



# CD952 Series

Embedded SBC 3.5"  
User's Manual

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

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## 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 B

This equipment has been tested and found to comply with the limits for a Class B 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.

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## About this Manual

An electronic file of this manual is included in the CD. To view the user's manual in the CD, insert the CD into a CD-ROM drive. The autorun screen (Main Board Utility CD) will appear. Click "User's Manual" on the main menu.

## Warranty

1. Warranty does not cover damages or failures that arise 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 consequential 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 connectors by their ends.



### Important:

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.



## 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.

- One CD952 board
- One DVD
- One QR (Quick Reference)

## Optional Items

- USB port cable
- Power adapter (120W, 19V)

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.

## Before Using the System Board

Before using the system board, prepare basic system components.

If you are installing the system board in a new system, you will need at least the following internal components.

- Storage devices such as hard disk drive, CD-ROM, etc.

You will also need external system peripherals you intend to use which will normally include at least a keyboard, a mouse and a video display monitor.

## Chapter 1 - Introduction

### Specifications

<b>Processor</b>	<ul style="list-style-type: none"> <li>Intel® Atom™ D2550, 1.86GHz, 2x 512K L2, 10W TDP, dual-core</li> <li>Intel® Atom™ N2800, 1.86GHz, 2x 512K L2, 6.5W TDP, dual-core</li> <li>Intel® Atom™ N2600, 1.6GHz, 2x 512K L2, 3.5W TDP, dual-core</li> </ul>
<b>Chipset</b>	Intel® NM10 Express chipset
<b>System Memory</b>	<ul style="list-style-type: none"> <li>2GB DDR3 onboard (standard)</li> <li>- Intel® Atom™ D2550/N2800 supports up to 4GB (option)</li> </ul>
<b>Expansion Slots</b>	<ul style="list-style-type: none"> <li>3 Mini PCIe slots               <ul style="list-style-type: none"> <li>- 2 slots for communication                   <ul style="list-style-type: none"> <li>: One slot supports PCIe x1, USB, and LPC signals for Wi-Fi/LPC</li> <li>: One slot supports PCIe x1, USB, and 3G signals for 3G/GPRS</li> </ul> </li> <li>- 1 slot for storage                   <ul style="list-style-type: none"> <li>: Supports mSATA module</li> </ul> </li> </ul> </li> <li>1 SIM card socket</li> <li>1 CFast socket</li> </ul>
<b>Graphics</b>	<ul style="list-style-type: none"> <li>Intel® GMA 3650 (Intel® Atom™ D2550/N2800)</li> <li>Intel® GMA 3600 (Intel® Atom™ N2600)</li> <li>VGA: resolution up to 1920x1600 @60Hz</li> <li>HDMI, DVI: resolution up to 1920x1200 @60Hz</li> <li>Smooth Video Playback               <ul style="list-style-type: none"> <li>- Supports hardware decoders (H.264, VC-1, MPEG-4) with Full HD 1080p video playback capability</li> </ul> </li> </ul>
<b>Audio</b>	<ul style="list-style-type: none"> <li>Realtek® ALC886 7.1-channel High Definition Audio</li> <li>1 line-out and 1 mic-in</li> </ul>
<b>LAN</b>	<ul style="list-style-type: none"> <li>2 Intel® WG82574L Gigabit Ethernet Controllers</li> <li>Integrated 10/100/1000 transceiver</li> <li>Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab</li> </ul>
<b>COM</b>	<ul style="list-style-type: none"> <li>2 DB-9 ports               <ul style="list-style-type: none"> <li>- 1 DB-9 port supports RS232/422/485 COM port</li> <li>- 1 DB-9 port supports RS232/422/485 COM or isolated 2-bit In and 2-bit Out DIO</li> </ul> </li> <li>Supports RS485 auto direction control</li> </ul>
<b>Storage</b>	<ul style="list-style-type: none"> <li>1 mSATA module via a Mini PCIe slot</li> <li>1 CFast socket</li> </ul>
<b>DIO</b>	<ul style="list-style-type: none"> <li>1 isolated 4-bit DIO via the DB-9 port (signal+power) or 1 8-bit DIO connector* (optional)</li> </ul>
<b>Front I/O Ports</b>	<ul style="list-style-type: none"> <li>1 DB-9 RS232/422/485 COM</li> <li>1 mic-in</li> <li>2 LAN</li> <li>4 USB 2.0 (Type A)</li> <li>1 CFast socket</li> <li>1 reset switch connector</li> <li>1 power button with LED connector</li> </ul>

<b>I/O Connectors</b>	<ul style="list-style-type: none"> <li>1 connector for 2 external USB 2.0/1.1 ports</li> <li>1 8-bit DIO connector* (optional)</li> <li>1 chassis intrusion connector</li> <li>1 fan connector</li> </ul>
<b>BIOS</b>	<ul style="list-style-type: none"> <li>AMI BIOS               <ul style="list-style-type: none"> <li>- 16Mbit SPI BIOS</li> </ul> </li> </ul>
<b>Watchdog Timer</b>	<ul style="list-style-type: none"> <li>Software programmable from 1 to 255 seconds</li> </ul>
<b>Power</b>	<ul style="list-style-type: none"> <li>9~24V DC power input voltage</li> </ul>
<b>Energy Efficient Design</b>	<ul style="list-style-type: none"> <li>Supports ACPI</li> <li>System Power Management</li> <li>Wake-On-Events include:               <ul style="list-style-type: none"> <li>- Wake-On-USB KB/Mouse</li> <li>- Wake-On-LAN</li> <li>- RTC timer to power-on the system</li> </ul> </li> <li>CPU stopped clock control</li> <li>AC power failure recovery</li> </ul>
<b>Damage Free Intelligence</b>	<ul style="list-style-type: none"> <li>Monitors CPU/system temperature and overheat alarm</li> <li>Monitors V<sub>CORE</sub>/5V/3.3V/V<sub>DIMM</sub>/12V/5V<sub>SB</sub> voltages and failure alarm</li> <li>Monitors system fan speed and failure alarm</li> <li>Read back capability that displays temperature, voltage and fan speed</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>13.41W with N2800 at 1.86GHz and 1x 2GB DDR3 onboard</li> </ul>
<b>OS Support</b>	<ul style="list-style-type: none"> <li>Windows XP Professional x86 &amp; SP3 (32-bit)</li> <li>Windows 7 Ultimate x86 &amp; SP1 (32-bit)</li> </ul>
<b>Temperature</b>	<ul style="list-style-type: none"> <li>Operating               <ul style="list-style-type: none"> <li>- Standard: 0°C to 60°C</li> <li>- Option: -20°C to 70°C</li> </ul> </li> <li>Storage: -20°C to 85°C</li> </ul>
<b>Humidity</b>	<ul style="list-style-type: none"> <li>10% to 90%</li> </ul>
<b>PCB</b>	<ul style="list-style-type: none"> <li>146mm (5.75") x 102mm (4.02")</li> </ul>


**Note:**

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

## Features

- **Watchdog Timer**

The Watchdog Timer function allows your application to regularly “clear” the system at the set time interval. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

- **DDR3**

DDR3 delivers increased system bandwidth and improved performance. The advantages of DDR3 are its higher bandwidth and its increase in performance at a lower power than DDR2.

- **Graphics**

The integrated Intel® GMA graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today's and tomorrow's business applications. Supports DVI and VGA for up to 2 independent displays.

- **Gigabit LAN**

The Intel® WG82574L Gigabit LAN controller supports up to 1Gbps data transmission.

- **Audio**

The Realtek ALC886 audio codec provides 7.1-channel High Definition audio output.

- **Wake-On-LAN**

This feature allows the network to remotely wake up a Soft Power Down (Soft-Off) PC. It is supported via the onboard LAN port or via a PCI LAN card that uses the PCI PME (Power Management Event) signal. However, if your system is in the Suspend mode, you can power-on the system only through an IRQ or DMA interrupt.

**Important:**

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

- **Wake-On-USB**

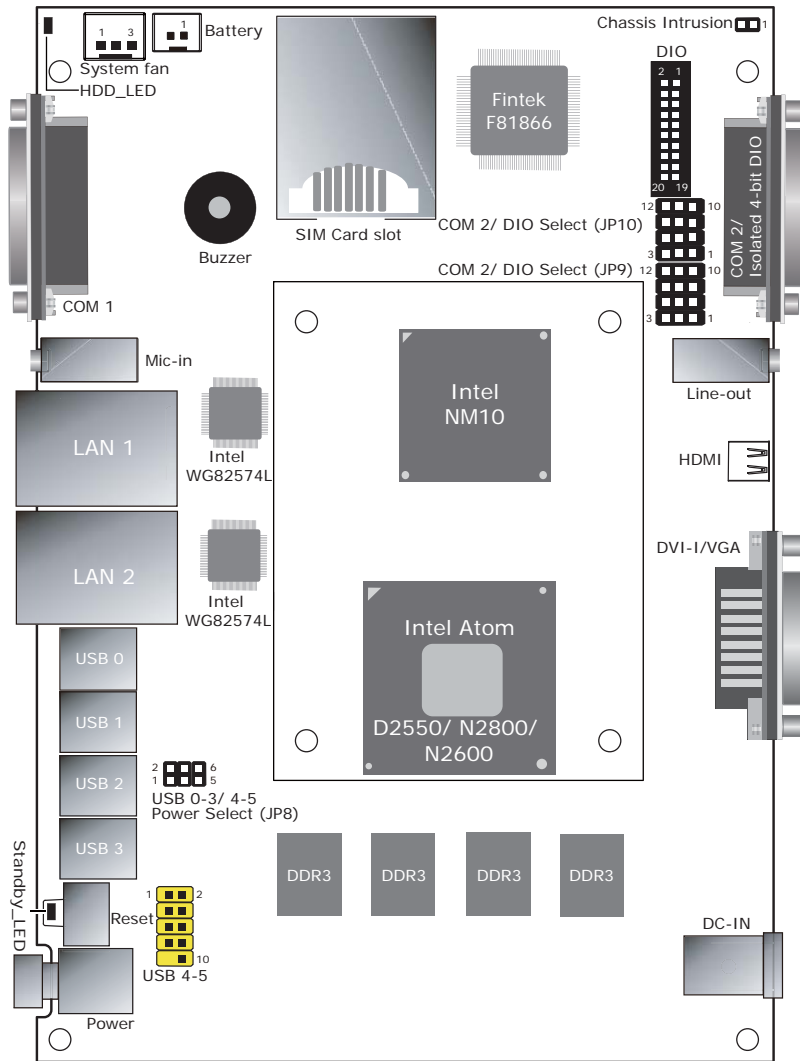
This function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state.

**Important:**

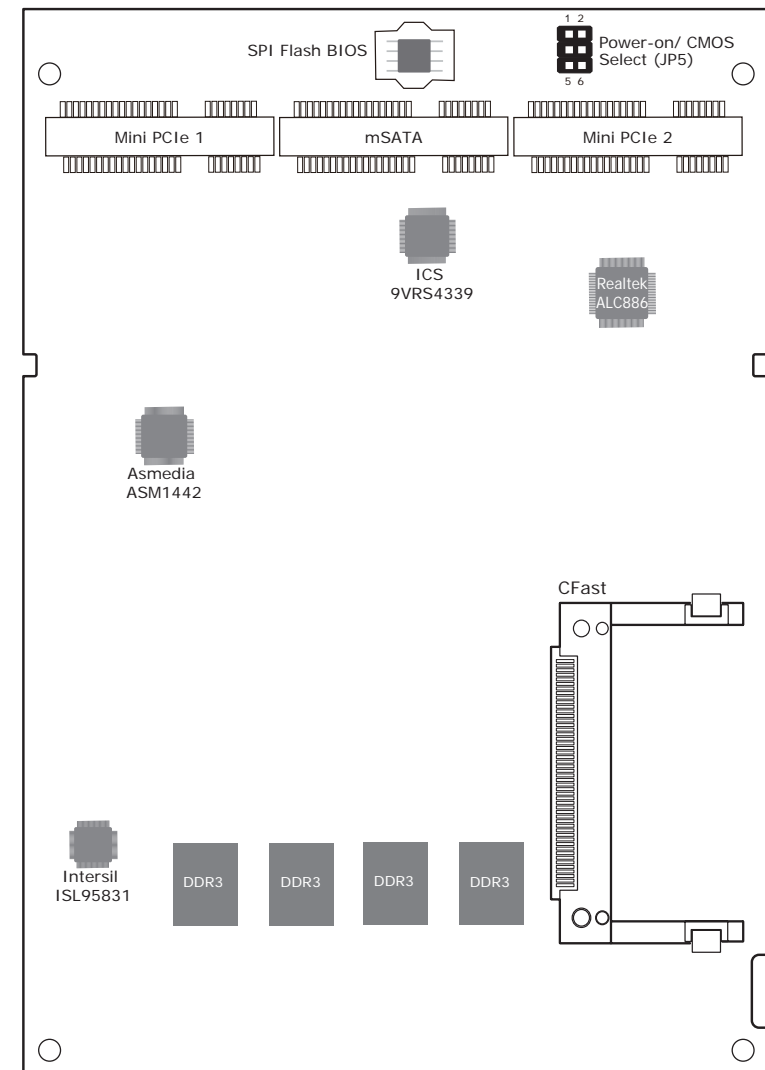
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the 5V\_standby power source of your power supply must support  $\geq 1.5\text{A}$ . For 3 or more USB ports, the 5V\_standby power source of your power supply must support  $\geq 2\text{A}$ .

## Chapter 2 - Hardware Installation

### Board Layout

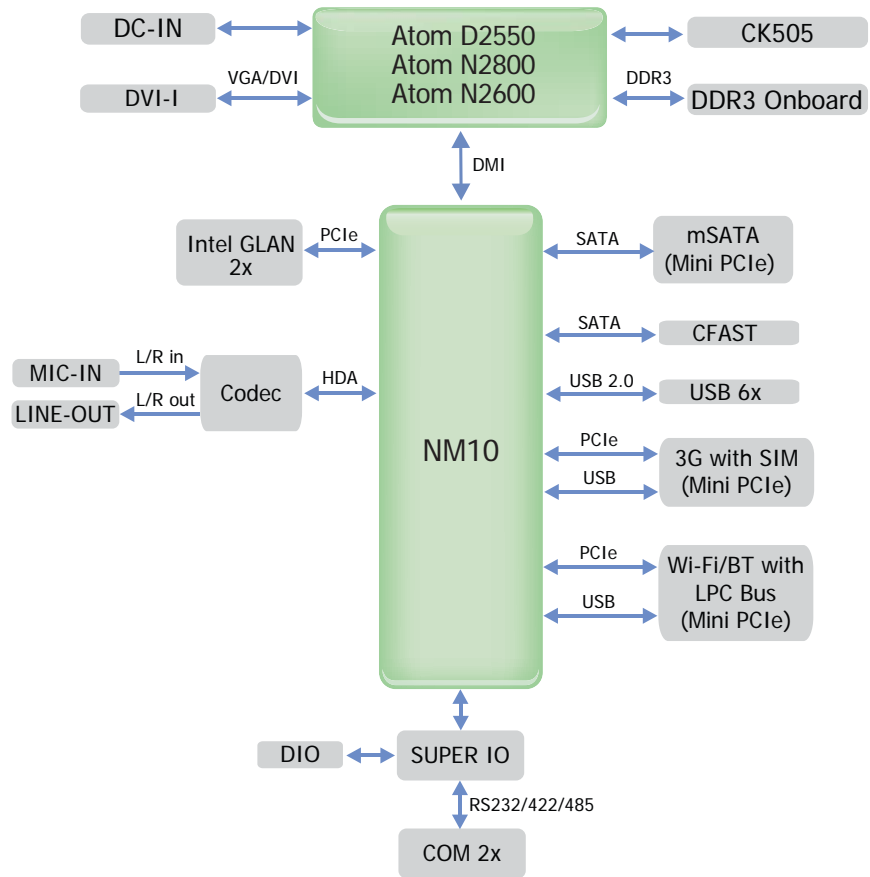


Top View

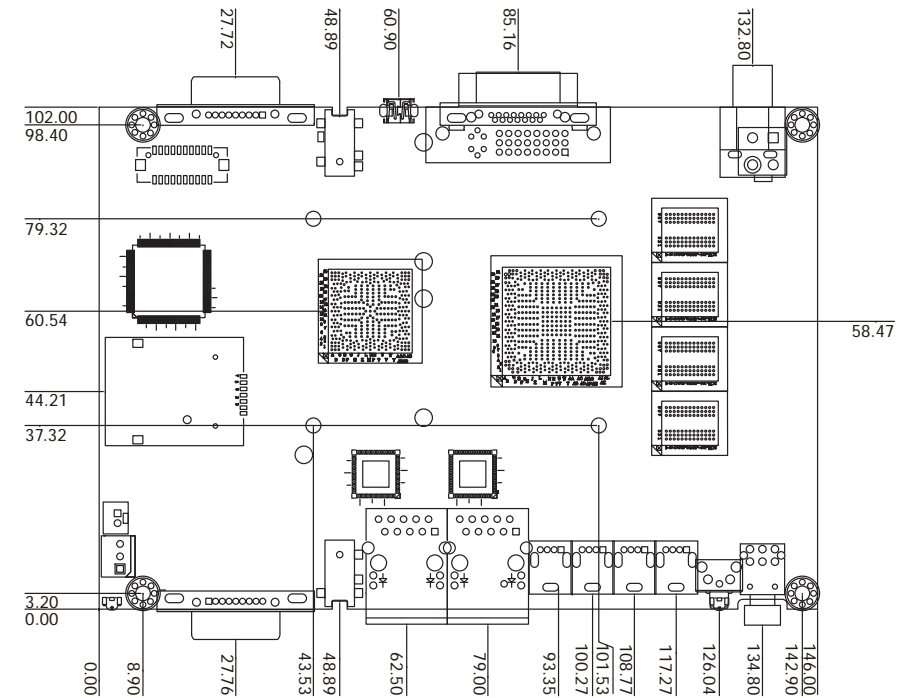


Bottom View

## Block Diagram



## Mechanical Diagram



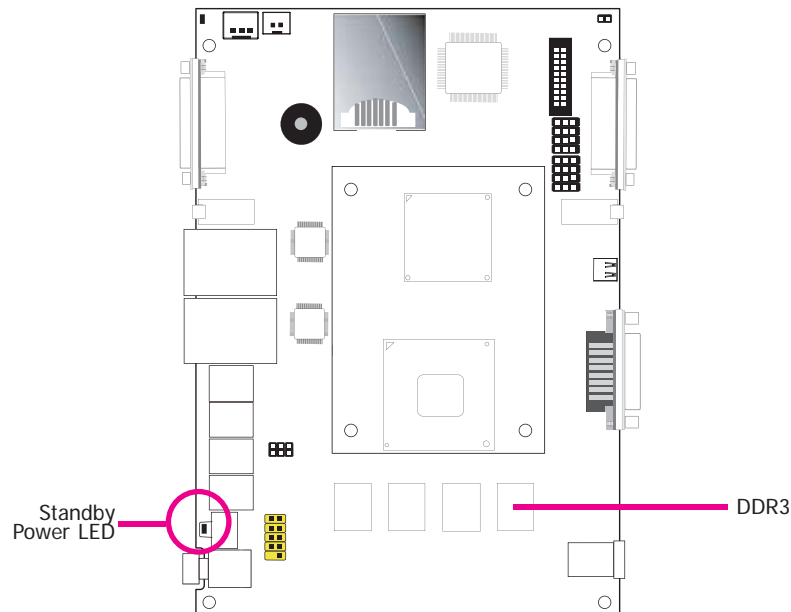
**Important:**

Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures 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.

## System Memory

**Important:**

When the Standby Power LED lit red, it indicates that there is power on the system board. Power-off the PC then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

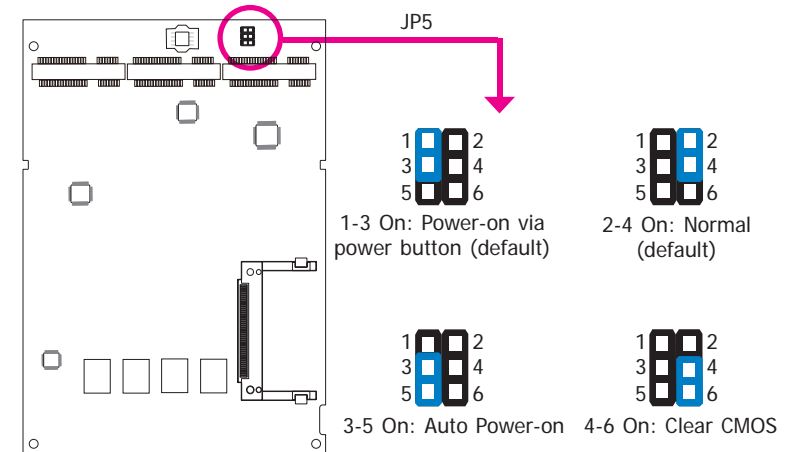


### Features

- 2GB DDR3 onboard (standard)
- Intel® Atom™ D2550/N2800 supports up to 4G (optional)

## Jumper Settings

### Power-on/Clear CMOS



### Power-on

JP5 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 JP5 pins 3 and 5 to On. If you want to use the power button, set pins 1 and 3 to On.

When using the JP5 "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).

**Note:**

In order to ensure that power is resumed after a power failure that recovers within a 5 second period, JP5 must be set to pins 3-5 and the "AC Power Lose" in CMOS is set to "On".

## Clear CMOS

If you encounter the following,

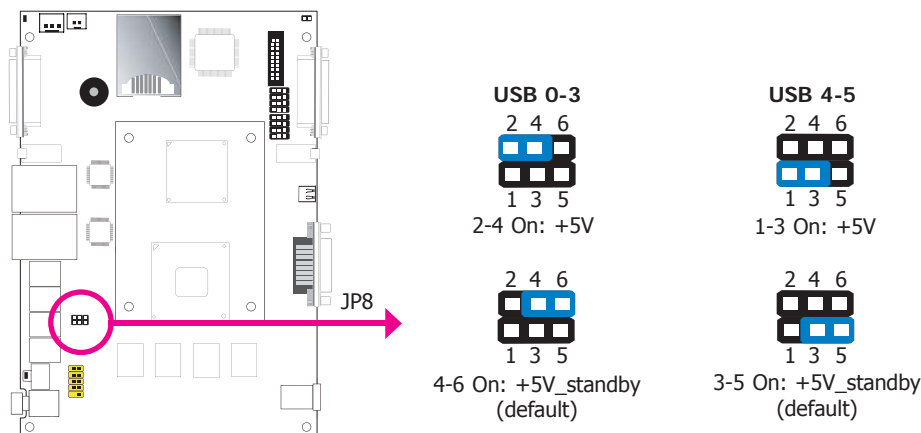
- a) CMOS data becomes corrupted.
- b) You forgot the supervisor or user password.

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 JP5 pins 4 and 6 to On. Wait for a few seconds and set JP5 back to its default setting, pins 2 and 4 On.
3. Now plug the power cord and power-on the system.

## USB Power Select



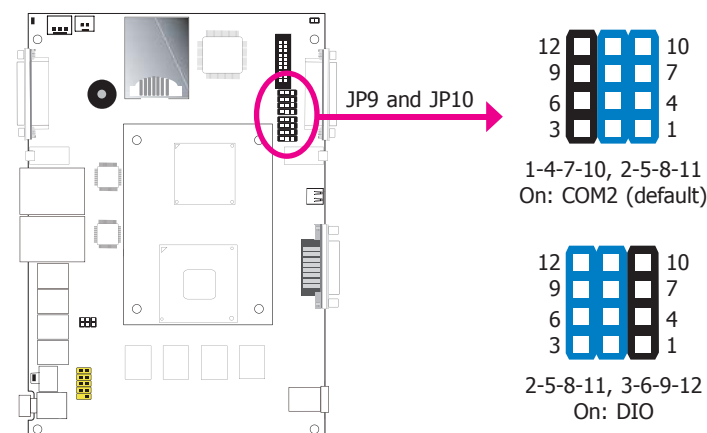
These jumpers are used to select the power of the USB ports. Selecting +5V\_standby will allow you to use a USB device to wake up the system.



### 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  $\geq 2A$ .

## COM2/DIO Select



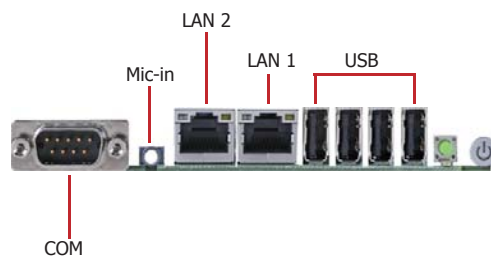
The system board uses JP9 and JP10 to select between RS232/422/485 COM2 or isolated 4-bit DIO at the rear panel.



### Note:

You cannot use COM2 and DIO at the same time. Please set up JP9 and JP10 at the same time.

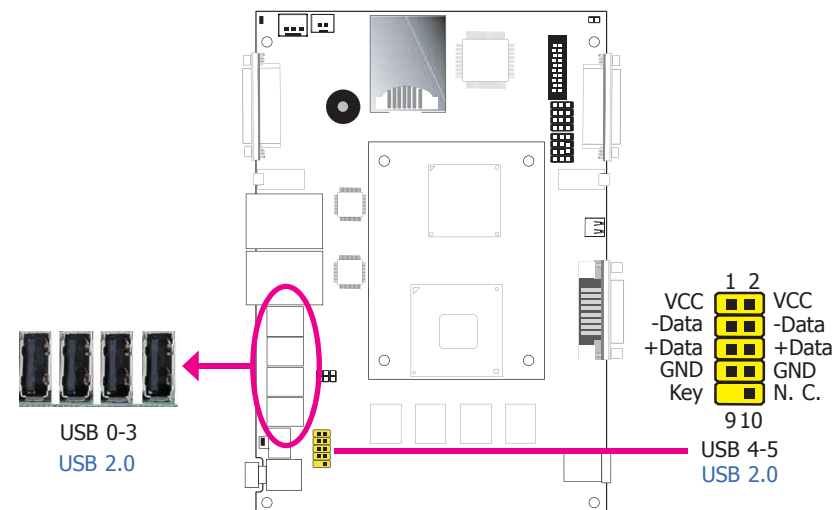
## Front Panel I/O Ports



The front panel I/O port consists of the following:

- 4 USB ports
- 1 COM port
- 2 LAN ports
- 1 Mic-in jack

## USB Ports



USB allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

The system board is equipped with 4 USB 2.0/1.1 ports (USB 0-3). The 10-pin connector allow you to connect 2 additional USB 2.0/1.1 ports (USB 4-5).

## BIOS Setting

Configure the onboard USB in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

## Driver Installation

You may need to install the proper drivers in your operating system to use the USB device. Refer to chapter 4 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

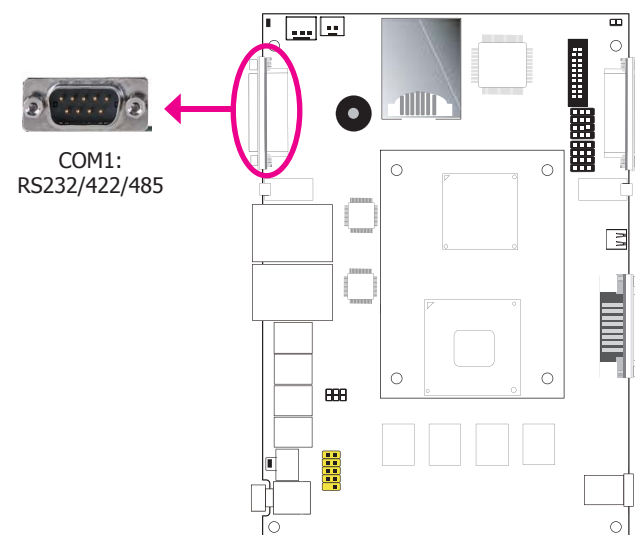
JP8 must be set to "4-6 On: +5V\_standby". Refer to "USB Power Select" in this chapter for more information.



**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  $\geq 2A$ .

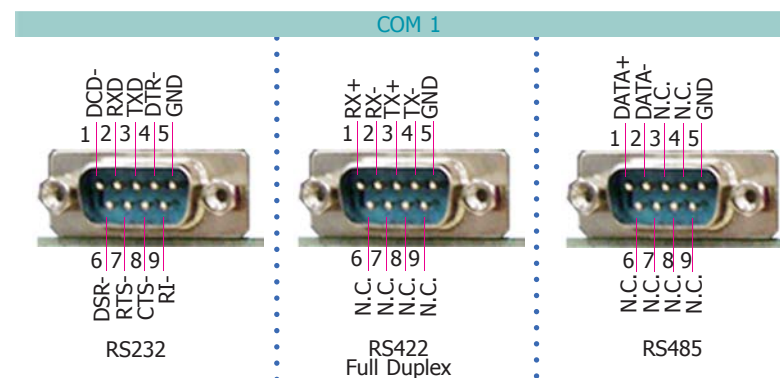
## COM1 (Serial) Port



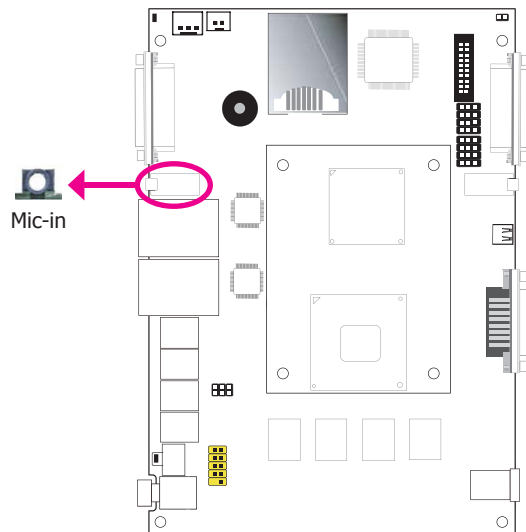
The serial ports are asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices.

## BIOS Setting

Configure the serial ports in the Integrated Peripherals submenu ("Onboard I/O Chip Setup" section) of the BIOS. Refer to chapter 3 for more information.



### Mic-in jack



This jack is used to connect an external microphone.

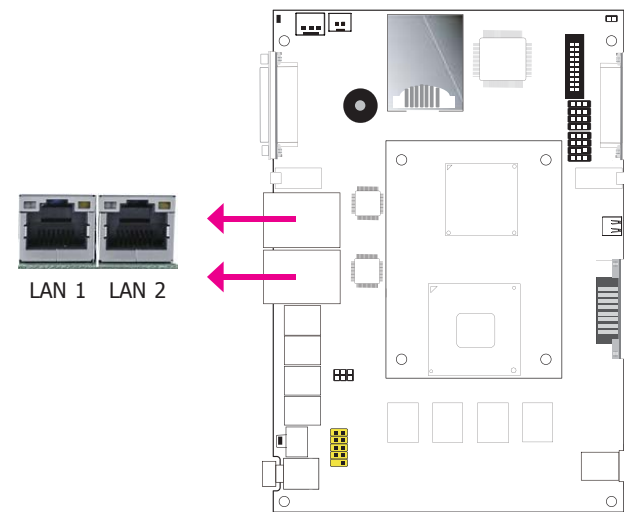
### BIOS Setting

Configure the onboard audio in the Chipset menu ("South Bridge" submenu) of the BIOS. Refer to chapter 3 for more information.

### Driver Installation

Install the audio driver. Refer to chapter 4 for more information.

### RJ45 LAN Ports



### Features

- 2 Intel® WG82574L Gigabit Ethernet LAN controllers

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 ("South Bridge Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

### Driver Installation

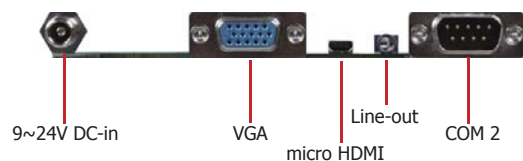
Install the LAN drivers. Refer to chapter 4 for more information.

## Rear Panel I/O Ports



The rear panel I/O ports consist of the following:

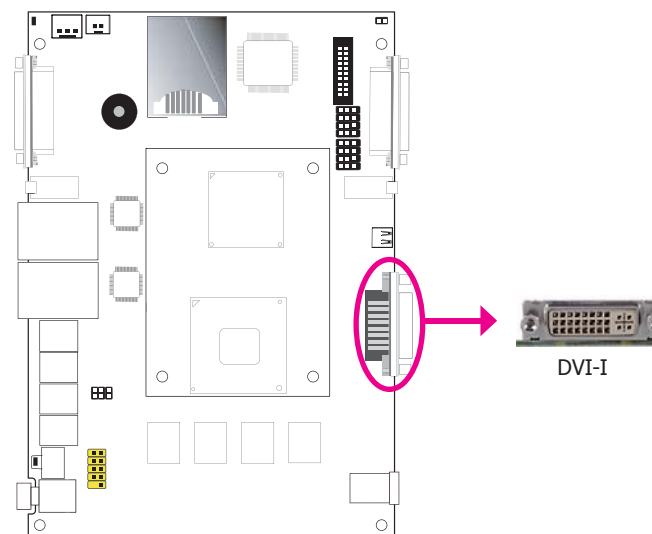
- 1 DVI port
- 1 DC-in
- 1 RS232/422/485 COM port or Isolated 4-bit DIO
- 1 Line-out jack



The rear panel I/O ports consist of the following:

- 1 micro HDMI port
- 1 VGA port
- 1 DC-in
- 1 RS232/422/485 COM port
- 1 Line-out jack

## DVI-I Port



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

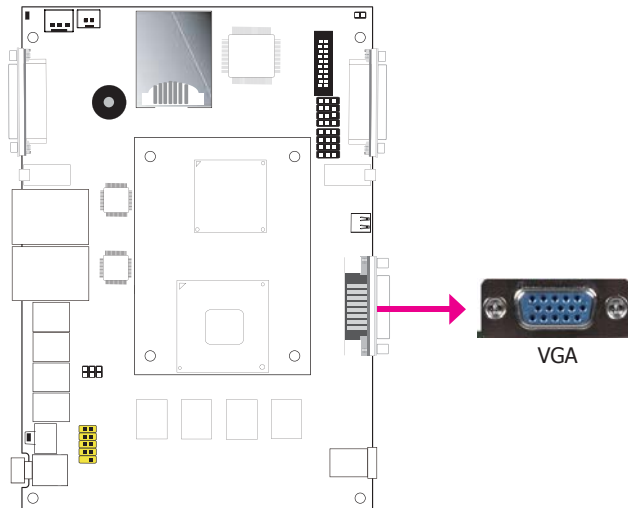
## BIOS Setting

Configure the display device in the Chipset menu ("North Bridge Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

## Driver Installation

Install the graphics driver. Refer to chapter 4 for more information.

## VGA Port



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.

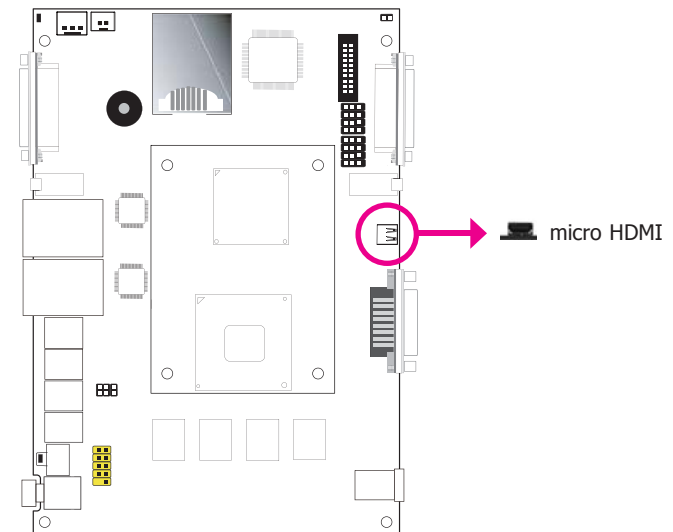
## BIOS Setting

Configure VGA in the Chipset menu ("North Bridge Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

## Driver Installation

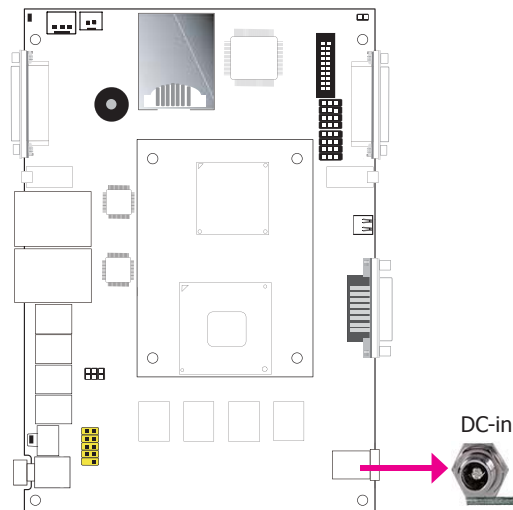
Install the graphics driver. Refer to chapter 4 for more information.

## micro HDMI



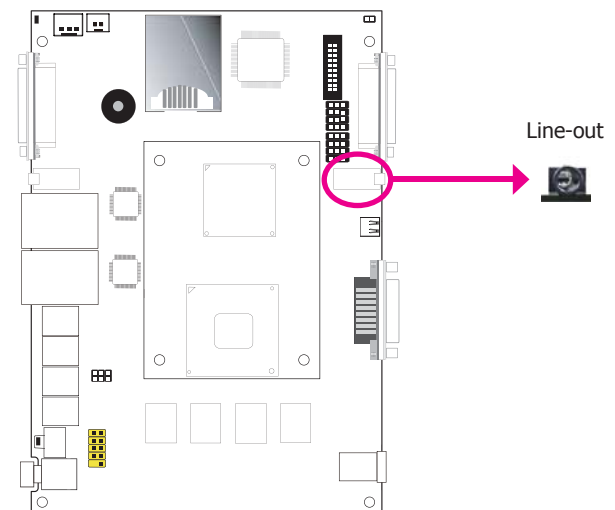
The HDMI port which carries both digital audio and video signals is used to connect a LCD monitor or digital TV that has the HDMI port.

## DC-in



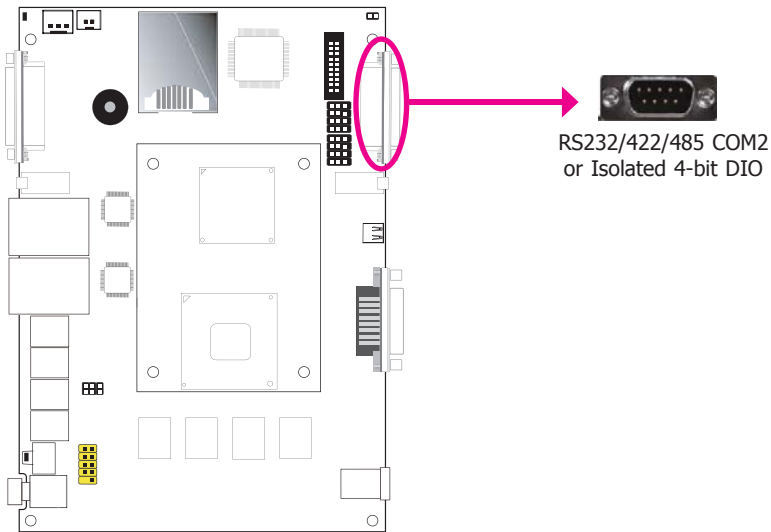
This jack provides maximum of 120W power and is considered a low power solution. Connect a DC power cord to this jack. Use a power adapter within 9~24V DC output voltage. (We only provide 19V DC output in the package contents.) Using a voltage out of the range 9~24V may fail to boot the system or cause damage to the system board.

## Line-out jack



This jack is used to connect a headphone or external speakers.

## COM2 (Serial) Port/ Isolated 4-bit DIO



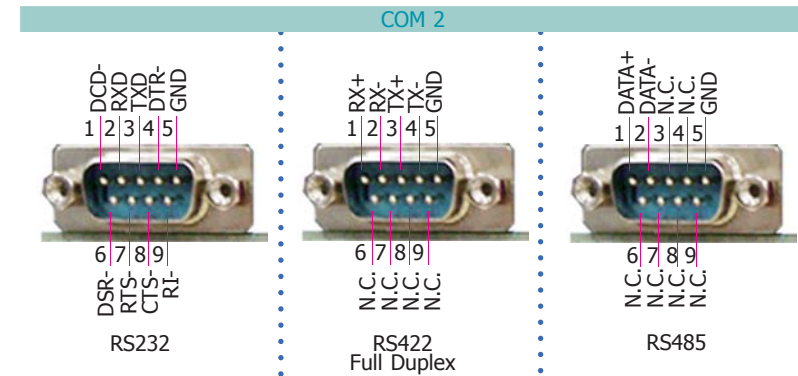
This DB-9 port can be used as an RS232/422/485 COM port or as an isolated 4-bit DIO. Refer to the jumper setting in this section for its respective configuration.

### COM2 (Serial) Port

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

### Isolated 4-bit DIO (2-bit in and 2-bit out)

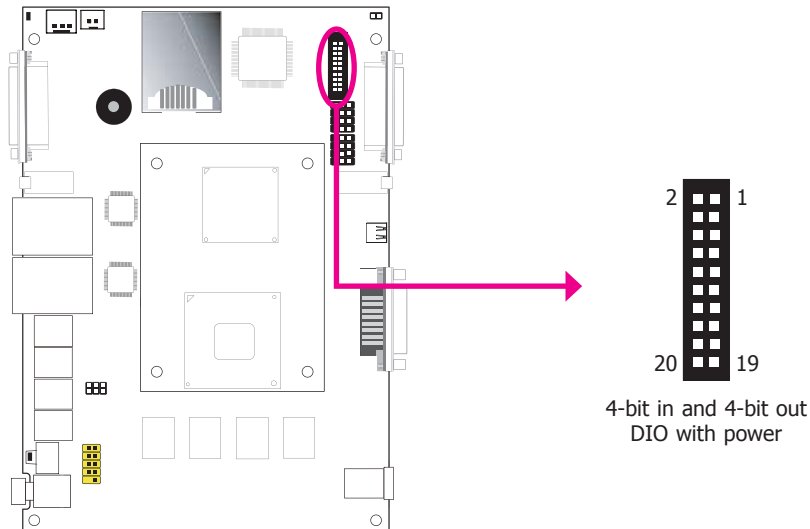
The isolated 4-bit Digital I/O connector provides powering-on function to external devices that are connected to these connectors.



Pins	COM2 Function			DIO Function
	RS232	RS422	RS485	
1	DCD	RX+	DATA+	DIN0A
2	RX	RX-	DATA-	DIN0B
3	TX	TX+	NC	DIN1A
4	DTR	TX-	NC	DIN1B
5	GND	GND	GND	GND
6	DSR	NC	NC	DOUT0A
7	RTS	NC	NC	DOUT0B
8	CTS	NC	NC	DOUT1A
9	RI	NC	NC	DOUT1B

## I/O Connectors

### Digital I/O Connector (optional)

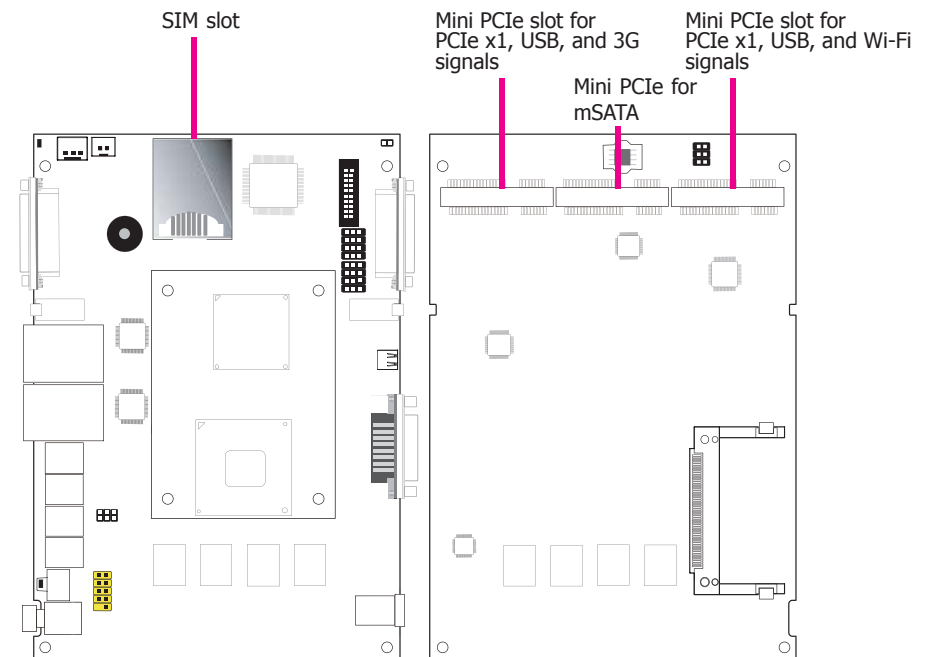


The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to these connectors.

### Digital I/O Connector

Pins	Function	Pins	Function
1	DIN0A	2	DOUT0A
3	DIN0B	4	DOUT0B
5	DIN1A	6	DOUT1A
7	DIN1B	8	DOUT1B
9	DIN2A	10	DOUT2A
11	DIN2B	12	DOUT2B
13	DIN3A	14	DOUT3A
15	DIN3B	16	DOUT3B
17	+5V	18	+5V_standby
19	GND	20	GND

## Expansion Slots



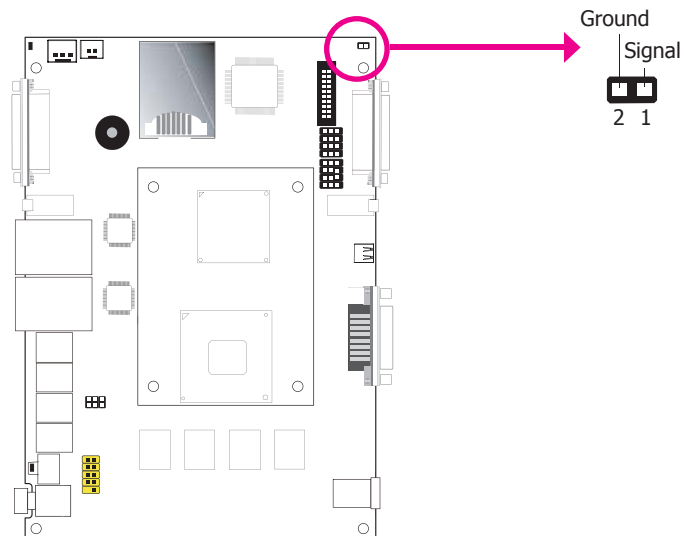
### SIM Slot

The SIM slot on the system board is used to insert a SIM card.

### Mini PCI Express Slot

The Mini PCI Express slot on the system board is used to install a half and/or full size Mini PCIe card such as network cards or other cards that comply to the mini PCI Express specifications into the mini PCI Express slot.

### Chassis Intrusion Connector

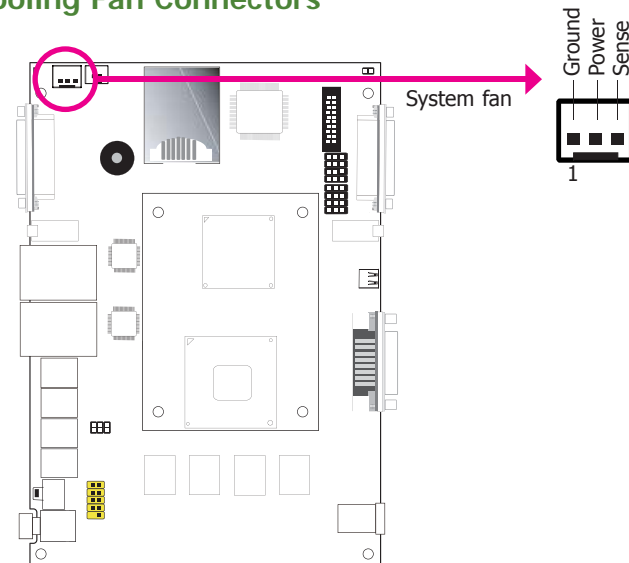


The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will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

#### MyGuard Hardware Monitor

Install the "MyGuard Hardware Monitor" utility. By default, the chassis intrusion detection function is disabled. When enabled, a warning message will appear when the chassis is open. The utility can also be configured so that a beeping alarm will sound when the chassis is open. Refer to the "MyGuard Hardware Monitor" section in chapter 4 for more information.

### Cooling Fan Connectors



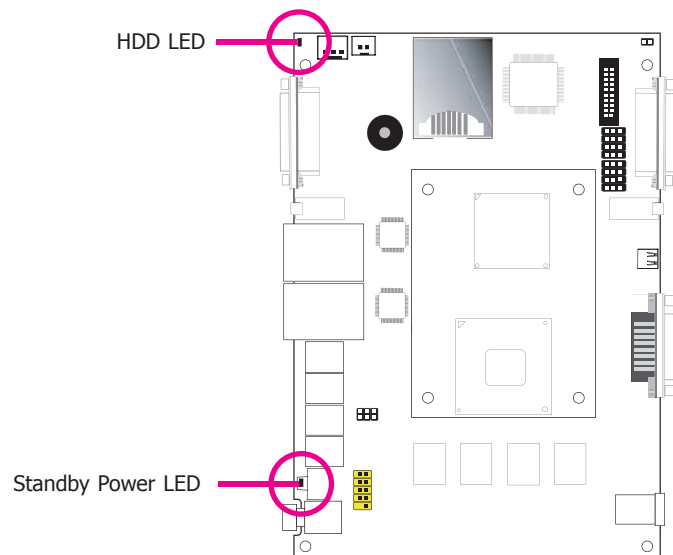
The fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

#### BIOS Setting

The Advanced menu ("Hardware Health Configuration" submenu) of the BIOS will display the current speed of the cooling fans. Refer to chapter 3 for more information.



## LEDs



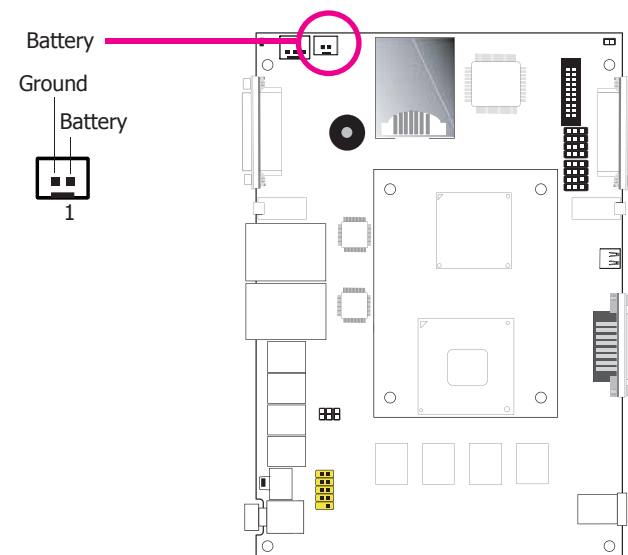
### Standby Power LED

This LED will blink 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.

### HDD LED

The HDD LED will light when the hard drive is being accessed.

## Battery



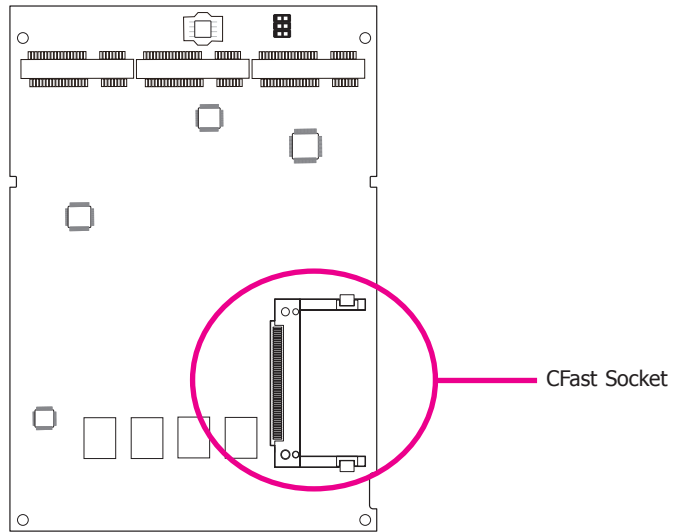
Connect to the battery connector

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.

## CFast Socket



The CFast socket is used to insert a CFast card. A CFast card is a small removable mass storage device designed with flash technology - a non-volatile storage solution that does not require a battery to retain data indefinitely.

## Chapter 3 - 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.


**Note:**

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 highlight up or down between submenu or fields.
<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>	Displays General Help
<F4>	Saves and exits the Setup program.
<Enter>	Press <Enter> to enter the highlighted submenu.

### 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.

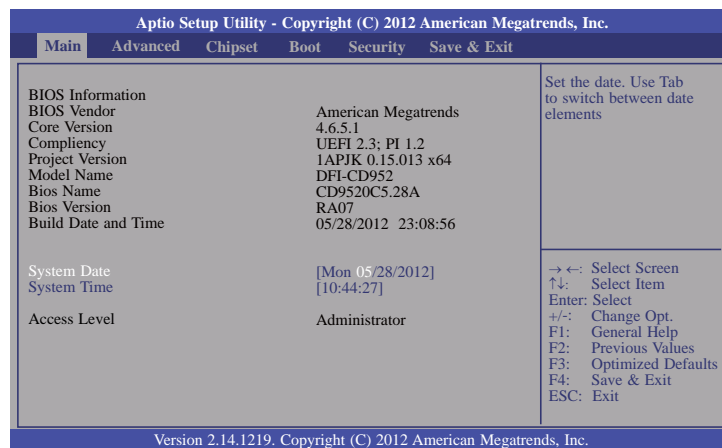
### Submenu

When "►" 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.

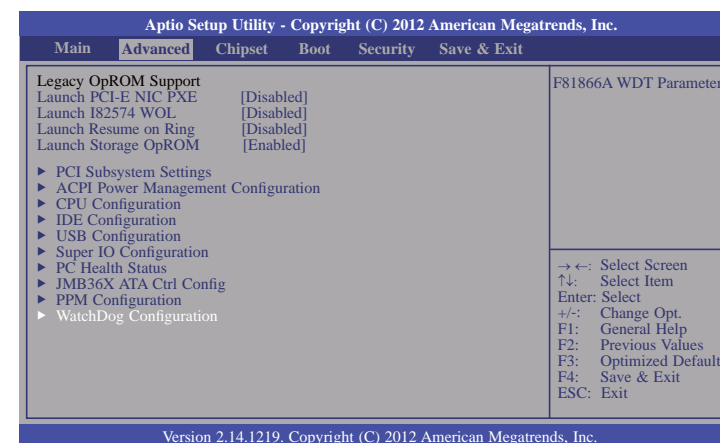
### Advanced

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.



#### Important:

Setting incorrect field values may cause the system to malfunction.



#### Legacy PCI-E NIC PXE

Enable or Disable Boot option for Realtek 8111DL NIC.

#### Launch I82574 WOL

Enable or Disable WOL for Intel 82574 LAN Option.

#### Launch Resume on Ring

Enable or Disable resume on ring option.

#### Launch Storage OpROM

Enable or Disable Boot Option for Legacy Mass Storage Devices with Option ROM.

### PCI Subsystem Settings

This section is used to configure the PCI Subsystem.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
PCI Bus Driver Version	V 2.05.01	Incase of multiple Option ROMs (Legacy and EFI compatible), specifies what PCI Option ROM to launch.
PCI Option ROM Handling PCI ROM Priority	[EFI Compatible ROM]	
		→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.14.1219. Copyright (C) 2012 American Megatrends, Inc.		

### ACPI Power Management Configuration

This section is used to configure the ACPI Setting.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
<b>ACPI Power Management Configuration</b>		Enables or disables BIOS ACPI Auto Configuration.
Enable ACPI Auto Conf	[Disabled]	
ACPI Sleep State	[S3 (Suspend to RAM) ]	→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Lock Legacy Resources	[Disabled]	
S3 Video Repost	[Enabled]	
Resume by RTC Alarm	[Disabled]	
USB Dev Wake from S3	[Disabled]	
Version 2.14.1219. Copyright (C) 2012 American Megatrends, Inc.		

#### Enable ACPI Auto Config

Enables or disables BIOS ACPI Auto Configuration.

#### ACPI Sleep State

Selects the highest ACPI sleep state the system will enter when the Suspend button is pressed.

**S1(POS)** Enables the Power On Suspend function.

**S3(STR)** Enables the Suspend to RAM function.

#### Lock Legacy Resources

Enables or Disables Lock Legacy Resources.

#### Resume by RTC Alarm

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

#### USB Dev Wake from S3

This field, when enabled, allows you to use a USB keyboard to wake up a system that is in the S3 (STR - Suspend To RAM) state.

## 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		Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).
Processor Type	Intel (R) Atom (TM) CPU	
EMT64	Supported	
Processor Speed	1865 MHz	
System Bus Speed	533 MHz	
Ratio Status	14	
Actual Ratio	14	
Processor Stepping	30661	
Microcode Revision	268	
L2 Cache RAM	2x56 k	
L3 Cache RAM	2x512 k	→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Processor Core	Dual	
Hyper-threading	Supported	
Hyper-threading	[Enabled]	
Execute Disable Bit	[Enabled]	
Limit CUPID Maximum	[Disabled]	

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### Hyper-threading

Enable 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.

### Execute Disable Bit

XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 update 3.)

### Limit CUPID Maximum

The CPUID instruction of some newer CPUs will return a value greater than 3. The default is Disabled because this problem does not exist in the Windows series operating systems. If you are using an operating system other than Windows, this problem may occur. To avoid this problem, enable this field to limit the return value to 3 or less than 3.

## IDE Configuration

This section is used to configure IDE functions.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
SATA Port0	Not Present	SATA Ports (0-3) device names if present and enabled.
SATA Port1	WDC WD800BEVS-(80.0G	
SATA Controller(s)	[Enabled]	
Configure SATA as	[IDE]	
Misc Configuration for hard disk		
→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit		

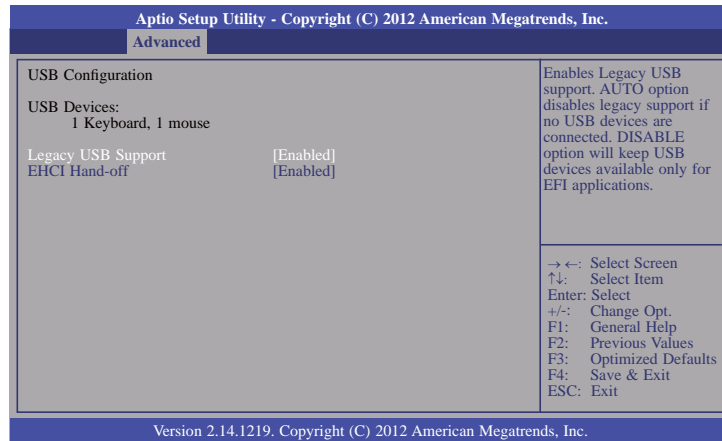
Version 2.14.1219. Copyright (C) 2012 American Megatrends, Inc.

### Configure SATA as

Select a configuration for SATA controller.

## USB Configuration

This section is used to configure USB.



### Legacy USB Support

#### Enabled

Enables legacy USB.

#### Auto

Disables support for legacy when no USB devices are connected.

#### Disabled

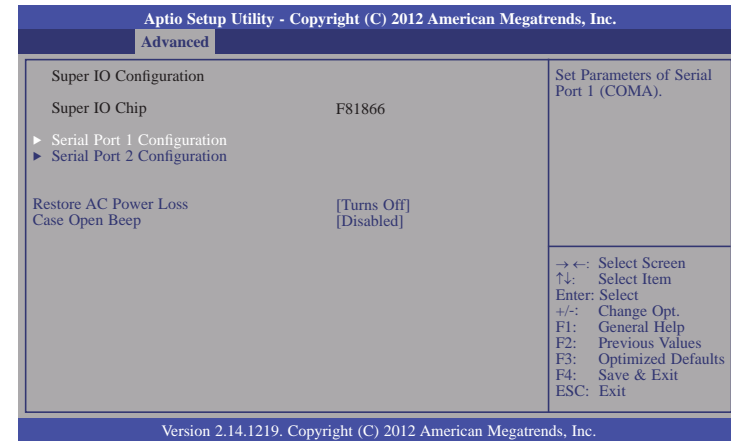
Keeps USB devices available only for EFI applications.

### EHCI Hand-off

This is a workaround for OSes that does not support EHCI hand-off. The EHCI ownership change 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.



### Restore AC Power Lost

#### 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.

#### 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.

### Case Open Beep

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

### Serial Port 1 Configuration to Serial Port 2 Configuration

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Serial Port 1 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=3F8h; IRQ=4;	
Change Settings	[Auto]	
COM1 Driver Mode	[RS232 driver]	
		→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.14.1219. Copyright (C) 2012 American Megatrends, Inc.		

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Serial Port 2 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=2F8h; IRQ=3;	
Change Settings	[Auto]	
COM2 Driver Mode	[RS232 driver]	
		→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.14.1219. Copyright (C) 2012 American Megatrends, Inc.		

#### Serial Port

Enables or disables the serial port.

#### Change Settings

Selects the IO/IRQ setting of the I/O device.

#### COM1/2 Driver Mode

Enable or disable serial port (COM)

### PC Health Status

This section displays the hardware health monitor.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
PC Health Status		Enable or Disable Smart Fan
Smart Fan Function [Enabled] ▶ Smart Fan Mode Configuration		
CPU Temperature	: +34 C	
System Temperature	: +35 C	
System FAN Speed	: N/A	
VCore	: +1.064 V	
VCCGFX	: +1.048 V	
V_SM	: +1.568 V	
1.05V	: +1.064 V	
5VSB	: +4.992 V	
3VCC	: +3.344 V	
3VSB	: +3.360 V	
VBAT	: +3.312 V	
		→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.14.1219. Copyright (C) 2012 American Megatrends, Inc.		

### Smart Fan Mode Configuration

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.		
Advanced		
Smart Fan Mode Configuration		Smart Fan Mode Select
System Fan Smart Fan [Auto Duty-Cycle Mode]		
Temperature 1	60	
Temperature 2	50	
Temperature 3	40	
Temperature 4	30	
Duty Cycle 1	85	
Duty Cycle 2	70	
Duty Cycle 3	60	
Duty Cycle 4	50	
		→ ←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.14.1219. Copyright (C) 2012 American Megatrends, Inc.		



### PPM Configuration

This section is used to configure the PPM functions.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.	
Advanced	
PPM Configuration	Enable/Disable Intel SpeedStep
EIST [Disabled]	
CPU C State Report [Disabled]	
→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.14.1219. Copyright (C) 2012 American Megatrends, Inc.	

#### CPU C State Report

Enable/Disable CPU C Status Report to OS.

### WatchDog Configuration

This section is used to configure the watchdog functions.

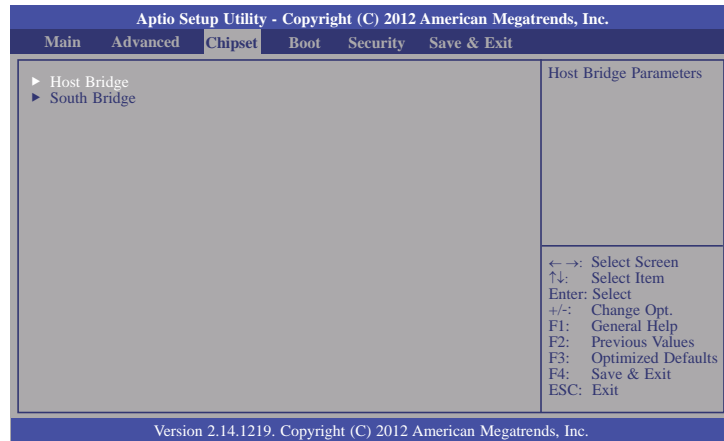
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.	
Advanced	
WatchDog Configuration	Enable/Disable F81866 WatchDog Timer.
WatchDog function [Disabled]	
WatchDog Timer 10	
→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.14.1219. Copyright (C) 2012 American Megatrends, Inc.	

#### WatchDog function

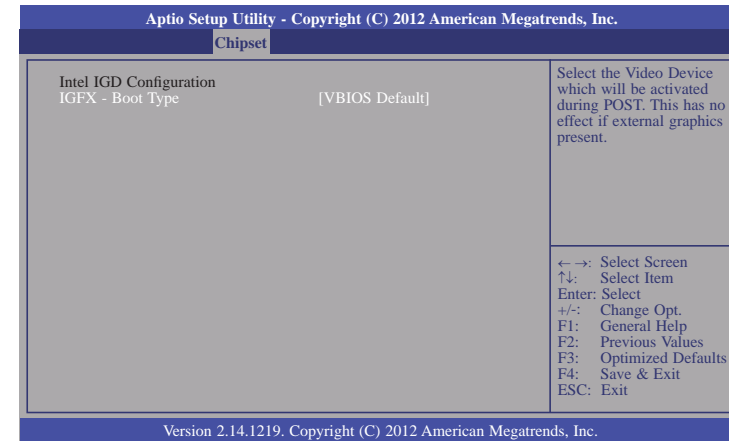
This field is used to enable or disable the Watchdog timer function.

## Chipset

Configures relevant chipset functions.



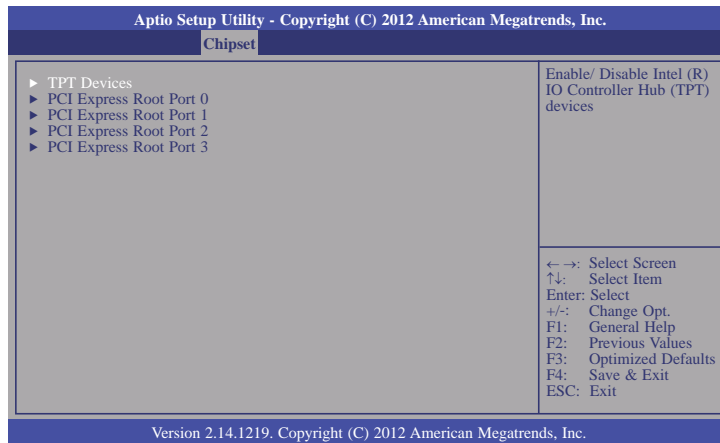
## Host Bridge



### IGFX - Boot Type

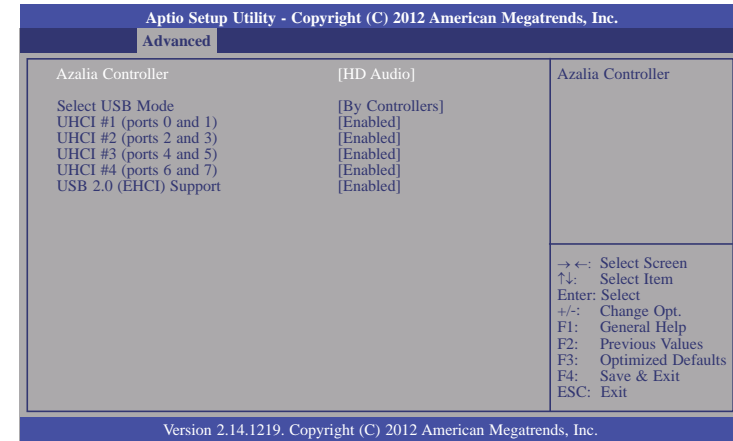
Select the Video Device which will be activated during POST. This has no effect if external graphics present.

## South Bridge



## TPT Devices

Enable or disable Intel IO Controller Hub (TPT) devices.



## Select USB Mode

This field is used to select the USB's operation mode.

## High Speed

If the USB device is a high speed device, it will operate in high speed mode. If it is a full/low speed device, it will operate in full/low speed mode.

## Full/Low Speed

Regardless of the speed of the USB device, it will always operate in full/low speed mode.

## UHCI 1~4

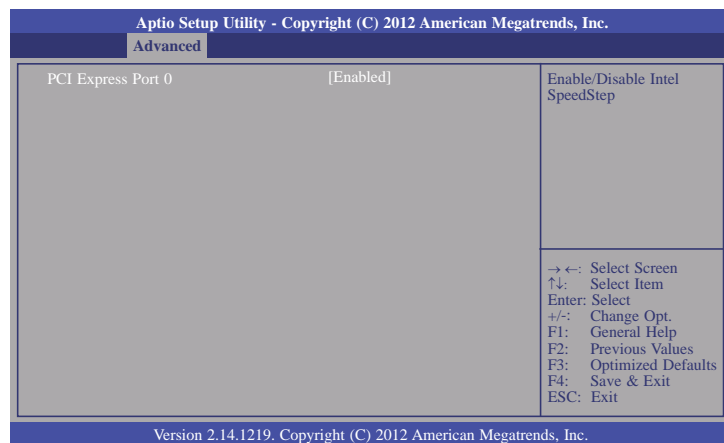
Control the USB UHCI (USB 1.1) function.

## USB 2.0 (EHCI) Support

Enable or disable USB 2.0 (EHCI) support.

### PCI Express Root Port 0~3

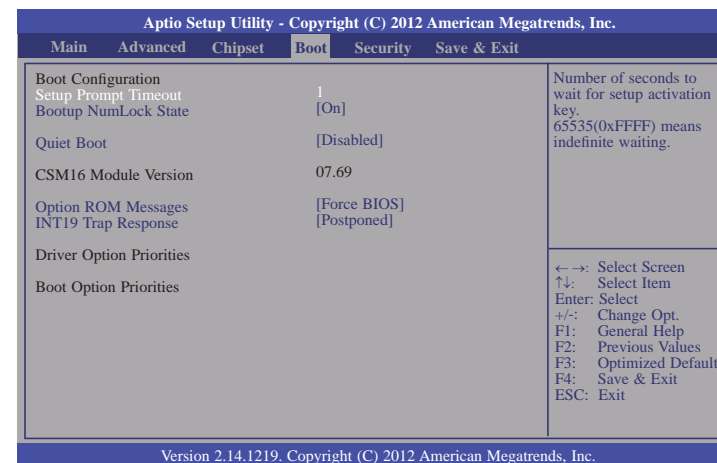
This section is used to configure the PCI Express Root functions.



### PCI Express Port 0~3

Enable/Disable PCI Express Root Port 0~3.

## Boot



### 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.

### Option ROM Messages

Set display mode for option ROM.

### INT19 Trap Response

BIOS reaction on Int19 trapping by option ROM.

### Immediate

Execute the trap right away.

### Postponed

Execute the trap during legacy boot.

### Hard Driver BBS Priorities

Set the order of the legacy devices in this group.

## Security

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.					
Main	Advanced	Chipset	Boot	Security	Save & Exit
<b>Password Description</b> If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights. The password length must be in the following range: Minimum length 3 Maximum length 20			Set Administrator Password.		
Administrator Password User Password			→ ←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit		
<b>HDD Security Configuration</b>					
Version 2.14.1219. Copyright (C) 2012 American Megatrends, Inc.					

### Administrator Password

Sets the administrator password.

### User Password

Sets the user password.

## Save & Exit

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Save Changes and Reset Discard Changes and Reset				Reset the system after saving the changes.	
<b>Save Options</b> Restore Defaults Save as User Defaults Restore User Defaults					
<b>Boot Override</b>					
				← →: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.14.1219. Copyright (C) 2012 American Megatrends, 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.

### Save as User Defaults

To save changes done so far as user default, select this field and then press <Enter>. A dialog box will appear. Select Yes to save values as user default.

### Restore User Defaults

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

## 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>.

```
C:\AFU\AFUDOS>afudos filename /B /P /N

+-----+
|               AMI Firmware 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 BootBlock ..... done
Writing BootBlock ..... done
Verifying BootBlock ..... done

C:\AFU\AFUDOS>
```

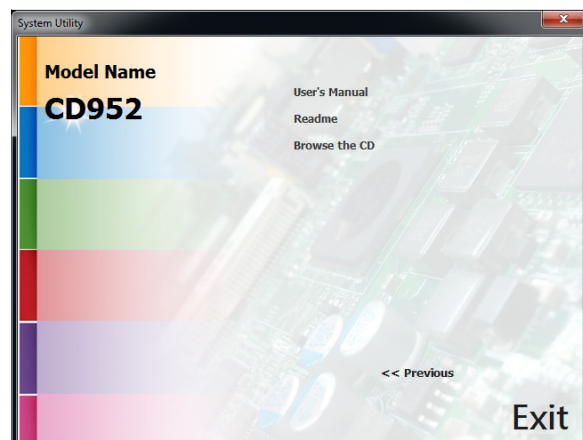
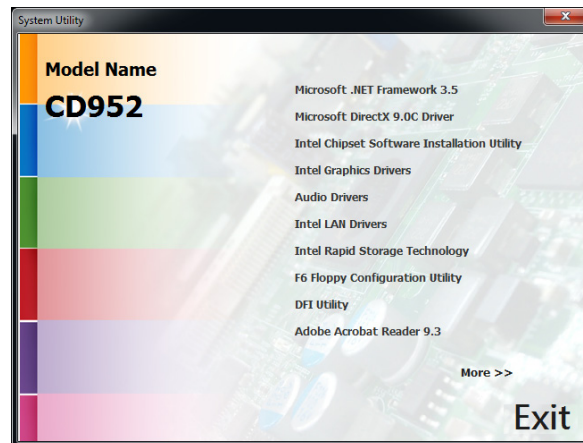
After finishing BIOS update, please turn off the AC power. Wait about 10 seconds and then turn on the AC power again.

## Chapter 4 - Supported Software

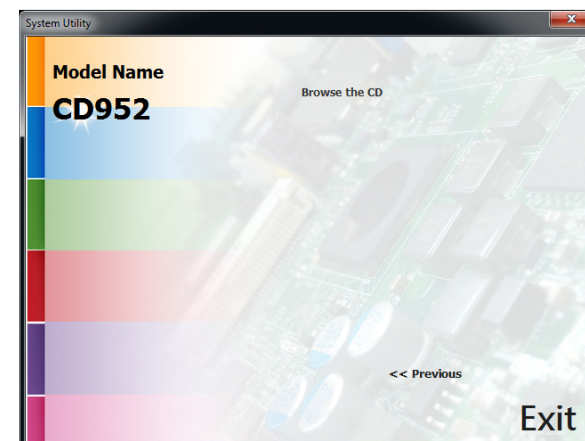
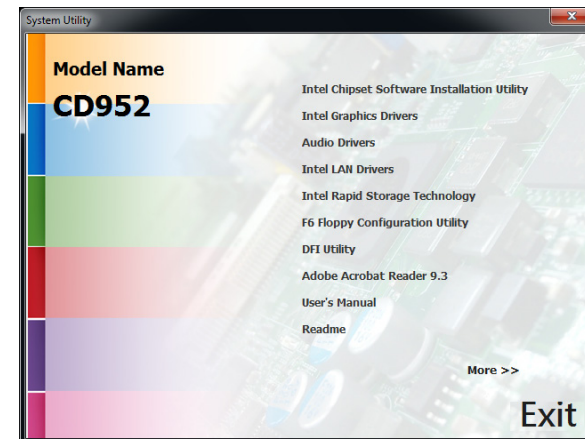
The CD that came with the system board contains drivers, utilities and software applications required to enhance the performance of the system board.

Insert the CD into a CD-ROM drive. The autorun screen (Mainboard Utility CD) will appear. If after inserting the CD, "Autorun" did not automatically start (which is, the Mainboard Utility CD screen did not appear), please go directly to the root directory of the CD and double-click "Setup".

### Auto Run Page (For Windows XP)



### Auto Run Page (For Windows 7)



## Microsoft .NET Framework 3.5 (For Windows XP only)

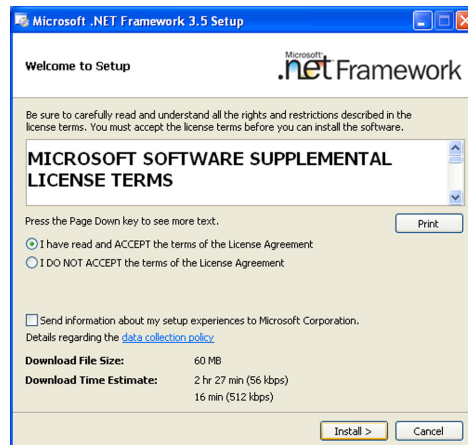

**Note:**

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

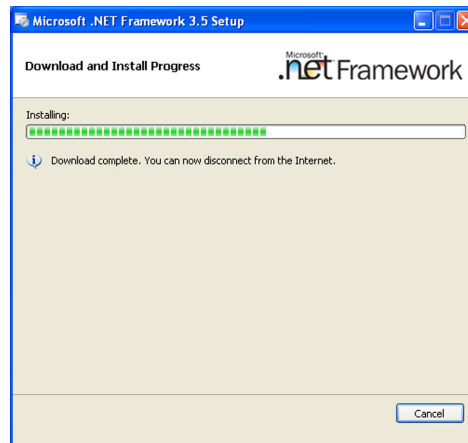
To install the driver, click "Microsoft .NET Framework 3.5" on the main menu.

1. Read the license agreement carefully.

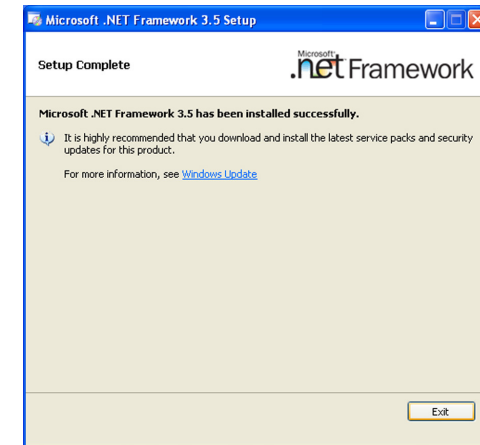
Click "I have read and accept the terms of the License Agreement" then click Install.



2. Setup is now installing the driver.



3. Click Exit.

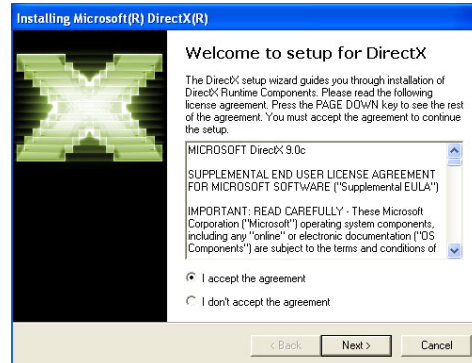




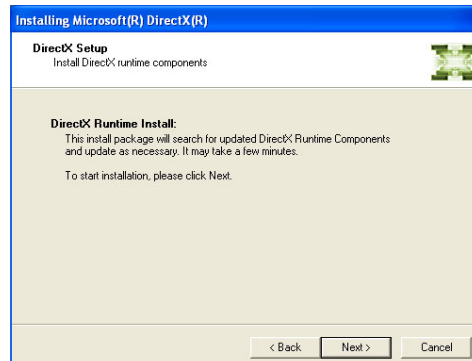
## Microsoft DirectX 9.0C (For Windows XP only)

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

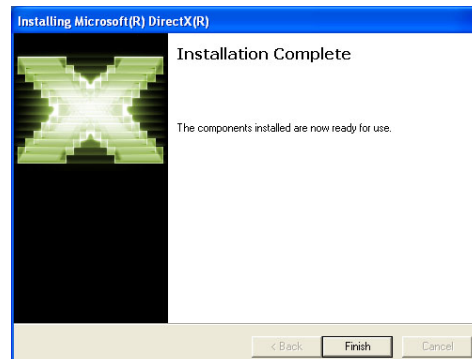
1. Click "I accept the agreement" then click Next.



2. To start installation, click Next.



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



## Intel Chipset Software Installation Utility (For Windows XP)

The Intel Chipset Software Installation Utility is used for updating Windows® 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 now ready to install the utility. Click Next.



2. Read the license agreement then click Yes.



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



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



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 Chipset Software Installation Utility (For Windows 7)

The Intel Chipset Software Installation Utility is used for updating Windows® 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.

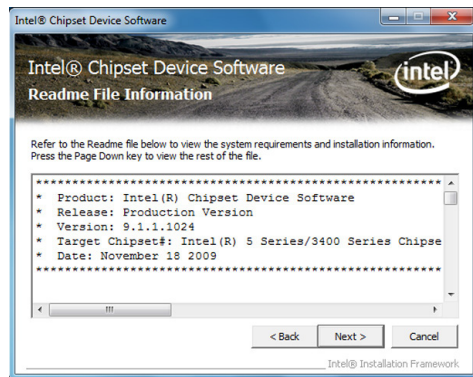
1. Setup is now ready to install the utility. Click Next.



2. Read the license agreement then click Yes.



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



- After completing installation, click Finish to exit setup.



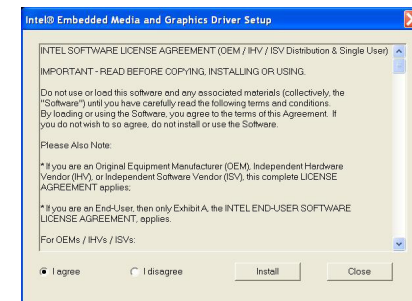
## Intel Graphics Drivers (For Windows XP)

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

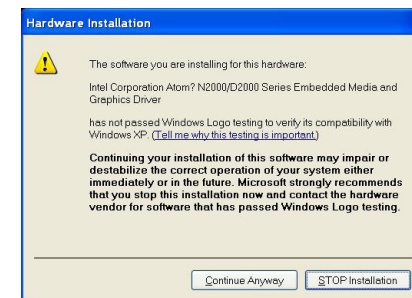
- Setup is now ready to install the graphics driver. Select "Installs driver and application files" and click Next.



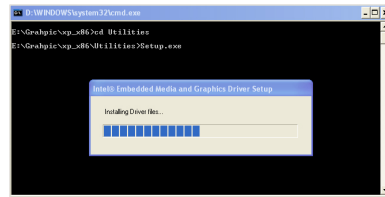
- Read the license agreement. Then, select "I agree" and click Install.



- Click "Continue Anyway" to start the installation.

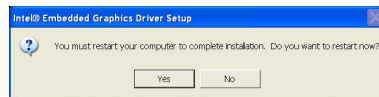


4. Setup is now installing the driver.



5. Click "Yes" to restart this computer now.

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



## Intel Graphics Drivers (For Windows 7)

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

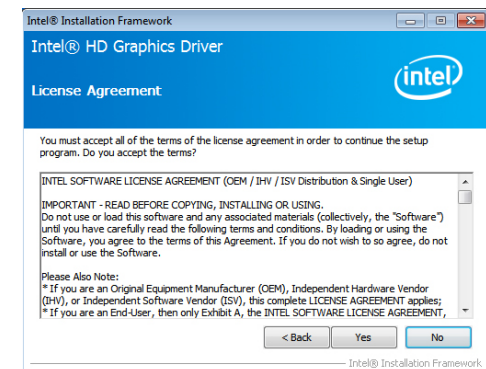
1. Setup is now ready to install the graphics driver. Click Next.



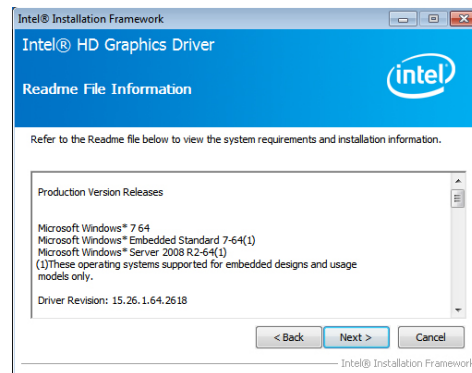
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7/Windows 8 desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.

We recommend that you skip this process by disabling this function then click Next.

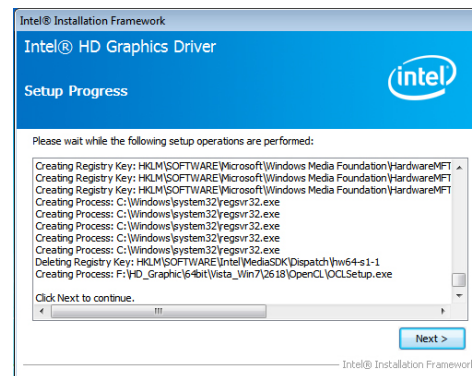
2. Read the license agreement then click Yes.



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

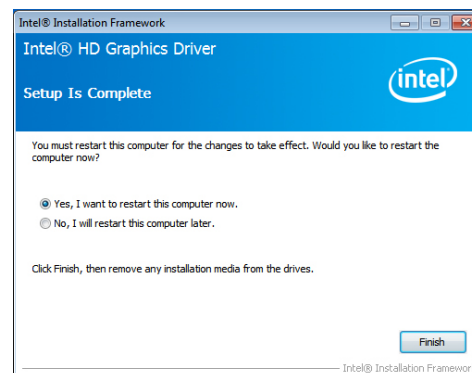


- Setup is now installing the driver. Click Next to continue.



- Click "Yes, I want to restart this computer now" then click Finish.

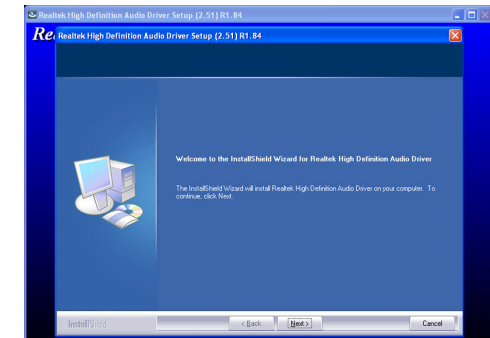
Restarting the system will allow the new software installation to take effect.



## Audio Drivers (For Windows XP)

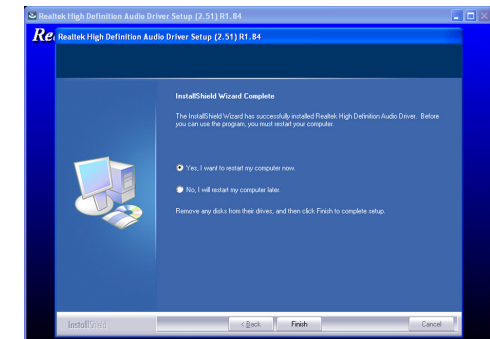
To install the driver, click "Audio Drivers" on the main menu.

- Setup is now ready to install the audio driver. Click Next.
- Follow the remainder of the steps on the screen; clicking "Next" each time you finish a step.



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

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





## Audio Drivers (For Windows 7)

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

1. Setup is now ready to install the driver. Click Next.
2. Follow the remainder of the steps on the screen; clicking "Next" each time you finish a step.



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

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



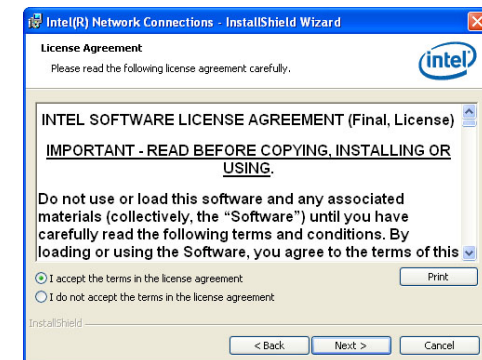
## Intel LAN Drivers (For Windows XP)

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

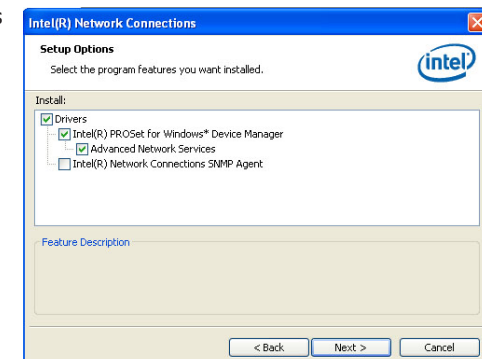
1. Setup is ready to install the driver. Click Next.



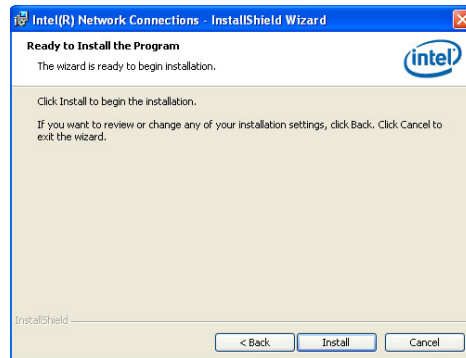
2. Click "I accept the terms in the license agreement" then click "Next".



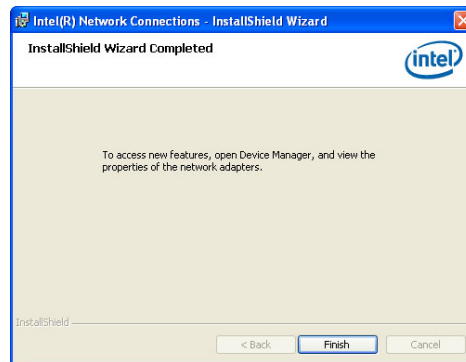
3. Select the program features you want installed then click Next.



- Click Install to begin the installation.



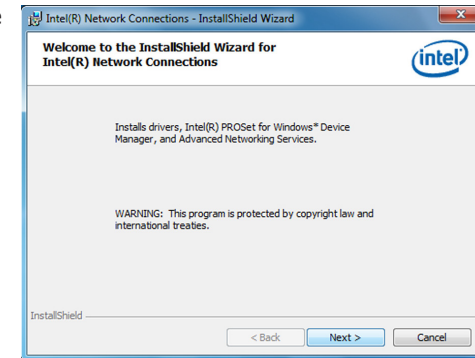
- After completing installation, click Finish.



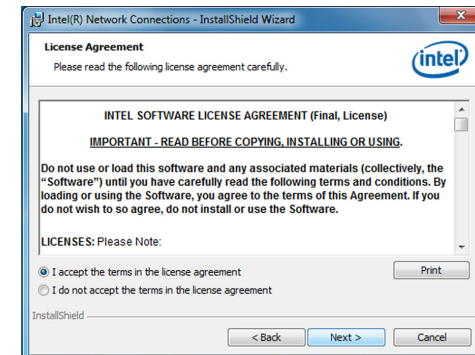
## Intel LAN Drivers (For Windows 7)

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

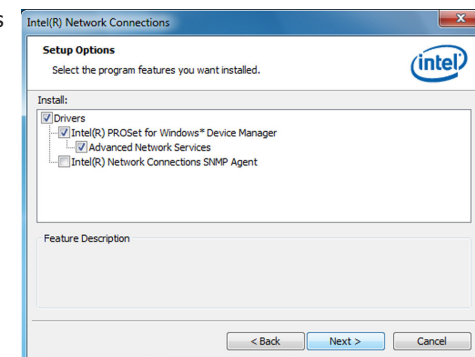
- Setup is ready to install the driver. Click Next.



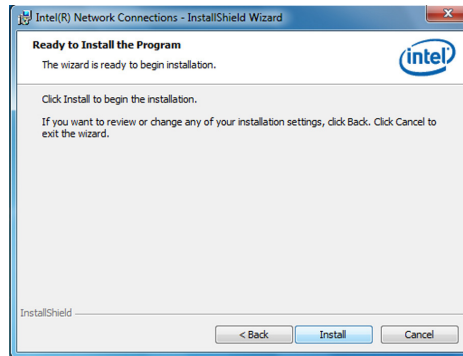
- Click "I accept the terms in the license agreement" then click "Next".



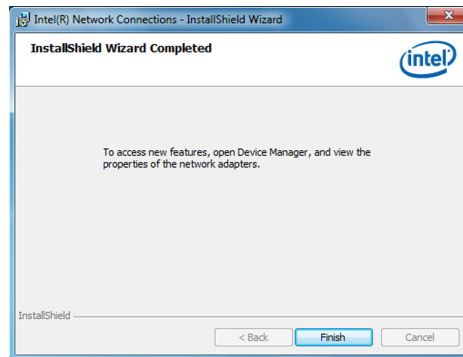
- Select the program features you want installed then click Next.



- Click Install to begin the installation.



- After completing installation, click Finish.

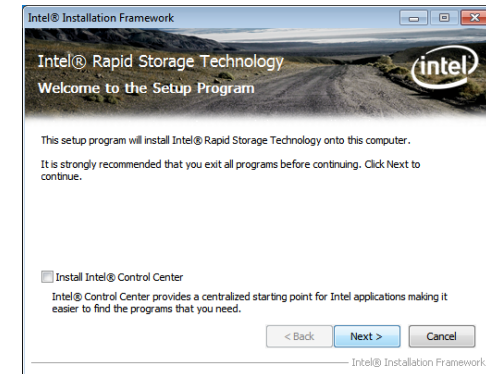


## Intel Rapid Storage Technology

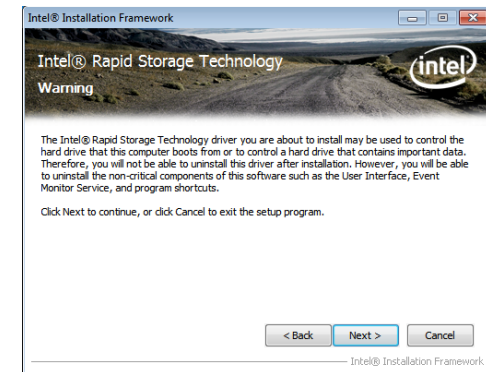
The Intel Rapid Storage Technology is a utility that allows you to monitor the current status of the SATA drives. It enables enhanced performance and power management for the storage subsystem.

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

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



- Read the warning then click Yes.

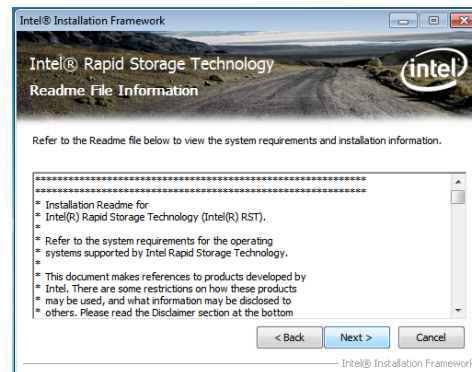




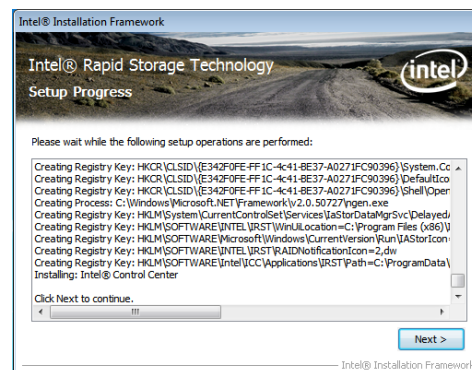
3. Read the license agreement then click Yes.



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

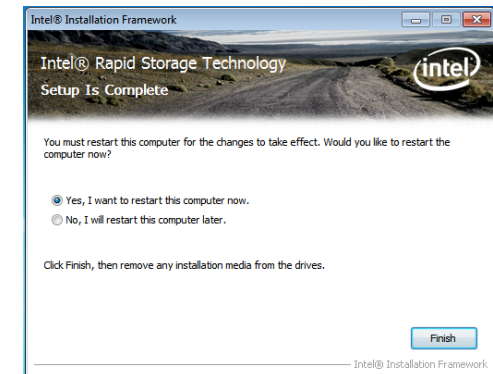


5. Setup is now installing the utility. Click Next to continue.

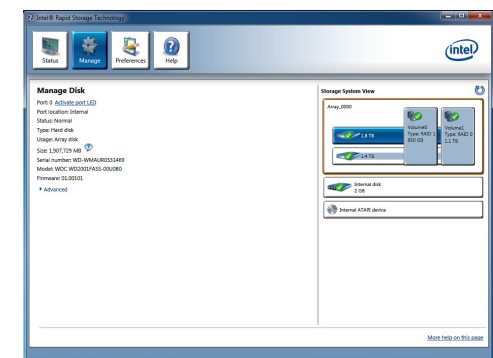


6. Click "Yes, I want to restart my computer now" then click Finish.

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



7. Run the Intel Matrix Storage Console utility to view the hard drives' configuration.



## F6 Floppy Configuration Utility

This is used to create a floppy driver diskette needed when you install Windows® XP using the F6 installation method. This will allow you to install the operating system onto a hard drive when in AHCI mode.

1. Insert a blank floppy diskette.
2. Locate for the drivers in the CD then copy them to the floppy diskette. The CD includes drivers for both 32-bit and 64-bit operating systems. The path to the drivers are shown below.

32-bit  
CD Drive:\AHCI\_RAID\F6FLOPPY\f6flpy32

64-bit  
CD Drive:\AHCI\_RAID\F6FLOPPY\f6flpy64

## DFI Utility

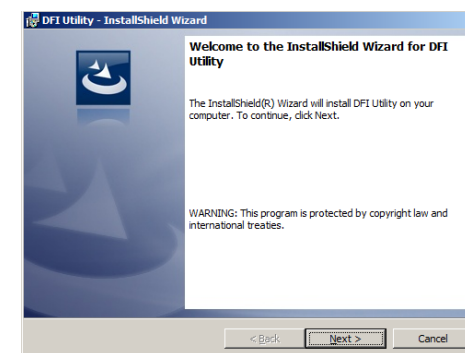
DFI Utility provides information about the board, Watchdog, DIO, and Backlight. To access the utility, click "DFI Utility" on the main menu.



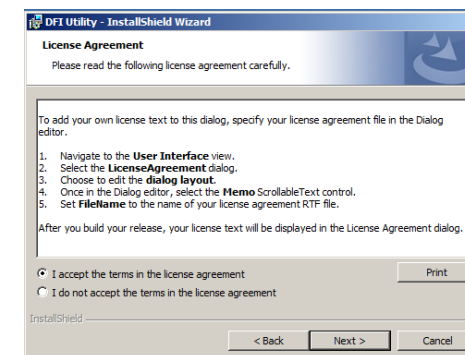
### Note:

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

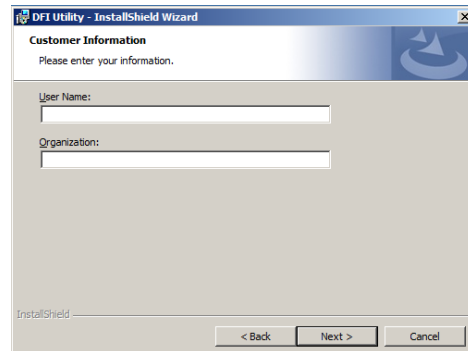
1. Setup is ready to install the DFI Utility driver. Click "Next".



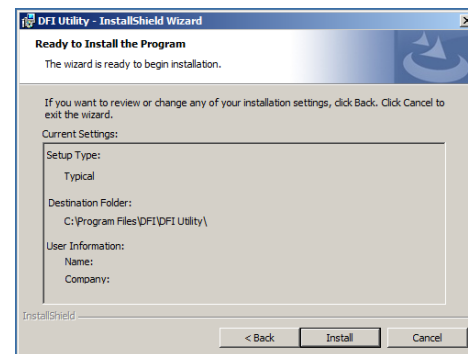
2. Click "I accept the terms in the license agreement" then click "Next".



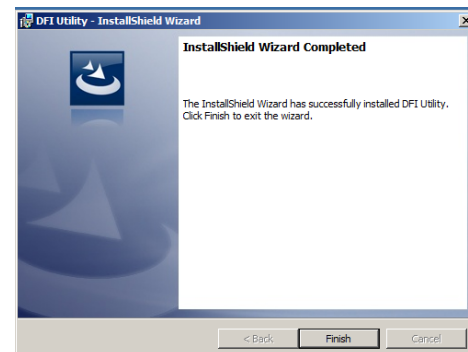
3. Enter "User name" and "Organization" information then click "Next".



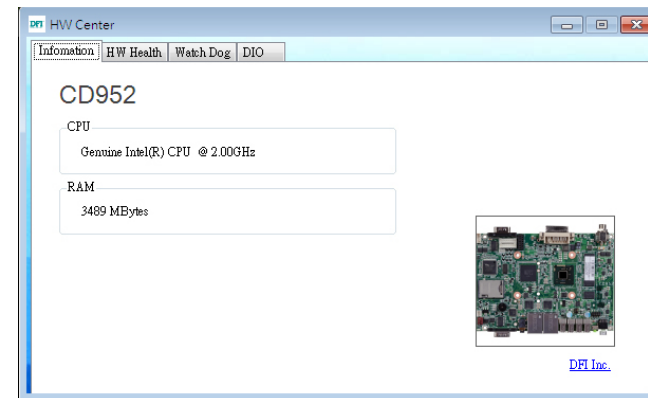
4. Click "Install" to begin the installation.



5. After completing installation, click "Finish".



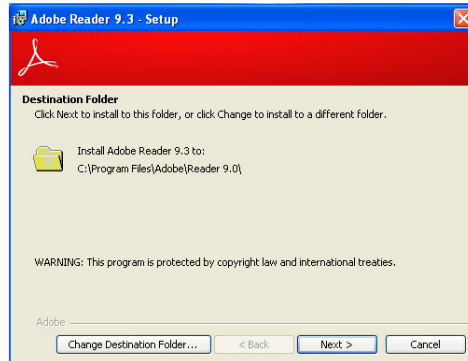
The DFI Utility icon will appear on the desktop. Double-click the icon to open the utility.



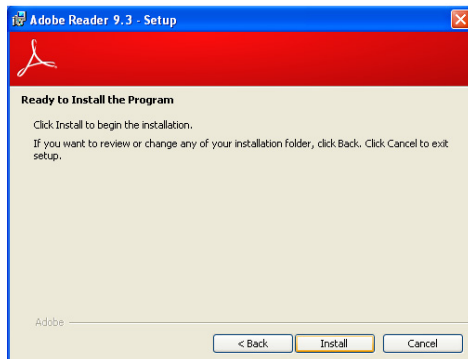
## Adobe Acrobat Reader 9.3

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

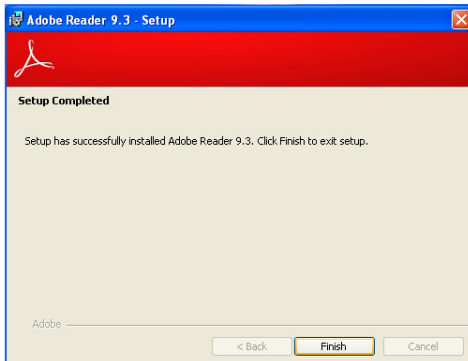
1. Click Next to install or click Change Destination Folder to select another folder.



2. Click Install to begin installation.



3. Click Finish to exit installation.



## Appendix A - NLITE and AHCI Installation Guide

### nLite

nLite is an application program that allows you to customize your XP installation disc by integrating the RAID/AHCI drivers into the disc. By using nLite, the F6 function key usually required during installation is no longer needed.


**Note:**

The installation steps below are based on nLite version 1.4.9. Installation procedures may slightly vary if you're using another version of the program.

1. Download the program from nLite's official website.

<http://www.nliteos.com/download.html>

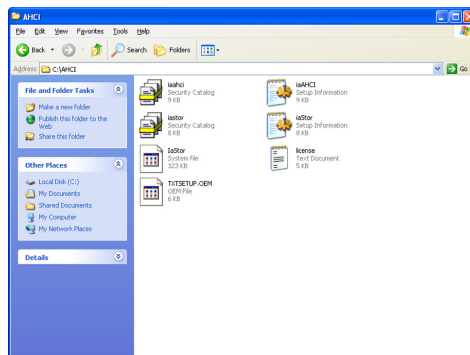
2. Install nLite.


**Important:**

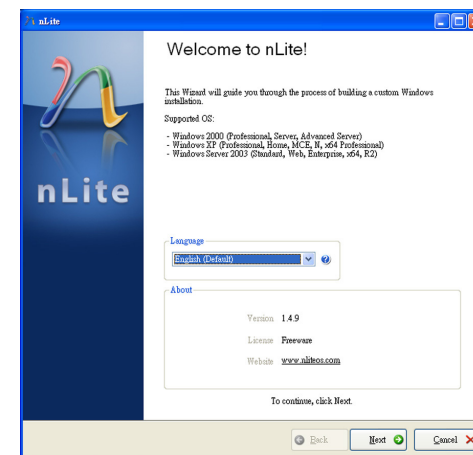
Due to it's coding with Visual.Net, you may need to first install .NET Framework prior to installing nLite.

3. Download relevant RAID/AHCI driver files from Intel's website. The drivers you choose will depend on the operating system and chipset used by your computer.

The downloaded driver files should include iaahci.cat, iaAHCI.inf, iastor.cat, iaStor.inf, IaStor.sys, license.txt and TXTSETUP.OEM.

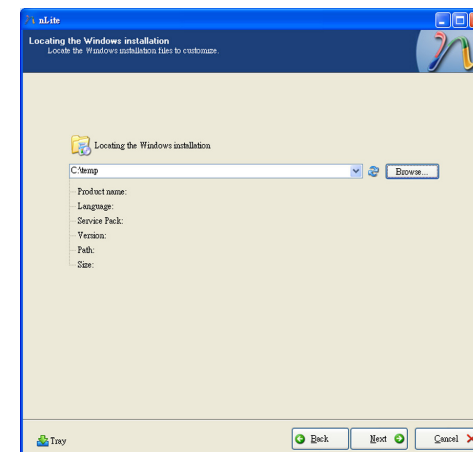


4. Insert the XP installation disc into an optical drive.
5. Launch nLite. The Welcome screen will appear. Click **Next**.

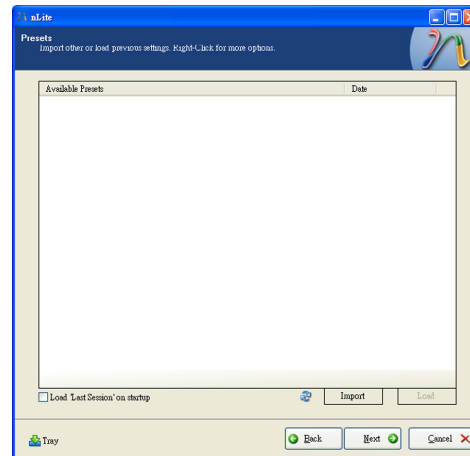


6. Click **Next** to temporarily save the Windows installation files to the designated default folder.

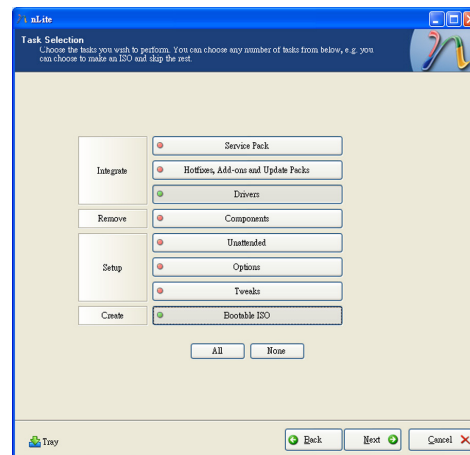
If you want to save them in another folder, click **Browse**, select the folder and then click **Next**.



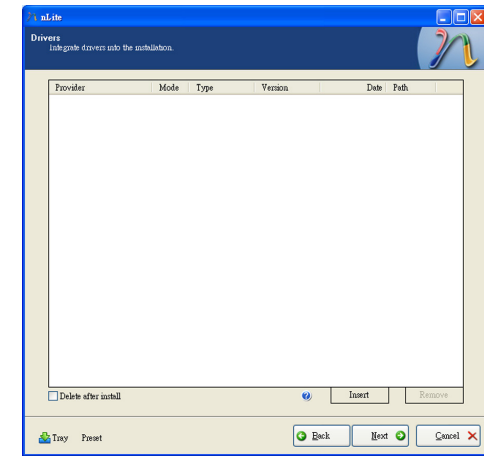
7. Click **Next**.



8. In the Task Selection dialog box, click **Drivers** and **Bootable ISO**. Click **Next**.

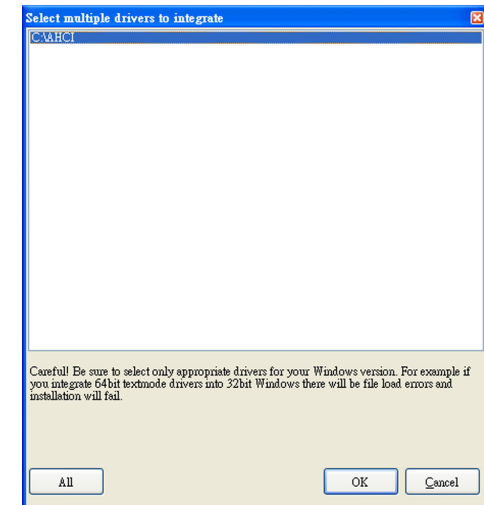


9. Click **Insert** and then select **Multiple driver folder** to select the drivers you will integrate. Click **Next**.

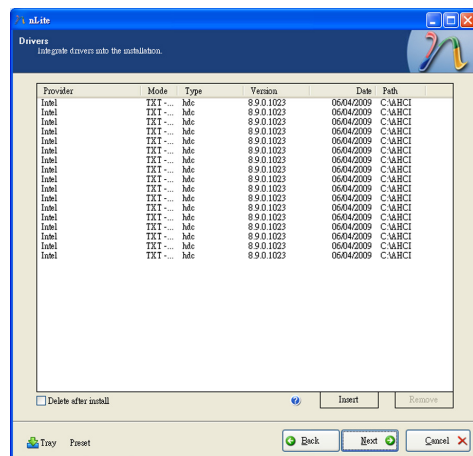


10. Select only the drivers appropriate for the Windows version that you are using and then click **OK**.

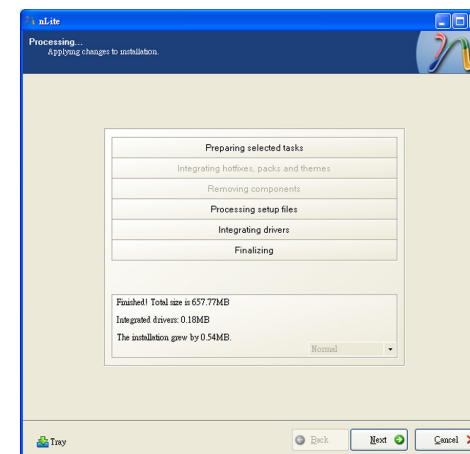
Integrating 64-bit drivers into 32-bit Windows or vice versa will cause file load errors and failed installation.



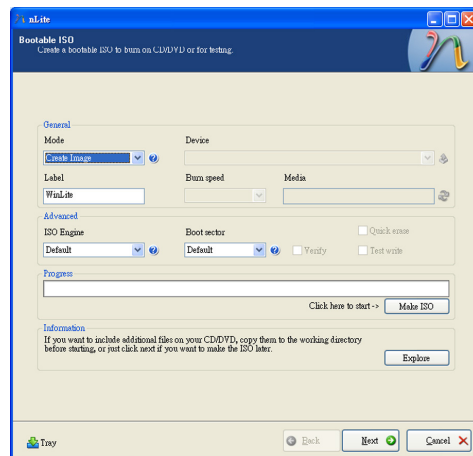
12. Click **Next**.



14. When the program is finished applying the changes, click **Next**.

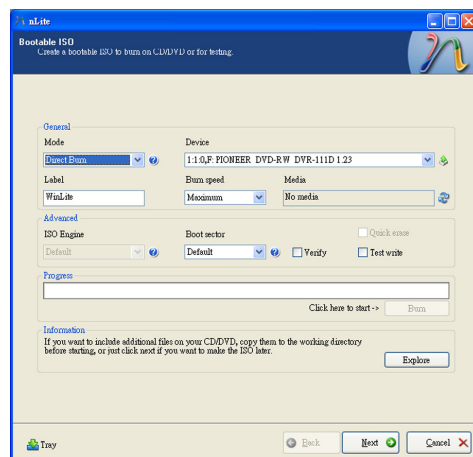


15. To create an image, select the **Create Image** mode under the General section and then click **Next**.



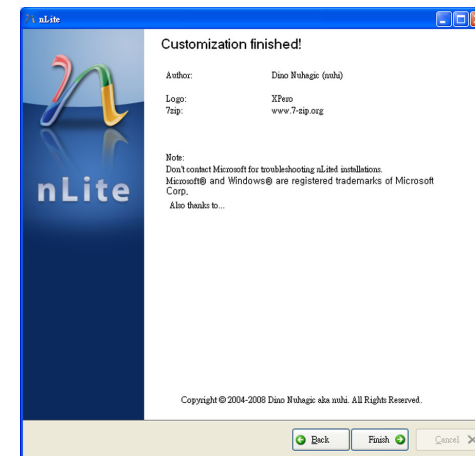
16. Or you can choose to burn it directly to a disc by selecting the **Direct Burn** mode under the General section.

Select the optical device and all other necessary settings and then click **Next**.



17. You have finished customizing the Windows XP installation disc. Click **Finish**.

Enter the BIOS utility to configure the SATA controller to RAID/AHCI. You can now install Windows XP.



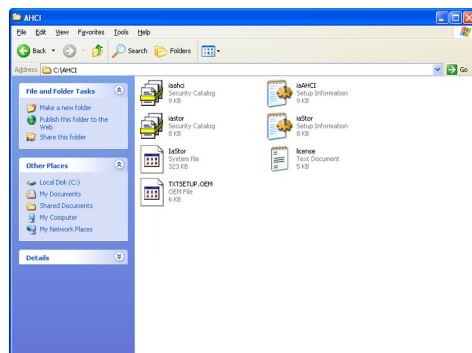


## AHCI

The installation steps below will guide you in configuring your SATA drive to AHCI mode.

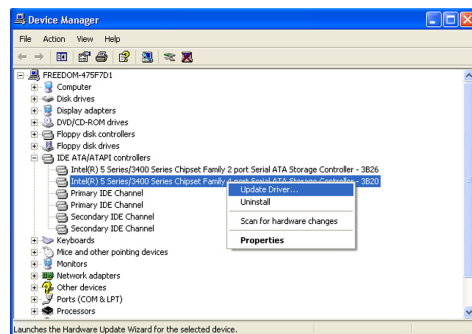
1. Enter the BIOS utility and configure the SATA controller to IDE mode.
2. Install Windows XP but do not press F6.
3. Download relevant RAID/AHCI driver files supported by the motherboard chipset from Intel's website.

Transfer the downloaded driver files to C:\AHCI.



4. Open Device Manager and right click on one of the Intel Serial ATA Storage Controllers, then select **Update Driver**.

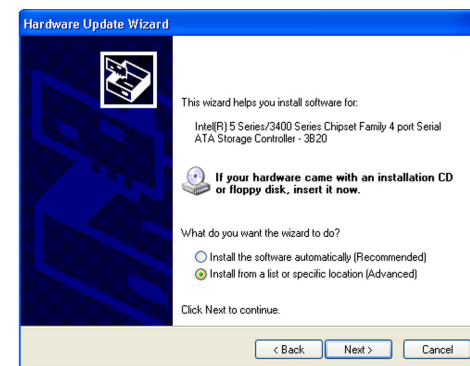
If the controller you selected did not work, try selecting another one.



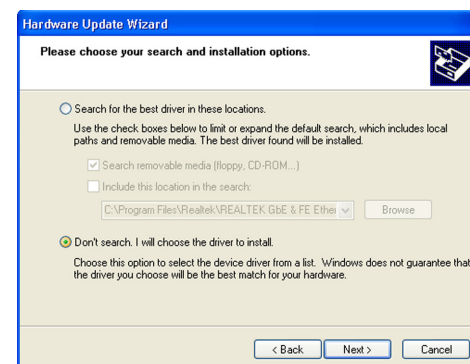
5. In the Hardware Update Wizard dialog box, select **"No, not this time"** then click **Next**.



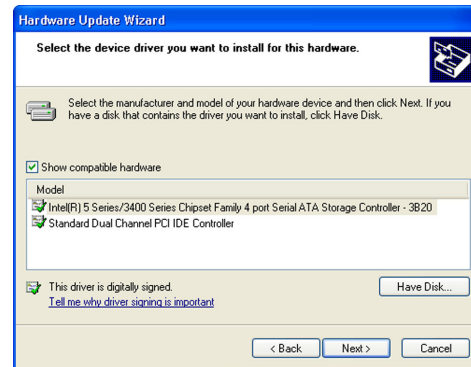
6. Select **"Install from a list or specific location (Advanced)"** and then click **Next**.



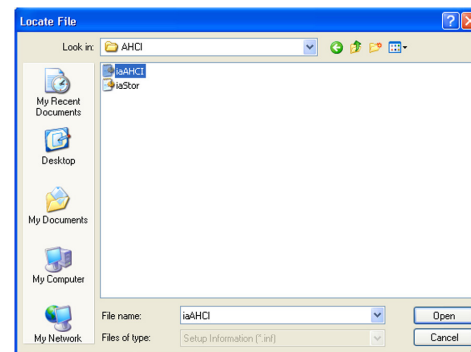
7. Select **"Don't search. I will choose the driver to install"** and then click **Next**.



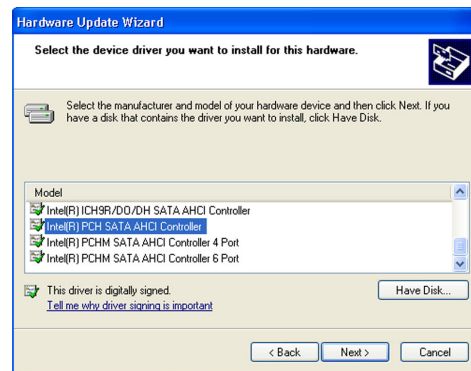
8. Click **"Have Disk"**.



9. Select C:\AHCI\iaAHCI.inf and then click **Open**.



10. Select the appropriate AHCI Controller of your hardware device and then click **Next**.

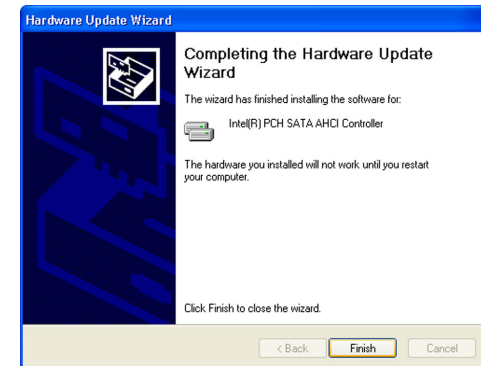


11. A warning message appeared because the selected SATA controller did not match your hardware device.

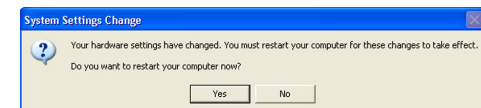


Ignore the warning and click **Yes** to proceed.

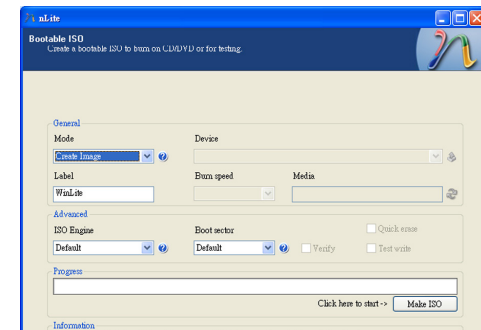
12. Click **Finish**.



13. The system's settings have been changed. Windows XP requires that you restart the computer. Click **Yes**.



14. Enter the BIOS utility and modify the SATA controller from IDE to AHCI. By doing so, Windows will work normally with the SATA controller that is in AHCI mode.



## Appendix B - Watchdog Sample Code

;Software programming example:

-----  
 ;(1) Enter Super IO Configuration mode  
 -----

```
MOV    DX,2EH
MOV    AL,87H
OUT    DX,AL
OUT    DX,AL
```

-----  
 ;(2) Configuration Logical Device 7, register CRF5/CRF6 (WDT Control /WDT timer)  
 -----

```
MOV    DX,2EH
MOV    AL,07H      ;Ready to Program Logical Device
OUT    DX,AL
```

```
MOV    DX,2FH
MOV    AL,07H      ;Select Logical Device 7
OUT    DX,AL
```

```
MOV    DX,2EH
MOV    AL, F6H      ;Select watchdog timer register
OUT    DX,AL
```

```
MOV    DX,2FH
MOV    AL,10H      ;Set watchdog timer value
OUT    DX,AL
```

```
MOV    DX,2EH
MOV    AL, F5H      ;Select watchdog Control Register
OUT    DX,AL
```

```
MOV    DX,2FH
MOV    AL,61H      ;Set Watchdog Control Value
OUT    DX,AL
```

-----  
 ;(1) Exit extended function mode  
 -----

```
MOV    DX,2EH
MOV    AL,AAH
OUT    DX,AL
```

## Appendix C - 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.



**Important:**

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 D - 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.

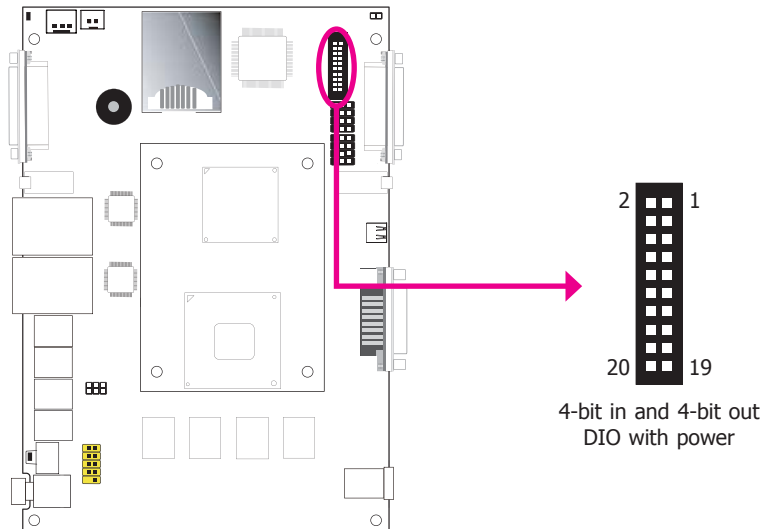
1. Make sure the keyboard is properly connected.
2. Make sure there are no objects resting on the keyboard and that no keys are pressed during the booting process.

## 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.

## Appendix E - Digital I/O User Guide

### CD952 Series: Isolated 8-bit Digital I/O Pin Define

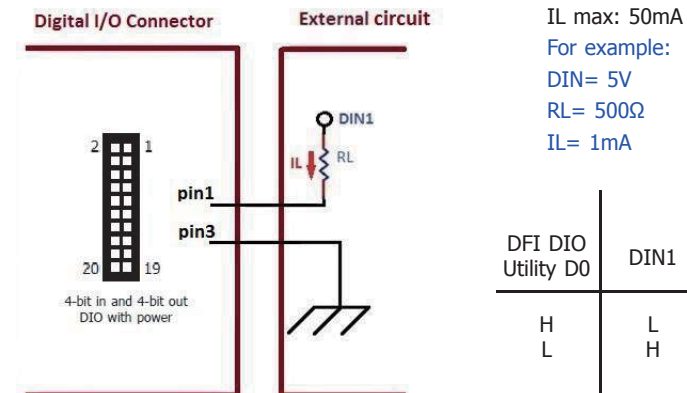


The 4-bit in and 4-bit out Digital I/O connector provides powering-on function to external devices that are connected to these connectors.

#### Digital I/O Connector

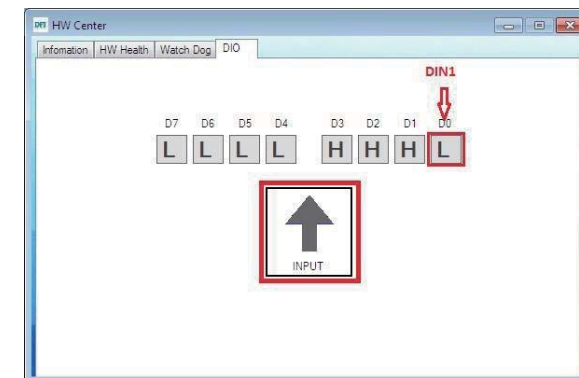
Pins	Function	Pins	Function
1	DIN0A	2	DOUT0A
3	DIN0B	4	DOUT0B
5	DIN1A	6	DOUT1A
7	DIN1B	8	DOUT1B
9	DIN2A	10	DOUT2A
11	DIN2B	12	DOUT2B
13	DIN3A	14	DOUT3A
15	DIN3B	16	DOUT3B
17	+5V	18	+5V_standby
19	GND	20	GND

### DIN Example with DIN0A/DIN0B

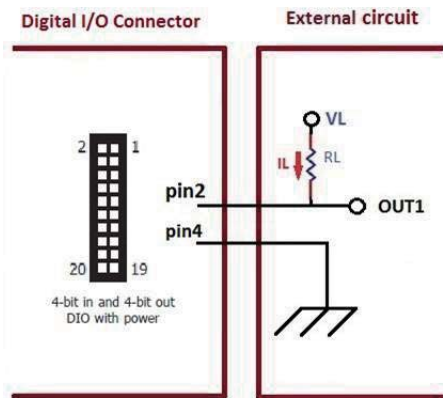


### Set DIO at Input Mode

Example1 DIN1= 5V D0 to L.



## DOUT Example1 with Dout0A/Dout0B



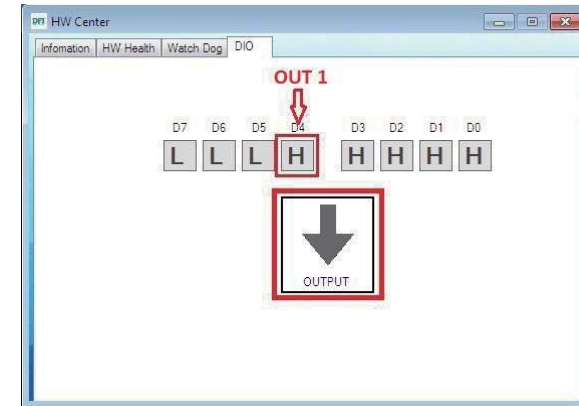
VL: 60V max  
 IL max: 600mA  
 For example:  
 VL= 5V  
 RL= 1K $\Omega$   
 IL= 5mA

DFI DIO Utility D4	OUT1
H	L
L	H

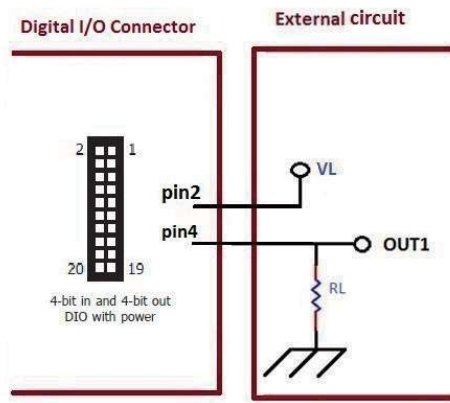
## Set DIO at Output Mode, Press D4 to H

Example1 OUT1 to Low.

Example2 OUT1 to High.



## DOUT Example2 with Dout0A/Dout0B



DFI DIO Utility D4	OUT1
H	H
L	L

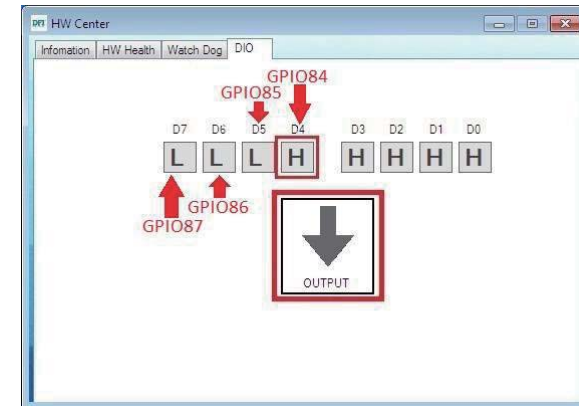
## According DIO pin to GPIO Programming Setting

Pins	Function	
1	DIN0A	Couple for GPIO 80
3	DIN0B	
5	DIN1A	Couple for GPIO 81
7	DIN1B	
9	DIN2A	Couple for GPIO 82
11	DIN2B	
13	DIN3A	Couple for GPIO 83
15	DIN3B	
17	+5V	
19	GND	

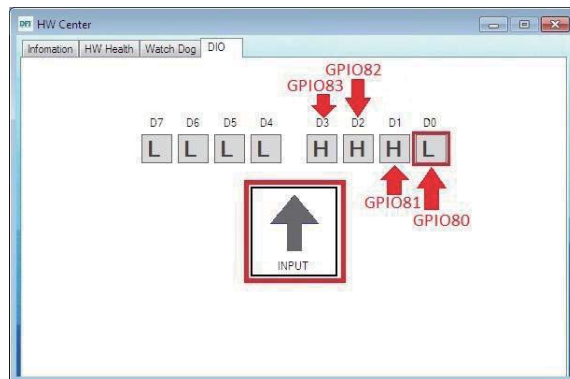


## DOUT MAP

Pins	Function	
2	DOUT0A	Couple for GPIO 84
4	DOUT0B	
6	DOUT1A	Couple for GPIO 85
8	DOUT1B	
10	DOUT2A	Couple for GPIO 86
12	DOUT2B	
14	DOUT3A	Couple for GPIO 87
16	DOUT3B	
18	+5V_standby	
20	GND	



## DIN MAP



## Digital I/O Programming Guide

### 1. Pins for Digital I/O

Item	Standard
GPIO80 (Pin111)	GP80
GPIO81 (Pin112)	GP81
GPIO82 (Pin113)	GP82
GPIO83 (Pin114)	GP83
GPIO84 (Pin115)	GP84
GPIO85 (Pin116)	GP85
GPIO86 (Pin117)	GP86
GPIO87 (Pin118)	GP87
GPIO71 (Pin104)	CTR-GP71
GPIO72 (Pin105)	CTR-GP72

### 2. Programming Guide

To program the F81866A configuration registers, the following configuration procedures must be followed in sequence:

- (1) Enter the Extended Function Mode
- (2) Configure the configuration registers
- (3) Exit the Extended Function Mode

The configuration register is used to control the behavior of the corresponding devices. To configure the register, using the index port to select the index and then writing data port to alter the parameters. The default index port and data port are 0x4E and 0x4F respectively. **Pull down the SOUT1 pin to change the default value to 0x2E/0x2F. To enable configuration, the entry key 0x87 must be written to the index port. To disable configuration, write exit entry key 0xAA to the index port.** Following is an example to enable configuration and disable configuration by using debug.

- o 4e 87
- o 4e 87 (enable configuration)
- o 4e aa (disable configuration)

### 3. Relative Registers

Logic Device Number Register (LDN) — Index 07h				
Bit	Name	R/W	Default	Description
7-0	LDN	R/W	00h	00h: Select FDC device configuration registers. 03h: Select Parallel Port device configuration registers. 04h: Select Hardware Monitor device configuration registers. 05h: Select KBC device configuration registers. <b>06h: Select GPIO device configuration registers.</b> 07h: Select WDT device configuration registers. 0Ah: Select PME, ACPI and ERP device configuration registers. 10h: Select COM1 device configuration registers. 11h: Select COM2 device configuration registers. 12h: Select COM3 device configuration registers. 13h: Select COM4 device configuration registers. 14h: Select COM5 device configuration registers. 15h: Select COM6 device configuration registers. Otherwise: Reserved.

GPIO8 Output Enable Register — Index 88h				
Bit	Name	R/W	Default	Description
7	GPIO87_OE	R/W	0	0: GPIO87 is in input mode. 1: GPIO87 is in output mode.
6	GPIO86_OE	R/W	0	0: GPIO86 is in input mode. 1: GPIO86 is in output mode.
5	GPIO85_OE	R/W	0	0: GPIO85 is in input mode. 1: GPIO85 is in output mode.
4	GPIO84_OE	R/W	0	0: GPIO84 is in input mode. 1: GPIO84 is in output mode.
3	GPIO83_OE	R/W	0	0: GPIO83 is in input mode. 1: GPIO83 is in output mode.
2	GPIO82_OE	R/W	0	0: GPIO82 is in input mode. 1: GPIO82 is in output mode.
1	GPIO81_OE	R/W	0	0: GPIO81 is in input mode. 1: GPIO81 is in output mode.
0	GPIO80_OE	R/W	0	0: GPIO80 is in input mode. 1: GPIO80 is in output mode.

**GPIO8 Output Data Register — Index 89h (This byte could be also written by base address + 2)**

Bit	Name	R/W	Default	Description
7	GPIO87_VAL	R/W	1	0: GPIO87 outputs 0 when in output mode. 1: GPIO87 outputs 1 when in output mode.
6	GPIO86_VAL	R/W	1	0: GPIO86 outputs 0 when in output mode. 1: GPIO86 outputs 1 when in output mode.
5	GPIO85_VAL	R/W	1	0: GPIO85 outputs 0 when in output mode. 1: GPIO85 outputs 1 when in output mode.
4	GPIO84_VAL	R/W	1	0: GPIO84 outputs 0 when in output mode. 1: GPIO84 outputs 1 when in output mode.
3	GPIO83_VAL	R/W	1	0: GPIO83 outputs 0 when in output mode. 1: GPIO83 outputs 1 when in output mode.
2	GPIO82_VAL	R/W	1	0: GPIO82 outputs 0 when in output mode. 1: GPIO82 outputs 1 when in output mode.
1	GPIO81_VAL	R/W	1	0: GPIO81 outputs 0 when in output mode. 1: GPIO81 outputs 1 when in output mode.
0	GPIO80_VAL	R/W	1	0: GPIO80 outputs 0 when in output mode. 1: GPIO80 outputs 1 when in output mode.

**GPIO7 Output Enable Register — Index 80h**

Bit	Name	R/W	Default	Description
7	GPIO77_OE	R/W	0	0: GPIO77 is in input mode. 1: GPIO77 is in output mode.
6	GPIO76_OE	R/W	0	0: GPIO76 is in input mode. 1: GPIO76 is in output mode.
5	GPIO75_OE	R/W	0	0: GPIO75 is in input mode. 1: GPIO75 is in output mode.
4	GPIO74_OE	R/W	0	0: GPIO74 is in input mode. 1: GPIO74 is in output mode.
3	GPIO73_OE	R/W	0	0: GPIO73 is in input mode. 1: GPIO73 is in output mode.
2	GPIO72_OE	R/W	0	0: GPIO72 is in input mode. 1: GPIO72 is in output mode.
1	GPIO71_OE	R/W	0	0: GPIO71 is in input mode. 1: GPIO71 is in output mode.
0	GPIO70_OE	R/W	0	0: GPIO70 is in input mode. 1: GPIO70 is in output mode.

**GPIO7 Output Data Register — Index 81h (This byte could be also written by base address + 3)**

Bit	Name	R/W	Default	Description
7	GPIO77_VAL	R/W	1	0: GPIO77 outputs 0 when in output mode. 1: GPIO77 outputs 1 when in output mode.
6	GPIO76_VAL	R/W	1	0: GPIO76 outputs 0 when in output mode. 1: GPIO76 outputs 1 when in output mode.
5	GPIO75_VAL	R/W	1	0: GPIO75 outputs 0 when in output mode. 1: GPIO75 outputs 1 when in output mode.
4	GPIO74_VAL	R/W	1	0: GPIO74 outputs 0 when in output mode. 1: GPIO74 outputs 1 when in output mode.
3	GPIO73_VAL	R/W	1	0: GPIO73 outputs 0 when in output mode. 1: GPIO73 outputs 1 when in output mode.
2	GPIO72_VAL	R/W	1	0: GPIO72 outputs 0 when in output mode. 1: GPIO72 outputs 1 when in output mode.
1	GPIO71_VAL	R/W	1	0: GPIO71 outputs 0 when in output mode. 1: GPIO71 outputs 1 when in output mode.
0	GPIO70_VAL	R/W	1	0: GPIO70 outputs 0 when in output mode. 1: GPIO70 outputs 1 when in output mode.

## 4. Sample Code in C Language

### 4.1 Control of GP03, GP02 and GP07

```
#define AddrPort 0x2E
#define DataPort 0x2F

<Enter the Extended Function Mode>
WriteByte(AddrPort, 0x87)
WriteByte(AddrPort, 0x87) //Must write twice to entering
Extended mode

<Select Logic Device>
WriteByte(AddrPort, 0x07)
WriteByte(AddrPort, 0x06)
//Select logic device 06h

<Output Mode Selection> //SetGPIO71/72 to output Mode
WriteByte(AddrPort, 0x80) // Select configuration register 80h
WriteByte(DataPort, (ReadByte(DataPort) | 0x06))
//Set (bit 0/1) = (1) to select GPIO 71/72 as Output mode.

<Output Value>
WriteByte(AddrPort, 0x81) // Select configuration register 81h
WriteByte(DataPort, Value) // Set bit n=(1/2) to output GPIO7n
as Low or High

<Leave the Extended Function Mode>
WriteByte(AddrPort, 0xAA)
```

### 4.2 Control of GP80 to GP87

```
#define AddrPort 0x2E
#define DataPort 0x2F

<Enter the Extended Function Mode>
WriteByte(AddrPort, 0x87)
WriteByte(AddrPort, 0x87) //Must write twice to entering
Extended mode

<Select Logic Device>
WriteByte(AddrPort, 0x07)
WriteByte(DataPort, 0x06) // Select logic device 06h

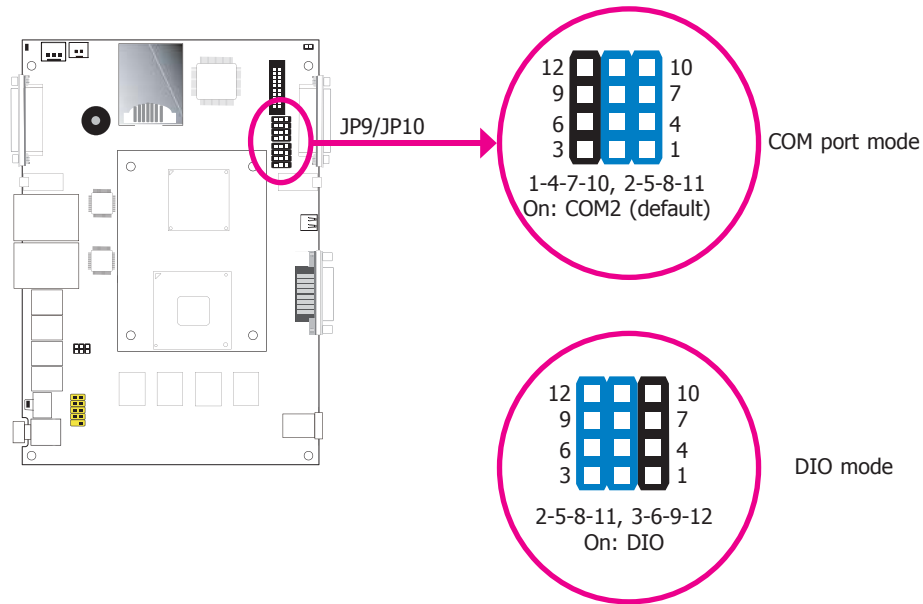
<Output/Input Mode Selection> //SetGP80 to GP87 I/O Mode
WriteByte(AddrPort, 0x88) // Select configuration register 88h
WriteByte(DataPort, (ReadByte(DataPort) & 0xFF))
//Set (bit n) = (1/0) to select GP 8n as Output/Input mode.

<Get Input Value>
WriteByte(AddrPort, 0x8A) // Select configuration register 8Ah
Data = ReadByte(DataPort) // The "Data" represent the input value of GP80~87

<Output Value>
WriteByte(AddrPort, 0x89) // Select configuration register 89h
WriteByte(DataPort, Value) // Set bit n=(0/1) to output GP 8n
as Low or High

<Leave the Extended Function Mode>
WriteByte(AddrPort, 0xAA)
```

## CD952 Series: Isolated 4-bit Digital I/O Jumper Setting COM2/DIO Select



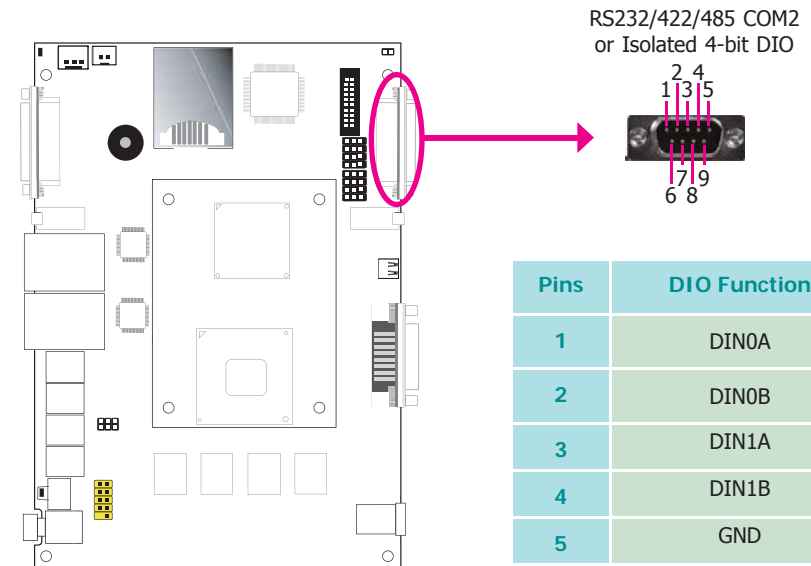
The system board uses JP9 and JP10 to select between RS232/422/485 COM2 or isolated 4-bit DIO at the rear panel.



### **Note:**

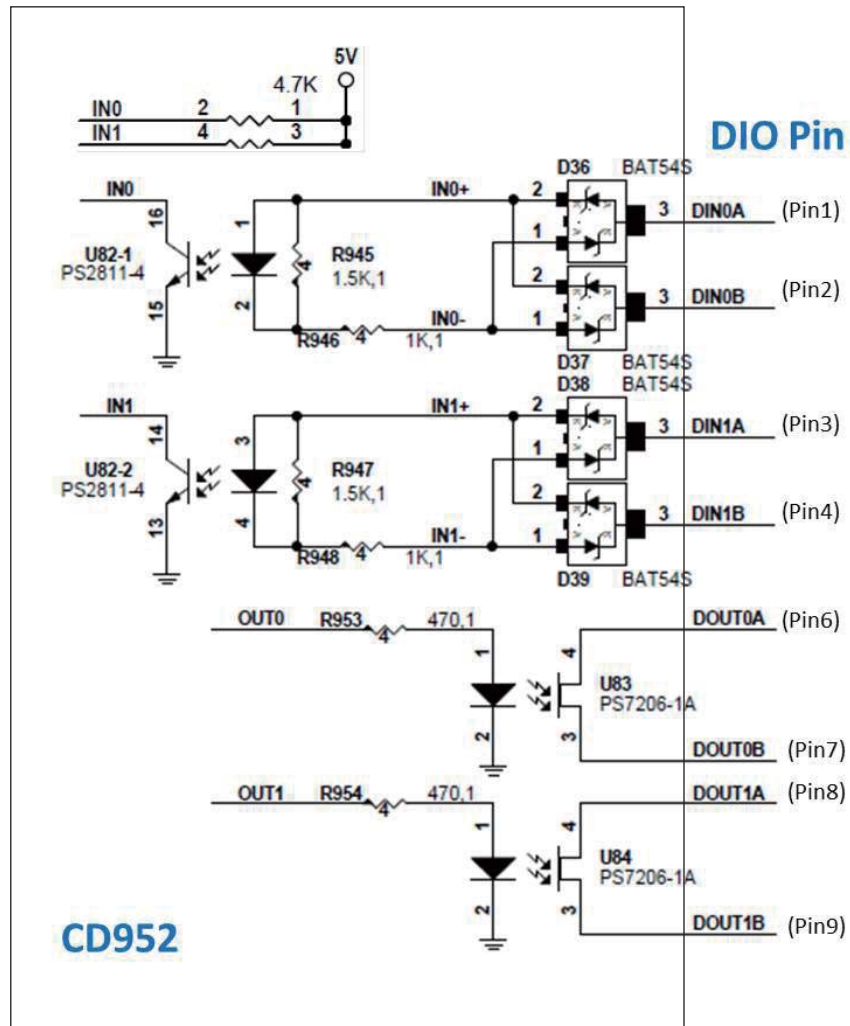
You cannot use COM2 and DIO at the same time. Please set up JP9 and JP10 at the same time.



## CD952 Series: Isolated 4-bit Digital I/O Pin Define COM2 (Serial) Port/ Isolated 4-bit DIO



Pins	DIO Function
1	DIN0A
2	DIN0B
3	DIN1A
4	DIN1B
5	GND
6	DOUT0A
7	DOUT0B
8	DOUT1A
9	DOUT1B

## Isolated 4-bit Digital I/O Input Request



Pins	Input Request
*1	5V~12V
2	GND
*3	5V~12V
4	GND
5	GND
*6	 Loading AC or DC 5V~60V
7	
*8	 Loading AC or DC 5V~60V
9	

## ABSOLUTE MAXIMUM RATINGS SPECIFICATION

\*Pin1/Pin3 :

- Diode forward current(DC) rating  $I_F = 50\text{mA/ch.}$

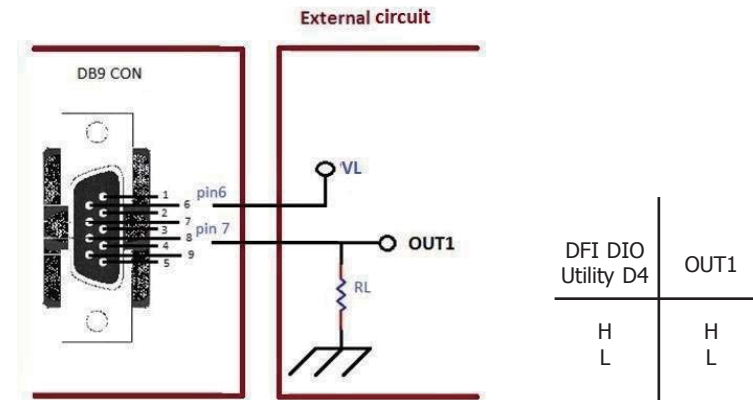
\*Pin6/Pin8 :

- MOS FET Continuous Load Current rating  $I_L = 600\text{mA.}$

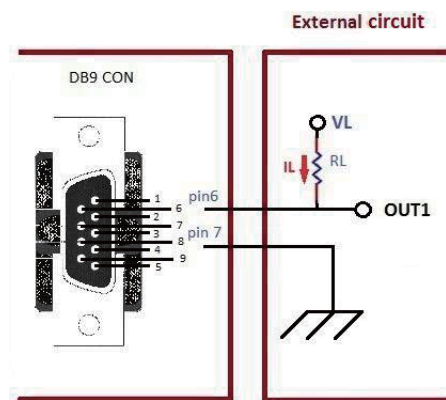
## 4-bit (2-bit in and 2-bit out) description

Pins	Input Request	
*1	5V~12V	Pin 1 and 2 are couple, DIN1
2	GND	
*3	5V~12V	Pin 3 and 4 are couple, DIN2
4	GND	
5	GND	
*6	AC or DC Load	Pin 6 and 7 are couple, OUT1
7	Loading AC or DC 5V~60V	
*8	AC or DC Load	Pin 8 and 9 are couple, OUT2
9	Loading AC or DC 5V~60V	

## DOUT Example2 with Dout0A/Dout0B



## DOUT Example1 with Dout0A/Dout0B

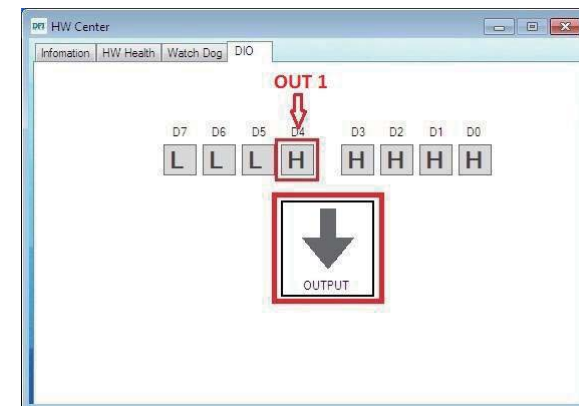


VL: 60V max  
 IL max: 600mA  
 For example:  
 VL= 5V  
 RL= 1KΩ  
 IL= 5mA

DFI DIO Utility D4	OUT1
H	L
L	H

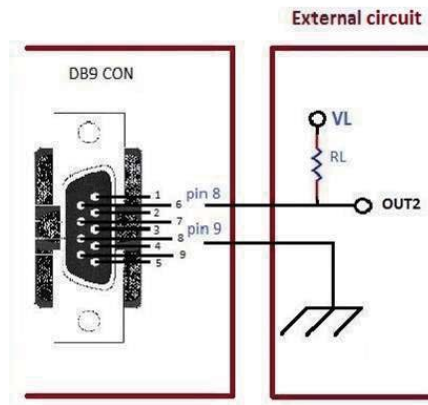
## Set DIO at Output Mode, Press D4 to H

Example1 OUT1 to Low.  
 Example2 OUT1 to High.





## DOUT Example3 with Dout1A/Dout1B

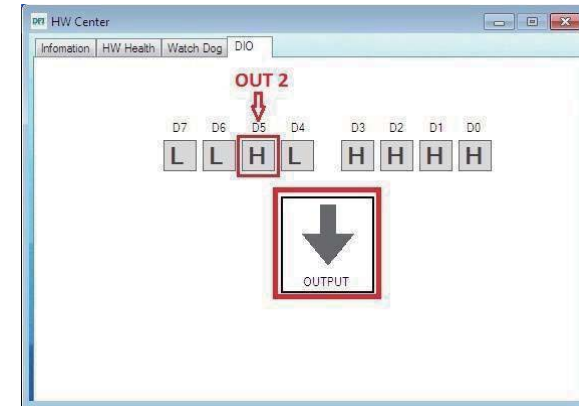


DFI DIO Utility D5	OUT2
H	L
L	H

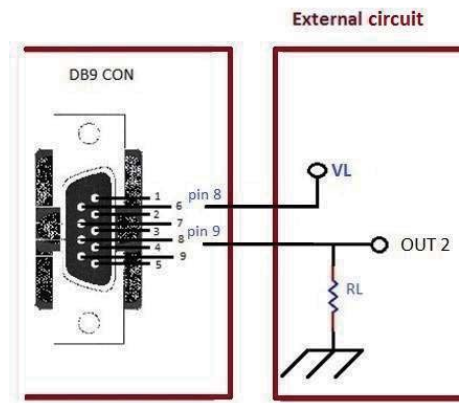
## Set DIO at Output Mode, Press D5 to H

Example3 OUT2 to Low.

Example4 OUT2 to High.

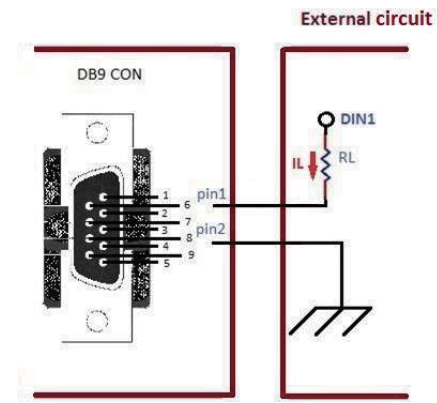


## DOUT Example4 with Dout1A/Dout1B



DFI DIO Utility D5	OUT2
H	H
L	L

## DIN Example1 with DIN0A/DIN0B



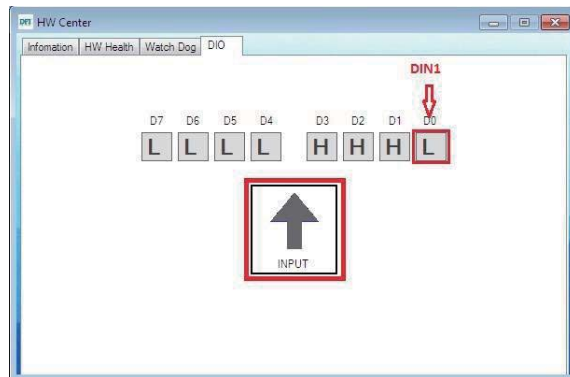
IL max: 50mA  
 For example:  
 DIN= 5V  
 RL= 500Ω  
 IL= 1mA

DFI DIO Utility D0	OUT1
H	L
L	H



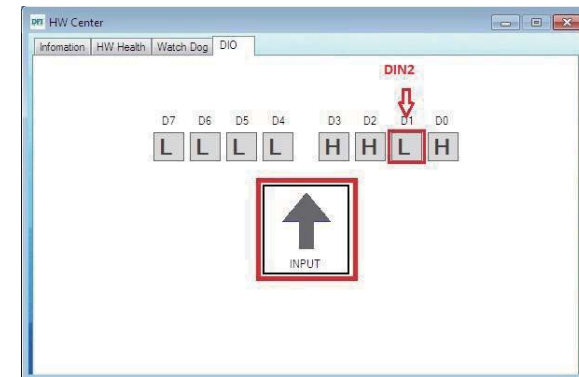
## Set DIO at Input Mode

Example1 DIN1= 5V D0 to L

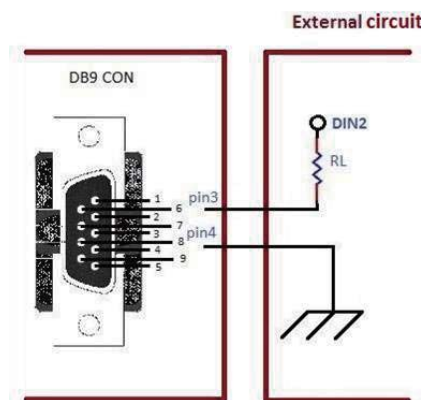


## Set DIO at Input Mode

Example2 DIN2= 5V D1 to L



## DIN Example1 with DIN1A/DIN1B



DFI DIO Utility D1	OUT2
H	L
L	H