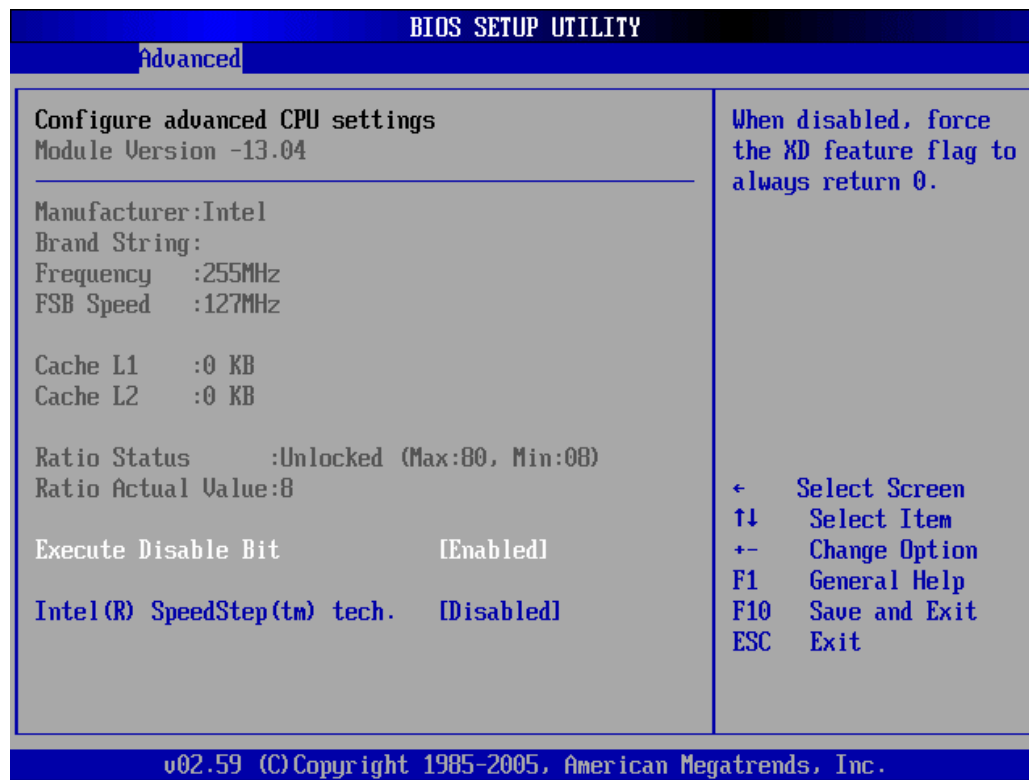
- Trusted Computing (see **Section 0**)
- USB Configuration (see **Section 6.3.7**)



BIOS Menu 2: Advanced

6.3.1 CPU Configuration

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



BIOS Menu 3: CPU Configuration

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

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

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

- Execute Disable Bit
- Intel® SpeedStep™ tech

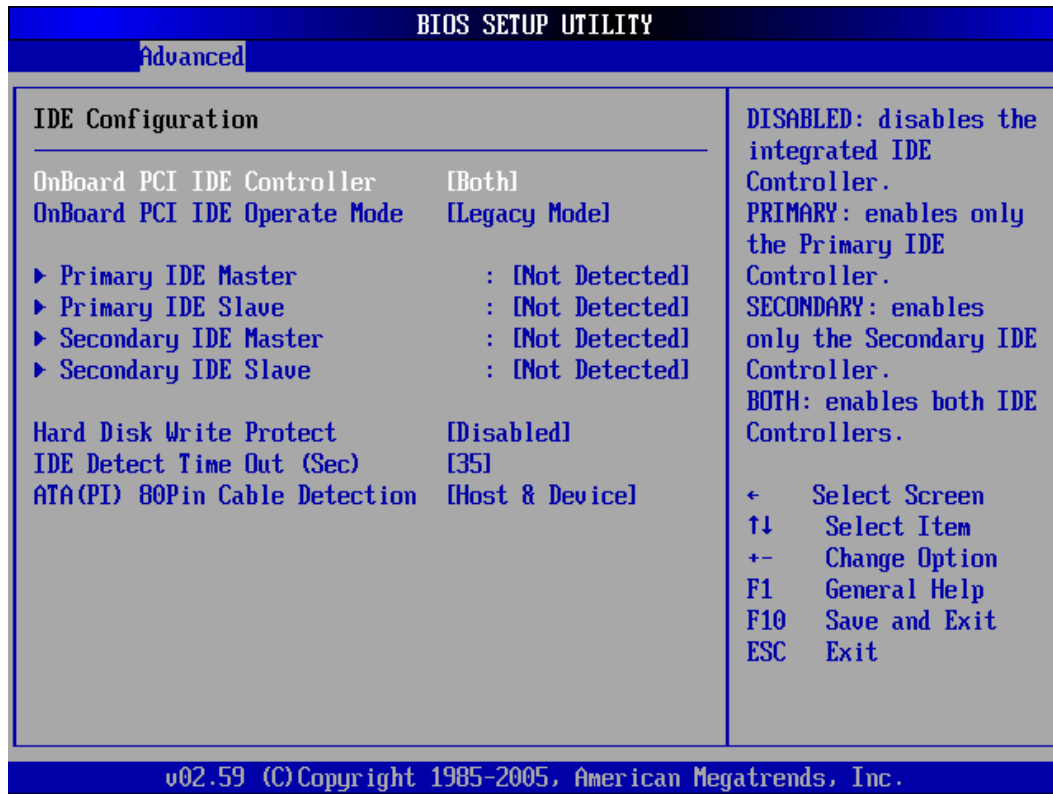
➔ **Execute Bit Disable [Enabled]**

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

- **Disabled** Code can be executed in any memory area.
- **Enabled** **DEFAULT** Code execution in data-only memory pages is prohibited.

6.3.2 IDE Configuration

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



BIOS Menu 4: IDE Configuration

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

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

- **Disabled** Prevents the system from using the onboard IDE controller
- **Primary** Only allows the system to detect the Primary IDE channel, including both the Primary Master and the Primary Slave
- **Secondary** Only allows the system to detect the Secondary IDE channel, including both the Secondary Master and Secondary Slave
- **Both** **DEFAULT** Allows the system to detect both the Primary and Secondary IDE channels including the Primary Master, Primary Slave, Secondary Master and Secondary Slave.

→ **Onboard PCI IDE Operate Mode [Legacy Mode]**

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

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

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

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

- **Disabled** **DEFAULT** Allows hard disks to be overwritten

→ **Enabled** Prevents hard disks from being overwritten

→ **IDE Detect Time Out (Sec) [35]**

The **IDE Detect Time Out (Sec)** BIOS option specifies the maximum time (in seconds) the AMI BIOS will search for IDE devices. This allows fine-tunes the settings to allow for faster boot times. The following configuration options are available.

- 0 seconds
- 5 seconds
- 10 seconds
- 15 seconds
- 20 seconds
- 25 seconds
- 30 seconds
- 35 seconds (Default)

The best setting to use if the onboard IDE controllers are set to a specific IDE disk drive in the AMI BIOS is “0 seconds” and a large majority of ultra ATA hard disk drives can be detected well within “35 seconds” (the default setting).

→ **ATA (PI) 80Pin Cable Detection [Host & Device]**

When an Ultra ATA/66, an Ultra ATA/100 or an Ultra ATA/133 IDE hard disk drive is used, an 80-conductor ATA cable must be used. The 80-conductor ATA cable is plug compatible with the standard 40-conductor ATA cable. The system must detect the presence of correct cable so that the AMIBIOS can instruct the drive to run at the correct speed for the cable type detected.

The **ATA (PI) 80Pin Cable Detection** BIOS option determines how the IDE cable will be detected.

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- ➔ **Host & Device** **DEFAULT** Both the motherboard onboard IDE controller and IDE disk drive are used to detect the type of IDE cable used.
- ➔ **Host** The motherboard onboard IDE controller detects the type of IDE cable used.
- ➔ **Device** The IDE disk drive to detects the type of IDE cable used.

➔ **IDE Master and IDE Slave**

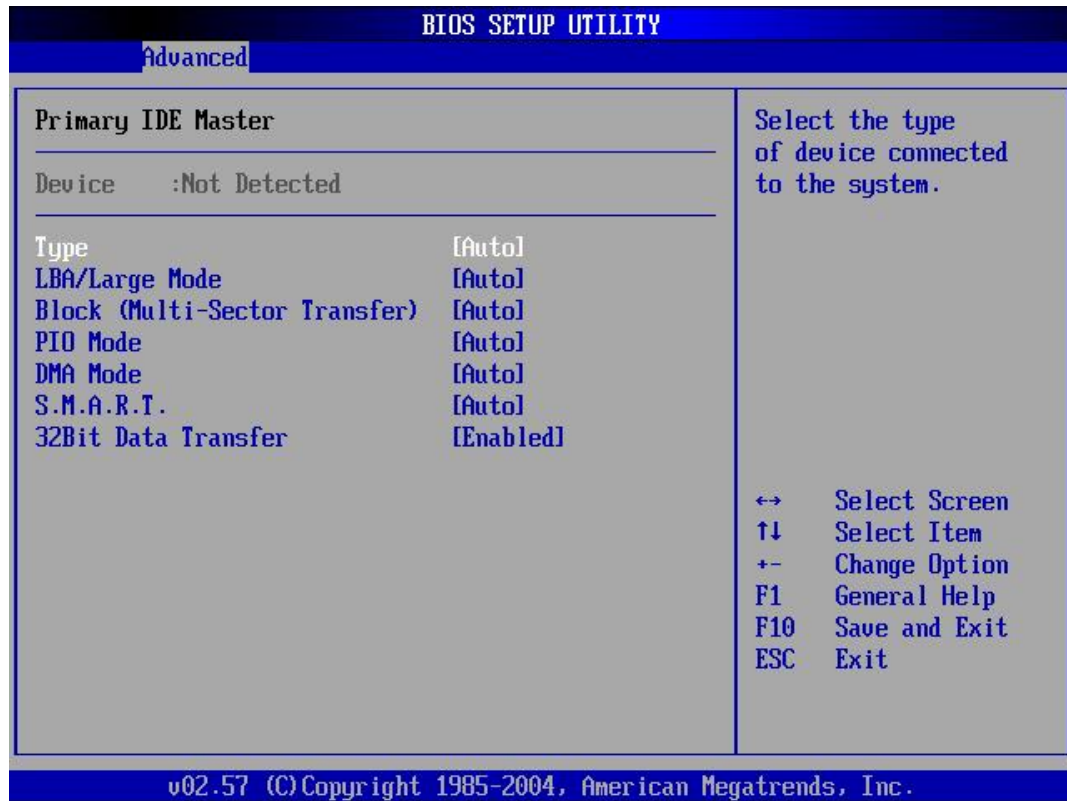
When entering setup, BIOS auto detects the presence of IDE devices. BIOS displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

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

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 6.3.2.1** appear.

6.3.2.1 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 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:

- **Type:** Lists the device type (e.g. hard disk, CD-ROM etc.)
- **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.
- **DMA Mode:** Indicates the highest Asynchronous DMA Mode that is supported.

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- **S.M.A.R.T.:** Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.

→ 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

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- 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.

→ 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

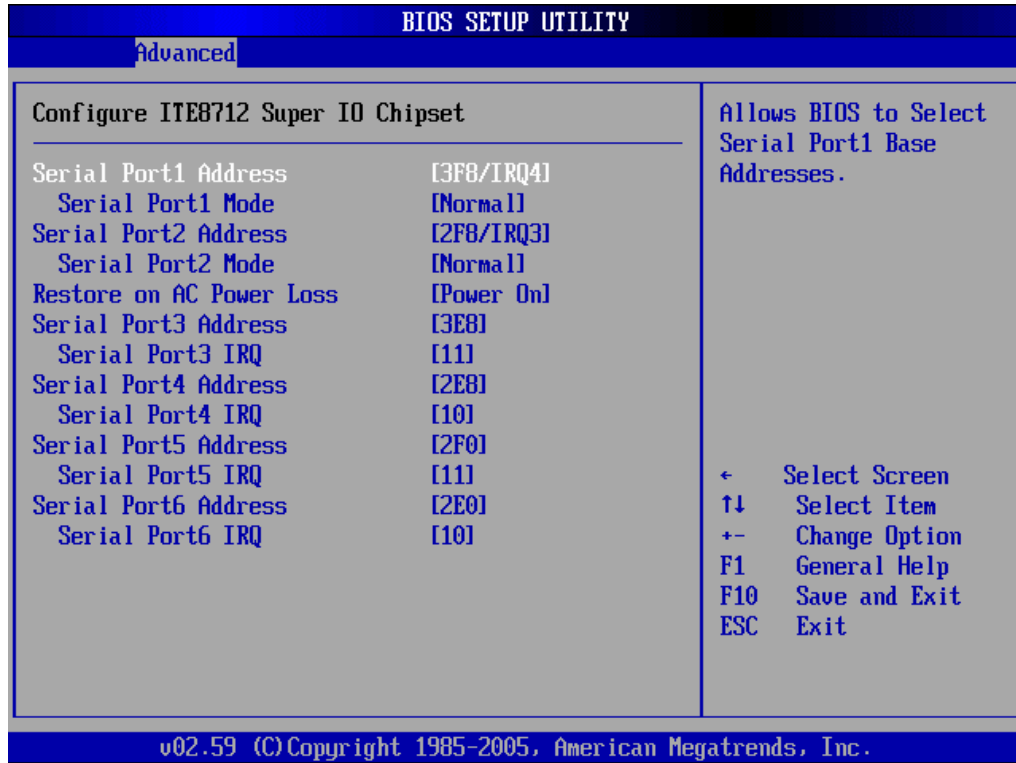
→ 32Bit Data Transfer [Disabled]

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

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

6.3.3 Super IO Configuration

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



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

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→ Serial Port1 Mode [Normal]

Use the **Serial Port1 Mode** option to select the transmitting and receiving mode for the first serial port.

- **Normal** (Default) Serial Port 1 mode is normal
- **IrDA** Serial Port 1 mode is IrDA
- **ASK IR** Serial Port 1 mode is ASK IR

→ 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
- **IrDA** Serial Port 2 mode is IrDA
- **ASK IR** Serial Port 2 mode is ASK IR

→ Restore on AC Power Loss [Power On]

The Restore on AC Power Loss BIOS option specifies 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.

➔ **Serial Port3 Address [3E8]**

Use the **Serial Port3 Address** option to select the base addresses 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
- ➔ **2F8** Serial port 3 I/O port address is 2F8
- ➔ **3E8** Serial port 3 I/O port address is 3E8
- ➔ **2E8** Serial port 3 I/O port address is 2E8
- ➔ **2F0** Serial port 3 I/O port address is 2F0
- ➔ **2E0** Serial port 3 I/O port address is 2E0

➔ **Serial Port3 IRQ [11]**

Use the **Serial Port3 IRQ** option to select the interrupt address for serial port 3.

- ➔ **4** Serial port 3 IRQ address is 4
- ➔ **9** Serial port 3 IRQ address is 9
- ➔ **10** Serial port 3 IRQ address is 10
- ➔ **11** **DEFAULT** Serial port 3 IRQ address is 11

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→ Serial Port4 Address [2E8]

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

- **Disabled** No base address is assigned to serial port 3
- **3F8** Serial port 4 I/O port address is 3F8
- **2F8** Serial port 4 I/O port address is 2F8
- **3E8** Serial port 4 I/O port address is 3E8
- **2E8** **DEFAULT** Serial port 4 I/O port address is 2E8
- **2F0** Serial port 4 I/O port address is 2F0
- **2E0** Serial port 4 I/O port address is 2E0

→ Serial Port4 IRQ [10]

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

- **3** Serial port 4 IRQ address is 3
- **9** Serial port 4 IRQ address is 9
- **10** **DEFAULT** Serial port 4 IRQ address is 10
- **11** Serial port 4 IRQ address is 11

→ Serial Port5 Address [2F0]

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

- **Disabled** No base address is assigned to serial port 3
- **3E8** Serial port 5 I/O port address is 3E8
- **2E8** Serial port 5 I/O port address is 2E8
- **2F0** **DEFAULT** Serial port 5 I/O port address is 2F0

- **2E0** Serial port 5 I/O port address is 2E0
- **2D8** Serial port 5 I/O port address is 2D8
- **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.

- **3** Serial port 4 IRQ address is 3
- **9** Serial port 4 IRQ address is 9
- **10** Serial port 4 IRQ address is 10
- **11** **DEFAULT** Serial port 4 IRQ address is 11

→ **Serial Port6 Address [2E0]**

Use the **Serial Port6 IRQ** option to select the interrupt address for serial port6.

- **Disabled** No base address is assigned to serial port 3
- **3E8** Serial port 6 I/O port address is 3E8
- **2E8** Serial port 6 I/O port address is 2E8
- **2F0** Serial port 6 I/O port address is 2F0
- **2E0** **DEFAULT** Serial port 6 I/O port address is 2E0
- **2D8** Serial port 6 I/O port address is 2D8
- **2D0** Serial port 6 I/O port address is 2D0

→ **Serial Port6 IRQ [10]**

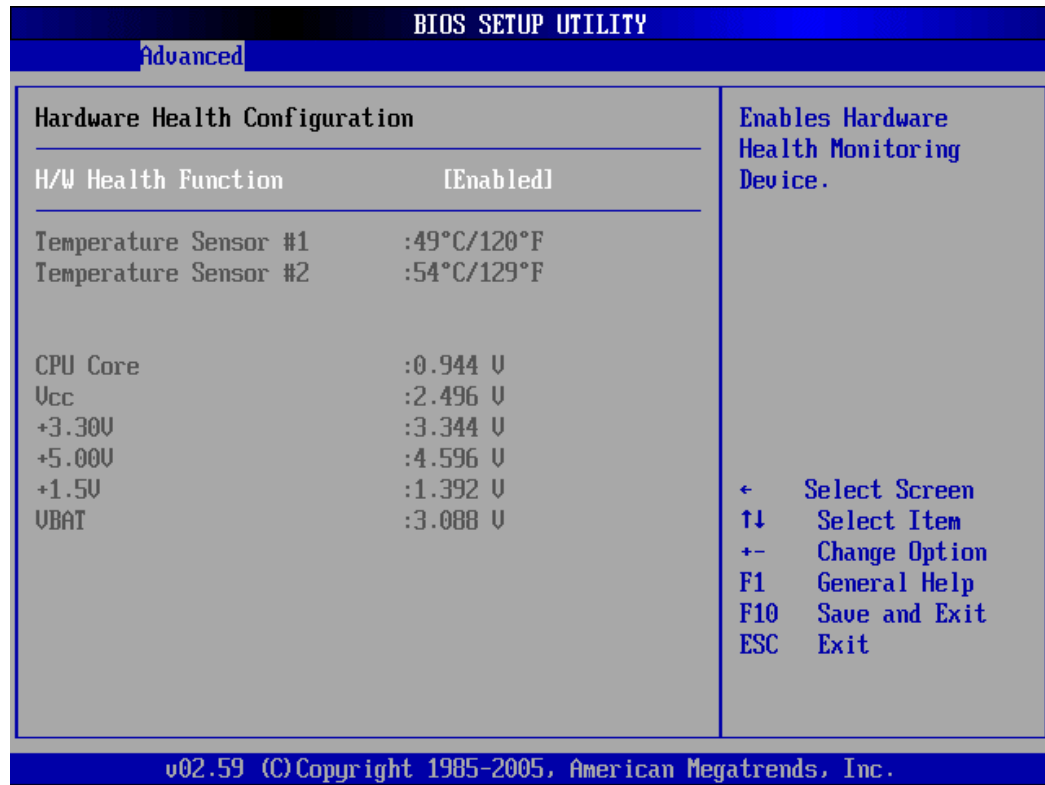
Use the **Serial Port6 IRQ** option to select the interrupt address for serial port 6.

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- 3 Serial port 6 IRQ address is 3
- 9 Serial port 6 IRQ address is 9
- 10 **DEFAULT** Serial port 6 IRQ address is 10
- 11 Serial port 6 IRQ address is 11

6.3.4 Hardware Health Configuration

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



BIOS Menu 7: Hardware Health Configuration

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

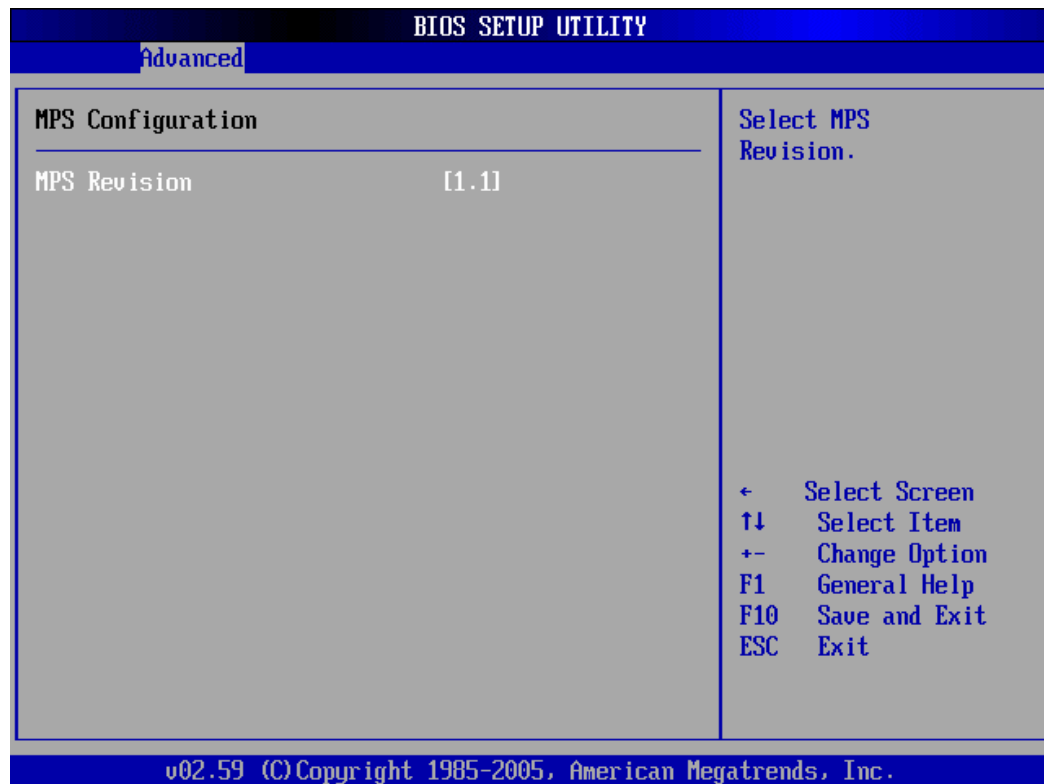
- **System Temperatures:** The following system temperatures are monitored
 - Temperature Sensor #1
 - Temperature Sensor #2
- **Voltages:** The following system voltages are monitored
 - CPU Core
 - VCC
 - +3.3V

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- +5.0V
- +1.5V
- VBAT

6.3.5 MPS Configuration

Use the MPS Configuration menu (**BIOS Menu 8**) to select the multi-processor table.



BIOS Menu 8: MPS Configuration

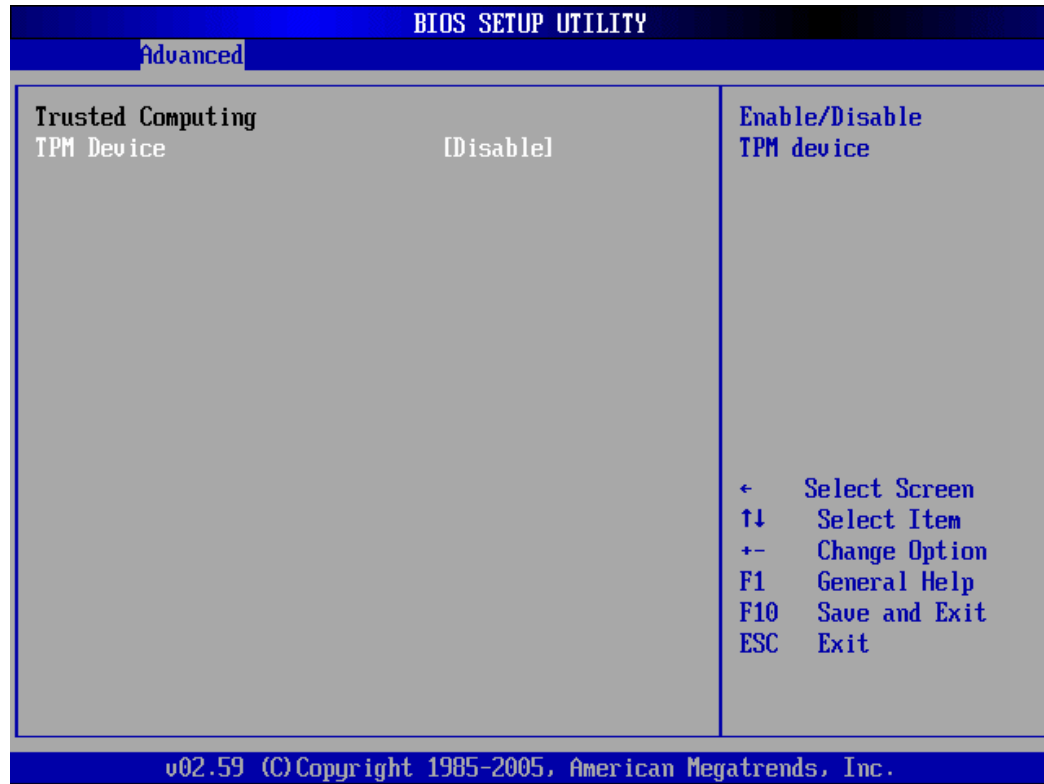
➔ MPS Revision [1.1]

Use the **Multiprocessor Specification (MPS) for OS** option to specify the MPS version to be used.

- ➔ 1.1 **DEFAULT** MPS version 1.1 is used
- ➔ 1.4 MPS version 1.4 is used

6.3.6 Trusted Computing

Use the Trusted Computing menu (**BIOS Menu 9**) to configure TPM parameters.



BIOS Menu 9: Trusted Computing

→ TPM Device [Disabled]

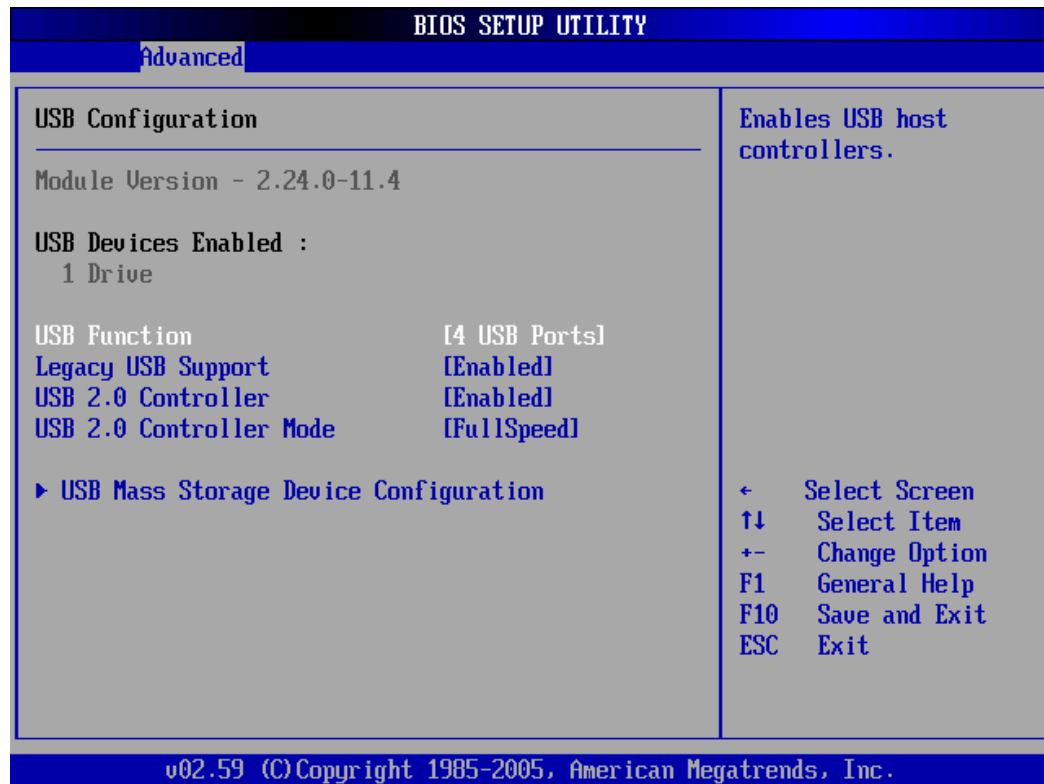
Use the **TPM Device** to disable or enable the system to support the Trusted Platform Module (TPM).

- **Disabled** DEFAULT TPM function not supported
- **Enabled** TPM function supported

6.3.7 USB Configuration

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Use the **USB Configuration** menu (**BIOS Menu 10**) to read USB configuration information and configure the USB settings.



BIOS Menu 10: USB Configuration

→ USB Configuration

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

- Module Version: 2.24.0-11.4

→ USB Devices Enabled

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

→ USB Function [4 USB Ports]

Use the **USB Function** BIOS option to enable USB host controllers.

- ➔ **Disabled** USB function support disabled
- ➔ **2 USB Ports** The USB controller activates 2 USB ports
- ➔ **4 USB Ports** **DEFAULT** The USB controller activates 4 USB ports

➔ **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** The Legacy USB support is automatically detected and enabled.

➔ **USB 2.0 Controller [Enabled]**

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

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

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

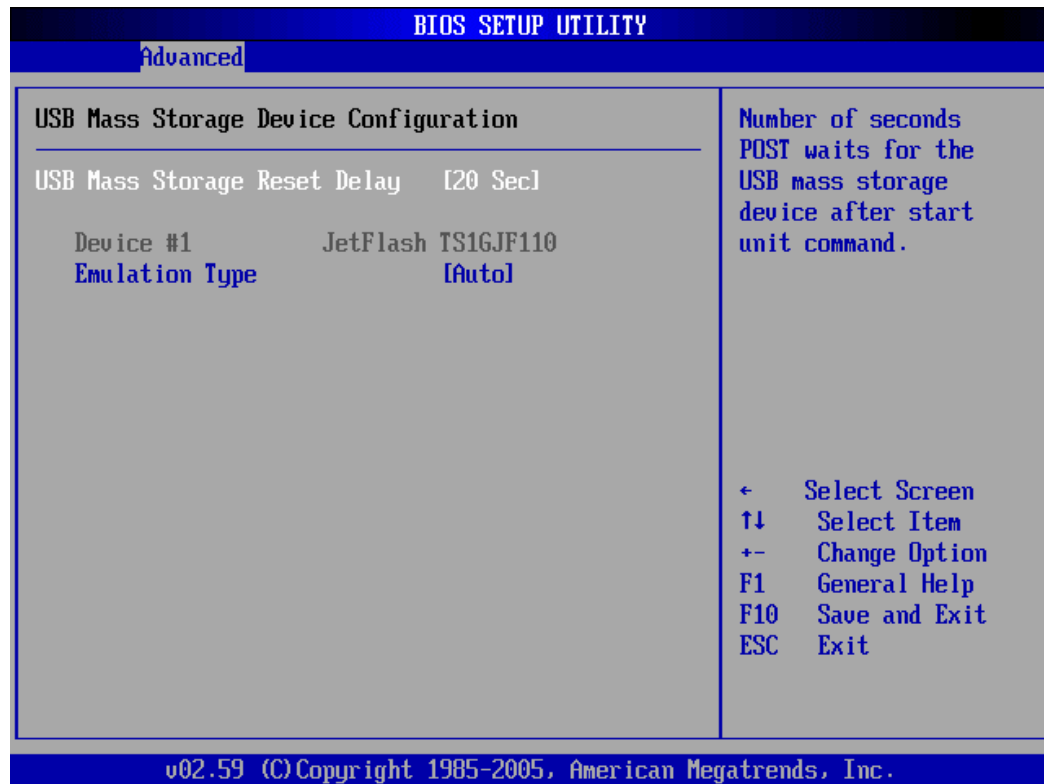
Use the **USB2.0 Controller Mode** option to set the speed of the USB2.0 controller.

- ➔ **FullSpeed** **DEFAULT** The controller is capable of operating at 12Mb/s
- ➔ **HiSpeed** The controller is capable of operating at 480Mb/s

WAFER-8522 Motherboard

6.3.7.1 USB Mass Storage Device Configuration

Use the **USB Mass Storage Device Configuration** menu (**BIOS Menu 11**) to configure USB mass storage class devices.



BIOS Menu 11: USB Mass Storage Device Configuration

→ Device

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

→ Emulation Type [Auto]

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

**NOTE:**

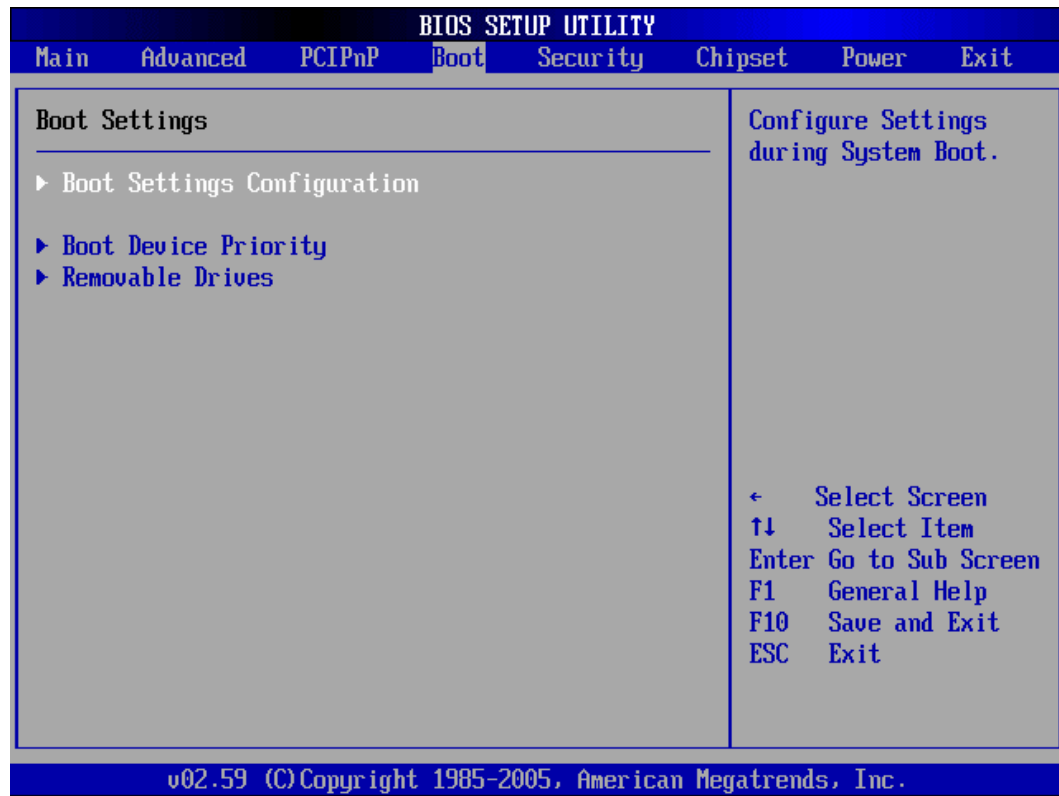
Please note that the device's formatted type and the emulation type provided by the BIOS must match for a device to boot properly. If both types do not match then device's behavior is undefined. To make sure both types match, format the device using BIOS INT13h calls after selecting the proper emulation option in BIOS setup. The FORMAT utility provided by Microsoft® MS-DOS®, Microsoft® Windows® 95, and Microsoft® Windows® 98 can be used for this purpose.

- | | | | |
|---|-------------------|----------------|--|
| → | Auto | DEFAULT | BIOS auto-detects the current USB. |
| → | Floppy | | The USB device will be emulated as a floppy drive. The device can be either A: or B: responding to INT13h calls that return DL = 0 or DL = 1 respectively. |
| → | Forced FDD | | Allows a hard disk image to be connected as a floppy image. This option works only for drives formatted with FAT12, FAT16 or FAT32. |
| → | Hard Disk | | Allows the USB device to be emulated as hard disk responding to INT13h calls that return DL values of 80h or above. |
| → | CDROM | | Assumes the CD-ROM is formatted as bootable media. All the devices that support block sizes greater than 512 bytes can only be booted using this option. |

6.4 Boot

WAFER-8522 Motherboard

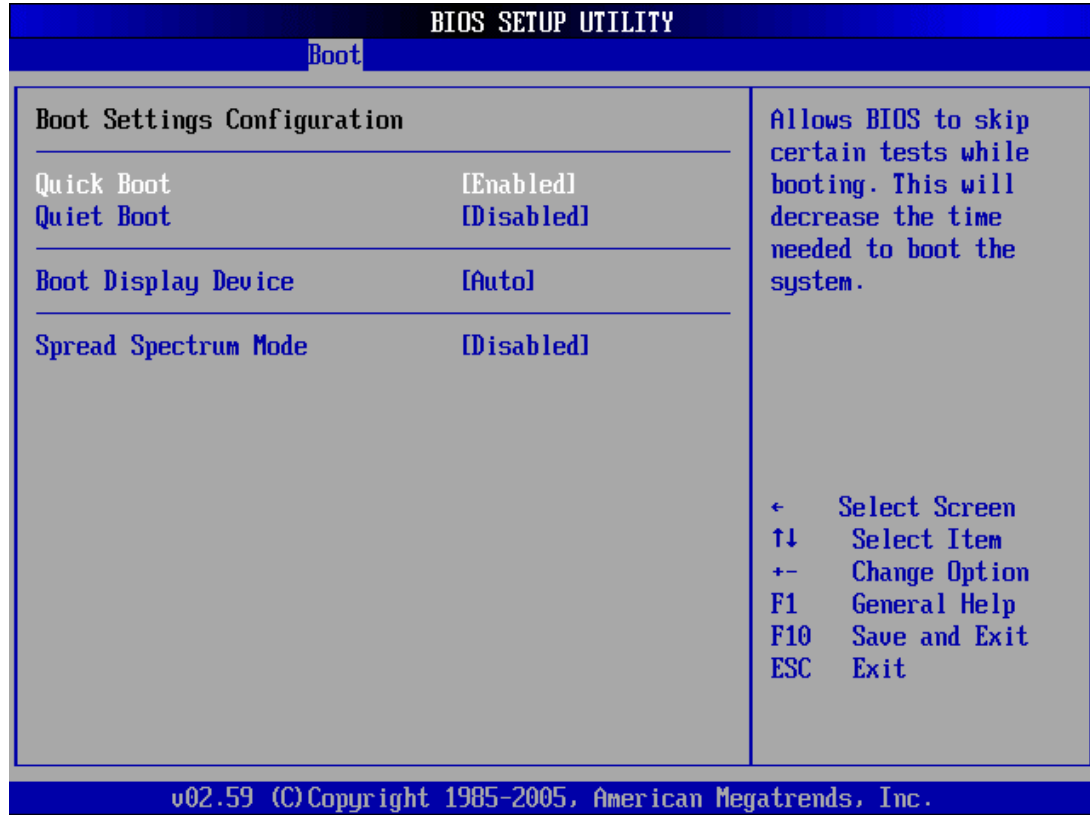
Use the Boot menu (**BIOS Menu 12**) to configure system boot options.



BIOS Menu 12: Boot

6.4.1 Boot Settings Configuration

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


BIOS Menu 13: Boot Settings Configuration
→ Quick Boot [Enabled]

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

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

→ Quiet Boot [Disabled]

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

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

WAFER-8522 Motherboard

→ Boot Display Device [Auto]

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

- Auto **DEFAULT**
- CRT
- LFP
- CRT + LFP

→ Spread Spectrum Mode [Disabled]

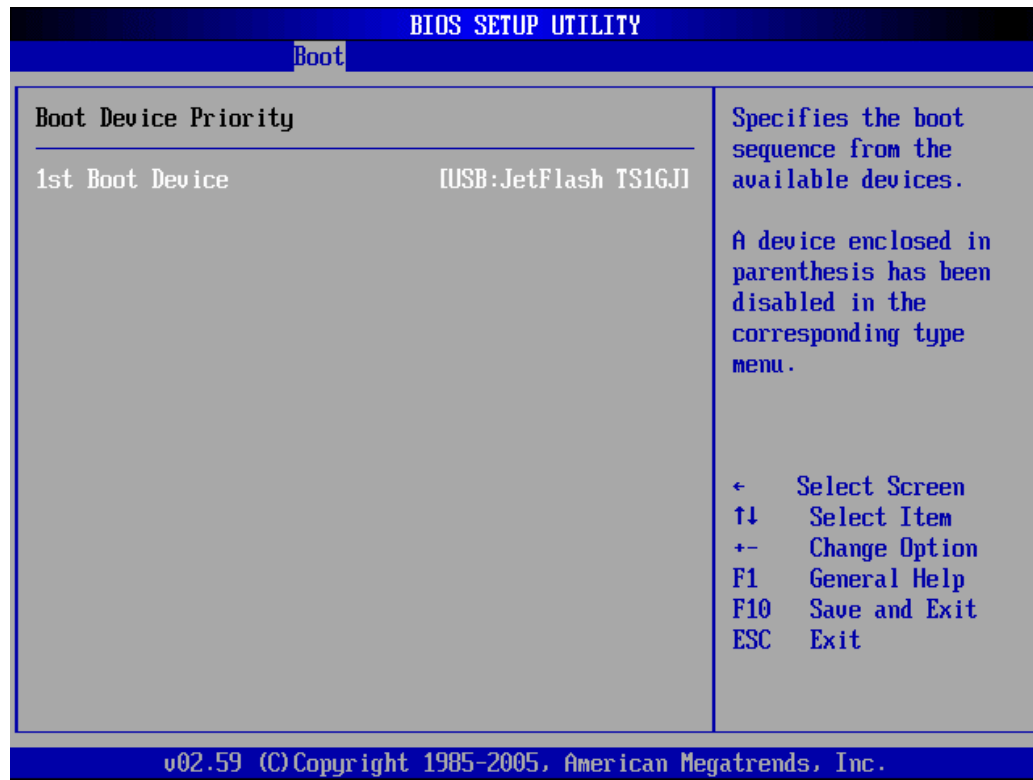
Use the **Spread Spectrum Mode** option to reduce the EMI. Excess EMI is generated when the system clock generator pulses have extreme values. Spreading the pulse spectrum modulates changes in the extreme values from spikes to flat curves, thus reducing the EMI. This benefit may in some cases be outweighed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

- Disabled **DEFAULT** EMI not reduced
- Enabled EMI reduced

6.4.2 Boot Device Priority

Use the **Boot Device Priority** menu (**BIOS Menu 14**) to specify the boot sequence from the available devices. Possible boot devices may include:

- HDD



BIOS Menu 14: Boot Device Priority Settings

6.4.3 Removable Drives

Use the **Removable Drives** menu (**BIOS Menu 15**) to specify the boot sequence of the available drives. When the menu is opened, the removable drives connected to the system are listed as shown below:

- 1st Drive [1st USB]

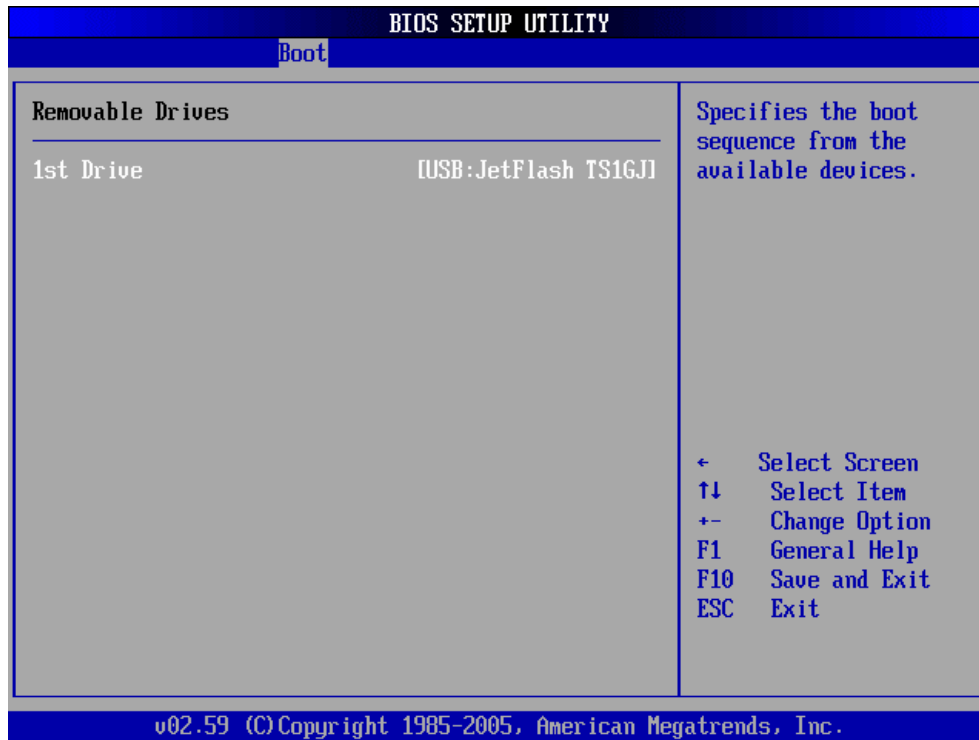


NOTE:

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

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



BIOS Menu 15: Removable Drives

6.5 Security

Use the Security menu (**BIOS Menu 16**) to set system and user passwords.



BIOS Menu 16: 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**.

→ Clear User Password

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Use the **Clear User Password** to clear a user password.

6.6 Chipset

Use the **Chipset** menu (**BIOS Menu 17**) to access the NorthBridge and SouthBridge configuration menus



WARNING!

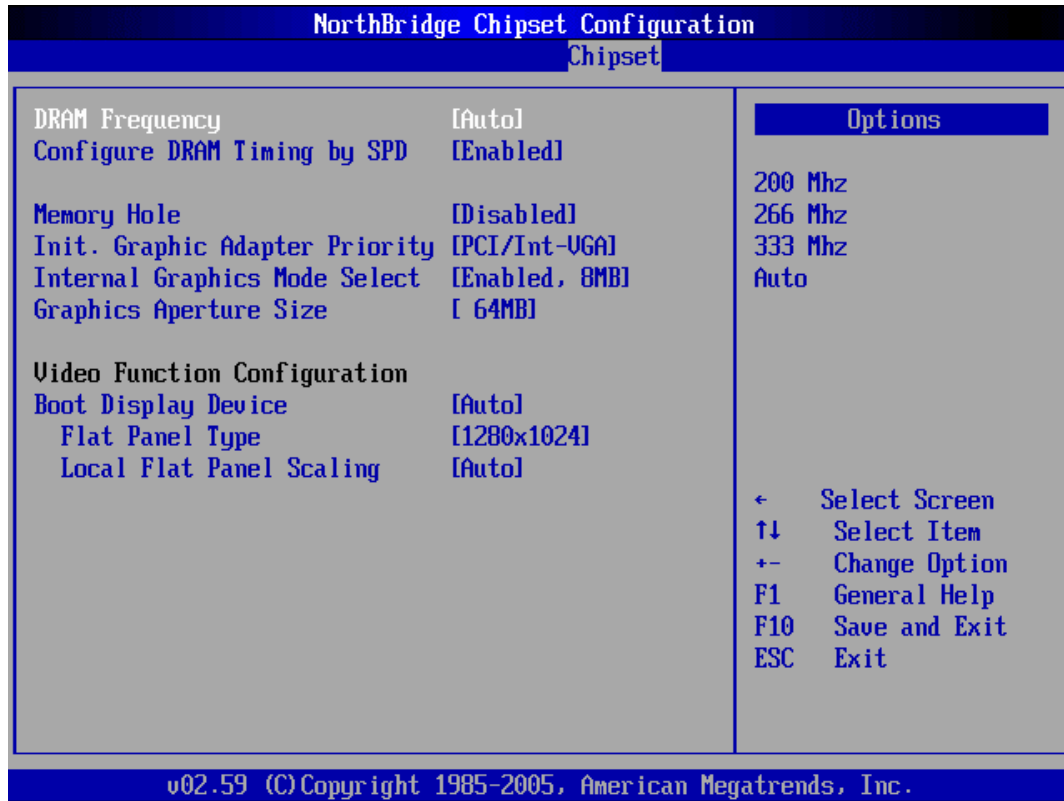
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 17: Chipset

6.6.1 NorthBridge Configuration

Use the NorthBridge Configuration menu (**BIOS Menu 18**) to configure the northbridge chipset.



BIOS Menu 18:NorthBridge Chipset Configuration

→ DRAM Frequency [Auto]

Use the **DRAM Frequency** option to specify the DRAM frequency or allow 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

→ Configure DRAM Timing by SPD [Enabled]

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Use the **Configure DRAM Timing by SPD** option to determine if the system uses the SPD (Serial Presence Detect) EEPROM to configure the DRAM timing. The SPD EEPROM contains all necessary DIMM specifications including the 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.

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

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

- DRAM CAS# Latency [3]
- DRAM RAS# to CAS# Delay [5 DRAM Clocks]
- DRAM RAS# Precharge [5 DRAM Clocks]
- DRAM RAS# Activate to Precha [15 DRAM Clocks]

➔ **Memory Hole [Disabled]**

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

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

➔ **Init. Graphic Adapter Priority [PCI/Int-VGA]**

The **Init. Graphic Adapter Priority** option selects the graphics controller the system uses as a primary boot device. The options are:

- Internal VGA
- PCI/Int-VGA **DEFAULT**

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

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

- **Disable**
- **Enable, 1MB** 1MB of memory used by internal graphics device
- **Enable, 4MB** 4MB of memory used by internal graphics device
- **Enable, 8MB** **DEFAULT** 8MB of memory used by internal graphics device
- **Enable, 16MB** 16MB of memory used by internal graphics device
- **Enable, 32MB** 32MB of memory used by internal graphics device

→ **Graphics Aperture Size [64MB]**

The **Graphics Aperture Size** option selects the size of the AGP aperture. The aperture is a portion of the PCI memory address range dedicated as graphics memory address space.

- **64MB** **DEFAULT** Graphics aperture size set as 64MB
- **128MB** Graphics aperture size set as 128MB
- **256MB** Graphics aperture size set as 256MB

→ **Boot Display Device [Auto]**

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

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- Auto **DEFAULT**
- CRT
- LFP
- CRT+LFP

→ Flat Panel Type [1280x1024]

The **Flat Panel Type** BIOS option specifies the flat panel PC type being used.



NOTE:

Please refer to the technical documents that came with the flat panel PC to ensure the correct settings are selected.

The following options are available:

- 640x480
- 800x600
- 1024x768
- 1280x1024
- 1400x1050
- 1600x1200
- 1400x900 36bits
- 1440x900 48bits
- 1280x800
- 1024x768 24bit
- 1024x768 48bit

→ Local Flat Panel Scaling [Auto]

The **Local Flat Panel Scaling** option selects the mode of the local flat panel scaling.

- **Auto** **DEFAULT** Automatically scale the connected local flat

➔ **Forced Scaling**

panel.

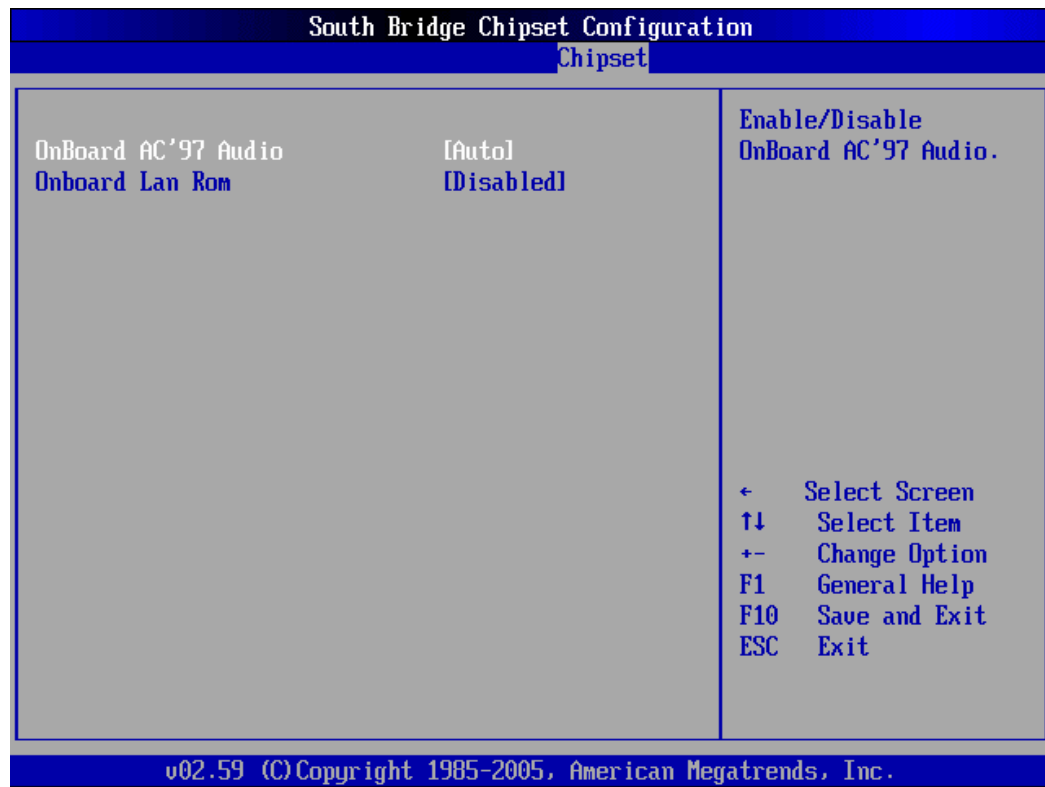
The connected local flat panel is forced to scale.

➔ **Disabled**

Disable the local flat panel scaling.

6.6.2 SouthBridge Configuration

The SouthBridge Intel ICH4 Configuration menu (**BIOS Menu 19**) the southbridge chipset to be configured.



BIOS Menu 19:SouthBridge Chipset Configuration

→ OnBoard AC97 Audio [Auto]

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

- **Auto** **DEFAULT** The onboard AC'97 automatically detected and enabled
- **Disabled** The onboard AC'97 is disabled

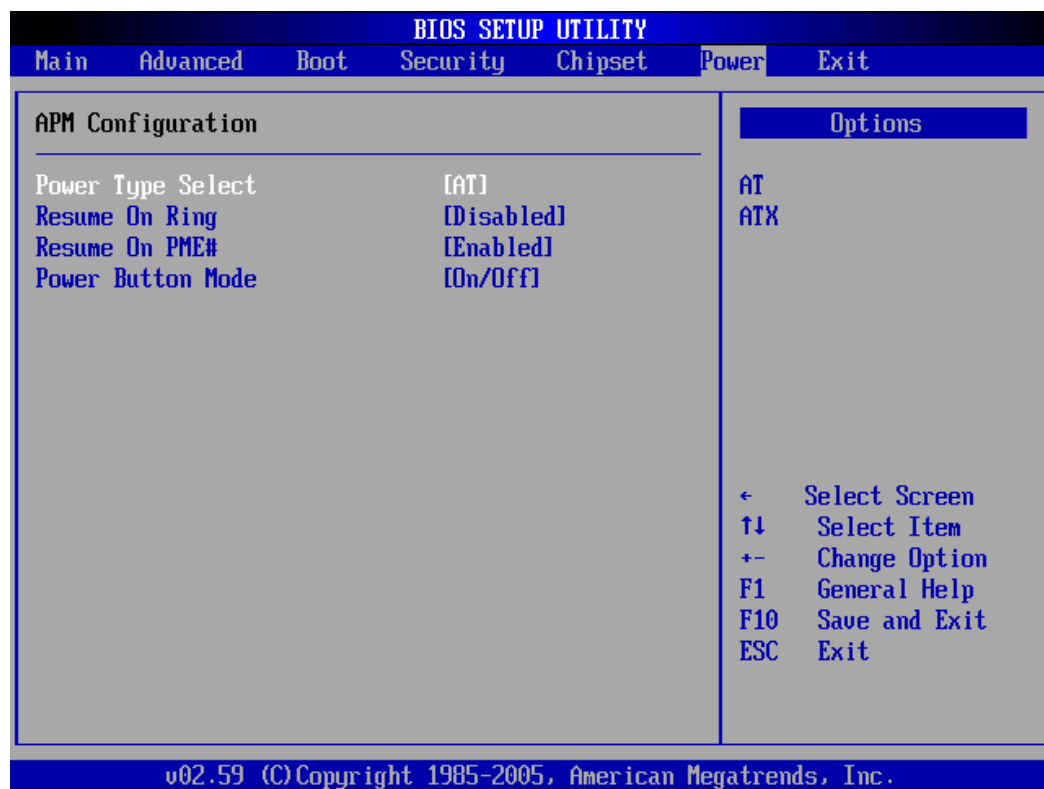
→ OnBoard Lan Rom [Disabled]

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

- ➔ **Enabled** The onboard LAN device automatically detected and enabled
- ➔ **Disabled** **DEFAULT** Onboard LAN device manually disabled

6.7 Power Key

The **Power** menu (**BIOS Menu 20**) allows the advanced power management options to be configured.



BIOS Menu 20:Power

➔ **Power Type Select [AT]**

Use the **Power Type Select** BIOS option to select the power supply that is connected to the system.

- ➔ **AT** **DEFAULT** An AT power supply is connected to the system

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→ **ATX** An ATX power supply is connected to the system

→ **Resume on Ring [Disabled]**

The **Resume on Ring** BIOS option specifies if the system will be roused from a suspended or standby state when there is activity on the RI (ring in) modem line. 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# [Enabled]**

The **Resume on PME#** BIOS option specifies if the system will be roused from a suspended or standby state when there is activity on the PCI PME (power management event) controller.

→ **Disabled** Wake event not generated by PCI PME controller activity

→ **Enabled** **DEFAULT** Wake event generated by PCI PME controller activity

→ **Power Button Mode [On/Off]**

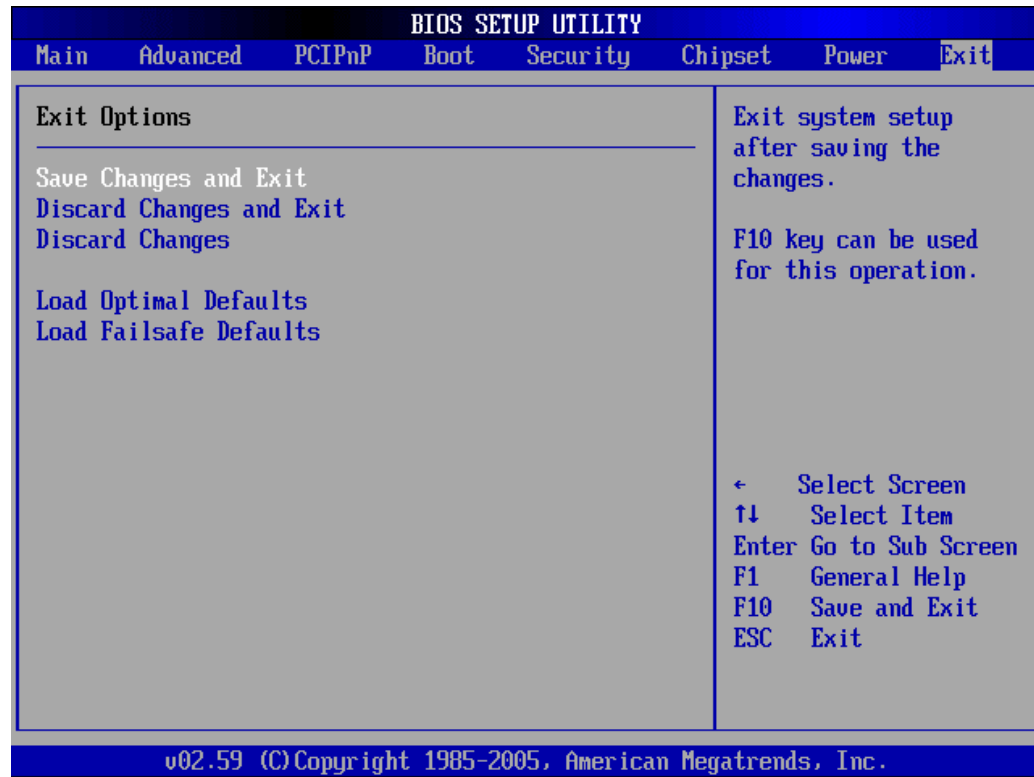
The **Power Button Mode** BIOS specifies how the power button functions.

→ **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

6.8 Exit

The **Exit** menu (**BIOS Menu 21**) loads default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 21:Exit

→ Save Changes and Exit

If configuration changes are complete, select this option to save them and exit the BIOS menus.

→ Discard Changes and Exit

If configuration changes are complete but do need to be saved, select this option to exit the BIOS menus.

→ Discard Changes

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If configuration changes are complete but do need to be saved but BIOS still needs to be run , select this option.

→ Load Optimal Defaults

This option loads optimal default values for each of the parameters on the Setup menus.

F9 key can be used for this operation.

→ Load Failsafe Defaults

This option loads failsafe default values for each of the parameters on the Setup menus.

F8 key can be used for this operation.

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Chapter

7

Software Drivers

7.1 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-8522 board has five software drivers:

- Chipset
- Audio
- LAN
- VGA

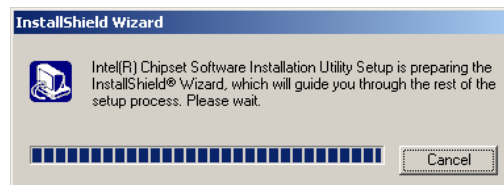
All five drivers can be found on the CD that came with the WAFER-8522. To install the drivers please follow the instructions in the sections below

7.2 Chipset Driver Installation

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

Step 1: Insert the CD into the system that contains the WAFER-8522 board. Open the Chipset/852GM directory and locate the icon for the Setup installation file. Once located, use the mouse to double click the icon.

Step 2: The “InstallShield Wizard Preparation Screen” in Figure 7-1 appears.



Step 3:

Figure 7-1: InstallShield Wizard Preparation Screen

Step 4: The “Welcome” window in Figure 7-2 appears next.

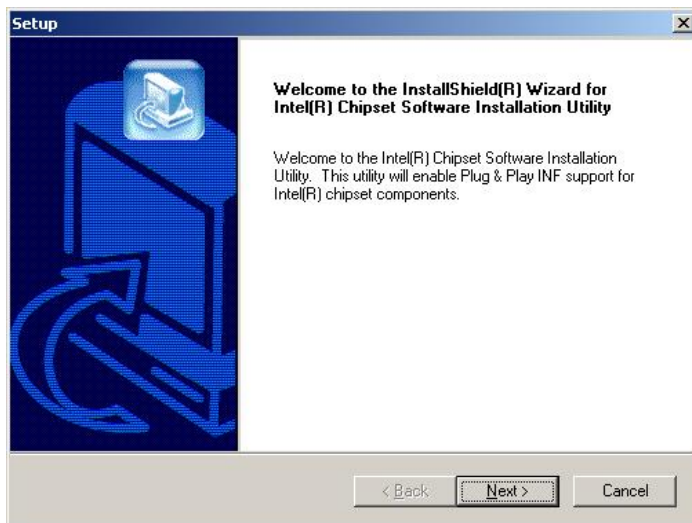


Figure 7-2: Welcome Screen

Step 5: Click “Next” and the license agreement shown in Figure 7-3 appears.

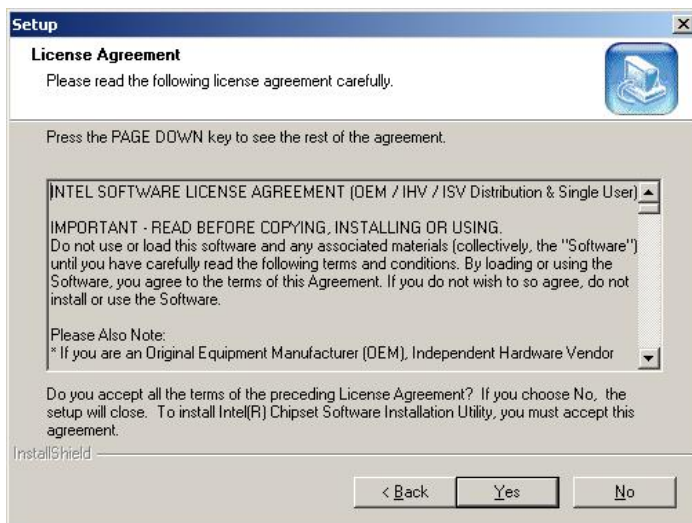


Figure 7-3: License Agreement

Step 6: Agree to the license terms by clicking “Yes”. The “Readme” in Figure 7-4 appears.

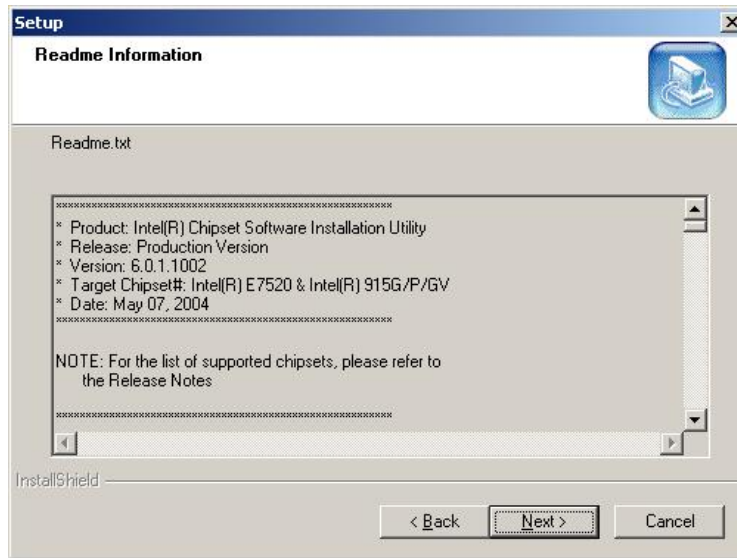


Figure 7-4: Readme Information

Step 7: Click "Yes". The driver is installed on the computer. After the installation is complete, the installation complete screen shown in **Figure 7-5** appears. Select the preferred option and click "Finish" to complete the installation process.



Figure 7-5: Restart the Computer

7.3 RealTek Audio Driver Installation

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

- Step 1:** Insert the CD into the system that contains the WAFER-8522 board. Open the CD folder and locate the **AUDIO DRIVER A3.79** directory. Open the directory and look for icon for the **setup.exe** installation file. Once located, use the mouse to double click the icon.
- Step 2:** Once double clicking the **Setup** icon, the install shield wizard for the audio driver starts. See **Figure 7-6**.

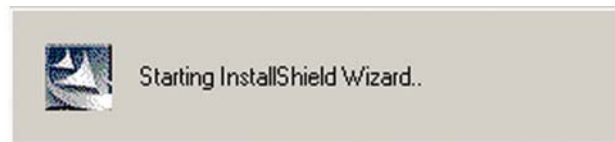


Figure 7-6: Audio Driver Install Shield Wizard Starting

- Step 3:** The RealTek Audio Setup prepares the install shield to guide through the rest of the setup process. See **Figure 7-7**.

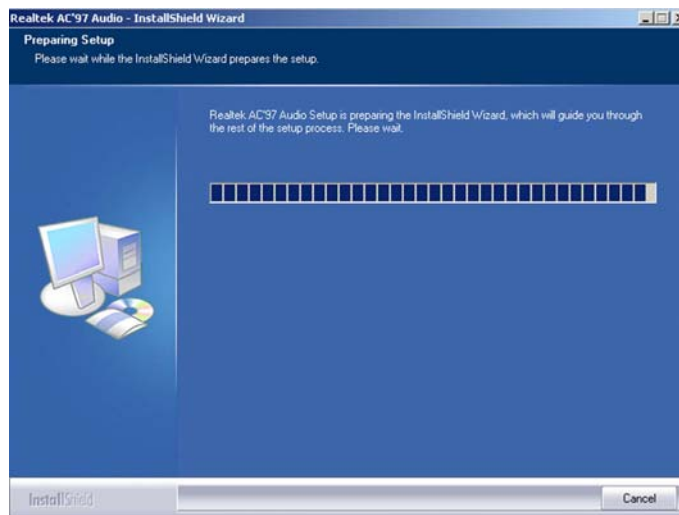


Figure 7-7: Audio Driver Setup Preparation

- Step 4:** After install shield is prepared, the welcome screen shown in **Figure 7-8**

appears. To continue the installation process, click the “Next” button. The install shield starts to configure the new software as shown in **Figure 7-9**.

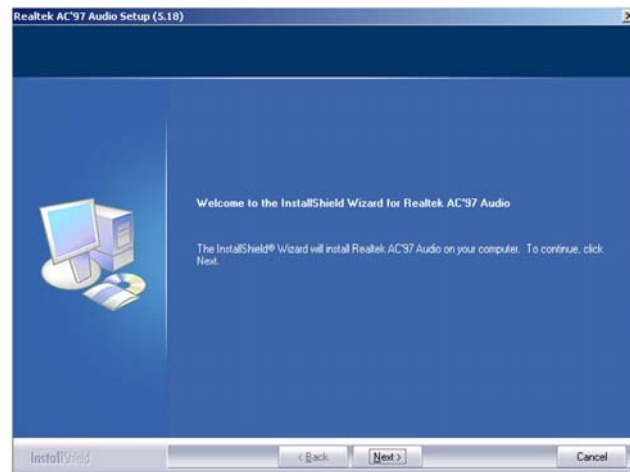


Figure 7-8: Audio Driver Welcome Screen

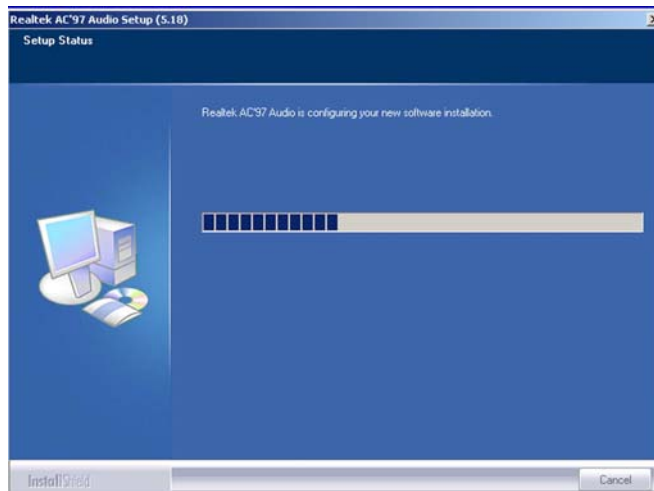


Figure 7-9: Audio Driver Software Configuration

Step 5: At this stage the “Digital Signal Not Found” screen shown in **Figure 7-10** appears. To continue the installation process, click the “Yes” button. The installation notice shown below appears.

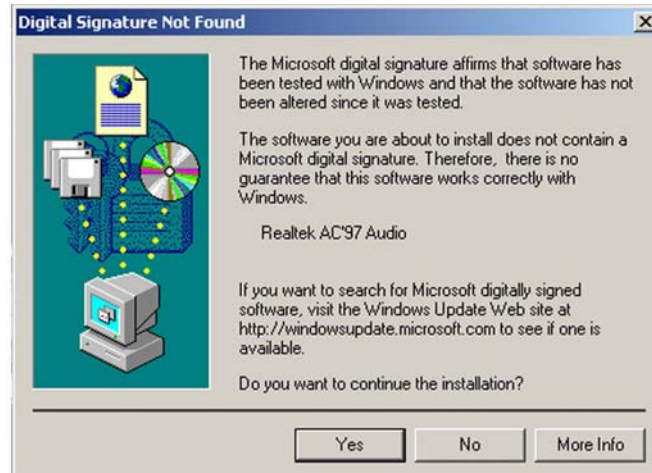


Figure 7-10: Audio Driver Digital Signal

Step 6: At this stage the clicking the “Yes” button in Figure 7-10 appears, the installation of the driver begins. See Figure 7-11.

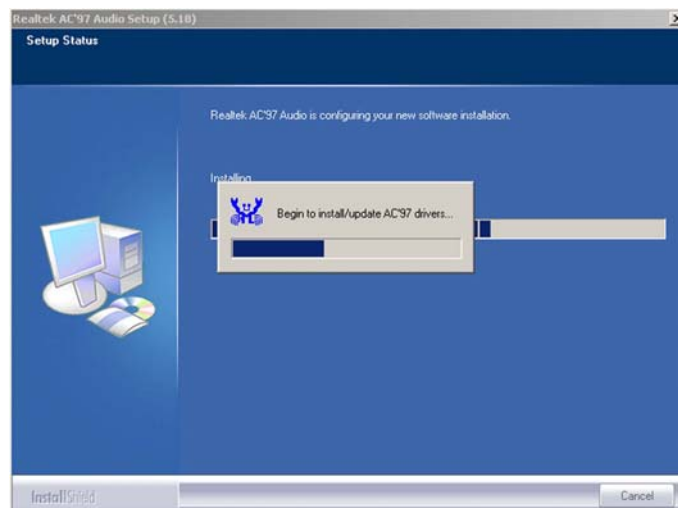


Figure 7-11: Audio Driver Installation Begins

Step 7: After the driver installation process is complete, a confirmation screen shown in **Figure 7-12** appears

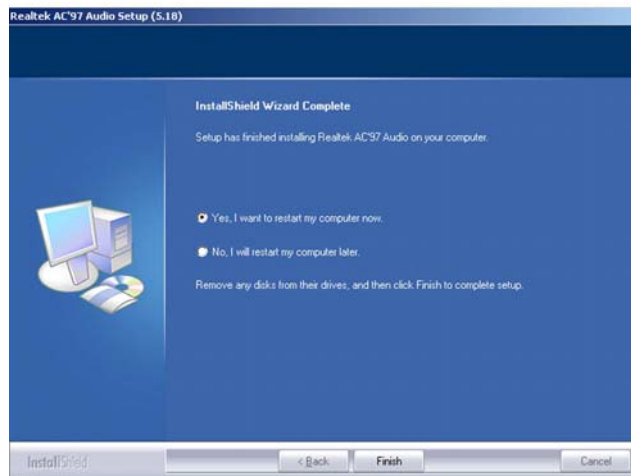


Figure 7-12: Audio Driver Installation Complete

Step 8: The confirmation screen shown in **Figure 7-12** allows user 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 decided when to restart the computer, click the “**Finish**” button.

7.4 Intel Graphics Media Accelerator Driver

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

- Step 1:** Insert the CD into the system that contains the WAFER-8522. Open the CD folder and locate the icon for the **Setup** installation file. Once located, use the mouse to double click the icon.
- Step 2:** Once double clicking the Setup icon, a Welcome screen shown in **Figure 7-13** appears.

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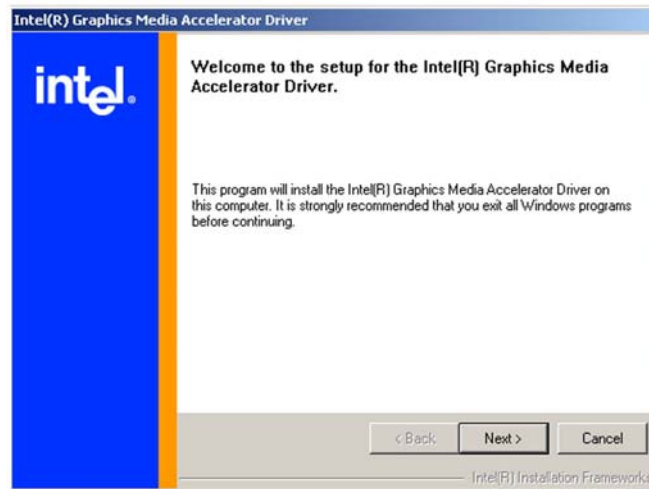


Figure 7-13: GMA Driver Installation Welcome Screen

Step 3: To continue installing click “**Next**” and a license agreement shown in **Figure 7-14** appears. Read through the license agreement.



Figure 7-14: GMA Driver License Agreement

Step 4: Accept the terms and conditions stipulated in the license agreement by clicking the “**Yes**” button (**Figure 7-14**). The installation notice shown in **Figure 7-15** appears.



Figure 7-15: GMA Driver Installing Notice

Step 5: After the driver installation process is complete, a confirmation screen shown in **Figure 7-16** appears.

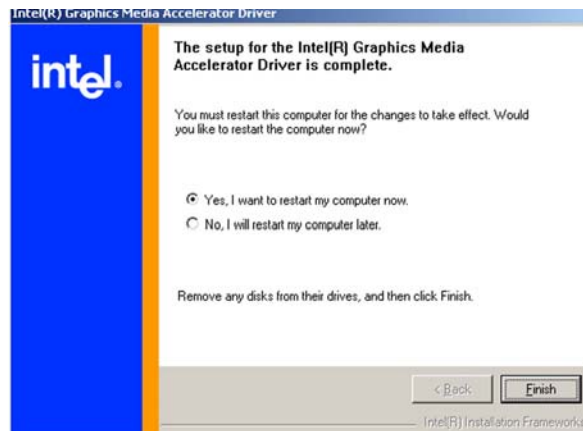


Figure 7-16: GMA Driver Installation Complete

Step 6: The confirmation screen shown in **Figure 7-16** allows user 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 decided when to restart the computer, click the “**Finish**” button.

7.5 LAN Driver Installation

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

Step 1: Insert the CD into the system that contains the WAFER-8522. Open the **LAN** directory and locate the icon for the relevant **Setup** installation file. Once located, use the mouse to double click the icon.

Step 2: Once double clicked the Setup icon, a LAN License Agreement screen shown in **Figure 7-17** appears.

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Figure 7-17: LAN License Agreement

Step 3: Accept the License Agreement by clicking “Next.” The follow-up window prompts for the directory the driver is stored in. (See **Figure 7-18**)

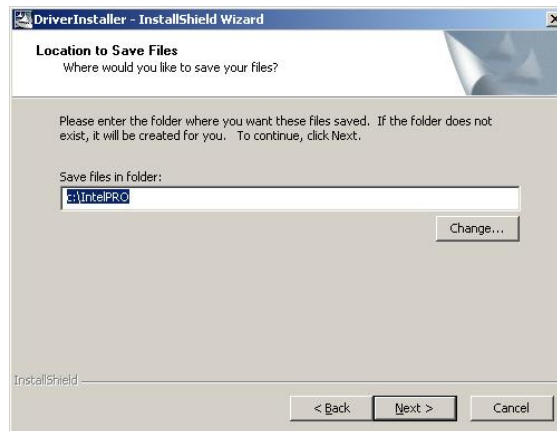


Figure 7-18: Select the Driver Directory

Step 4: After selecting the directory the driver is installed in, click “Next.” The screen in **Figure 7-19** appears.



Figure 7-19: LAN Driver Configuration

Step 5: In Figure 7-19, there are three options.

- Install Base Driver → Installs the base driver
- Make Driver Disk → Copies the driver to disk
- View Release Notes → Opens word document of the release notes

Appendix

A

BIOS Options

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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 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
2E0-2E7	Serial Port 6 (COM6)
2E8-2EF	Serial Port 4 (COM4)
2F0-2F7	Serial Port 5 (COM5)
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	Intel Graphics Controller
3C0-3DF	Intel Graphics Controller
3E8-3EF	Serial Port 3 (COM3)
3F6-3F6	Primary IDE Channel
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	COM4/COM6
IRQ3	COM2	IRQ11	COM3/COM5
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
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 ALC203 CODEC. Realtek ALC203 is a 16-bit, full duplex AC'97 Rev. 2.3 compatible audio CODEC with a sampling rate of 48KHz.

D.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through a connector on the WAFER-8522 motherboard. Connect the audio kit to the connector.

D.1.2 Driver Installation

The driver installation has been described in **Chapter 7**

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

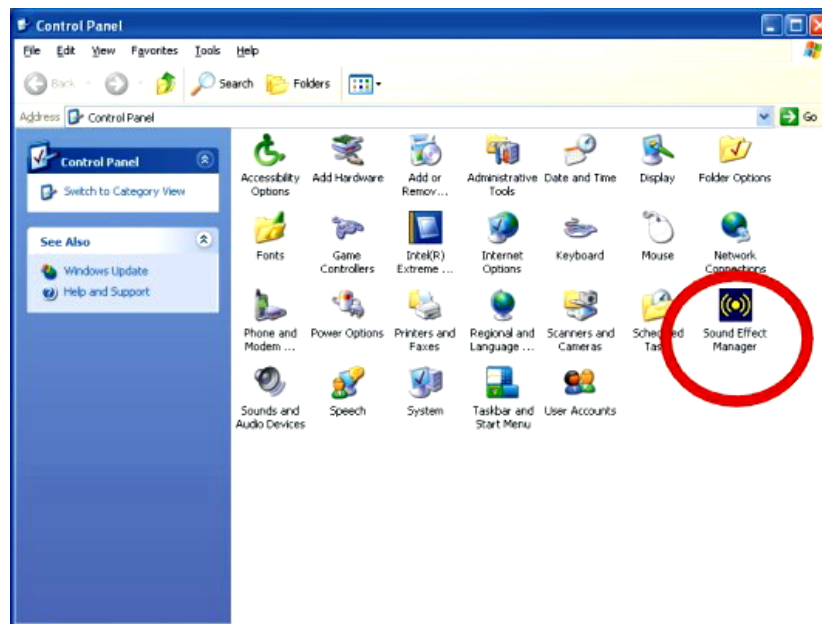


Figure D-1: Sound Effect Manager Control Panel

D.2 Sound Effect Configuration

D.2.1 Accessing the Sound Effects Manager

WAFER-8522 Motherboard

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

Step 6: Install the audio CODEC driver.

Step 7: Click either:

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

Sound Effect Manager



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

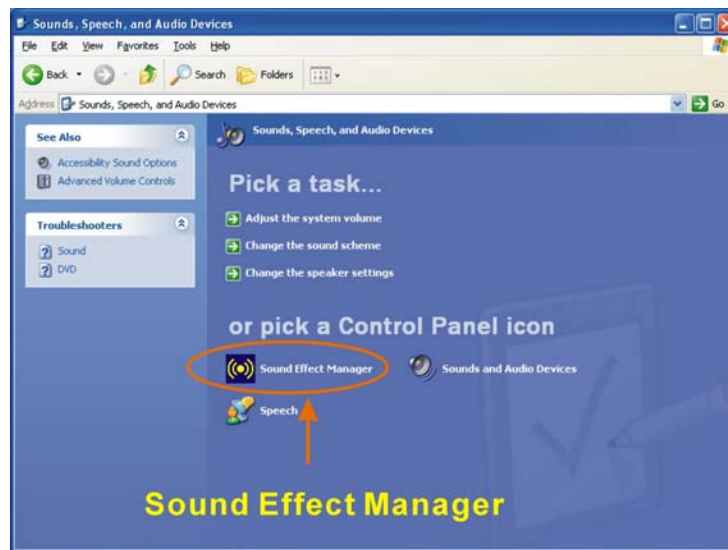


Figure D-3: Sound Effect Manager Icon [Control Panel]

Step 8: The sound effect manager appears.

**NOTE:**

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

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

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:
 - Headphone
 - Channel mode for stereo speaker output
 - Channel mode for 4 speaker output
 - Channel mode for 5.1 speaker output
 - Synchronize the phonejack switch with speakers settings
- **Speaker Test:**- Each speaker connected to the system is tested individually to see if the 4-channel or 6-channel audio operates properly.
- **S/PDIF-In & S/PDIF-Out:**- These functions are currently not supported.

- **Connector Sensing:-** Realtek ALC655 detects if an audio device is plugged into the wrong connector. If an incorrect device is plugged in a warning message appears.
- **HRTF Demo:-** Adjust HRTF (Head Related Transfer Functions) 3D positional audio here before running 3D applications.
- **Microphone Effect:-** Microphone noise suppression is enabled in this menu.
- **General:-** General information about the installed AC'97 audio configuration utility is listed here.

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