SI-83

User Manual

Revision	Release Date
V1.0	2014/12/12

Table of Contents

Safety Information

Your SI-83 is designed and tested to meet the latest standards of safety for information technology equipment. However, to ensure your safety, it is important that you read the following safety instructions

Setting up your system

- Read and follow all instructions in the documentation before you operate your system.
- Do not use this product near water.
- Set up the system on a stable surface. Do not secure the system on any unstable plane.
- Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
- Slots and openings on the chassis are for ventilation. Do not block or cover these openings. Make sure you leave plenty of space around the system for ventilation. ***Never insert objects of any kind into the ventilation openings***.
- This system should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
- Use this product in environments with ambient temperatures between 0˚C and 45˚C.
- If you use an extension cord, make sure that the total ampere rating of the devices plugged into the extension cord does not exceed its ampere rating.
- DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 80° C (176° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.

Care during use

- Do not walk on the power cord or allow anything to rest on it.
- Do not spill water or any other liquids on your system.
- When the system is turned off, a small amount of electrical current still flows. Always unplug all power, and network cables from the power outlets before cleaning the system.
- If you encounter the following technical problems with the product, unplug the power cord and contact a qualified service technician or your retailer.
  - The power cord or plug is damaged.
  - Liquid has been spilled into the system.
  - The system does not function properly even if you follow the operating instructions.
  - The system was dropped or the cabinet is damaged.

Lithium-Ion Battery Warning

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

NO DISASSEMBLY

The warranty does not apply to the products that have been disassembled by users

WARNING
HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER BODY PARTS AWAY

Acknowledgments

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CHAPTER 1 INTRODUCTION

1.1 General Description

The “Signature Book™” SI-83 is a professional digital signage system powered by 4th Gen. Intel® Core™ i Processor with Intel® HD 4600 / 4400 Integrated Graphics. It comes with dual DP and one HDMI. The slim and segregated ventilation design player comes with a chassis that provides passive cooling for better system reliability and quiet operation.

SI-83 overview

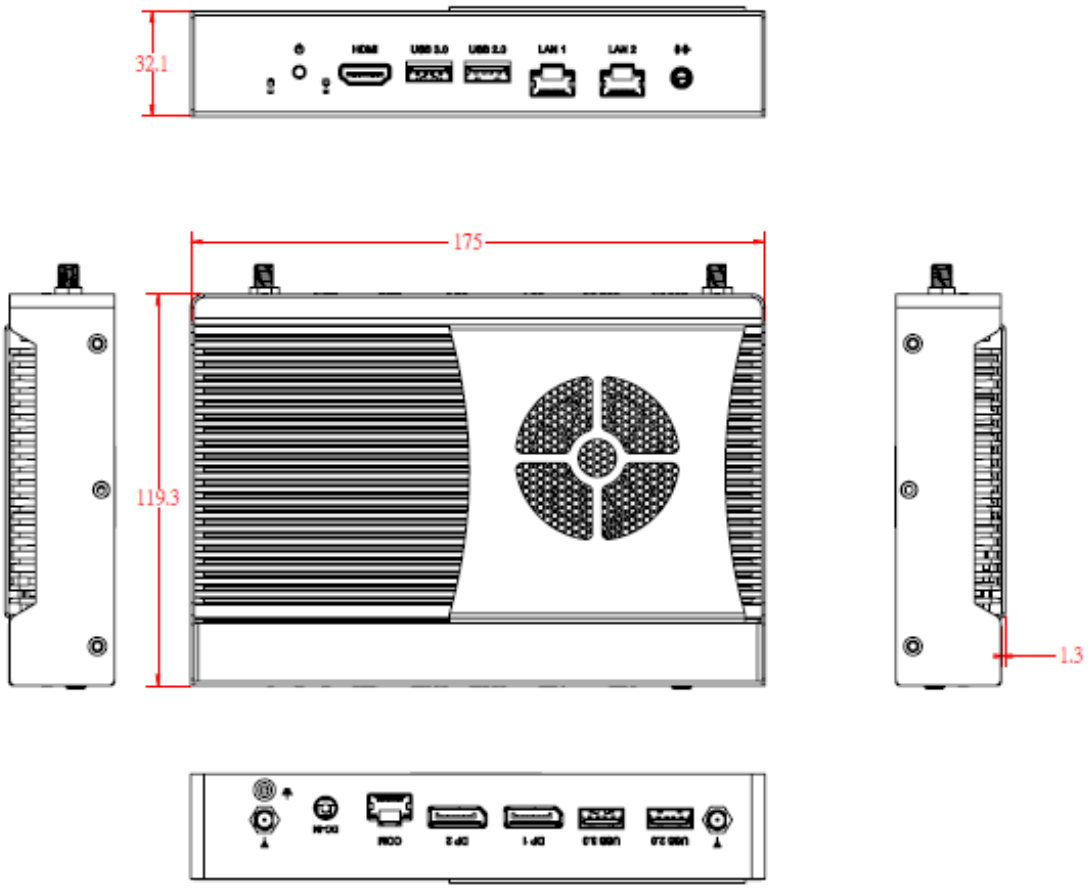
1.2 System Specifications

1.2.1 Hardware Specifications

Model Name	SI-83
System Mainboard	IB983
CPU	4th Generation Intel® Core™ i7-4700EQ 2.4GHz 4th Generation Intel® Core™ i5-4400E 2.7GHz
Memory	2x DDR3L-1600 MHz SO-DIMM, Max. 16GB (Non-ECC)
I/O Interface	1 x HDMI 2 x DP 2 x USB 3.0 ports, 2x USB 2.0 port 2 x RJ45 for GbE LAN, 1x RJ45 for RS232 1 x Microjack audio connectors for Audio/Mic 1 x Power on/off button 1 x Reset button 1 x DC jack
Storage	1 x mSATA
Expansion Slots	1 x mPCIe(x1) for WiFi + Bluetooth, 3G, GPS and TV tuner options 1 x UIM/SIM card slot (for 3G/LTE adapter in mPCIe slot)
Power Supply	+ 12V DC-in
Construction	Aluminum + SGCC
Mounting	Standard system bracket
Dimensions	175mm(W) x 116mm(D) x 32mm(H) 6.9”(W) x 4.6”(D) x 1.18”(H)
Operating Temperature	0°C~ 45°C (32°F~113°F)
Storage Temperature	-20° ~ 80°C (-4°F~176°F)
Relative Humidity	5~90% @ 45°C, (non-condensing)
Vibration	mSATA: 5 grms / 5~500Hz / random operation
RoHS	Available
Certification	CE, FCC, UL, CCC

·This specification is subject to change without prior notice.

1.2.2 Dimensions

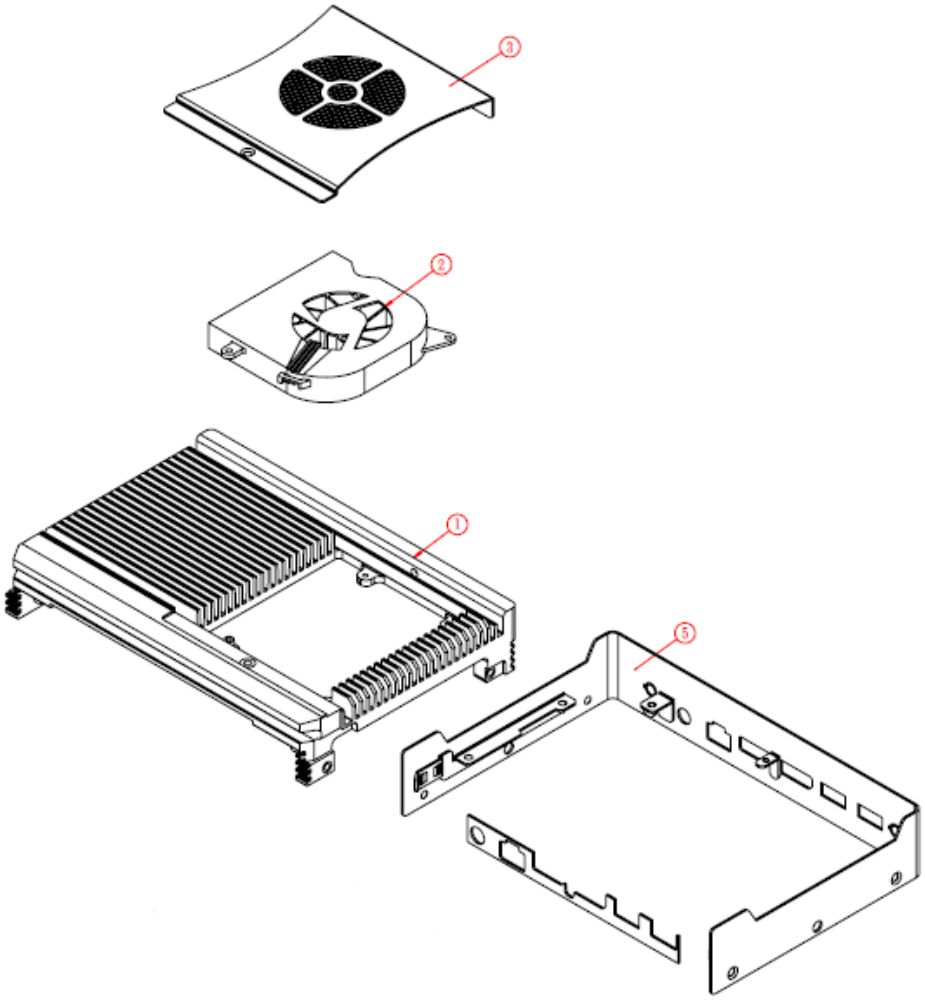


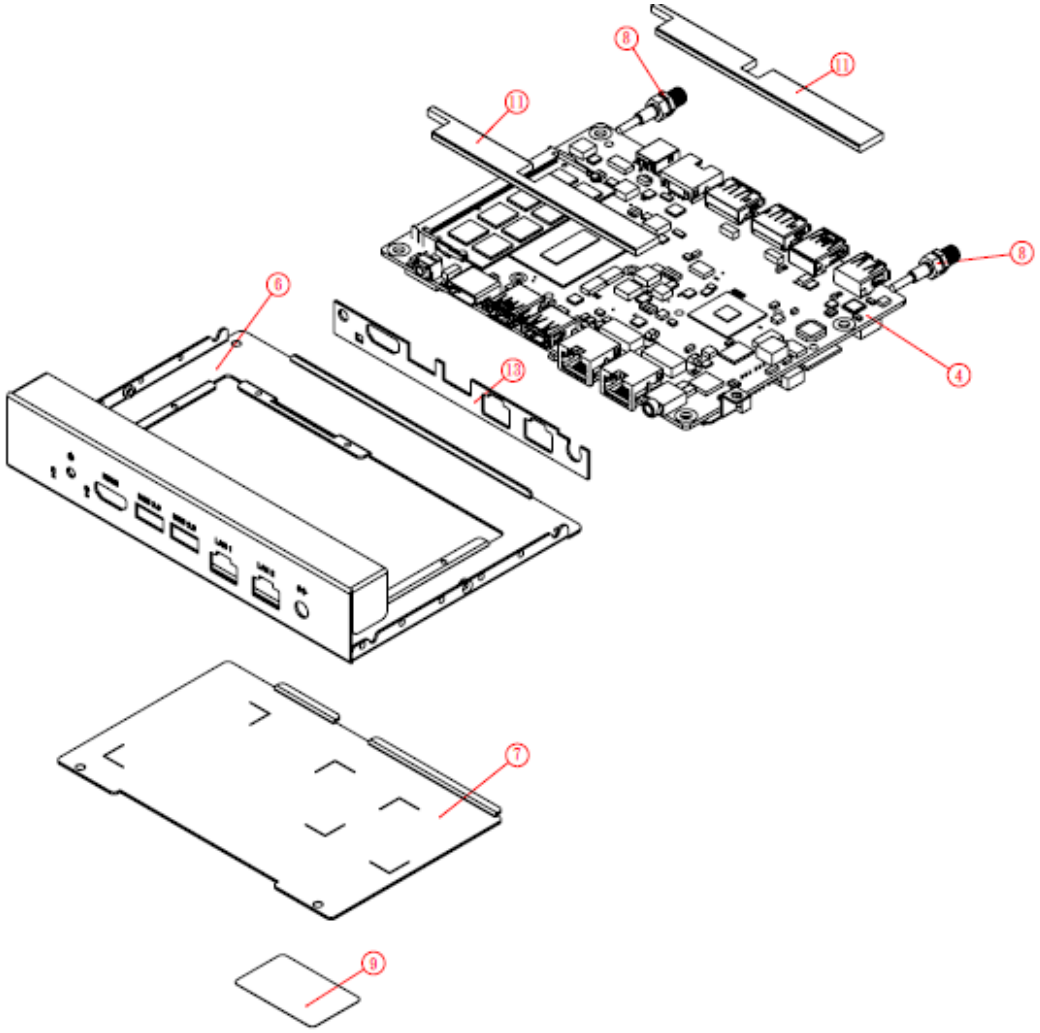
1.2.3 I/O View

SI-83 front side

SI-83 rear side

1.3 Exploded View of the SI-83 Assembly





1.3.1 Parts Description

Part No.	Description	Part No.	Description
1	SI-83 heat sink	2	Fan
3	SI-83 fan bracket	4	IB983 motherboard
5	SI-83 body case	6	SI-83 base
7	SI-83 system base bracket	8	Antenna
9	SI-83 label	10	SI-83 board bracket
11	SI-83 top gasket	12/13	SI-83 I/O gasket-1/2

1.4 Packing List

Item No.	Description	Qty
1	Driver CD	1
2	Power adaptor	1
3	Power cord	1
4	Mounting kit	1

1.4.1 Optional Items

WiFi Solution	Description	
WiFi module	Wireless; PCI-E Mini Card 802.11B/G/N [AW-NE238H] (A008WLAWNE238H000P)	
External Antenna, 2pcs	WiFi Antenna (A055RFA02C2M20800P)	 
Internal cable	Internal Antenna 100mm[BTC130-1-70B-100] RoHS (A055RFA0000021000P)	
Internal cable	Internal Antenna 200mm [BTC130-1-70B-200-1] RoHS, (A055RFA0000020000P)	
Screw, 2pcs	Screw;A44-N NI 3.4 NYLOK M2*L3.8 P0.4mm [LHS]RoHS (H02203A0442200N00P)	
Bracket, -1set	Component BOM;MPCIE-EXT V-B2 Bracket (SC2MPCIEEXT0B2100P)	
3G Solution	**Description**	
3G	Wireless; 3.75G UMTS/HSPA [ZU202] RoHS (A008WIRELESS00520P)	
3G+GPS	Wireless; 3.75G UMTS/HSPA & GPS Module [ZU200] RoHS (A008WIRELESS00510P)	
Cable	Cable; SMA IPX Cable For 3G 30CM [RF11030A] RoHS (A012INTENAL010000P)	
Antenna	3G [ANT0921Q2P] RoHS (A055ANT0921Q2P000P)	
COM Port Cable	**Description**	
EXT-424	Cable;EXT-424 2-HD 8C 90CM; RJ45 Jack-8M=>DSU-9F RoHS (C501EXT4240902000P)	
EXT-481	Cable;EXT-481 2-HD 8C 90CM; RJ45 Jack-8M=>DSU-9M RoHS (C501EXT4810902000P)	

1.5 HARDWARE INSTALLATION

1.5.1 Installing the Mounting Kit

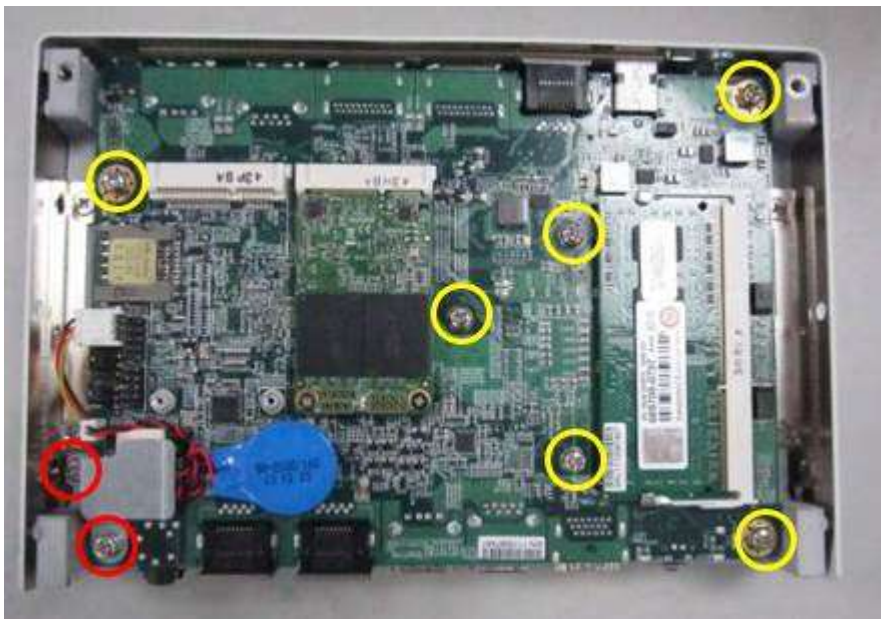
1. Please install the mounting kit and make sure the direction.
   And then screw two screws as shown.

1.5.2 Installing the Optional Wireless Module

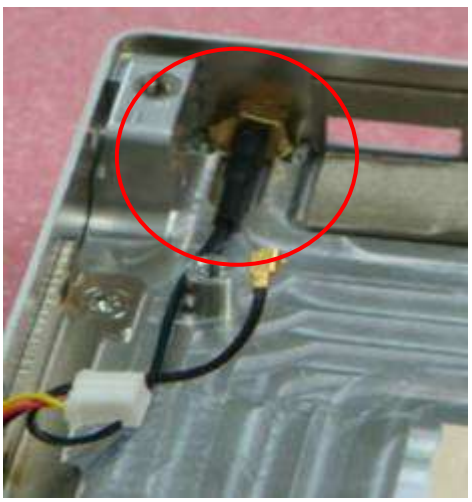
1. Remove the two screws on the back cover that are used to secure the cover to the chassis. Once all the screws are removed, from the side, dismount the cover forward to remove it.

2. Remove the two screws on the base and four screws on the bracket and draw out the chassis.

3. Remove the eight screws indicated on the picture below and remove the motherboard.



4. Install the internal cable on the "⊓" type bracket. Please pay attention to the length of two internal cables.



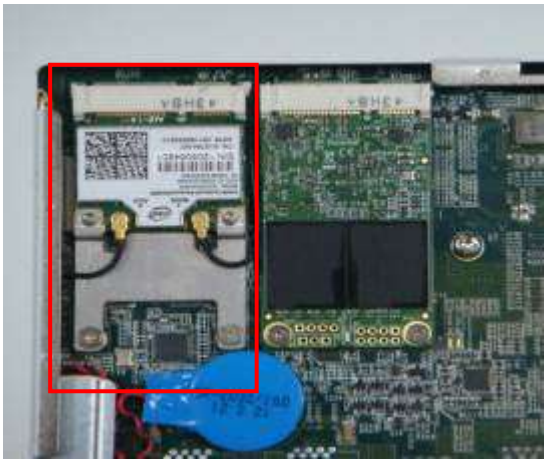
Internal Antenna [A055RFA0000021000P] 10cm

Internal Antenna [A055RFA0000020000P] 20cm

5. Install the motherboard and bracket, and arrange the longer right cable as shown.

6. Screw the two screws and note to the orientation of the WIFI module and bracket.

7. Push the WIFI module into the slot and connect the two internal antenna as shown below.



1.5.3 Installing mSATA

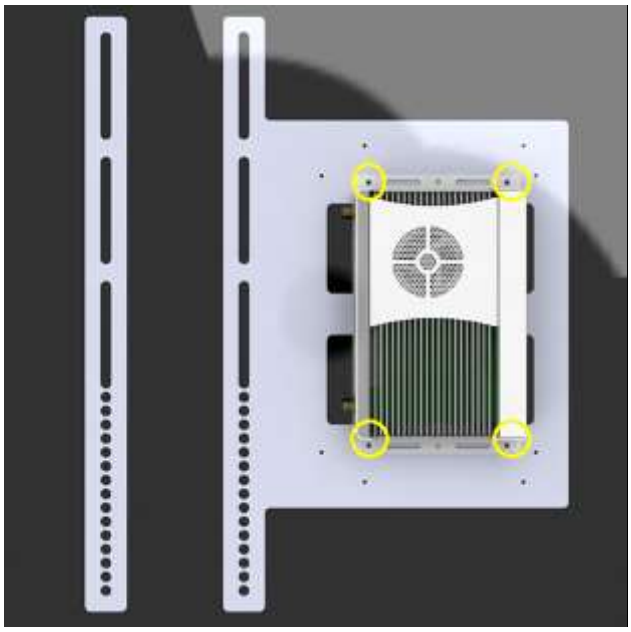
1. Remove the 2 screws on the back cover that are used to secure the cover to the chassis. Once all the screws are removed, from the side, dismount the cover forward to remove it.

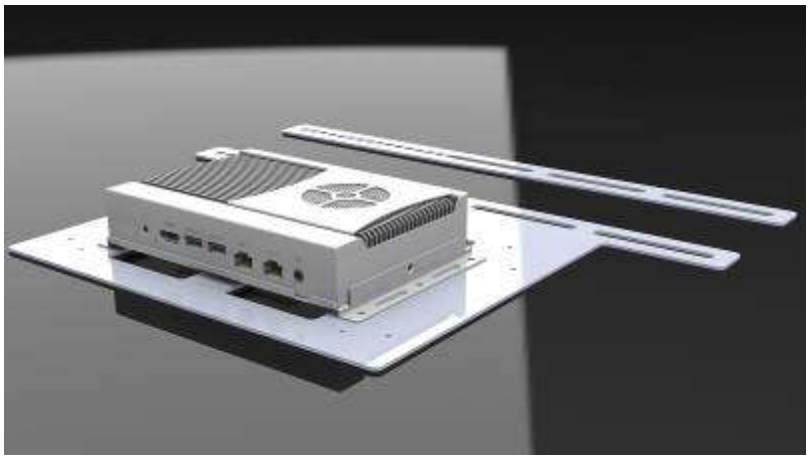
2. Push the mSATA module into the slot as shown in the picture below.

1.5.4 SI-83 Mounting Bracket Solution

SI-83 mounting bracket (IBASE) part number: SC2SIMK3---0A1100P

Please install SI-83 to the mounting bracket using 4 screws, as shown in the picture.





CHAPTER 2 MOTHERBOARD INTRODUCTION

2.1 Introduction

The IB983 **CUSTOM SIGNAGE SBC** is based on the latest Intel® QM87 chipset. The platform supports onboard 4th generation Intel® Core processor family that features an integrated dual-channel DDR3 memory controller as well as a graphics core.

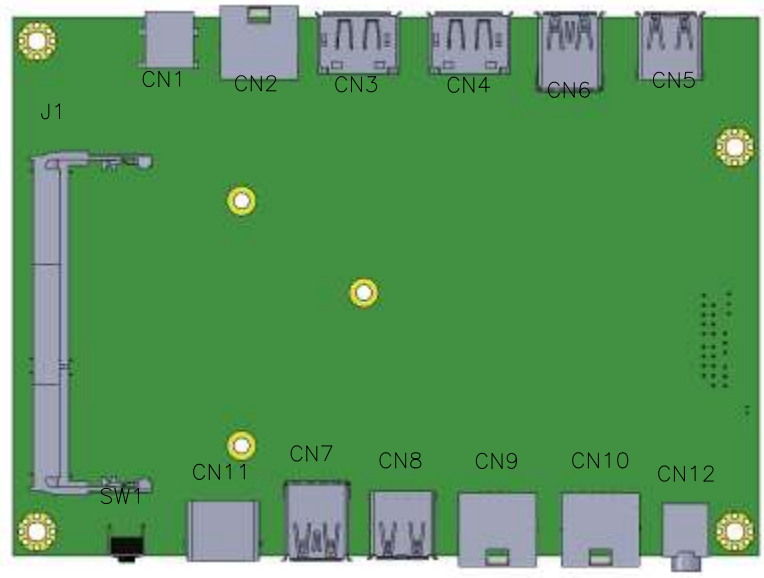
The latest Intel® processors provide advanced performance in both computing and graphics quality. This meets the requirement of customers in the gaming, POS, digital signage and server market segment.

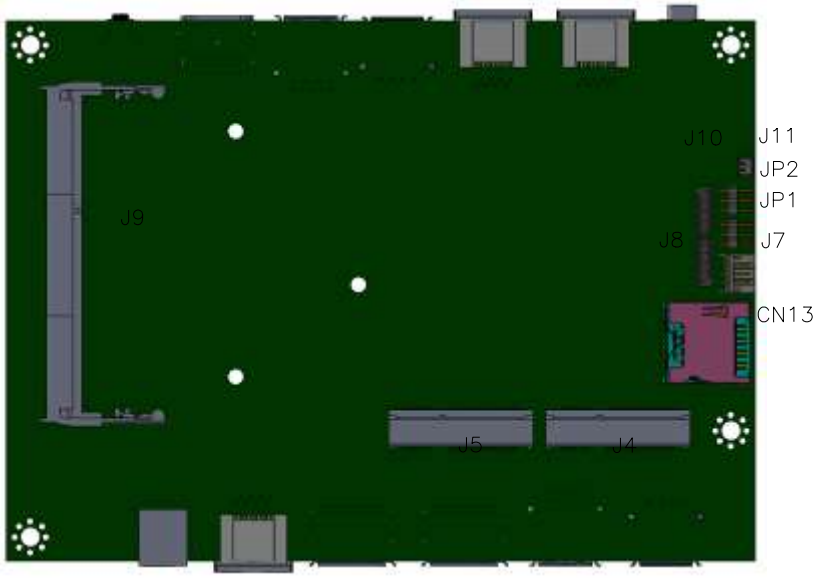
The QM87 platform is made with 22-nanometer technology that supports Intel's first processor architecture to unite the CPU and the graphics core on the transistor level. The IB983 **CUSTOM SIGNAGE SBC** utilizes the dramatic increase in performance provided by this Intel's latest cutting-edge technology. It offers fast 6Gbps SATA support, USB3.0 and interfaces for HDMI and DP displays.

CPU	
Model	4th Generation Intel® Core™ i7-4700EQ 2.4GHz 4th Generation Intel® Core™ i5-4400E 2.7GHz
Speed	2.4GHz and 2.7GHz
Cache	6MB / 3MB
Socket	FCBGA1364 package
TDP	TDP=47 W / 37 W
Chipset	
Model	Intel® QM87 PCH
BIOS	
Model	AMI BIOS, support ACPI Function
Memory	
Configuration	4GB x 2
Max. Support	2x DDR3 1600 MHz SO-DIMM, Max. 16GB (Non-ECC)

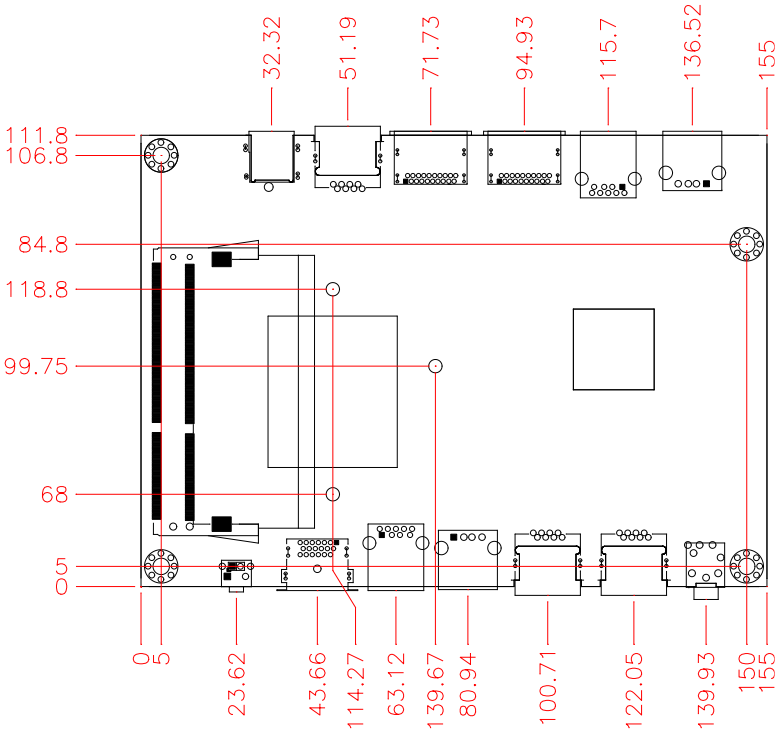
Edge I/O	
Display	1x HDMI 1.4a 2x DP v1.3
LAN / PHY	1x GbE with Intel® WGI217LM **1x GbE with Realtek RTL8111G-CG**
Audio	Intel® QM87 PCH built-in HD audio controller + ALC892 w/ 7.1 channels 1x Audio Connector (Lin out)
USB	2x USB 3.0; 2x USB 2.0
LPC I / O	1x RS-232 (recessed-Mount RJ45)
Button	1x Power Button
DC Jack	1x Screw type) Power Jack (+12V DC)
Other	1x LED for Power 1x Smart DC fan (12V DC)
Internal I/O	
Super I/O	NCT 5523D Super I/O CPU Temp + Temp monitor +Voltage Monitor
Expansion Slot	1x mSATA, 1x mPCIe(x1) only 1x UIM/SIM card slot (for 3G/LTE adapter in mPCIe slot)
Add-On Feature	
Watchdog	Yes (256 segments, 0, 1, 2…255 sec/min)
H/W Monitor	YES
iSMART	YES
Others	LAN Wakeup, iSmart, Vpro (9965), & TPM
Dimensions	
PCB Dimensions	155mm(W) x 108mm(D)
Power	
Power	Power Jack (+12V DC)
Environmental	
Temperature	Operating Temperature : 0°C~60°C (32°F~140°F) Storage Temperature : -20°C~80°C (-4°F~176°F)
Regulation	RoHS
Certification	CE/FCC Class A (Target B) UL, CCC

IB983 Jumpers and Connectors





Board Dimensions



2.2 Installations

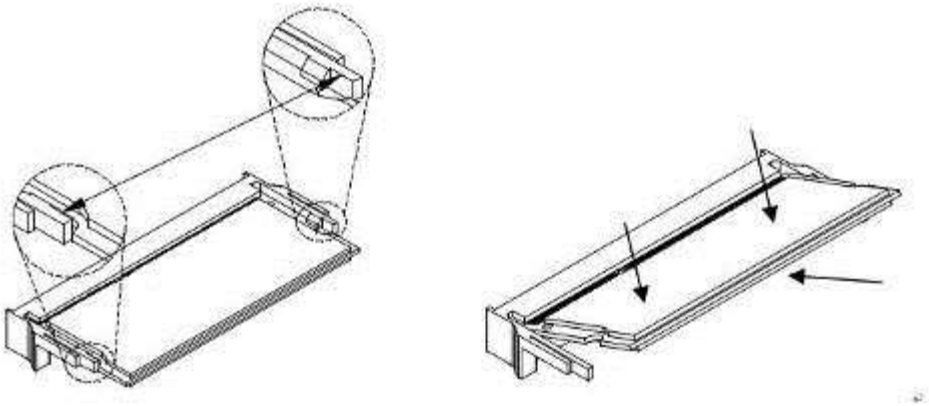
2.2.1 Installing the Memory

The IB983 board supports two DDR3 memory sockets for a maximum total memory of 16GB DDR3 memory type.

Installing and Removing Memory Modules

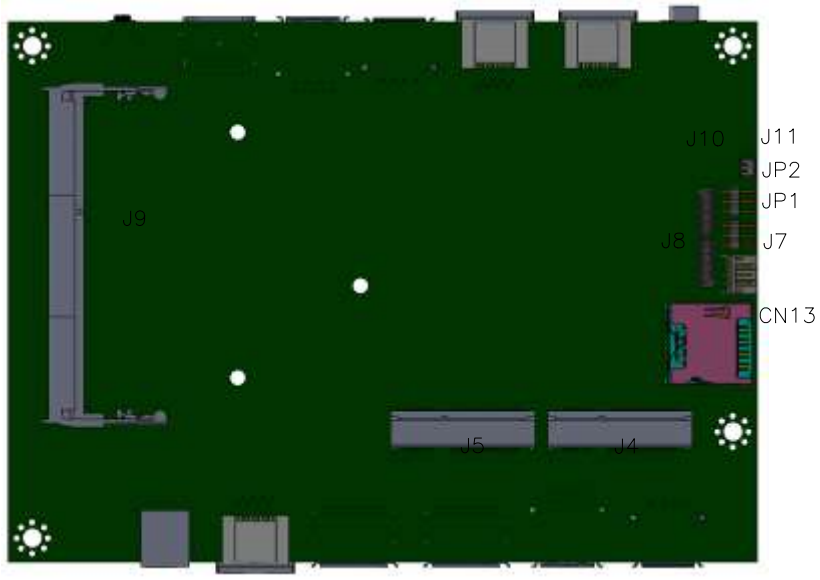
To install the DDR3 modules, locate the memory slot on the board and perform the following steps:

1. Hold the DDR3 module so that the key of the DDR3 module aligned with that on the memory slot.
2. Gently push the DDR3 module in an upright position until the clips of the slot close to hold the DDR3 module in place when the DDR3 module touches the bottom of the slot.
3. To remove the DDR3 module, press the clips with both hands.

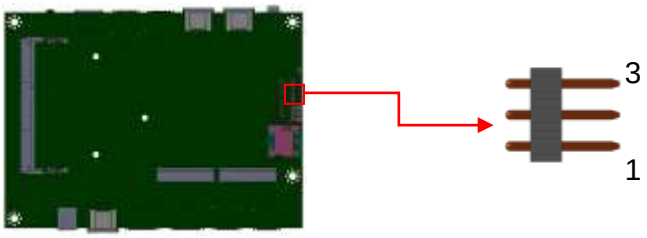


2.3 Setting the Jumpers

Jumper Locations on IB983

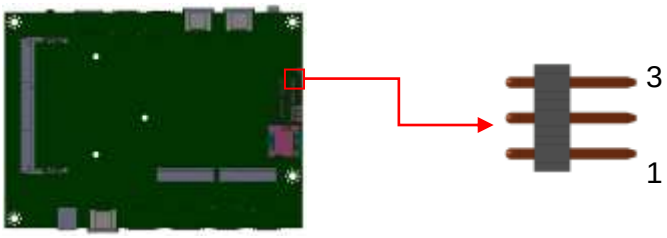


JP1: Clear CMOS Contents



JP1	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear CMOS

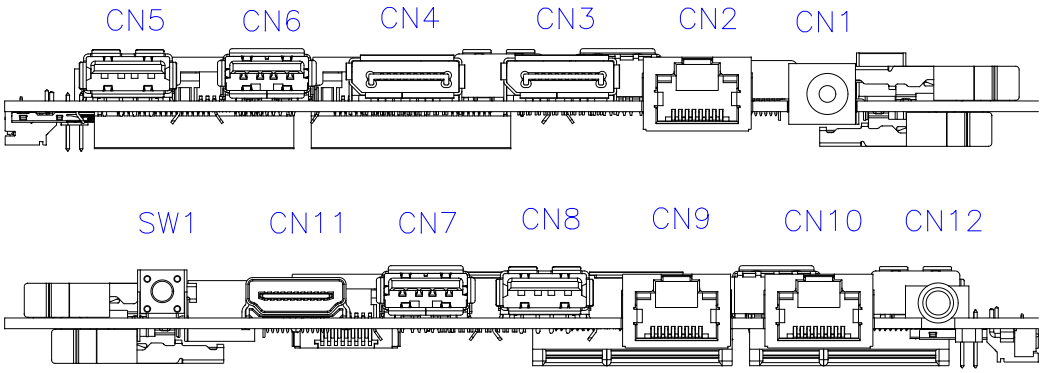
JP2: Clear ME Contents



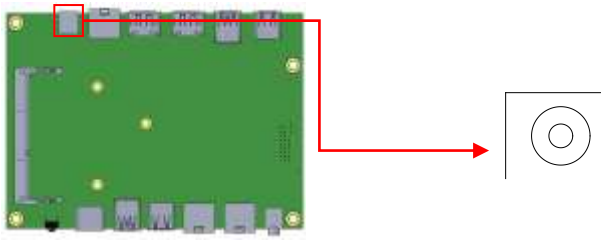
J18	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear CMOS

2.4 Connectors on IB983

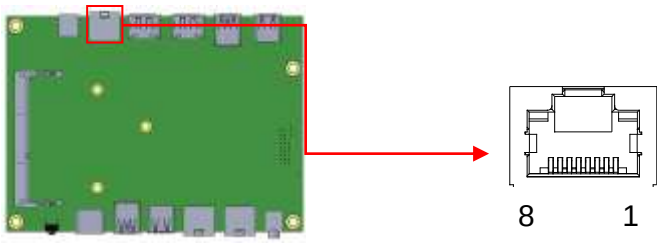
Connector Locations on IB983



CN1: Board Input Power(12V) Connector



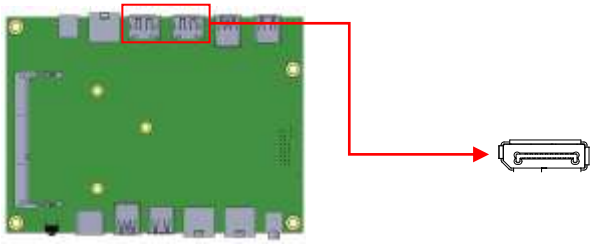
CN2: Console Port (COM1)



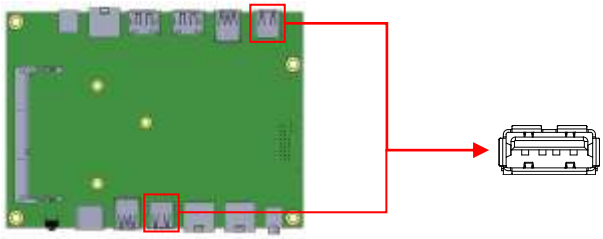
The console port is an RJ45 RS-232 serial port.

Pin #	Signal Name
1	RTS
2	DTR
3	TXD
4	GND
5	GND
6	RXD
7	DSR
8	CTS

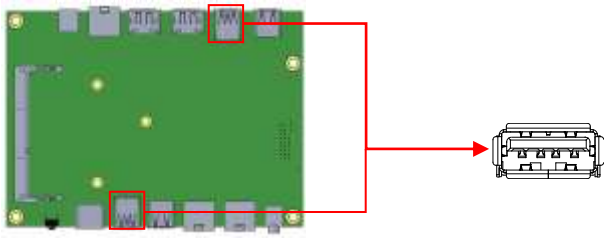
CN3, CN4: Display Port



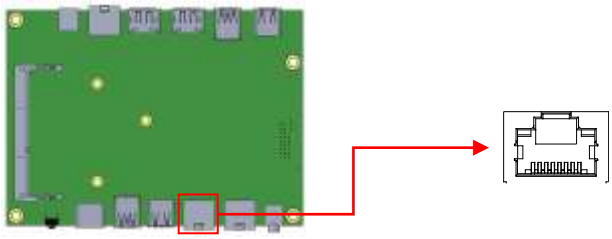
CN5, CN8: USB2.0 Connector



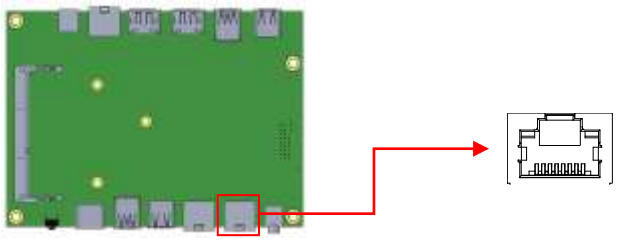
CN6, CN7: USB3.0 Connector



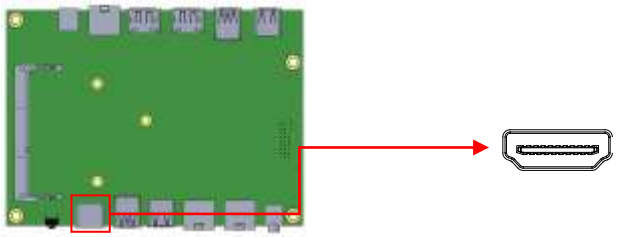
CN9: Gigabit LAN (RTL8111G) RJ45 Connector



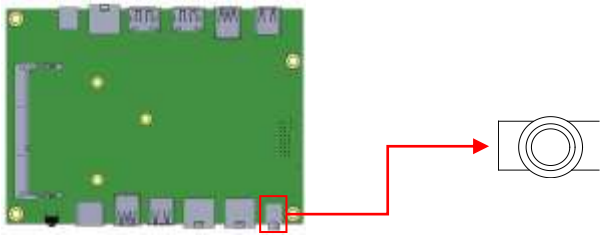
CN10: Gigabit LAN (I217) RJ45 Connector



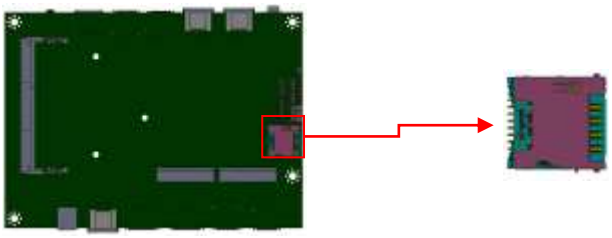
CN11: HDMI Port



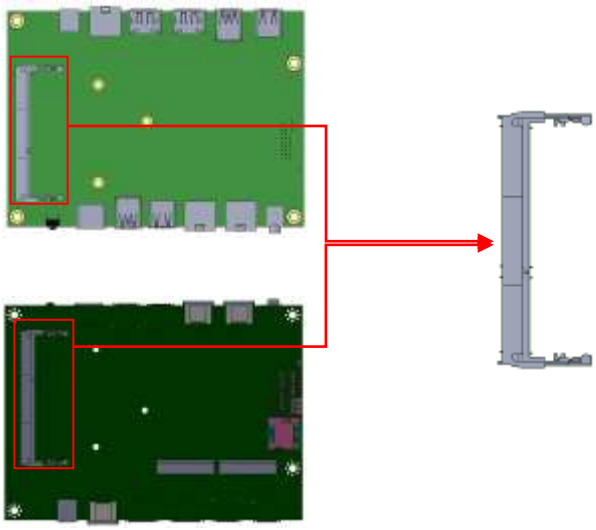
CN12: HD Audio (Audio out) Connector



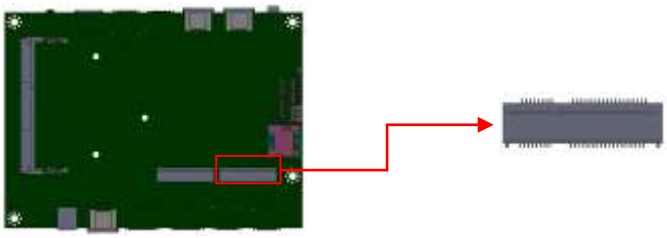
CN13: Micro SIM Card Connector



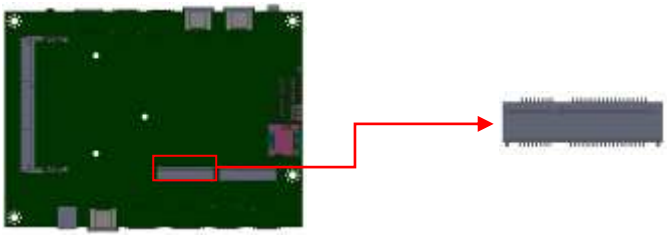
J1, J9: DDR3 SO-DIMM Socket



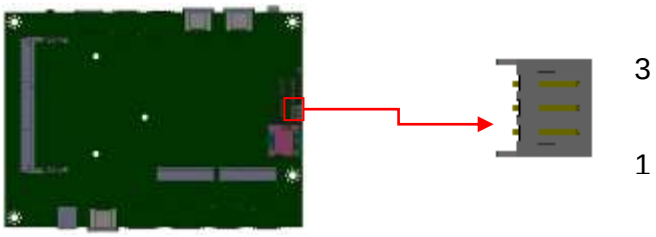
J4: Mini PCIE Connector



J5: mSATA Connector

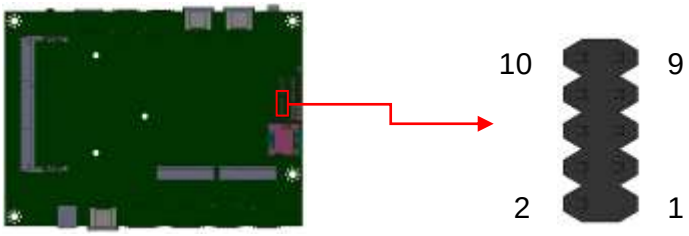


J7: CPU Fan Power Connector

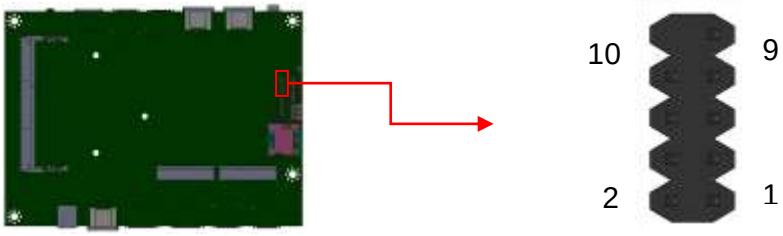


Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection

J8: SPI Flash Connector (Factory use only)



J10: LPC debug Connector (Factory use only)



SW1: Power Switch

CHAPTER 3 BIOS SETUP

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

3.1 BIOS Introduction

The BIOS (Basic Input/Output System) installed in your computer system's ROM supports Intel processors. The BIOS provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

3.2 BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again. The following message will appear on the screen:

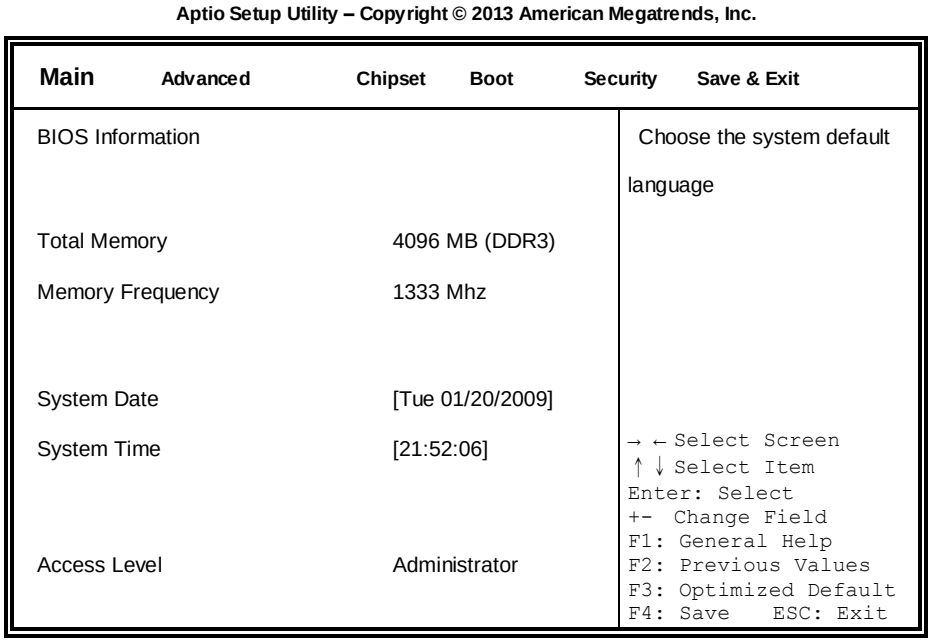
```
Press <DEL> to Enter Setup
```

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Warning: *It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.*

Main Settings



System Date

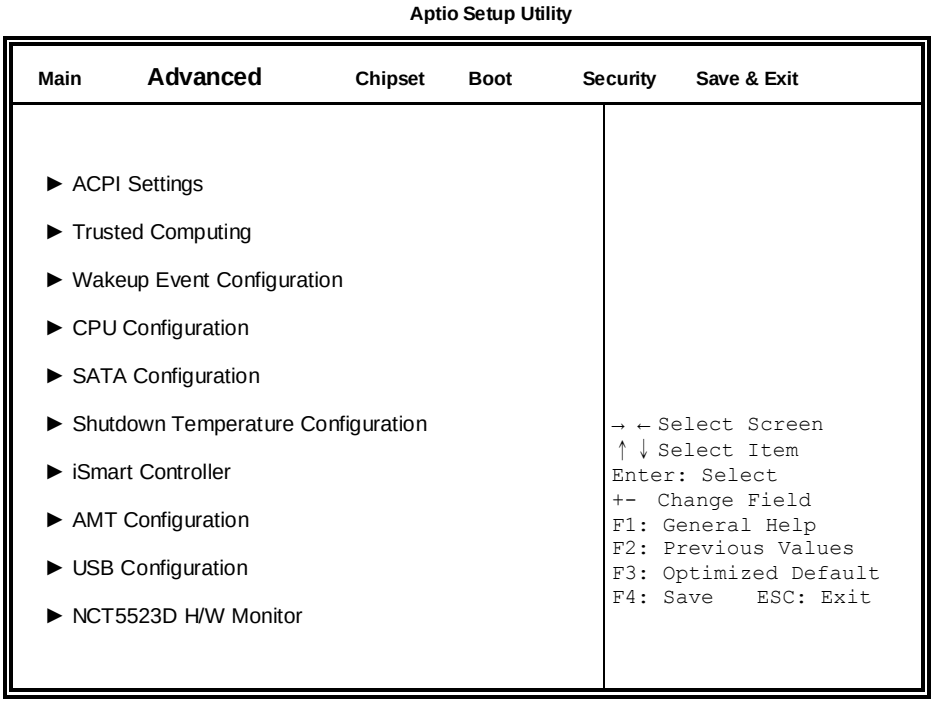
Set the Date. Use Tab to switch between Data elements.

System Time

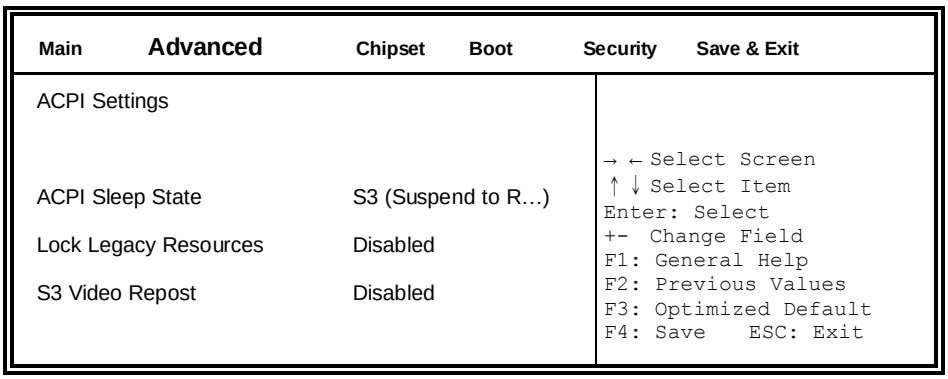
Set the Time. Use Tab to switch between Data elements.

Advanced Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.



ACPI Settings



ACPI Sleep State

Select ACPI sleep state the system will enter, when the *SUSPEND* button is pressed.

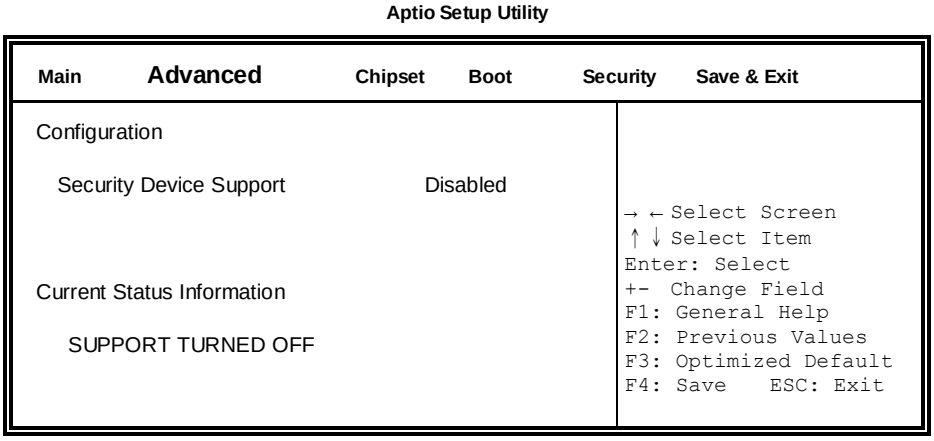
Lock Legacy Resources

Enabled or Disabled Lock of Legacy Resources.

S3 Video Repost

Enable or disable S3 Video Repost.

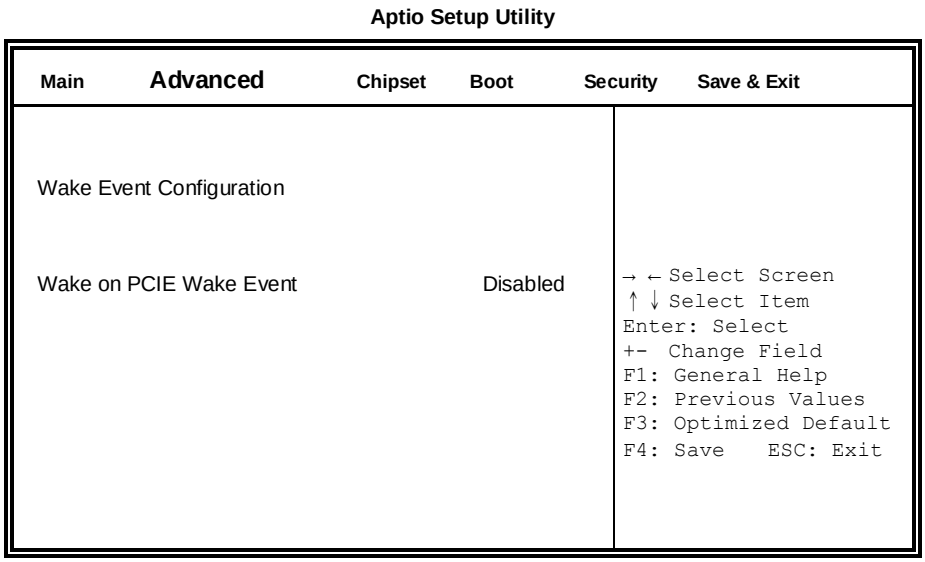
Trusted Computing



Security Device Support

Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

Wake up event settings

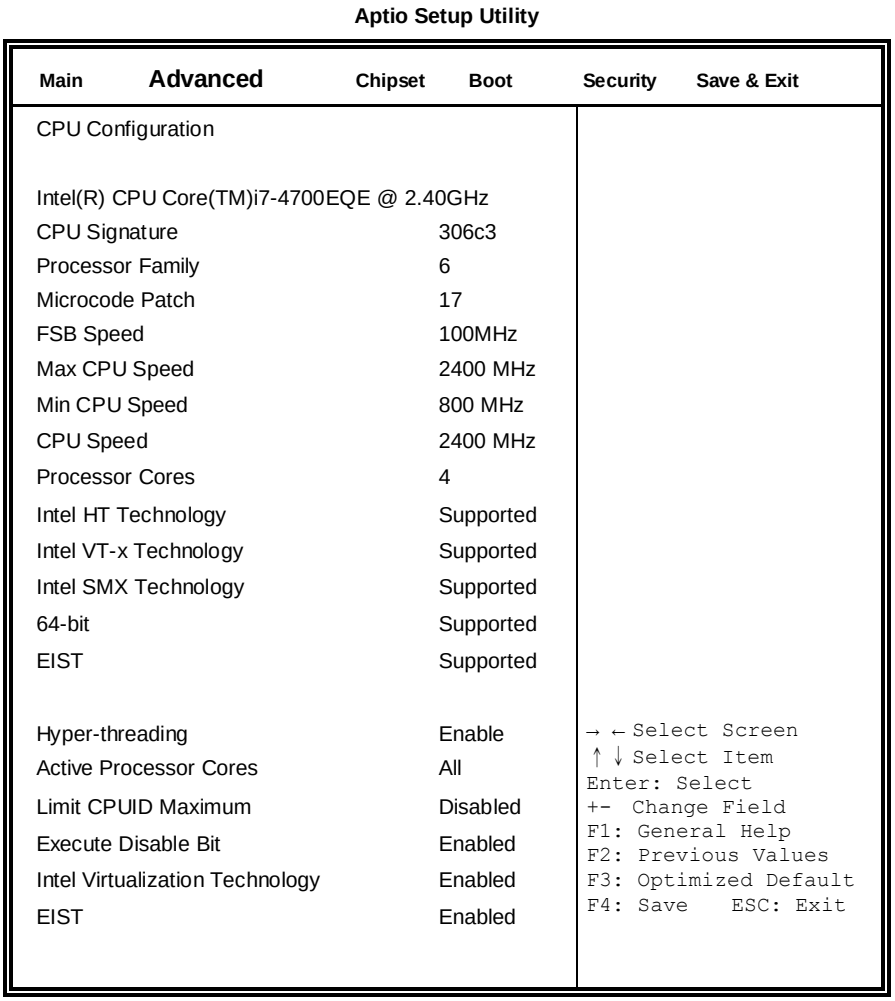


Wake on PCIE Wake Event

The options are Disabled and Enabled.

CPU Configuration

This section shows the CPU configuration parameters.



Hyper-threading

Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled.

Active Processor Cores

Number of cores to enable in each processor package.

Limit CPUID Maximum

Disabled for Windows XP.

Execute Disable Bit

XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS

Intel Virtualization Technology

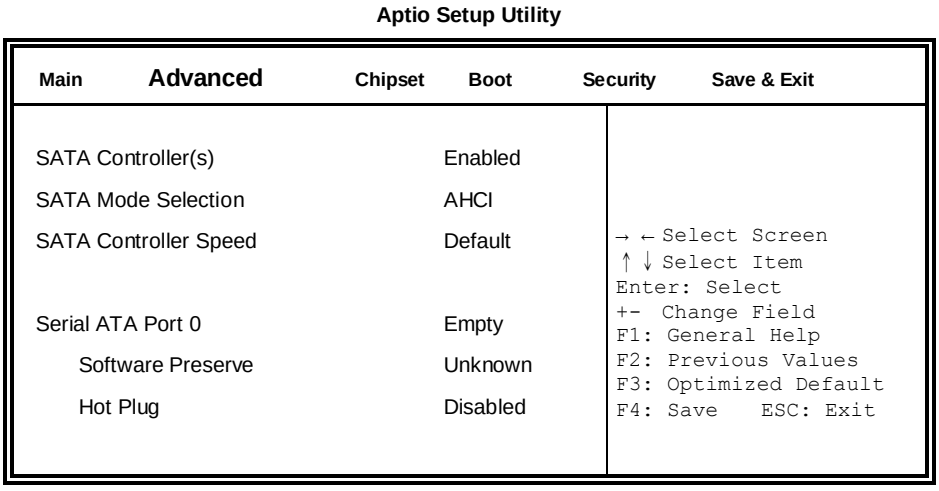
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

EIST

Enabled/Disabled Intel Speedstep.

SATA Configuration

SATA Devices Configuration.



SATA Controller(s)

Enable or disable SATA Device.

SATA Mode Selection

(1) IDE Mode.

(2) AHCI Mode.

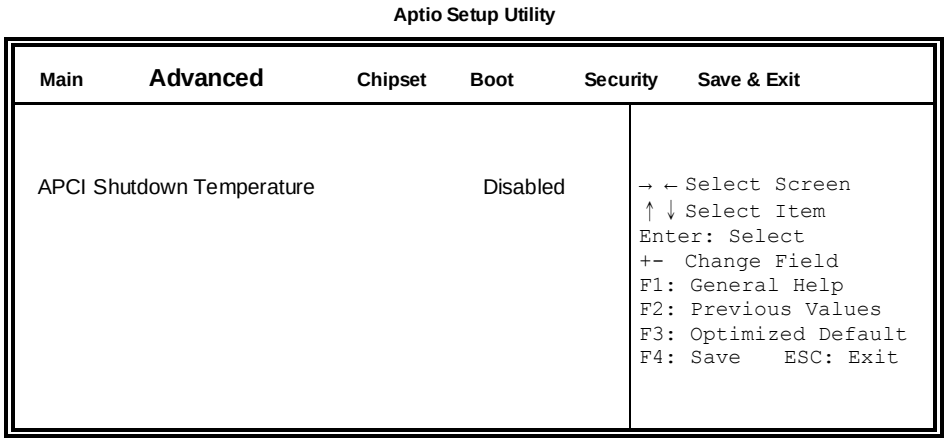
SATA Controller Speed

Indicates the maximum speed the SATA controller can support.

Hot Plug

Designates this port as Hot Pluggable.

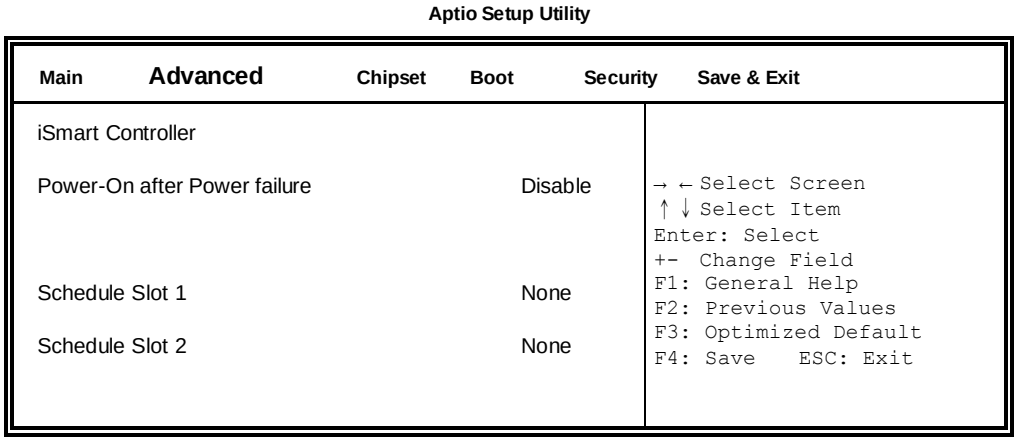
Shutdown Temperature Configuration



ACPI Shutdown Temperature

The default setting is Disabled.

iSmart Controller



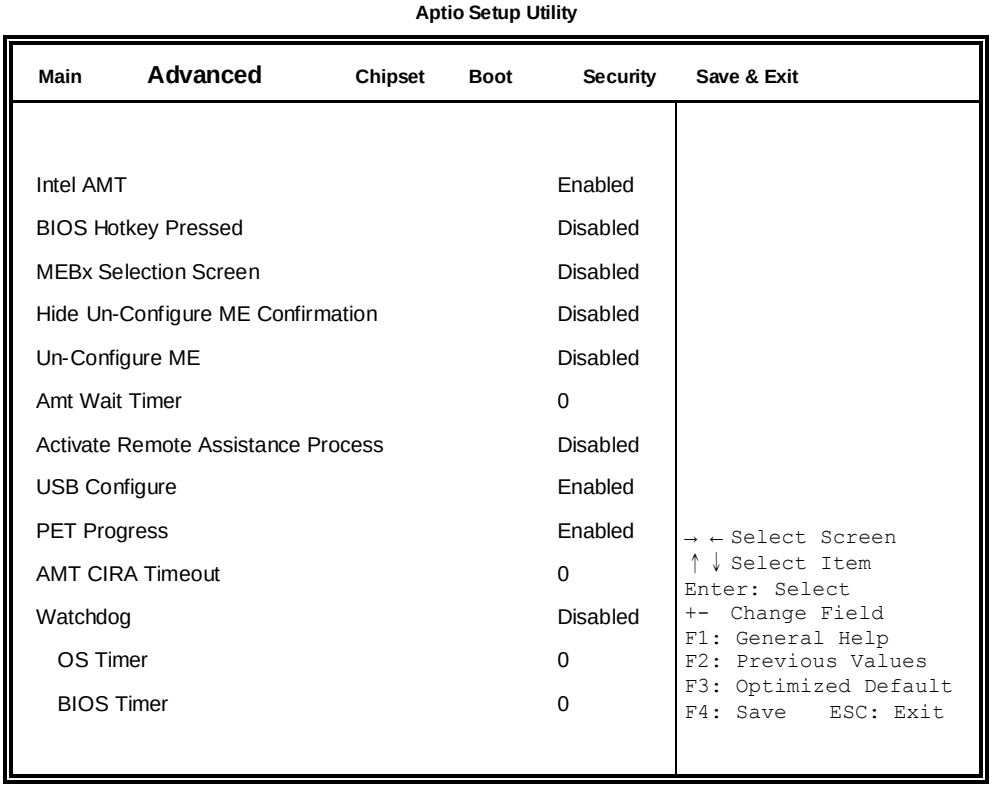
iSmart Controller

Setup the power on time for the system.

Schedule Slot 1 / 2

Setup the hour/minute for system power on.

AMT Configuration



Intel AMT

Enabled / Disabled Intel(R) Active Management Technology BIOS Extension.

Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution.

If enabled, this requires additional firmware in the SPI device.

BIOS Hotkey Pressed

OEMFLag Bit 1:

Enable/Disable BIOS hotkey press.

MEBx Selection Screen

OEMFLag Bit 2:

Enable/Disable MEBx selection screen.

Hide Un-Configure ME Confirmation

OEMFLag Bit 6:

Hide Un-Configure ME without password Confirmation Prompt

Hide Un-Configure ME Confirmation

OEMFLag Bit 15:

Un-Configure ME without password

Amt Wait Timer

Set timer to wait before sending ASF_GET_BOOT_OPTIONS.

Disable ME

Set ME to Soft Temporary Disabled.

Activate Remote Assistance Process

Trigger CIRA boot.

USB Configure

Enable/Disable USB Configure function.

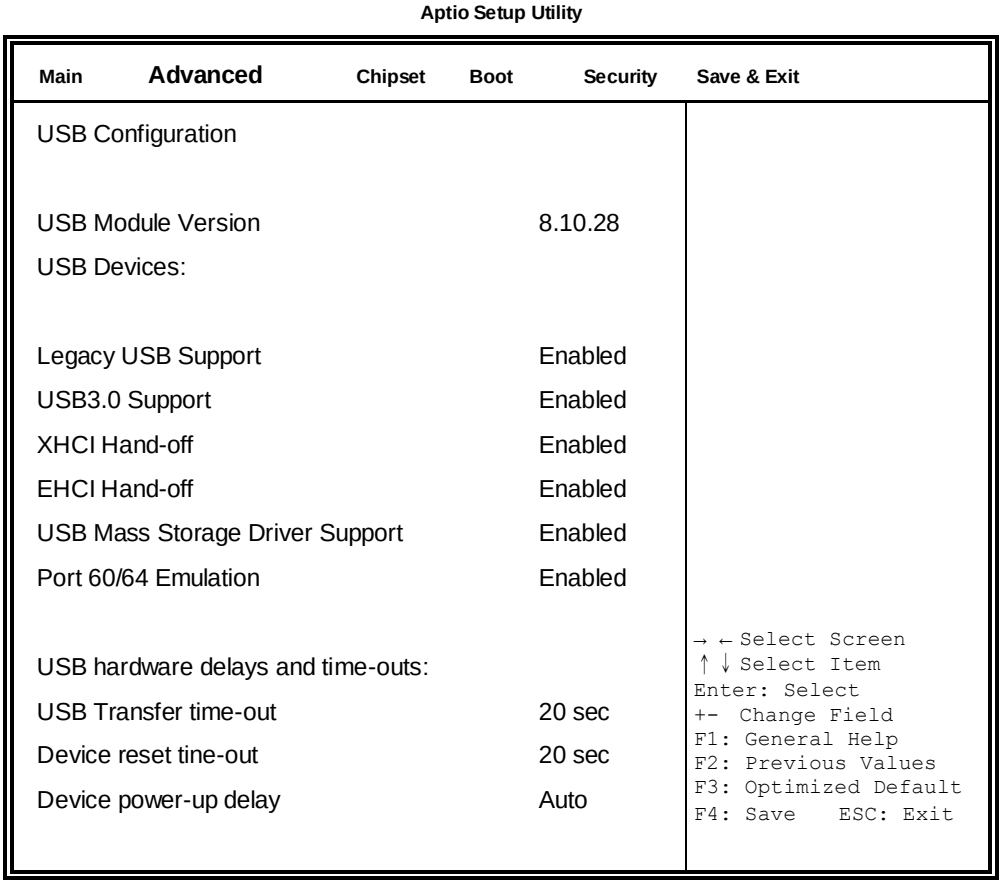
PET Progress

User can Enable/Disable PET Events progress to receive PET events or not.

Watchdog Timer

Enable/Disable Watchdog Timer.

USB Configuration



Legacy USB Support

Enables Legacy USB support.

AUTO option disables legacy support if no USB devices are connected.

DISABLE option will keep USB devices available only for EFI applications.

USB3.0 Support

Enable/Disable USB3.0 (XHCI) Controller support.

XHCI Hand-off

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

EHCI Hand-off

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

USB Mass Storage Driver Support

Enable/Disable USB Mass Storage Driver Support.

Port 60/64 Emulation

Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.

USB Transfer time-out

The time-out value for Control, Bulk, and Interrupt transfers.

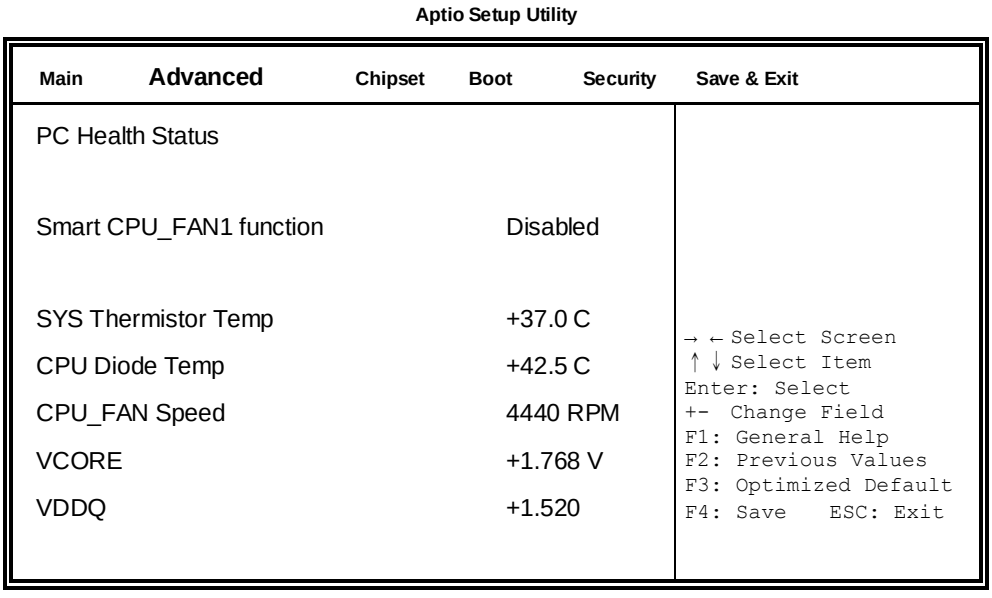
Device reset tine-out

USB mass Storage device start Unit command time-out.

Device power-up delay

Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

NCT5523D HW Monitor

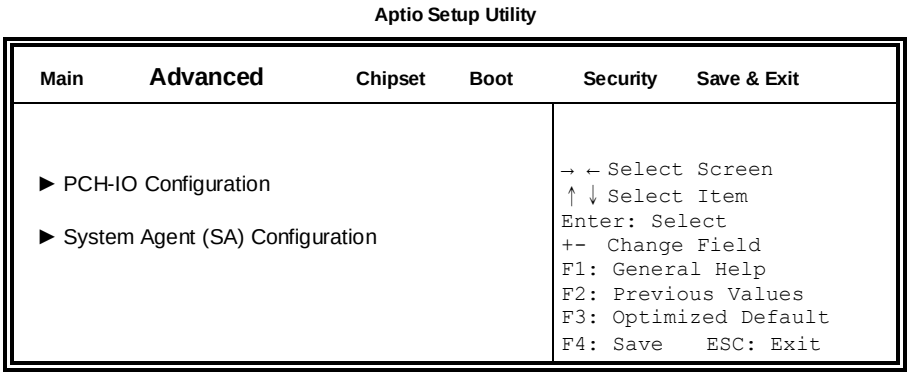


Smart CPU_FAN1 Function

Smart Fan Mode select

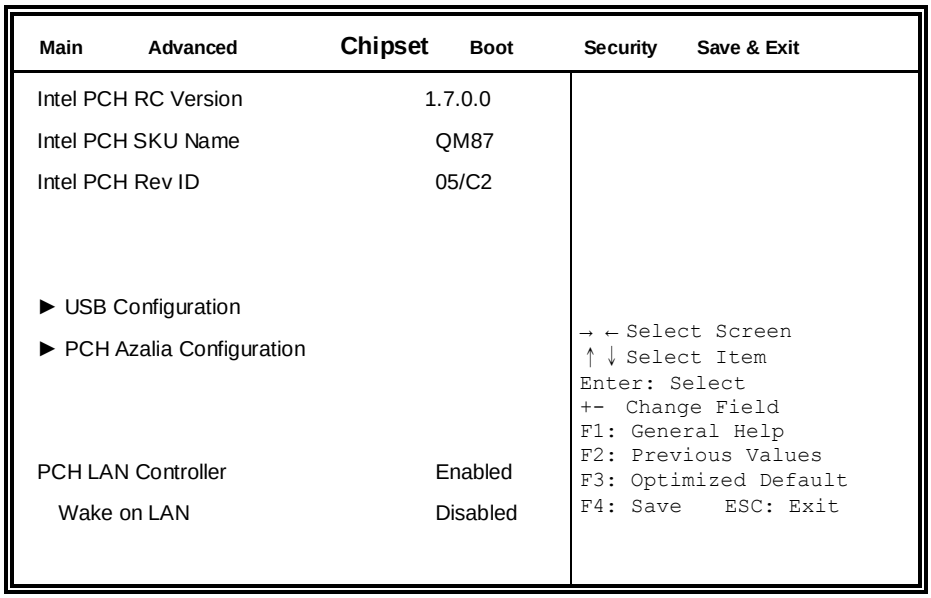
Chipset Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.



PCH-IO Configuration

This section allows you to configure the North Bridge Chipset.



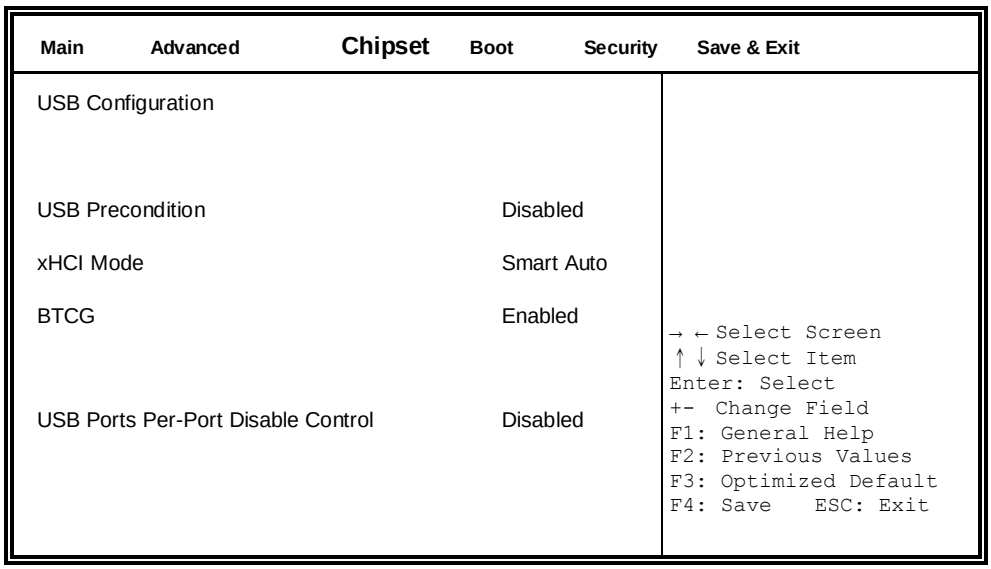
PCH LAN Controller

Enable or disable onboard NIC.

Wake on LAN

Enable or disable integrated LAN to wake the system. (The Wake On LAN cannot be disabled if ME is on at Sx state.)

USB Configuration



USB Precondition

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

xHCI Mode

Mode of operation of xHCI controller.

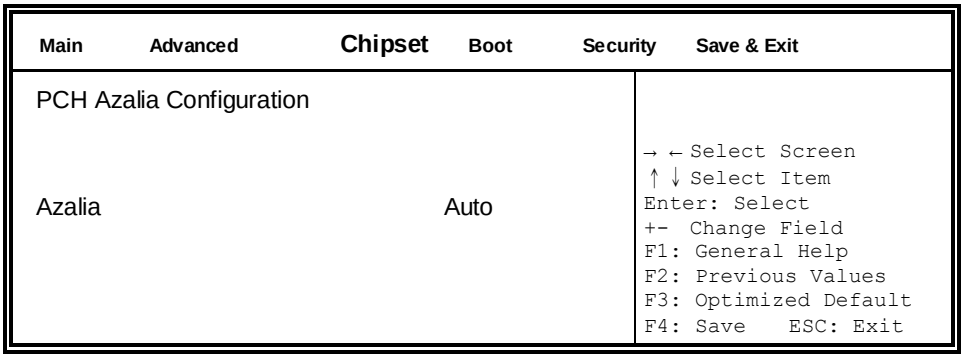
BTCG

Enabling/disabling trunk clock gating

USB Ports Per-Port Disable Control

Control each of the USB ports (0~13) disabling.

PCH Azalia Configuration



Azalia

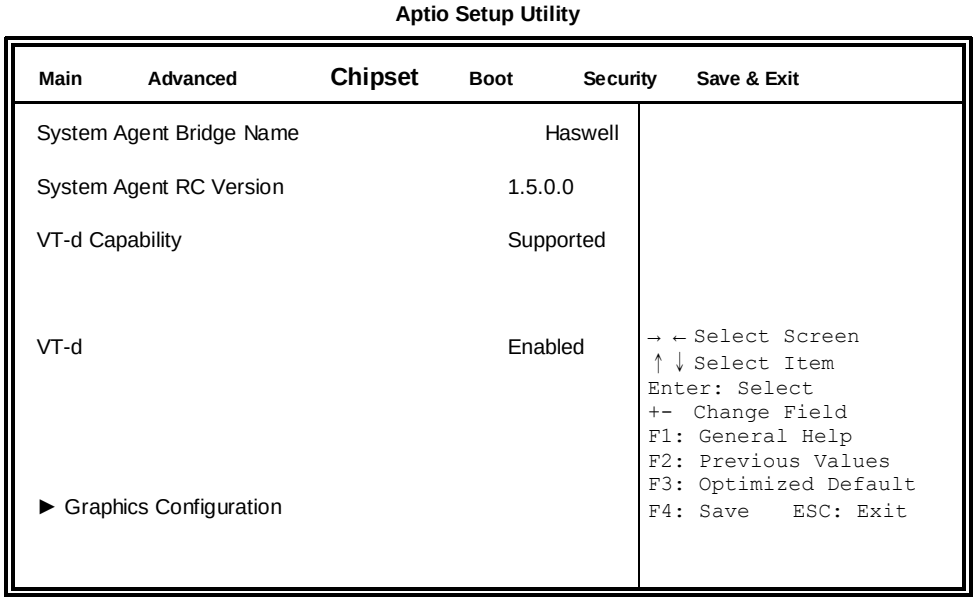
Control Detection of the Azalia device.

Disabled = Azalia will be unconditionally be disabled.

Enabled = Azalia will be unconditionally be enabled.

Auto = Azalia will be enabled if present, disabled otherwise.

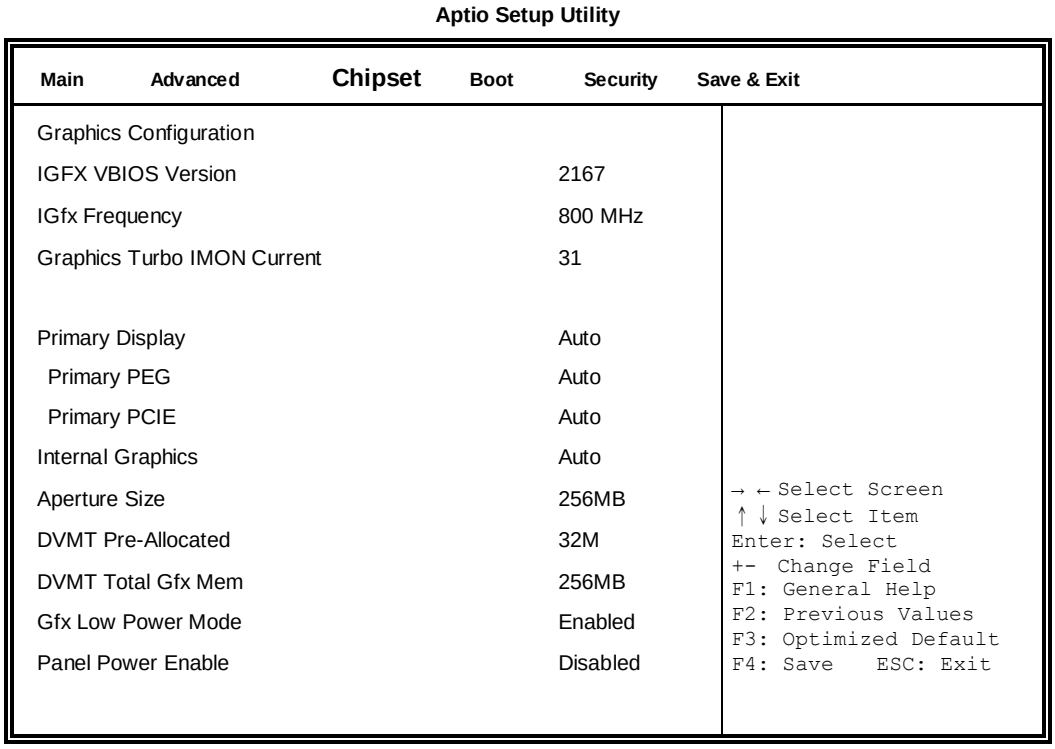
System Agent (SA) Configuration



VT-d

Check to enable VT-d function on MCH.

Graphics Configuration



Graphics Turbo IMON Current

Graphics turbo Imon current values supported (14-31)

Primary Display

Select which of IGFX/PEG/PCI graphics device should be primary display or select SG for switchable Gfx.

Primary PEG

Select PEGO/PEG1/PEG2/PEG3 Graphics device should be Primary PEG.

Primary PCIE

Select PCIE0/PCIE1/PCIE2/PCIE3/PCIE4/PCIE5/PCIE6PCIE7 Graphics device should be primary PCIE.

Internal Graphics

Keep IGD enabled based on the setup options.

Aperture Size

Select the Aperture Size

DVMT Pre-Allocated

Select DVMT 5.0 Pre-Allocated (Fixed) Graphics memory size used by the internal graphics device.

DVMT Total Gfx Mem

Select DVMT 5.0 total graphics memory size used by the internal graphics device.

Gfx Low Power Mode

This option is applicable for SFF only.

Panel Power Enable

This applicable for SFF only

Boot Settings

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
Boot Configuration					
Setup Prompt Timeout			1		
Bootup NumLock State			On		
Quiet Boot			Disabled		
Fast Boot			Disabled		
Set Boot Priority					
1st Boot			CD/DVD		
2nd Boot			Hard Disk		
3rd Boot			USb Floppy		
4th Boot			USB CD/DVD		
5th Boot			USB Hard Disk		
6th Boot			USB KEY		
7th Boot			Network		
8th Boot			UEFI		
Boot Option Priorities					→ ← Select Screen
Boot Option #1					↑ ↓ Select Item
► CSM16 Parameters					Enter: Select
CSM Parameters					+- Change Field
					F1: General Help
					F2: Previous Values
► Hard Disk Drive BBS Priorities					F3: Optimized Default
					F4: Save ESC: Exit

Setup Prompt Timeout

Number of seconds to wait for setup activation key.
65535(0xFFFF) means indefinite waiting.

Bootup NumLock State

Select the keyboard NumLock state.

Quiet Boot

Enables or disables Quiet Boot option.

Fast Boot

Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

Set Boot Priority

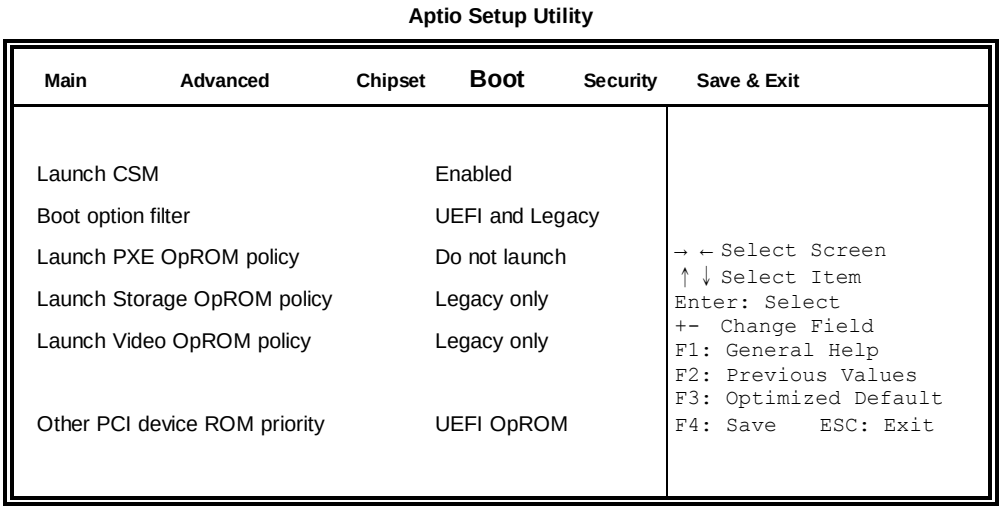
Set Boot Priority

Boot Option Priorities

Sets the system boot order.

CSM parameters

This section allows you to configure the boot settings.



Launch CSM

This option controls if CSM will be launched.

Boot Option Filter

This option controls what devices system can boot to.

Launch PXE OpROM Policy

Controls the execution of UEFI and Legacy PXE OpROM.

Launch Storatge OpROM Policy

Controls the execution of UEFI and Legacy Storage OpROM.

Launch Video OpROM Policy

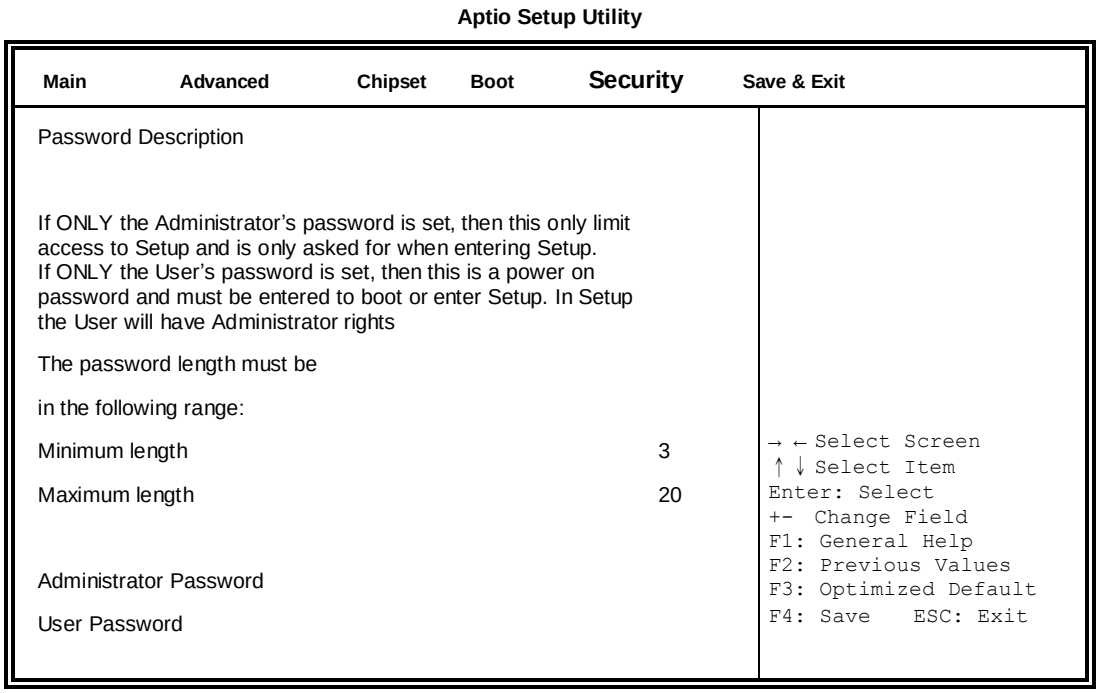
Controls the execution of UEFI and Legacy Video OpROM.

Other PCI Device ROM Priority

For PCI devices other than Network, Mass storage or Video defines which OpROM to launch.

Security Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.



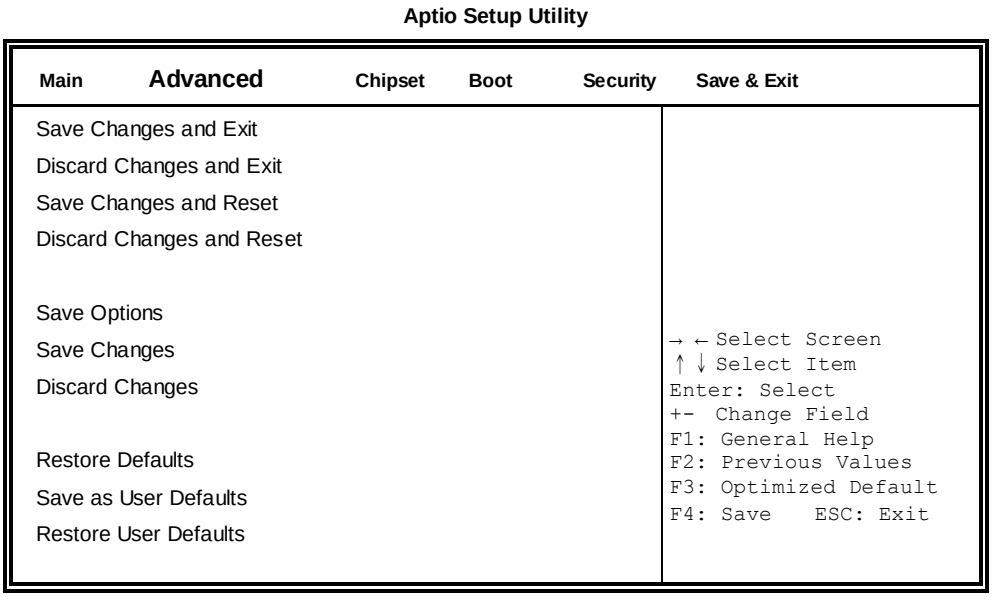
Administrator Password

Set Setup Administrator Password.

User Password

Set User Password.

Save & Exit Settings



Save Changes and Exit

Exit system setup after saving the changes.

Discard Changes and Exit

Exit system setup without saving any changes.

Save Changes and Reset

Reset the system after saving the changes.

Discard Changes and Reset

Reset system setup without saving any changes.

Save Changes

Save Changes done so far to any of the setup options.

Discard Changes

Discard Changes done so far to any of the setup options.

Restore Defaults

Restore/Load Defaults values for all the setup options.

Save as User Defaults

Save the changes done so far as User Defaults.

Restore User Defaults

Restore the User Defaults to all the setup options.

CHAPTER 4 DRIVERS INSTALLATION

The Intel Chipset Drivers should be installed first before the software drivers to enable Plug & Play INF support for Intel chipset components. Follow the instructions below to complete the installation.

4.1 Intel Chipset Software Installation Utility

1. Insert the DVD that comes with the board. Click ***Intel*** and then ***Intel(R) 8 Series Chipset Drivers***.

2. Click ***Intel(R) Chipset Software Installation Utility.***

3. When the Welcome screen to the Intel® Chipset Device Software appears, click ***Next*** to continue.

4. Click ***Yes*** to accept the software license agreement and proceed with the installation process.

5. On the Readme File Information screen, click ***Next*** to continue the installation.

6. The Setup process is now complete. Click ***Finish*** to restart the computer and for changes to take effect.

4.2 VGA Drivers Installation

1. Insert the DVD that comes with the board. Click ***Intel*** and then ***Intel(R) 8 Series Chipset Drivers***.

2. Click ***Intel(R) Core(TM) i3/i5/i7 Graphics Driver.***

3. When the Welcome screen appears, click ***Next*** to continue.

4. Click ***Yes*** to to agree with the license agreement and continue the installation.

5. On the screen shown below, click ***Install*** to continue.

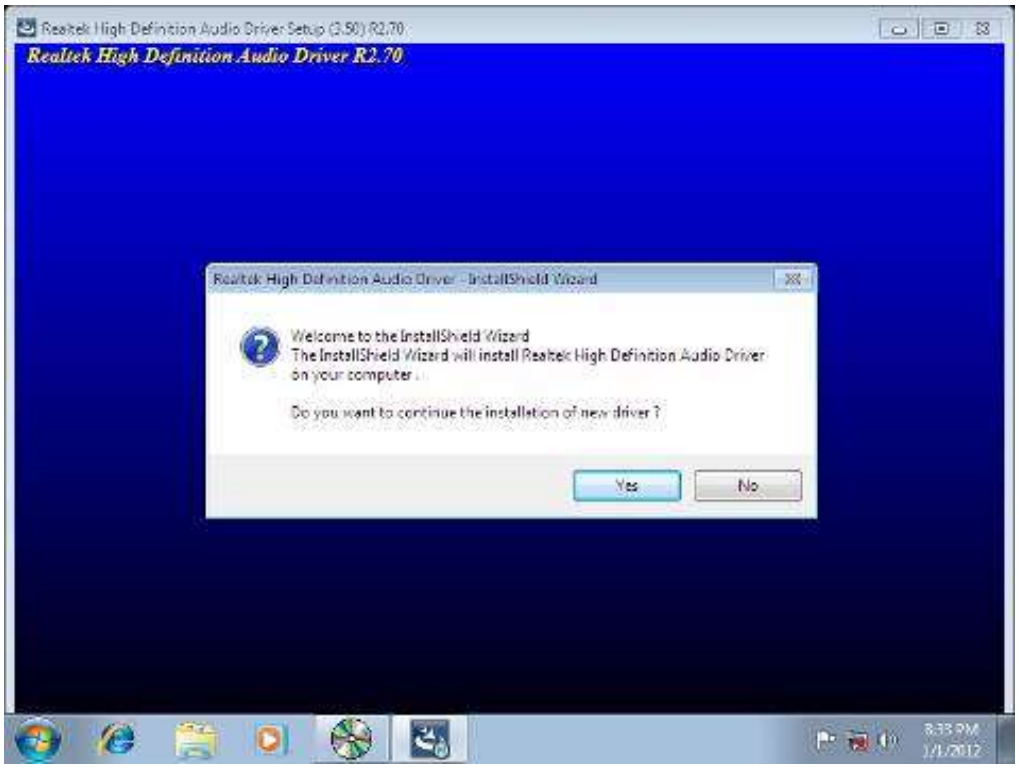
6. Setup complete. Click ***Finish*** to restart the computer and for changes to take effect.

4.3 Realtek HD Audio Driver Installation

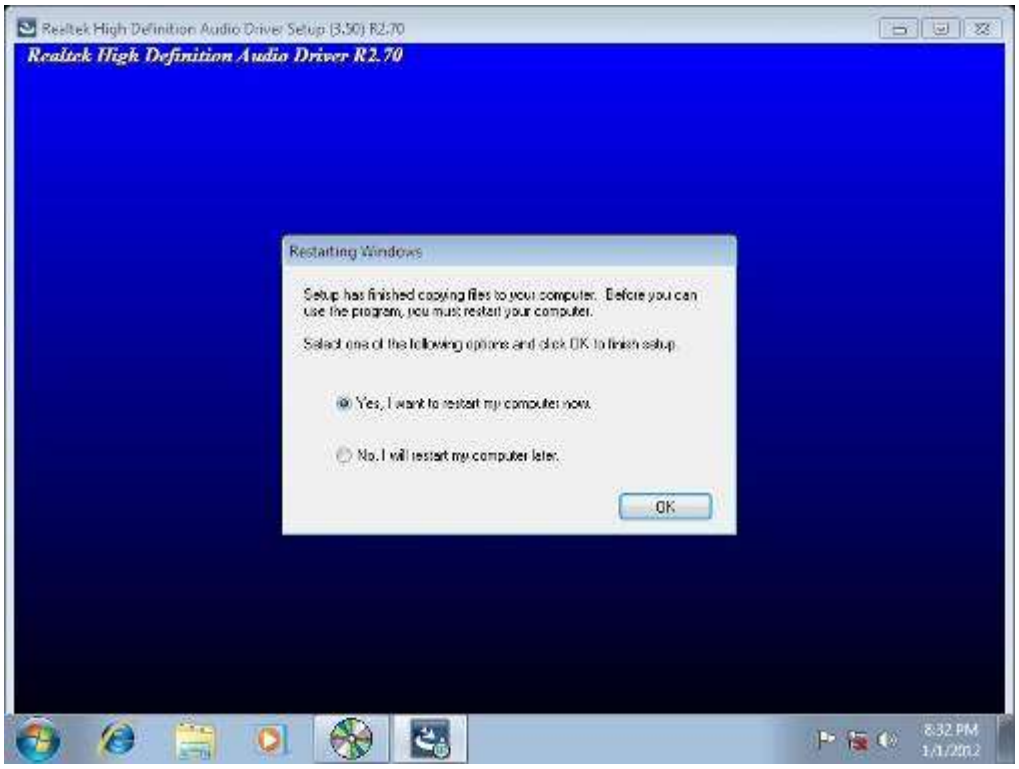
1. Insert the DVD that comes with the board. Click ***Intel*** and then ***Intel(R) 8 Series Chipset Drivers***.

2. Click ***Realtek High Definition Audio Driver.***

3. On the Welcome to the InstallShield Wizard screen, click ***Yes*** to proceed with and complete the installation process.



4. The InstallShield Wizard Complete. Click ***Finish*** to restart the computer and for changes to take ffect.

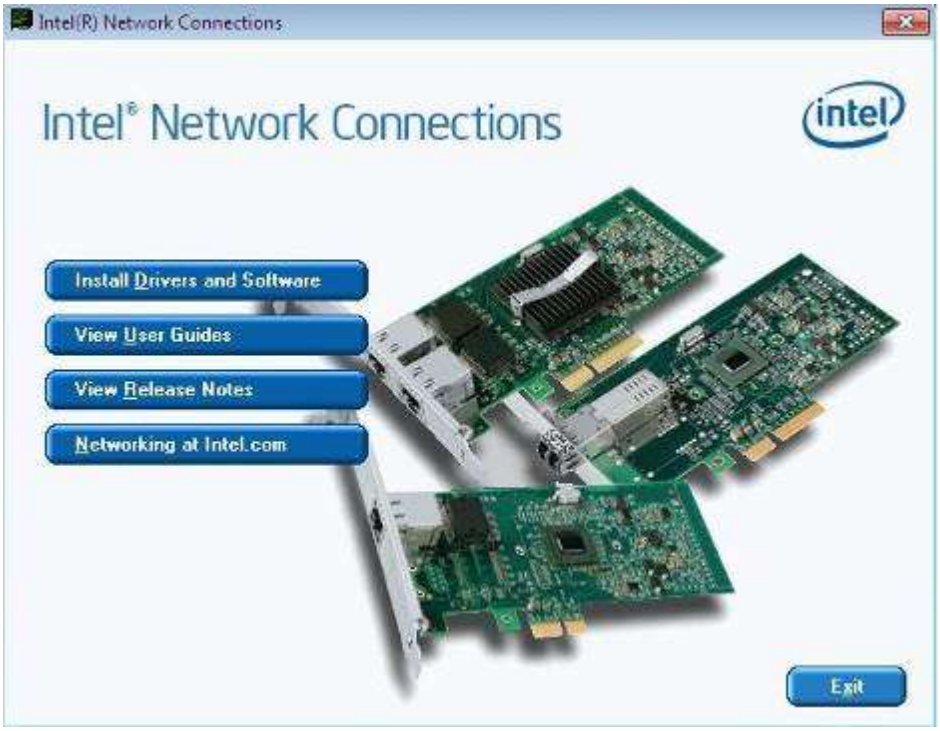


4.4 LAN Drivers Installation

1. Insert the DVD that comes with the board. Click ***Intel*** and then ***Intel(R) 8 Series Chipset Drivers***.

2. Click ***Intel(R) PRO LAN Network Driver.***

3. Click ***Install Drivers and Software.***

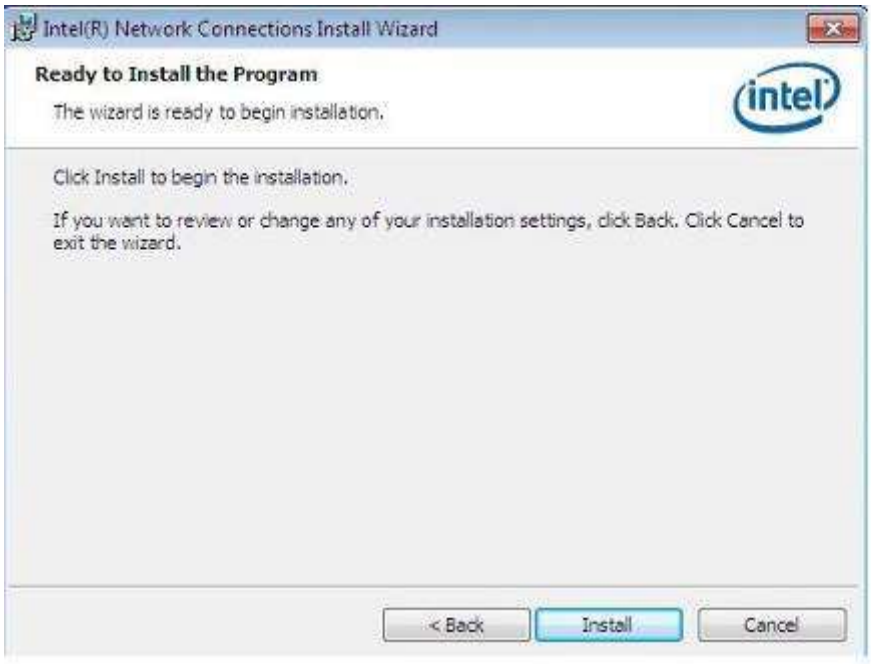


4. When the Welcome screen appears, click ***Next***.

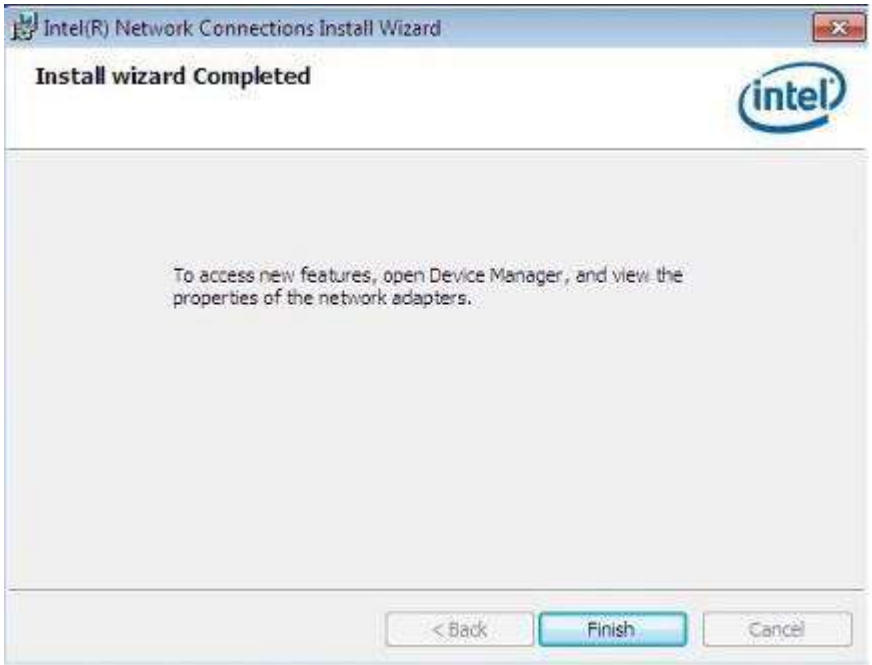
5. Click ***Next*** to to agree with the license agreement.

6. Click the checkbox for **Drivers** in the Setup Options screen to select it and click **Next** to continue.

7. The wizard is ready to begin installation. Click ***Install*** to begin the installation.



8. When InstallShield Wizard is complete, click ***Finish***.



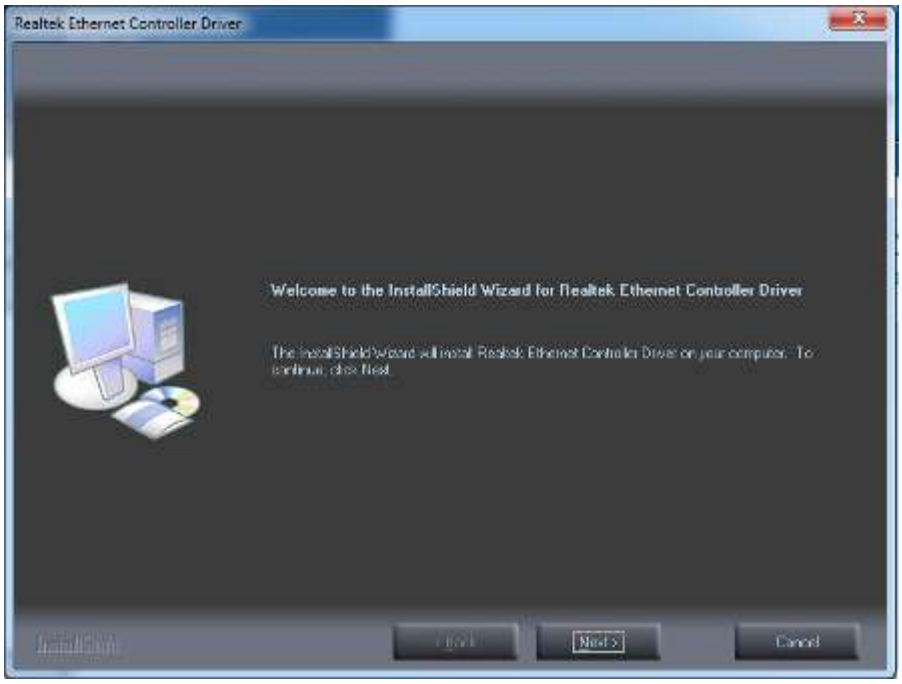
4.5 Realtek LAN Controller Drivers Installation

Follow the steps below to install the Realtek LAN Drivers.

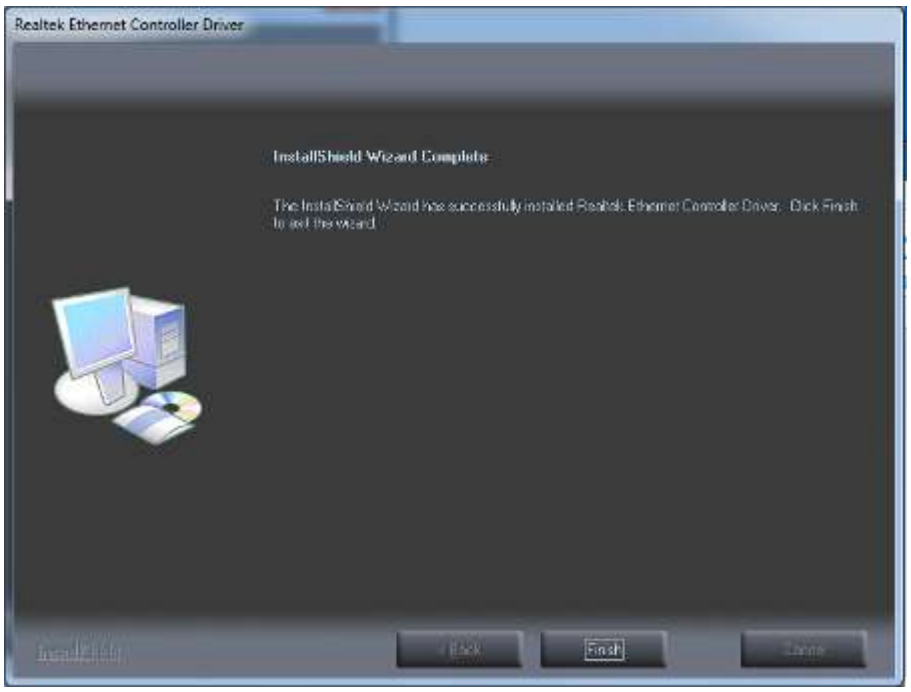
1. Insert the CD that comes with the board. Click ***LAN Card,*** and then ***Realtek Lan Controller Drivers***.

2. Click ***Realtek RTL8111E LAN Drivers.***

3.When the welcome screen to InstallShield Wizard appears, click ***Next*** to start the installation.



4.When the InstallShieldWizard has finished installing the Realtek LAN drivers, click ***Finish***.



4.6 Intel® Management Engine Interface

Follow the steps below to install the Intel Management Engine.

1. Insert the DVD that comes with the board. Click ***Intel*** and then ***Intel(R) 8 Series Chipset Drivers*** and then ***Intel(R) AMT 9.0 Drivers***.

2. When the Welcome screen to the InstallShield Wizard for Intel® Management Engine Components, click the checkbox for **Install Intel® Control Center** & click ***Next***.

3. Click ***Yes*** to to agree with the license agreement.

4. When the Setup Progress screen appears, click ***Next***. Then, click ***Finish*** when the setup progress has been successfully installed.

4.7 Intel® USB 3.0 Drivers

1. Insert the DVD that comes with the board. Click ***Intel*** and then ***Intel(R) 8 Series Chipset Drivers***.

2. Click ***Intel(R) USB 3.0 Drivers.***

3. When the Welcome screen to the InstallShield Wizard for Intel® USB 3.0 eXtensible Host Controller Driver, click ***Next***.

4. Click ***Yes*** to to agree with the license agreement and continue the installation.

5. On the Readme File Information screen, click ***Next*** to continue the installation of the Intel® USB 3.0 eXtensible Host Controller Driver.

6. Setup complete. Click ***Finish*** to restart the computer and for changes to take effect.

Appendix

A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
0000h-001Fh	Direct memory access controller
0000h-0001h	PCI bus
0040h-0043h	System timer
0050h-0053h	System timer
0070h-0077h	System CMOS/real time clock
0081h-0091h	Direct memory access controller
0093h-009Fh	Direct memory access controller
00C0h-00DFh	Direct memory access controller
00F0h-00F0h	Numeric data processor
03B0h-03BBh	Intel(R) HD Graphics 4600
03C0h-03DFh	Intel(R) HD Graphics 4600
03F8h-03FFh	Communications Port (COM1)
0D00h-FFFFh	PCI bus
E000h-EFFFh	Intel(R) 8 Series/C220 Series PCI Express Root Port #7 - 8C1C
F000h-F03Fh	Intel(R) HD Graphics 4600
F040h-F05Fh	Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
F0E0h-F0E7h	Intel(R) Active Management Technology - SOL (COM3)

B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ0	System timer
IRQ4	Serial Port #1
IRQ8	System CMOS / real time clock
IRQ11	Intel(R) 8 Series/C220 Series SMBus Controller -8C22
IRQ13	Numeric data processor
IRQ16	Intel(R) 8 Series/C220 Series USB EHCI#2 -8C2D
IRQ19	Intel(R) 8 Series 4 port Serial ATA Storage Controller -8C01
IRQ22	High Definition Audio Controller
IRQ23	Intel(R) 8 Series/C220 Series USB EHCI#1-8C26

C. Watchdog Timer Configuration

The WDT is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven. Under normal circumstance, the user will restart the WDT at regular intervals before the timer counts to zero.

SAMPLE CODE:

File of the NCT5523D.H

```
//-----------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----------------------------------------------------------------------
#ifndef __NCT5523D_H
#define __NCT5523D_H                                    1
//-----------------------------------------------------------------------
#define     NCT5523D_INDEX_PORT                         (NCT5523D_BASE)
#define     NCT5523D_DATA_PORT                          (NCT5523D_BASE+1)
//-----------------------------------------------------------------------
#define     NCT5523D_REG_LD                             0x07
//-----------------------------------------------------------------------
#define    NCT5523D_UNLOCK                              0x87
#define    NCT5523D_LOCK                                0xAA
//-----------------------------------------------------------------------
unsigned int Init_NCT5523D(void);
void Set_NCT5523D_LD( unsigned char);
void Set_NCT5523D_Reg( unsigned char, unsigned char);
unsigned char Get_NCT5523D_Reg( unsigned char);
//-----------------------------------------------------------------------
#endif    //__NCT5523D_H
```

File of the MAIN.CPP.

```
//---------------------------------------------------------------------------
//
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// PURPOSE.
//
//---------------------------------------------------------------------------
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "NCT5523D.H"
//---------------------------------------------------------------------------
int main (void);


void WDTInitial(void);
void WDTEnable(unsigned char);
void WDTDisable(void);
```

```
//---------------------------------------------------------------------------
int main (void)
{
   char SIO;
   SIO = Init_NCT5523D();
   if (SIO == 0)
   {
       printf("Can not detect Nuvoton NCT5523D, program abort.\n");
       return(1);
    }
      WDTInitial();

      WDTEnable(10);

      WDTDisable();

      return 0;
}
//---------------------------------------------------------------------------
void WDTInitial(void)
{
   unsigned char bBuf;
   Set_NCT5523D_LD(0x08);                          //switch to logic device 8
   bBuf = Get_NCT5523D_Reg(0x30);
   bBuf &= (~0x01);
   Set_NCT5523D_Reg(0x30, bBuf);                   //Enable WDTO
}
//---------------------------------------------------------------------------

void WDTEnable(unsigned char NewInterval)
{
   unsigned char bBuf;

   Set_NCT5523D_LD(0x08);                          //switch to logic device 8
   Set_NCT5523D_Reg(0x30, 0x01);                   //enable timer

   bBuf = Get_NCT5523D_Reg(0xF0);
   bBuf &= (~0x08);
   Set_NCT5523D_Reg(0xF0, bBuf);                   //count mode is second
```

```
   Set_NCT5523D_Reg(0xF1, NewInterval);                    //set timer
}
//---------------------------------------------------------------------------
void WDTDisable(void)
{
   Set_NCT5523D_LD(0x08);                                  //switch to logic device 8
   Set_NCT5523D_Reg(0xF1, 0x00);                           //clear watchdog timer
   Set_NCT5523D_Reg(0x30, 0x00);                           //watchdog disabled
}
//---------------------------------------------------------------------------
```

File of the NCT5523D.CPP

```
//---------------------------------------------------------------------------
//
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// PURPOSE.
//
//---------------------------------------------------------------------------
#include "NCT5523D.H"
#include <dos.h>
//---------------------------------------------------------------------------
unsigned int NCT5523D_BASE;
```

```
void Unlock_NCT5523D (void);
void Lock_NCT5523D (void);
//----------------------------------------------------------------------------
unsigned int Init_NCT5523D(void)
{
   unsigned int result;
   unsigned char ucDid;

   NCT5523D_BASE = 0x4E;
   result = NCT5523D_BASE;
   ucDid = Get_NCT5523D_Reg(0x20);
   if (ucDid == 0xC4)                                    //NCT5523D??
{   goto Init_Finish;   }

   NCT5523D_BASE = 0x2E;
   result = NCT5523D_BASE;

   ucDid = Get_NCT5523D_Reg(0x20);
   if (ucDid == 0xC4)                                    //NCT5523D??
 {   goto Init_Finish;   }

   NCT5523D_BASE = 0x00;
   result = NCT5523D_BASE;

Init_Finish:
return (result);
}
//----------------------------------------------------------------------------
void Unlock_NCT5523D (void)
{
   outportb(NCT5523D_INDEX_PORT, NCT5523D_UNLOCK);
   outportb(NCT5523D_INDEX_PORT, NCT5523D_UNLOCK);
}
//----------------------------------------------------------------------------
void Lock_NCT5523D (void)
{
   outportb(NCT5523D_INDEX_PORT, NCT5523D_LOCK);
}
```

```
//---------------------------------------------------------------------------


void Set_NCT5523D_LD( unsigned char LD)
{
   Unlock_NCT5523D();
   outportb(NCT5523D_INDEX_PORT, NCT5523D_REG_LD);
   outportb(NCT5523D_DATA_PORT, LD);
   Lock_NCT5523D();
}
//---------------------------------------------------------------------------
void Set_NCT5523D_Reg( unsigned char REG, unsigned char DATA)
{
   Unlock_NCT5523D();
   outportb(NCT5523D_INDEX_PORT, REG);
   outportb(NCT5523D_DATA_PORT, DATA);
   Lock_NCT5523D();
}
//---------------------------------------------------------------------------
unsigned char Get_NCT5523D_Reg(unsigned char REG)
{
   unsigned char Result;
   Unlock_NCT5523D();
   outportb(NCT5523D_INDEX_PORT, REG);
   Result = inportb(NCT5523D_DATA_PORT);
   Lock_NCT5523D();
   return Result;
}
//---------------------------------------------------------------------------
```