



# EC531/EC532-HD/DL Modular-Designed Embedded System User's Manual

# Copyright

This publication contains information that is protected by copyright. No part of it may be reproduced in any form or by any means or used to make any transformation/adaptation without the prior written permission from the copyright holders.

This publication is provided for informational purposes only. The manufacturer makes no representations or warranties with respect to the contents or use of this manual and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. The user will assume the entire risk of the use or the results of the use of this document. Further, the manufacturer reserves the right to revise this publication and make changes to its contents at any time, without obligation to notify any person or entity of such revisions or changes.

Changes after the publication's first release will be based on the product's revision. The website will always provide the most updated information.

© 2015. All Rights Reserved.

# **Trademarks**

Product names or trademarks appearing in this manual are for identification purpose only and are the properties of the respective owners.

# FCC and DOC Statement on Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

### **Notice:**

- 1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- 2. Shielded interface cables must be used in order to comply with the emission limits.

# **Table of Contents**

Copyright2
Trademarks
FCC and DOC Statement on Class A2
About this Manual4
Warranty4
Static Electricity Precautions4
Safety Measures
Safety Precautions
About the Package
Chapter 1 - Introduction
Overview
Chapter 2 - Getting Started
Preparing the system
Chapter 3 - Installing the Devices
Removing the Chassis Cover12Installing the SODIMM13Installing the 2.5" SATA Drive14Installing the Mini PCIe and/or mSATA Card16Installing the PCI and PCIe Expansion Cards17Installing the CPU19
Chapter 4 - Jumper Settings
Jumper Setting - System BoardClear CMOS DataUSB Power SelectAuto Power-on Select23PS/2 Keyboard/Mouse Power Select23COM 1/COM 2 RS232/422/485 Select24COM 1/COM 2 RS232/Power Select25Mini PCIe Signal Select26
Jumper Setting - I/O Board USB Power Select

Digital I/O Power Select Digital I/O Output State	28 28 29
Chapter 5 - Ports and Connectors	30
Front Panel I/O Ports	30 31 32 33 34 35 36 36 36 36 37 38 39 40 41 41 42 43
Chapter 6 - Mounting Options	44
Wall Mount	
waii mount	44
Chapter 7 - BIOS Setup	44 45
Chapter 7 - BIOS Setup Overview. AMI BIOS Setup Utility. Main Advanced Chipset Boot. Security. Save & Exit. Event & Logs. Updating the BIOS Notice: BIOS SPI ROM.	44 45 46 46 46 57 65 66 66 67 68 69
Chapter 7 - BIOS Setup Overview AMI BIOS Setup Utility Main Advanced Chipset Boot. Security Save & Exit. Event & Logs Updating the BIOS Notice: BIOS SPI ROM Chapter 8 - Supported Software	44 45 46 46 46 57 65 66 66 67 68 69 70
Chapter 7 - BIOS Setup Overview AMI BIOS Setup Utility Main Advanced Chipset Boot Security Save & Exit. Event & Logs Updating the BIOS Notice: BIOS SPI ROM Chapter 8 - Supported Software Chapter 9 - Digital I/O Programming Guide.	44 45 46 46 46 57 65 66 66 67 68 69 70 91
Chapter 7 - BIOS Setup Overview AMI BIOS Setup Utility Main Advanced Chipset Boot. Security Save & Exit. Event & Logs Updating the BIOS Notice: BIOS SPI ROM Chapter 8 - Supported Software Chapter 9 - Digital I/O Programming Guide. Appendix A - Watchdog Sample Code.	<ul> <li>44</li> <li>45</li> <li>46</li> <li>46</li> <li>46</li> <li>57</li> <li>65</li> <li>66</li> <li>67</li> <li>68</li> <li>69</li> <li>70</li> <li>91</li> <li>93</li> </ul>
Chapter 7 - BIOS Setup Overview AMI BIOS Setup Utility Main Advanced Chipset Boot Security Save & Exit. Event & Logs Updating the BIOS Notice: BIOS SPI ROM Chapter 8 - Supported Software Chapter 9 - Digital I/O Programming Guide. Appendix A - Watchdog Sample Code. Appendix B - System Error Message.	<ul> <li>44</li> <li>45</li> <li>46</li> <li>46</li> <li>57</li> <li>65</li> <li>66</li> <li>67</li> <li>68</li> <li>69</li> <li>70</li> <li>91</li> <li>93</li> <li>94</li> </ul>

# **About this Manual**

An electronic file of this manual can be obtained from the DFI website at www.dfi.com. To download the user's manual from our website, please go to "Support" > "Download Center." On the Download Center page, select your product or type the model name and click "Search" to find all technical documents including the user's manual for a specific product.

# Warranty

- 1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
- 2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
- 3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
- 4. We will not be liable for any indirect, special, incidental or consequencial damages to the product that has been modified or altered.

# **Static Electricity Precautions**

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

- 1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
- 2. Wear an antistatic wrist strap.
- 3. Do all preparation work on a static-free surface.
- 4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
- 5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or con nectors by their ends.

AL.	Import	ant:

Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

# **Safety Measures**

To avoid damage to the system:

• Use the correct AC input voltage range.

To reduce the risk of electric shock:

• Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

#### Battery:

- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.

# **Safety Precautions**

- Use the correct DC input voltage range.
- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.
- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.
- Keep this system away from humidity.
- Place the system on a stable surface. Dropping it or letting it fall may cause damage.
- The openings on the system are for air ventilation to protect the system from overheating. DO NOT COVER THE OPENINGS.
- Place the power cord in such a way that it will not be stepped on. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the system and that it matches the voltage and current marked on the system's electrical range label.
- If the system will not be used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- If one of the following occurs, consult a service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated the system.
  - The system has been exposed to moisture.
  - The system is not working properly.
  - The system dropped or is damaged.
  - The system has obvious signs of breakage.
- The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace the outlet.
- Disconnect the system from the DC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.

# **About the Package**

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

• 1 system unit

### **Optional Items**

- Wall Mount kit
- Power Cord
- Power Adapter: 120W, 19V/6.31A

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance to the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

# **Chapter 1 - Introduction**

### **Overview**



**Front View** 

### **Key Features**

Model Name	EC531/EC532-HD/DL	
Processor	4th Generation Intel <sup>®</sup> Core <sup>™</sup> processors	
Chipset	Intel <sup>®</sup> H81 Express Chipset (EC531/EC532-HD) Intel <sup>®</sup> C226 Express Chipset (EC532-DL)	
LAN	2 LAN ports	
СОМ	6 COM ports	
Display	1 VGA, 1 DVI-I	
USB	2 Type A USB 2.0 ports, 6 Type A USB 3.0 ports	
Power	9~36V DC-in	

### Specifications

Processor System	<ul> <li>EC531/EC532-HD</li> <li>4th Generation Intel<sup>®</sup> Core<sup>™</sup> processors (22nm process technology)</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i7-4770TE (8M Cache, up to 3.3 GHz); 45W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i5-4590T (6M Cache, up to 3.0 GHz); 35W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i5-4570TE (4M Cache, up to 3.3 GHz); 35W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i3-4350T (4M Cache, 3.1 GHz); 35W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i3-4340TE (4M Cache, 2.4 GHz); 35W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i3-4330TE (4M Cache, 2.4 GHz); 35W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i3-4330TE (2M Cache, 2.3 GHz); 35W</li> <li>: Intel<sup>®</sup> Celeron<sup>®</sup> G1820TE (2M Cache, 2.2 GHz); 35W</li> <li>: EC532-DL</li> <li>4th Generation Intel<sup>®</sup> Core<sup>™</sup>/Intel<sup>®</sup> Xeon<sup>®</sup> processors (22nm process technology</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i7-4770TE (8M Cache, up to 3.3 GHz); 45W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i3-4340TE (4M Cache, up to 3.3 GHz); 35W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i3-4330TE (4M Cache, up to 3.3 GHz); 35W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i3-4340TE (4M Cache, 2.4 GHz); 35W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i3-4340TE (4M Cache, 2.4 GHz); 35W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i3-4340TE (4M Cache, 2.4 GHz); 35W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i3-4340TE (4M Cache, 2.4 GHz); 35W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i3-4340TE (4M Cache, 2.4 GHz); 35W</li> <li>: Intel<sup>®</sup> Core<sup>™</sup> i3-4340TE (4M Cache, 2.4 GHz); 35W</li> </ul>
Chipset	<ul> <li>Intel<sup>®</sup> H81 Express chipset (EC531/EC532-HD)</li> <li>Intel<sup>®</sup> C226 Express Chipset (EC532-DL)</li> </ul>
Memory	<ul> <li>Two 204-pin DDR3 SODIMM sockets</li> <li>Supports DDR3 1333/1600MHz</li> <li>Supports up to 16GB system memory</li> <li>Supports dual channel memory interface</li> </ul>
Graphics	<ul> <li>Intel<sup>®</sup> HD Graphics</li> <li>Display ports: 1 VGA, 1 DVI-I* (optional)</li> <li>VGA: 24-bit, resolution up to 1920x1200 @ 60Hz</li> <li>DVI-I: resolution up to 1920x1200 @ 60Hz</li> </ul>
Storage	<ul> <li>2 2.5" SATA drive bays</li> <li>SATA 3.0 port with data transfer rate up to 6Gb/s</li> <li>Supports 1 mSATA module via the mini PCIe socket</li> </ul>
Ethernet	<ul> <li>1 Intel<sup>®</sup> I210 PCI Express Gigabit Ethernet controller</li> <li>1 Intel<sup>®</sup> I217 Gigabit Ethernet Phy</li> <li>Integrated 10/100/1000 transceiver</li> <li>Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab</li> </ul>
Front Panel I/O Ports	<ul> <li>1 power button with LED</li> <li>1 reset button</li> <li>1 Status LED</li> <li>1 HDD LED</li> <li>1 VGA port</li> <li>1 DVI-I port</li> <li>2 RJ45 LAN ports</li> <li>2 Type A USB 2.0 ports</li> <li>6 Type A USB 3.0 ports</li> <li>3 DB-9 RS232/422/485 serial ports (with power)</li> <li>3 DB-9 RS232 serial ports</li> <li>1 9~36V DC-in 3-pole terminal block</li> <li>1 8-bit GPIO 9-pole terminal block</li> <li>Audio jacks: Mic-in, Line-in, Line-out</li> </ul>
Audio	Realtek ALC886 5.1-channel High Definition Audio     S/PDIF audio interface

Expansion	<ul> <li>EC531-HD <ul> <li>2 PCI slots</li> <li>1 PCIe x16 slot</li> </ul> </li> <li>1 Mini PCIe slot <ul> <li>Supports USB and PCIe signals</li> <li>Supports mSATA, Wi-Fi or 3G*</li> <li>Supports half size or full size Mini PCIe card</li> </ul> </li> <li>EC532-HD <ul> <li>1 PCI slot</li> <li>2 PCIe x16 slots</li> <li>1 x1 signal and 1 x8 signal</li> <li>1 Mini PCIe slot</li> <li>Supports USB and PCIe signals</li> <li>Supports USB and PCIe signals</li> <li>Supports USB and PCIe signals</li> <li>Supports SATA, Wi-Fi or 3G*</li> <li>Supports half size or full size Mini PCIe card</li> </ul> </li> <li>EC532-DL <ul> <li>2 PCIe x16 slots</li> <li>2 x8 signal</li> <li>1 PCI slot</li> <li>Supports USB and PCIe signals</li> <li>Supports MSATA, Wi-Fi or 3G*</li> <li>Supports USB and PCIe signals</li> <li>Supports MSATA, Wi-Fi or 3G*</li> <li>Supports MSATA, Wi-Fi or 3G*</li> </ul> </li> </ul>
Power	Power input voltage: 9~36V DC-in
Environment	<ul> <li>Temperature <ul> <li>Operating: 0°C ~ 45°C</li> <li>Storage: -20°C ~ 85°C</li> <li>Humidity: 5% ~ 90%</li> </ul> </li> <li>Operating Vibration <ul> <li>IEC68-2-64</li> </ul> </li> <li>Operating Shock <ul> <li>Half sine wave 3G, 11ms, 3 shock per axis</li> </ul> </li> </ul>
Construction	• Aluminum + SGCC
Mounting	<ul> <li>Wall mount         <ul> <li>Mounting brackets and screws* (optional)</li> </ul> </li> </ul>
Dimensions	• 235mm x 153.8mm x 222mm (W x H x D)
Weight	• TBD
OS Support	<ul> <li>EC531/EC532-HD</li> <li>Windows XP (32-bit) (<u>limited function</u>), Windows 7, WES 7, Windows 8, WE8S</li> <li>Linux (Distribution available upon request)</li> <li>EC532-DL</li> <li>Windows 7, WES 7, Windows 8, WE8S</li> <li>Linux (Distribution available upon request)</li> </ul>
Other Features	Watchdog timeout programmable via software from 1 to 255 seconds
Certification	• CE • FCC Class A • RoHS



7

**Note:** \*Optional and is not supported in standard model. Please contact your sales representative for more information.

### Getting to Know the EC531/EC532-HD/DL

### **Front View**



VGA Port Used to connect a VGA device.

LAN Ports Used to connect the system to a local area network.

USB Ports Used to connect USB 2.0/1.1 devices or USB 3.0 devices.

COM Ports Used to connect serial devices.

DC-in Used to plug a power adapter.

DVI-I Port Used to connect a DVI device.

GPIO Supports 8-bit digital output and input.

#### Line-in

Used to connect any audio devices such as Hi-fi set, CD player, tape player, AM/FM radio tuner, synthesizer, etc.

Line-out Used to connect to a speaker.

Mic-in jack Used to connect to a microphone.

Expansion slots Supports to add riser cards.

Power button Press to power-on or power-off the system.

Reset Button Press to reset the system.

#### HDD LED

Indicates the status of the hard drive.

#### Status LED

Indicates the status as below.

Status LED				
Suspend Mode	<b>S0</b>	<b>S1</b>	<b>S</b> 3	S4, S5
LED Action	Always ON	Quick Blink (cycle 1 sec)	Slow Blink (cycle >1 sec)	OFF

### **Mechanical Dimensions**

### **Chassis Dimensions**



Left View





**Front View** 

**Right View** 

### **Motherboard Dimensions**



# **Chapter 2 - Getting Started**

### **Preparing the System**

Before you start using the system, you need the following items:

- SATA hard drive
- AC power adapter
- CD-ROM drive (for installing software/drivers)
- Memory module

### **Installing Devices**

The following are devices that can be installed in the system.

- Memory module
- SATA hard drive
- Mini PCIe card

### **Configuring the BIOS**

To get you started, you may need to change configurations such as the date, time and the type of hard disk drive.

- 1. Power-on the system.
- 2. After the memory test, the message "Press DEL to run setup" will appear on the screen. Press the Delete key to enter the AMI BIOS setup utility.

### **Installing the Operating System**

Most operating system software can be installed using a DVD (and DVD burner) or bootable USB drive.

Please refer to your operating system manual for instructions on installing an operating system.

### **Installing the Drivers**

The system requires you to install drivers for some devices to operate properly. Refer to the Supported Software chapter for instructions on installing the drivers.

ing the chassis cover.

# **Chapter 3 - Installing the Devices**

### **Removing the Chassis Cover**

- 1. Make sure the system and all other peripheral devices connected to it have been powered-off.
- 2. Disconnect all power cords and cables.
- 3. The 4 mounting screws on the side of the system are used to secure the cover to the chassis. Remove these screws and then put them in a safe place for later use.





SATA drive bay

5. The SODIMM sockets, Mini PCIe slot and SATA drive bay are readily accessible after remov-

4. After removing the mounting screws, lift the cover up.



Lift the Cover Upward

### Installing the SODIMM

1. The SODIMM sockets are located on the system board.



3. Grasping the module by its edges, align the module into the socket at an approximately 30 degrees angle. Apply firm even pressure to each end of the module until it slips down into the socket. The contact fingers on the edge of the module will almost completely disappear inside the socket.



- 2. Note the key on the socket. The key ensures the module can be plugged into the socket in one direction only.
- 4. Push the module down until the clips at each end of the socket lock into position. You will hear a distinctive "click", indicating the module is correctly locked into position.





### Installing the 2.5" SATA Drive

1. The SATA drive bay is located on the system.



2. Use the 2 provided mounting screws to secure the SATA power/data cable on the HDD bracket.

3. Connect the SATA power/data connector on the SATA drive to the SATA power/data cable secured on the HDD bracket. Then, align mounting holes of the SATA drive with mounting holes on the HDD bracket and use the provided mounting screws to secure the drive in place.



4. Place the SATA drive with the HDD bracket into the system. Align mounting holes on the HDD bracket with mounting holes on the SATA drive bay and then use the provided mounting screws to secure the drive with the HDD bracket in place.







Mounting screw

SATA power/data connector



SATA power connector

5. Connect the SATA power cable and SATA data cable to the SATA power connector and the SATA data connector respectively on the system board.



### Installing the Mini PCIe and/or mSATA Card

1. Locate the Mini PCIe slot on the system board.



3. Grasping the Mini PCIe card by its edges, align the card into the slot at an approximately 30 degrees angle. Apply firm even pressure to each end of the card until it slips down into the slot. The contact fingers on the edge of the card will almost completely disappear inside the slot.



Mini PCIe card

- 2. The system board is equipped with 1 Mini PCIe slot. The Mini PCIe slot supports a half length or a full length Mini PCIe card. Note the key on the slot. The key ensures the Mini PCIe card can be plugged into the slot in one direction only.
- 4. Push the Mini PCIe card down until the clips at each end of the latch lock into position. You will hear a distinctive "click", indicating the card is correctly locked into position.





### Installing the PCI and PCIe Expansion Cards



Important: When inserting expansion cards into the system unit, please select a standard card within 190mm (as the following pictures show) in order to fit expansion slots.

1. PCI slots and PCIe x16 slots on the riser card are used to install the expansion cards. To install the expansion cards, you need to remove the brackets from the chassis.



Mechanical Drawing for Expansion Cards



EC531-HD



EC532-HD/DL

PCIe x16 card

3. Insert one expansion card with a bracket into PCIe slots and PCI slots respectively that are on the riser card and secure the bracket in place.





Rear View



Rear View



H320-2P1E for EC531-HD



H320-1P2E for EC532-HD/DL

2. To remove the brackets, the mounting screw on the front chassis has to be removed first.



### Installing the CPU

- 1. Make sure the system and all other peripheral devices connected to it have been poweredoff.
- 2. Disconnect all power cords and cables.
- 3. Before installing the Intel CPU, remove the 8 mounting screws on the top side of the system unit and then put them in a safe place for later use.





#### Important:

- 1. Before you proceed, make sure (1) the LGA 1150 socket comes with a protective cap, (2) the cap is not damaged and (3) the socket's contact pins are not bent. If the cap is missing or the cap and/or contact pins are damaged, contact your dealer immediately.
- 2. Make sure to keep the protective cap. RMA requests will be accepted and processed only if the LGA 1150 socket comes with the protective cap.





5. Unlock the socket by pushing the load lever down, moving it sideways until it is released from the retention tab; then lift the load lever up.



- 6. Lifting the load lever will at the same time lift the load plate and lift the load lever up to the angle as the photo shown below.
- 8. Insert the CPU into the socket. The gold triangular mark on the CPU must align with the corner of the CPU socket as the photo shown below.



7. Remove the protective cap from the CPU socket. The cap is used to protect the CPU socket against dust and harmful particles. Remove the protective cap only when you are about to install the CPU.





The CPU's notch will at the same time fit into the socket's alignment key.



Alignment key



Important: The CPU will fit in only one orientation and can easily be inserted without exerting any force.



10. Hook the load lever under the retention tab.



Retention tab

9. Close the load plate then push the load lever down.

While closing the load plate, make sure the front edge of the load plate slides under the retention knob.



Retention knob

## **Chapter 4 - Jumper Settings**

# **Jumper Settings - System Board**

### **Clear CMOS Data**



If you encounter the following,

- a) CMOS data becomes corrupted.
- b) You forgot the supervisor or user password.

you can reconfigure the system with the default values stored in the ROM BIOS.

To load the default values stored in the ROM BIOS, please follow the steps below.

- 1. Power-off the system and unplug the power cord.
- 2. Set JP4 pins 2 and 3 to On. Wait for a few seconds and set JP4 back to its default setting, pins 1 and 2 On.
- 3. Now plug the power cord and power-on the system.

### **USB Power Select**



JP1 and JP2 are used to select the power of the USB ports. Selecting +5V\_standby will allow you to use a USB device to wake up the system.

### Important:



### Auto Power-on Select



2-3 On: Power-on via AC power

JP7 is used to select the method of powering on the system. If you want the system to power-on whenever AC power comes in, set JP7 pins 2 and 3 to On. If you want to use the power button, set pins 1 and 2 to On.

When using the JP7 "Power On" feature to power the system back on after a power failure occurs, the system may not power on if the power lost is resumed within 5 seconds (power flicker).

### PS/2 Keyboard/Mouse Power Select



JP3 is used to select the power of the PS/2 keyboard/mouse port. Selecting +5V\_standby will allow you to use the PS/2 keyboard or PS/2 mouse to wake up the system.



The +5V\_standby power source of your power supply must support  $\geq$ 720mA.

COM 1/COM 2 RS232/422/485 Select



These jumpers allow you to configure the Serial COM ports to RS232, RS422 (Full Duplex) or RS485. JP8, JP11 and JP13 are used to configure the Serial COM port 1. JP12, JP15 and JP17 are used to configure the Serial COM port 2. The pin functions of Serial COM port 1 and COM port 2 will vary according to these jumpers' setting.

	COM 1		
	<ul> <li>4 1 4 1 4 1 2 3 4 5 1 2 3 4 5 1 1 2 3 4 5 1 1 2 3 4 5 1 1 2 3 4 5 1 1 2 3 4 5 1 1 2 3 4 5 1 1 2 3 4 5 1 1 2 3 4 5 1 1 2 3 4 5 1 1 2 3 4 5 1 2 3 4 5 1 1 2 3 4 5 1 1 2 3 4 5 1 1 2 3 4 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</li></ul>	¢ LUCICIC LUCICIC LUCICIC LUCICICIC 1 2 3 4 5 COMMENT 6 7 8 9 COCICICIC 2 2 2 2 RS485	
	COM 2	•	
DCD- TXD GND GND GND GSND GSND GSND GSND GSND G		DATA+ TXD TXD TXD NC: NC: NC: NC: NC: NC: NC: NC: DATA- 1 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
RS232	RS422 Full Duplex	RS485	
JP13 (for COM 1)/JP17 (for COM 2)			
2 4 6 1 3 5 1-2 On: RS232 (default)	2 4 6 1 3 5 3-4 On: RS422 Full Duplex	2 4 6 1 3 5 5-6 On: RS485	
JP8 and JP11	(for COM 1)/JP12 and JP15	(for COM 2)	
2 4 6 1 3 5 1-3, 2-4 On: RS232 (default)	2 1 3-5 RS422 Fu	4 6 3 5 , 4-6 On: Il Duplex/RS485	

#### Note:

When COM 1 RS232/422/485 is selected, JP8 and JP11 must be set in accordance to JP13. And when COM 2 RS232/422/485 is selected, JP12 and JP15 must be set in accordante to JP17.

Chapter 4 Jumper Settings

COM 1/COM 2 RS232/Power Select



Mini PCIe Signal Select



JP9 is used to select the Mini PCIe signal: PCIe or mSATA.

JP14 (for COM 1) and JP18 (for COM 2) are used to configure Serial COM ports to pure RS232 or RS232 with power. The pin functions of COM 1 and COM 2 will vary according to JP14's and JP18's setting respectively.

### **Mini PCIe Power Select**



# Jumper Settings - I/O Board

**USB Power Select** 



JP6 is used to select the power supplied with the Mini PCIe.

JP4 and JP5 are used to select the power of the USB ports. Selecting +5V\_standby will allow you to use a USB device to wake up the system.

#### Important:

If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V\_standby power source of your power supply must support  $\geq$ 1.5A. For 3 or more USB ports, the +5V\_standby power source of your power supply must support  $\geq$ 2A.

COM 7/COM 8 RS232/422/485 Select



These jumpers allow you to configure Serial COM ports to RS232, RS422 (Full Duplex) or RS485. JP13, JP15 and JP17 are used to configure the Serial COM port 7. JP11, JP12 and JP16 are used to configure the Serial COM port 8. The pin functions of the Serial COM port 7 and 8 will vary according to these jumpers' setting.

	COM 7/COM 8	
	6 7 8 9 2 2 2 2 2 6 7 8 9 2 2 2 2 2 RS422 Full Duplex	¢досо 12345 6789 Сосо и и и и RS485
JP15	(for COM 7)/ JP11 (for COM	4 8)
6 5 4 3 2 1 1-2 On: RS232 (default)	6 5 4 3 2 1 3-4 On: RS422 Full Duplex	6 5 4 3 2 1 5-6 On: RS485
JP13 and JP17	(for COM 7)/ JP12 and JP16	(for COM 8)
6 5 4 3 2 1 1-3, 2-4 On: RS232 (default)	6 4 2 3-5 RS422 Fu	5 3 1 , 4-6 On: Il Duplex/RS485

Note:

- 1. When COM 7 RS232/422/485 is selected, JP13 and JP17 must be set in accordance to JP15.
- 2. When COM 8 RS232/422/485 is selected, JP12 and JP16 must be set in accordante to JP11.

### COM 7/COM 8 RS232/Power Select



JP18 (for COM 7) and JP14 (for COM 8) are used to configure Serial COM ports to pure RS232 or RS232 with power. The pin functions of COM 7 and COM 8 will vary according to these jumpers' settings respectively.

### **Digital I/O Power Select**



JP10 is used to select the power of DIO (Digital I/O) signal.

### **Digital I/O Output State**



Based on the power level of DIO (Digital I/O) selected on JP10, JP9 (DIO pin 1-4) and JP8 (DIO pin 6-9) are used to select the state of DIO output: pull high or pull low. When selecting pull high, the power selection will be the same as JP10's setting.

## **Chapter 5 - Ports and Connectors**

# Front Panel I/O Ports



The front panel I/O ports consist of the followings:

EC531/EC532 - HD6881

- 1 DC-in power jack: 3-pole terminal block
- 1 VGA port
- 1 DVI-I port
- 1 Audio jacks: Mic-in, Line-in, Line-out
- 2 RJ45 LAN ports
- 3 RS232 Serial COM ports
- 3 RS232/422/485 Serial COM ports
- 6 USB 3.0 (Type A) ports
- 2 USB 2.0 (Type A) ports
- 1 8-bit GPIO via DB-9 D-Sub
- 1 Power button
- 1 Reset button
- 1 Status LED
- 1 HDD LED

#### EC532 - HD1040

- 1 DC-in power jack: 3-pole terminal block
- 1 VGA port
- 2 RJ45 LAN ports
- 1 RS232 Serial COM port
- 2 USB 3.0 (Type A) ports
- 2 USB 2.0 (Type A) ports
- 1 Power button
- 1 Reset button
- 1 Status LED
- 1 HDD LED

#### EC532 - DL6881

- 1 DC-in power jack: 3-pole terminal block
- 1 VGA port
- 1 DVI-I port
- 1 Audio jacks: Mic-in, Line-in, Line-out
- 2 RJ45 LAN ports
- 3 RS232 Serial COM ports
- 3 RS232/422/485 Serial COM ports
- 6 USB 3.0 (Type A) ports
- 2 USB 2.0 (Type A) ports
- 1 8-bit GPIO via DB-9 D-Sub
- 1 Power button
- 1 Reset button
- 1 Status LED
- 1 HDD LED

EC532 - DL1040

- 1 DC-in power jack: 3-pole terminal block
- 1 VGA port
- 2 RJ45 LAN ports
- 1 RS232 Serial COM port
- 2 USB 3.0 (Type A) ports
- 2 USB 2.0 (Type A) ports
  1 Power button
- 1 Reset button
- 1 Status LED
- 1 HDD LED

### **RJ45 LAN Ports**



#### Features

- Intel® I210 PCI Express Gigabit Ethernet Controller
   Intel® I217 Gigabit Ethernet Phy

The LAN ports allow the system board to connect to a local area network by means of a network hub.

#### **BIOS Setting**

Configure the onboard LAN in the Chipset menu ("PCH-IO Configuration" submenu) of the BIOS. Refer to chapter 7 for more information.

#### **Driver Installation**

Install the LAN drivers. Refer to chapter 8 for more information.

**COM (Serial) Ports** 





The serial ports are asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices.

#### **Connecting External Serial Ports**

Your COM port may come mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then insert the serial port cable to the COM connector. Make sure the colored stripe on the ribbon cable is aligned with pin 1 of the COM connector.

#### BIOS Setting

Configure the serial ports in the Advanced menu ("Super IO Configuration" submenu) of the BIOS. Refer to chapter 7 for more information.



The VGA port is used for connecting a VGA monitor. Connect the monitor's 15-pin D-shell cable connector to the VGA port. After you plug the monitor's cable connector into the VGA port, gently tighten the cable screws to hold the connector in place.

#### **BIOS Setting**

Configure the display device in the Chipset menu ("System Agent Configuration" submenu) of the BIOS. Refer to chapter 7 for more information.

#### **Driver Installation**

Install the graphics driver. Refer to chapter 8 for more information.

### **USB** Ports



The USB device allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals. The system board is equipped with 2 USB 3.0 ports and 6 USB 2.0 ports.

#### BIOS Setting

Configure the onboard USB in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to chapter 7 for more information.

#### Wake-On-USB Keyboard/Mouse

The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state. To use this function:

Jumper Setting

JP1, JP2, JP4 and JP5 must be set to "2-3 On: +5V\_standby". Refer to "USB Power Select" in chapter 4 for more information.

#### Important:

If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V\_standby power source of your power supply must support  $\geq$ 1.5A. For 3 or more USB ports, the +5V\_standby power source of your power supply must support  $\geq$ 2A.



This jack provides maximum of 120W power and is considered a low power solution. Connect a DC power cord to this jack. Using a voltage higher than the recommended one may fail to boot the system or cause damage to the system board.

#### 8-bit GPIO



The Digital I/O connector provides powering-on function to an external device that is connected to this connector.

Pins	Digital Output/Input Pin Assignment
1	D100
2	DIO1
3	DIO2
4	DIO3
5	GND
6	DIO4
7	DIO5
8	DIO6
9	DIO7

Audio jacks



### **DVI-I** Port



The DVI-I port is used to connect an LCD monitor. Connect the display device's cable connector to the DVI-D port. After plugging the cable connector into the port, gently tighten the cable screws to hold the connector in place.

#### **Rear Audio**

The system board is equipped with 3 audio jacks. A jack is a one-hole connecting interface for inserting a plug.

- Line-in/Surround Jack (Light Blue) This jack is used to connect any audio devices such as Hi-fi set, CD player, tape player, AM/FM radio tuner, synthesizer, etc.
- Line-out Jack (Lime) This jack is used to connect a headphone or external speakers.
- Mic-in/Center+Subwoofer Jack (Pink) This jack is used to connect an external microphone.

#### **Driver Installation**

Install the audio driver. Refer to the chapter 8 for more information.

## I/O Connectors

### **Power Connector**



Use a power supply that complies with the ATX12V Power Supply Design Guide Version 1.1. An ATX12V power supply unit has a standard 4-pin ATX main power connector that must be inserted into the 4-pin connector.

The power connector from the power supply unit are designed to fit the 4-pin connector in only one orientation. Make sure to find the proper orientation before plugging the connectors.

#### Important:

 Insufficient power supplied to the system may result in instability or the add-in boards and peripherals not functioning properly. Calculating the system's approximate power usage is important to ensure that the power supply meets the system's consumption requirements.

### **Parallel Connector**



The 25-pin connector is used to connect an external parallel port. The parallel port connects your PC to a parallel printer. It supports SPP, ECP and EPP.

SPP (Standard Parallel Port)	Allows normal speed operation but in one direction only.
ECP (Extended Capabilities Port)	Allows parallel port to operate in bidirectional mode and at a speed faster than the SPP's data transfer rate.
EPP (Enhanced Parallel Port)	Allows bidirectional parallel port operation at maximum speed.
# **Cooling Fan Connectors**

The fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

## **BIOS Setting**

The Advanced menu ("PC Health Status" submenu) of the BIOS will display the current speed of the cooling fans. Refer to chapter 7 for more information.



 $(\bigcirc)$  $(\bigcirc$ ø 12 Front Ø PWR-LED Panel HDD-LED ¢ RESET-SW -PWR-BTN 8888. 11 12 R 0 œ 0 **\_** ¢ X 888888888 888 (C) ٢

# **SMBus Connector**



#### HDD-LED - HDD LED

This LED will light when the hard drive is being accessed.

#### **RESET SW - Reset Switch**

**Front Panel Connector** 

This switch allows you to reboot without having to power off the system.

#### **PWR-BTN - Power Switch**

This switch is used to power on or off the system.

#### PWR-LED - Power/Standby LED

When the system's power is on, this LED will light. When the system is in the S1 (POS - Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 4 seconds.

	Pin	Pin Assignment		Pin	Pin Assignment
	3	HDD Power	ower PWR-LED	2	LED Power
HDD-LED	5	Signal		4	LED Power
RESET SW	7	Ground		6	Signal
	9	RST Signal	PWR-BTN	8	Ground
	11	N.C.		10	Signal

The SMBus (System Management Bus) connector is used to connect SMBus devices. It is a multiple device bus that allows multiple chips to connect to the same bus and enable each one to act as a master by initiating data transfer.

# SATA (Serial ATA) Connectors



### Features

- 2 Serial ATA 3.0 ports
   SATA port 0 and 1 with data transfer rate up to 6Gb/s
- Integrated Advanced Host Controller Interface (AHCI) controller

The Serial ATA connectors are used to connect the Serial ATA device. Connect one end of the Serial ATA data cable to a SATA connector on the system board and the other end to your Serial ATA device.

The power cable must be connected from the system board's Serial ATA power connector to the SATA drive's power connector in order to provide power to the drive.

#### **BIOS Setting**

Configure the Serial ATA drives in the Advanced submenu ("SATA Confiuration" section) of the BIOS. Refer to chapter 7 for more information.

# SATA (Serial ATA) Power Connectors



These SATA power connectors supply power to the SATA drive. Connect one end of the provided power cable to the SATA power connector and the other end to your storage device.

# **PS/2 Keyboard/Mouse Connector**



The Keyboard/Mouse connector is used to connect PS/2 keyboard and PS/2 mouse by means of a PS/2 cable. Connect one end of the cable to the Keyboard/Mouse connector. The other ends are used to connect a PS/2 keyboard and a PS/2 mouse.



#### Wake-On-PS/2 Keyboard/Mouse

The Wake-On-PS/2 Keyboard/Mouse function allows you to use the PS/2 keyboard or PS/2 mouse to power-on the system. To use this function:

#### Jumper Setting

JP3 must be set to "2-3 On: 5V\_standby". Refer to "PS/2 Keyboard/Mouse Power Select" in chapter 4 for more information.

#### Important:

The 5V\_standby power source of your power supply must support  $\geq$ 720mA.

# **Chassis Intrusion Connector**



The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will sound only when the system restarts.

# **Expansion Slots**



#### Mini PCIe Slot

The Mini PCIe socket is used to install a Mini PCIe card. Mini PCIe card is a small form factor PCI card with the same signal protocol, electrical definitions, and configuration definitions as the conventional PCI.

#### PCI Express x16 Slot

Install PCI Express x16 graphics card, that comply to the PCI Express specifications, into the PCI Express x16 slot. To install a graphics card into the x16 slot, align the graphics card above the slot then press it down firmly until it is completely seated in the slot. The retaining clip of the slot will automatically hold the graphics card in place.

#### PCI Express x4 Slot

Install PCI Express cards such as network cards or other cards that comply to the PCI Express specifications into the PCI Express x4 slot.

## **EXC Slot**

The EXC interface is used to install an EXC card for I/O expansion.

# Standby Power LED



This LED will lit red when the system is in the standby mode. It indicates that there is power on the system board. Power-off the PC and then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

# **Battery**



The lithium ion battery powers the real-time clock and CMOS memory. It is an auxiliary source of power when the main power is shut off.

## Safety Measures

- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.

# **Chapter 6 - Mounting Options**

# Wall Mount

The wall mount kit includes the following:

- 2 Wall mount brackets
- 4 Bracket screws



1. The wall mounting holes are located on the bottom side of the system unit.



2. Use the provided mounting screws to secure the wall mount brackets on each side of the system unit.





# Chapter 7 - BIOS Setup

## **Overview**

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board. The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.

It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.



The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

# **Default Configuration**

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

# **Entering the BIOS Setup Utility**

The BIOS Setup Utility can only be operated from the keyboard and all commands are keyboard commands. The commands are available at the right side of each setup screen.

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message "Press DEL to run setup" will appear on the screen. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and <Del> keys simultaneously.

## Legends

Keys	Function
Right and Left arrows	Moves the highlight left or right to select a menu.
Up and Down arrows	Moves the hightlight up or down between submenu or fields.
<esc></esc>	Exit to the BIOS Setup Utility.
+ (plus key)	Scrolls forward through the values or options of the highlighted field.
- (minus key)	Scrolls backward through the values or options of the highlighted field.
Tab	Select a field.
<f1></f1>	Displays General Help
<f2></f2>	Pervious values
<f3></f3>	Optimized defaults
<f4></f4>	Saves and resets the setup program
<enter></enter>	Press <enter> to enter the highlighted submenu.</enter>

# Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

## **Submenu**

When " $\blacktriangleright$ " appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

# **AMI BIOS Setup Utility**

# Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.



#### System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1980 to 2099.

#### System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

# Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.



Main Advanced	Chipset Boot	Security	Save & Exit	
ACPI Power Managen     Trusted Computing     CPU Configuration     SATA Configuration     SATA Configuration     PCH-FW Configuration     USB Configuration     USB Configuration     Super IO Configuration     PC Health Status     Second Super IO Conf     Network Stack	n n iguration			ACPI Power Manageme Configuration → ←: Select Screen ↑↓: Select Item Enter: Select +/: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defau F4: Save & Reset ESC: Exit

#### **ACPI Power Management Configuration**

This section is used to configure the ACPI power management.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.			
Advanced ACPI Power Management Configu Resume by PME Resume by Ring Resume by RTC Alarm	ration [Disabled] [Disabled] [Disabled]	About Resume by PME (PCI, PCIE, LAN). If PME is enabled then PCH After-G3 Function is ena- bled, too. But Auto Power On function is fail.	
		$\rightarrow \leftarrow: Select Screen$ $\uparrow_{4:} Select Item$ Enter: Select $+ \uparrow_{-:} Change Opt.$ F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.			

### Resume by PME

Enables this field to use the PME signal to wake up the system.

#### **Resume by Ring**

Enables this field to use the Ring signal to wake up the system.

#### Resume by RTC Alarm

When Enabled, the system uses the RTC to generate a wakeup event.

## **Trusted Computing**

This section configures settings relevant to Trusted Computing innovations.

Aptio Setup Utility -	Copyright (C) 2012 American Mega	trends, Inc.
Advanced		
Configuration Security Device Support Current Status Information No Security Device Found	[Disable]	Enables or Disables BIOS support for security device. O.S will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
		$\begin{array}{l} \rightarrow \leftarrow: \text{Select Screen} \\ \uparrow \downarrow:  \text{Select Item} \\ \text{Enter: Select} \\ + \prime^{-}:  \text{Change Opt.} \\ \uparrow \uparrow:  \text{Change Opt.} \\ \uparrow \uparrow:  \text{Cheneral Help} \\ \uparrow 2:  \text{Previous Values} \\ \uparrow 3:  \text{Optimized Defaults} \\ \uparrow 4:  \text{Save and Reset} \\ \textbf{ESC: Exit} \end{array}$
Version 2.15.1236.	Copyright (C) 2012 American Megatre	ends, Inc.

#### Security Device Support

This field is used to enable or disable BIOS supporting for the security device. O.S will not show the security device. TCG EFI protocol and INT1A interface will not be available.

#### **CPU Configuration**

This section is used to configure the CPU. It will also display the detected CPU information.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.			
Advanced			
CPU Configuration Intel(R) Core(TM) i7-4770S CPU @ 3.1 CPU Signature Processor Family Microcode Patch FSB Speed Max CPU Speed Max CPU Speed CPU Speed Processor Cores Intel HT Technology Intel VTX Technology Intel SMX Technology G4-bit EIST Technology CPU C3 State CPU C3 State CPU C3 State CPU C7 State L1 Data Cache L1 Code Cache L2 Cache L3 Cache Hyper-threading Active Processor Cores Intel VTX Processor Cores Cores Processor Cores ProCesor Cores ProCessor Cores	OGHz 306c3 6 1a 100 MHz 3100 MHz 3100 MHz 3100 MHz 4 Supported Sup	Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled. → ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.			

#### Hyper-threading

Enables this field for Windows XP and Linux which are optimized for Hyper-Threading technology. Select disabled for other OSes not optimized for Hyper-Threading technology. When disabled, only one thread per enabled core is enabled.

#### **Active Processor Cores**

Number of cores to enable in each processor package.

#### Intel Virtualization Technology

When this field is set to Enabled, the VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

#### EIST

This field is used to enable or disable the Intel Enhanced SpeedStep Technology.

#### **SATA Configuration**

This section is used to configure the settings of Serial ATA devices.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.			
Advanced			
SATA Controller(s) SATA Mode Selection	[Enabled] [IDE]	Enable or disable SATA Device.	
Serial ATA Port 0 Software Preserve Serial ATA Port 1 Software Preserve mATA Port Software Preserve CFAST Port Software Preserve	Empty Unknown Empty Unknown Empty Unknown Empty Unknown		
		$\begin{array}{rcl} \rightarrow \leftarrow : & \text{Select Screen} \\ \uparrow \& : & \text{Select Item} \\ & \text{Enter: Select} \\ +/-: & \text{Change Opt.} \\ F1: & \text{General Help} \\ F2: & \text{Previous Values} \\ F3: & \text{Optimized Defaults} \\ F4: & \text{Save & Reset} \\ ESC: & \text{Exit} \end{array}$	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.			

#### SATA Controller(s)

This field is used to enable or disable the Serial ATA devices.

#### SATA Mode Selection

The mode selection determines how the SATA controller(s) operates.

#### IDE Mode

This option configures the Serial ATA drives as Parallel ATA storage devices.

#### AHCI Mode

This option allows the Serial ATA devices to use AHCI (Advanced Host Controller Interface).

When IDE mode is selected in the SATA Mode Selection, it will display the following information:

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.			
Advanced SATA Controller(s) SATA Mode Selection Serial ATA Port 0 Software Preserve Serial ATA Port 1 Software Preserve mATA Port Software Preserve CFAST Port Software Preserve	[Enabled] [IDE] Empty Unknown Empty Unknown Empty Unknown Empty Unknown	Determines how SATA controller(s) operate. → ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values	
Version 2 15 123	6 Convright (C) 2012 American Megatren	F4: Save & Reset ESC: Exit	

When AHCI mode is selected in the SATA Mode Selection, it will display the following information:

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.			
Advanced			
Advanced SATA Controller(s) SATA Mode Selection SATA Controller Speed Serial ATA Port 0 Software Preserve Port 0 Hot Plug Serial ATA Port 1 Software Preserve Port 1 Hot Plug mATA Port Software Preserve mSATA Port	[Enabled] [AHCI] [Default] Empty Unknown [Enabled] Disabled] Empty Unknown [Enabled] Empty Unknown [Enabled]	Determines how SATA controller(s) operate.	
Hot Plug CFAST Port Software Preserve Port 5 Hot Plug	[Disabled] Empty Unknown [Enabled] [Disabled]	→ $\leftarrow$ : Select Screen $\uparrow\downarrow$ : Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.			

When RAID mode is selected in the SATA Mode Selection, it will display the following information:

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc. Advanced			
Advanced SATA Controller(s) SATA Mode Selection SATA Controller Speed Software Feature Mask Configuration Serial ATA Port 0 Software Preserve Port 0 Hot Plug Serial ATA Port 1 Software Preserve Port 1 Hot Plug mATA Port Software Preserve Port 1 Software Preserve Port 1 Software Preserve Port 1 Hot Plug mATA Port Software Preserve Port 1 Software Port Port Port Port Port Port Port Port	(Enabled) [RAID] [Default] Empty Unknown [Enabled] Empty Unknown [Enabled] [Disabled] [Disabled] Empty Unknown [Enabled] [Disabled] [Disabled] Empty Unknown [Enabled] [Disabled]	Determines how SATA controller(s) operate.	
mSAIA Pont Hot Plug CFAST Port Software Preserve Port 5 Hot Plug	[Enabled] Empty Unknown [Enabled] [Disabled]	→+.     Select blettern       Enter: Select     +/-:       +/-:     Change Opt.       F1:     General Help       F2:     Previous Values       F3:     Optimized Defaults       F4:     Save & Reset       ESC:     Exit	

### SATA Controller Speed

Indicates the maximum speed that the Serial ATA controller can support.

### Port 0, Port 1, mSATA Port, Port 5

Enables or disables these Serial ATA ports.

## Hot Plug

Designates the serial ATA port as hot pluggable.

#### Software Feature Mask Configuration

RAID OROM/RST driver will refer to the SWFM configuration in order to enable or disable the features of the storage device.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc. Advanced			
RAID0 RAID1 RAID5 Intel Rapid Recovery Technology OROM UI and BANNER Smart Response Technology OROM UI Delay	[Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Z Seconds]	Enable or disable RAID0 feature.	
		→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.			

#### RAIO 0/1/5/10

Enables or disables the RAID feature.

#### Intel Rapid Recovery Technology

Enables or disables the Intel Rapid Recovery Technology.

#### OROM UI and BANNER

When enabled, then the OROM UI is shown. When disabled, no OROM banner or information will be displayed if all disks and RAID volumes are Normal.

#### Smart Response Technology

Enables or disables the Smart Response Technology.

#### **OROM UI Dealy**

When enabled, it indicates the delay of the OROM UI Splash Screen in a normal status.

#### **PCH-FW Configuration**

This section is used to configure the parameters of Management Engine Technology.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.			
Advanced			
ME FW Version ME Firmware Mode ME Firmware Type ME Firmware SKU Firmware Update Configuration	9.1.2.1010 Normal Mode Full Sku Firmware 5MB	Configure Management Engine Technology Parameters → ←: Select Screen 7↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Ontimized Defaults	
Version 2 15 123	6. Convright (C) 2012 American Megatrer	F4: Save & Reset ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.			

#### Firmware Update Configuration

Enables or disables the Me FW Image Re-Flash function.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Me FW Image Re-Flash	[Disabled]	Enable/Disable Me FW Image Re-Flash function.
		→ $\leftarrow$ : Select Screen $\uparrow$ : Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

#### **AMT Configuration**

This section configures the parameters of Active Management Technology.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Intel AMT Un-Configure ME Disable ME	[Enabled] [Disabled] [Disabled]	Enable/Disable Intel(R) Active Management Tech- nology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execu- tion. If enabled, this re- quires additional firmware in the SPI device. → ←: Select Screen \\: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save and Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

#### Intel AMT

Enables or disables the AMT function.

#### **Un-Configure ME**

Selects Enabled to un-configure the ME function without a password.

#### **Disable ME**

Sets ME to soft temporary disabled.

#### **USB** Configuration

This section is used to configure USB.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
USB Configuration		Enables Legacy USB support. AUTO option
USB Module Version	8.10.27	no USB devices are
1 Keyboard, 2 Hubs		option will keep USB devices available only for
Legacy USB Support USB3.0 Support XHCI Hand-off EHCI Hand-off	[Enabled] [Enabled] [Enabled] [Disabled]	EFI applications.
		→ $\leftarrow$ : Select Screen ↑1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

#### Legacy USB Support

Enabled

Enables legacy USB.

Auto

Disables support for legacy when no USB devices are connected.

#### Disabled

Keeps USB devices available only for EFI applications.

#### **USB3.0 Support**

Enable or disable the support of the USB 3.0 (XHCI) controller.

#### **XHCI Hand-off**

This is a workaround for OSes without the support of XHCI hand-off. The change of XHCI ownership should be claimed by the XHCI driver.

#### **EHCI Hand-off**

This is a workaround for OSes without the support of EHCI hand-off. The change of EHCI ownership should be claimed by the EHCI driver.

#### Super IO Configuration

This section is used to configure the I/O functions supported by the onboard Super I/O chip.

Aptio Setup Utility -	Copyright (C) 2012 America	an Megatrends, Inc.
Super IO Configuration Super IO Chip Restore AC Power Loss WatchDog Timer Unit	NCT6106D [Power Off] [Second]	Restore AC Power Loss Help.
Super IO Watchdog Timer Serial Port 0 Configuration Serial Port 1 Configuration Serial Port 2 Configuration Serial Port 2 Configuration Serial Port 4 Configuration Serial Port 5 Configuration Parallel Port Configuration	0	$\rightarrow \leftarrow: Select Screen$ $\uparrow \downarrow: Select Item$ Enter: Select Item Fil: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236.	Copyright (C) 2012 American	Megatrends, Inc.

#### **Restore AC Power Loss**

#### Power Off

When power returns after an AC power failure, the system's power is off. You must press the Power button to power-on the system.

#### Power On

When power returns after an AC power failure, the system will automatically power-on.

#### Last State

When power returns after an AC power failure, the system will return to the state where you left off before power failure occurs. If the system's power is off when AC power failure occurs, it will remain off when power returns. If the system's power is on when AC power failure occurs, the system will power-on when power returns.

#### Watchdog Timer Unit

Selects the watchdog timer unit: second or minute.

#### Super IO Watchdog Timer

Sets the timeout value of the super IO watchdog timer. 0 means disabled.

#### Serial Port 0 Configuration and Serial Port 5 Configuration

Sets parameters of serial port 0 (COM A) and serial port 5 (COM F).

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Serial Port 0 Configuration		Enable or Disable Serial
Serial Port Device Settings	[Enabled] IO=3F8h; IRQ=4;	Port (COM)
Change Settings	[Auto]	
RS485 Auto Flow	[Disabled]	
		$  \rightarrow \leftarrow: Select Screen  \uparrow \downarrow: Select Item  Enter: Select  +/-: Change Opt.  F1: General Help  F2: Previous Values  F3: Optimized Defaults  F4: Save & Reset  ESC: Exit$
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Serial Port 1 Configuration Serial Port Device Settings	[Enabled] IO=2F8h; IRQ=3;	Enable or Disable Serial Port (COM)
Change Settings	[Auto]	
RS485 Auto Flow	[Disabled]	→ ←: Select Screen
		<ul> <li>Files Select them</li> <li>Enter: Select</li> <li>+/-: Change Opt.</li> <li>FI: General Help</li> <li>F2: Previous Values</li> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Reset</li> <li>ESC: Exit</li> </ul>
Version 2.15.12	236. Copyright (C) 2012 American Mega	trends. Inc.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.			
4	Advanced		
Serial Port 2 Con Serial Port Device Settings	figuration	[Enabled] IO=3E8h; IRQ=5;	Enable or Disable Serial Port (COM)
Change Settings		[Auto]	→ ←: Select Screen ↑↓: Select Item Enter: Select +/: Change Opt.
			F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc. Advanced		
Serial Port 3 Configurati Serial Port Device Settings Change Settings	ion [Enabled] IO=2E8h; IRQ=7; [Auto]	Enable or Disable Serial Port (COM)
		$  \rightarrow \leftarrow: Select Screen  \uparrow \downarrow: Select Item  Enter: Select  +/: Change Opt.  F1: General Help  F2: Previous Values  F3: Optimized Defaults  F4: Save & Reset  ESC: Exit$
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Serial Port 4 Configuration Serial Port Device Settings	[Enabled] IO=2E0h; IRQ=10;	Enable or Disable Serial Port (COM)
Change Settings	[Auto]	<ul> <li>→ ←: Select Screen</li> <li>↑↓: Select Item</li> <li>Enter: Select</li> <li>+/: Change Opt.</li> <li>F1: General Help</li> <li>F2: Previous Values</li> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Reset</li> <li>ESC: Exit</li> </ul>
Version 2 15 1236 Convr	ight (C) 2012 American Megatran	de Inc

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.			
	Advanced		
Serial Port 5 Co Serial Port Device Settings Change Setting	onfiguration ; s	[Enabled] IO=2F0h; IRQ=6; [Auto]	Enable or Disable Serial Port (COM)
			→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
	Version 2 15 1236 Conv	rinht (C) 2012 American Magatran	F4: Save & Reset ESC: Exit

### Serial Port

Enables or disables the serial port (COM).

## **Change Settings**

Selects the IO/IRQ settings for the super I/O device.

#### **RS485 Auto Flow**

Sets the RS485 auto flow for the serial port.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Parallel Port Configuration Parallel Port Change Settings Device Mode	[Enabled] [Auto] [STD Printer Mode]	Enable or Disable Parallel Port (LPT/LPTE)
		→ $\leftarrow$ : Select Screen $\uparrow \downarrow$ : Select Item Enter: Select $\neq /$ : Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.12	36. Copyright (C) 2012 American Meg	atrends. Inc.

#### Parallel Port

Enables or disables the parallel port (LPT/LPTE).

## **Change Settings**

Selects the IO/IRQ settings for the super I/O device.

### Device Mode

Selects the device mode for the parallel port.

### **PC Health Status**

This section displays the hardware health monitor.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
PC Health Status ► Smart Fan Function		Smart Fan Function Setting
Case Open CPU Temperature System Temperature CPU Fan 1 Speed CPU Fan 2 Speed System Fan Speed VCore +5V +12V +1.5V +3.3V 3VSB VBAT	[Disabled] : +53.0 C : +32.0 C : N/A : N/A : N/A : +1.792 V : +5.038 V : +12.144 V : +1.536 V : +3.296 V : +3.296 V : +3.344 V : +3.072 V	→ ←: Select Screen ↑↓: Select Item Enter: Select +/: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

### **Smart Fan Function**

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Smart Fan Function		Enable CPU Smart Fan
Smart Fan Function CPU Smart Fan (1) Control Boundary 4 Boundary 2 Boundary 1 Speed Count 5 Speed Count 5 Speed Count 2 Speed Count 2 Speed Count 2 Boundary 4 Boundary 3 Boundary 2 Boundary 2 Boundary 3 Speed Count 5 Speed Count 5 Speed Count 4 Speed Count 3 Speed Count 1 System Smart Fan Control Boundary 4 Boundary 4 Boundary 2 Speed Count 1 System Smart Fan Control Boundary 4 Boundary 2 Boundary 2 Speed Count 5 Speed Count 3 Speed Count 4 Speed Cou	[Enabled]         60         50         50         40         30         100         75         50         40         30         [Enabled]         60         50         40         30	Enable CPU Smart Fan → ←: Select Screen ↑↓: Select Item Enter: Select H:-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Co	pyright (C) 2012 American Megatre	nds. Inc.

55

### **CPU Smart Fan Control**

When this feature is set to Automatic, the CPU's fan speed will rotate according to the CPU's temperature. The higher the temperature, the faster the speed of rotation.

#### System Smart Fan Control

When this feature is set to Automatic, the System's fan speed will rotate according to the System's temperature. The higher the temperature, the faster the speed of rotation.

### Boundary 1 to Boundary 4

The range is 0-127.

#### Speed Count 1 to Speed Count 5

The range is 1-100%.

#### Case Open

Sets this field to Enabled to allow the system to alert you of a chassis intrusion event.

#### Second Super IO Configuration

This section is used to configure the parameters of the system second super I/O chip.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc. Advanced		
Second Super IO Configuration Second Super IO Chip Serial Port 0 Configuration Serial Port 1 Configuration Serial Port 2 Configuration Serial Port 3 Configuration	NCT5104D	Set Parameters of Serial Port 0 (COMA)
		→ $\leftarrow$ : Select Screen ↑↓: Select Item Enter: Select +/: Change Opt. FI: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

#### Serial Port 0 Configuration to Serial Port 3 Configuration

Sets parameters of serial port 0 to 3.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc. Advanced			
Serial Port 0/1/2/3 Configuration Serial Port Device Settings Change Settings RS485 Auto Flow	[Enabled] Reset Required [Auto] [Disabled]	Enable or Disable Serial Port (COM)	
		→ $\leftarrow$ : Select Screen $\uparrow$ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.			

## Serial Port

Enables or disables the serial port (COM).

## **Change Settings**

Selects the IO/IRQ settings for the super I/O device.

### **RS485 Auto Flow**

Sets the RS485 auto flow for the serial port.

### **Network Stack**

This section is used to enable or disable UEFI network stack.

Aptio Setup Utility	Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced			
Network Stack	[Disabled]	Enable/Disable UEFI network stack. → ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.			

When Network Stack is enabled, it will display the following information:

Aptio Setup Utility	- Copyright (C) 2012 American Megatr	rends, Inc.
Advanced Network Stack Ipv4 PXE Support Ipv6 PXE Support	[Enabled] [Enabled] [Enabled]	Enable/Disable UEFI network stack.
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

## Ipv4 PXE Support

When enabled, Ipv4 PXE boot supports. When disabled, Ipv4 PXE boot option will not be created.

## Ipv6 PXE Support

When enabled, Ipv6 PXE boot supports. When disabled, Ipv6 PXE boot option will not be created.

# Chipset

This section configures relevant chipset functions.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.				
Main Advanced <mark>Chipset</mark>	Boot	Security	Save & Exit	Even Logs
System Agent (SA) Configuration PCH-IO Configuration				System Agent (SA)       Parameters       → ←: Select Screen       ↑↓: Select Item       Enter: Select       +/: Change Opt.       F1: General Help       F2: Previous Values       F3: Optimized Default       F4: Save & Reset       F2: Creit

Chapter 7 BIOS Setup

## System Agent (SA) Configuration

This section is used to configure the parameters of System Agent.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Chipset		
System Agent Bridge Name System Agent RC Version VT-d Capability	Haswell 1.5.0.0 Supported	Check to enable VT-d function on MCH.
VT-d		
<ul> <li>Graphics Configuration</li> <li>NB PCIe Configuration</li> <li>Memory Configuration</li> </ul>		
		$\begin{array}{l} \rightarrow \leftarrow: \text{Select Screen} \\ \uparrow \downarrow: \text{Select Item} \\ \text{Enter: Select} \\ +/:: \text{Change Opt.} \\ \text{F1: General Help} \\ \text{F2: Previous Values} \\ \text{F3: Optimized Defaults} \\ \text{F4: Save & Reset} \end{array}$
		ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

## VT-d

Checks to enable VT-d function on MCH.

## **Graphics Configuration**

This field configures the graphics settings.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Chipset	t	
Graphics Configuration IGFX VBIOS Version IGFX requency Primary Display Internal Graphics DVMT Pre-Allocated DVMT Total Gfx Mem ► LCD Control	2166 700 MHz [Auto] [Auto] [32M] [256M]	Select which of IGFX/ PEG/PCI Graphics device should be Primary Display.
		→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

## Primary Display

**Auto** When the system boots, it will auto detects the display device. **IGFX** When the system boots, it will first initialize the onboard VGA. **PEG** When the system boots, it will first initialize the PCI Express x16 graphics card.

## **Internal Graphics**

Keeps IGD enabled based on the setup options.

#### **DVMT Pre-Allocated**

Selects DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device. Please refer to the information below.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.			
Chipset			
Graphics Configuration IGFX VBIOS Version IGFX Frequency Primary Display Internal Graphics DVMT Pre-Allocated DVMT Total Gfx Mem ► LCD Control	2166 700 MHz DVMT Pre-Allocated 32M 64M 96M 128M 128M 160M 192M 224M 256M 288M 320M 352M 352M 352M 352M 352M 352M 351M 416M 448M 416M 448M 512M	Select DVMT5.0 Pre- Allocated (Fixed) Graph- ics Memory size used by the Internal Graphics Device. → ←: Select Screen ↑↓: Select Item Enter: Select +/: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.			

#### **DVMT Total Gfx Mem**

Selects DVMT 5.0 total graphics memory size used by the internal graphics device. Please refer to the information below.



#### LCD Control

This field configures the LCD control.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.			
Chipset	Chipset		
LCD Control Primary IGFX Boot Display	[VBIOS Default]	Select the Video Device which will be activated during POST. This has no effect if external graphics present.         Secondary boot display selection will appear based on your selection.         VGA modes will be sup- ported only on primary display.         → ←: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt.         F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.			

When any device is selected in the Primary IGFX Boot Display, it will display the following information:

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.			
Chipset	Chipset		
LCD Control Primary IGFX Boot Display Secondary IGFX Boot Display	[CRT] [None]	Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be sup- ported only on primary display. $\forall GA$ modes will be sup- ported only on primary display. $\Rightarrow \leftarrow$ : Select Screen $\uparrow \downarrow$ : Select Item Enter: Select Heiter Select $\uparrow \downarrow$ : General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit	
Version 2.15.1236. Converget (C) 2012 American Megatrends. Inc.			

Secondary IGFX Boot Display

Selects the secondary display device.

## NB PCIe Configuration

This field is used to configure the settings of NB PCI Express.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc. Chipset		
NB PCIe Configuration PEG0 - Gen X	[Auto]	Configure PEG0 B0:D1:F0 Gen1-Gen2.
Enable PEG	[Enabled]	→ $\leftarrow$ : Select Screen $\uparrow \downarrow$ : Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

## Enable PEG

Enables or disables the PEG.

## Memory Configuration

This field only displays the memory configuration.

Memory Information Memory RC Version Memory Frequency Total Memory Memory Voltage DIMM#1	1.5.0.0 1600 Mhz 2048 MB (DDR3) 1.50V 2048 MB (DDR3) Net Durant	
CAS Latency (tCL) Minimum delay time CAS to RAS (tRCDmin) Row Precharge (tRPmin) Active to Precharge (tRASmin)	101 Fresent 11 11 11 28	→ $\leftarrow$ : Select Screen $\lambda$ : Select Item Enter: Select $\pm/$ : Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaul F4: Save & Reset ESC: Exit

## **PCH-IO Configuration**

This section illustrates the PCH parameters.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc. Chipset		
Intel PCH RC Version Intel PCH SKU Name Intel PCH Rev ID	1.5.0.0 C226 05/C2	PCI Express Configuration settings.
<ul> <li>PCI Express Configuration</li> <li>USB Configuration</li> <li>PCH Azalia Configuration</li> </ul>		
Onboard I217 LAN Controller Onboard I210 LAN Controller	[Enabled] [Enabled]	
High Precision Event Timer Configuration High Precision Timer	[Enabled]	→ ←: Select Screen ↑↓: Select Item Enter: Select +/: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

#### Onboard 1217 LAN Controller

Enables or disables the onboard I217 LAN controller.

### Onboard I210 LAN Controller

Enables or disables the onboard I210 LAN controller

### **High Precision Timer**

Enables or disables the High Precision Event Timer.

## PCI Express Configuration

This field is used to configure the PCI Express settings.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.	
Chipset	
PCI Express Configuration PCI Express Root Port 4 PCI Express Root Port 5 PCI Express Root Port 6 PCI Express Root Port 7	PCI Express Root Port 4 Settings.
	→ $\leftarrow$ : Select Screen $\uparrow\downarrow$ : Select Item Enter: Select +/-: Change Opt. FI: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.	

## PCI Express Root Port 4 to PCI Express Root Port 7

Enables or disables the PCI Express Root Port.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc. Chipset		
PCI Express Root Port 4 PCIe Speed	[Enabled] [Auto]	Control the PCI Express Root Port. → ←: Select Screen ↑.: Select Item Enter: Select +/-: Change Opt. FI: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15	5.1236. Copyright (C) 2012 American M	Megatrends, Inc.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc. Chipset		
PCI Express Root Port 5 PCIe Speed	[Enabled] [Auto]	Control the PCI Express Root Port. → ←: Select Screen ↑ 4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Chips	et	
PCI Express Root Port 6 PCIe Speed	[Enabled] [Auto]	Control the PCI Express Root Port. → ←: Select Screen ↑ : Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

		Control the PCI Express
PCIe Speed	[Auto]	Root Port.
		$\rightarrow \leftarrow$ : Select Screen $\uparrow \downarrow$ : Select Item
		Enter: Select
		F1: General Help
		F2: Previous Values
		F3: Optimized Default
		ESC. Exit

# PCIe Speed

Selects the speed of PCI Express port: Auto, Gen 1 or Gen 2.

## **USB** Configuration

This field is used to configure the USB settings.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Chipset		
USB Configuration		Precondition work on USB host controller
USB Precondition XHCI Mode	[Disabled] [Auto]	and root ports for faster enumeration.
USB Ports Per-Port Disable Control	[Disabled]	
		$\rightarrow \leftarrow$ : Select Screen $\uparrow \downarrow$ : Select Item Enter: Select
		+/-: Change Opt. F1: General Help
		F2: Previous Values F3: Optimized Defaults
		ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

#### **USB** Precondition

Precondition works on USB host controller and root ports for faster enumeration.

#### XHCI Mode

Selects the operation mode of XHCI controller. These options are Auto, Enabled, and Disabled. When Disabled is selected in the XHCI Mode, it will display the following information:

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Chipset		
USB Configuration USB Precondition XHCI Mode	[Disabled] [Disabled]	Mode of operation of XHCI controller.
EHCI1 EHCI2	[Enabled] [Enabled]	
USB Ports Per-Port Disable Control	[Disabled]	$\rightarrow \leftarrow: Select Screen$ $\uparrow \downarrow: Select Item$ Enter: Select $+/: Change Opt.$ FI: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

### EHCI 1 and EHCI 2

These fields are used to control the functions of USB EHCI (USB 2.0) controllers. One EHCI controller must always be enabled.

#### USB Ports Per-Port Disable Control

This field is used to control each of the USB ports (0~13) disabling. When enabled, it will display the following information:

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Chipset		
USB Configuration USB Precondition XHCI Mode USB Port #0 USB Port #1 USB Port #1 USB Port #2 USB Port #3 USB Port #4 USB Port #5 USB Port #8 USB Port #9 USB Port #11	[Disabled] [Auto] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled]	Control each of the USB ports (0~13) disabling. → ←: Select Screen ↑: Select Item Enter: Select +/: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

# PCH Azalia Configuration

This field is used to configure the PCH Azalia settings.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc. Chipset		
PCH Azalia Configuration Azalia	[Auto]	Control detection of the         Azalia device.         Disable= Azalia will be         unconditionally disabled         Enabled= Azalia will be         unconditionally enabled         duto=Azalia will be enabled         otherwise.         → ←: Select Screen         ↑\: Select Item         Enter: Select         +/∹         Change Opt.         F1: General Help         F2: Previous Values         F3: Optimized Defaults         F4: Save & Reset         F5C: Evit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

USB Port #0/1/2/3/4/5/8/9/11

Enables or disables these USB ports.

# Boot



#### Setup Prompt Timeout

Selects the number of seconds to wait for the setup activation key. 65535(0xFFFF) denotes indefinite waiting.

#### **Bootup NumLock State**

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

#### **Quiet Boot**

Enables or disables the quiet boot function.

#### **CSM Parameters**

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Boot		
Launch CSM Boot option filter Launch PXE OpROM policy Launch Storage OpROM policy Other PCI device ROM priority	[UEFI and Legacy] [Do not launch] [Legacy only] [Legacy OpROM]	This option controls if CSM will be launched.         CSM will be launched.         ↑ ←: Select Screen         ↑ ↓: Select Item         Enter: Select         FI: General Help         F2: Previous Values         F3: Optimized Defaults         F4: Save & Reset         ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.		

### Launch CSM

This option controls if CSM will be launched.

#### Boot option filter

This option controls what devices system can be boot to.

#### Launch PXE OpROM policy

Controls the execution of UEFI and legacy PXE OpROM.

#### Launch Storage OpROM policy

Controls the execution of UEFI and legacy storage OpROM.

#### Other PCI device ROM priority

For PCI devices other than Network, Mass Storage, or Video defines which  $\ensuremath{\mathsf{OpROM}}$  to launch.

# Security

Aptio Set	up Utility -	· Copyri	ght (C) 2012	American Meg	atrends, Inc.
Main Advanced	Chipset	Boot	Security	Save & Exit	Even Logs
Password Description If ONLY the Administrator then this only limits access asked for when entering S2 If ONLY the User's passw is a power on password an boot or enter Setup. In Set Administrator rights. The password length must in the following range: Minimum length Maximum length Administrator Password User Password HDD Security Configuration	r's passworr s to Setup a etup. ord is set, it dd must be e up the User be	d is set, nd is onl, hen this ntered to will hav	y e 20		Set Administrator Password. → ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Version	1 2.15.1236.	Copyrig	ht (C) 2012 A	American Megat	rends, Inc.

#### **Administrator Password**

Sets the administrator password.

#### **User Password**

Sets the user password.

# Save & Exit

Aptio	Setup Utility	- Copyri	ght (C) 2012	American Meg	atrends, Inc.
Main Advanced	Chipset	Boot	Security	Save & Exit	Even Logs
Save Changes and Rese Discard Changes and R	eset				Reset the system after saving the changes.
Restore Defaults					
Boot Override					
Launch EFI Shell from	filesystem dev	vice			
					←→: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Reset ESC: Exit
Ver	ion 2.15.1236	. Copyrig	tht (C) 2012	American Megat	rends, Inc.

#### Save Changes and Reset

To save the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system after saving all changes made.

#### **Discard Changes and Reset**

To discard the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system setup without saving any changes.

#### **Restore Defaults**

To restore and load the optimized default values, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore the default values of all the setup options.

#### Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

# Event & Logs

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.						
Main	Advanced	Chipset	Boot	Security	Save & Exit	Event & Logs
Change     View Sr	Smbios Event L	Log Settings				Press <enter> to change         the Smbios Event Log         Configuration.         ←→: Select Screen         ↑↓: Select Item         Enter: Select         +/-: Change Opt.         F1: General Help         F2: Previous Values         F3: Optimized Defaults         F4: Save &amp; Exit         ESC: Exit</enter>
	Versio	on 2.15.1236.	Copyrigh	nt (C) 2012 A	American Megati	ends, Inc.

#### **Change Smbios Event Log Settings**

Press the <Enter> button to change the Smbios Event Log configuration.

Aptio Setup Utility - Copyrigh	t (C) 2012 American Megat	rends, Inc.
		Event & Logs
Enabling/Disabling Options Smbios Event Log	[Enabled]	Change this to enable or disable all features of Smbios Event Logging
Erasing Settings Erase Event Log When Log is Full	[No] [Do nothing]	during boot.
Smbios Event Log Standard Settings Log System Boot Event	[Enabled]	
Note: All values changed here do not take effect until computer is restarted.		$\begin{array}{l} \leftarrow \rightarrow: \text{ Select Screen} \\ \uparrow\downarrow:  \text{Select Item} \\ \text{Enter: Select} \\ +/:  \text{Change Opt.} \\ F1:  \text{General Help} \\ F2:  \text{Previous Values} \\ F3:  \text{Optimized Defaults} \\ F4:  \text{Save \& Exit} \\ \text{ESC: Exit} \end{array}$
Version 2.15.1236. Copyright	(C) 2012 American Megatre	nds, Inc.

### **Smbios Event Log**

Changes this field to enable or disable all features of Smbios Event Logging during boot.

### Erase Event Log

Chooses options for erasing Smbios Event Log. Erasing is prior to any logging activation during reset.

### When Log is Full

Chooses options for reactions to a full Smbios Event Log.

### Log System Boot Event

Chooses options to enable or disable the logging of system boot event.

## **View Smbios Event Log**

Press the <Enter> button to change the Smbios Event Log configuration.

Aptio Setup Utility -	Copyright (C) 2012 American Megat	rends, Inc.
		Event & Logs
DATE TIME ERROR CODE	SEVERITY	DESCRIPTION Log Area Reset
01/26/73 17:20:29 Smbios 0x16 01/26/73 17:20:29 Smbios 0x17 01/26/73 17:20:42 Smbios 0x17	N/A N/A N/A	<ul> <li>←→: Select Screen</li> <li>↑↓: Select Item</li> <li>Enter: Select</li> <li>+/-: Change Opt.</li> <li>F1: General Help</li> <li>F2: Previous Values</li> <li>F3: Optimized Defaults</li> <li>F4: Save &amp; Exit</li> <li>ESC: Exit</li> </ul>
Version 2 15 1236 (	Convright (C) 2012 American Megatre	nds Inc

# Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility, AFUDOS. EXE. Please contact technical support or your sales representative for the files.

To execute the utility, type:

A:> AFUDOS BIOS\_File\_Name /b /p /n

then press <Enter>.

AMI Fi	rmware Update Utility(APTIO) v2.25
Copyright (C)2008	American Megatrends Inc. All Rights Reserved.
Reading file	done
Erasing flash	done
Writing flash	done
Verifying flash	done
Erasing BooBlock	done
Writing BooBlock	done
Verifying BootBlock	done
C:\AFU\AFUDOS>	done

# Notice: **BIOS SPI ROM**

- 1. The Intel® Management Engine has already been integrated into this system board. Due to the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.
- 2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.
- 3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.

Note:

- a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
- b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical person's instructions to confirm that the MAC address should be burned or not.

# **Chapter 8 - Supported Software**

Some devices of the system require drivers from hardware manufactures to operate properly. The system may come with a CD/DVD that contains drivers, utilities and software applications. Insert the CD into a CD-ROM drive. The auto-run screen (Mainboard Utility CD) will appear. If the "Autorun" does not automatically start, please go to the root directory of the CD and double-click "Setup".

If your product package does not include a CD/DVD, you can download the latest drivers from the DFI Download Center:

#### http://www.dfi.com/DownloadCenter

Once you are in the Download Center page, select your product or type the model name and click "Search" to find product-related resources such as documentation and drivers.

# Auto Run Page (For Windows 8)





# Auto Run Page (For Windows 7)







# Auto Run Pages (For Windows XP)





# Microsoft .NET Framework 3.5 (For Windows XP)



Before installing Microsoft .NET Framework 3.5, make sure you have updated your Windows XP operating system to Service Pack 3.

To install the driver, click "Microsoft .NET Framework 3.5" on the main menu.

- 1. Read the license agreement carefully.
- Click "I have read and accept the terms of the License Agree ment" then click Install.



2. Setup is now installing the driver.






## **Intel Chipset Software Installation Utility**

The Intel Chipset Software Installation Utility is used for updating Windows<sup>®</sup> INF files so that the Intel chipset can be recognized and configured properly in the system.

To install the utility, click "Intel Chipset Software Installation Utility" on the main menu.

1. Setup is ready to install the utility. Click Next.

ntel® Chipset Device Software	
Intel® Chipset Device Software	intel
Welcome to the Setup Program	
This setup program will install the Intel® Chipset Device Soft strongly recommended that you exit all programs before cor	ware onto this computer. It is tinuing.
< <u>B</u> ack	Next > Cancel

2. Read the license agreement then click Yes.



3. Go through the readme document for more installation tips then click Next.

eadme File	Informatio	n		1	unite
			Street Mar	Mary and	and the second second
Refer to the Read	me file below to v wo key to view th	iew the syste	m requirements file	and installation	information.
******	*****	******	*******	*******	*******
* Product:	Intel(R)	Chipset	Device So	ftware	
* Release:	Productio	n Versio	n		
* Version:	9.0.0.100	8			
* Target (	hipset#: I	ntel(R)	4 Series	Chipset	
* Date: Ma	y 01 2008				
*********	*******	******	*******	*******	******

#### 4. Click Finish to exit setup.



## Microsoft DirectX 9.0C (For Windows XP)

To install the utility, click "Microsoft DirectX 9.0C Driver" on the main menu.

1. Click "I accept the agreement" then click Next.



2. To start installation, click Next.



 Click Finish. Reboot the system for DirectX to take effect.



## Intel HD Graphics Drivers (For Windows XP)

To install the driver, click "Intel HD Graphics Drivers" on the main menu.

1. To start installation, click Intel® Graphics Media Accelerator Driver Next. Intel® Graphics Media Accelerator Driver Welcome to the Setup Program This setup program will install the following components: - Intel® Graphics Media Accelerator Driver It is strongly recommended that you exit all programs before continuing. Click Next to continue. 5. Click "Yes, I want to restart < Ball Next > Cancel this computer now" then - Initekill Installation Fram click Finish. Restarting the system will allow 2. Read the license agreement Intel® Graphics Media Accelerator Driver then click Yes. take effect. Intel® Graphics Media Accelerator Driver (inte License Agreement You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms? INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User) ~ IMPORTANT - READ BEFORE COPVING, INSTALLING OR USING. Do not use or load this software and any associated materials (collectively, the "Software") unit you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not instal or use the Software. Please Also Note: \* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies; < Back Yes No Intel® Installation Framewor 3. Go through the readme Intel® Graphics Media Accelerator Driver document for system requirements and installation tips then (intel) Intel® Graphics Media Accelerator Driver click Next. Readme File Information Refer to the Readme file below to view the system requirements and installation information. \*\*\*\*\* \*\*\*\*\*\*\*\* \* Production Version Releases Microsoft Windows\* 2000

Microsoft Windows\* XP

4. Setup is now installing the ntel® Graphics Media Accelerator Driver driver. Click Next to continue. Intel® Graphics Media Accelerator Drive Setup Progress Please wait while the following setup operations are performed: Copving File: C: IProgram Fileslänte/Unite/IR) Graphics Media Accelerator Driver/uninstall.sv-SE

Coping The C (Program Healphote)(net(1)) Graphics Neda Accelerator Driver (unreadily)-Th Coping The C (Program Healphote)(net(1)) Graphics Neda Accelerator Driver (unreadily)-Th Coping The C (Program Healphote)(net(1)) Graphics Neda Accelerator Driver (unreadily)-Th Coping The C (Program Healphote)(net(1)) Graphics Neda Accelerator Driver (unreadily)-Th Coping The C (Program Healphote)(net(1)) Graphics Neda Accelerator Driver (unreadily)-Th Coping The C (Program Healphote)(net(1)) Graphics Neda Accelerator Driver (unreadily)-Ch Coping The C (Program Healphote)(net(1)) Graphics Neda Accelerator Driver (unreadily)-Th Coping The C (Program Healphote)(net(1)) Graphics Neda Accelerator Driver (unreadily)-Th Coping The C (Program Healphote)(net(1)) Graphics Neda Accelerator Driver (unreadily)-Th Coping The C (VIIDCOVE)(untersize)(addition) Coping The C (VIIDCOVE)(untersize)(addition) C (V	Coming Elec C (Exogram Elec) Intel(Intel(E)) Gran	hice Madia Accelerator Driver Universall the Tol
Coping Net Clinogan Neslsteetlinet(3) Gisphis Neda Accelerator Drive (uninstallion Ne Coping Net Clinogan Neslsteetlinet(3) Gisphis Neda Accelerator Drive (uninstallion Ne Coping Net Clinogan Neslsteetlinet(3) Gisphis Neda Accelerator Drive (uninstallion Ne Coping Net Clinogan Neslsteetlinet(3) Gisphis Neda Accelerator Drive (uninstallion Coping Net Clinogan Neslsteetlinet(3) Gisphis Neda Accelerator Drive (uninstallion Clink Net to continue.	Conving File: C (Program Files) Intel(Intel(R) Grap)	his Media Accelerator Driver uninstallith-TH
Coping File: C (Program Files(Deta)(Intel)() Graphics Media Accelerator Drive (uninstallity) TM Coping File: C (Program Files(Deta)(Intel)() Graphics Media Accelerator Drive (uninstallity) - CA Coping File: C (Program Files(Deta)(Intel)() Graphics Media Accelerator Drive (uninstallity) - CA Coping File: C (Program Files(Deta)(Intel)() Graphics Media Accelerator Drive (uninstallity) - CA Coping File: C (Program Files(Deta)(Intel)() Graphics Media Accelerator Drive (uninstallity) - TV Coping File: C (VIII)OCV/Dipystem/2)(driap).dl Click Next to continue.	Conving File: C:(Program Filer)Intel(Intel(P) Gran	hins Merike Accelerator Driveriuminstality TP
Coping File: Cliningsan Files(Detail)(meth) Graphics Media Accelerator Drive (unnestal)(b-C) Coping File: Cliningsan Files(Detail)(meth)) Graphics Media Accelerator Driver (unnestal)(b-C) Coping File: Cliningsan Files(Detail)(meth)(R) Graphics Media Accelerator Driver (unnestal)(b-T) Coping File: Cliningsan Files(Detail)(meth)(R) Graphics Media Accelerator Driver (unnestal)(b-T) Coping File: Clivit)(Drovan Files(Detail)(meth)(R) Graphics Media Accelerator Driver (unnestal)(b-T) Coping File: Clivit)(Drovan)(b)(Drovan)(B)(Dr	Convine Files Collingueses Files (Intel/Prior) (Convi	hins Marka Accelerator Driver uninstallar. TBS
Coping File: C (Program Files/predifice(IP)) Graphics Neda Accelerator Driver/unnistalish-CI) Coping File: C (Program Files/predifice(IP)) Graphics Neda Accelerator Driver/unnistalish-CI) Coping File: C (Program Files/predifice(IP)) Graphics Neda Accelerator Driver/unnistalish-TIV Coping File: C (VINDOVR)system/2) drivapud Cick Next to continue.	Company Files Company and Files (Intelligited P) Gran	hist Marks Accelerator Driver uninstallab. (%)
Coping File: (C)Program Hespletellinet(R) Graphics Neda Accelerator Driver (uninstalligh-TV Coping File: (C)Program Hespletellinet(R) Graphics Neda Accelerator Driver (uninstalligh-TV Coping File: C)(WINDOWS)(system32)(dhap).dll Click Next to continue.	Convine File: C: Program Files(Intel(P)) Gran	hise Marks Accelerator Driver uninstallab./Th
Copying the Clining and Hisphane (Lining) of a plus the data code address on the functional of the Copying the Clining and Hisphane (Lining) of a plus the data code address of the multi-address the Clining of the Cli	Copying File: Cliffordran Files(alter(intel)(c) drap	hise Marka Accelerator Driver (uninstalligh PCA
Copying File: C: (WINDOWS)(syntem)2()dhospit.dll Click Next to continue.	Copying Hiel Cliphogram Hies Unitellinitel(R) Graph	hird Merke Accelerator Driver UninstallybyTM
Click Next to continue.	Copying File: C:\WINDOWS\system32\difxapi.dll	
¢	Click Next to continue.	
	<	>
		Percet 24
Perod. 3		

the new software installation to



v

Cancel Intel® Installation Framework

< Back Next >

## Intel HD Graphics Drivers (For Windows 7 and Windows 8)

To install the driver, click "Intel HD Graphics Drivers" on the main menu.

1. Setup is now ready to install the graphics driver. Click Next.

Intel® Installation Framework	
Intel® HD Graphics Driver	(
Welcome to the Setup Program	Intel
This setup program will install the following components: - Intel® HD Graphics Driver - Intel® Display Audio Driver	
It is strongly recommended that you exit all programs before contin	nuing. Click Next to continue.
V Automatically run WinSAT and enable the Windows Aero deskto	p theme (if supported).
< Back	Next > Cancel

By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows Vista desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.

2. Read the license agreement then click Yes.



 Go through the readme document for system requirements and installation tips then click Next.



 Setup is now installing the driver. Click Next to continue.

ntel® HD Graphics Driver	$\sim$
etup Progress	(intel)
Please wait while the following setup operations are performed:	
Creating Registry Key: HKLM\SOFTWARE\Microsoft\Windows M	Media Foundation HardwareMFT
Creating Registry (key: HAM/SOFTWARE/Horcooft/Windows K Registering DL: C: Program Files (Common Files Untel Welds SD Registering DL: C: Program Files (Common Files Untel Welds SD Registering DL: C: Program Files (Common Files Untel Welds SD Registering DL: C: Program Files (Common Files Untel Welds SD Deleting Registry Key: HAM/SOFTWARE/Untel Welds SD Deleting Registry Key: HAM/SOFTWARE/Untel Welds SD Ceating Process: E: Graphices WIN7(8, 15, 10, 2639Win32)Op Click Next to continue.	tedia Foundation \\FardwareMFT \KY[23.0mfx,mft,h264vd, 32, \KY[23.0mfx,mft,h264vd, 32, \KY[23.0mfx,mft,mp2ad, 32,d \KY[23.0mfx,mft,mp2a,d] \KY[23.0mfx,mft,mpa_23,d] \KY[24.0mfx,mft,mpa_23,d] \text{th}\Wa32=1:1 eenCL\OCLSetup.exe

- 5. Click "Yes, I want to restart this computer now" then click Finish.
- Restarting the system will allow the new software installation to take effect.



## Intel Management Engine Drivers (For Windows 7 and Windows 8)

To install the driver, click "Intel Management Engine Drivers" on the main menu.

1.	Setup is ready to install the	
	driver. Click Next.	

- Intel® Installation Framework

  Intel® Management Engine Components

  Welcome to the Setup Program

  This setup program will install the Intel® Management Engine Components.

  It is strongly recommended that you exit all programs before continuing. Click Next to continue.

  Install Intel® Control Center

  Intel® Installation Framework
- 2. Read the license agreement then click Yes.

icense A	greement				inter
You must acc program. Do 1	ept all of the terms you accept the terr	of the license agreemer ms?	nt in order to	continue the	e setup
INTEL SOFTV	ARE LICENSE AGR	REEMENT (OEM / IHV / IS	SV Distribution	n & Single U	ser)
IMPORTANT Do not use or until you hav Software, yo install or use	- READ BEFORE CO load this software e carefully read the u agree to the tern the Software.	DPYING, INSTALLING OR and any associated ma following terms and co ms of this Agreement. If	USING. terials (collec nditions. By le you do not v	tively, the " bading or us rish to so ag	Software") ing the ree, do not
Please Also N * If you are a	iote: an Original Equipme	ent Manufacturer (OEM), Vendor (ISV), this comp	, Independen blete LICENSE	t Hardware	Vendor (Tapplies;
(IHV), or Inde * If you are a	an End-User, then	only Exhibit A, the INTE	SOFTWARE	LICENSE AG	SREEMENT,

3. Setup is currently installing the driver. After installation has completed, click Next.



Intel® Installation Framework

Intel® Installation Framework

4. After completing installation, click Finish.

Coture To Complete	(intel)
etup 1s complete	$\smile$
The setup program successfully installed the following components: - Intel® Management Engine Interface - Intel® Upamic Application Lader - Intel® Upamic Application Lader - Intel® Upamic and Security Status - Local Management and Security Status - Local Management Service - User Notification Service - Click Finish to complete the setup process.	
	Finish

### **Audio Drivers**

To install the driver, click "Audio Drivers" on the main menu.

1. Setup is ready to install the driver. Click Next.



2. Click "Yes, I want to restart my computer now" then click Finish.

Restarting the system will allow the new software installation to take effect.



## Intel LAN Drivers (For Windows XP)

The LAN drivers for Windows XP supporting on the Haswell system board has to be installed manually. When you want to install the LAN driver for Windows XP, please follow the steps below to accomplish the installation.

1. Launch the Hardware Update Wizard for the selected device. Select "Update Driver."



2. Choose "Install from a list or specific location (Advanced)" and click "Next" to continue the installation.



6. Insert the installation disk and make sure the selected drive is correct.



(For 32-bit, the file name is "e1d5132.inf".)

7. Select the device driver you want to install for this hardware and then click "Next."

That affaire Opdate frizaria	
Select the device driver you want to in	istall for this hardware.
Select the manufacturer and model of y have a disk that contains the driver you	our hardware device and then click Next. If you want to install, click Have Disk.
Show compatible hardware	
Model	
Intel(R) Ethernet Connection 1217-LM	
This driver is not digitally signed!     Tell me why driver signing is important	Have Disk
	< Back Next > Cancel

8. Check the software you are installing, Then, click "Continue Anyway" to start the installation.



- 9. Click "Finish" to close the wizard.
- After completing the installation, the Network adapters "Intel(R) Ethernet Connection I217LM" will appear on the computer management list.



## Intel LAN Drivers (For Windows 7 and Windows 8)

To install the driver, click "Intel LAN Drivers" on the main menu.

- 1. Setup is ready to install the driver. Click Next.

   Image: Click Next.
   Image: Click
- 2. Click "I accept the terms in the license agreement" then click "Next".



3. Select the program features you want installed then click Next.

Setup Options Select the program features you want installed.	(intel)
Install:	
Drivers     D	
Feature Description	lext > Cancel

4. Click Install to begin the installation.



5. After completing installation, click Finish.



## **HW Utility**

DFI Utility provides information about the board, Watchdog, and DIO. To access the utility, click "HW Utility" on the main menu.



Note:

If you are using Windows 7, you need to access the operating system as an administrator to be able to install the utility.

1. Setup is ready to instal the DFI Utility driver Click "Next".

🖥 DFI Utility - InstallShield W	izard	×
2	Welcome to the InstallShield Wizard for DFI Utility	
	The InstallShield(R) Wizard will install DFI Utility on your computer. To continue, click Next.	
	WARNING: This program is protected by copyright law and international treaties.	
	< Back Cancel	

2. Click "I accept the terms in the license agreement" then click "Next".

License Agreement			
Please read the following license agree	ement carefully.		2
To add your own license text to this dialog editor.	g, specify your licen	se agreement file in	the Dialog
<ol> <li>Navigate to the User Interface vie</li> <li>Select the LicenseAgreement dial</li> <li>Choose to edit the dialog layout.</li> <li>Once in the Dialog editor, select the</li> <li>Set FileName to the name of your li</li> </ol>	ew. log. <b>Memo</b> ScrollableTe icense agreement R	ext control. TF file.	
After you build your release, your license	text will be displaye	d in the License Ag	reement dialog. Print
• I do not accept the terms in the license	e agreement		

3. Click "Install" to begin the installation.

18 DF1 Offity - Instalished Wizard
Ready to Install the Program The wizard is ready to begin installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
Current Settings:
Setup Type:
Typical
Destination Folder:
C:\Program Files\DFI\DFI Utility\
User Information:
Name:
Company:
InstallShield
< Back Install Cancel

4. After completing installa tion, click "Finish".



The DFI Utility icon will appear on the desktop. Double-click the icon to open the utility.



Information



HW Health



HW Health Set



WatchDog



DIO

## Intel USB 3.0 Drivers (For Windows 7)

To install the driver, click "Intel USB 3.0 Driver" on the main menu.

 Setup is ready to install the driver. Click Next.



2. Read the license agreement then click Yes.



3. Go through the readme document for more installation tips then click Next.



4. Setup is currently installing the driver. After installation has completed, click Next.

etup Progress	inter
Please wait while the following setup operations are pe	erformed:
Copying File: C: Program File: (p68) Intel/Untel(R) UI Copying File: C: Program File: (p68)	8.3.0 eXtensible Host Controller Driver (A 3.0 eXtensible Host Controller Driver (A Indows (Current Version (Run (USB3MON = Control (USB))
Click Next to continue.	
< III	- P

Intel® Installation Framework

5. After completing installation, click Finish.



### Intel USB 3.0 Host Drivers (For Windows 7 and Windows 8)

To install the driver, click "Intel USB 3.0 Host Drivers" on the main menu.

1. Click "Intel USB 3.0 Host Drivers" on the main menu to prepare the installation.



2. It indicates the setup status.



3. Click "finish" to complete the installation.



### Intel Rapid Storage Technology (For Windows 7 and Windows 8)

The Intel Rapid Storage Technology is a utility that allows you to monitor the current status of the SATA drives. It enables enhanced performance and power management for the storage subsystem.

To install the driver, click "Intel Rapid Storage Technology" on the main menu.

1. Setup is now ready to install the utility. Click Next.



2. Read the warning then click Yes.



3. Read the license agreement then click Yes.



4. Go through the readme document for system requirements and installation tips then click Next.



5. Setup is now installing the utility. Click Next to continue.



Intel® Installation Framework

6. Click "Yes, I want to restart my computer now" then click Finish.

Restarting the system will allow the new software installation to take effect.



## Infineon TPM Driver and Tool (optional)

To install the driver, click "Infineon TPM driver and tool (option)" on the main menu.

1. The setup program is preparing to install the driver.



- 2. The setup program is now ready to install the utility. Click Next.
- Infineon TPM Professional Package InstallShield Wizard

   Infineon TPM Professional Package

   Version 4.3.100.3287

   The InstallShield(R) Wizard will install Infineon TPM Professional Package on your computer. To continue, click Next.

   It is recommended that you dose all other applications before starting Setup.

   WARNING: This program is protected by copyright law and international treates.

   <tr
- 3. Click "I accept the terms in the license agreement" and then click "Next".



4. Enter the necessary information and then click Next.



5. Select a setup type and then click Next.



Click Install.



7. TPM requires installing the Microsoft Visual C++ package prior to installing the utility. Click Install.

🔂 Infineo Installing The pro	n TPM Professional Package - InstallShield Wizard 🔹 💽 🗙 g Infineon TPM Professional Package gram features you selected are being installed.
ß	Please wait while the InstallShield Wizard installs Infineon TPM Professional Package. This may take several minutes. Status: Installing Microsoft World C4+ 2010 SPI Packstriky table Darkage.
InstaliShield -	< Back Next > Cancel

 The setup program is currently installing the Microsoft Visual C++ package.

il Infineou Installing The prog	n TPM Professional Package - InstallShield Wizard
1 <sup>p</sup>	Please wait while the InstallShield Wizard Installs Infineon TPM Professional Package. This may take several minutes. Status: Copying new files
	< Back Next > Cancel

9. Click Finish.



10. Click "Yes" to restart your system.



## Nuvton-SIO

To install the driver, click "Nuvton-SIO" on the main menu.

1. The setup program is preparing to install the driver.



2. The setup program is now ready to install the utility. Click Next.



3. Click "Install" to begin the installation.



4. Installing status.



5. Click "Finish" to exit the wizard after the installation is completed.



X

## Adobe Acrobat Reader 9.3

To install the reader, click "Adobe Acrobat Reader 9.3" on the main menu.

1.	Click Next to install or click Change Destination Folder to select another folder.	i∛ Adobe Reader 9.3 - Setup
		Destination Folder Click Next to install to this folder, or click Change to install to a different folder. Install Adobe Reader 9.3 to: C:\Program Files\Adobe\Reader 9.0\
		WARNING: This program is protected by copyright law and international treaties.  Adobe Change Destination Folder

2. Click Install to begin installation.

18 Adobe Keader 9.3 - Setup
Å
Ready to Install the Program
Click Install to begin the installation.
If you want to review or change any of your installation folder, click Back. Click Cancel to exit setup.
Adobe

3. Click Finish to exit installation.



## Chapter 9 - Digital I/O Programming Guide

## **Register Description**

The Input Port Register (register 0) reflects the incoming logic levels of the pins, regardless of whether the pin if defined as an input or output by the Configuration Register. They act only on the red operation. Writes to this register have no effect. The default value (X) is determined by the externally applied logic level. Before a red operation, a write transmission is sent with the command byte to indicate to the I<sup>2</sup>C device that the Input Port Regiser will be accessed next.

Register 0 (Input Port Register)

BIT	1-7	1-6	1-5	1-4	1-3	1-2	I-1	I-0
DEFAULT	Х	Х	Х	Х	Х	Х	Х	Х

The Onput Port Register (register 1) shows the outgoing logic levels of the pins defined as outputs by the Configuration Register. Bit values in this register have no effect on pins defined as inputs. In turns, reads from this register reflect the value that is in the flip-flop contolling the output selection, not the actual pin value.

### Register 1 (Onput Port Register)

BIT	0-7	0-6	0-5	0-4	0-3	0-2	0-1	<b>O-0</b>
DEFAULT	1	1	1	1	1	1	1	1

The Polarity Inversion Register (register 2) allows polarity inversion of the pins defined as inputs by the Configuration Register. If a bit in this register is set (written with 1), the corresponding port pin's polarity is inverted. If a bit in this register is clear (written with a 0), the corresponding port pin's original polarity is retained.

#### Register 2 (Polarity Inversion Register)

BIT	N-7	N-6	N-5	N-4	N-3	N-2	N-1	N-0
DEFAULT	0	0	0	0	0	0	0	0

The Configuration Register (register 3) configures the direction of the I/O pins. If a bit in this register is set to 1, the corresponding port pin is enabled as an input with a high-impedence output driver. If a bit in this register is cleared to 0, the corresponding port is enabled as an input.

### Register 3 (Configuration Register)

BIT	C-7	C-6	C-5	C-4	C-3	C-2	C-1	C-0
DEFAULT	1	1	1	1	1	1	1	1

## **Function Description**

I2CWriteByte(SlaveAddr, SubAddr, Data): Write a Byte data to a specified I2C Device.

I2CReadByte(SlaveAddr, SubAddr, \*Data): Read a Byte data from a specified I2C Device.

SetBit(\*Data, Bit) : Set Data bit n as "1".

ClrBit(\*Data, Bit) : Set Data bit n as "0".

GetBit(Data, Bit) : Return the value of data bit n.

## Sample Code

### **GPIO** Configuration

#define \$	SLAVE_ADDR	0x42
#define	INPUT_PORT	0x00
#define (	OUTPUT_PORT	0x01
#define	INVERSION_PORT	0x02
#define (	COMFIG PORT	0x03

GpioConfig(int PinNum, int Mode)

BYTE Data; BYTE TempPinNum = PinNum%8;

//Pin0-7 Input/Output Configuration I2C\_ReadByte(SLAVE\_ADDR, CONFIG\_PORT, &Data); if(Mode == 1){SetBit(&Data, TempPinNum);} //Input else {ClrBit(&Data, TempPinNum);} //Output I2C\_WriteByte(SLAVE\_ADDR, CONFIG\_PORT, Data);

return 1;

### **GPIO Output Process**

#define	SLAVE_ADDR	0x42
#define	INPUT_PORT	0x00
#define	OUTPUT PORT	0x01
#define	INVERSION_PORT	0x02
#define	COMFIG PORT	0x03

GpioOut(int PinNum, int Level)

BYTE Data; BYTE TempPinNum = PinNum%8;

//Pin0-7

I2C\_ReadByte(SLAVE\_ADDR, OUTPUT\_PORT, &Data); if(Level == 0){ClrBit(&Data, TempPinNum);} else {SetBit(&Data, TempPinNum);} I2C\_WriteByte(SLAVE\_ADDR, OUTPUT\_PORT, Data);

return 1;

### **GPIO Iutput Process**

#define	SLAVE_ADDR	0x42
#define	INPUT_PORT	0x00
#define	OUTPUT PORT	0x01
#define	INVERSION PORT	0x02
#define	COMFIG_PORT	0x03

GpioIn(int PinNum, int \*Status)

BYTE Data: BYTE Group = PinNum/8; BYTE TempPinNum = PinNum%8;

//Pin0-7 I2C\_ReadByte(SLAVE\_ADDR, INPUT\_PORT, &Data); \*Status = GetBit(Data, TempPinNum);

return 1;

# Appendix A - Watchdog Sample Code

;Software programming example:

;;(1) Ent	er Super IO Confi	guration mode
MOV MOV OUT OUT	DX,4EH AL,87H DX,AL DX,AL DX,AL	
; ;(2) Co timer)	nfiguration Logic	al Device 8, register CRF0/CRF1 (WDT Control/WDT
; MOV MOV OUT	DX,4EH AL,07H DX,AL	;Ready to Program Logical Device
MOV MOV OUT	DX,4FH AL,08H DX,AL	;Select Logical Device 8
MOV MOV OUT	DX,4EH AL, F1H DX,AL	;Select watchdog timer register
MOV MOV OUT	DX,4FH AL,10H DX,AL	;Set watchdog timer value
MOV MOV OUT	DX,4EH AL, FOH DX,AL	;Select watchdog Control Register
MOV MOV OUT	DX,4FH AL,02H DX,AL	;Set Watchdog Control Value
;;(1) Exi	t extended functio	n mode
MOV MOV	DX,4EH AL,AAH	

OUT DX,AL

## Appendix B - System Error Message

When the BIOS encounters an error that requires the user to correct something, either a beep code will sound or a message will be displayed in a box in the middle of the screen and the message, PRESS F1 TO CONTINUE, CTRL-ALT-ESC or DEL TO ENTER SETUP, will be shown in the information box at the bottom. Enter Setup to correct the error.

### **Error Messages**

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list indicates the error messages for all Awards BIOSes:

### **CMOS BATTERY HAS FAILED**

The CMOS battery is no longer functional. It should be replaced.



Danger of explosion if battery incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the battery manufacturer's instructions.

### **CMOS CHECKSUM ERROR**

Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

### **DISPLAY SWITCH IS SET INCORRECTLY**

The display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, either turn off the system and change the jumper or enter Setup and change the VIDEO selection.

#### FLOPPY DISK(S) fail (80)

Unable to reset floppy subsystem.

FLOPPY DISK(S) fail (40)

Floppy type mismatch.

Hard Disk(s) fail (80)

HDD reset failed.

### Hard Disk(s) fail (40)

HDD controller diagnostics failed.

#### Hard Disk(s) fail (20)

HDD initialization error.

#### Hard Disk(s) fail (10)

Unable to recalibrate fixed disk.

#### Hard Disk(s) fail (08)

Sector Verify failed.

#### Keyboard is locked out - Unlock the key

The BIOS detects that the keyboard is locked. Keyboard controller is pulled low.

#### Keyboard error or no keyboard present

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

#### Manufacturing POST loop

System will repeat POST procedure infinitely while the keyboard controller is pull low. This is also used for the M/B burn in test at the factory.

#### **BIOS ROM checksum error - System halted**

The checksum of ROM address F0000H-FFFFFH is bad.

#### Memory test fail

The BIOS reports memory test fail if the memory has error(s).

## Appendix C - Troubleshooting Checklist

### **Troubleshooting Checklist**

This chapter of the manual is designed to help you with problems that you may encounter with your personal computer. To efficiently troubleshoot your system, treat each problem individually. This is to ensure an accurate diagnosis of the problem in case a problem has multiple causes.

Some of the most common things to check when you encounter problems while using your system are listed below.

- 1. The power switch of each peripheral device is turned on.
- 2. All cables and power cords are tightly connected.
- 3. The electrical outlet to which your peripheral devices are connected is working. Test the outlet by plugging in a lamp or other electrical device.
- 4. The monitor is turned on.
- 5. The display's brightness and contrast controls are adjusted properly.
- 6. All add-in boards in the expansion slots are seated securely.
- 7. Any add-in board you have installed is designed for your system and is set up correctly.

### **Monitor/Display**

### If the display screen remains dark after the system is turned on:

- 1. Make sure that the monitor's power switch is on.
- 2. Check that one end of the monitor's power cord is properly attached to the monitor and the other end is plugged into a working AC outlet. If necessary, try another outlet.
- 3. Check that the video input cable is properly attached to the monitor and the system's display adapter.
- 4. Adjust the brightness of the display by turning the monitor's brightness control knob.

#### The picture seems to be constantly moving.

- 1. The monitor has lost its vertical sync. Adjust the monitor's vertical sync.
- 2. Move away any objects, such as another monitor or fan, that may be creating a magnetic field around the display.
- 3. Make sure your video card's output frequencies are supported by this monitor.

#### The screen seems to be constantly wavering.

1. If the monitor is close to another monitor, the adjacent monitor may need to be turned off. Fluorescent lights adjacent to the monitor may also cause screen wavering.

### **Power Supply**

#### When the computer is turned on, nothing happens.

- 1. Check that one end of the AC power cord is plugged into a live outlet and the other end properly plugged into the back of the system.
- 2. Make sure that the voltage selection switch on the back panel is set for the correct type of voltage you are using.
- 3. The power cord may have a "short" or "open". Inspect the cord and install a new one if necessary.

### **Floppy Drive**

#### The computer cannot access the floppy drive.

- 1. The floppy diskette may not be formatted. Format the diskette and try again.
- 2. The diskette may be write-protected. Use a diskette that is not write-protected.
- 3. You may be writing to the wrong drive. Check the path statement to make sure you are writing to the targeted drive.
- 4. There is not enough space left on the diskette. Use another diskette with adequate storage space.

### Hard Drive

### Hard disk failure.

- 1. Make sure the correct drive type for the hard disk drive has been entered in the BIOS.
- 2. If the system is configured with two hard drives, make sure the bootable (first) hard drive is configured as Master and the second hard drive is configured as Slave. The master hard drive must have an active/bootable partition.

### Excessively long formatting period.

If your hard drive takes an excessively long period of time to format, it is likely a cable connection problem. However, if your hard drive has a large capacity, it will take a longer time to format.

## **Serial Port**

# The serial device (modem, printer) doesn't output anything or is outputting garbled characters.

- 1. Make sure that the serial device's power is turned on and that the device is on-line.
- 2. Verify that the device is plugged into the correct serial port on the rear of the computer.
- 3. Verify that the attached serial device works by attaching it to a serial port that is working and configured correctly. If the serial device does not work, either the cable or the serial device has a problem. If the serial device works, the problem may be due to the onboard I/O or the address setting.
- 4. Make sure the COM settings and I/O address are configured correctly.

### **Keyboard**

### Nothing happens when a key on the keyboard was pressed.

- 1. Make sure the keyboard is properly connected.
- 2. Make sure there are no objects resting on the keyboard and that no keys are pressed during the booting process.

### System Board

- 1. Make sure the add-in card is seated securely in the expansion slot. If the add-in card is loose, power off the system, re-install the card and power up the system.
- 2. Check the jumper settings to ensure that the jumpers are properly set.
- 3. Verify that all memory modules are seated securely into the memory sockets.
- 4. Make sure the memory modules are in the correct locations.
- 5. If the board fails to function, place the board on a flat surface and seat all socketed components. Gently press each component into the socket.
- 6. If you made changes to the BIOS settings, re-enter setup and load the BIOS defaults.