ASB200-909

Slim & Compact SBC System

User's Manual

Version 1.0
(Nov. 2016)

iBASE

Compliance

CE

This product has passed CE tests for environmental specifications and limits. This product is in accordance with the directives of the Union European (EU). If users modify and/or install other devices in this equipment, the CE conformity declaration may no longer apply.

FC

This product has been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications.

WEEE

This product must not be disposed of as normal household waste, in accordance with the EU directive of for waste electrical and electronic equipment (WEEE - 2012/19/EU). Instead, it should be disposed of by returning it to a municipal recycling collection point. Check local regulations for disposal of electronic products.

Green IBASE

This product is compliant with the current RoHS restrictions and prohibits use of the following substances in concentrations exceeding 0.1% by weight (1000 ppm) except for cadmium, limited to 0.01% by weight (100 ppm).

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (Cr6+)
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ether (PBDE)

Important Safety Information

Carefully read the precautions before using the device.

Environmental conditions:

- Lay the device horizontally on a stable and solid surface in case the device may fall, causing serious damage.
- Leave plenty of space around the device and do not block the openings for ventilation. NEVER DROP OR INSERT ANY OBJECTS OF ANY KIND INTO THE VENTIILATION OPENINGS.
- 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 device for ventilation. NEVER INSERT OBJECTS OF ANY KIND INTO THE VENTILATION OPENINGS.
- Use this product in environments with ambient temperatures between -10˚C and 60˚C for SSD, and between 0˚C and 45˚C for HDD.
- DO NOT LEAVE THIS DEVICE IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20˚C OR ABOVE 80˚C. This could damage the device. The device must be used in a controlled environment.

Care for your IBASE products:

- Before cleaning the device, turn it off and unplug all cables such as power in case a small amount of electrical current may still flow.
- Use neutral cleaning agents or diluted alcohol to clean the device chassis with a cloth. Then wipe the chassis with a dry cloth.
- Vacuum the dust with a computer vacuum cleaner to prevent the air vent or slots from being clogged.

WARNING

Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on your device.
- Do not place heavy objects on the top of the device.
- Operate this device from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your distributor or local power company.
- Do not walk on the power cord or allow anything to rest on it.
- If you use an extension cord, make sure that the total ampere rating of the product plugged into the extension cord does not exceed its limits.

Avoid Disassembly

You are not suggested to disassemble, repair or make any modification to the device. Disassembly, modification, or any attempt at repair could generate hazards and cause damage to the device, even bodily injury or property damage, and will void any warranty.

CAUTION

Danger of explosion if internal lithium-ion battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Warranty Policy

- **IBASE standard products:**

  24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.

- **3rd-party parts:**

  12-month (1-year) warranty from delivery for the 3rd-party parts that are not manufactured by IBASE, such as CPU, memory, HDD, power adapter, panel and touchscreen.

* PRODUCTS, HOWEVER, THAT FAILS DUE TO MISUSE, ACCIDENT, IMPROPER INSTALLATION OR UNAUTHORIZED REPAIR SHALL BE TREATED AS OUT OF WARRANTY AND CUSTOMERS SHALL BE BILLED FOR REPAIR AND SHIPPING CHARGES.

Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
2. If you need any further assistance from your distributor or sales representative, prepare the following information of your product and elaborate upon the problem.

   - Product model name
   - Product serial number
   - Detailed description of the problem
   - The error messages in text or in screenshots if there is any
   - The arrangement of the peripherals
   - Software in use (such as OS and application software, including the version numbers)

3. If repair service is required, you can download the RMA form at http://www.ibase.com.tw/english/Supports/RMAService/. Fill out the form and contact your distributor or sales representative.

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Table of Contents

Chapter 1
General Information

The information provided in this chapter includes:

- Features
- Packing List
- Specifications
- Overview
- Dimensions

1.1 Introduction

The ASB200-909 is a product series of IBASE embedded computing system, applicable to thin clients, smart industrial automation or controller, and retail equipment. It is a compact and fanless design with an Intel®-5th Gen. Core™ i7 / i5 processor and an Intel® I218LM Ethernet controller. This product features iSMART that allows the device capable of auto-scheduling for general applications and gives energy savings on power. It is able to be operated at the ambient operating temperature ranging from -10 ~ 60 °C for SSD, 0 ~ 45 °C for HDD, and even from -20 ~ 80 °C for storage.

1.2 Features

- Slim and compact fanless design with IBASE 3.5” disk-sized SBC
- On board Intel® 5th Gen. Core™ i7 / i5 / i3 U-Series
- iSMART for auto-scheduler and power resume
- 2.5” drive tray for SATA HDD or SSD
- 2 x USB 3.0, 2 x USB2.0, 4 x COM
- 12 ~ 24V wide-range DC power input

1.3 Packing List

Your ASB200-909 package should include the items listed below. If any of the items below is missing, contact the distributor or the dealer from whom you purchased the product.

- ASB200-909 x 1
- Female Terminal Block x 1
- Wall Mount Kit x 1
- Screws for Wall Mount Kit x 4
- Disk (including drivers and this user manual) x 1

1.4 Optional Accessories

IBASE provide optional accessories as follows. Please contact us or your dealer if you need any.

- Power Adapter x 1
- Power Cord x 1
- VESA Mount Kit (with 4 screws) x 1

1.5 Specifications

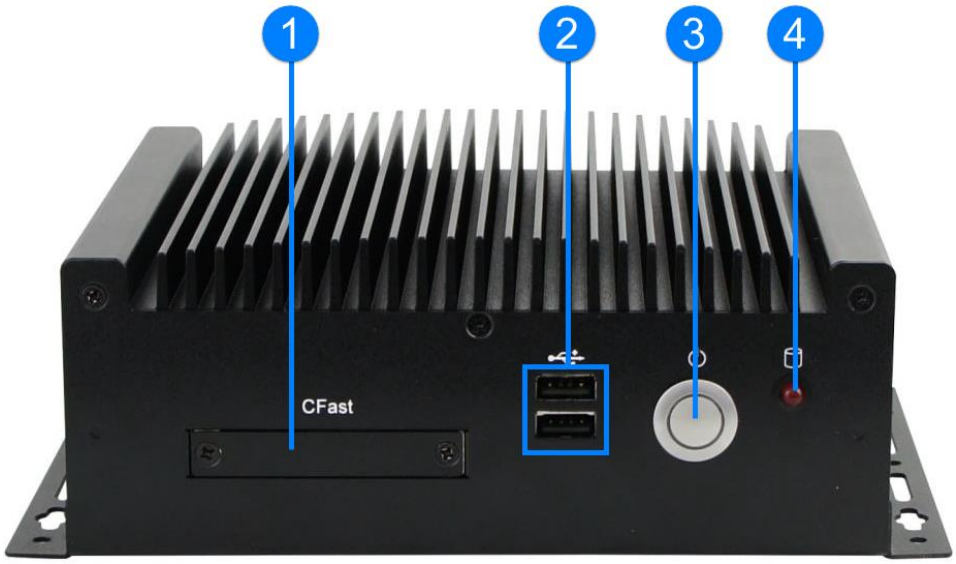
Product Name	ASB200-909		
System			
Motherboard	IB909AF-5650	IB909AF-5350	IB909F-5010
Operating System	• Windows 7 / 8 (32-bit & 64-bit) • Windows Embedded 8 / 7 • Linux		
CPU	Intel® 5th Gen. Core™ i7 5650U at 2.2 GHz	Intel® 5th Gen. Core™ i5 5350U at 1.8 GHz	Intel® 5th Gen. Core™ i3 5010U at 2.1 GHz
Chipset	Integrated		
Memory	2 x DDR3L-1600 SO-DIMM 2GB, expandable to 16 GB		
Graphics	Intel® HD Graphics 6000/5500		
Storage	1 x 2.5” drive bay for SSD / HDD		
Super I/O	Nuvoton NCT6102D		
Audio Codec	Realtek ALC269Q-VC3-GR		
Network	• Intel® I218LM (1st GbE LAN) • Intel® I211AT (2nd GbE LAN)		• Intel® I218V (1st GbE LAN) • Intel® I211AT (2nd GbE LAN)
Power Supply	60W power adaptor (Optional)		
BIOS	AMI BIOS		
Watchdog	Watchdog Timer 256 segments, 0, 1, 2…255 sec/min		
Chassis	Aluminum & steel, black		
Mounting	• Desktop mount • Wall mount • VESA mount		
Dimensions (W x H x D)	180 x 66 x 150 mm (7.09” x 2.6” x 5.9”)		
Weight	1.8 kg (3.97 lb)		
Certificate	CE / LVD / FCC Class B / CCC		
I/O Ports			
DC Input	DC Jack with terminal block for 12 ~ 24V DC-In		
LAN	2 x RJ45 GbE LAN		

USB	• 2 x USB 3.0 • 2 x USB 2.0
Serial	• 1 x COM1 (RS-232/422/485) • 1 x COM2 (RS-232 only)
Display	1 x DVI-I port
SATA	2 x SATA II connector
Expansion	• 1 x Mini PCIe / mSATA slot, with USB signal (full-sized) • 1 x Mini PCIe / mSATA slot, with USB signal (half-sized)
Environment	
Temperature	• **Operating:** With SSD: -10 ~ 60 °C (14 ~ 140 °F) With HDD: 0 ~ 45 °C (32 ~ 113 °F) • **Storage:** -20~ 80 °C (-4 ~ 176 °F)
Relative Humidity	5 ~ 90% at 45 °C (non-condensing)
Vibration Protection	• **Operating:** 0.25 Grms / 5 ~ 500 Hz • **Non-operating:** 1 Grms / 5 ~ 500Hz
Shock Protection	• **Operating:** 20 g / 11 ms • **Non-operating:** 40 g / 11 ms

All specifications are subject to change without prior notice.

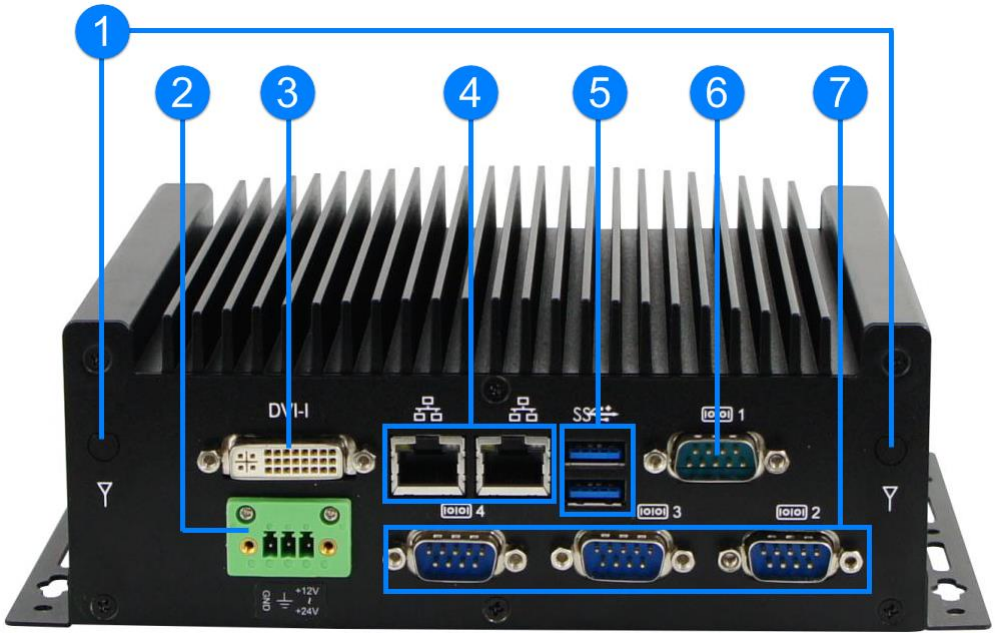
1.6 Overview

Front View



No.	Name	No.	Name
1	CFast Slot Door	3	Power Button
2	USB 2.0 Ports	4	HDD LED Indicator

Rear View

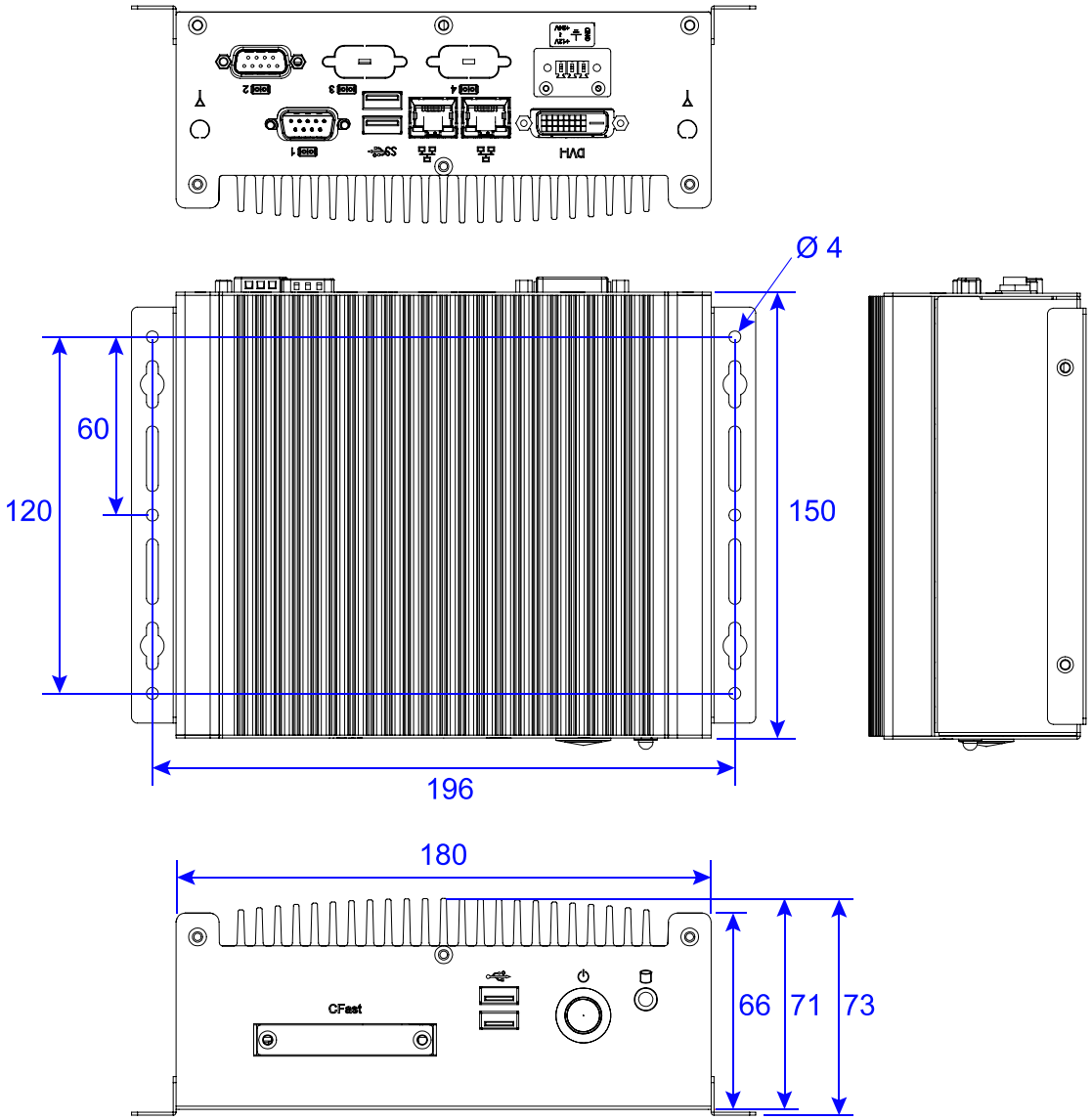


No.	Name	No.	Name
1	Antenna Holes	5	USB 3.0 Port
2	DC-In Power Connector	6	COM Port - RS-232 / 422 / 485
3	DVI-I Port	7	COM Ports – RS-232 Only
4	LAN Port		

Oblique View

1.7 Dimensions

Unit: mm



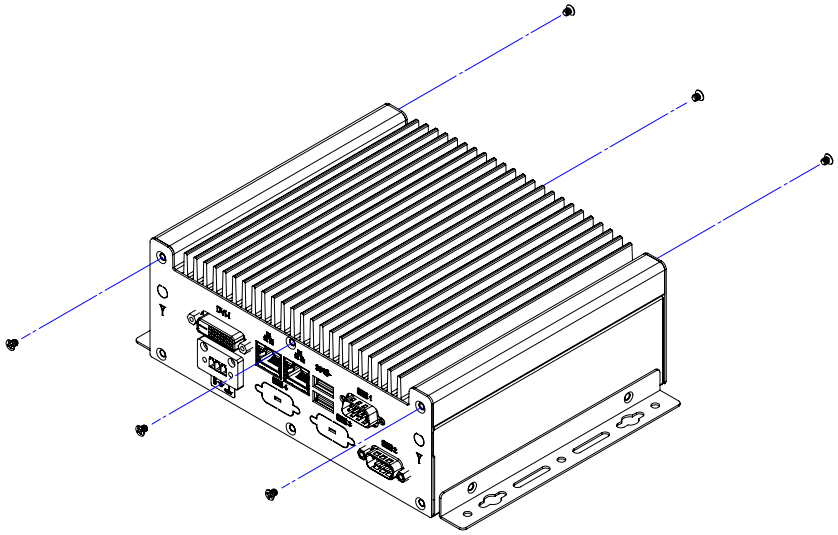
Chapter 2
Hardware Configuration

The information provided in this chapter includes:

- Essential installations before you begin
- Information and locations of connectors

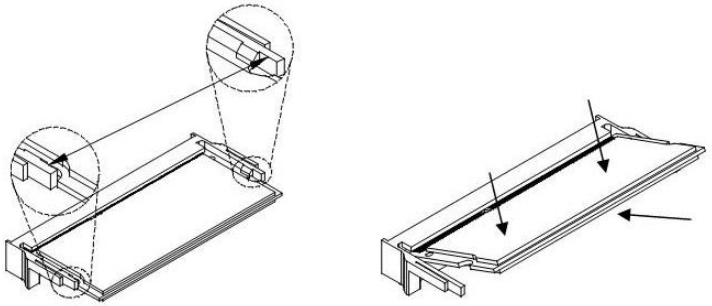
2.1 Essential Installations Before You Begin

Before installations, you need to disassemble the device cover by loosen 6 screws from the device.



2.1.1 Memory Installation

There are two SO-DIMM DDR3L memory slots inside ASB200-909 and the maximum memory is expandable up to 16 GB. To install the modules, locate the memory slot on the board and perform the following steps.



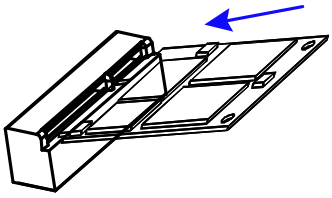
1. Align the key of the memory module with that on the memory slot and insertl the module slantwise.
2. Gently push the module in an upright position until the clips of the slot close to hold the module in place when the module touches the bottom of the slot.

To remove the module, press the clips outwards with both hands.

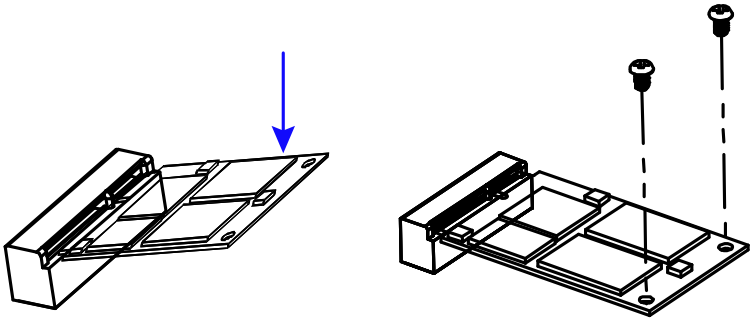
2.1.2 Mini PCIe Card Installation

If you need to use a mini PCIe card for expansion slots, follow the instructions below for installation after you disassemble the device cover.

1. Align the key of the mini PCIe card to the Mini PCIe interface, and insert the card slantwise.



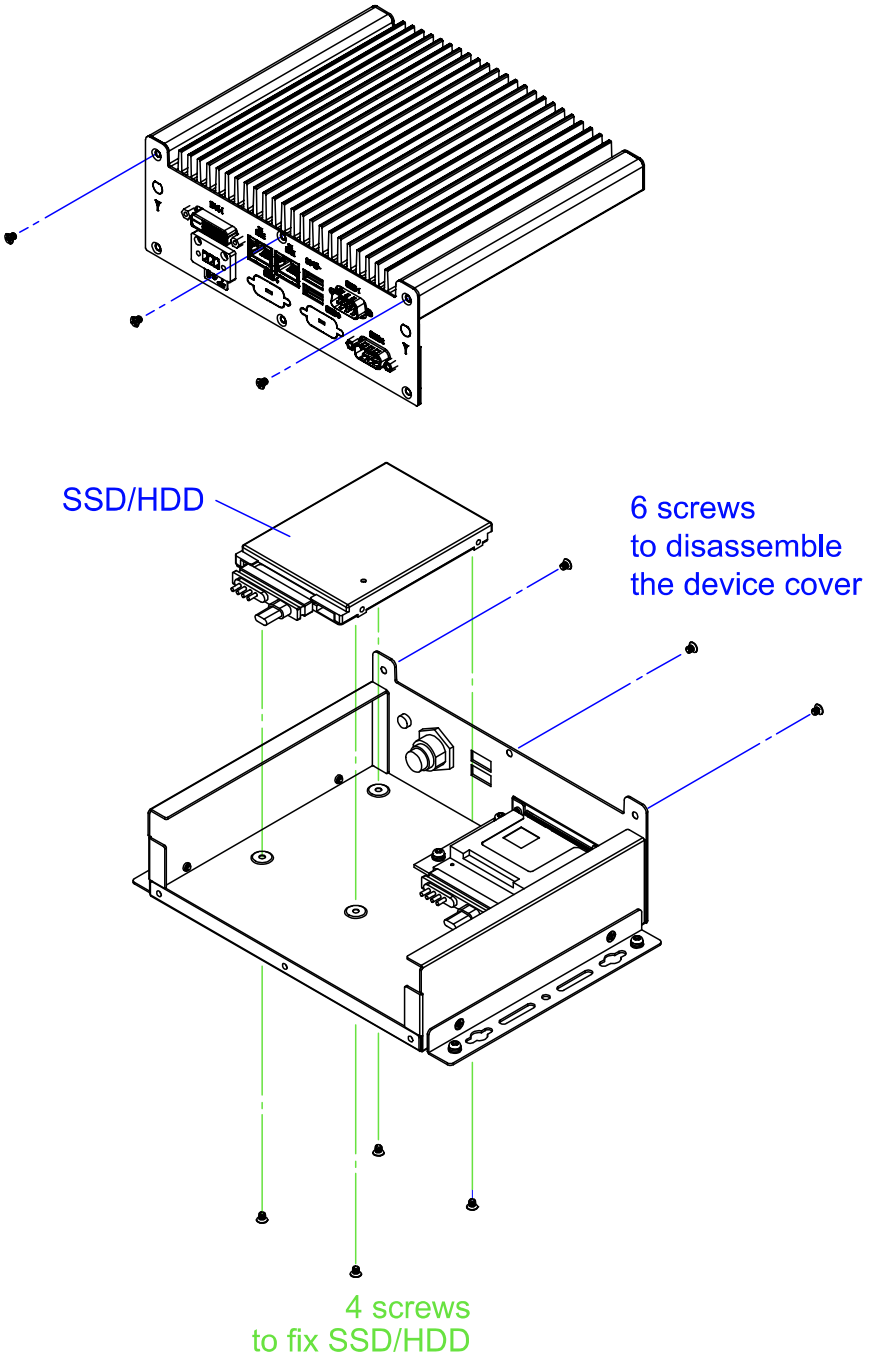
2. Push the mini PCIe card down, fix it onto two standoffs with 2 screws .



2.1.3 HDD Installation

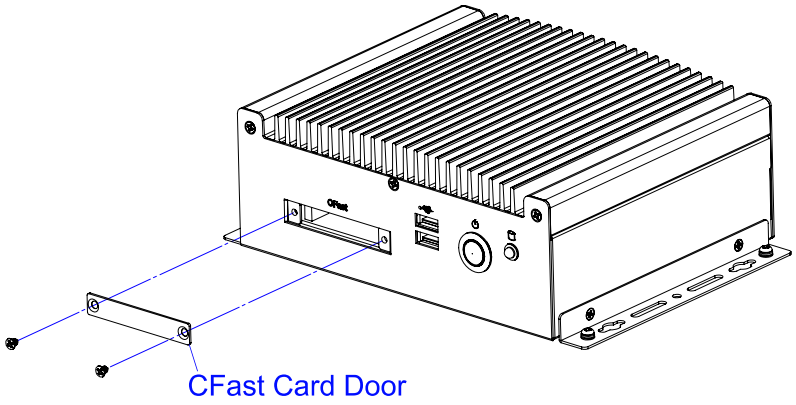
If you are using a model type of ASB200-909 that doesn't include a HDD card, you will need to install one. Follow the instructions below for installation after you disassemble the device cover.

1. Loosen 4 screws to attach your HDD and then tighten these screws to fix the HDD.

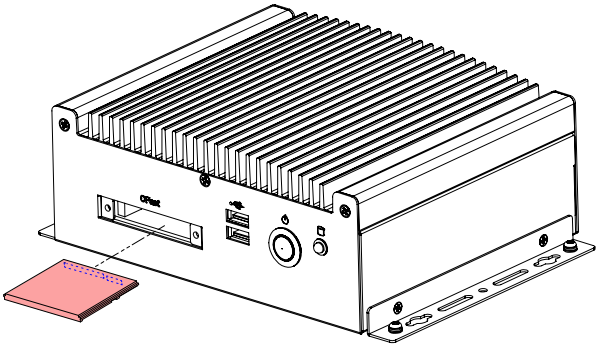


2.1.4 CFast Card Installation

1. Release the two screws as shown below to open the CFAST card doot.

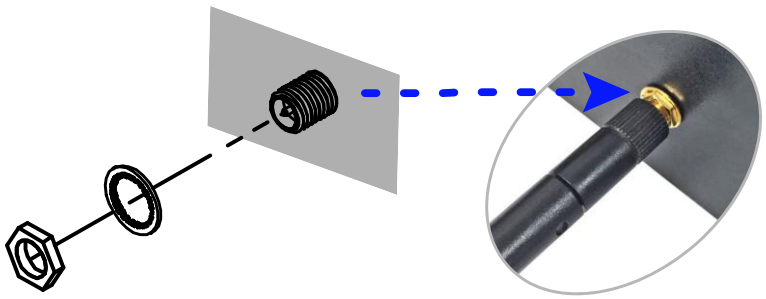


2. Insert the card as below.
   To remove the CFast card, push the card again.



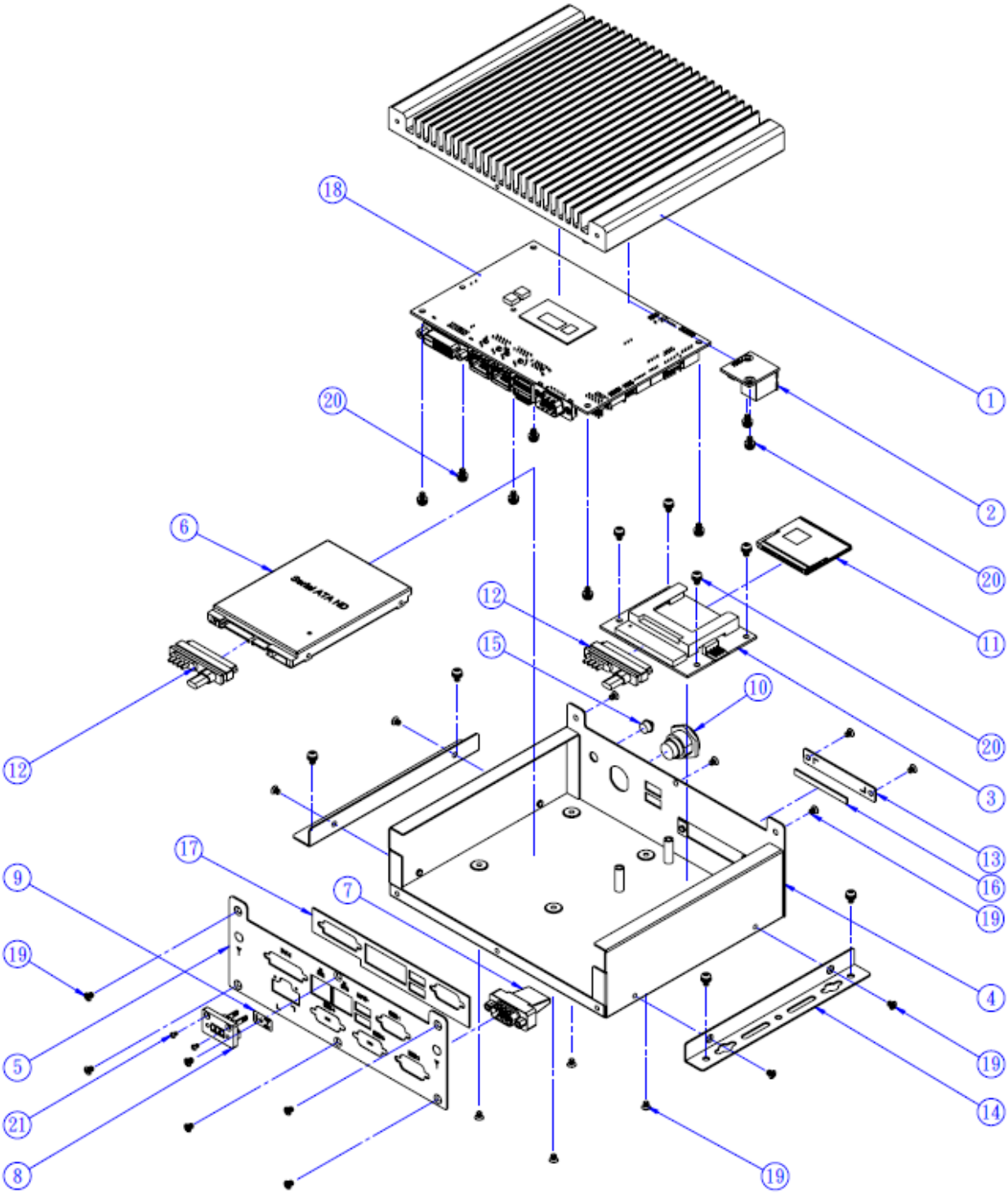
2.1.5 WiFi / 3G / 4G Antenna Installation

Thread the WiFi / 3G / 4G antenna cable through an antenna hole. Then fasten the antenna as shown below.



Info: The diameter of the nut is around 6.35 mm (0.25”-36UNC).

2.1.6 Device Exploded Diagram



Item	Name	Q'ty
1	ASB200-909 heatsink	1
2	ID112 board	1
3	IBCFAST board	1
4	ASB200-909 base chassis	1
5	ASB200-909 front plate	1
6	SATA 2.5" hard disk	1
7	COM port cable	1
8	DINKLE 3-pin DC-in	1
9	Label	1
10	Power switch connector	1
11	CFAST card	1
12	SATA cable	2
13	ASB200-909 CFast cover	1
14	ASB200-909 mounting bracket	2
15	LED	1
16	CFast card sponge	1
17	ASB200-908 I/O gasket	1
18	IB909 main board	1
19	Screw-B30-B (M3 x 4L)	19
20	Screw-B28A (M3 x 6L)	16
21	Screw-A16 (M2 x L6)	2

2.1.7 Wall Mount Installation

Note: Before mounting the system on wall, ensure that you are following all applicable building and electric codes.

Requirements

When mounting, ensure that you have enough room for power and signal cable routing, and have good ventilation for power adapter. The method of mounting must be able to support weight of the ASB200-909 plus the suspension weight of all the cables to be attached to the system. Use the following methods for mounting your system:

Selecting the location

Plan the mounting location thoroughly. Locations such as walkway areas, hallways, and crowded areas are not recommended. Mount the product to a flat, sturdy, structurally sound column or wall surface.

The best mounting surface is a standard countertop, cabinet, table, or other structure that is minimally the width and length of the product. This will reduce the risk that someone may accidentally wall into and damage the product. Local laws governing the safety of individuals might require this type of consideration.

Selecting the type of wall construction

1. Mounting on a hollow wall

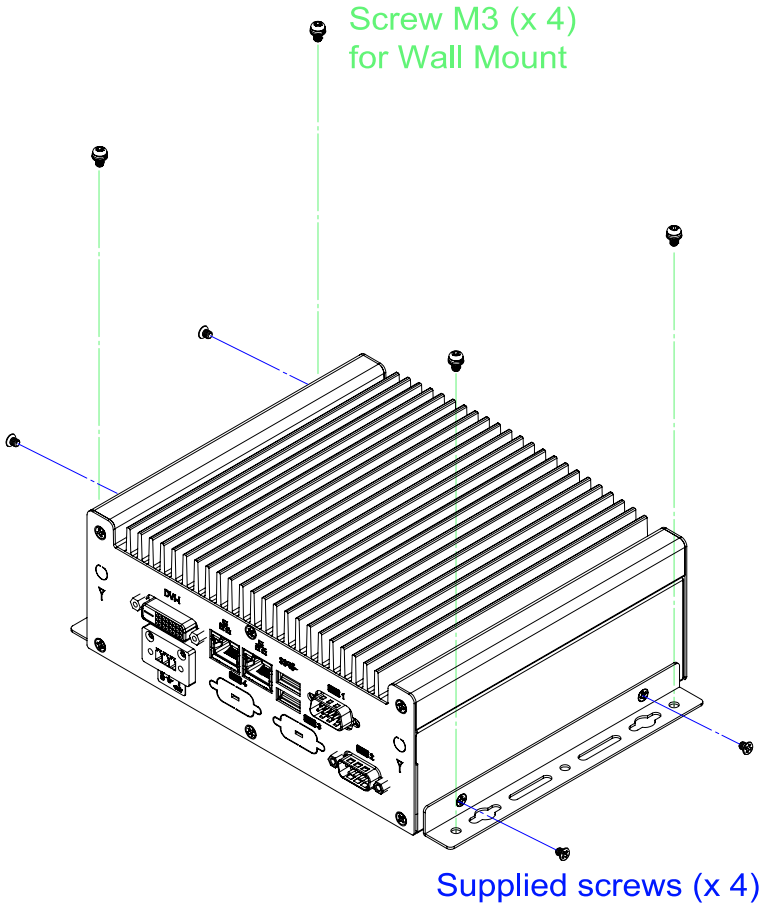
   - **Wood surface**
     Use construction-grade wood and the recommended minimum thickness is 38 x 25.4 mm (1.5” x 10”).

     Note: This method provides the most reliable attachment for the product with little risk that the product may come loose or require ongoing maintenance.

   - **Drywall**
     Drywall over wood studs is acceptable.

2. Mounting on a solid concrete or brick wall with flat and smooth surface

Wall mount installation instructions



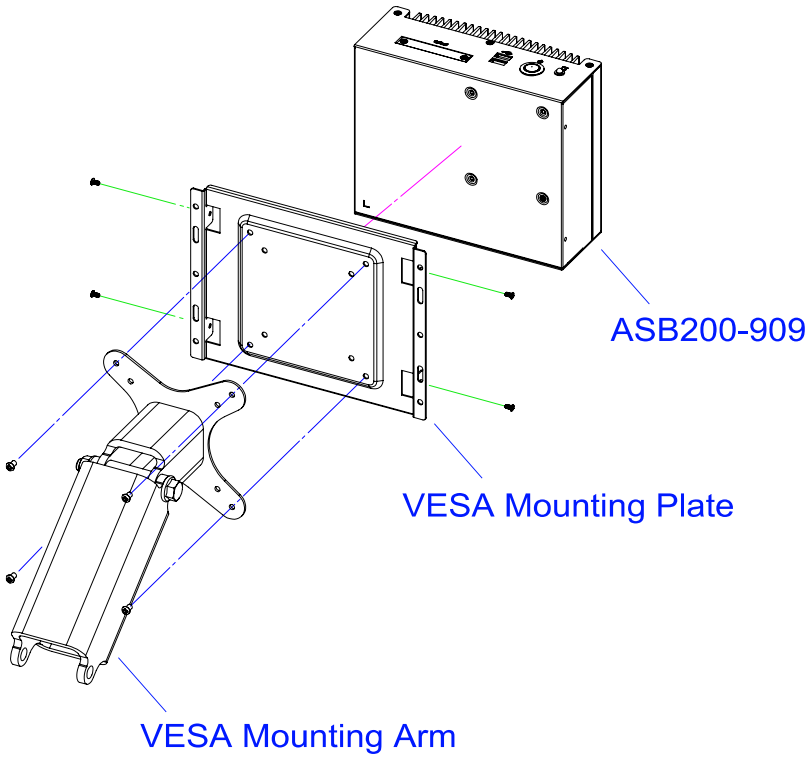
1. Attach the mounting brackets to your ASB200-909, and secure with the supplied four screws.
2. Then prepare at least four screws (M3, 6 mm) to mount the device on wall .

You can install ASB200-909 on plastic (LCD monitor), wood, drywall surface over studs, or a solid concrete or metal plane directly. The types of fasteners required are dependent on the type of wall construction.

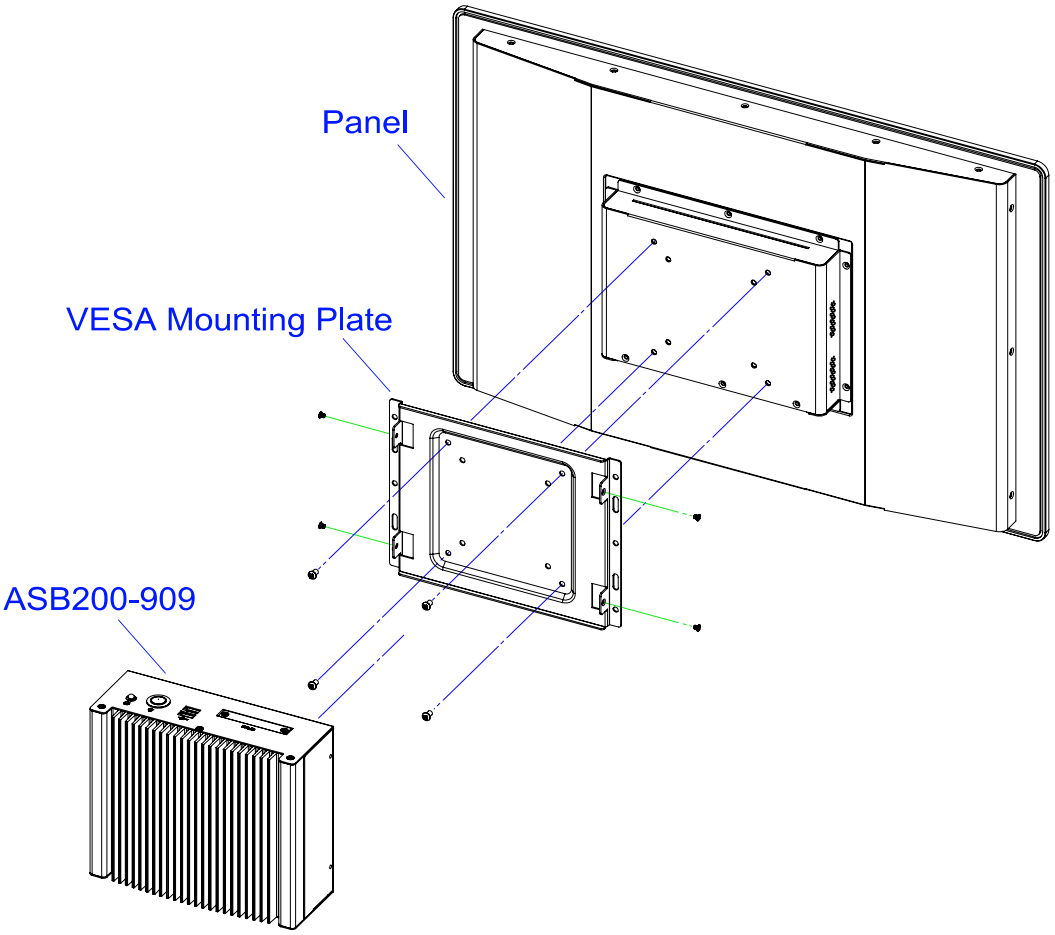
Fasteners are not supplied in the product package. You will need to prepare the fasteners. Choose fasteners that are rated either **Medium Duty** or **Heavy Duty**. To assure proper fastener selection and installation, follow the fastener manufacturer's recommendations.

2.1.8 VESA Mount Installation

1. VESA mounting ASB200-909.

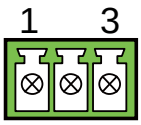


2. VESA mounting ASB200-909 to a panel



2.1.9 Pinout for DC Power Input Connector

- **DC Power Input (terminal block)**



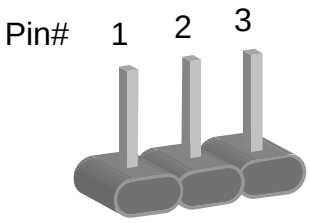
Pin	Assigment	Pin	Assigment
1	GND	3	+12V ~ +24V
2	Chassis GBD		

2.2 Setting the Jumpers

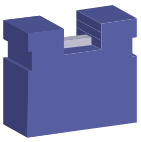
Set up and configure your ASB200-909 by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

2.2.1 How to Set Jumpers

Jumpers are short-length conductors consisting of several metal pins with a non-conductive base mounted on the circuit board. Jumper caps are used to have the functions and features enabled or disabled. If a jumper has 3 pins, you can connect either PIN1 to PIN2 or PIN2 to PIN3 by shorting.

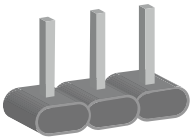
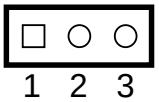
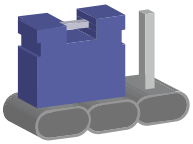
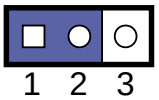
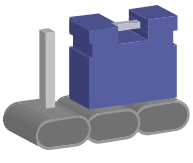
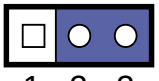


A 3-pin jumper



A jumper cap

Refer to the illustration below to set jumpers.

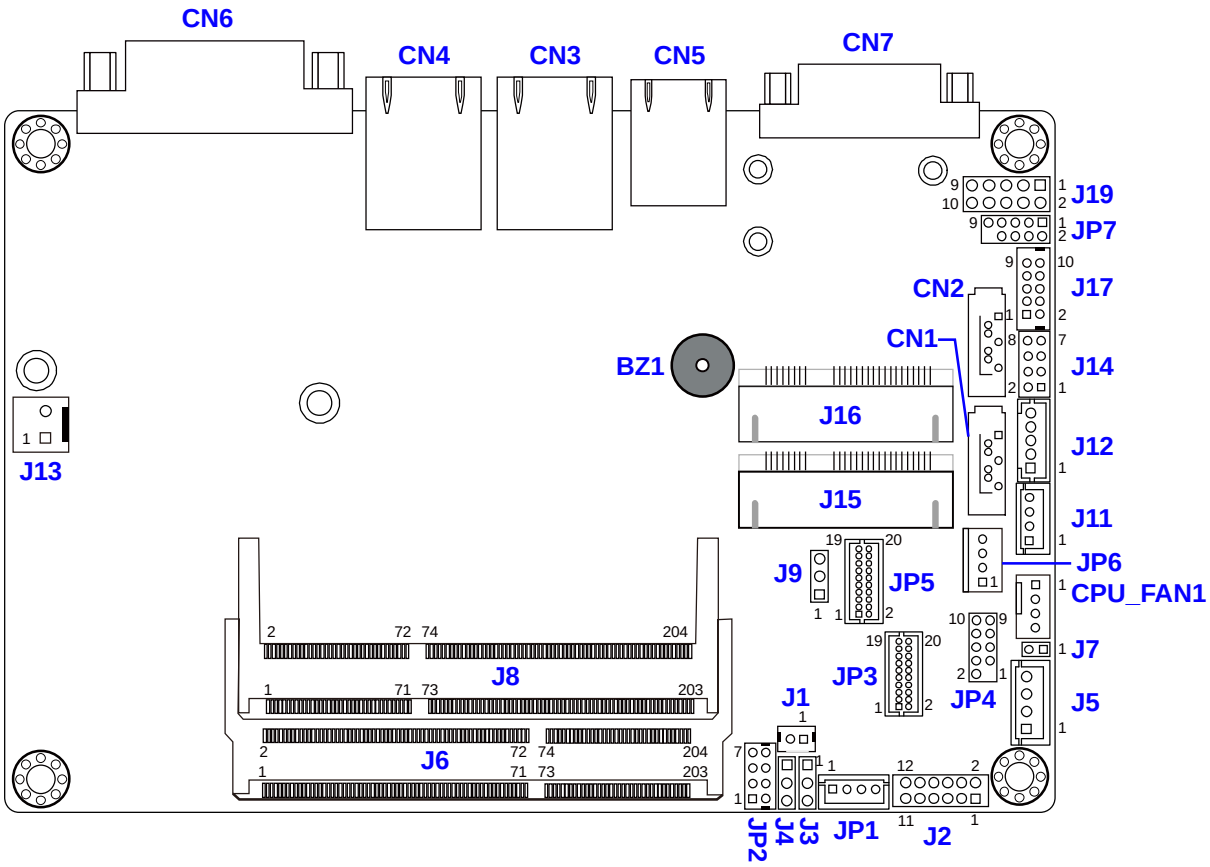
Pin closed	Oblique view	Schematic illustration in the manual
Open		
1-2		
2-3		

When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e. turned **On**.

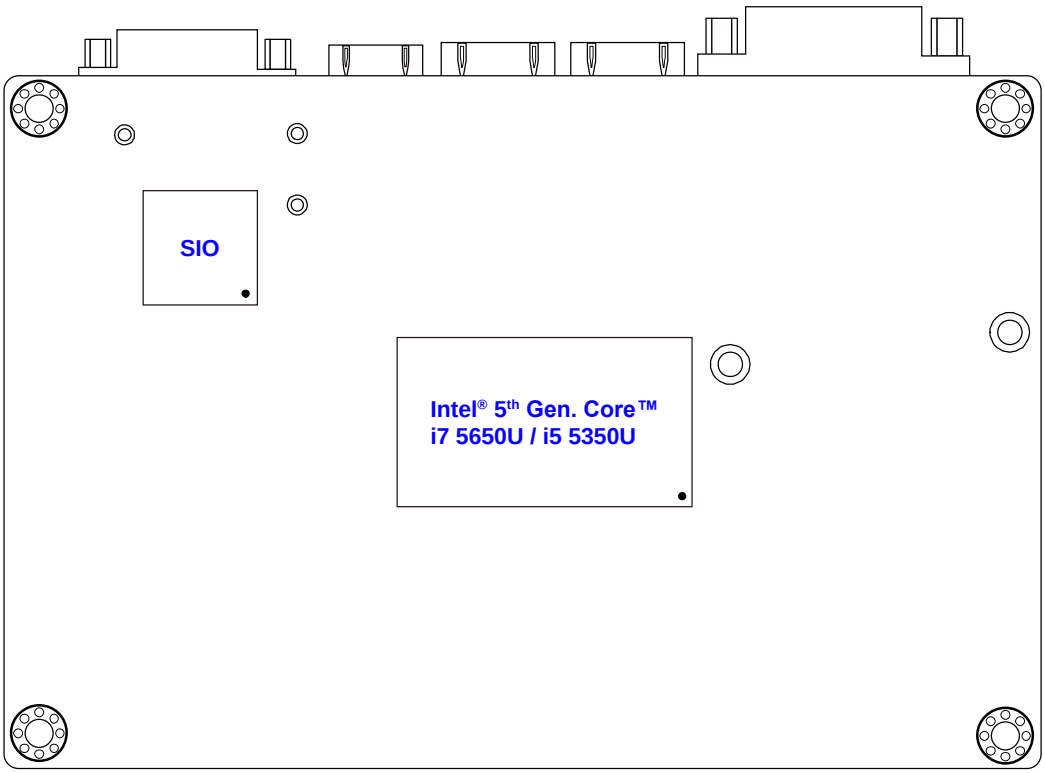
When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e. turned **Off**.

2.3 Jumper & Connector Locations on Motherboard

Motherboard: IB909



IB909 - top

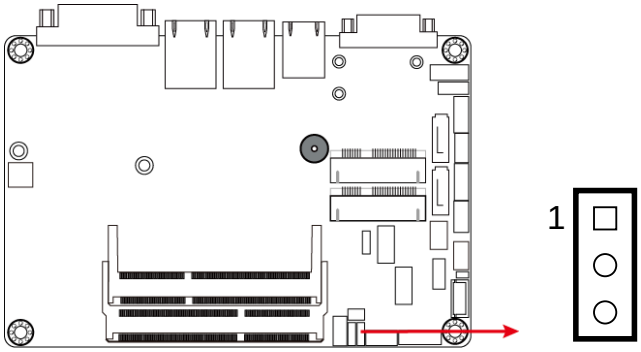


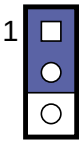
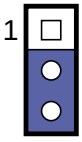
IB909 - bottom

2.4 Jumpers Quick Reference

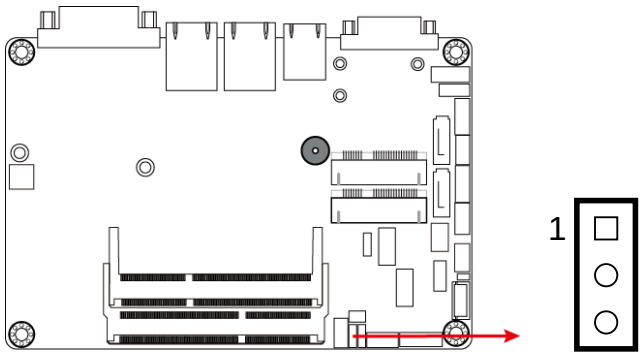
Function	Connector Name	Page
CMOS Data Clearance	J3	25
ME Register Clearance	J4	26
LVDS Panel Power Selection	J9	26
Factory Use Only	J7	--

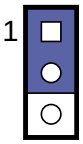
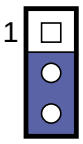
2.4.1 CMOS Data Clearance (J3)



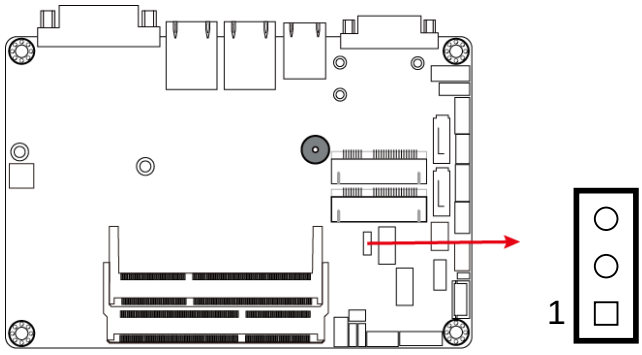
Function	Pin closed	Illustration
Normal (default)	1-2	
Clear CMOS	2-3	

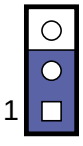
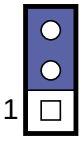
2.4.2 ME Register Clearance (J4)



Function	Pin closed	Illustration
Normal (default)	1-2	
Clear ME Register	2-3	

2.4.3 LVDS Panel Power Selection (J9)

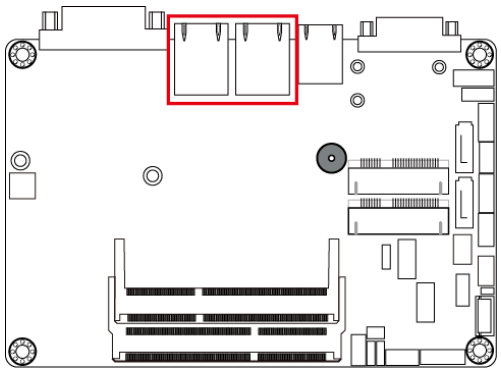


Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

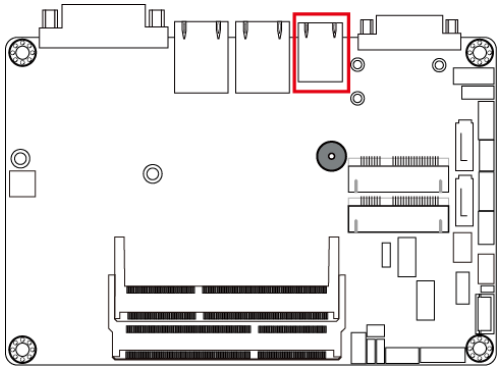
2.5 Connectors Quick Reference

Function	Connector Name	Page
LAN Port (GbE)	CN3, CN4	28
USB 3.0 Port	CN5	28
DVI-I Port	CN6	28
COM1 RS-232/422/485 Port	CN7	29
SATA III Port	CN1, CN2	30
LCD Backlight Connector	JP1	30
USB 2.0 Connector	JP2	31
Audio Connector	J2	31
LVDS Connector	JP3, JP5	32
Amplifier Connector	J5	33
DDR3L SO-DIMM Socket	J6, J8	33
SATA HDD Power Connector	JP6	34
Smart Battery Connector	J12	34
Motherboard Power Input Connector	J13	35
Front Panel Setting Connector	J14	35
Full-Size Mini-PCIe / mSATA Connector	J15	36
Half-Size Mini-PCIe / mSATA Connector	J16	36
COM2 RS-232 Connector	J17	37
Digital I/O Connector	J19	37
CPU Fan Power Connector	CPU_FAN1	38
Factory Use Only	J7, J11, JP4, JP7	--

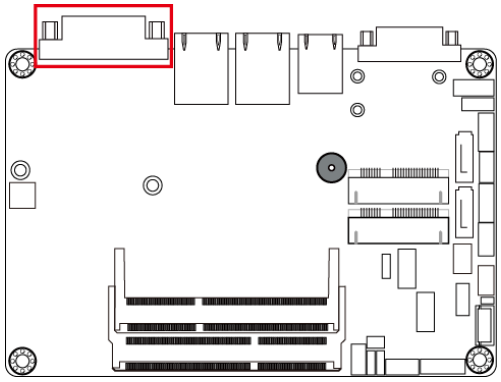
2.5.1 LAN Port (GbE) (CN3, CN4)



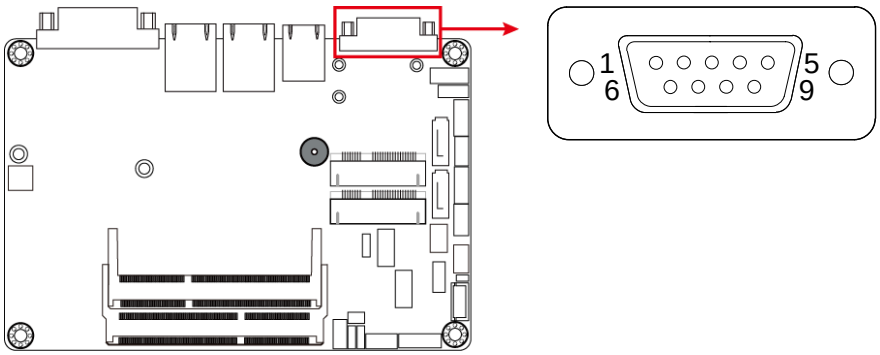
2.5.2 USB 3.0 Port (CN5)



2.5.3 DVI-I Port (CN6)



2.5.4 COM1 RS-232/422/485 Port (CN7)

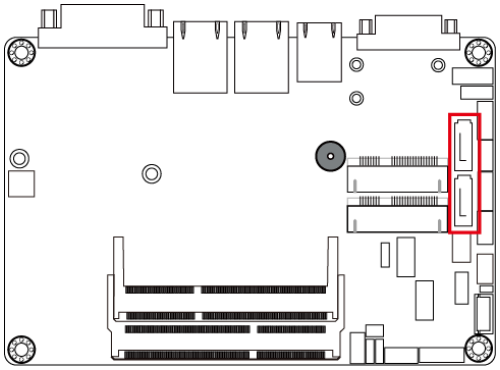


COM1 port is jumper-less and configurable in BIOS.

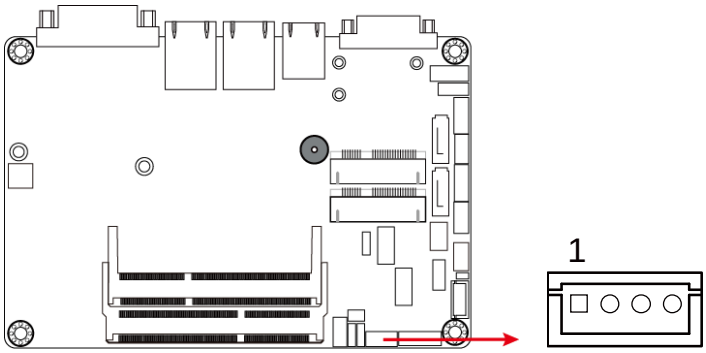
Pin	Assigment	Pin	Assigment
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	GND, ground		

Pin	Assignment		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

2.5.5 SATA III Port (CN1, CN2)

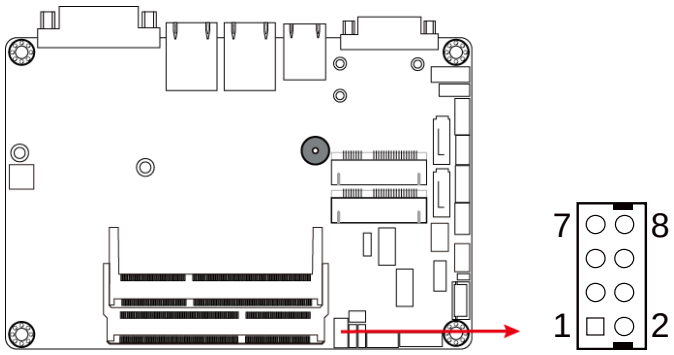


2.5.6 LCD Backlight Connector (JP1)



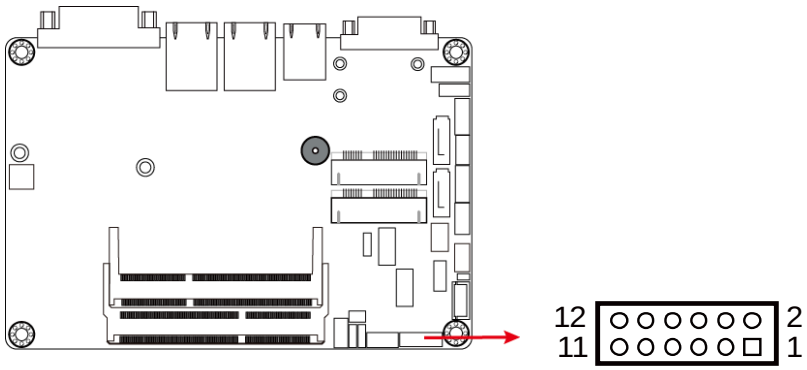
Pin	Assigment	Pin	Assigment
1	+12V	3	Brightness Control
2	Backlight Enable	4	Ground

2.5.7 USB 2.0 Connector (JP2)



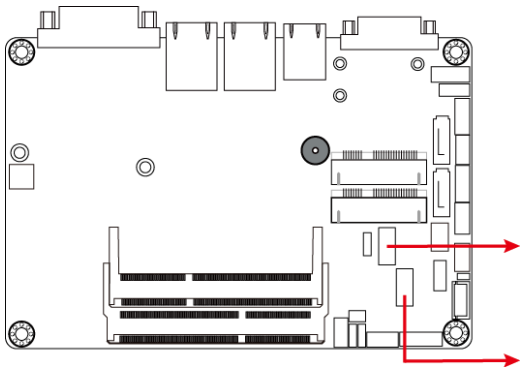
Pin	Assigment	Pin	Assigment
1	VCC	5	D0+
2	Ground	6	D1-
3	D0-	7	Ground
4	D1+	8	VCC

2.5.8 Audio Connector (J2)

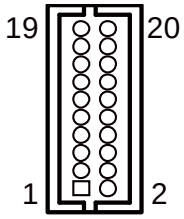


Pin	Assigment	Pin	Assigment
1	Lineout_L	7	JD_Linein
2	Lineout_R	8	Ground
3	JD_Front	9	MIC_L
4	Ground	10	MIC-R
5	Linein_L	11	JD_MIC1
6	Linein_R	12	Ground

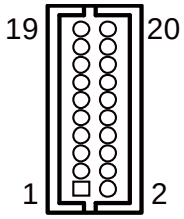
2.5.9 LVDS Connector (JP3, JP5)



JP5: Channel 2

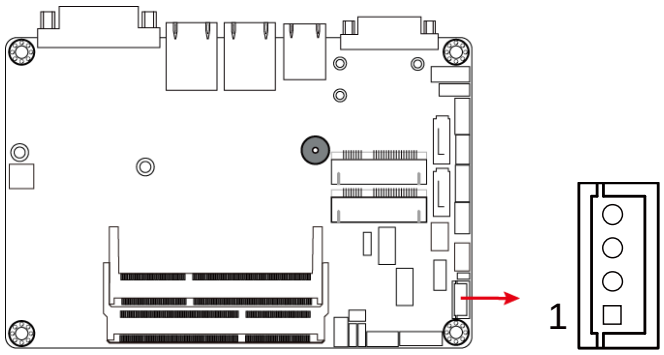


JP3: Channel 1



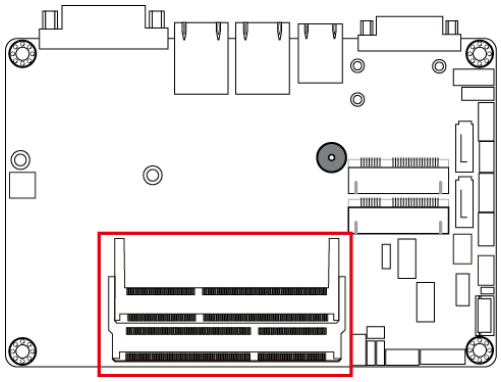
Pin	Assigment	Pin	Assigment
1	TX0P	11	Ground
2	TX0N	12	Ground
3	Ground	13	CLKP
4	Ground	14	CLKN
5	TX1P	15	Ground
6	TX1N	16	Ground
7	Ground	17	TX3P
8	Ground	18	TX3N
9	TX2P	19	Power
10	TX2N	20	Power

2.5.10 Amplifier Connector (J5)

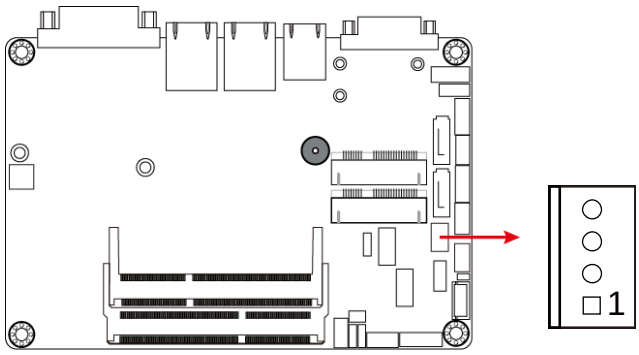


Pin	Assigment	Pin	Assigment
1	OUTL+	3	OUTR-
2	OUTL-	4	OUTR+

2.5.11 DDR3L SO-DIMM Socket (J6, J8)

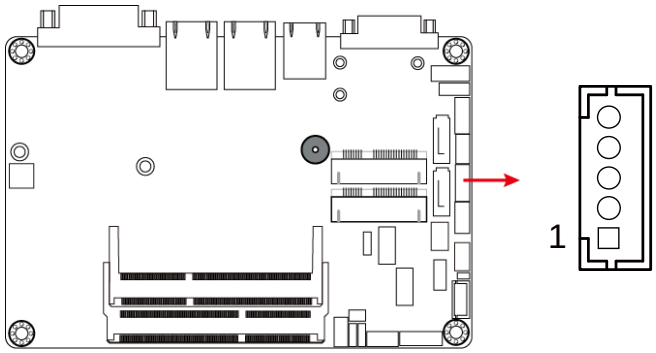


2.5.12 SATA HDD Power Connector (JP6)



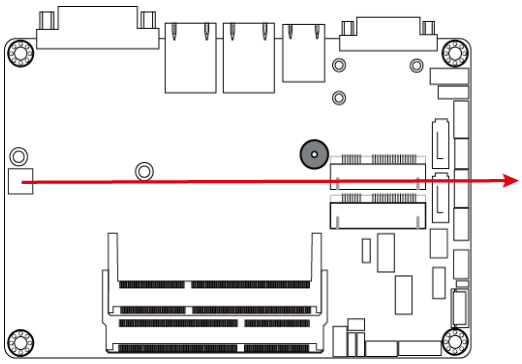
Pin	Assigment	Pin	Assigment
1	+5V	3	Ground
2	Ground	4	+12V

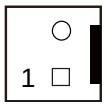
2.5.13 Smart Battery Connector (J12)



Pin	Assigment	Pin	Assigment
1	RST#	4	SMB_Data
2	ICHSWI#	5	SMB_CLK
3	Ground		

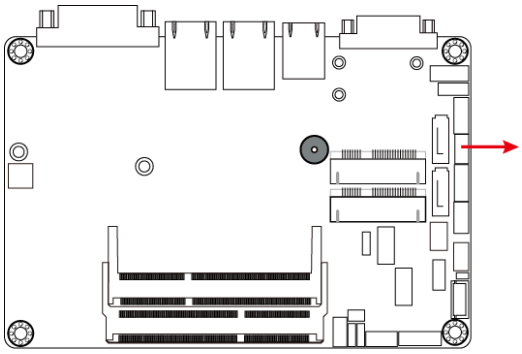
2.5.14 Motherboard Power Input Connector (J13)

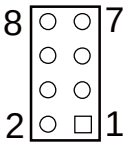




Pin	Assigment
1	+9V ~ +24V
2	GND

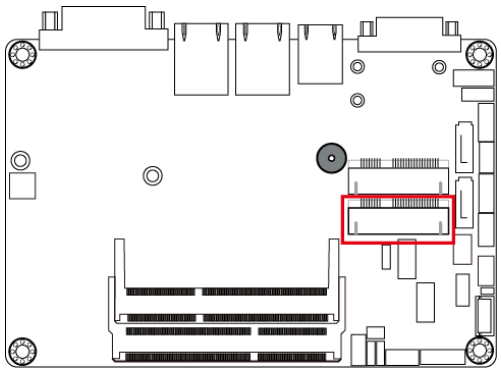
2.5.15 Front Panel Setting Connector for LED Indicators (J14)



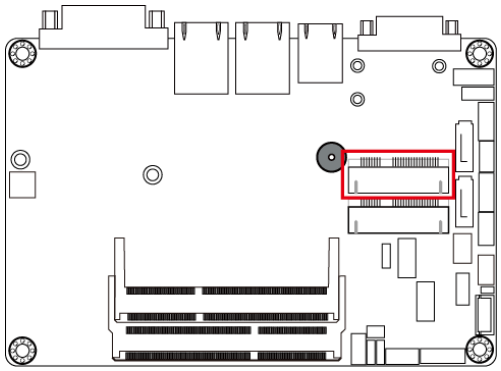


Pin	Assigment	Pin	Assigment
1	Ground	5	HDD_LED+
2	PWR_SW	6	HDD_LED-
3	PWR_LED+	7	Ground
4	PWR_LED-	8	Reset-

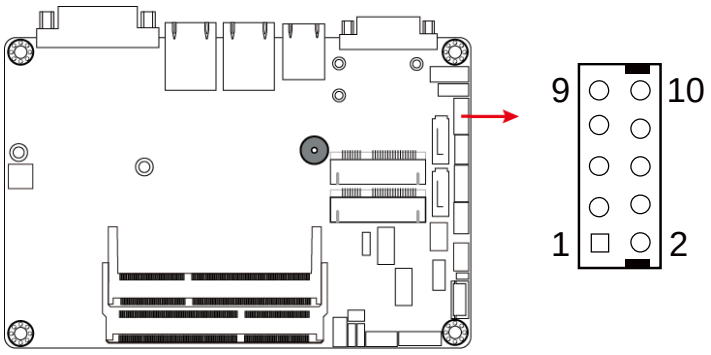
2.5.16 Full-Size Mini-PCIe / mSATA Connector (J15)



2.5.17 Half-Size Mini-PCIe / mSATA Connector (J16)

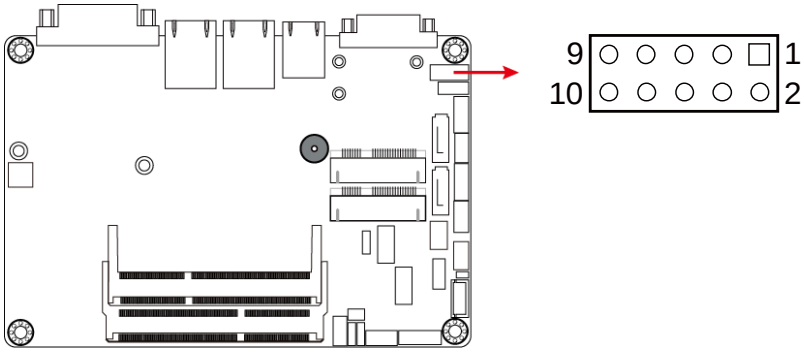


2.5.18 COM2 (RS-232) Port (J17)



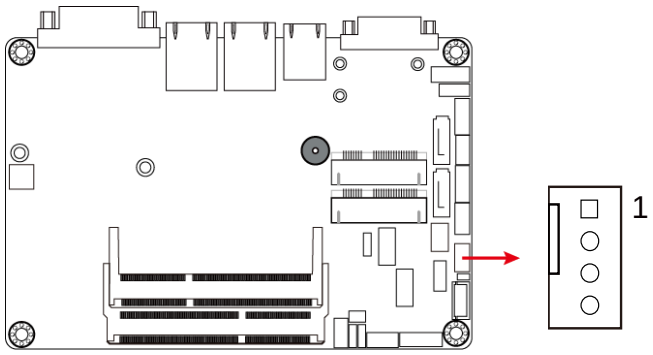
Pin	Assigment	Pin	Assigment
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	Data terminal ready	9	RI, Ring indicator
5	GND, ground	10	Not Used

2.5.19 Digital I/O Connector (J19)



Pin	Assigment	Pin	Assigment
1	Ground	6	OUT0
2	VCC	7	IN3
3	OUT3	8	IN1
4	OUT1	9	IN2
5	OUT2	10	IN0

2.5.20 CPU Fan Power Connector (CPU_FAN1)



Pin	Assigment	Pin	Assigment
1	Ground	3	Rotation detection
2	+12V	4	Control

Chapter 3
Driver Installation

The information provided in this chapter includes:

- Intel® Chipset Software Installation Utility
- VGA Driver Installation
- HD Audio Driver Installation
- LAN Driver Installation
- Intel® Management Engine Interface Installation

3.1 Introduction

This section describes the installation procedures for software drivers. The software drivers are in a disk enclosed with the product package. If you find anything missing, please contact the distributor where you made the purchase.

Note: After installing your Windows operating system, you must install the Intel® Chipset Software Installation Utility first before proceeding with the drivers installation.

3.2 Intel® Chipset Software Installation Utility

The Intel® Chipset drivers should be installed first before the software drivers to install INF files for Plug & Play function for the chipset components. Follow the instructions below to complete the installation.

1. Insert the disk enclosed in the package. Click **Intel** and then **Intel(R) Boardwell ULT 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** for installation.

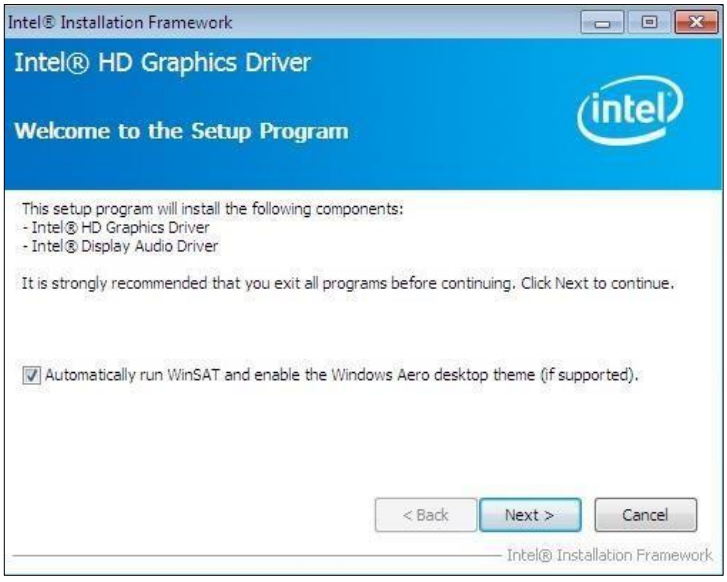
6. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

3.3 Intel® VGA Driver Installation

1. Click **Intel** and then **Intel(R) Broadwell ULT Chipset Drivers**.

2. Click **Intel(R) HD Graphics Driver**.

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



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

5. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

3.4 HD Audio Driver Installation

1. Click **Intel** and then **Intel(R) Broadwell ULT Chipset Drivers**.

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

3. On the *Welcome* screen of the InstallShield Wizard, click **Yes** for installation.

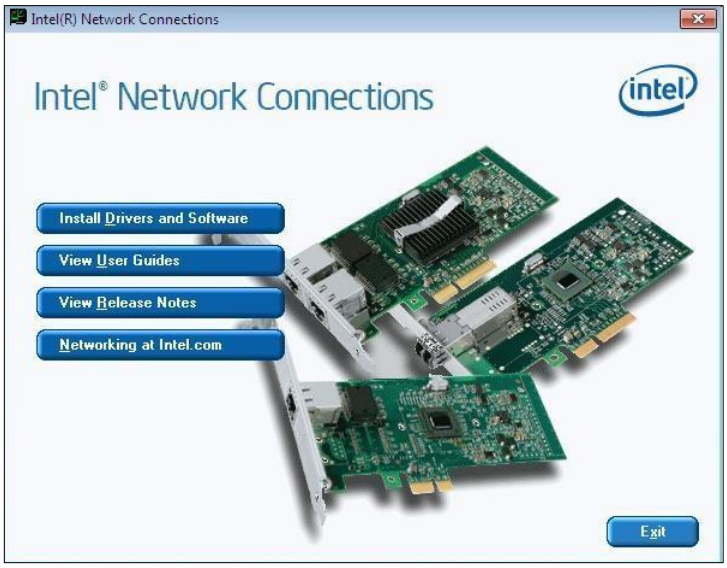
4. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

3.5 LAN Driver Installation

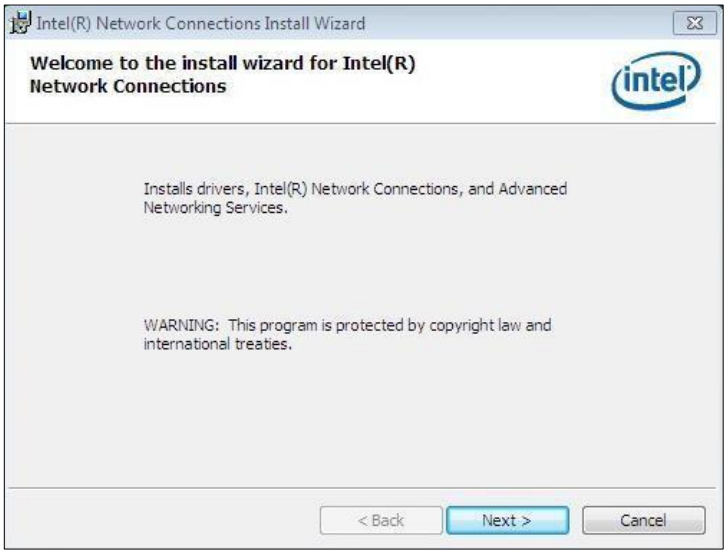
1. Click **Intel** and then **Intel(R) Broadwell ULT Chipset Drivers**.

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

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

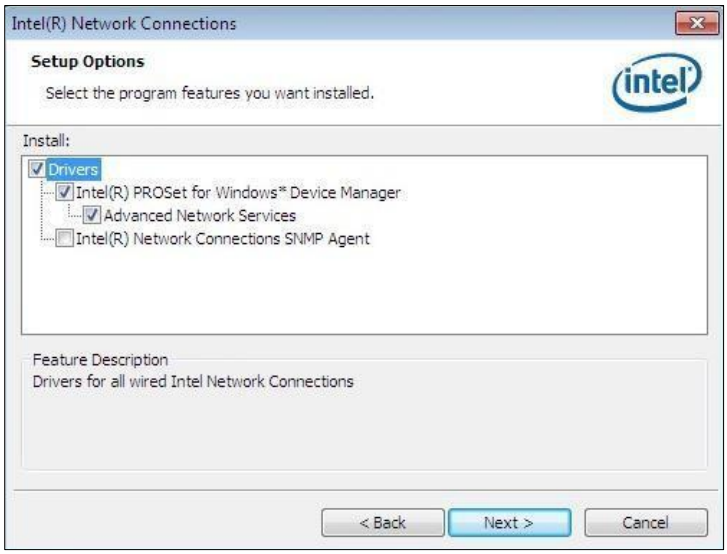


4. On the *Welcome* screen of the InstallShield Wizard, click **Next**.



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

6. Tick the checkbox for **Drivers** to select the related drivers and click **Next**.



7. When the wizard is ready for installation, click **Install**.

8. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

3.6 Intel® Management Engine Driver Installation

1. Click **Intel** and then **Intel(R) Broadwell ULT Chipset Drivers**.

2. Click **Intel(R) ME 10.0 Drivers**.

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

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

5. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

Chapter 4
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:

- Main Settings
- Advanced Settings
- Chipset Settings
- Security Settings
- Book Settings
- Save & Exit

4.1 Introduction

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

4.2 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. Press 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 need 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
```

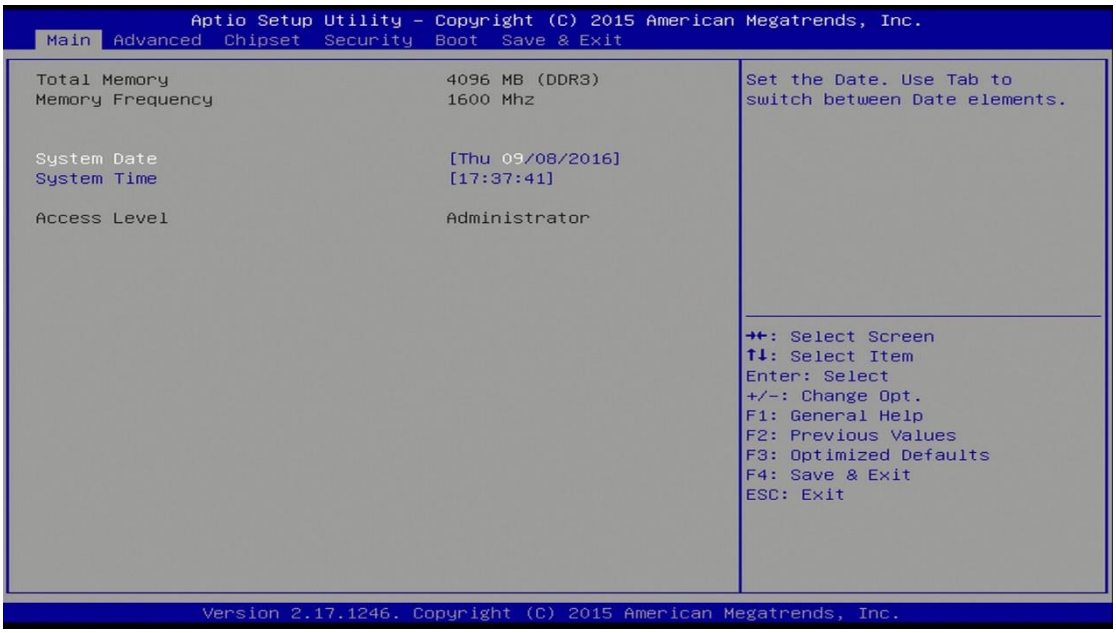
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

When you enter the BIOS 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 make the system unstable and crash in some cases.

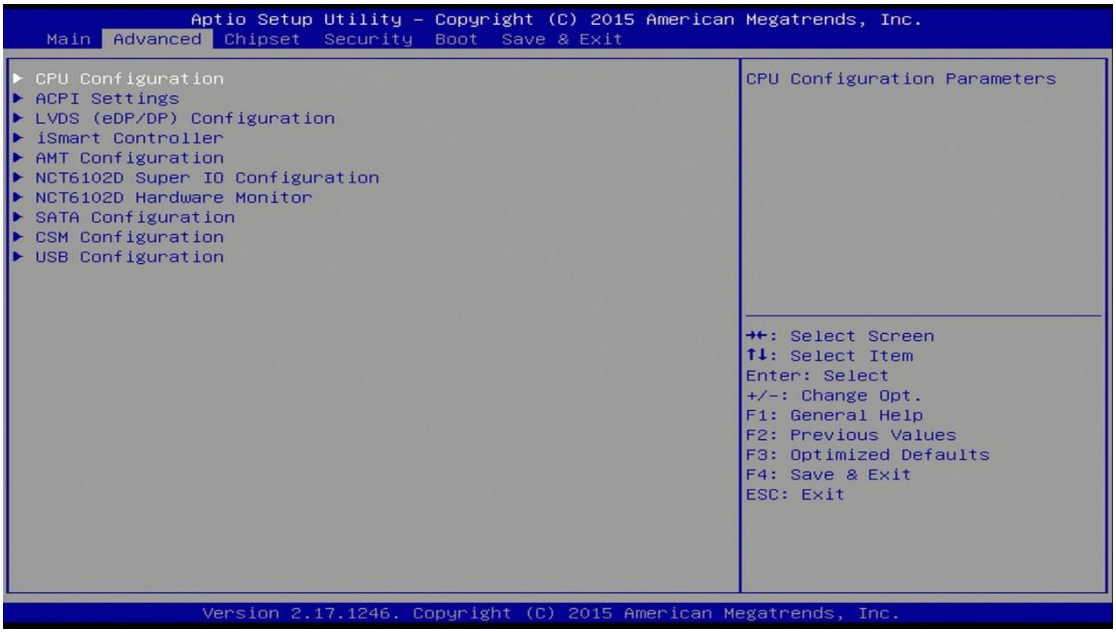
4.3 Main Settings



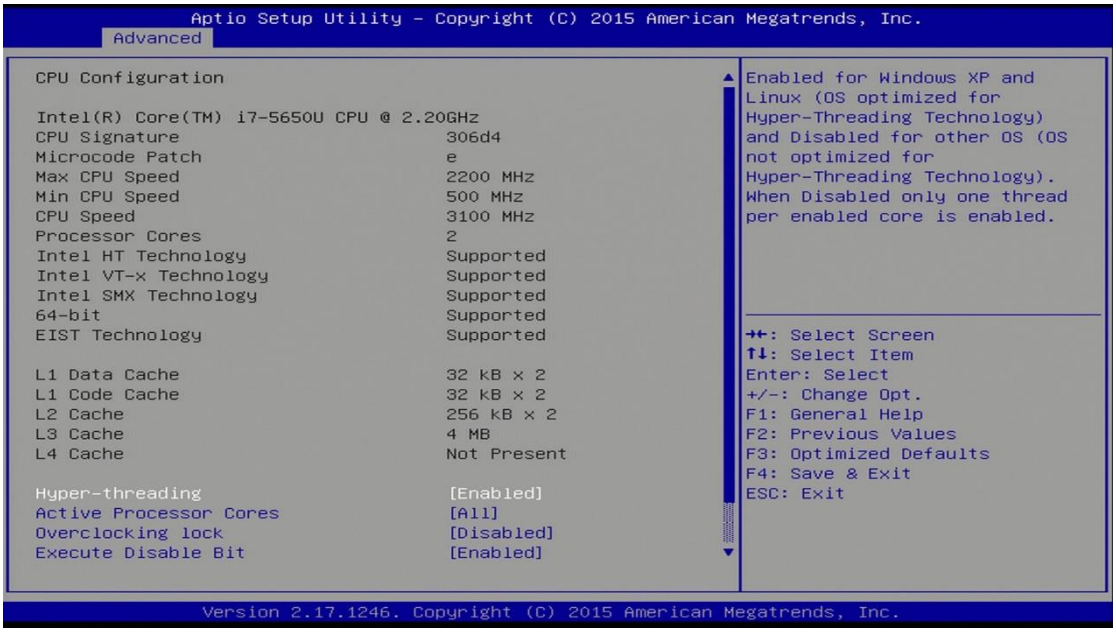
BIOS Setting	Description
System Date	Sets the date. Use the <Tab> key to switch between the data elements.
System Time	Set the time. Use the <Tab> key to switch between the data elements.

4.4 Advanced Settings

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

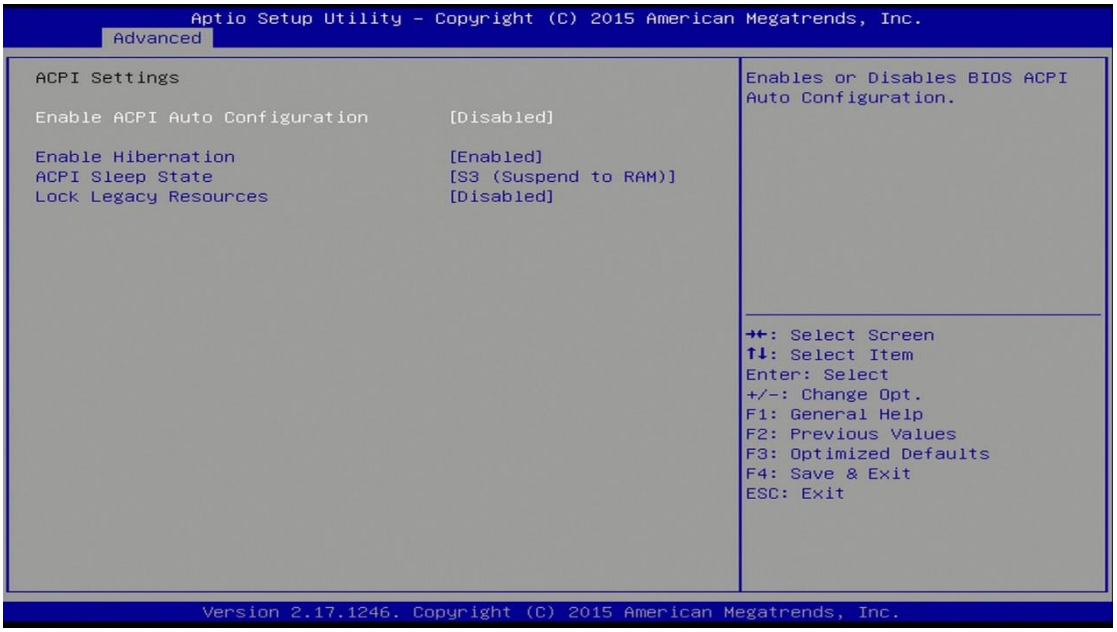


4.4.1 CPU Configuration



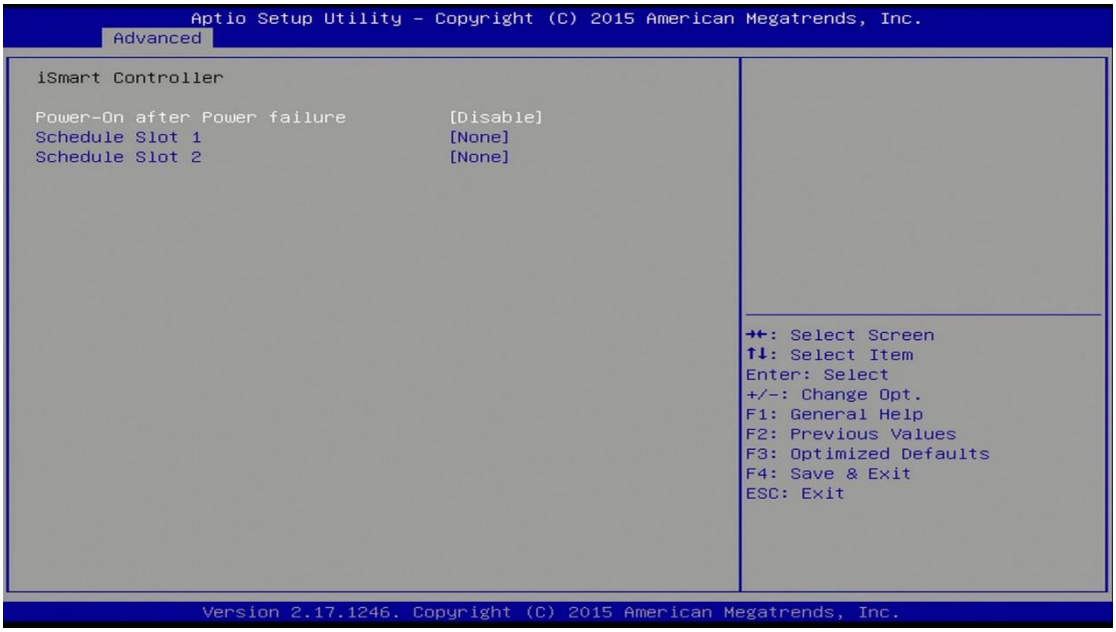
BIOS Setting	Description
Hyper-threading	Enables for Windows XP and Linux (OS optimized for Hyper-Threading Technology). Disables for other OS (OS not optimized for Hyper-Threading Technology). When disabled, only one thread per enabled core is enabled.
Active Processor Cores	Number of cores to enable in each processor package.
Overcolcking lock	Flex ratio (194) MSR
Execute Disable Bit	Prevents 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.)
Intel Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

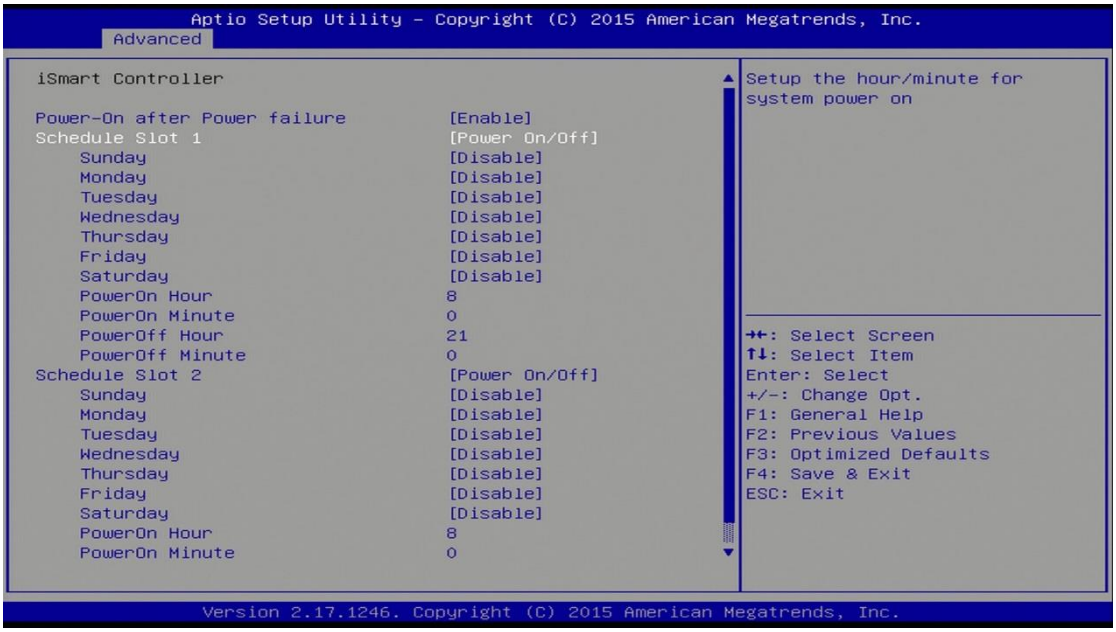
4.4.2 ACPI Settings



BIOS Setting	Description
Enable ACPI Auto Configuration	Enables / Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Enables / Disables the System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
ACPI Sleep State	Selects ACPI sleep state that the system will enter when the SUSPEND button is pressed. Options: • Suspended Disabled • S3 (Suspend to RAM)

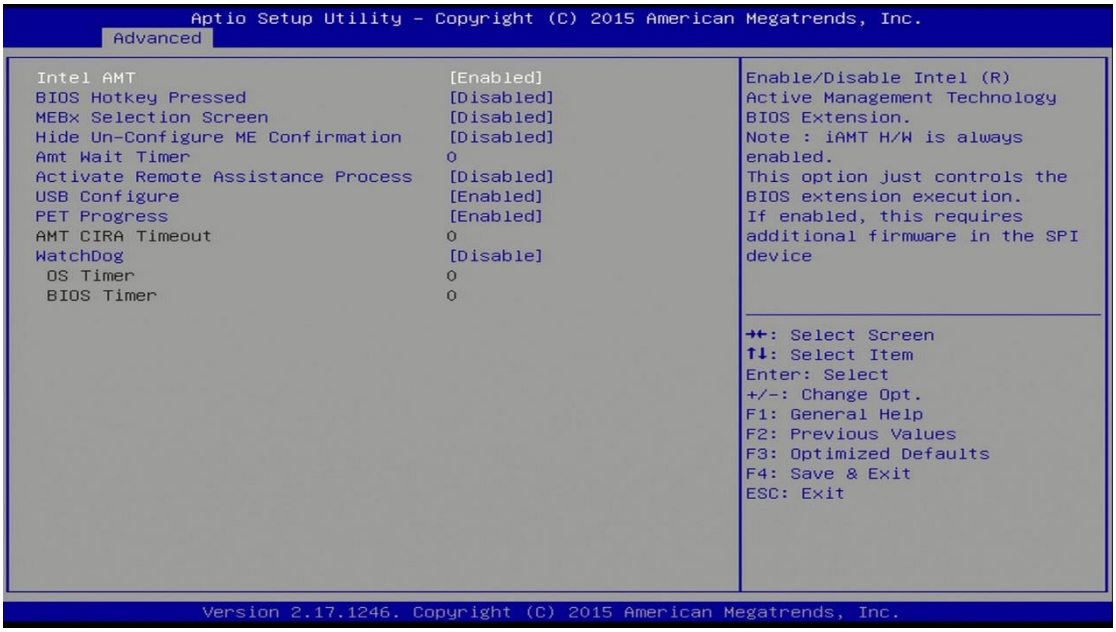
4.4.3 iSmart Controller





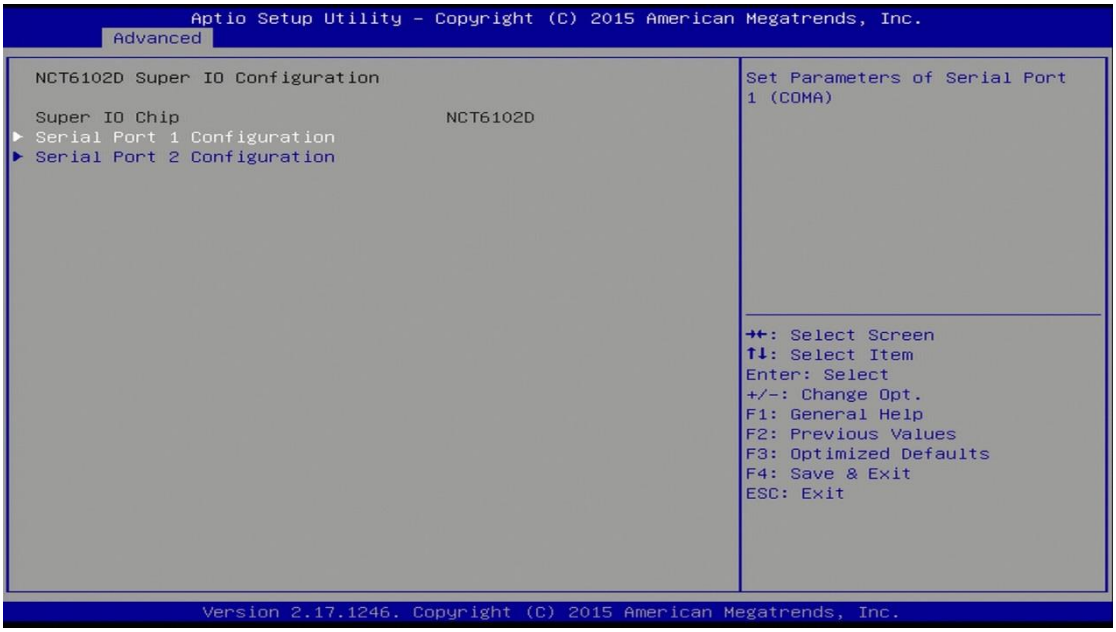
BIOS Setting	Description
Power-On after Power failure	Enables / Disables the system to be turned on automatically after a power failure.
Schedule Slot 1 / 2	Sets up the hour / minute / day for the power-on schedule for the system. Options: • None • Power On • Power On / Off

4.4.4 AMT Configuration



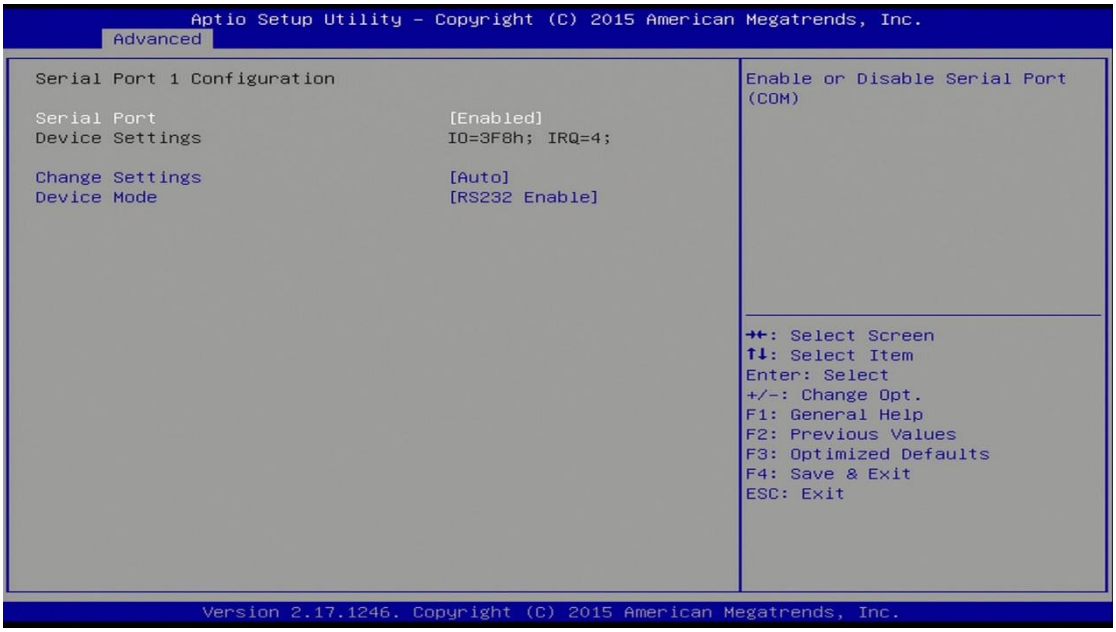
BIOS Setting	Description
Intel AMT	Enables / Disables Intel(R) Active Management Tecnology BIOS Extension. Note: iAMT H/W is alwas enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.
BIOS Hotkey Pressed	OEMFlag Bit 1: enables or disables BIOS hotkey press.
MEBx Selection Screen	OEMFlag Bit 2: enables or disables MEBx selection screen.
Hide Un-Configure ME Confirmation	OEMFlag Bit 6: hides un-configure ME without passowrd confirmation prompt.
Amt Wait Timer	Sets timer to wait before sending ASF_GET_BOOT_OPTIONS.
Active Remote Assistance Process	Triggers CIRA boot.
USB Configure	Enables / Disables USB configure function.
PET Progress	Enables / Disables PET events progress to receive PET events or not.
WatchDog	Enables / Disables watchdog timer.

4.4.5 Super IO Configuration



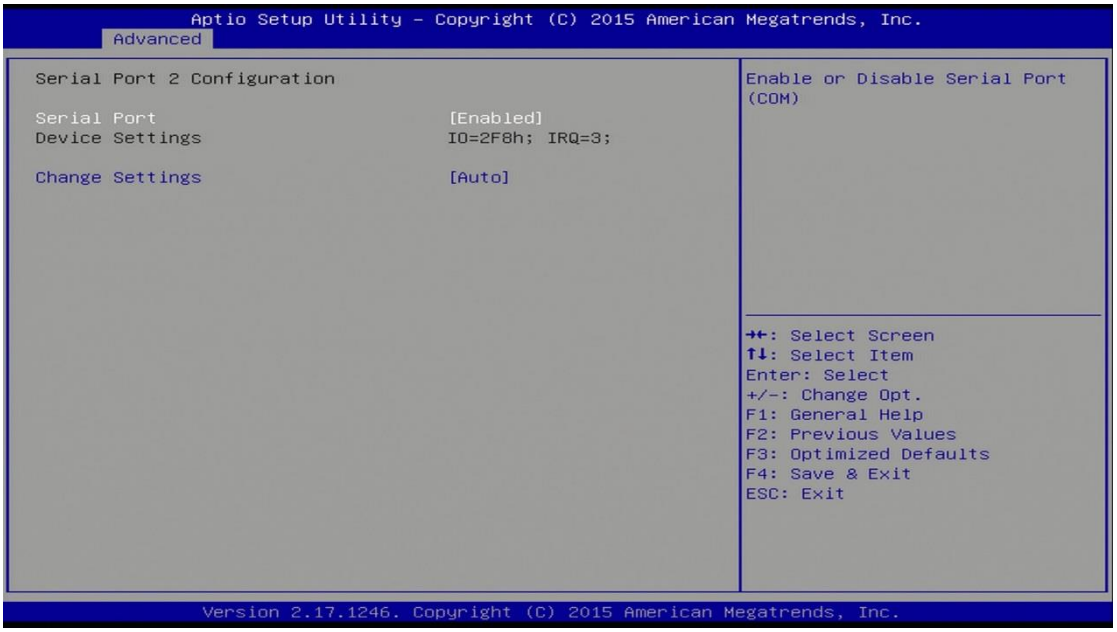
BIOS Setting	Description
Serial Port Configuration	Sets Parameters of Serial Ports. You can enable / disable the serial port and select an optimal settings for the Super IO device.

4.5.1.1. Serial Port 1 Configuration



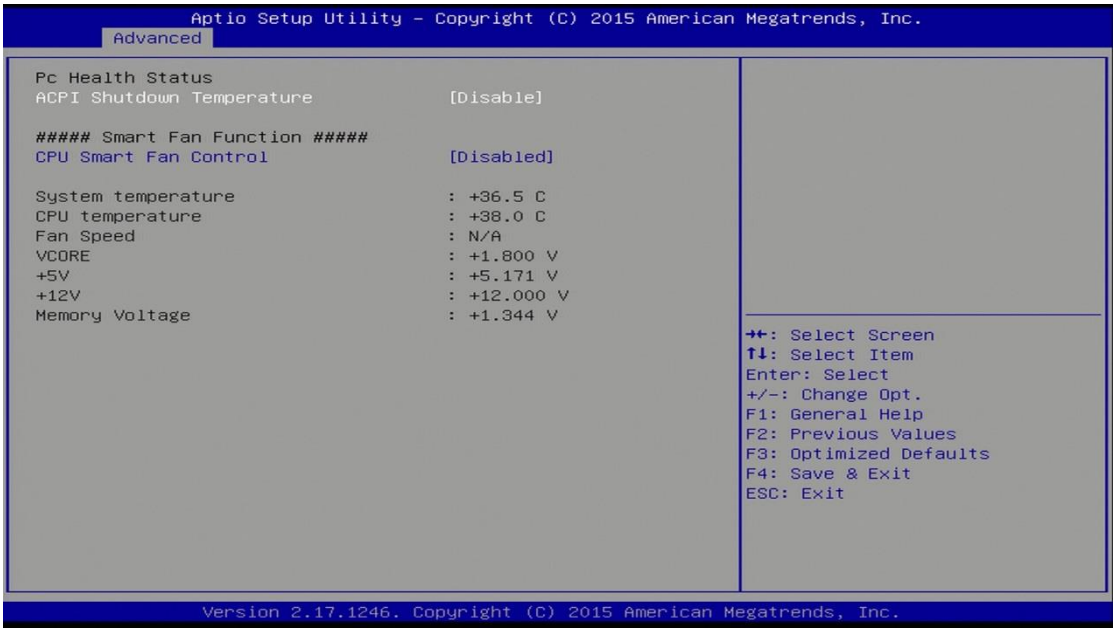
BIOS Setting	Description
Change Settings	Selects an optimal settings for the Super I/O device. Options: • Auto • IO=3F8h ; IRQ=4 • IO=3F8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2F8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=3E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12
Device Mode	Changes the mode of serial port. Options: • RS232 Enable • RS485 Enable • RS422 Enable

4.5.1.2. Serial Port 2 Configuration



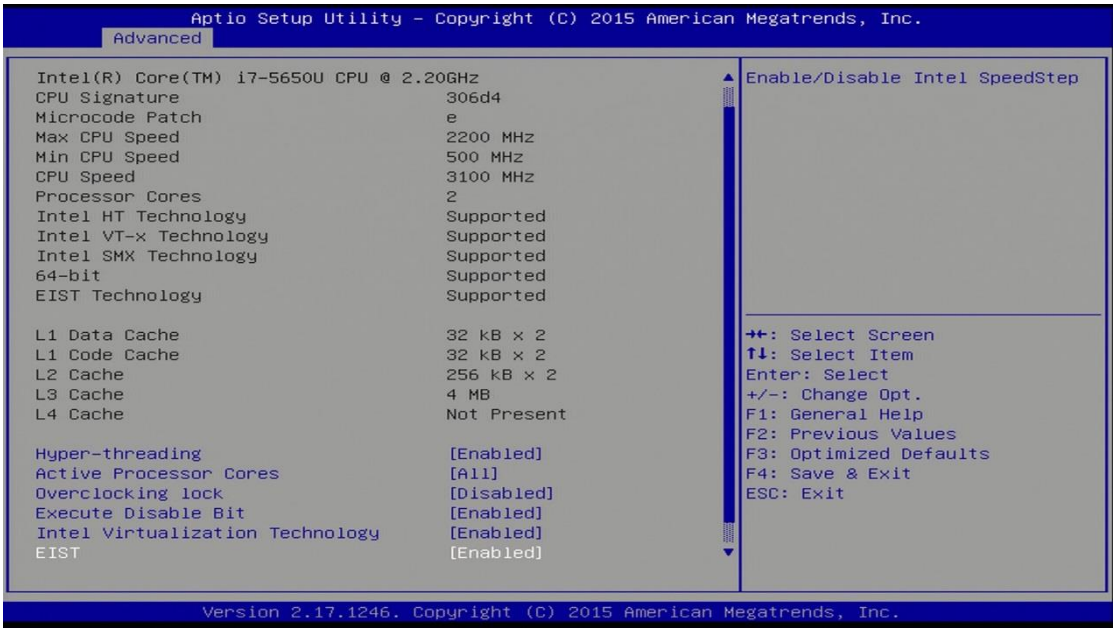
BIOS Setting	Description
Change Settings	Selects an optimal settings for the Super I/O device. Options: • Auto • IO=2F8h ; IRQ=3 • IO=3F8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2F8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=3E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12

4.4.6 Hardware Monitor



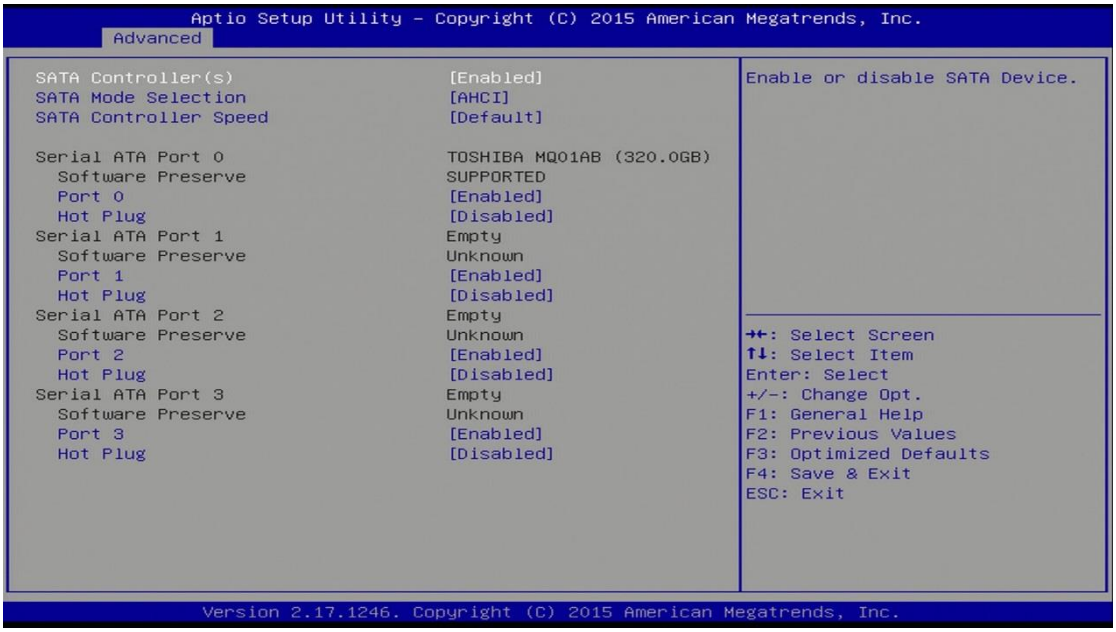
BIOS Setting	Description
Shutdown Temperature	This field enables or disables the Shutdown Temperature Options: Disabled (default). 70 ℃, 75 ℃, 80 ℃, 85 ℃, 90 ℃, 95 ℃
Smart Fan Function	This field enables or disables the smart fan feature. Options: Disabled (default), 50 ℃, 60 ℃, 70 ℃, 80 ℃
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status

4.4.7 CPU PPM Configuration



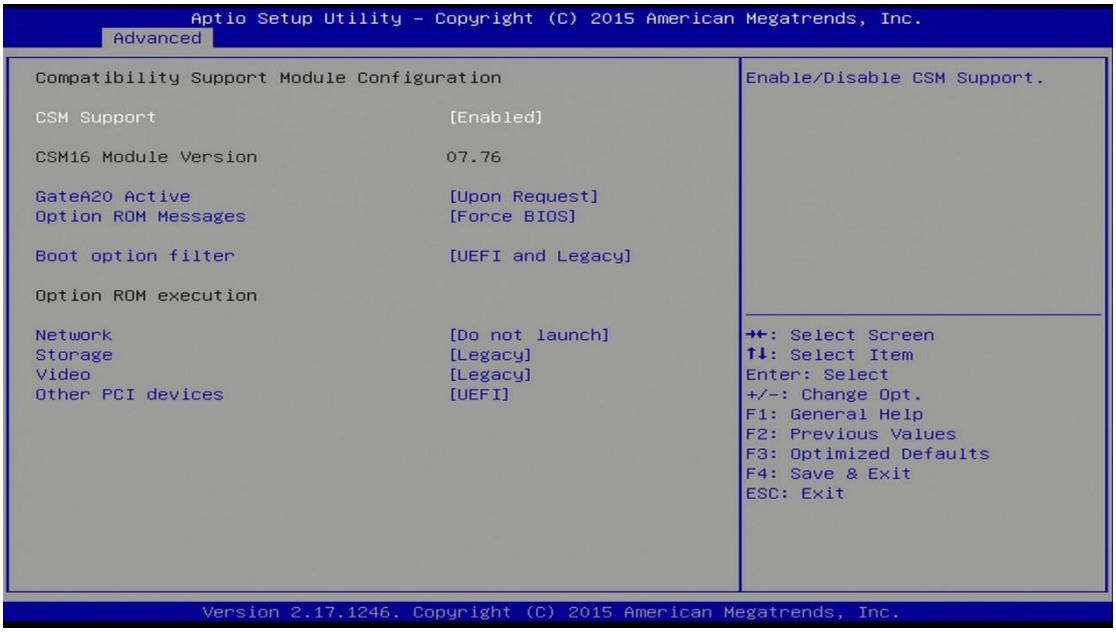
BIOS Setting	Description
EIST	Enables / Disables Intel SpeedStep.

4.4.8 SATA Configuration



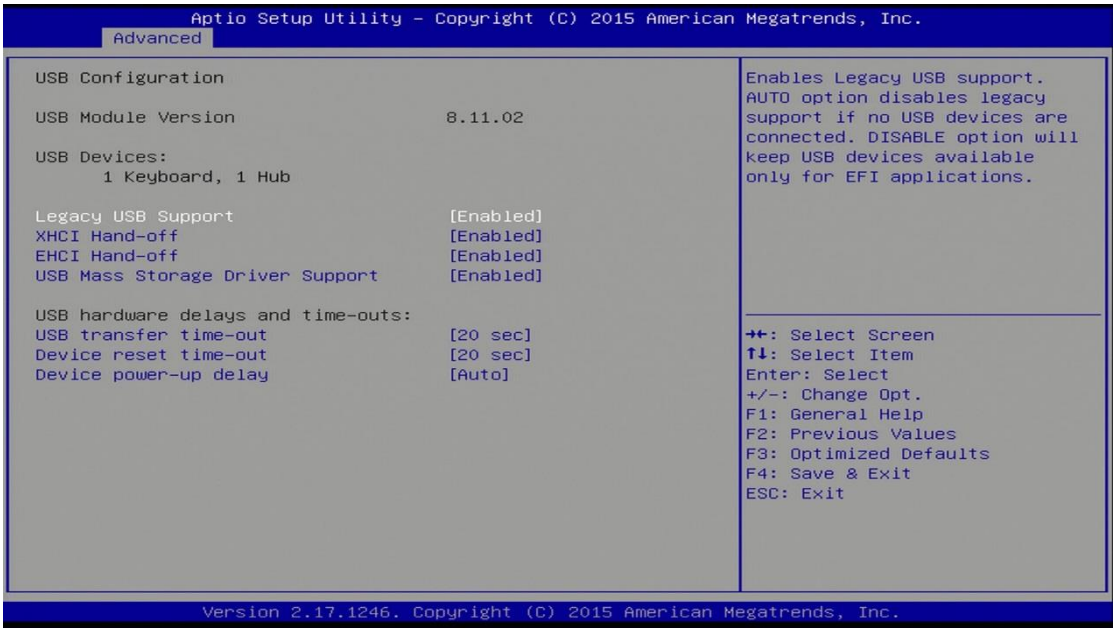
BIOS Setting	Description
SATA Controller(s)	Enables / Disables SATA device.
SATA Mode Selection	Selects IDE / AHCI Mode.
SATA Controller Speed	Selects the SATA controller speed as Default / Gen1 / Gen2 / Gen3.
Serial ATA Port 0	Enables / Disables Serial Port 0.
SATA Port0 HotPlug	Enables / Disables SATA Port 0 HotPlug.
Serial ATA Port 1	Enables / Disables Serial Port 1.
SATA Port1 HotPlug	Enables / Disables SATA Port 1 HotPlug.

4.4.9 CSM Configuration



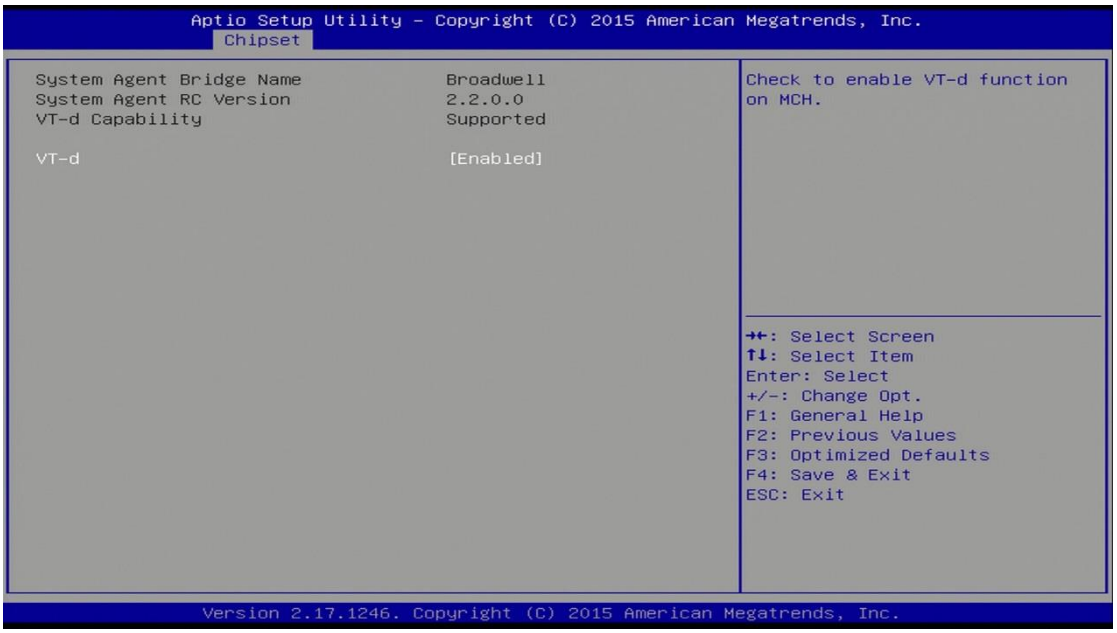
BIOS Setting	Description
CSM Support	Enables / Disables CSM support.
GateA20 Active	The option Upon Request disables GA20 when using BIOS services. The option Always cannot disable GA20, but is useful when any RT code is executed above 1 MB.
Option ROM Messages	Sets a display mode, Force BIOS or Keep Current, for Option ROM.
Boot option filter	Controls the priority of Legacy and UEFI.
Network	Controls the execution of UEFI and Legacy PXE OpROM.
Storage	Controls the execution of UEFI and Legacy Storage OpROM.
Video	Controls the execution of UEFI and Legacy Video OpROM.
Other PCI devices	Determines OpROM execution policy for devices other than network, storage or video.

4.4.10 USB Configuration



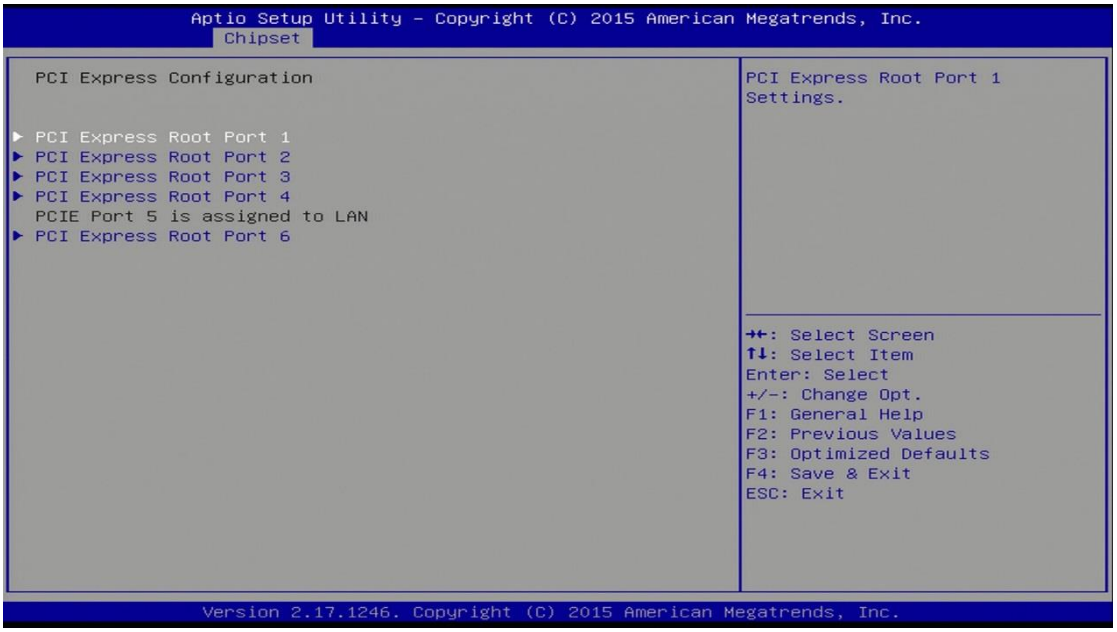
BIOS Setting	Description
Legacy USB Support	Enables / Disables Legacy USB support. • "Auto" disables legacy support if there is no USB device connected. • "Disable" keeps USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
EHCI Hand-pff	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	Enables / Disables the support for USB mass storage driver.
USB Transfer time-out	Sets the time-out value 1, 5, 10 or 20 sec(s) for Control, Bulk, and Interrupt transfers.
Device reset time-out	Sets the seconds (10, 20, 30, 40 secs) of delaying execution of start unit command to USB mass storage device.
Device power-up delay	The 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 100 ms. For a Hub port, the delay is taken from Hub descriptor.

4.5 Chipset Settings



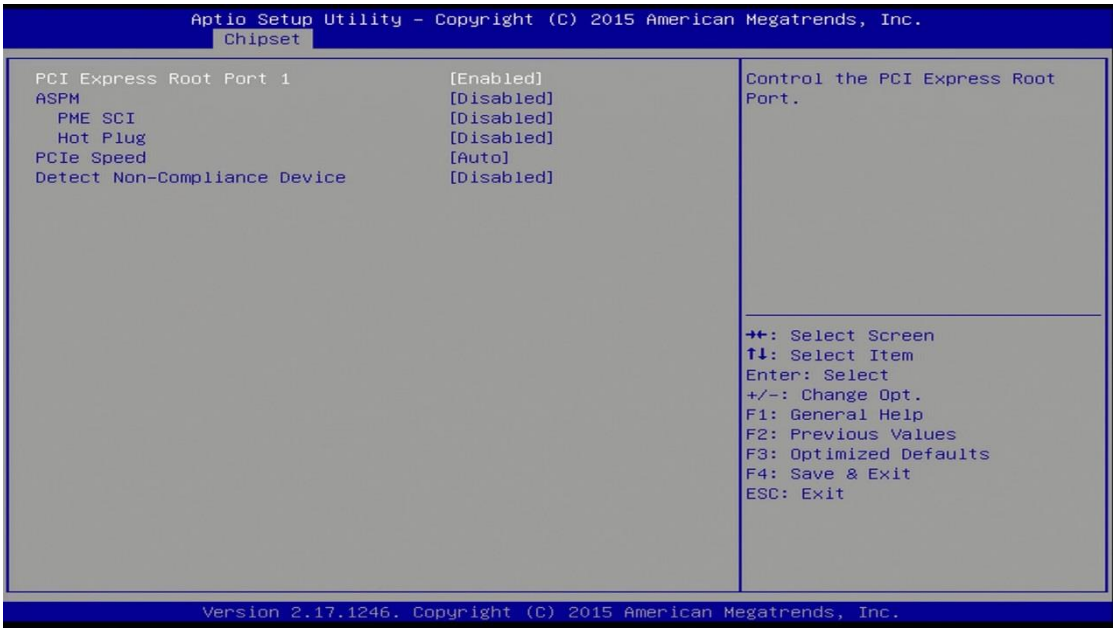
BIOS Setting	Description
VT-d	Enables / Disables VT-d function on MCH.

4.5.1 PCI Express Configuration



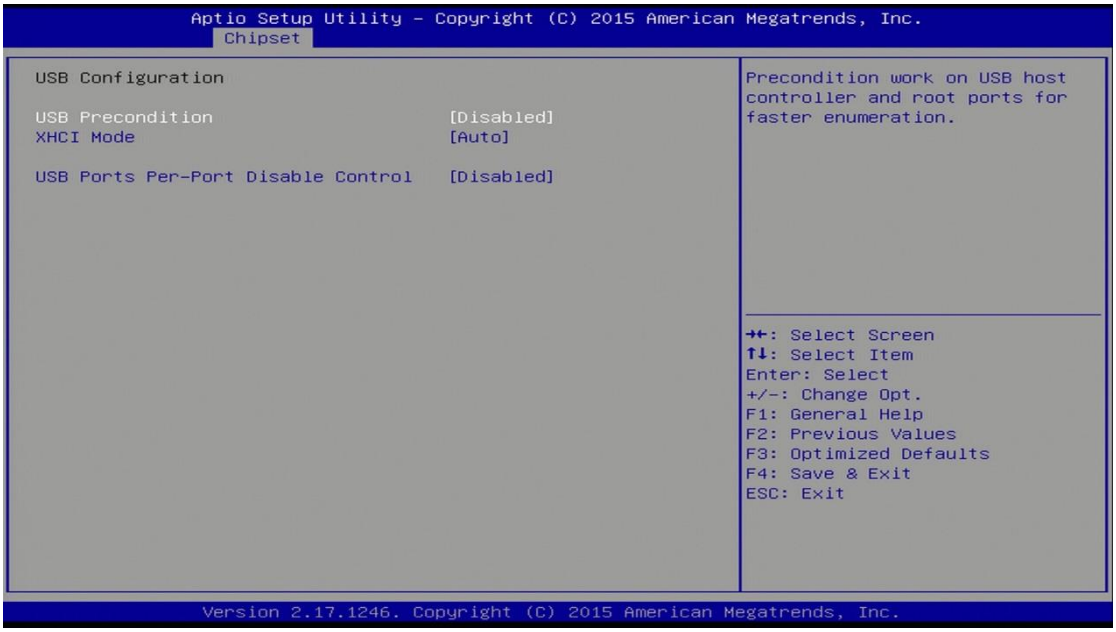
BIOS Setting	Description
PCI Express Root Ports	Sets each PCI Express Root Port.

4.5.1.1. PCI Express Root Port 1



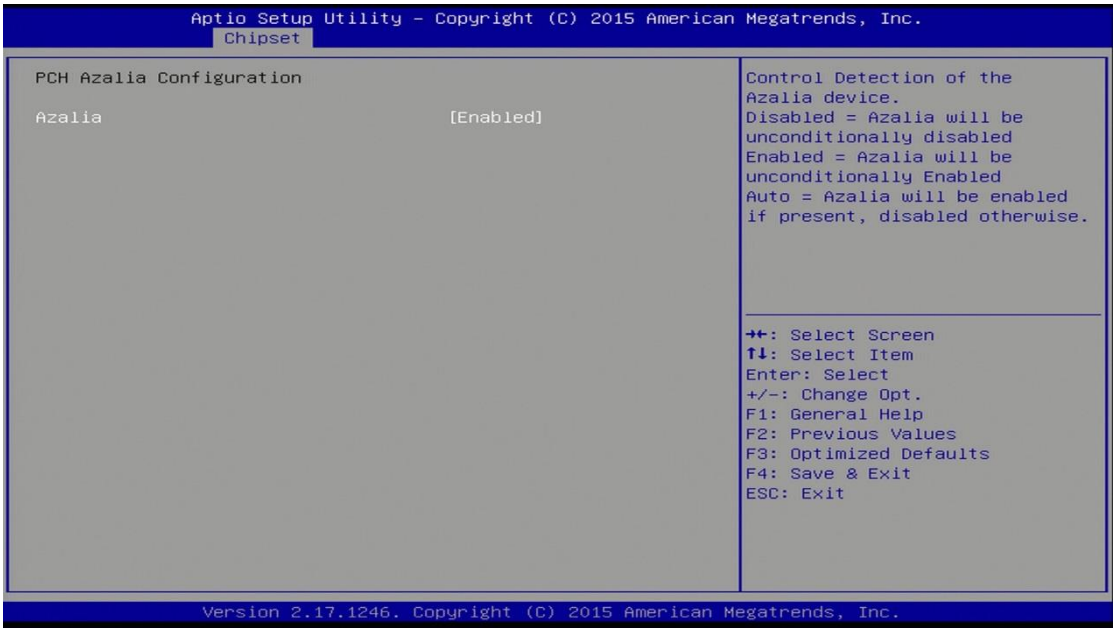
BIOS Setting	Description
PCI Express Root Port 1	Enables / Disables the PCI Express Root Port.
ASPM	Sets the PCI Express Active State Power Management. Options: Disabled, LOs, L1, LOsL1, Auto
PME SCI	Enables / Disables PCI Express PME SCI.
Hot Plug	Enables / Disables PCI Express Hot Plug.
PCIe Speed	Selects a speed type, Auto / Gen1 / Gen2, for PCI Express.
Detect Non-Compliance Device	Enables / Disables the detection of non-compliance PCI Express Device. If enabled, it will take more time at POST time.

4.5.2 USB Configuration



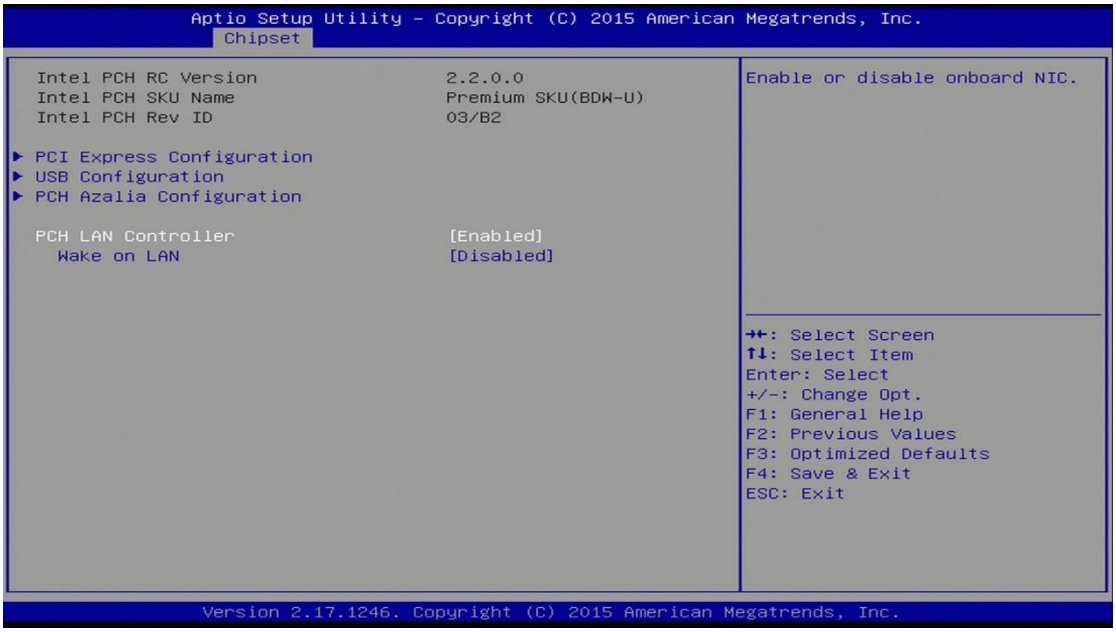
BIOS Setting	Description
USB Precondition	Enables / Disables the precondition work on USB host controller and root ports for faster enumeration.
XHCI Mode	Selects a mode, Smart Auto / Auto / Enabled / Disabled, for operation of XHCI controller.
USB Ports Pre-port Disable Control	Enables / Disables the disabling control of the USB ports (0~13).

4.5.3 PCH Azalia Configuration



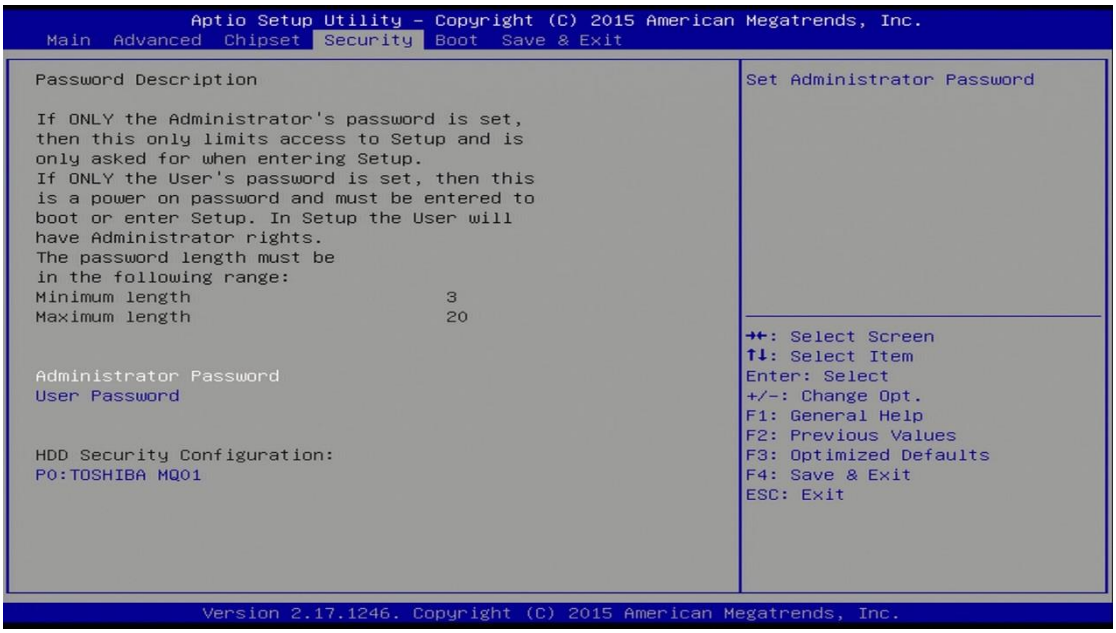
BIOS Setting	Description
Azalia	Enables / Disables detection of the Azalia device unconditionally. “Auto” keeps Azalia to the present status as being enabled or disabled.

4.5.4 PCH LAN Controller



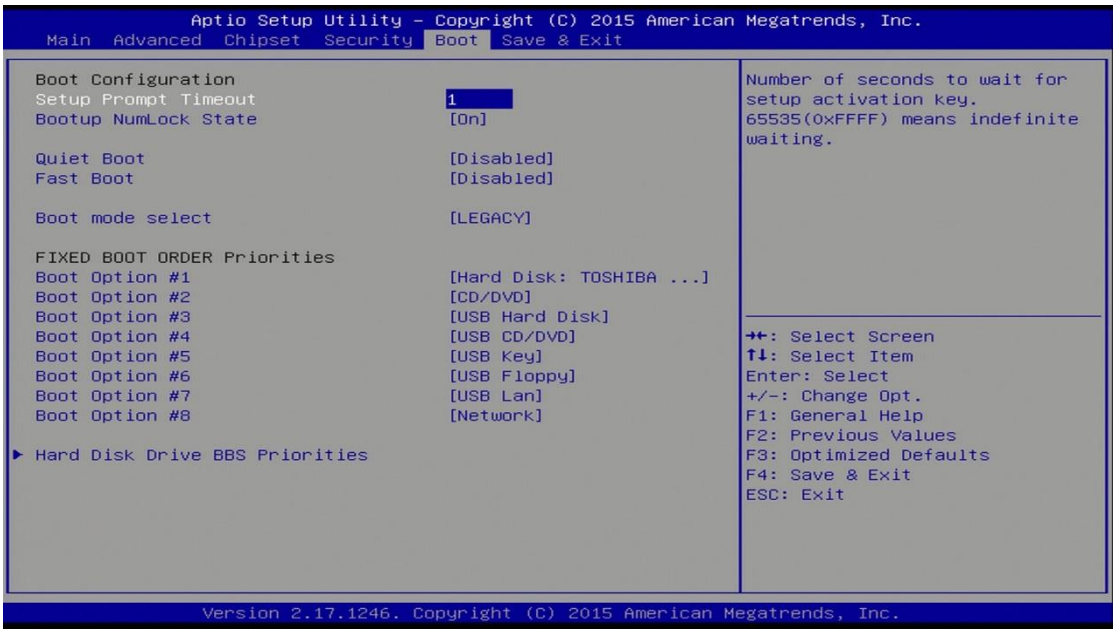
BIOS Setting	Description
PCH LAN Controller	Enables / Disables onboard NIC.
Wake on LAN	Enables / Disables integrated LAN to wake the system. This function cannot be disabled if ME is in a state of Sx.

4.6 Security Settings



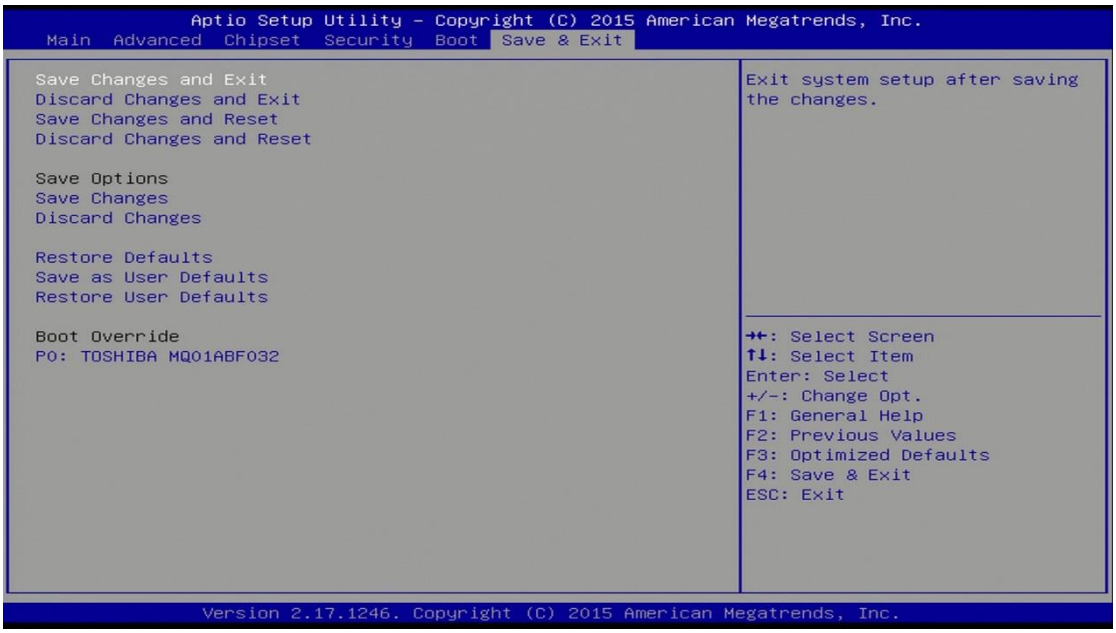
BIOS Setting	Description
Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.

4.7 Boot Settings



BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	Selects the keyboard NumLock state.
Quiet Boot	Enables / Disables Quiet Boot option.
Fast Boot	Enables / Disables boot with initialization of a minimal set of devices required to launch the active boot option. Has no effect for BBS boot options.
Boot mode select	Selects a Boot mode, Legacy / UEFI.
Boot Option Priorities	Sets the system boot order.

4.8 Save & Exit Settings



BIOS Setting	Description
Save Changes and Exit	Exits system setup after saving the changes.
Discard Changes and Exit	Exits system setup without saving any changes.
Save Changes and Reset	Resets the system after saving the changes.
Discard Changes and Reset	Resets system setup without saving any changes.
Save Changes	Saves changes done so far to any of the setup options.
Discard Changes	Discards changes done so far to any of the setup options.
Restore Defaults	Restores / Loads defaults values for all the setup options.
Save as User Defaults	Saves the changes done so far as user defaults.
Restore User Defaults	Restores the user defaults to all the setup options.

Appendix

This section provides the mapping addresses of peripheral devices and the sample code of watchdog timer configuration.

- I/O Port Address Map
- Interrupt Request Lines (IRQ)
- Watchdog Timer Configuration

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
0x00001854-0x00001857	Motherboard resources
0x0000F000-0x0000F03F	Intel(R) HD Graphics 6000
0x000003B0-0x000003BB	Intel(R) HD Graphics 6000
0x000003C0-0x000003DF	Intel(R) HD Graphics 6000
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x0000F0D0-0x0000F0D7	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83
0x0000F0C0-0x0000F0C3	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83

Address	Device Description
0x0000F0B0-0x0000F0B7	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83
0x0000F0A0-0x0000F0A3	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83
0x0000F060-0x0000F07F	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83
0x00000000-0x0000001F	Direct memory access controller
0x00000000-0x0000001F	PCI bus
0x00000081-0x00000091	Direct memory access controller
0x00000093-0x0000009F	Direct memory access controller
0x000000C0-0x000000DF	Direct memory access controller
0x00000060-0x00000060	Standard PS/2 keyboard
0x00000064-0x00000064	Standard PS/2 keyboard
0x0000E000-0x0000EFFF	Mobile 5th Generation Intel(R) Core(TM) PCI Express Root Port #3 - 9C94
0x000003F8-0x000003FF	Serial Port (COM1)
0x000002F8-0x000002FF	Serial Port (COM2)
0x00000D00-0x0000FFFF	PCI bus
0x00000070-0x00000077	System CMOS/real time clock
0x00000070-0x00000077	Motherboard resources
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A20-0x00000A2F	Motherboard resources
0x00000A30-0x00000A3F	Motherboard resources
0x0000002E-0x0000002F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources

Address	Device Description
0x00000680-0x0000069F	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x0000F040-0x0000F05F	Mobile 5th Generation Intel(R) Core(TM) SMBus Controller - 9CA2

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
IRQ 0	System timer
IRQ 1	Standard PS/2 Keyboard
IRQ 3	Serial Port (COM2)
IRQ 4	Serial Port (COM1)
IRQ 5	Mobile 5th Generation Intel(R) Core(TM) SMBus Controller - 9CA2
IRQ 8	System CMOS/real time clock
IRQ 12	Microsoft PS/2 Mouse
IRQ 16	Exar's Communications Port (COM4)
IRQ 16	Exar's Communications Port (COM3)
IRQ 16	Exar's 2-Port UART PCI-Express Card
IRQ 16	Mobile 5th Generation Intel(R) Core(TM) PCI Express Root Port #5 - 9C98
IRQ 18	Mobile 5th Generation Intel(R) Core(TM) PCI Express Root Port #3 - 9C94
IRQ 19	Mobile 5th Generation Intel(R) Core(TM) SATA Controller [AHCI Mode] - 9C83
IRQ 22	High Definition Audio Controller
IRQ 23	Mobile 5th Generation Intel(R) Core(TM) USB EHCI Controller - 9CA6
IRQ 81 ~ 190	Microsoft ACPI-Compliant System
IRQ 4294967287 ~ IRQ 4294967290	Intel(R) I211 Gigabit Network Connection
IRQ 4294967291	Intel(R) Ethernet Connection I218-LM
IRQ 4294967292	Intel(R) Management Engine Interface
IRQ 4294967293	Intel(R) USB 3.0 extensible host controller
IRQ 4294967294	Intel(R) HD Graphics 6000

C. Watchdog Timer Configuration

The Watchdog Timer (WDT) is used to generate a variety of output signals after a user programmable count. The WDT is suitable for the 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, you will need to restart the WDT at regular intervals before the timer counts to zero.

Sample Code:

```
//---------------------------------------------------------------------------
//
// T HIS CODE AND INFORMAT ION IS PROVIDED "AS IS" WIT HOUT WARRANT Y OF
ANY
// KIND, EIT HER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMIT ED T O T HE
// IMPLIED WARRANT IES OF MERCHANT ABILIT Y AND/OR FIT NESS FOR A PART
ICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "6106"
//---------------------------------------------------------------------------
int main (int argc, char *argv[]); void EnableWDT (int);
void DisableWDT (void);
//---------------------------------------------------------------------------
int main (int argc, char *argv[])
{
unsigned char bBuf; unsigned char bT ime; char **endptr;
//      char SIO;

printf("6106 watch dog program\n");

bT ime = strtol (argv[1], endptr, 10);
printf("System will reset after %d seconds\n", bT ime);

if (bT ime)
{
else
{

if (bT ime > 0 && bT ime < 256)
{ A=2;
unsigned char result; Set_6106_LD(0x08);
gotoxy(1,12);
pr
}
```

```
}
//---------------------------------------------------------------------------
void EnableWDT (int interval)
{
return 0;
unsigned char bBuf; Set_6106_LD(0x08);
Set_6106_Reg(0x30,    0x01); Set_6106_Reg(0xF1, interval);
}
//---------------------------------------------------------------------------
void DisableWDT (void)
{
unsigned char bBuf; Set_6106_LD(0x08);
Set_6106_Reg(0x30,    0x00);
}
//---------------------------------------------------------------------------



//---------------------------------------------------------------------------
//
// T HIS CODE AND INFORMAT ION IS PROVIDED "AS IS" WIT HOUT WARRANT Y OF
ANY
// KIND, EIT HER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMIT ED T O T HE
// IMPLIED WARRANT IES OF MERCHANT ABILIT Y AND/OR FIT NESS FOR A PART
ICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#include "6106.H"
#include <dos.h>
//---------------------------------------------------------------------------
unsigned int 6106_BASE; void Unlock_6106 (void); void Lock_6106 (void);
//---------------------------------------------------------------------------
unsigned int    Init_6106(void)
{
unsigned int result; unsigned char ucDid;

6106_BASE = 0x4E;
result = 6106_BASE;
ucDid = Get_6106_Reg(0x20); if (ucDid == 0x07)
//6106
{       goto Init_Finish;}
6106_BASE = 0x2E;
result = 6106_BASE;
ucDid = Get_6106_Reg(0x20); if (ucDid == 0x07)
//6106
{       goto Init_Finish;}
6106_BASE = 0x00;
result = 6106_BASE;

Init_Finish:
return (result);
}
//---------------------------------------------------------------------------
```

```
void Unlock_6106 (void)
{
outportb(6106_INDEX_PORT ,    6106_UNL OCK); outportb(6106_INDEX_PORT ,
6106_UNLOCK);
}
//---------------------------------------------------------------------------
void Lock_6106 (void)
{
outportb(6106_INDEX_PORT ,    6106_LOCK);
}
//---------------------------------------------------------------------------
void Set_6106_LD( unsigned char LD)
{
Unlock_6106();
outportb(6106_INDEX_PORT ,    6106_REG_LD); outportb(6106_DAT A_PORT , LD);
Lock_6106();
}
//---------------------------------------------------------------------------
void Set_6106_Reg( unsigned char REG, unsigned char DAT A)
{
Unlock_6106();
outportb(6106_INDEX_PORT ,    REG); outportb(6106_DAT A_PORT , DAT A); Lock_6106();
}
//---------------------------------------------------------------------------
unsigned char Get_6106_Reg(unsigned char REG)
{
unsigned char Result; Unlock_6106();
outportb(6106_INDEX_PORT ,    REG); Result = inportb(6106_DAT A_PORT ); Lock_6106();
return Result;
}
//---------------------------------------------------------------------------
```