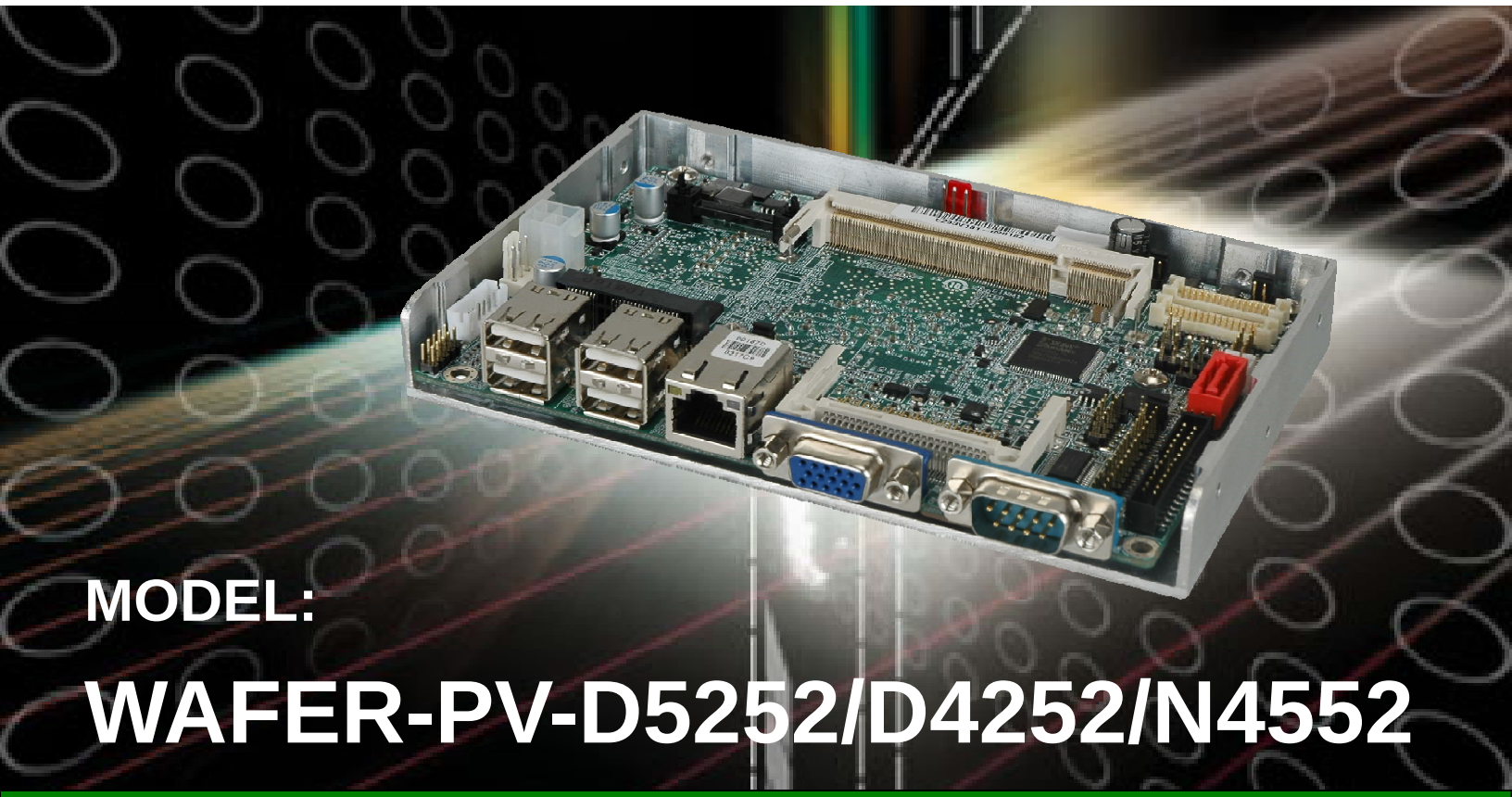
IEI Integration Corp.



MODEL:

WAFER-PV-D5252/D4252/N4552

3.5" SBC with Intel® Atom™ Processor
Up to 2.0 GB DDR3, VGA, LVDS, PCIe Mini, RS-232/422/485, SATA 3Gb/s, CompactFlash®, Eight USB, RoHS

User Manual

Rev. 1.11 – December 17, 2014

RoHS Lead Free

Revision

Date	Version	Changes
December 17, 2014	1.11	Added WAFER-PV-D4252 information
November 24, 2014	1.10	Updated for R11 version - Changed audio controller from ALC888 to ALC662 - Updated **Chapter 5: BIOS**
November 7, 2014	1.03	Modified COM port information to - RS-232 serial port: COM2~COM5 - RS-232/422/485 serial port: COM6
March 20, 2013	1.02	Modified supported memory specifications (**Table 1-1**)
March 4, 2011	1.01	Modified LVDS connector pinouts (**Table 3-11**) Modified LVDS resolution select jumper settings (**Table 4-5**)
January 11, 2011	1.00	Initial release

Copyright

COPYRIGHT NOTICE

The information in this document is subject to change without prior notice in order to improve reliability, design and function and does not represent a commitment on the part of the manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

This document contains proprietary information protected by copyright. All rights are reserved. No part of this manual may be reproduced by any mechanical, electronic, or other means in any form without prior written permission of the manufacturer.

TRADEMARKS

All registered trademarks and product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective owners.

Table of Contents

1 INTRODUCTION 1

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

2 PACKING LIST 9

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

3 CONNECTOR PINOUTS 13

3.1 PERIPHERAL INTERFACE CONNECTORS 14
3.1.1 Layout 14
3.1.2 Peripheral Interface Connectors 15
3.1.3 External Interface Panel Connectors 16
3.2 INTERNAL PERIPHERAL CONNECTORS 16
3.2.1 ATX Power Connector 16
3.2.2 Audio Connector 17
3.2.3 Battery Connector 18
3.2.4 CompactFlash® Slot 19
3.2.5 Digital I/O Connector 20
3.2.6 Fan Connectors 21
3.2.7 Keyboard/Mouse Connector 22
3.2.8 LED and +5 V Power Output Connector 23
3.2.9 LVDS Connector 24
3.2.10 LVDS Backlight Connector 25

3.2.11 PCIe Mini Card Slot *26*
3.2.12 Power Button Connector *28*
3.2.13 Reset Button Connector *28*
3.2.14 RS-232/422/485 Serial Port Connector (COM6) *29*
3.2.15 RS-232 Serial Port Connector (COM2~COM5) *30*
3.2.16 SATA Drive Connectors *31*
3.2.17 SATA Power Connectors *32*
3.2.18 SMBus Connector *33*
3.2.19 SO-DIMM Connector *33*
3.2.20 SPI Flash Connector *34*
3.2.21 USB Connectors *35*
3.3 EXTERNAL INTERFACE CONNECTORS 36
3.3.1 Ethernet Connectors *36*
3.3.2 Serial Port Connector *37*
3.3.3 USB Ports *38*
3.3.4 VGA Connector *38*

4 INSTALLATION 40

4.1 ANTI-STATIC PRECAUTIONS 41
4.2 INSTALLATION CONSIDERATIONS 42
4.3 SO-DIMM INSTALLATION 43
4.4 COMPACTFLASH® INSTALLATION 44
4.5 JUMPER SETTINGS 45
4.5.1 AT/ATX Mode Selection *45*
4.5.2 Clear CMOS Jumper *46*
4.5.3 LVDS Voltage Selection *47*
4.5.4 LVDS Resolution Selection *48*
4.5.5 CompactFlash® Master/Slave Selection *49*
4.5.6 COM6 RS-232/422/485 Selection *50*
4.5.7 COM 1 Pin 9 Setting Jumper *51*
4.6 CHASSIS INSTALLATION 52
4.6.1 Airflow *52*
4.6.2 Motherboard Installation *52*
4.7 INTERNAL PERIPHERAL DEVICE CONNECTIONS 52
4.7.1 AT Power Connection *52*

4.7.2 Audio Kit Installation *53*
4.7.3 Keyboard/Mouse Connector *55*
4.7.4 Four Serial Port Connector *57*
4.8 SOFTWARE INSTALLATION 58

5 BIOS 60

5.1 INTRODUCTION 61
5.1.1 Starting Setup *61*
5.1.2 Using Setup *61*
5.1.3 Getting Help *62*
5.1.4 Unable to Reboot After Configuration Changes *62*
5.1.5 BIOS Menu Bar *62*
5.2 MAIN 63
5.3 ADVANCED 64
5.3.1 ACPI Configuration *65*
5.3.2 RTC Wake Settings *66*
5.3.3 CPU Configuration *67*
5.3.4 IDE Configuration *68*
5.3.5 USB Configuration *70*
5.3.6 Super IO Configuration *71*
5.3.6.1 Serial Port n Configuration 72
5.3.7 H/W Monitor *77*
5.3.8 Serial Port Console Redirection *78*
5.3.9 IEI Feature *80*
5.4 CHIPSET 81
5.4.1 Host Bridge *82*
5.4.2 South Bridge *83*
5.4.3 Intel IGD SWSCI OpRegion *85*
5.5 BOOT 87
5.6 SECURITY 89
5.7 EXIT 89

A BIOS OPTIONS 91

B TERMINOLOGY 94

C DIGITAL I/O INTERFACE 98

C.1 INTRODUCTION 99
C.2 ASSEMBLY LANGUAGE SAMPLE 1 100
C.3 ASSEMBLY LANGUAGE SAMPLE 2 100

D HAZARDOUS MATERIALS DISCLOSURE 101

D.1 HAZARDOUS MATERIALS DISCLOSURE TABLE FOR IPB PRODUCTS CERTIFIED AS ROHS COMPLIANT UNDER 2002/95/EC WITHOUT MERCURY 102

List of Figures

Figure 1-1: WAFER-PV-D5252/D4252/N4552 2
Figure 1-2: Connectors 3
Figure 1-3: Dimensions without Heatsink (mm) 4
Figure 1-4: Dimensions with Heatsink (mm) 5
Figure 1-5: Data Flow Diagram 6
Figure 3-1: Connector and Jumper Locations 14
Figure 3-2: ATX Power Connector Location 17
Figure 3-3: Audio Connector Location 17
Figure 3-4: Battery Connector Location 18
Figure 3-5: CompactFlash® Slot Location 19
Figure 3-6: Digital I/O Connector Location 21
Figure 3-7: Fan Connector Locations 22
Figure 3-8: Keyboard/Mouse Connector Location 23
Figure 3-9: LED and +5 V Power Output Connector Location 24
Figure 3-10: LVDS Connector Location 25
Figure 3-11: Backlight Inverter Connector 26
Figure 3-12: PCIe Mini Card Slot Location 27
Figure 3-13: Power Button Connector Location 28
Figure 3-14: Reset Button Connector Location 29
Figure 3-15: RS-232/422/485 Serial Port Connector Location 29
Figure 3-16: RS-232 Serial Port Connector Location 30
Figure 3-17: SATA Drive Connector Location 31
Figure 3-18: SATA Power Connector Locations 32
Figure 3-19: SMBus Connector Location 33
Figure 3-20: SO-DIMM Connector Location 34
Figure 3-21: SPI Flash Connector Location 34
Figure 3-22: USB Connector Location 35
Figure 3-23: External Interface Connectors 36
Figure 3-24: Ethernet Connector 37
Figure 3-25: Serial Port Pinout Locations 38

Figure 3-26: VGA Connector 39
Figure 4-1: SO-DIMM Installation 43
Figure 4-2: CompactFlash® Card Installation 44
Figure 4-3: AT/ATX Mode Selection Jumper Location 46
Figure 4-4: Clear CMOS Jumper Location 47
Figure 4-5: LVDS Voltage Selection Jumper Location 48
Figure 4-6: LVDS Resolution Selection Jumper Location 49
Figure 4-7: CompactFlash® Master/Slave Selection Jumper Location 50
Figure 4-8: COM6 RS-232/422/485 Selection Jumper Location 50
Figure 4-9: COM 1 Pin 9 Setting Jumper Location 51
Figure 4-10: Power Cable to Motherboard Connection 53
Figure 4-11: Audio Kit Cable Connection 54
Figure 4-12: Connect Power Cable to Power Supply 55
Figure 4-13: Keyboard/mouse Y-cable Connection 56
Figure 4-14: Four Serial Port Connector 57
Figure 4-15: Serial Device Connector 58
Figure 4-16: Introduction Screen 59
Figure 4-17: Available Drivers 59

List of Tables

Table 1-1: Technical Specifications 8
Table 2-1: Packing List 12
Table 2-2: Optional Items 12
Table 3-1: Peripheral Interface Connectors 16
Table 3-2: Rear Panel Connectors 16
Table 3-3: ATX Power Connector Pinouts 17
Table 3-4: Audio Connector Pinouts 18
Table 3-5: Battery Connector Pinouts 18
Table 3-6: CompactFlash® Slot Pinouts 20
Table 3-7: Digital I/O Connector Pinouts 21
Table 3-8: Fan Connector Pinouts 22
Table 3-9: Keyboard/Mouse Connector Pinouts 23
Table 3-10: LED and +5 V Power Output Connector Pinouts 24
Table 3-11: LVDS Connector Pinouts 25
Table 3-12: Backlight Inverter Connector 26
Table 3-13: PCIe Mini Card Slot Pinouts 28
Table 3-14: Power Button Connector Pinouts 28
Table 3-15: Reset Button Connector Pinouts 29
Table 3-16: RS-232/422/485 Serial Port Connector Pinouts 30
Table 3-17: Serial Port Connector Pinouts 31
Table 3-18: SATA Drive Connector Pinouts 32
Table 3-19: SATA Power Connector Pinouts 32
Table 3-20: SMBus Connector Pinouts 33
Table 3-21: SPI Flash Connector Pinouts 34
Table 3-22: USB Port Connector Pinouts 35
Table 3-23: Ethernet Connector Pinouts 36
Table 3-24: RJ-45 Ethernet Connector LEDs 37
Table 3-25: Serial Port Pinouts 37
Table 3-26: USB Connector Pinouts 38
Table 3-27: VGA Connector Pinouts 39

Table 4-1: Jumpers 45
Table 4-2: AT/ATX Mode Selection 46
Table 4-3: Clear CMOS Jumper Settings 47
Table 4-4: LVDS Voltage Selection 48
Table 4-5: LVDS Resolution Selection 48
Table 4-6: CompactFlash® Master/Slave Selection 49
Table 4-7: COM6 RS-232/422/485 Selection 50
Table 4-8: COM 1 Pin 9 Setting Jumper Settings 51
Table 5-1: BIOS Navigation Keys 62

BIOS Menus

BIOS Menu 1: Main 63
BIOS Menu 2: Advanced 64
BIOS Menu 3: ACPI Configuration 65
BIOS Menu 4: RTC Wake Settings 66
BIOS Menu 5: CPU Configuration 67
BIOS Menu 6: IDE Configuration 68
BIOS Menu 7: USB Configuration 70
BIOS Menu 8: Super IO Configuration 71
BIOS Menu 9: Serial Port n Configuration Menu 72
BIOS Menu 10: Hardware Health Configuration 77
BIOS Menu 11: Serial Port Console Redirection 79
BIOS Menu 12: IEI Feature 80
BIOS Menu 13: Chipset 81
BIOS Menu 14:Host Bridge Configuration 82
BIOS Menu 15:Southbridge Chipset Configuration 83
BIOS Menu 16: Intel IGD SWSCI OpRegion 85
BIOS Menu 17: Boot 87
BIOS Menu 18: Security 89
BIOS Menu 19:Exit 90

Chapter

1

Introduction

1.1 Introduction

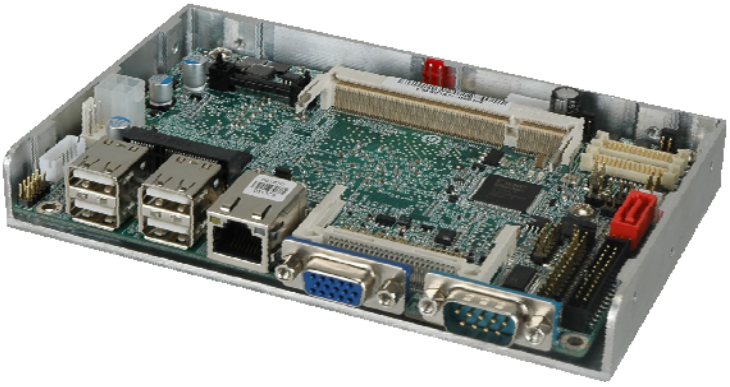


Figure 1-1: WAFER-PV-D5252/D4252/N4552

The WAFER-PV-D5252/D4252/N4552 is a 3.5" SBC with a Intel® Atom™ D525, D425 or N455 CPU.

The WAFER-PV-D5252/D4252/N4552 is designed for fanless operation. The low power CPUs don't require active cooling and stay within specified heat range using the included heatsink.

Storage on the board is handled by a SATA 3Gb/s port for connecting a hard drive, optical drive or SSD. The CompactFlash® slot allows a Type II CompactFlash® card to be installed.

The board has two graphics outputs. A VGA output connects to a traditional VGA monitor and one LVDS connector supports 18-bit single-channel display.

Other slots and connectors include a PCIe Mini cards slot, RS-232, RS-232/422/485, Gigabit Ethernet, USB ports, and digital I/O.

1.2 Benefits

Some of the WAFER-PV-D5252/D4252/N4552 motherboard benefits include:

- Low power consumption
- Wide range of I/O interfaces
- Dual display support

1.3 Features

Some of the WAFER-PV-D5252/D4252/N4552 motherboard features are listed below:

- 3.5" form factor
- Fanless design
- RoHS compliant
- Eight USB 2.0 ports
- Six serial ports
- PCIe Mini card slot
- CompactFlash® Type II slot
- Gigabit Ethernet

1.4 Connectors

The connectors on the WAFER-PV-D5252/D4252/N4552 are shown in the figure below.

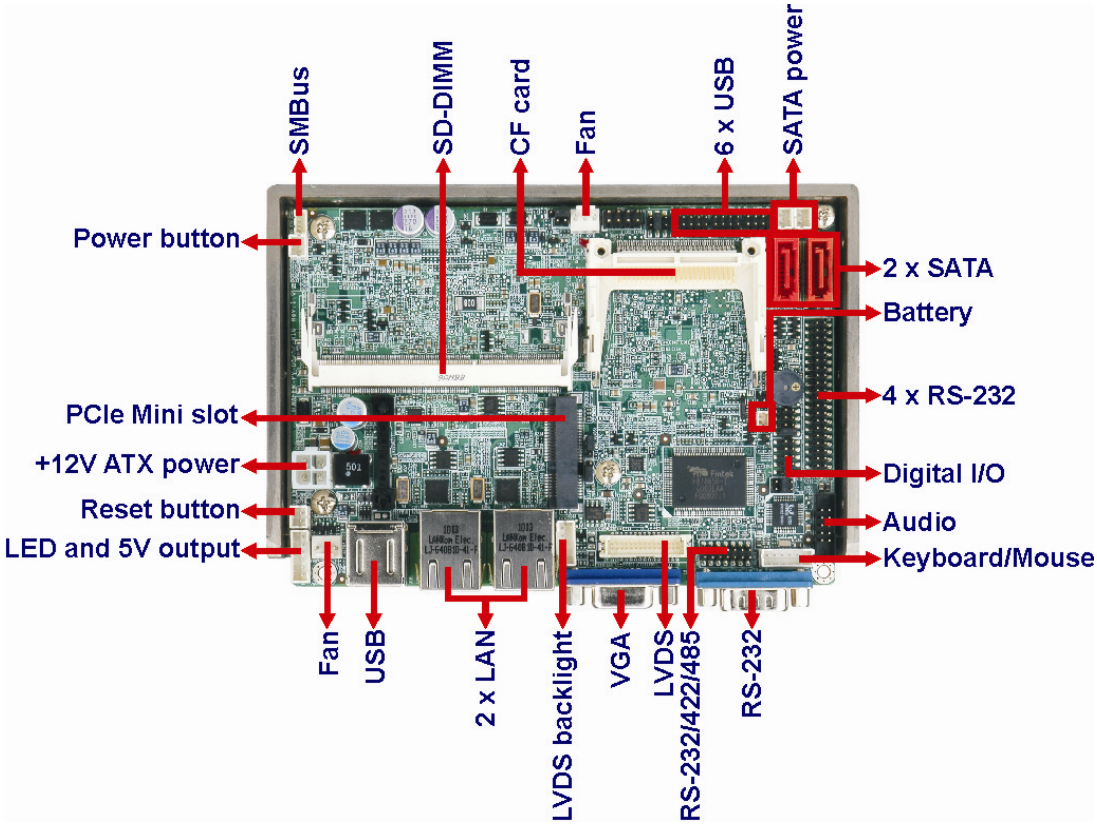


Figure 1-2: Connectors

1.5 Dimensions

The main dimensions of the WAFER-PV-D5252/D4252/N4552 are shown in the diagram below.

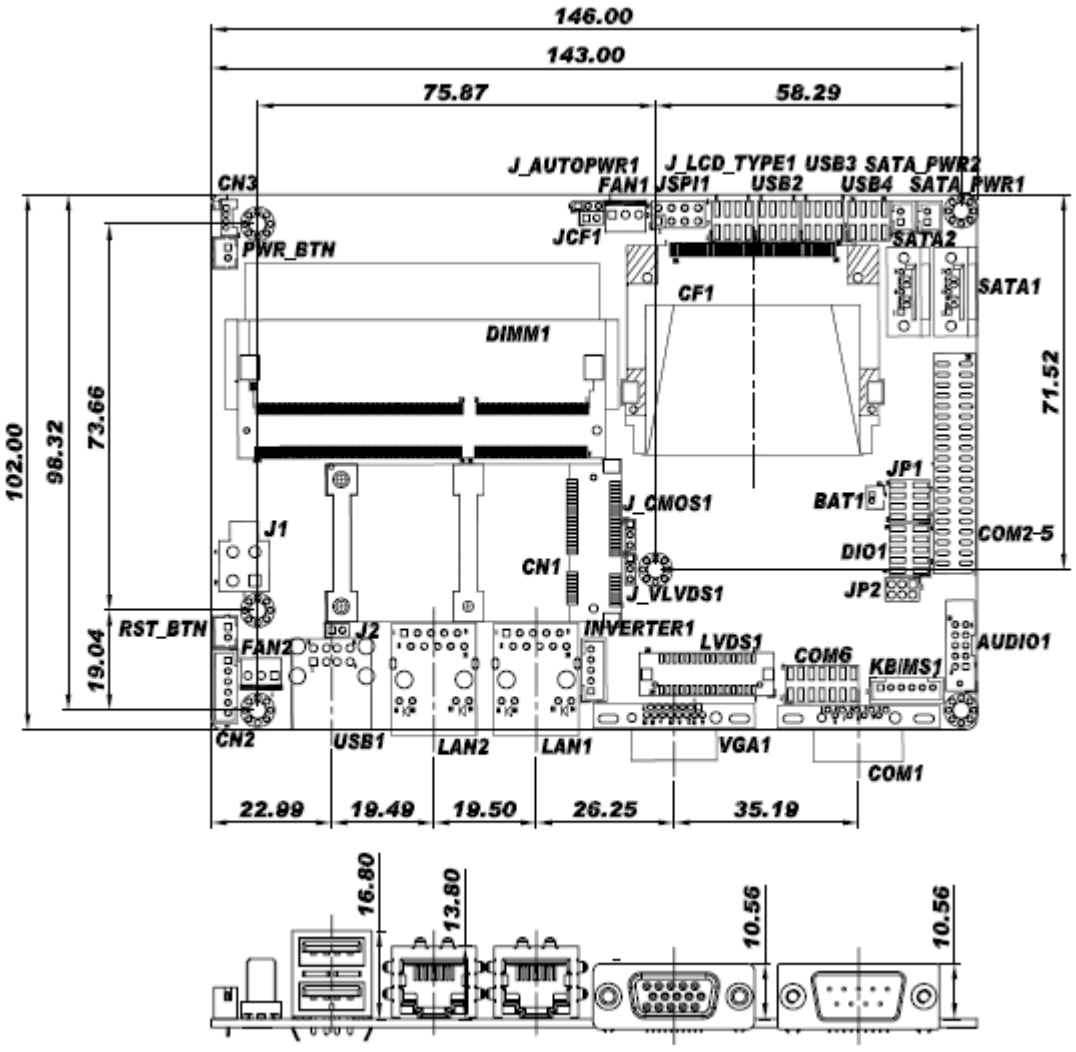


Figure 1-3: Dimensions without Heatsink (mm)

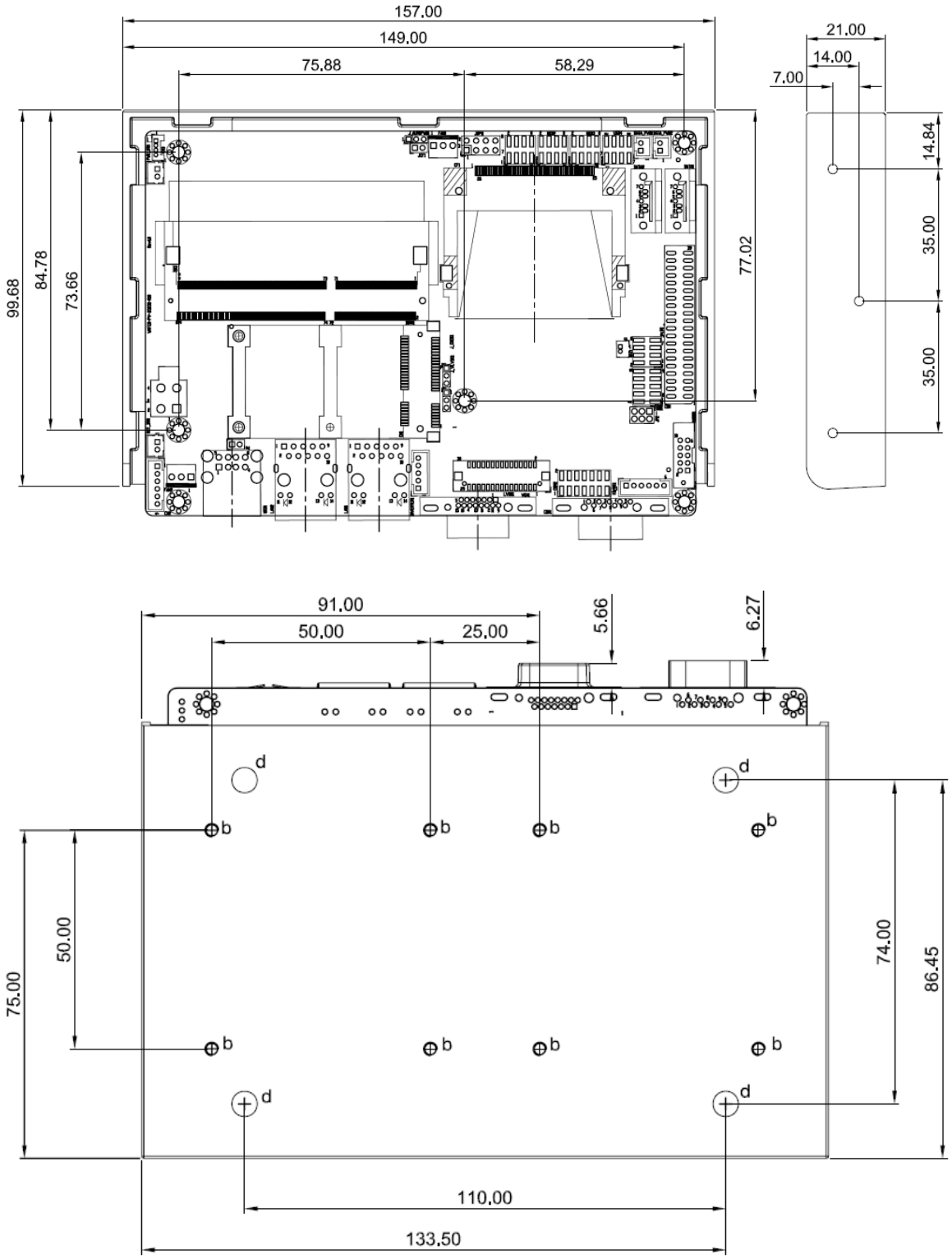


Figure 1-4: Dimensions with Heatsink (mm)

1.6 Data Flow

Figure 1-5 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

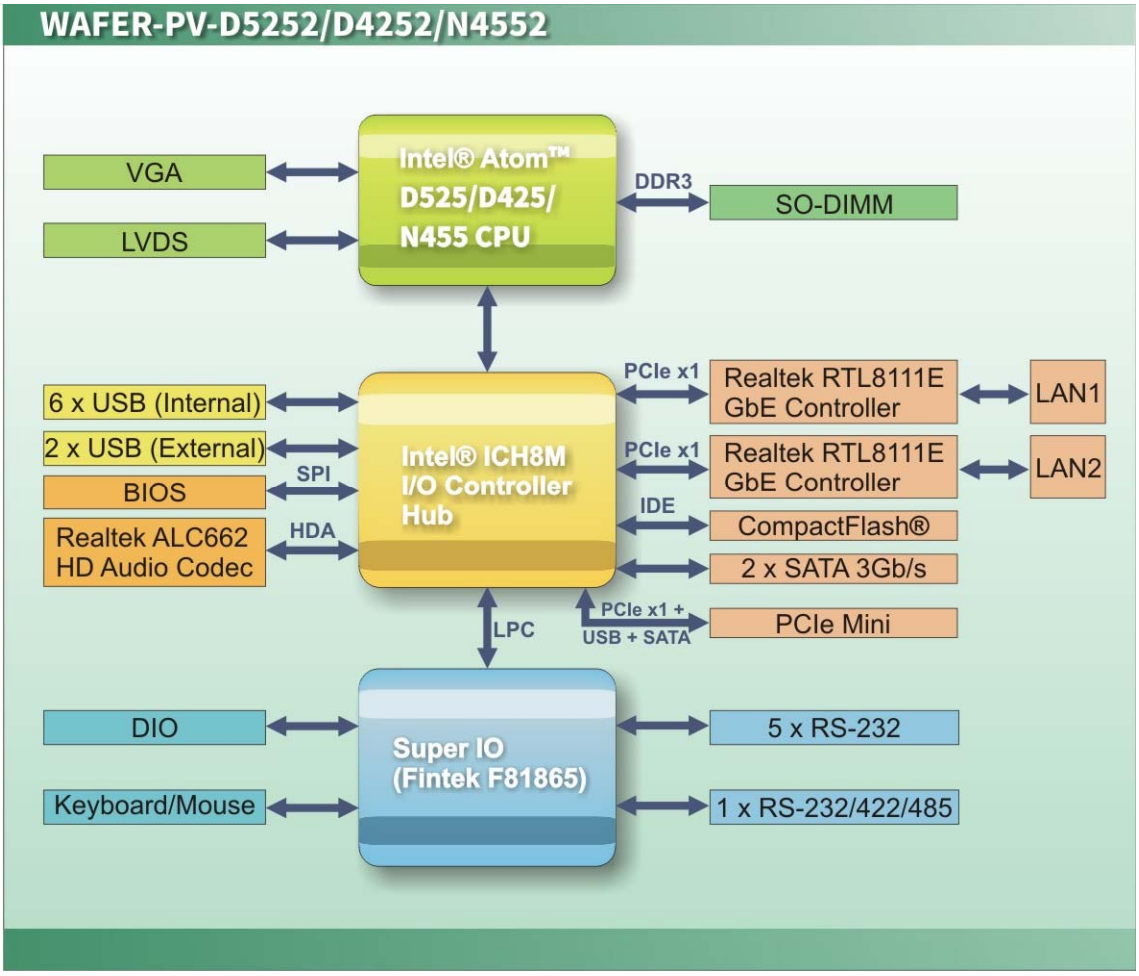


Figure 1-5: Data Flow Diagram

1.7 Technical Specifications

WAFER-PV-D5252/D4252/N4552 technical specifications are listed in Table 1-1.

Specification	WAFER-PV-D5252/D4252/N4552
Form Factor	3.5"
Socket	Embedded
CPU Supported	1.8 GHz Intel® Atom™ D525 dual-core CPU with 1 MB L2 cache 1.8 GHz Intel® Atom™ D425 single-core CPU with 512 KB L2 cache 1.66 GHz Intel® Atom™ N455 single-core CPU with 512 KB L2 cache
System Chipset	Intel® ICH8M
Memory	One 204-pin 800 MHz DDR3 SDRAM SO-DIMM ▪ D525/D425: system max. 4.0 GB ▪ N455: system max. 2.0 GB
Graphic Engine	Intel® GMA3150 ▪ D525/D425: Gen 3.5 DX9, 400 MHz ▪ N455: Gen 3.5 DX9, 200 MHz
Integrated Graphics	Analog CRT (CRT hot plug supported) ▪ D525/D425: up to 2048 x 1536 ▪ N455: up to 1400 x 1050 18-bit single-channel LVDS
BIOS	UEFI BIOS
Digital I/O	8-bit, 4-bit input/4-bit output
Ethernet Controllers	Two Realtek RTL8111E PCIe GbE controllers (LAN1 supports ASF2.0)
Audio	Realtek ALC662 HD Audio codec
Super I/O Controller	Fintek F81865F
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	PCIe Mini slot (PCIe + USB + SATA signal) supports IEI PCIe Mini disk on module (DOM) cards

I/O Interface Connectors	
Fan connector	Two 3-pin wafer for system fan
Keyboard/Mouse	One internal 6-pin wafer connector
Serial Ports	Five RS-232 COM connectors One RS-232/422/485 COM connector
USB 2.0/1.1 ports	Six internal via pin header Two external USB ports
SMBus	One 4-pin wafer connector
Storage	
IDE	CompactFlash® Type II slot
SATA	Two independent SATA channels with 3.0 Gb/s data transfer rates
Environmental and Power Specifications	
Power Supply	AT or ATX, 12 V only
Power Consumption	12 V @ 1.79 A (1.8 GHz Intel® Atom™ D525 dual-core CPU with one 1 GB DDR3 SO-DIMM)
Operating temperature	D525: -20ºC ~ 60ºC with free air; -20ºC ~ 70ºC with force air D425: -20ºC ~ 65ºC with free air; -20ºC ~ 70ºC with force air N455: -20ºC ~ 70ºC with free air; -20ºC ~ 75ºC with force air
Humidity	0% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	102 mm x 146 mm
Weight GW/NW	600 g/250 g

Table 1-1: Technical Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions

WARNING!

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

Make sure to adhere to the following guidelines:

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

2.2 Unpacking Precautions

When the WAFER-PV-D5252/D4252/N4552 is unpacked, please do the following:

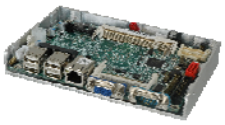
- Follow the antistatic guidelines above.
- Make sure the packing box is facing upwards when opening.
- Make sure all the packing list items are present.

2.3 Packing List

NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the WAFER-PV-D5252/D4252/N4552 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The WAFER-PV-D5252/D4252/N4552 is shipped with the following components:

Quantity	Item and Part Number	Image
1	WAFER-PV-D5252, WAFER-PV-D4252 or WAFER-PV-N4552	
1	SATA and power cable (**P/N:** 32801-000201-100-RS)	
1	4 COM (wo bracket) (**P/N**: 32200-025401-RS)	
1	KB/MS PS/2 Y-cable (**P/N**: 32000-023800-RS)	
1	AT 12 V cable (**P/N**: 32100-087100-RS)	
1	Audio cable (**P/N:** 32000-072100-RS)	

Quantity	Item and Part Number	Image
1	Mini jumper pack (2.0mm) (**P/N**:33100-000033-RS)	
1	Utility CD	
1	Quick installation guide	

Table 2-1: Packing List

2.4 Optional Items

These optional items are available.

Item and Part Number	Image
Dual USB cable (wo bracket) (**P/N**: 32000-070301-RS)	
RS-232/422/485 cable (**P/N**: 32205-000300-100-RS)	

Table 2-2: Optional Items

Chapter

3

Connector Pinouts

3.1 Peripheral Interface Connectors

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

3.1.1 Layout

The figure below shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.

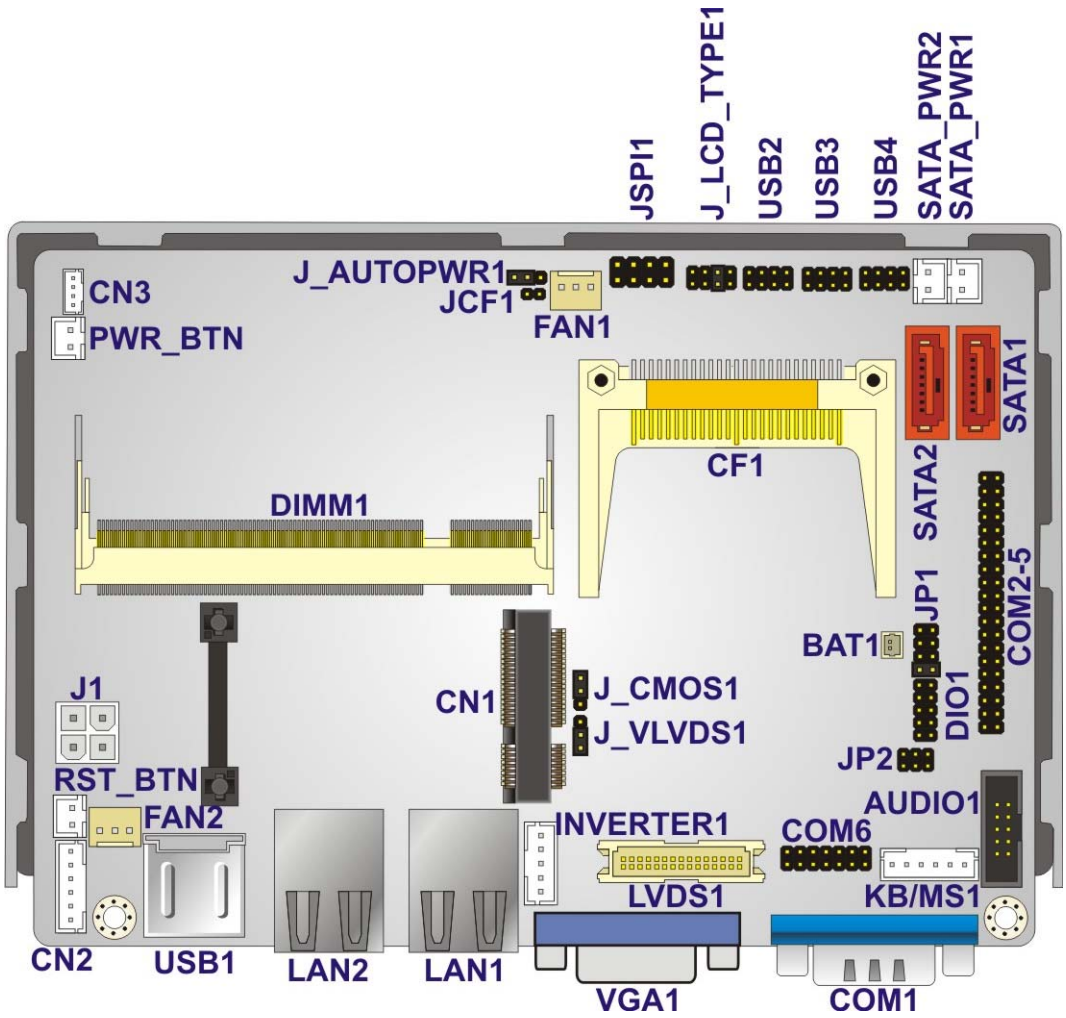


Figure 3-1: Connector and Jumper Locations

3.1.2 Peripheral Interface Connectors

The table below shows a list of the peripheral interface connectors on the WAFER-PV-D5252/D4252/N4552. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
+12 V ATX power connector	4-pin connector	J1
Audio connector	10-pin box header	AUDIO1
Battery connector	2-pin wafer	BT1
CompactFlash® card slot	CF card slot	CF1
Digital I/O connector	10-pin header	DIO1
Fan connectors	3-pin wafer	FAN1, FAN2
Keyboard/mouse connector	6-pin wafer	KB/MS1
LED indicators and 5 V power output connector	6-pin wafer	CN2
LVDS connector	30-pin crimp	LVDS1
LVDS backlight connector	5-pin box header	INVERTER1
PCIe Mini card slot	PCIe Mini card slot	CN1
Power button connector	2-pin wafer	PWR_BTN
Reset button connector	2-pin wafer	RST_BTN
RS-232 serial port (COM2~COM5)	40-pin header	COM2-5
RS-232/422/485 serial port (COM6)	14-pin header	COM6
SATA connectors	SATA connector	SATA1, SATA2
SATA power connectors	2-pin wafer	SATA_PWR1 SATA_PWR2
SMBus connector	4-pin wafer	CN3
SO-DIMM connector	SO-DIMM connector	DIMM1
SPI Flash	8-pin header	JSPI1

Connector	Type	Label
USB connectors	8-pin header	USB2, USB3, USB4

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

The table below lists the rear panel connectors on the WAFER-PV-D5252/D4252/N4552. Detailed descriptions of these connectors can be found in a later section.

Connector	Type	Label
USB connectors	Dual-USB	USB1
LAN connectors	RJ-45	LAN1, LAN2
Serial port connector	DB-9	COM1
VGA connector	15-pin female VGA	VGA1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the WAFER-PV-D5252/D4252/N4552.

3.2.1 ATX Power Connector

CN Label: **J1**

CN Type: 4-pin connector

CN Location: See **Figure 3-2**

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

The ATX connector is connected to an external ATX power supply. Power is provided to the system, from the power supply through this connector.

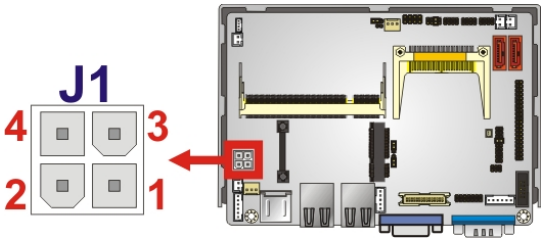


Figure 3-2: ATX Power Connector Location

Pin	Description	Pin	Description
1	Ground	2	Ground
3	+12 V	4	+12V

Table 3-3: ATX Power Connector Pinouts

3.2.2 Audio Connector

CN Label: **AUDIO1**

CN Type: 10-pin header

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

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

This connector connects to speakers, a microphone and an audio input.

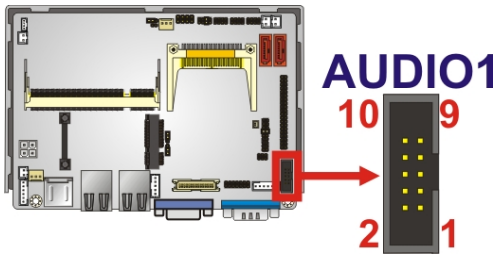


Figure 3-3: Audio Connector Location

Pin	Description	Pin	Description
1	LINE_OUTR	2	LINEIN_R
3	GND_AUDIO	4	GND_AUDIO
5	LINE_OUTL	6	LINEIN_L

Pin	Description	Pin	Description
7	GND_AUDIO	8	GND_AUDIO
9	MICIN	10	MICIN

Table 3-4: Audio Connector Pinouts

3.2.3 Battery Connector

CAUTION:

Risk of explosion if battery is replaced by an incorrect type. Only certified engineers should replace the on-board battery.

Dispose of used batteries according to instructions and local regulations.

CN Label: **BAT1**

CN Type: 2-pin wafer

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

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

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

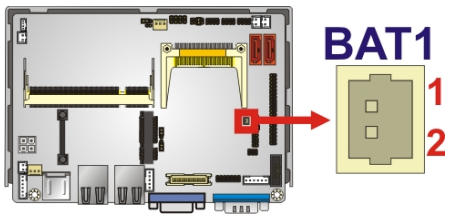


Figure 3-4: Battery Connector Location

Pin	Description
1	Battery+
2	Ground

Table 3-5: Battery Connector Pinouts

3.2.4 CompactFlash® Slot

CN Label:	**CF1**
CN Type:	CompactFlash® card slot
CN Location:	See **Figure 3-5**
CN Pinouts:	See **Table 3-6**

NOTE:

1. Both CompactFlash® Type I and Type II cards are supported.
2. To use SATA and CF, CF must be set to slave.

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

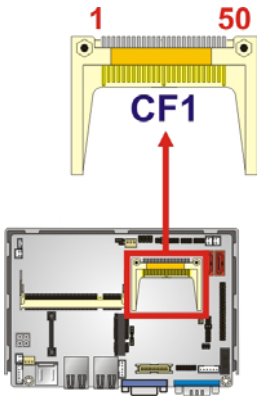


Figure 3-5: CompactFlash® Slot Location

Pin	Description	Pin	Description
1	GND	26	CD1#
2	D3	27	D11
3	D4	28	D12
4	D5	29	D13
5	D6	30	D14
6	D7	31	D15
7	CE#	32	CE2#

Pin	Description	Pin	Description
8	A10	33	VS1#
9	OE#	34	IOR#
10	A9	35	IOW#
11	A8	36	WE#
12	A7	37	IRQ
13	VCC	38	VCC
14	A6	39	CSEL#
15	A5	40	VS2#
16	A4	41	RESET#
17	A3	42	WAIT#
18	A2	43	INPACK#
19	A1	44	REG#
20	A0	45	BVD2
21	D0	46	BVD1
22	D1	47	D8
23	D2	48	D9
24	IOCS16#	49	D10
25	CD2#	50	GND2

Table 3-6: CompactFlash® Slot Pinouts

3.2.5 Digital I/O Connector

CN Label: **DIO1**

CN Type: 10-pin header

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

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

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

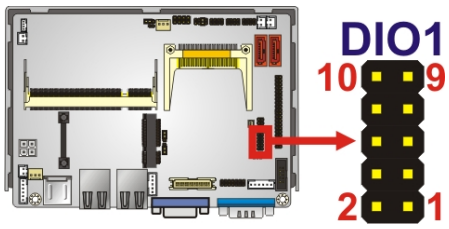


Figure 3-6: Digital I/O Connector Location

Pin	Description	Pin	Description
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 3-7: Digital I/O Connector Pinouts

3.2.6 Fan Connectors

CN Label: **FAN1, FAN2**

CN Type: 3-pin wafer

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

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

The fan connector attaches to a cooling fan.

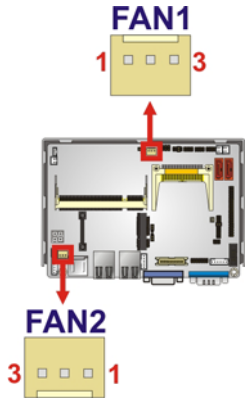


Figure 3-7: Fan Connector Locations

Pin	Description
1	FANIO1
2	+12V (PWM)
3	GND

Table 3-8: Fan Connector Pinouts

3.2.7 Keyboard/Mouse Connector

CN Label: **KB/MS1**

CN Type: 6-pin wafer

CN Location: See **Figure 3-8**

CN Pinouts: See **Table 3-9**

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

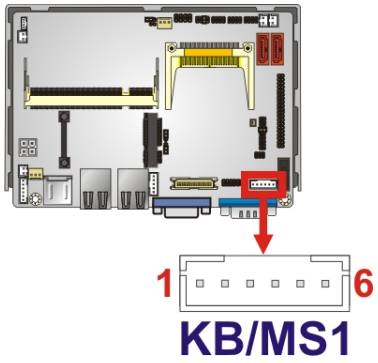


Figure 3-8: Keyboard/Mouse Connector Location

Pin	Description
1	VCC
2	Mouse Data
3	Mouse Clock
4	Keyboard Data
5	Keyboard Clock
6	GND

Table 3-9: Keyboard/Mouse Connector Pinouts

3.2.8 LED and +5 V Power Output Connector

CN Label: **CN2**

CN Type: 6-pin wafer

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

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

The connector connects to the hard drive activity LED and power LED on the system front panel. +5 V power output is also provided via this connector.

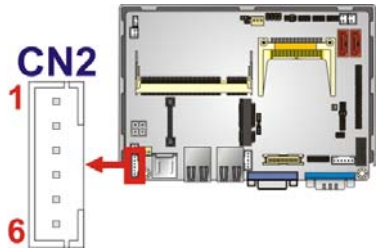


Figure 3-9: LED and +5 V Power Output Connector Location

	Pin	Description
+5 V Power Output	1	+5 V
	2	GND
Power LED	3	VCC
	4	GND
HDD LED	5	VCC
	6	-HDLED

Table 3-10: LED and +5 V Power Output Connector Pinouts

3.2.9 LVDS Connector

CN Label: **LVDS1**

CN Type: 30-pin crimp

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

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

The LVDS connector is for an LCD panel connected to the board.

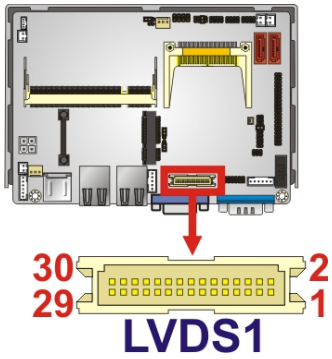


Figure 3-10: LVDS Connector Location

Pin	Description	Pin	Description
1	GROUND	2	GROUND
3	LVDS_A_TX0-P	4	LVDS_A_TX0-N
5	LVDS_A_TX1-P	6	LVDS_A_TX1-N
7	LVDS_A_TX2-P	8	LVDS_A_TX2-N
9	LVDS_A_TXCLK-P	10	LVDS_A_TXCLK-N
11	LVDS_A_TX3-P	12	LVDS_A_TX3-N
13	GROUND	14	GROUND
15	LVDS_B_TX0-P	16	LVDS_B_TX0-N
17	LVDS_B_TX1-P	18	LVDS_B_TX1-N
19	LVDS_B_TX2-P	20	LVDS_B_TX2-N
21	LVDS_B_TXCLK-P	22	LVDS_B_TXCLK-N
23	LVDS_B_TX3-P	24	LVDS_B_TX3-N
25	GROUND	26	GROUND
27	+LCD VCC	28	+LCD VCC
29	+LCD VCC	30	+LCD VCC

Table 3-11: LVDS Connector Pinouts

3.2.10 LVDS Backlight Connector

CN Label: **INVERTER1**

CN Type: 5-pin wafer

CN Location: See **Figure 3-11**

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

The backlight inverter connector provides power to an LCD panel.

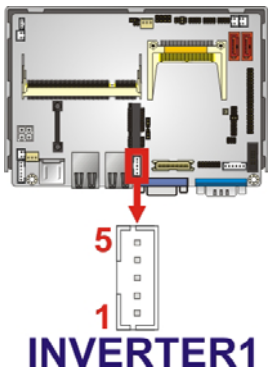


Figure 3-11: Backlight Inverter Connector

Pin	Description
1	LCD_BKLTCTL
2	GROUND
3	+12V
4	GROUND
5	BACKLIGHT ENABLE

Table 3-12: Backlight Inverter Connector

3.2.11 PCIe Mini Card Slot

CN Label: **CN1**

CN Type: PCIe Mini card slot

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

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

The PCIe mini card slot enables a PCIe mini card expansion module to be connected to the board. Cards supported include among others wireless LAN (WLAN) cards and IEI PCIe Mini disk on module (DOM) SSD cards.

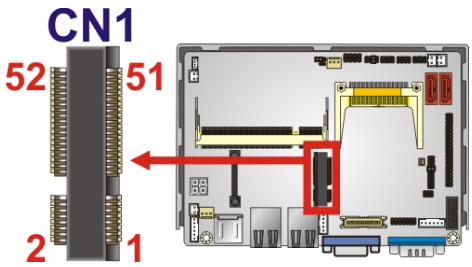


Figure 3-12: PCIe Mini Card Slot Location

Pin	Description	Pin	Description
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5V
7	CLKREQ#	8	LFRAME#
9	GND	10	LAD3
11	CLK-	12	LAD2
13	CLK+	14	LAD1
15	GND	16	LAD0
17	PCIRST#	18	GND
19	LPC	20	VCC3
21	GND	22	PCIRST#
23	PERN2	24	3VDual
25	PERP2	26	GND
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PETN2	32	SMBDATA
33	PETP2	34	GND
35	GND	36	USBD-
37	GND	38	USBD+
39	SATARXP	40	GND
41	SATARXN	42	N/C
43	N/C	44	RF_LINK#
45	SATATXN	46	BLUELED#
47	SATATXP	48	1.5V

Pin	Description	Pin	Description
49	GND	50	GND
51	N/C	52	VCC3

Table 3-13: PCIe Mini Card Slot Pinouts

3.2.12 Power Button Connector

CN Label: **PWR_BTN**

CN Type: 2-pin wafer

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

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

The power button connector is connected to a power switch on the system chassis.

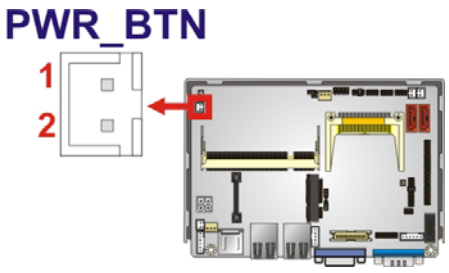


Figure 3-13: Power Button Connector Location

Pin	Description
1	Power Switch-
2	GND

Table 3-14: Power Button Connector Pinouts

3.2.13 Reset Button Connector

CN Label: **RST_BTN**

CN Type: 2-pin wafer

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

CN Pinouts: See **Table 3-15**

The reset button connector is connected to a reset switch on the system chassis.

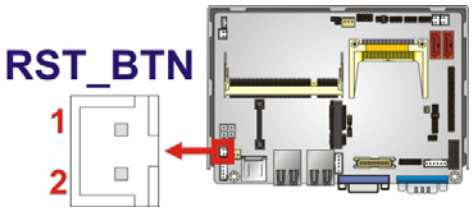


Figure 3-14: Reset Button Connector Location

Pin	Description
1	PM_RESET
2	GND

Table 3-15: Reset Button Connector Pinouts

3.2.14 RS-232/422/485 Serial Port Connector (COM6)

CN Label: **COM6**

CN Type: 14-pin header

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

CN Pinouts: See **Table 3-16**

This connector provides RS-232, RS-422 or RS-485 communications.

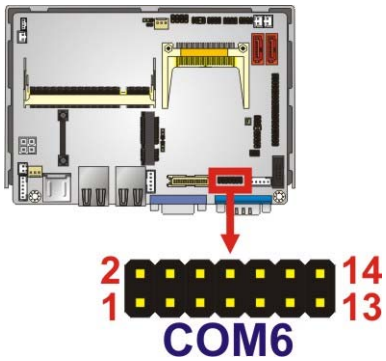


Figure 3-15: RS-232/422/485 Serial Port Connector Location

Pin	Description	Pin	Description
1	Data Carrier Direct (DCD)	2	Data Set Ready (DSR)
3	Receive Data (RXD)	4	Request To Send (RTS)
5	Transmit Data (TXD)	6	Clear To Send (CTS)
7	Data Terminal Ready (DTR)	8	Ring Indicator (RI)
9	Ground (GND)	10	N/C
11	TXD485+	12	TXD485#
13	RXD485+	14	RXD485#

Table 3-16: RS-232/422/485 Serial Port Connector Pinouts

3.2.15 RS-232 Serial Port Connector (COM2~COM5)

CN Label: **COM2-5**

CN Type: 40-pin header

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

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

This connector provides RS-232 connections for four serial ports (COM2, COM3, COM4 and COM5).

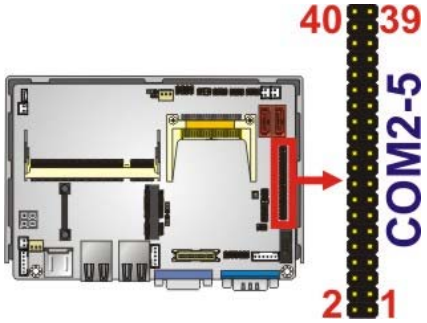


Figure 3-16: RS-232 Serial Port Connector Location

Pin	Description	Pin	Description
1	DATA CARRIER DETECT (DCD2)	2	DATA SET READY (DSR2)
3	RECEIVE DATA (RXD2)	4	REQUEST TO SEND (RTS2)
5	TRANSMIT DATA (TXD2)	6	CLEAR TO SEND (CTS2)
7	DATA TERMINAL READY (DTR2)	8	RING INDICATOR (RI2)

Pin	Description	Pin	Description
9	GND	10	GND
11	DATA CARRIER DETECT (DCD3)	12	DATA SET READY (DSR3)
13	RECEIVE DATA (RXD3)	14	REQUEST TO SEND (RTS3)
15	TRANSMIT DATA (TXD3)	16	CLEAR TO SEND (CTS3)
17	DATA TERMINAL READY (DTR3)	18	RING INDICATOR (RI3)
19	GND	20	GND
21	DATA CARRIER DETECT (DCD4)	22	DATA SET READY (DSR4)
23	RECEIVE DATA (RXD4)	24	REQUEST TO SEND (RTS4)
25	TRANSMIT DATA (TXD4)	26	CLEAR TO SEND (CTS4)
27	DATA TERMINAL READY (DTR4)	28	RING INDICATOR (RI4)
29	GND	30	GND
31	DATA CARRIER DETECT (DCD5)	32	DATA SET READY (DSR5)
33	RECEIVE DATA (RXD5)	34	REQUEST TO SEND (RTS5)
35	TRANSMIT DATA (TXD5)	36	CLEAR TO SEND (CTS5)
37	DATA TERMINAL READY (DTR5)	38	RING INDICATOR (RI5)
39	GND	40	GND

Table 3-17: Serial Port Connector Pinouts

3.2.16 SATA Drive Connectors

CN Label: **SATA1, SATA2**

CN Type: 7-pin SATA drive connectors

CN Location: See **Figure 3-17**

CN Pinouts: See **Table 3-18**

The SATA connectors connect to SATA hard drives or optical drives.

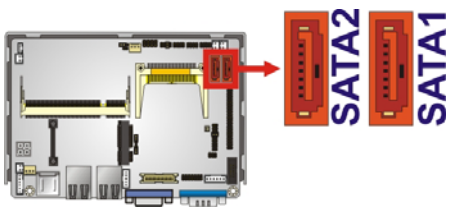


Figure 3-17: SATA Drive Connector Location

Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 3-18: SATA Drive Connector Pinouts

3.2.17 SATA Power Connectors

CN Label: **SATA_PWR1, SATA_PWR2**

CN Type: 2-pin wafer

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

CN Pinouts: See **Table 3-19**

Use the SATA Power Connector to connect to SATA device power connections.

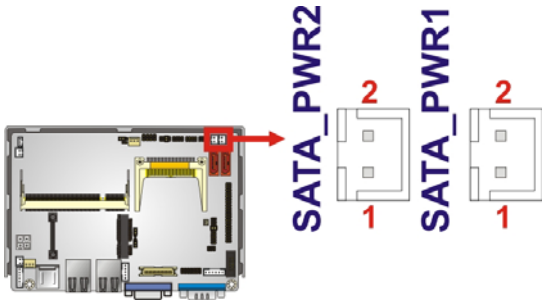


Figure 3-18: SATA Power Connector Locations

Pin	Description
1	VCC5
2	GND

Table 3-19: SATA Power Connector Pinouts

3.2.18 SMBus Connector

CN Label: **CN3**

CN Type: 4-pin wafer

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

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

The SMBus (System Management Bus) connector provides low-speed system management communications.

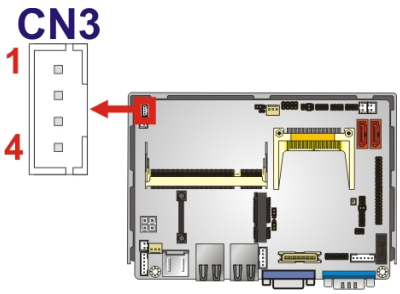


Figure 3-19: SMBus Connector Location

Pin	Description
1	GND
2	SMBDATA
3	SMBCLK
4	+5V

Table 3-20: SMBus Connector Pinouts

3.2.19 SO-DIMM Connector

CN Label: **DIMM1**

CN Type: 204-pin DDR3 SO-DIMM connector

CN Location: See **Figure 3-20**

The SO-DIMM connector is for installing memory on the system.

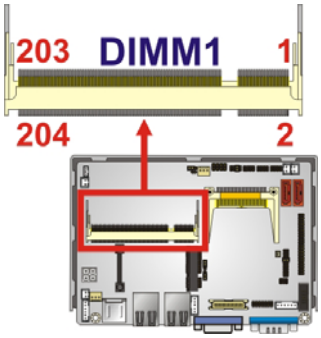


Figure 3-20: SO-DIMM Connector Location

3.2.20 SPI Flash Connector

CN Label:	**JSPI1**
CN Type:	8-pin header
CN Location:	See **Figure 3-21**
CN Pinouts:	See **Table 3-21**

The 8-pin SPI Flash connector is used to flash the BIOS.

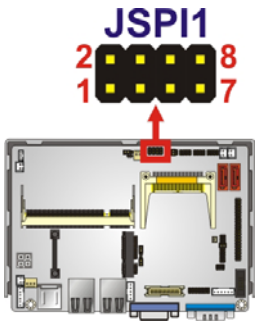


Figure 3-21: SPI Flash Connector Location

Pin	Description	Pin	Description
1	VCC	2	GND
3	CS#	4	CLOCK
5	SO	6	SI
7	NC	8	NC

Table 3-21: SPI Flash Connector Pinouts

3.2.21 USB Connectors

CN Label: **USB2, USB3, USB4**

CN Type: 8-pin header

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

CN Pinouts: See **Table 3-22**

The USB header can connect to two USB devices.

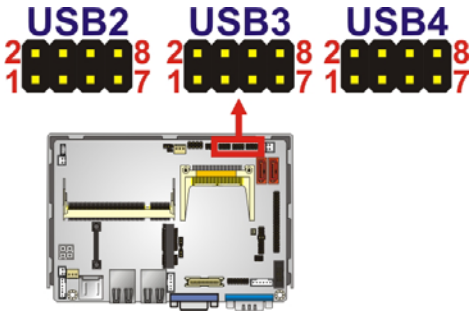


Figure 3-22: USB Connector Location

Pin	Description	Pin	Description
1	VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	VCC

Table 3-22: USB Port Connector Pinouts

3.3 External Interface Connectors

Figure 3-23 shows the WAFER-PV-D5252/D4252/N4552 motherboard external interface connectors. The WAFER-PV-D5252/D4252/N4552 on-board external interface connectors are shown in Figure 3-23**.**

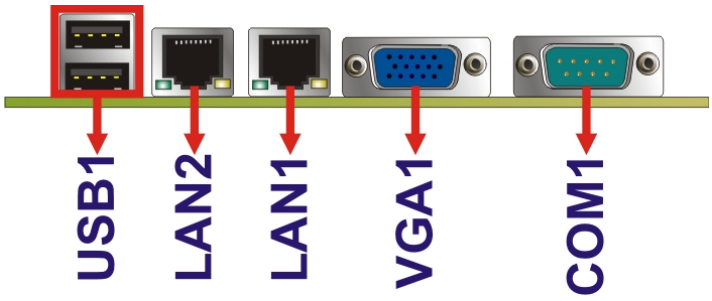


Figure 3-23: External Interface Connectors

3.3.1 Ethernet Connectors

CN Label: **LAN1, LAN2**

CN Type: RJ-45

CN Location: See **Figure 3-23**

CN Pinouts: See **Table 3-23**

A 10/100/1000 Mb/s connection can be made to a Local Area Network.

Pin	Description	Pin	Description
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+-
3.	MDIA2-	7	MDIA0-
4.	MDIA1-	8	MDIA0+

Table 3-23: Ethernet Connector Pinouts

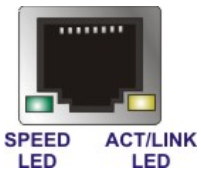


Figure 3-24: Ethernet Connector

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 3-24**.

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

Table 3-24: RJ-45 Ethernet Connector LEDs

3.3.2 Serial Port Connector

CN Label: **COM1**

CN Type: DB-9 Male connector

CN Location: See **Figure 3-23**

CN Pinouts: See **Table 3-25** and **Figure 3-25**

The RS-232 serial connector provides serial connection in the RS-232 mode.

Pin	Description	Pin	Description
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	GND		

Table 3-25: Serial Port Pinouts

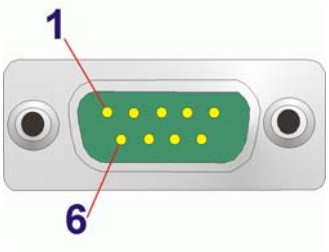


Figure 3-25: Serial Port Pinout Locations

3.3.3 USB Ports

CN Label: **USB1**

CN Type: USB Combo ports

CN Location: See **Figure 3-23**

CN Pinouts: See **Table 3-26**

The USB ports attach to standard USB devices.

Pin	Description
1	VCC
2	Data1-
3	Data1+
4	Ground
5	VCC
6	Data2-
7	Data2+
8	Ground

Table 3-26: USB Connector Pinouts

3.3.4 VGA Connector

CN Label: **VGA1**

CN Type: D-sub 15-pin female connector

CN Location: See **Figure 3-23**

CN Pinouts: See **Figure 3-26** an **Table 3-27**

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

Pin	Description	Pin	Description	Pin	Description
1	RED	6	GROUND	11	NC
2	GREEN	7	GROUND	12	SDA
3	BLUE	8	GROUND	13	HSYNC
4	+5V	9	NC	14	VSYNC
5	GROUND	10	GROUND	15	SCL

Table 3-27: VGA Connector Pinouts

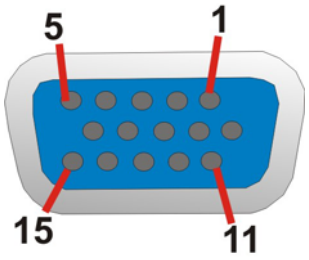


Figure 3-26: VGA Connector

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during installation may result in permanent damage to the product and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the WAFER-PV-D5252/D4252/N4552. Dry climates are especially susceptible to ESD. It is therefore critical to strictly adhere to the following anti-static precautions whenever the WAFER-PV-D5252/D4252/N4552, or any other electrical component, is handled.

- ***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-PV-D5252/D4252/N4552, place it on an anti-static pad. This reduces the possibility of ESD damaging the WAFER-PV-D5252/D4252/N4552.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold it by the edges.

4.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the WAFER-PV-D5252/D4252/N4552 is installed. All installation notices pertaining to the installation of WAFER-PV-D5252/D4252/N4552 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the WAFER-PV-D5252/D4252/N4552 and injury to the person installing the motherboard.

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the WAFER-PV-D5252/D4252/N4552, WAFER-PV-D5252/D4252/N4552 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 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 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 off**:
  - Make sure the product is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the WAFER-PV-D5252/D4252/N4552 **DO NOT:**

- **DO NOT** remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- **DO NOT** use the product before verifying all the cables and power connectors are properly connected.
- **DO NOT** allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.3 SO-DIMM Installation

To install an SO-DIMM, please follow the steps below and refer to Figure 4-1.

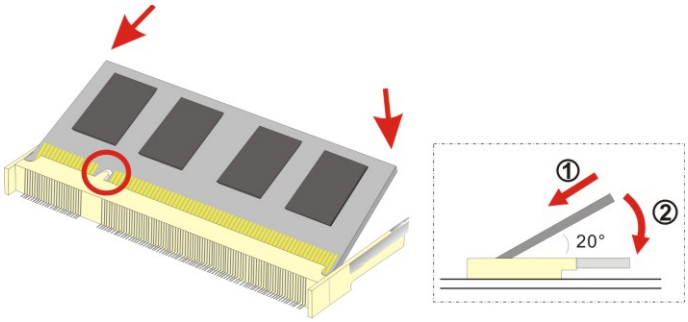


Figure 4-1: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket**. Place the board on an anti-static mat.

Step 2: **Align the SO-DIMM with the socket**. Align the notch on the memory with the notch on the memory socket.

Step 3: **Insert the SO-DIMM**. Push the memory in at a 20º angle. (See Figure 4-1)

Step 4: **Seat the SO-DIMM**. Gently push downwards and the arms clip into place. (See Figure 4-1)

4.4 CompactFlash® Installation

NOTE:

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

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

Step 1: **Locate the CF card socket**. Locate the CompactFlash® slot.

Step 2: **Align the CF card**. Align the CompactFlash® card. The label side should be facing away from the board. The grooves on the CompactFlash® slot ensure that the card cannot be inserted the wrong way.

Step 3: **Insert the CF card**. Push until the CompactFlash® card is firmly seated in the slot. See Figure 4-2.

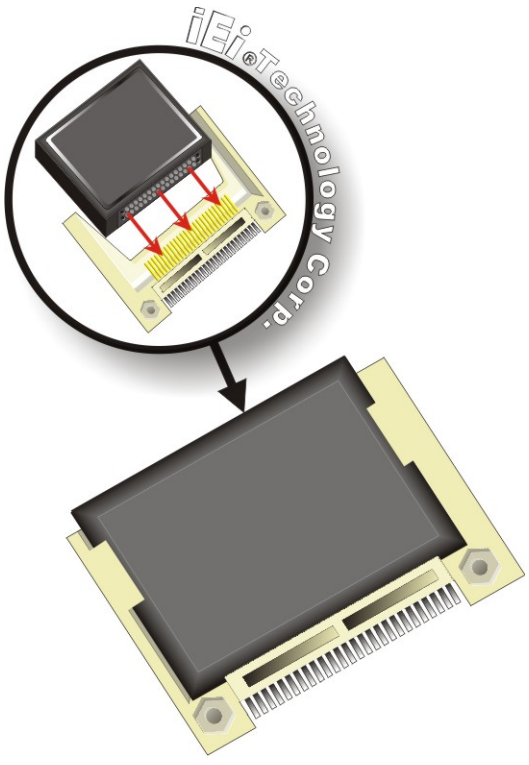
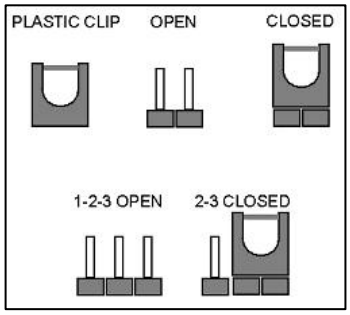


Figure 4-2: CompactFlash® Card Installation

4.5 Jumper Settings

NOTE:



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

Before the WAFER-PV-D5252/D4252/N4552 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the WAFER-PV-D5252/D4252/N4552 are listed in Table 4-1.

Description	Label	Type
AT/ATX mode selection	J_AUTOPWR1	3-pin header
Clear CMOS	J_CMOS1	3-pin header
LVDS voltage selection	J_VLVDS1	3-pin header
LVDS resolution selection	J_LCD_TYPE1	8-pin header
CompactFlash® master/slave selection	JCF1	2-pin header
COM6 RS-232/422/485 selection	JP1	8-pin header
COM1 pin-9 voltage selection	JP2	6-pin header

Table 4-1: Jumpers

4.5.1 AT/ATX Mode Selection

Jumper Label: **J_AUTOPWR1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-2**

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

Set both of the jumpers select AT or ATX power mode for the WAFER-PV-D5252/D4252/N4552. AT power mode limits the system to on/off. ATX allows the system to use various power saving states and enter a standby state, so the system can be turned on remotely over a network. The settings on both jumpers should be the same.

Pin	Description
Short 1-2	ATX mode (Default)
Short 2-3	AT mode

Table 4-2: AT/ATX Mode Selection

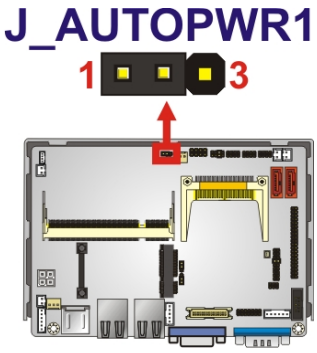


Figure 4-3: AT/ATX Mode Selection Jumper Location

4.5.2 Clear CMOS Jumper

Jumper Label: **J_CMOS1**

Jumper Type: 3-pin header

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

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

If the WAFER-PV-D5252/D4252/N4552 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

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

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

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

The clear CMOS jumper settings are shown in Table 4-3.

Pin	Description
1-2	Keep CMOS Setup (Default)
2-3	Clear CMOS Setup

Table 4-3: Clear CMOS Jumper Settings

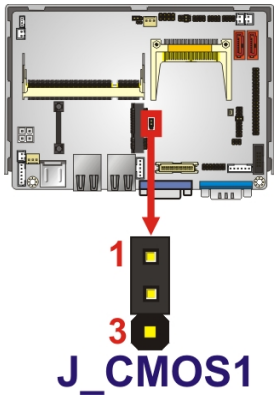


Figure 4-4: Clear CMOS Jumper Location

4.5.3 LVDS Voltage Selection

Jumper Label: **J_VLVDS1**

Jumper Type: 3-pin header

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

Jumper Location: See **Figure 4-5**

Selects the voltage of the LVDS connector.

Pin	Description
Short 1-2	+5 V
Short 2-3	+3.3 V (Default)

Table 4-4: LVDS Voltage Selection

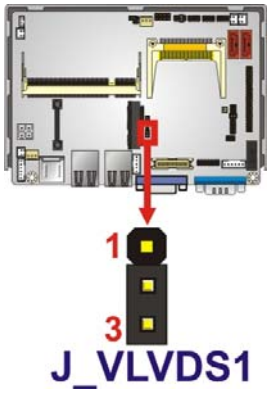


Figure 4-5: LVDS Voltage Selection Jumper Location

4.5.4 LVDS Resolution Selection

Jumper Label: **J_LCD_TYPE1**

Jumper Type: 8-pin header

Jumper Settings: See **Table 4-5**

Jumper Location: See **Figure 4-6**

Selects the resolution of the LCD panel connected to the LVDS1 connector.

Pin	Description
Open	640 x 480 (18-bit)
Short 1-2	800 x 480 (18-bit)
Short 3-4	800 x 600 (18-bit) (Default)
Short 1-2, 3-4	1024 x 768 (18-bit)
Short 5-6	1280 x 1024 (18-bit)
Short 1-2, 5-6	1366 x 768 (18-bit)
Short 3-4, 5-6	1280 x 800 (18-bit)
Short 1-2, 3-4, 5-6	1280 x 600 (18-bit)

Table 4-5: LVDS Resolution Selection

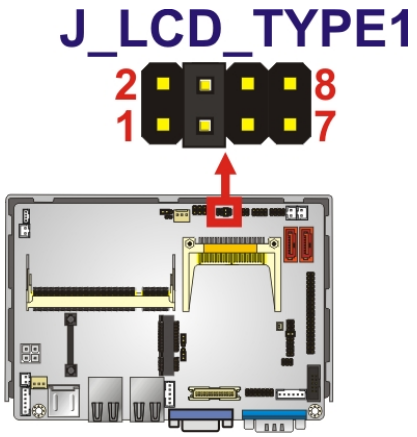


Figure 4-6: LVDS Resolution Selection Jumper Location

4.5.5 CompactFlash® Master/Slave Selection

Jumper Label:	**JCF1**
Jumper Type:	2-pin header
Jumper Settings:	See **Table 4-6**
Jumper Location:	See **Figure 4-7**

NOTE:

To use SATA and CF, CF must be set as slave

Sets the CompactFlash® slot as the IDE primary master or primary slave.

Pin	Description
Closed	Master
Open	Slave (Default)

Table 4-6: CompactFlash® Master/Slave Selection

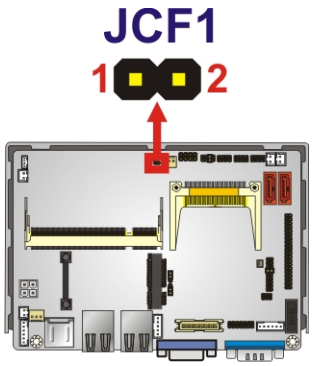


Figure 4-7: CompactFlash® Master/Slave Selection Jumper Location

4.5.6 COM6 RS-232/422/485 Selection

Jumper Label: **JP1**

Jumper Type: 8-pin header

Jumper Settings: See **Table 4-7**

Jumper Location: See **Figure 4-8**

Selects the communication method of COM6 serial port.

Pin	Description
Short 1-2	RS-232 (Default)
Short 3-4	RS-422
Short 5-6	RS-485
Short 5-6, 7-8	RS-485 with RTS control

Table 4-7: COM6 RS-232/422/485 Selection

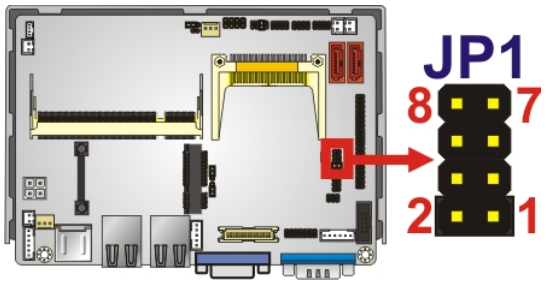


Figure 4-8: COM6 RS-232/422/485 Selection Jumper Location

4.5.7 COM 1 Pin 9 Setting Jumper

Jumper Label:	**JP2**
Jumper Type:	6-pin header
Jumper Settings:	See Table 4-8
Jumper Location:	See Figure 4-9

The COM 1 Pin 9 Setting jumper configures pin 9 on COM 1 as either a +5 V, +12 V power source or as a ring-in (RI) line. The COM 1 Pin 9 Setting jumper selection options are shown in Table 4-8.

Setting	Description
Short 1-3	COM 1 RI Pin use +5 V (Default)
Short 3-5	COM 1 RI Pin use +12 V
Short 3-4	COM 1 RI Pin use RI

Table 4-8: COM 1 Pin 9 Setting Jumper Settings

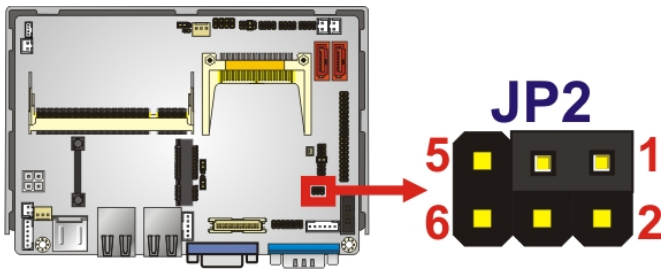


Figure 4-9: COM 1 Pin 9 Setting Jumper Location

4.6 Chassis Installation

4.6.1 Airflow

WARNING:

Airflow is critical for keeping components within recommended operating termperatures. The chassis should have fans and vents as necessary to keep things cool.

The WAFER-PV-D5252/D4252/N4552 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.

4.6.2 Motherboard Installation

To install the WAFER-PV-D5252/D4252/N4552 motherboard into the chassis please refer to the reference material that came with the chassis.

4.7 Internal Peripheral Device Connections

This section outlines the installation of peripheral devices to the onboard connectors.

4.7.1 AT Power Connection

Follow the instructions below to connect the WAFER-PV-D5252/D4252/N4552 to an AT power supply.

WARNING:

Disconnect the power supply power cord from its AC power source to prevent a sudden power surge to the WAFER-PV-D5252/D4252/N4552.

Step 1: **Locate the power cable**. The power cable is shown in the packing list in **Chapter 3**.

Step 2: **Connect the Power Cable to the Motherboard**. Connect the 4-pin (2x2) Molex type power cable connector to the AT power connector on the motherboard. See Figure 4-10.

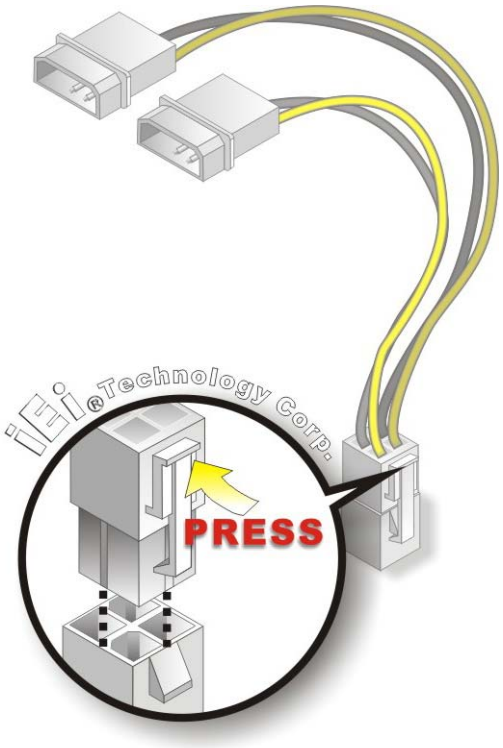


Figure 4-10: Power Cable to Motherboard Connection

Step 3: **Connect Power Cable to Power Supply**. Connect one of the 4-pin (1x4) Molex type power cable connectors to an AT power supply. See Figure 4-12.

4.7.2 Audio Kit Installation

The Audio Kit that came with the WAFER-PV-D5252/D4252/N4552 connects to the audio connector on the WAFER-PV-D5252/D4252/N4552. The audio kit consists of three audio jacks. Mic-in connects to a microphone. Line-in provides a stereo line-level input to connect to the output of an audio device. Line-out, a stereo line-level output, connects to two amplified speakers. To install the audio kit, please refer to the steps below:

Step 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 on-board connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See Figure 4-11.

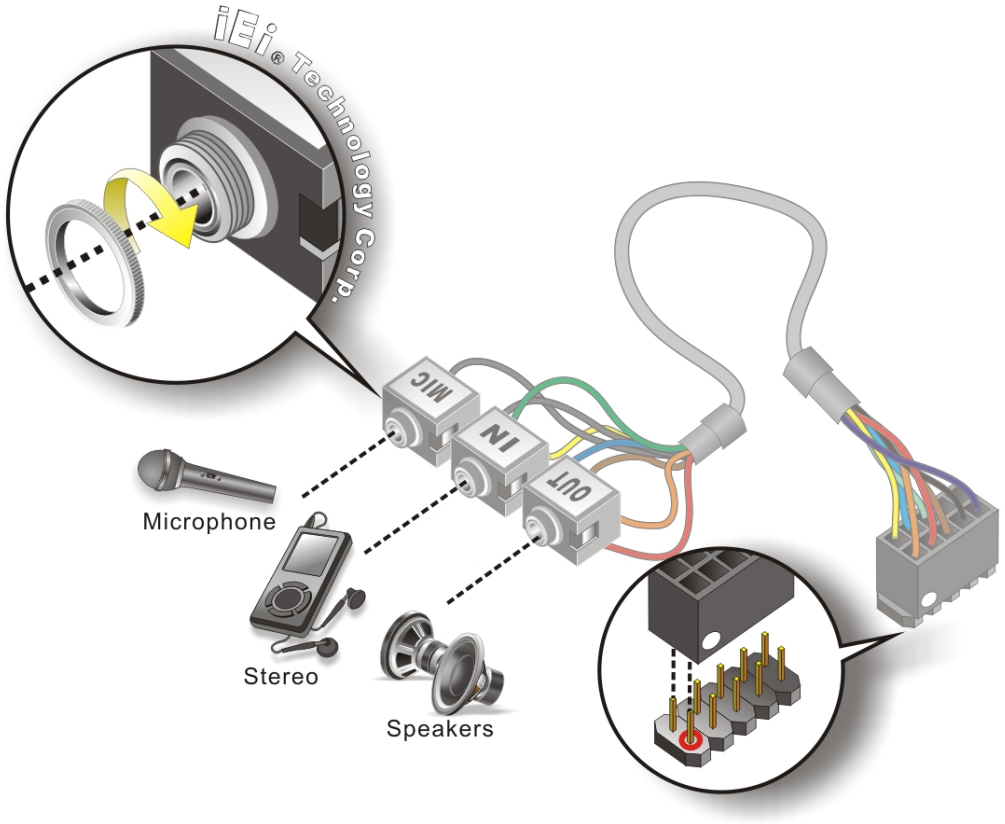


Figure 4-11: Audio Kit Cable Connection

Step 3: **Connect the audio devices**. Connect speakers to the line-out audio jack. Connect the output of an audio device to the line-in audio jack. Connect a microphone to the mic-in audio jack.

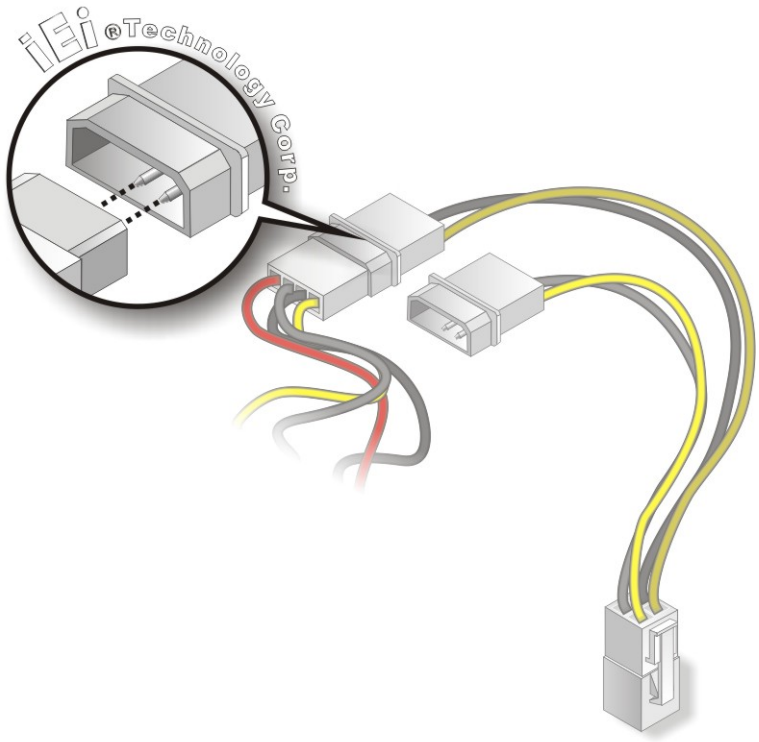


Figure 4-12: Connect Power Cable to Power Supply

4.7.3 Keyboard/Mouse Connector

The WAFER-PV-D5252/D4252/N4552 is shipped with a keyboard/mouse Y-cable connector. The keyboard/mouse Y-cable connector connects to a keyboard/mouse connector on the WAFER-PV-D5252/D4252/N4552 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-PV-D5252/D4252/N4552 keyboard/mouse connector. See Figure 4-13.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the keyboard/mouse connector on the WAFER-PV-D5252/D4252/N4552, connect the cable connector to the on-board connectors. See Figure 4-13.

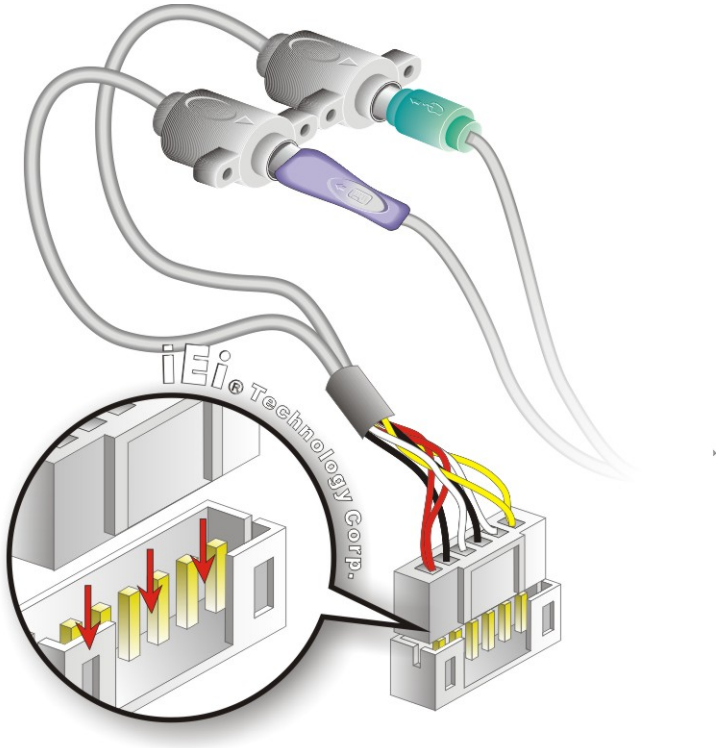


Figure 4-13: Keyboard/mouse Y-cable Connection

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

Step 5: **Connect the keyboard and mouse**. Once the PS/2 connectors are connected to the chassis, a keyboard and mouse can each be connected to one of the PS/2 connectors. The keyboard PS/2 connector and mouse PS/2 connector are both marked. Please make sure the keyboard and mouse are connected to the correct PS/2 connector.

4.7.4 Four Serial Port Connector

The 40-pin serial port connector connects the board connector to four DB-9 connectors. To install, please follow the steps below.

Step 1: **Locate the COM connector**. The locations of the COM port connectors are shown in Chapter 4.

Step 2: **Insert the cable connector.** Align the cable connector with the onboard connector. Make sure pin 1 on the board and connector line up..

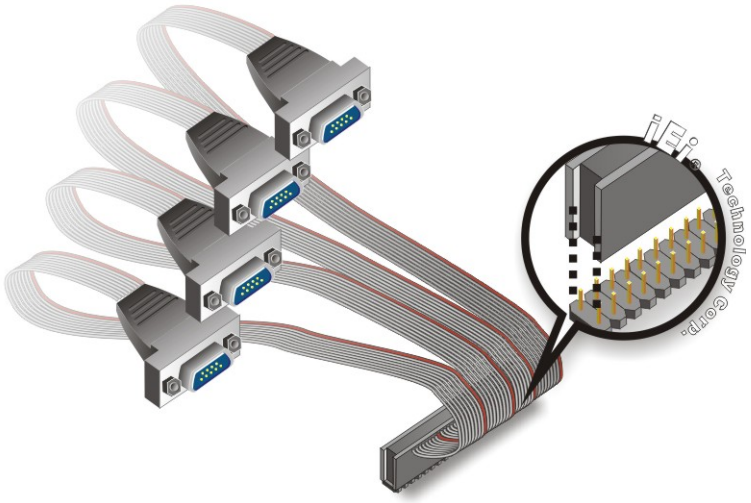


Figure 4-14: Four Serial Port Connector

Step 3: **Secure the serial ports to the chassis**. Tighten the screws on the DB-9 connectors to secure them to the chassis.

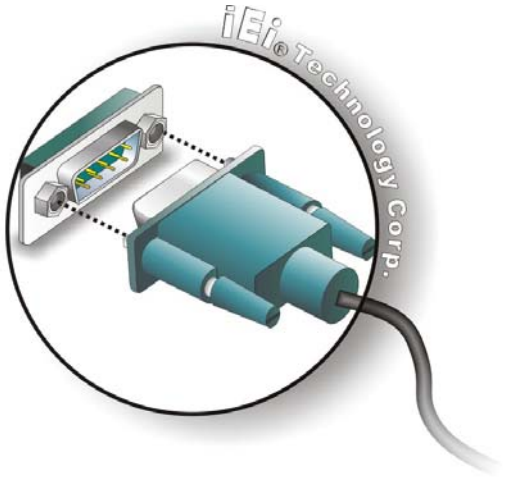


Figure 4-15: Serial Device Connector

4.8 Software Installation

All the drivers for the WAFER-PV-D5252/D4252/N4552 are on the CD that came with the system. To install the drivers, please follow the steps below.

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

NOTE:

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

Step 2: The driver main menu appears (Figure 4-16).

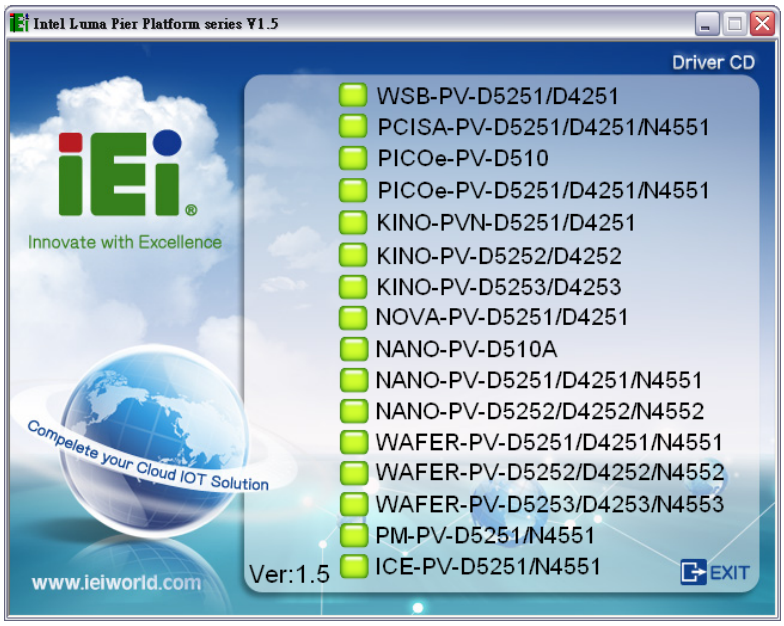


Figure 4-16: Introduction Screen

Step 3: Click WAFER-PV-D5252/D4252/N4552.

Step 4: A new screen with a list of available drivers appears (Figure 4-17).

Figure 4-17: Available Drivers

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

Chapter

5

BIOS

5.1 Introduction

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

NOTE:

Some of the BIOS options may vary throughout the life cycle of the product and are subject to change without prior notice.

5.1.1 Starting Setup

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

1. Press the **DELETE** or **F2** key as soon as the system is turned on or
2. Press the **DELETE** or **F2** key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before the **DELETE** or **F2** key is pressed, restart the computer and try again.

5.1.2 Using Setup

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

Key	Function
Up arrow	Move to the item above
Down arrow	Move to the item below
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+	Increase the numeric value or make changes

Key	Function
-	Decrease the numeric value or make changes
Page up	Move to the next page
Page down	Move to the previous page
Esc	Main Menu – Quit and do not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Load previous values
F3 key	Load optimized defaults
F4 key	Save changes and Exit BIOS

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

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

5.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in **Chapter 4**.

5.1.5 BIOS Menu Bar

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

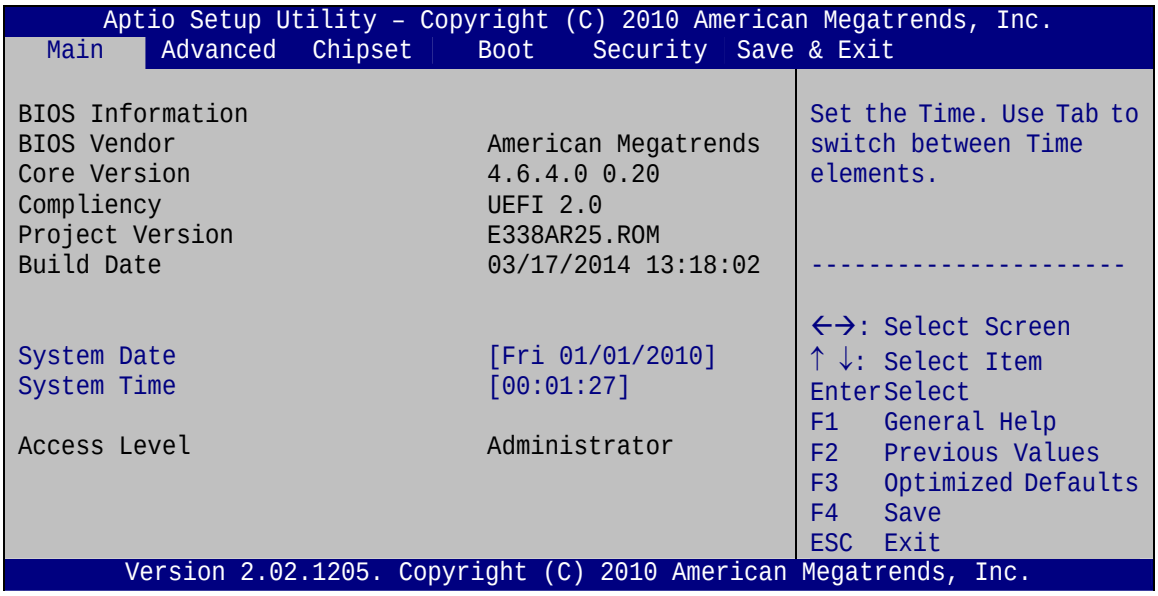
- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Boot – Changes the system boot configuration.
- Security – Sets User and Supervisor Passwords.

- Save & Exit – Selects exit options and loads default settings

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

5.2 Main

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



BIOS Menu 1: Main

➔ BIOS Information

The **BIOS Information** lists a brief summary of the BIOS. The fields in **BIOS Information** cannot be changed. The items shown in the system overview include:

- **BIOS Vendor:** Installed BIOS vendor
- **Core Version:** Current BIOS version
- **Project Version:** the board version
- **Build Date:** Date the current BIOS version was made

The System Overview field also has two user configurable fields:

➔ **System Date [xx/xx/xx]**

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

➔ **System Time [xx:xx:xx]**

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

5.3 Advanced

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

WARNING!

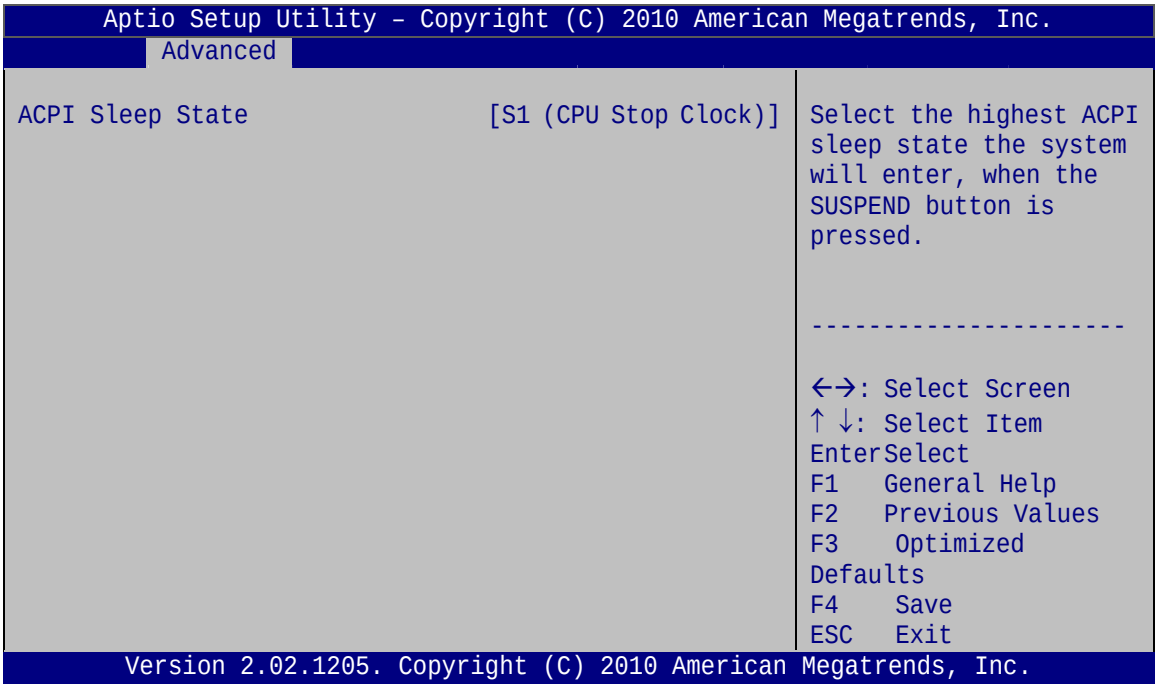
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

```
        Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
  Main    Advanced   Chipset    Boot    Security   Save & Exit

> ACPI Settings                                   System ACPI Parameters
> RTC Wake Settings
> CPU Configuration
> IDE Configuration
> USB Configuration                               ----------------------
> Super IO Configuration
> H/M Monitor                                     ←→: Select Screen
> Serial Port Console Redirection                 ↑ ↓: Select Item
> iEi Feature                                     EnterSelect
                                                  F1   General Help
                                                  F2   Previous Values
                                                  F3    Optimized
                                                  Defaults
                                                  F4    Save
                                                  ESC   Exit
        Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 2: Advanced

5.3.1 ACPI Configuration

The **ACPI Configuration** menu (**BIOS Menu 3**) configures the Advanced Configuration and Power Interface (ACPI) options.



BIOS Menu 3: ACPI Configuration

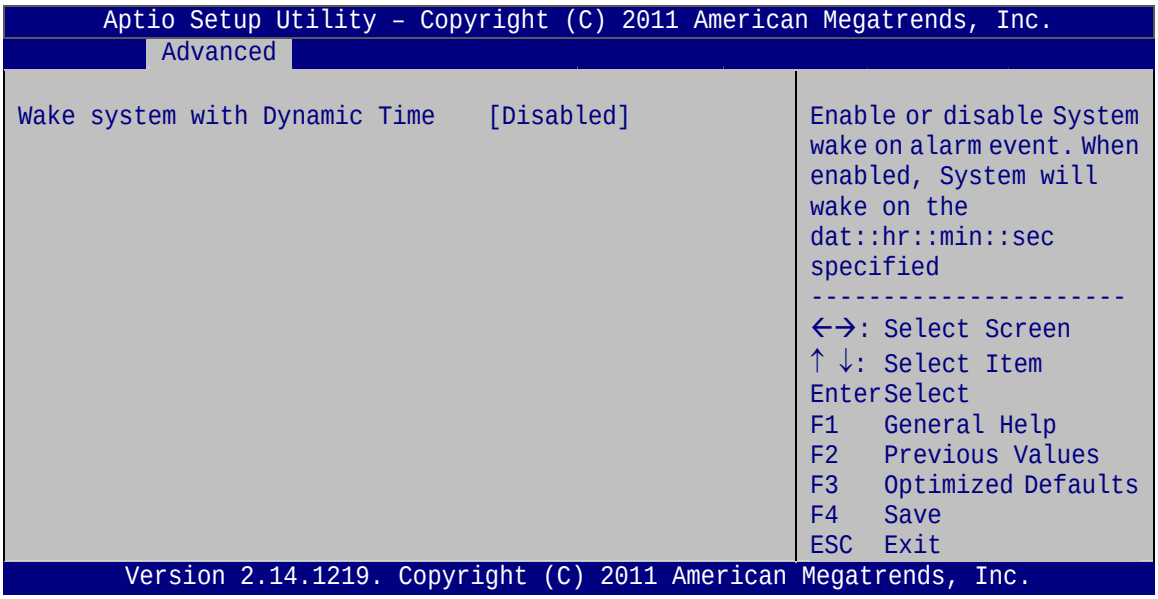
➔ **ACPI Sleep State [S1 (CPU Stop Clock)]**

Use the **ACPI Sleep State** option to specify the sleep state the system enters when it is not being used.

➔ **S1 (CPU Stop Clock)** **DEFAULT**	The system enters S1(POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.
➔ **S3 (Suspend to RAM)**	The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved.

5.3.2 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 4**) configures RTC wake event.



BIOS Menu 4: RTC Wake Settings

➔ **Wake System with Fixed Time [Disabled]**

Use the **Wake System with Fixed Time** option to specify the time the system should be roused from a suspended state.

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

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

*Wake up every day

*Wake up date

*Wake up hour

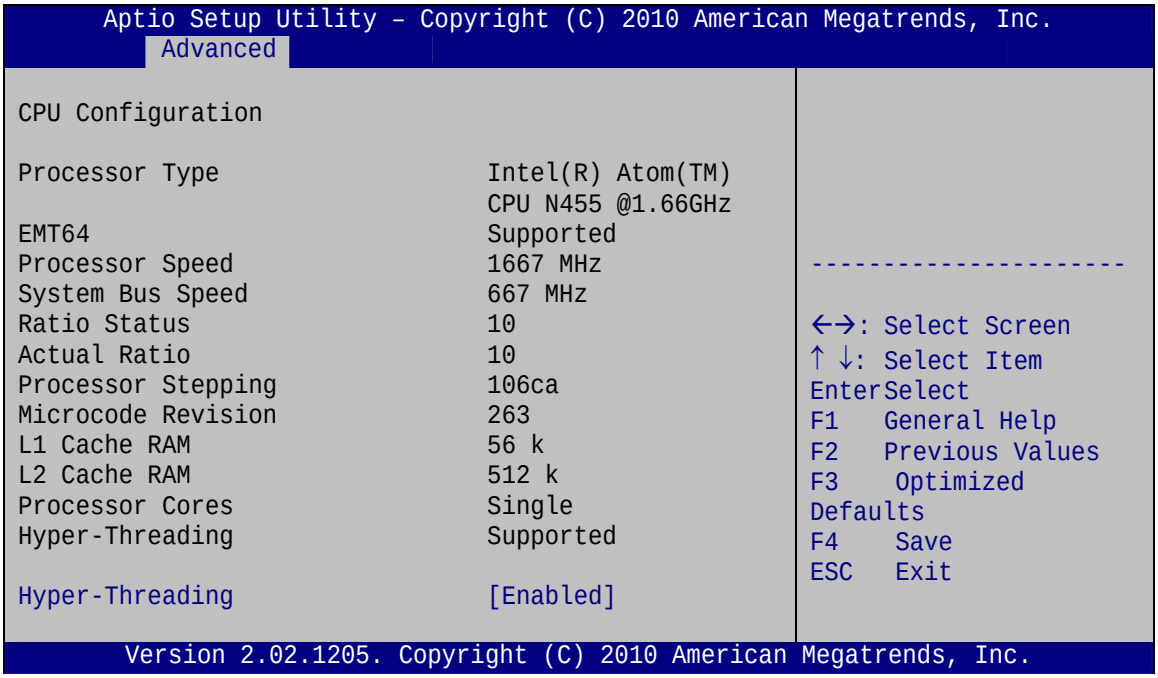
*Wake up minute

*Wake up second

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

5.3.3 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 5**) to view detailed CPU specifications and configure the CPU.



BIOS Menu 5: CPU Configuration

The CPU Configuration menu (**BIOS Menu 5**) lists the following CPU details:

- Processor Type: Lists the brand name of the CPU being used
- EMT64: Indicates if the EM64T is supported by the CPU.
- Processor Speed: Lists the CPU processing speed
- Actual Ratio: Lists the ratio of the frequency to the clock speed
- Processor Stepping: Lists the CPU processing stepping
- Microcode Revision: Lists the microcode revision
- L1 Cache RAM: Lists the CPU L1 cache size
- L2 Cache RAM: Lists the CPU L2 cache size
- Processor Cores: Lists the number of the processor core
- Hyper-Threading: Indicates if the Intel HT Technology is supported by the CPU.

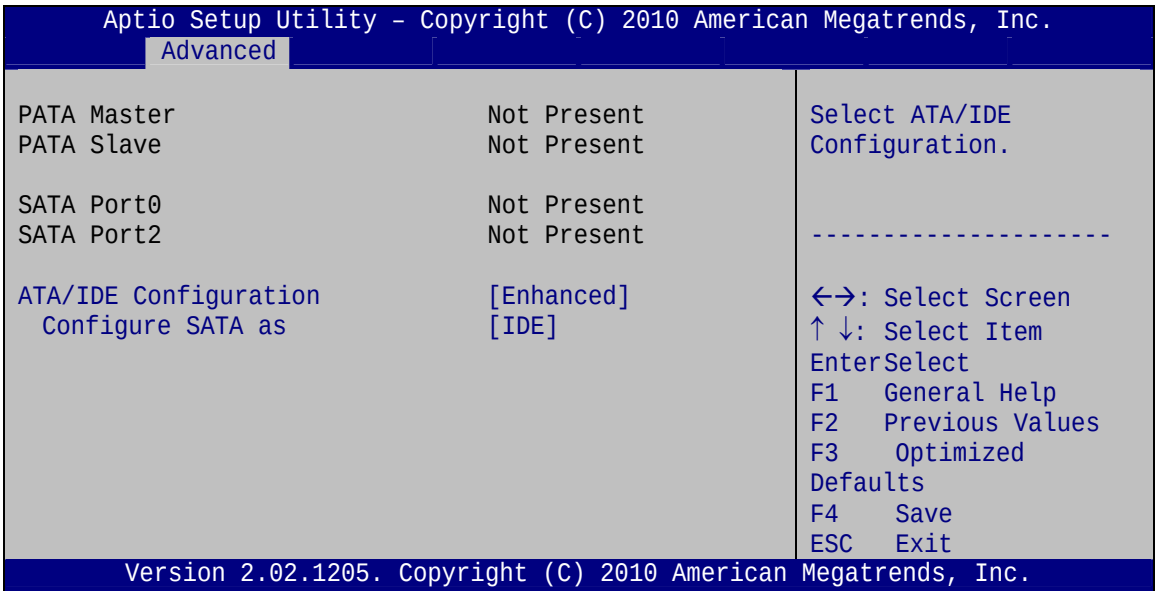
➔ **Hyper-Threading [Enabled]**

Use the **Hyper-Threading** option to enable or disable Intel Hyper-Threading technology.

➔ **Disabled**		Disables Intel technology	Hyper-Threading
➔ **Enabled**	**DEFAULT**	Enables Intel technology	Hyper-Threading

5.3.4 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 6**) to change and/or set the configuration of the IDE devices installed in the system.



BIOS Menu 6: IDE Configuration

➔ **ATA/IDE Configurations [Enhanced]**

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

➔ **Disabled**		Disables the on-board ATA/IDE controller.

➔ **Compatible** Configures the on-board ATA/IDE controller to be in compatible mode. In this mode, a SATA channel will replace one of the IDE channels. This mode supports up to 4 storage devices.

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

➔ **Configure SATA as [IDE]**

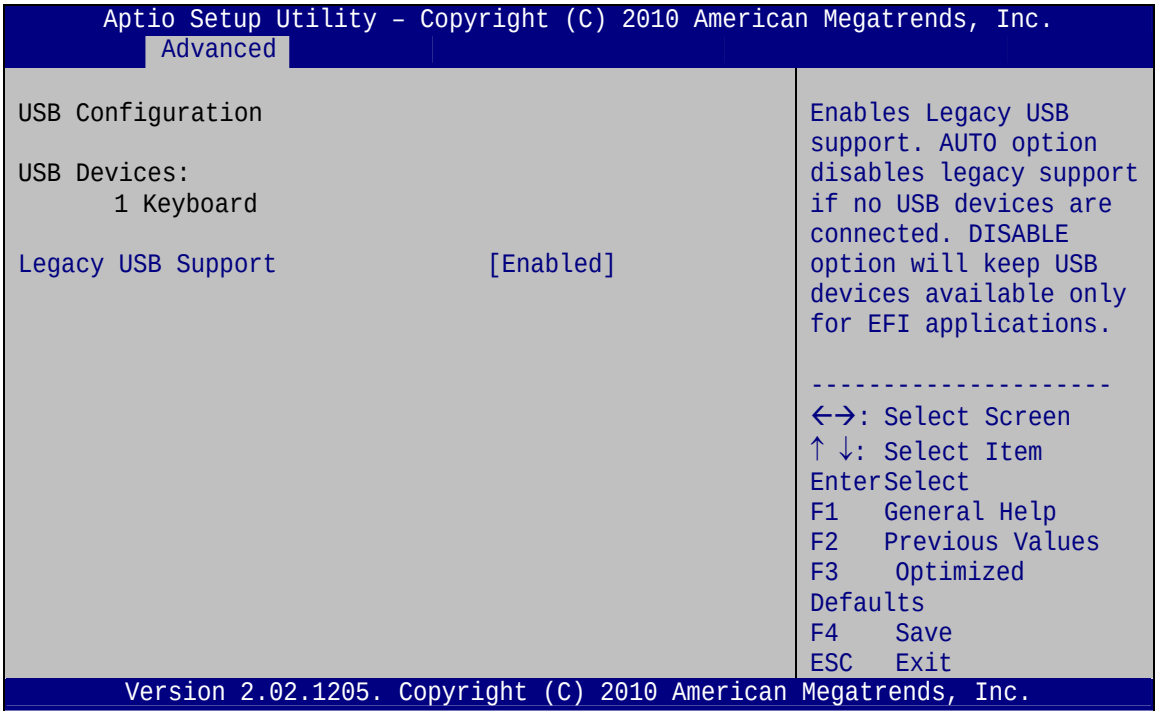
Use the **Configure SATA as** option to configure SATA devices as normal IDE devices.

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

➔ **AHCI** Configures SATA devices as normal AHCI device.

5.3.5 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 7**) to read USB configuration information and configure the USB settings.



BIOS Menu 7: USB Configuration

➔ **USB Devices**

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

➔ **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.

➔	**Enabled**	**DEFAULT**	Legacy USB support enabled
➔	**Disabled**		Legacy USB support disabled
➔	**Auto**		Legacy USB support disabled if no USB devices are connected

5.3.6 Super IO Configuration

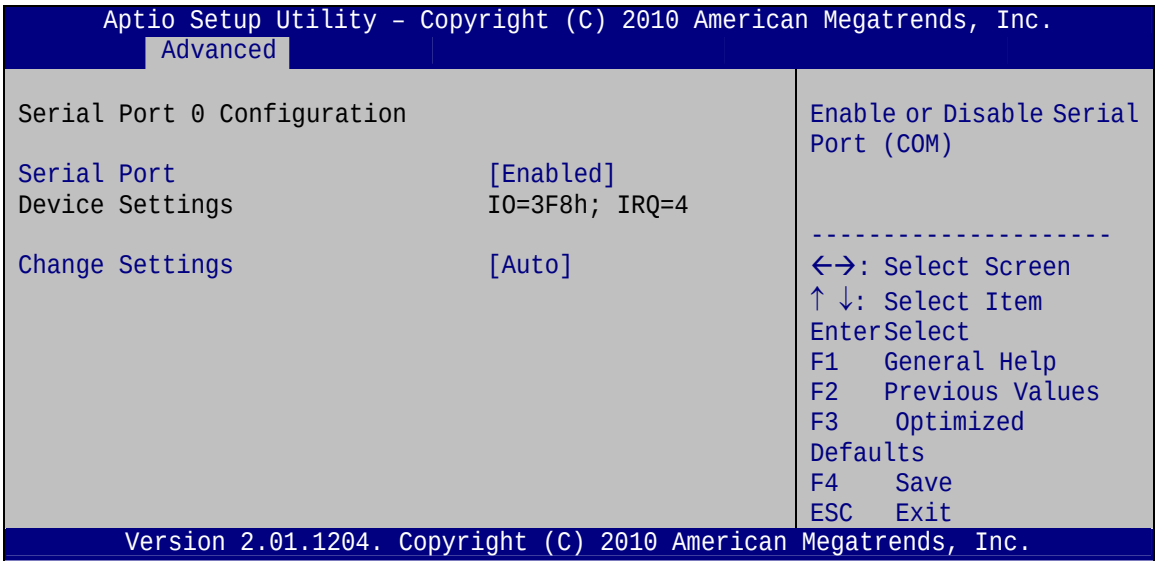
Use the **Super IO Configuration** menu (**BIOS Menu 8**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.

```
      Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
          Advanced
 Super IO Configuration                          | Set Parameters of Serial
                                                 | Port 1 (COMA)
 Super IO Chip                    Finteck F81865 |
 > Serial Port 1 Configuration                   |
 > Serial Port 2 Configuration                   | ---------------------
 > Serial Port 3 Configuration                   | ←→: Select Screen
 > Serial Port 4 Configuration                   | ↑ ↓: Select Item
 > Serial Port 5 Configuration                   | EnterSelect
 > Serial Port 6 Configuration                   | F1   General Help
                                                 | F2   Previous Values
                                                 | F3    Optimized
                                                 | Defaults
                                                 | F4    Save
                                                 | ESC   Exit
      Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 8: Super IO Configuration

5.3.6.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 9**) to configure the serial port n.



BIOS Menu 9: Serial Port n Configuration Menu

5.3.6.1.1 Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔	**Disabled**		Disable the serial port
➔	**Enabled**	**DEFAULT**	Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔	**Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔	**IO=3F8h; IRQ=4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ4

- ➔ **IO=3F8h; IRQ=3, 4** — Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4
- ➔ **IO=2F8h; IRQ=3, 4** — Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4

5.3.6.1.2 Serial Port 2 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

- ➔ **Disabled** — Disable the serial port
- ➔ **Enabled** **DEFAULT** — Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

- ➔ **Auto** **DEFAULT** — The serial port IO port address and interrupt address are automatically detected.
- ➔ **IO=2F8h; IRQ=3** — Serial Port I/O port address is 2F8h and the interrupt address is IRQ3
- ➔ **IO=3F8h; IRQ=3, 4** — Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4
- ➔ **IO=2F8h; IRQ=3, 4** — Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4

5.3.6.1.3 Serial Port 3 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

- ➔ **Disabled** — Disable the serial port

➔ **Enabled** **DEFAULT** Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.

➔ **IO=3E8h; IRQ=10** Serial Port I/O port address is 3E8h and the interrupt address is IRQ10

➔ **IO=3E8h; IRQ=10, 11** Serial Port I/O port address is 3E8h and the interrupt address is IRQ10, 11

➔ **IO=2E8h; IRQ=10, 11** Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11

5.3.6.1.4 Serial Port 4 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled** Disable the serial port

➔ **Enabled** **DEFAULT** Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.

➔ **IO=2E8h; IRQ=10** Serial Port I/O port address is 2E8h and the interrupt address is IRQ10

- ➔ **IO=3E8h; IRQ=10, 11** — Serial Port I/O port address is 3E8h and the interrupt address is IRQ10, 11
- ➔ **IO=2E8h; IRQ=10, 11** — Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11

5.3.6.1.5 Serial Port 5 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

- ➔ **Disabled** — Disable the serial port
- ➔ **Enabled** **DEFAULT** — Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

- ➔ **Auto** **DEFAULT** — The serial port IO port address and interrupt address are automatically detected.
- ➔ **IO=2C0h; IRQ=11** — Serial Port I/O port address is 2C0h and the interrupt address is IRQ11
- ➔ **IO=2C0h; IRQ=10, 11** — Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
- ➔ **IO=2C8h; IRQ=10, 11** — Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11

5.3.6.1.6 Serial Port 6 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**		Disable the serial port
➔ **Enabled**	**DEFAULT**	Enable the serial port

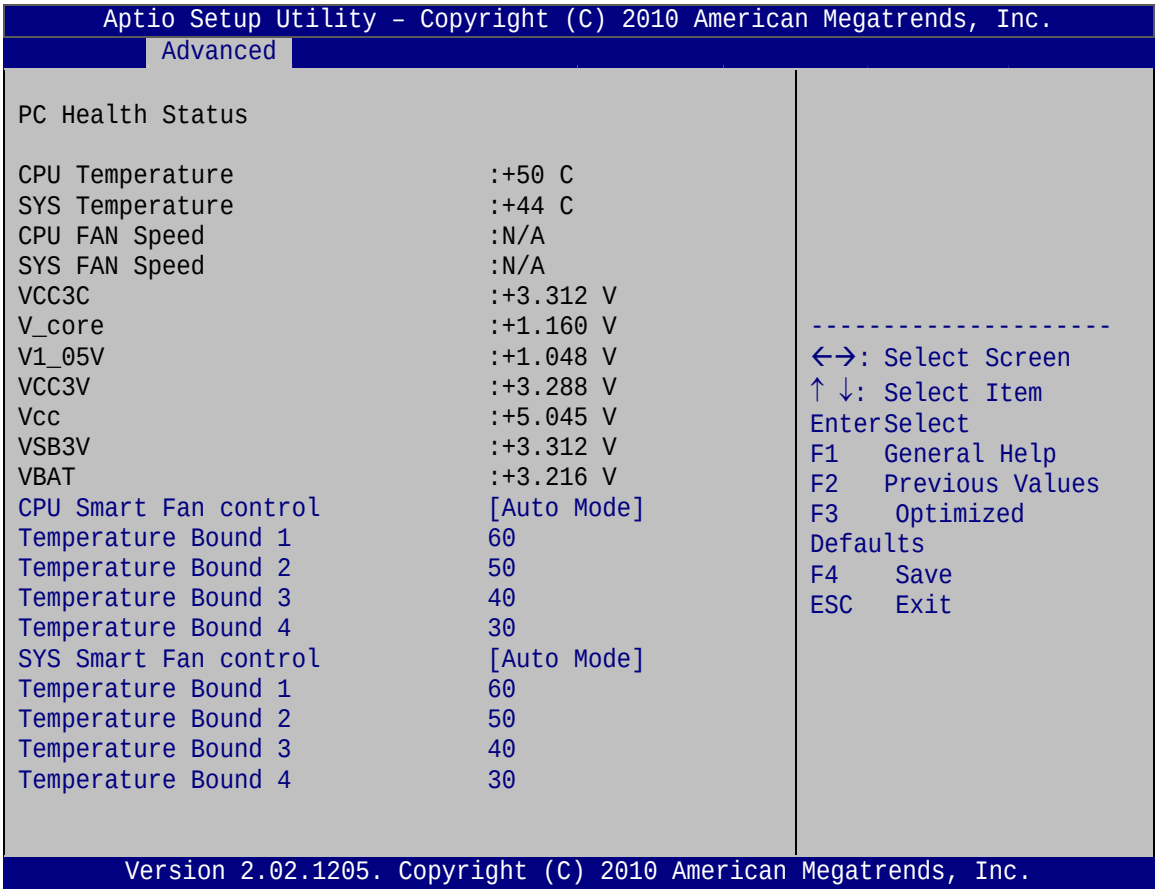
➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2C8h; IRQ=10**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ10
➔ **IO=2C0h; IRQ=10, 11**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
➔ **IO=2C8h; IRQ=10, 11**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11

5.3.7 H/W Monitor

The H/W Monitor menu (**BIOS Menu 10**) shows the operating temperature, fan speeds and system voltages.



BIOS Menu 10: Hardware Health Configuration

➔ **PC Health Status**

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

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speeds:
  - CPU Fan Speed
  - System Fan Speed

- Voltages:
  - VCC3V
  - V_core
  - V1_05V
  - VCC3V
  - Vcc
  - VSB3V
  - VBAT

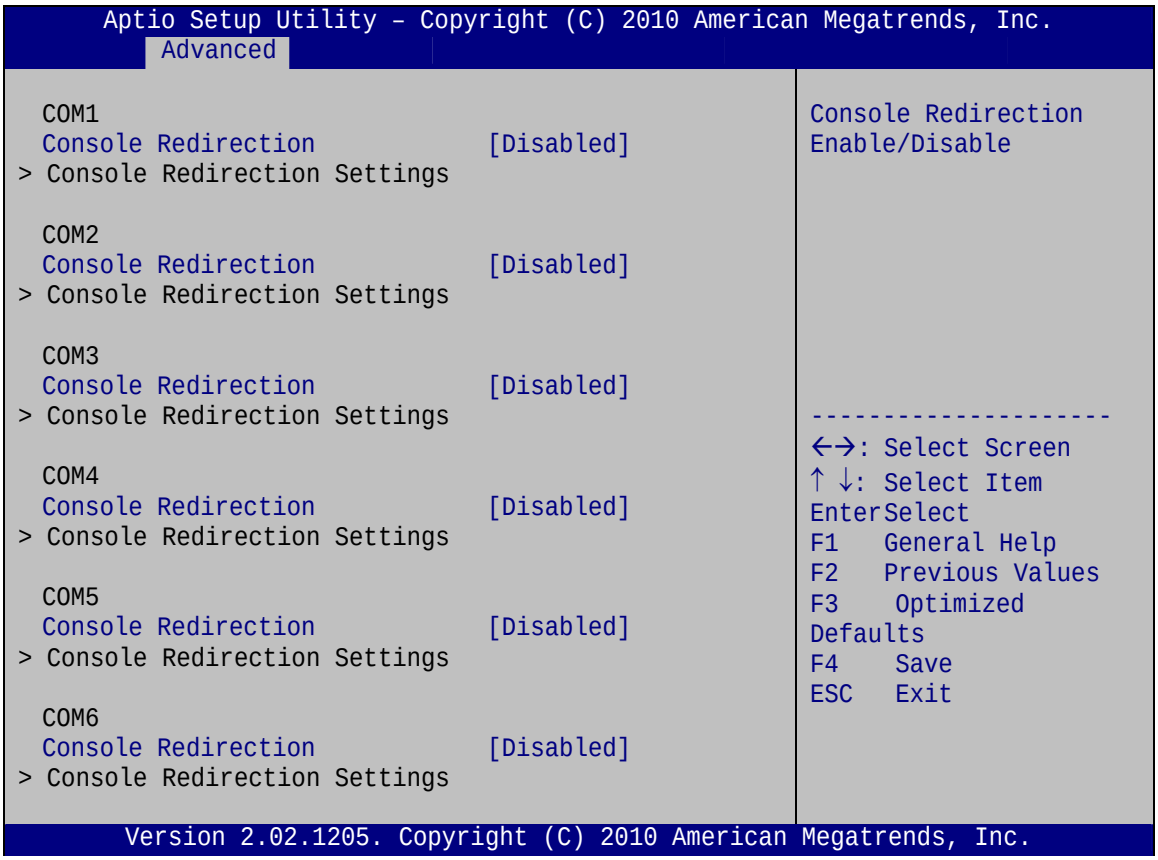
➔ **CPU Smart Fan control [Auto Mode]**

Use the **CPU Smart Fan control** option to configure the CPU fan.

➔ **Auto Mode**	The fan adjusts its speed using these settings: Temperature Bound 1 Temperature Bound 2 Temperature Bound 3 Temperature Bound 4
➔ **Manual Mode**	The fan spins at the speed set in: Manual Duty Cycle Setting

5.3.8 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 11**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.



BIOS Menu 11: Serial Port Console Redirection

➔ **Console Redirection [Disabled]**

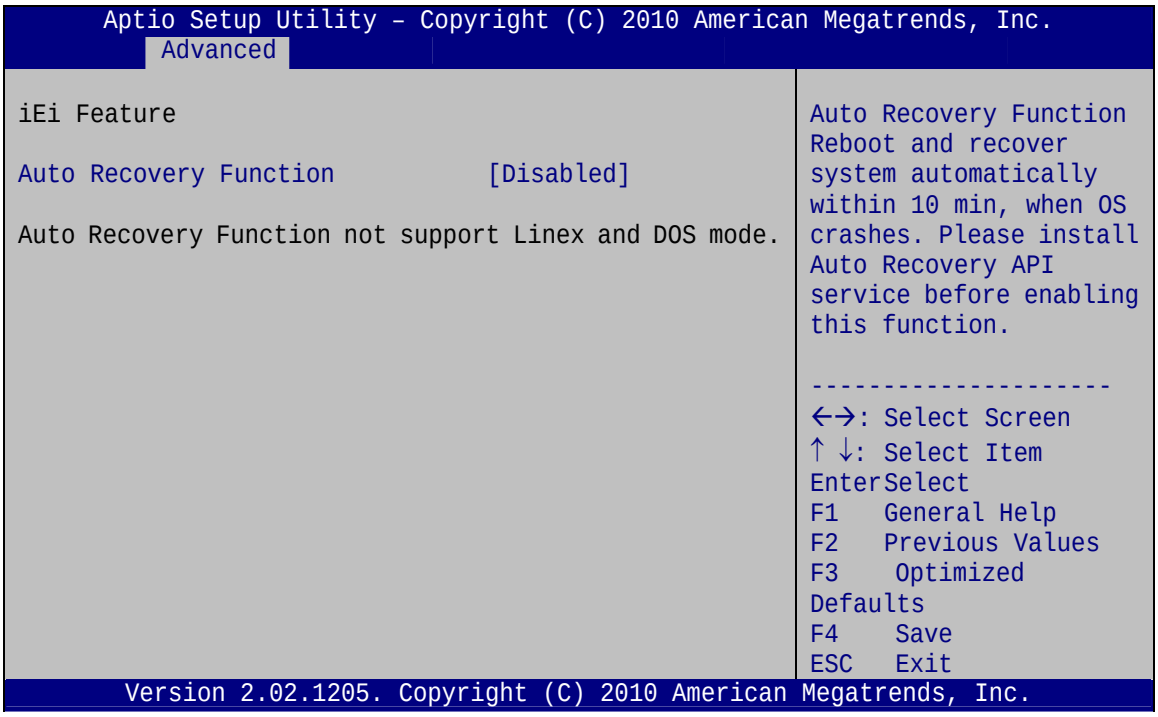
Use **Console Redirection** option to enable or disable the console redirection function.

➔ **Disabled** **DEFAULT** Disabled the console redirection function

➔ **Enabled** Enabled the console redirection function

5.3.9 IEI Feature

Use the **IEI Feature** menu (**BIOS Menu 12**) to configure One Key Recovery function.



BIOS Menu 12: IEI Feature

➔ **Auto Recovery Function [Disabled]**

Use the **Auto Recovery Function** BIOS option to enable or disable the auto recovery function of the IEI One Key Recovery.

➔ **Disabled** **DEFAULT** Auto recovery function disabled

➔ **Enabled** Auto recovery function enabled

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 13**) to access the Northbridge and Southbridge configuration menus

WARNING!

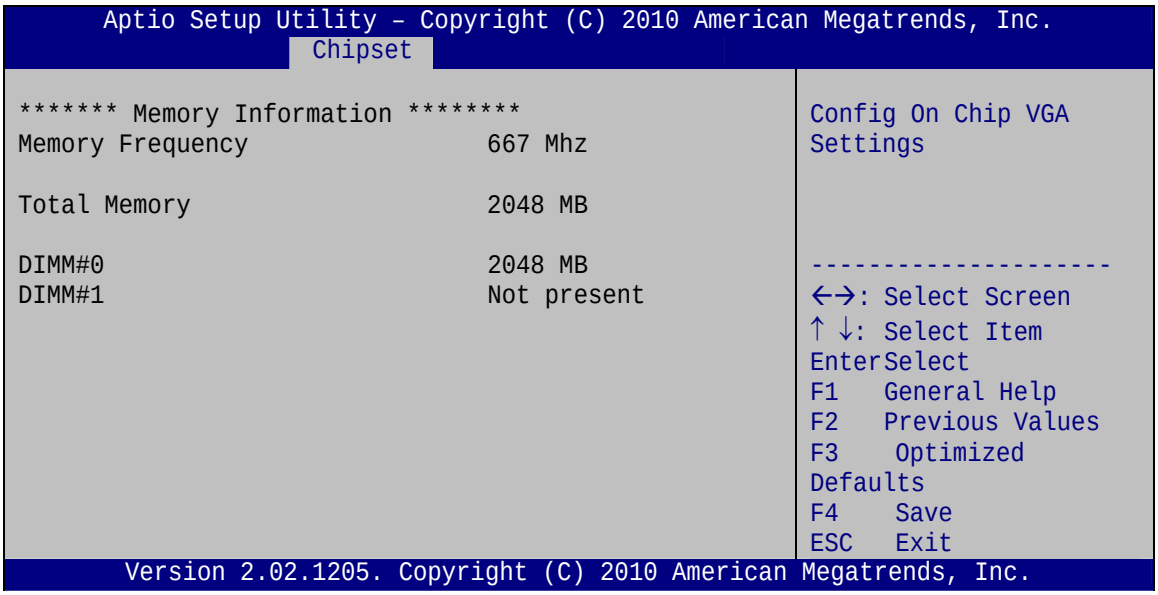
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

```
      Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
  Main    Advanced  Chipset    Boot    Security  Save & Exit

> Host Bridge                                    Host Bridge Parameters
> South Bridge
> Intel IGD SWSCI OpRegion


                                                 ---------------------
                                                 ←→: Select Screen
                                                 ↑ ↓: Select Item
                                                 EnterSelect
                                                 F1   General Help
                                                 F2   Previous Values
                                                 F3    Optimized
                                                 Defaults
                                                 F4    Save
                                                 ESC   Exit

        Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 13: Chipset

5.4.1 Host Bridge

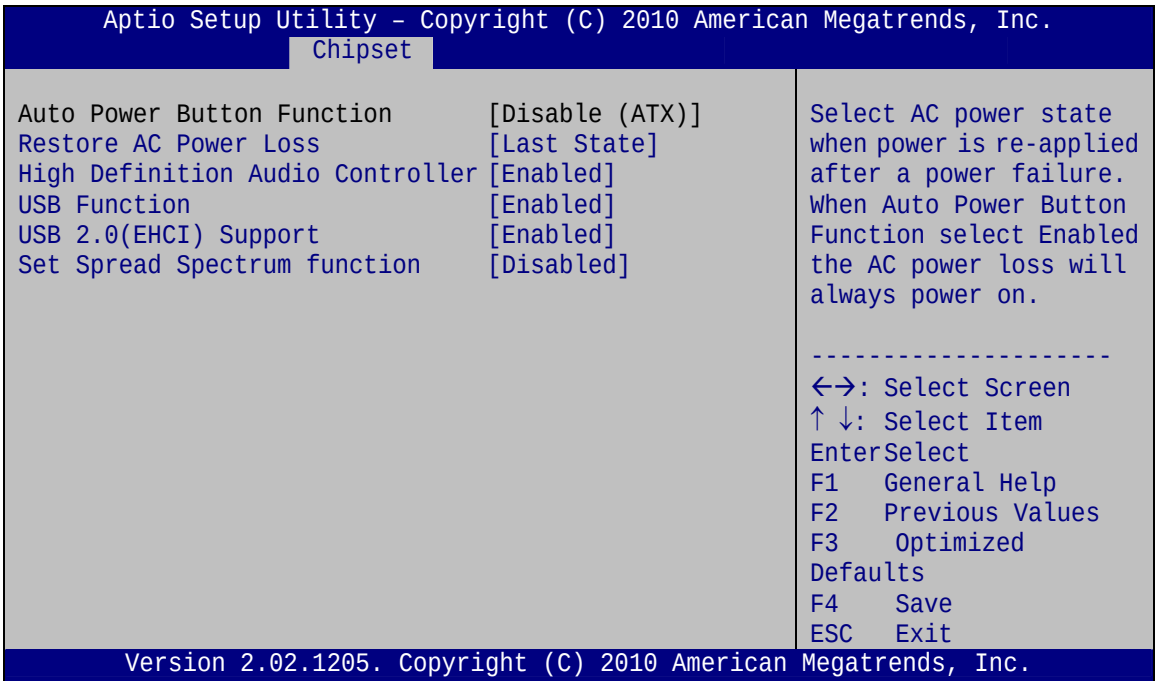
Use the **Host Bridge** menu (**BIOS Menu 14**) to configure the host bridge chipset.



BIOS Menu 14:Host Bridge Configuration

5.4.2 South Bridge

Use the **South Bridge** menu (**BIOS Menu 15**) to configure the Southbridge chipset.



BIOS Menu 15:Southbridge Chipset Configuration

➔ **Restore on AC Power Loss [Last State]**

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

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

➔ **Power On** The system turns on

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

➔ **High Definition Audio Controller [Enabled]**

The **High Definition Audio Controller** option enables or disables the HD audio controller.

➔ **Enabled** **DEFAULT** The onboard HD audio controller automatically detected and enabled

➔ **Disabled** The onboard HD audio controller is disabled

➔ **USB Function [Enabled]**

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

➔ **Disabled** USB function support disabled

➔ **Enabled** **DEFAULT** USB function support enabled

➔ **USB 2.0 (EHCI) Support [Enabled]**

Use the **USB 2.0 (EHCI) Support** BIOS option to enable or disable the USB 2.0 controller.

➔ **Enabled** **DEFAULT** USB 2.0 controller enabled

➔ **Disabled** USB 2.0 controller disabled

➔ **Set Spread Spectrum Function [Disabled]**

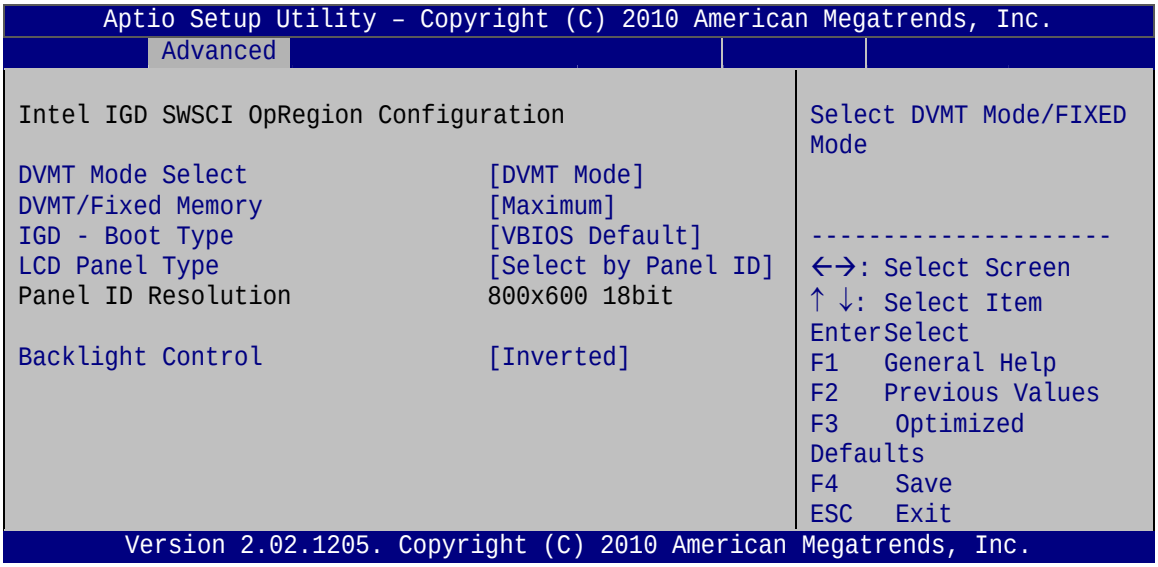
The **Set Spread Spectrum Function** option can help to improve CPU EMI issues.

➔ **Disabled** **DEFAULT** The spread spectrum function is disabled

➔ **Enabled** The spread spectrum function is enabled

5.4.3 Intel IGD SWSCI OpRegion

Use the **Intel IGD SWSCI OpRegion** menu (**BIOS Menu 16**) to configure the video device connected to the system.



BIOS Menu 16: Intel IGD SWSCI OpRegion

➔ **DVMT Mode Select [DVMT Mode]**

Use the **DVMT Mode Select** option to select the Intel Dynamic Video Memory Technology (DVMT) operating mode.

➔ **Fixed Mode** A fixed portion of graphics memory is reserved as graphics memory.

➔ **DVMT Mode** **DEFAULT** Graphics memory is dynamically allocated according to the system and graphics needs.

➔ **DVMT/FIXED Memory [Maximum]**

Use the **DVMT/FIXED Memory** option to specify the maximum amount of memory that can be allocated as graphics memory. Configuration options are listed below.

- 128 MB
- 256 MB
- Maximum **DEFAULT**

➔ **IGD - Boot Type [VBIOS Default]**

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

- VBIOS Default **DEFAULT**
- CRT
- LFP
- CRT + LFP

➔ **LCD Panel Type [VBIOS Default]**

Use the **LCD Panel Type** option to select the type of flat panel connected to the system. Configuration options are listed below.

- Select by Panel ID **DEFAULT**
- 640x480 18bit
- 800x480 18bit
- 800x600 18bit
- 1024x768 18bit
- 1280x1024 18bit
- 1366x768 18bit
- 1280x800 18bit
- 1280x600 18bit

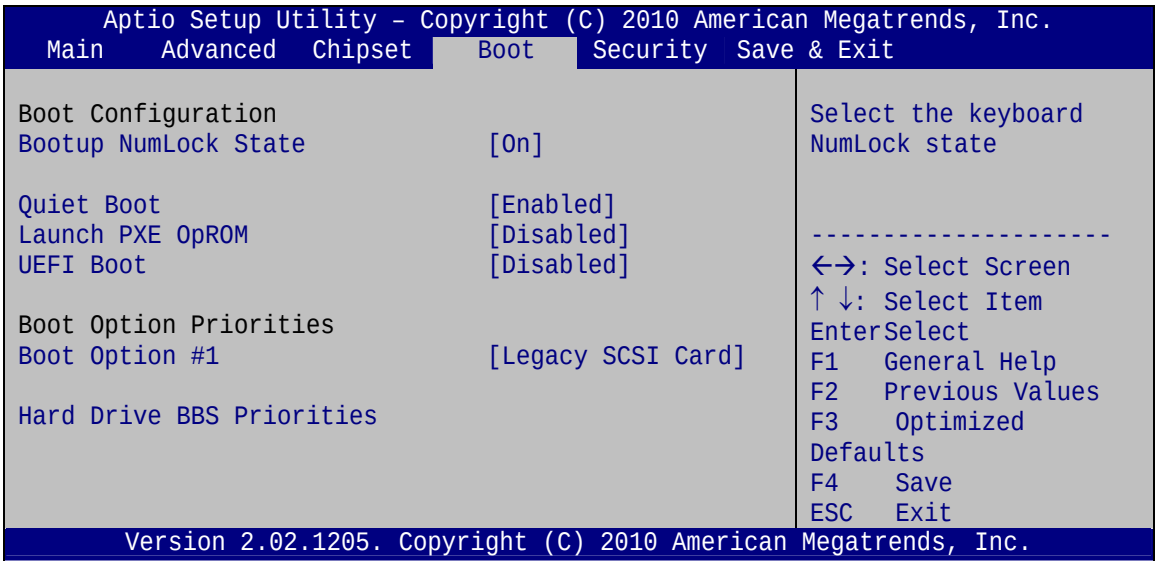
➔ **Backlight Control [Inverted]**

Use the **Backlight Control** option to select the backlight control mode.

➔	**Normal**		Brightest at low voltage level
➔	**Inverted**	**DEFAULT**	Brightest at high voltage level

5.5 Boot

Use the **Boot** menu (**BIOS Menu 17**) to configure system boot options.



BIOS Menu 17: Boot

➔ **Bootup NumLock State [On]**

Use the **Bootup NumLock State** BIOS option to specify if the number lock setting must be modified during boot up.

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

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

➔ **Quiet Boot [Enabled]**

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

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

➔ **Launch PXE OpROM [Disabled]**

Use the **Launch PXE OpROM** option to enable or disable boot option for legacy network devices.

➔ **Disabled**	**DEFAULT**	Ignore all PXE Option ROMs
➔ **Enabled**		Load PXE Option ROMs.

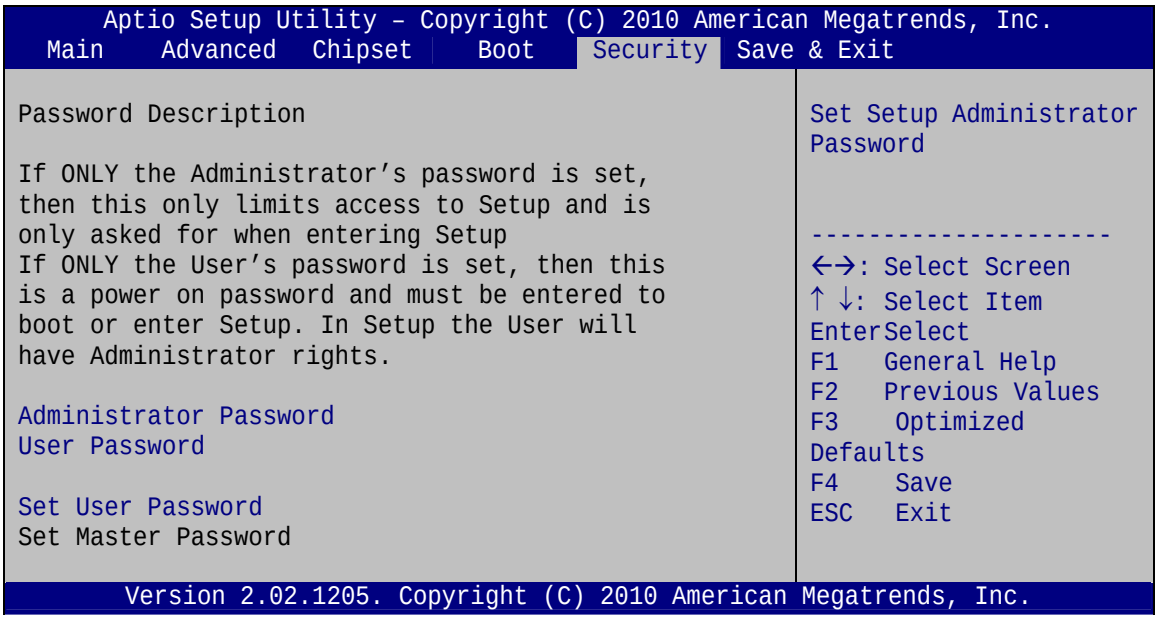
➔ **UEFI Boot [Disabled]**

Use the **UEFI Boot** option to enable or disable to boot from a UEFI device.

➔ **Enabled**		Enable to boot from a UEFI device.
➔ **Disabled**	**DEFAULT**	Disable to boot from a UEFI device.

5.6 Security

Use the **Security** menu (**BIOS Menu 18**) to set system and user passwords.



BIOS Menu 18: Security

➔ **Administrator Password**

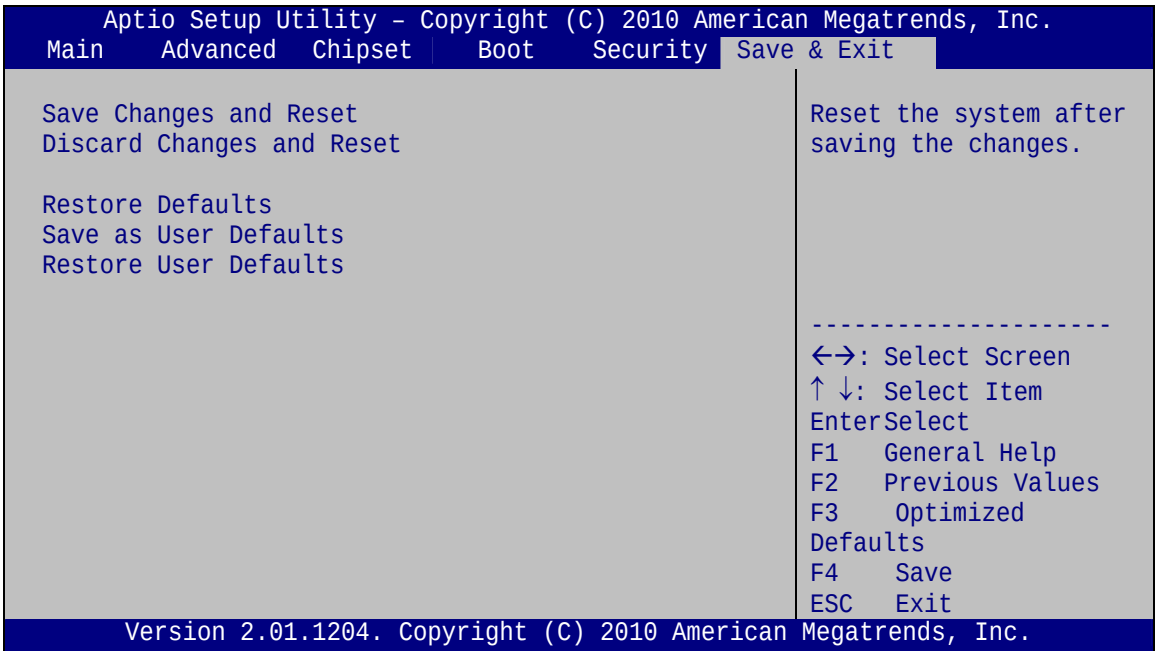
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

Use the **User Password** to set or change a user password.

5.7 Exit

Use the **Exit** menu (**BIOS Menu 19**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 19:Exit

➔ **Save Changes and Reset**

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

➔ **Discard Changes and Reset**

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

➔ **Restore Defaults**

Use the **Restore Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F3 key can be used for this operation.**

➔ **Save as User Defaults**

Use the **Save as User Defaults** option to save the changes done so far as user defaults.

➔ **Restore User Defaults**

Use the **Restore User Defaults** option to restore the user defaults to all the setup options.

Appendix

A

BIOS Options

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

BIOS Information 63
System Date [xx/xx/xx] 64
System Time [xx:xx:xx] 64
ACPI Sleep State [S1 (CPU Stop Clock)] 65
Wake System with Fixed Time [Disabled] 66
Hyper-Threading [Enabled] 68
ATA/IDE Configurations [Enhanced] 68
Configure SATA as [IDE] 69
USB Devices 70
Legacy USB Support [Enabled] 70
Serial Port [Enabled] 72
Change Settings [Auto] 72
Serial Port [Enabled] 73
Change Settings [Auto] 73
Serial Port [Enabled] 73
Change Settings [Auto] 74
Serial Port [Enabled] 74
Change Settings [Auto] 74
Serial Port [Enabled] 75
Change Settings [Auto] 75
Serial Port [Enabled] 76
Change Settings [Auto] 76
PC Health Status 77
CPU Smart Fan control [Auto Mode] 78
Console Redirection [Disabled] 79
Auto Recovery Function [Disabled] 80
Restore on AC Power Loss [Last State] 83
High Definition Audio Controller [Enabled] 83
USB Function [Enabled] 84
USB 2.0 (EHCI) Support [Enabled] 84
Set Spread Spectrum Function [Disabled] 84
DVMT Mode Select [DVMT Mode] 85
DVMT/FIXED Memory [Maximum] 85

IGD - Boot Type [VBIOS Default] 86
LCD Panel Type [VBIOS Default] 86
Backlight Control [Inverted] 86
Bootup NumLock State [On] 87
Quiet Boot [Enabled] 88
Launch PXE OpROM [Disabled] 88
UEFI Boot [Disabled] 88
Administrator Password 89
User Password 89
Save Changes and Reset 90
Discard Changes and Reset 90
Restore Defaults 90
Save as User Defaults 90
Restore User Defaults 90

Appendix

B

Terminology

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

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

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

Appendix

C

Digital I/O Interface

C.1 Introduction

The DIO connector on the WAFER-PV-D5252/D4252/N4552 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

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

The BIOS interrupt call **INT 15H** controls the digital I/O.

INT 15H:

AH – 6FH	
Sub-function:	
AL – 8	:Set the digital port as INPUT
AL	:Digital I/O input value

C.2 Assembly Language Sample 1

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

AL low byte = value

AH – 6FH	
Sub-function:	
AL – 9	:Set the digital port as OUTPUT
BL	:Digital I/O input value

C.3 Assembly Language Sample 2

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

Digital Output is 1001b

Appendix

D

Hazardous Materials Disclosure

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

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

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

Please refer to the table on the next page.

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

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

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

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

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

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	O	O	O	O	O	O
显示	O	O	O	O	O	O
印刷电路板	O	O	O	O	O	O
金属螺帽	O	O	O	O	O	O
电缆组装	O	O	O	O	O	O
风扇组装	O	O	O	O	O	O
电力供应组装	O	O	O	O	O	O
电池	O	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。 X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。						