ASB200-915

3.5” Slim & Disk-Size SBC System

User’s Manual

Version 1.0b
(Oct. 2019)

iBASE

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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.
- 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 -10˚C ~ 50˚C for SSD, and 0˚C ~ 40˚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, please log in to the RMA system of the website or contact your distributor or sales representative for assistance.

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Table of Contents

Chapter 1
General Information

The information provided in this chapter includes:

- Features
- Packing List
- Optional Accessories
- Specifications
- Overview
- Dimensions

1.1 Introduction

The ASB200-915 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®-6th Gen. Core™ i3 / i5 / i7 U-series processor. This product also 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 ~ 50 °C for an SSD, and even from -20 ~ 80 °C for storage.

1.2 Features

- Slim and fanless system with IBASE 3.5” disk-size SBC
- Onboard Intel® 6th Gen. Core™ i3 / I5 / I7 U-series processor
- iSMART for auto-scheduler and power resume
- 1 x 2.5” SATA HDD, 1 x Mini-PCIe (full-size)
- 1 x USB 3.1 Type-C, 4 x USB 3.0
- 2-in-1 design for wall mount and VESA mount
- 12 ~ 24V wide-range DC power input

1.3 Packing List

Your ASB200-915 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.

- ASB200-915 x 1
- Power Adapter x 1
  (either with a 3-pin terminal block or a locking DC jack)
- Power Cord x 1
- Wall Mount Kit x 1
- Screws for Wall Mount Kit x 4

1.4 Optional Accessories

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

- VESA Mount Kit (with 4 screws)

1.5 Specifications

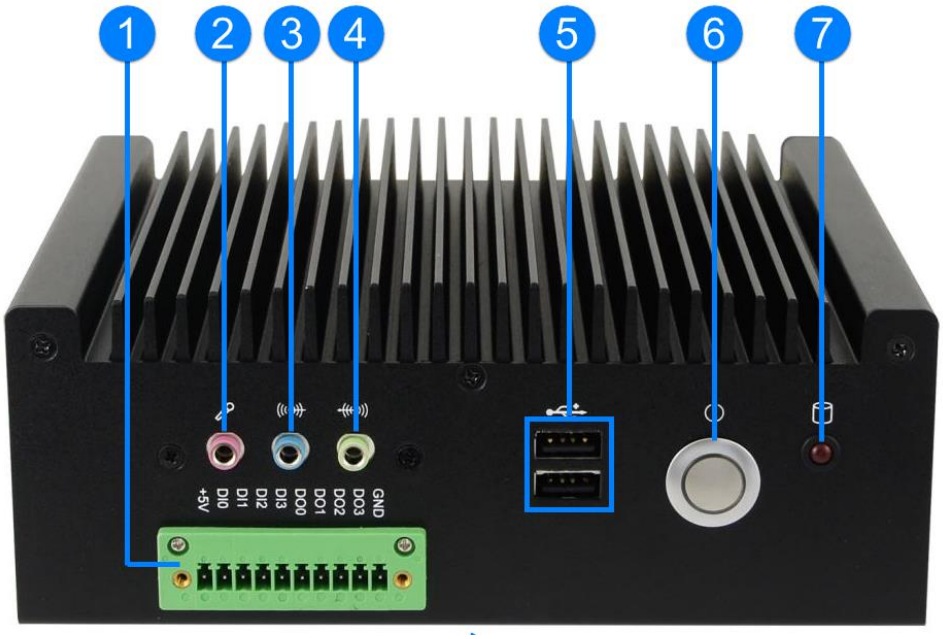
Product Name	ASB200-915		
System			
Motherboard	IB915AF-6600	IB915AF-6300	IB915AF-6100
Operating System	• Windows 7 (32-bit) • Linux		
CPU	Intel® 6th Gen. Core™ i7-6600U	Intel® 6th Gen. Core™ i5-6300U	Intel® 6th Gen. Core™ i3-6100U
CPU Speed	2.6 GHz	2.4 GHz	2.3 GHz
Memory	2 x DDR3L-1600 SO-DIMM 2GB, expandable to 16 GB		
Storage	2.5” HDD or SSD		
Super I/O	Fintek F81846AD		
Audio Codec	Realtek ALC662-GR		
Network	• Intel® I219LM GbE PHY • Intel® I211AT as 2nd GbE		• Intel® I219V GbE PHY • Intel® I211AT as 2nd GbE
Power Supply	90W 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 (Optional)		
Dimensions (W x H x D)	180 x 66 x 150 mm (7.09” x 2.6” x 5.9”)		
Weight	1.3 kg (2.87 lb)		
Certificate	CE / LVD / FCC Class B		
I/O Ports			
DC Input	12 ~ 24V DC-in through a 3-pin terminal block (Optional: a locking DC Jack)		
LAN	2 x RJ45 GbE LAN		
USB	• 2 x USB 2.0 • 4 x USB 3.0 • 1 x USB 3.1 Type-C		

Serial	**4 x COM ports:** • COM1 port through RJ50 connector (RS-232/422/485, selectable from BIOS) • COM2/3/4 port through DB9 connector (RS-232 only)
Digital I/O	4-In & 4-Out
Display	1 x DisplayPort
Audio Jack	• 1 x Microphone input • 1 x Line-out • 1 x Line-in
SATA	2 x SATA III connector
Expansion	1 x Mini-PCIe slot (full-sized)
Environment	
Temperature	• **Operating:** with SSD: -10 ~ 50 °C (14 ~ 122 °F) with HDD: 0 ~ 40 °C (32 ~ 104 °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.

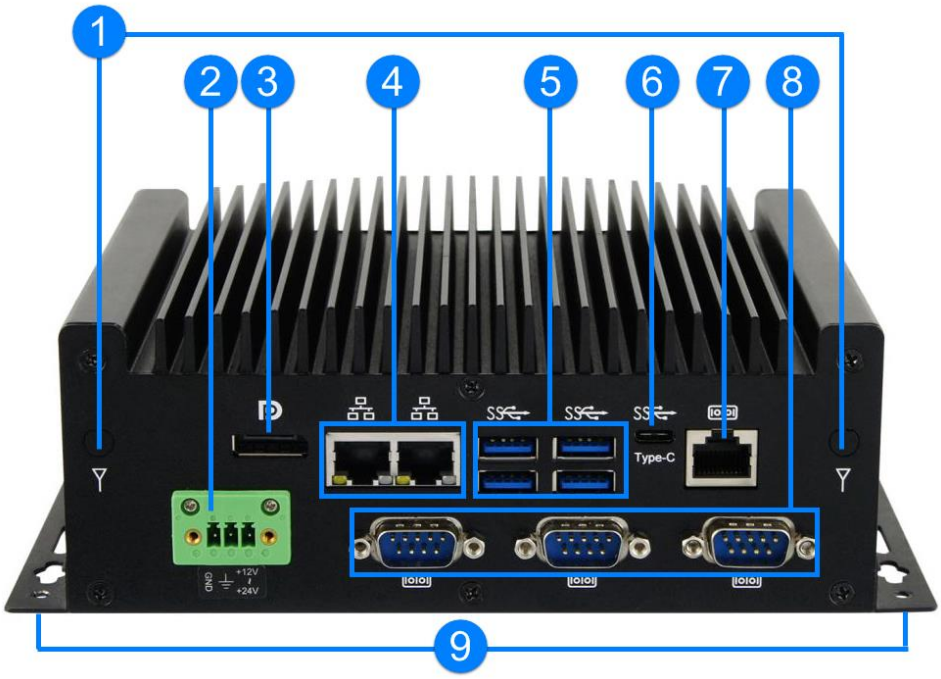
1.6 Overview

Front View



No.	Name	No.	Name
1	Digital I/O Connector	5	USB 2.0 Ports
2	Microphone Input	6	Power Button
3	Line-In	7	HDD LED Indicator
4	Line-Out		

Rear View

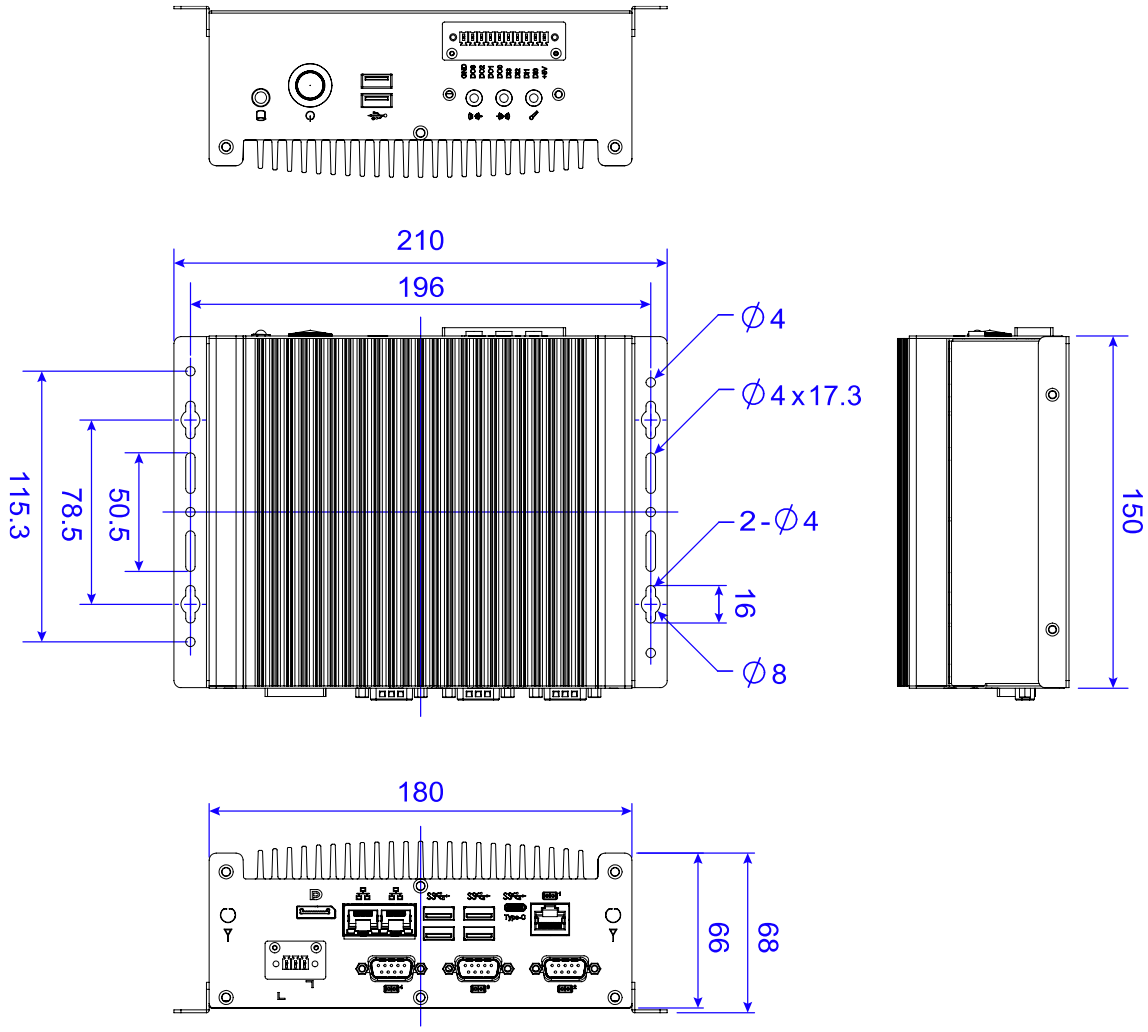


No.	Name	No.	Name
1	Antenna Holes	6	USB 3.1 Type-C
2	DC-In Power Connector	7	COM1 (RJ50) RS-232/422/485 Port
3	DisplayPort	8	COM2 / COM3 / COM4 (DB-9) RS-232 Ports
4	LAN Ports (GbE)	9	Wall Mount Kit
5	USB 3.0 Ports		

Oblique View

1.7 Dimensions

Unit: mm



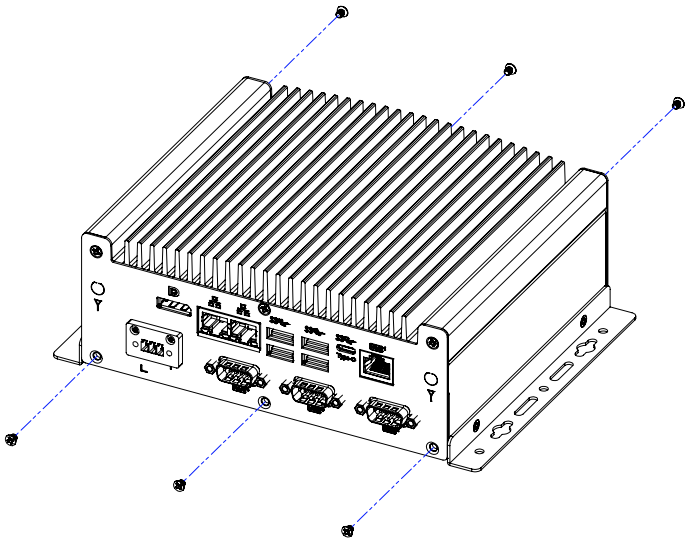
Chapter 2
Hardware Configuration

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 and pull out the cover.

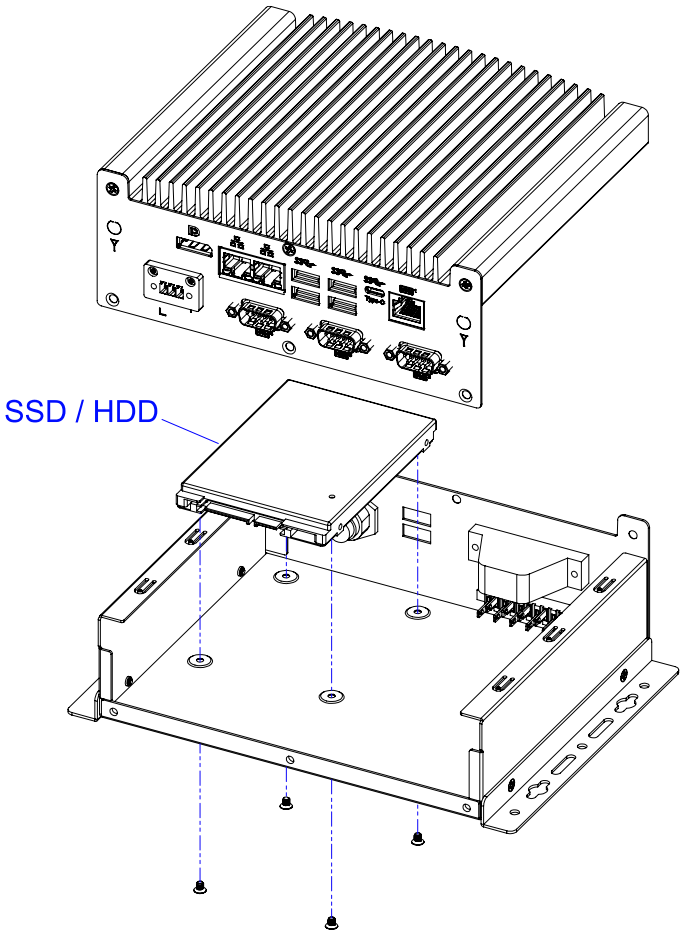


2.1.1 HDD Installation

If you need to install or replace an SSD or a HDD, follow the instructions below for installation after you disassemble the device cover.

1. Loosen 4 screws below.

2. Attach your SSD / HDD and tighten these screws.



2.1.2 Memory Installation

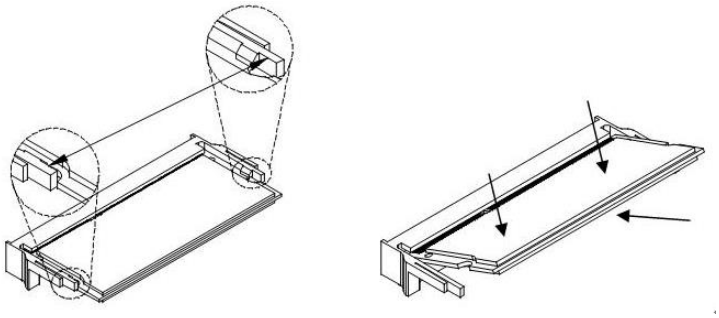
There are two SO-DIMM DDR3L memory slots inside ASB200-915 and the maximum memory is expandable up to 16 GB.

If you need to install or replace a memory module, follow the instructions below.

1. Locate the memory slot on the board.

2. Align the key of the memory module with that on the memory slot and insert the module slantwise.

3. Gently push the module down 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.

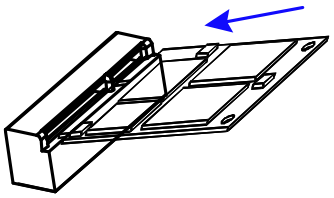


To remove the module, press the clips outwards with both hands.

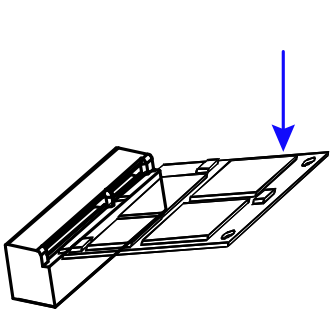
2.1.3 Mini-PCIe Card Installation

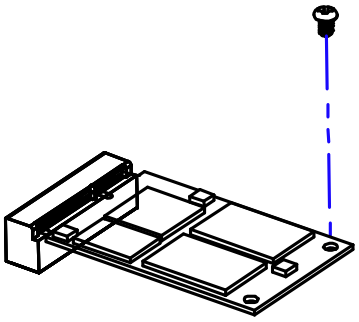
If you need to use a mini-PCIe card for expansion slots, follow the instructions below for installation after you disassemble the device cover and the internal PCB bracket.

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



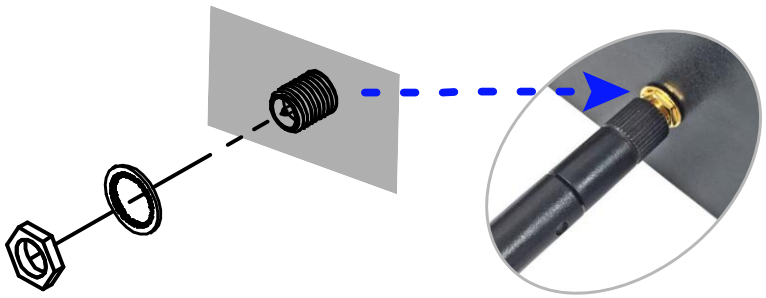
2. Push the mini-PCIe card down, fix it onto the standoff with a screw.





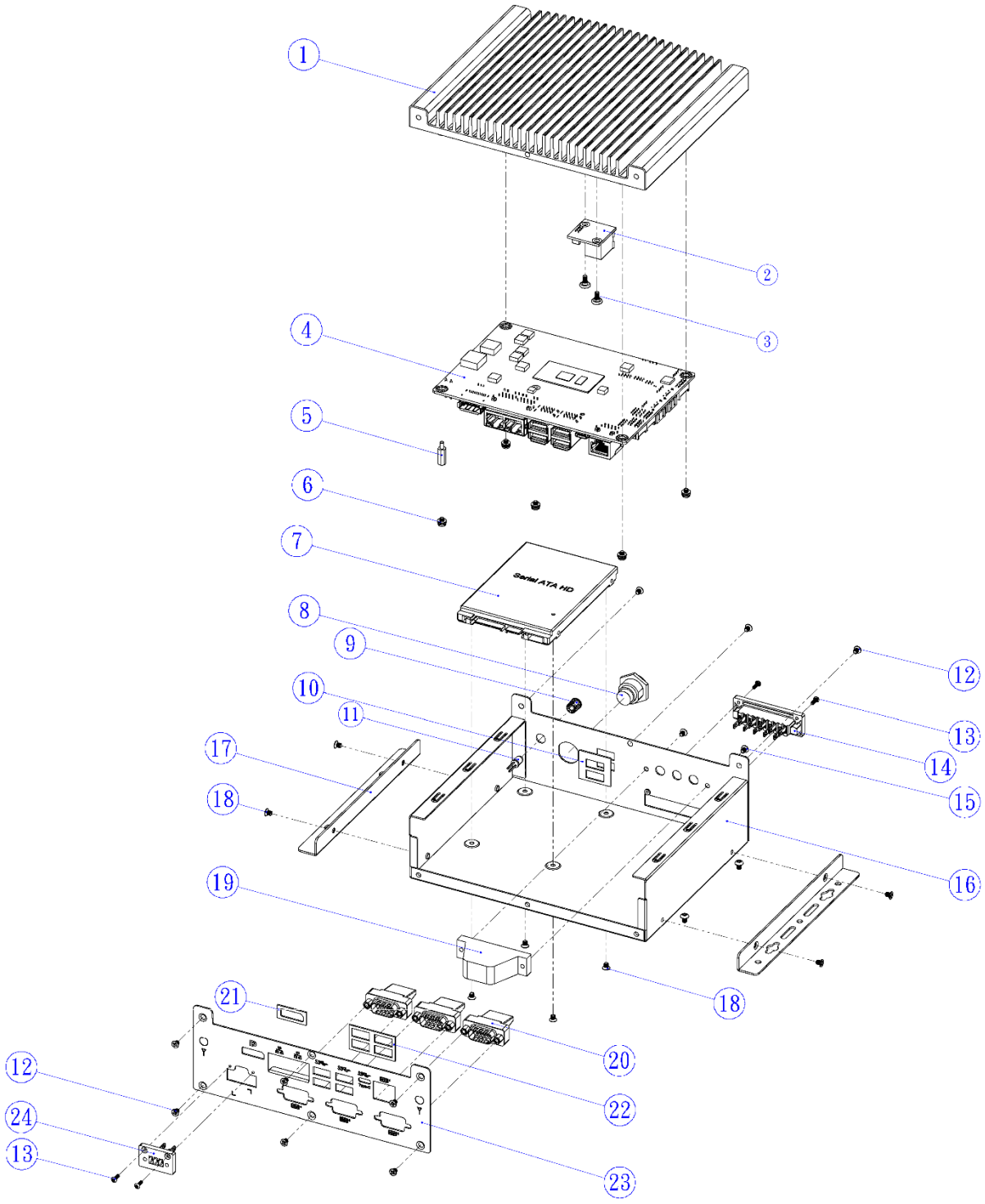
2.1.4 WiFi / 3G / 4G Antenna Installation

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).

2.1.5 Device Exploded Diagram



Item	Name	Q'ty
1	Heat Sink	1
2	ID112	1
3	Screw (M3*5)	2
4	IB915	1
5	NUT (M3*H12)	1
6	Screw (M3*6)	5
7	2.5" HDD	1
8	Power Button	1
9	LED Spacer Support	1
10	Gasket_ID112	1
11	LED	1
12	Screw (UNC #6-32*6)	9
13	Screw (M2*6)	4
14	Terminal Block (10P)	1
15	Screw (UNC #4-40*10)	2
16	Base	1
17	Wall Mount Bracket	2
18	Screw (M3*4)	8
19	Audio Cable	1
20	COM Cable	3
21	Gasket_DP	1
22	Gasket_USB	1
23	Rear Plate	1
24	Terminal Block (3P)	1

2.1.6 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 ASB200-915 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”).

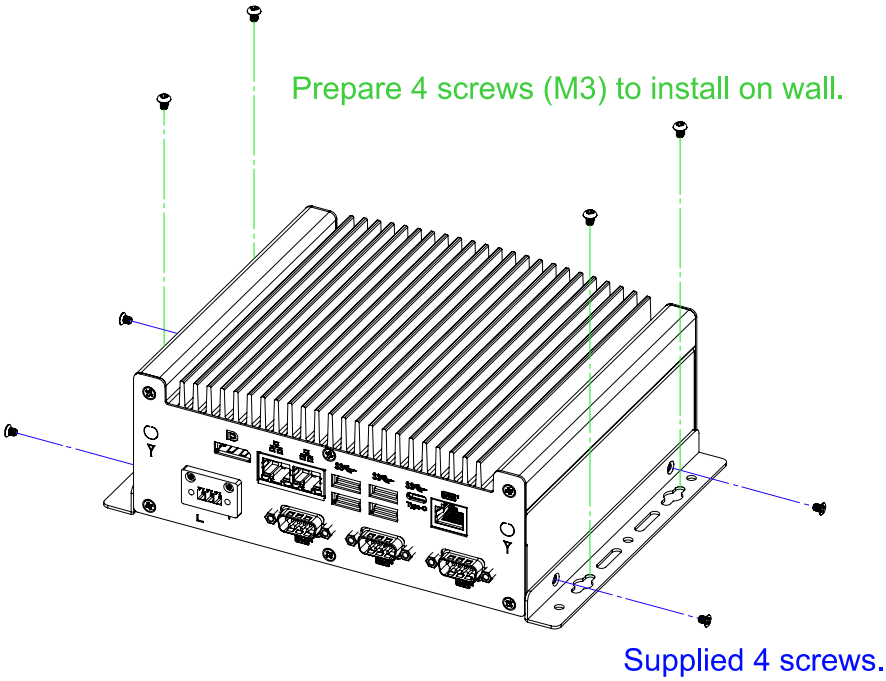
     Note: This method provides the most reliable attachment for the product with little risk that the product may come loose or require ongoing maintenance.

   - **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 ASB200-915, and secure with the supplied 4 screws.
2. Prepare at least 4 screws (M3) to install the device on wall .

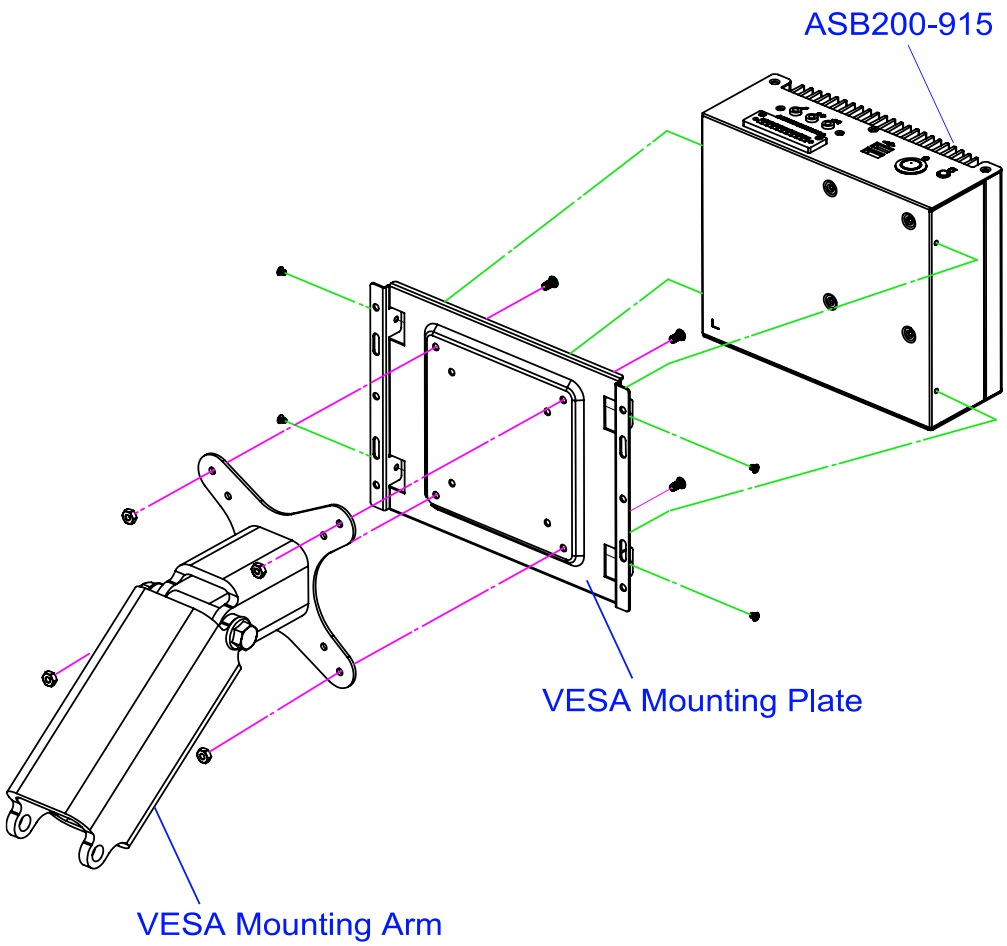


You can install ASB200-915 on plastic (LCD monitor), wood, drywall surface over studs, or a solid concrete or metal plane directly. The types of fasteners required are dependent on the type of wall construction.

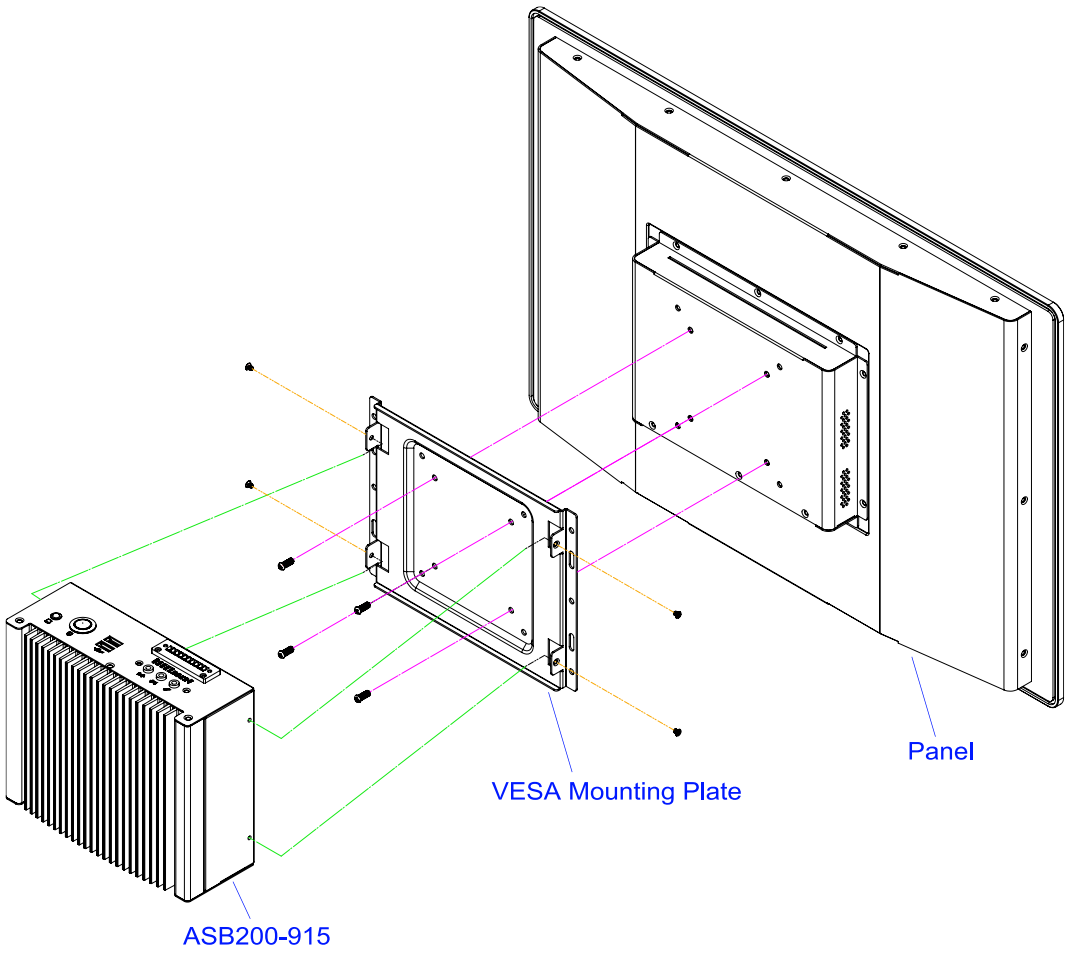
Fasteners are not supplied in the product package. You will need to prepare the fasteners. Choose fasteners that are rated either **Medium Duty** or **Heavy Duty**. To assure proper fastener selection and installation, follow the fastener manufacturer's recommendations.

2.1.7 VESA Mount Installation

1. VESA mounting ASB200-915

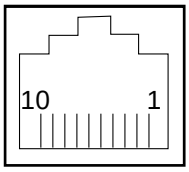


2. VESA mounting ASB200-915 to a panel



2.1.8 Pinout for COM Ports, DC Power & Digital I/O Connectors

- **COM1 (RJ50) RS232/422/485 Port**

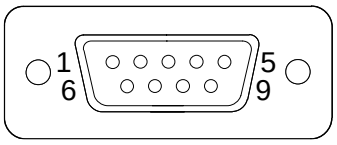


COM1 port is jumper-less and configurable in BIOS.

Pin	Assigment	Pin	Assigment
1	DSR, Data set ready	6	DCD, Data carrier detect
2	Ground	7	DTR, Data terminal ready
3	Ground	8	CTS, Clear to send
4	TXD, Transmit data	9	RTS, Request to send
5	RXD, Receive data	10	RI, Ring indicator

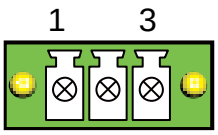
Pin	Assignment		
	RS-232	RS-422	RS-485
1	DSR	NC	NC
2	Ground	Ground	Ground
3	Ground	Ground	Ground
4	TX	RX+	NC
5	RX	TX+	Data+
6	DCD	TX-	Data-
7	DTR	RX-	NC
8	CTS	NC	NC
9	RTS	NC	NC
10	RI	NC	NC

- **COM2 / COM3 / COM4 (DB-9) RS-232 Ports**



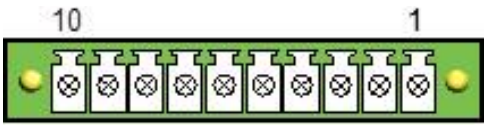
Pin	Assigment	Pin	Assigment
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

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



Pin	Assigment	Pin	Assigment
1	Ground	3	+12V
2	Chassis Ground		

- **Digital I/O Connector (terminal block)**



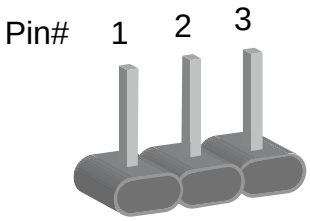
Pin	Assigment	Pin	Assigment
1	Ground	6	DI3
2	DO3	7	DI2
3	DO2	8	DI1
4	DO1	9	DI0
5	DO0	10	+5V

2.2 Setting the Jumpers

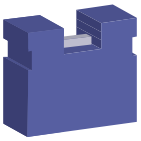
Set up and configure your ASB200-915 by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

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.

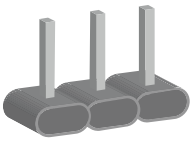
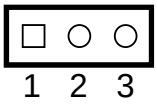
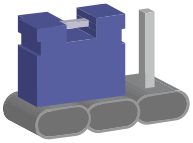
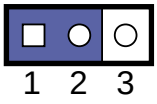
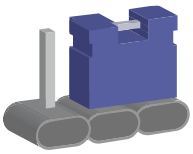
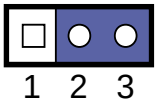


A 3-pin jumper



A jumper cap

Refer to the illustration below to set jumpers.

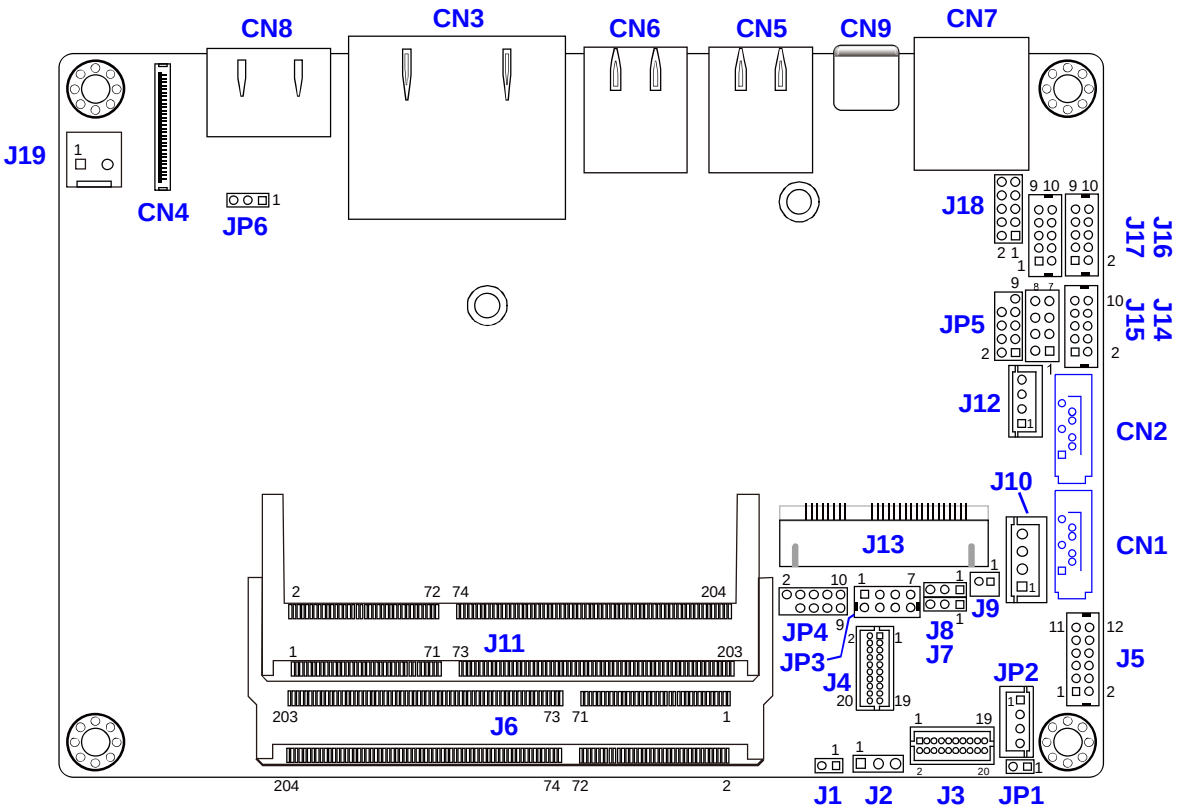
Pin closed	Oblique view	Schematic illustration in the manual
Open		
1-2		
2-3		

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

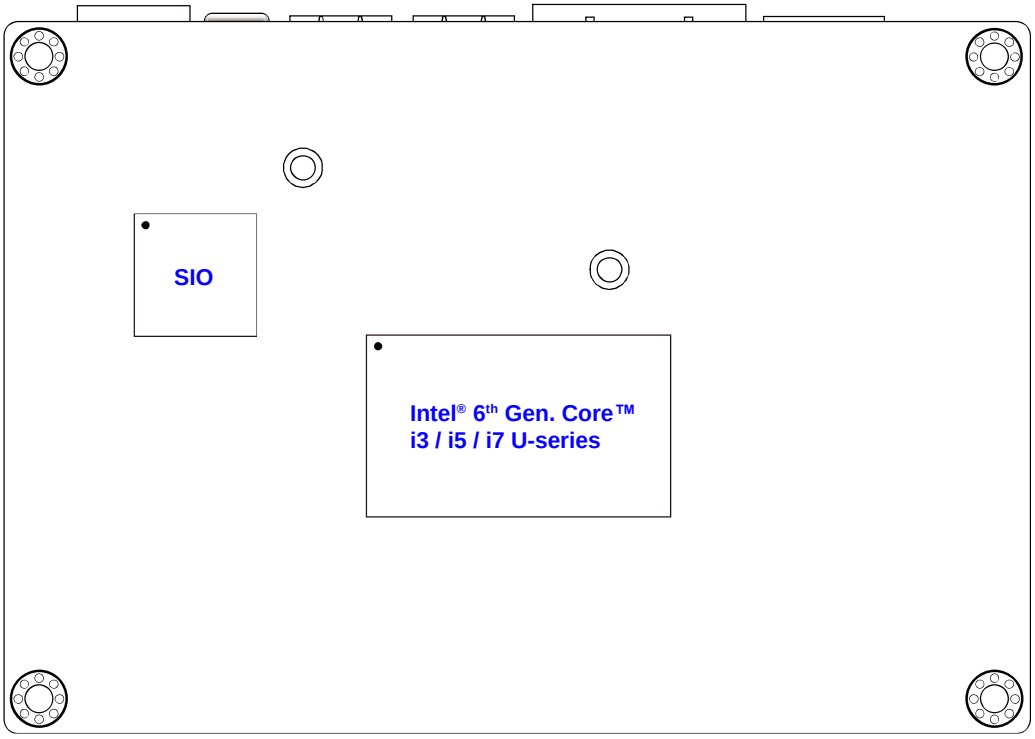
When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e. turned **Off**.

2.3 Jumper & Connector Locations on Motherboard

Motherboard: IB915AF



IB915AF - top

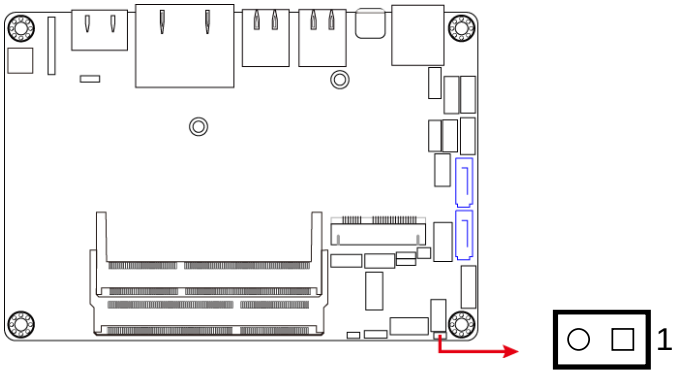


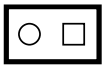
IB915AF - bottom

2.4 Jumpers Quick Reference

Function	Connector Name	Page
LVDS Panel Brightness Control Selection	JP1	27
LVDS Panel Power Selection	J2, JP6	28
ME Register Clearance	J7	29
CMOS Data Clearance	J8	29
Factory Use Only	JP4, JP5	--

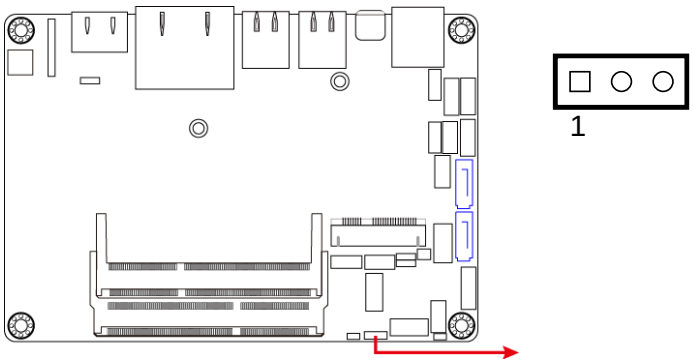
2.4.1 LVDS Panel Brightness Control Selection (JP1)

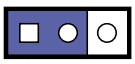
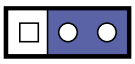


Function	Pin closed	Illustration
3.3V	Open	 1
5V (default)	Close	 1

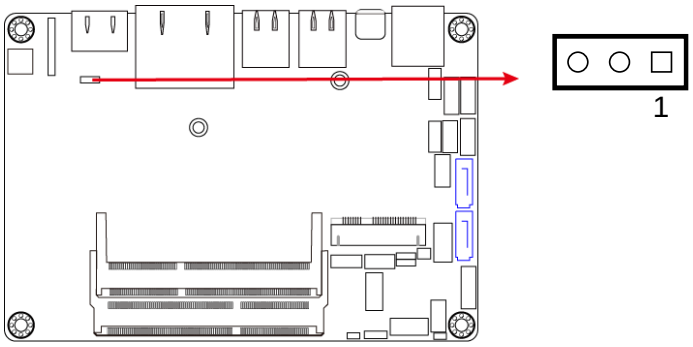
2.4.2 LVDS Panel Power Selection (J2, JP6)

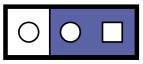
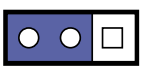
J2:



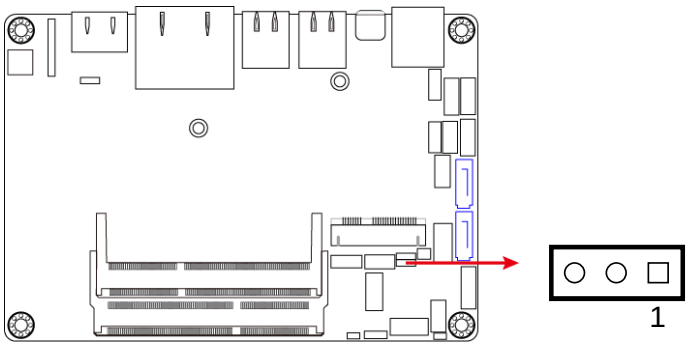
Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

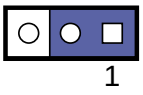
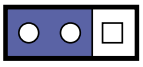
JP6:



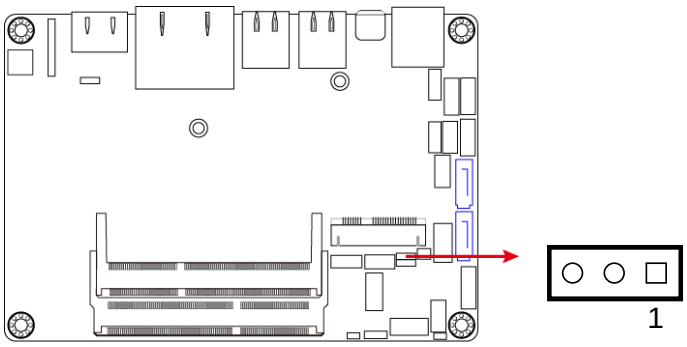
Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

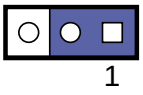
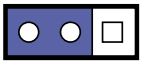
2.4.3 ME Register Clearance (J7)



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

2.4.4 CMOS Data Clearance (J8)

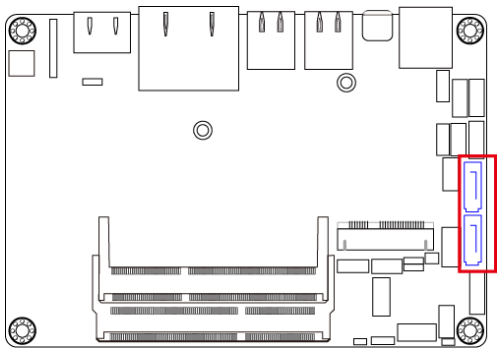


Function	Pin closed	Illustration
Normal (default)	1-2	 1
Clear CMOS	2-3	 1

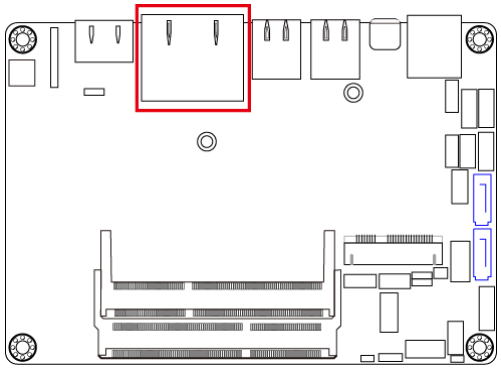
2.5 Connectors Quick Reference

Function	Connector Name	Page
SATA III Connector	CN1, CN2	31
Dual LAN Ports (GbE)	CN3	31
eDP Connector	CN4	31
USB 3.0 Connector	CN5, CN6	32
COM1 (RJ50) RS-232/422/485 Connector	CN7	32
DisplayPort	CN8	32
USB 3.1 Type-C Port	CN9	33
LCD Backlight Connector	JP2	33
USB 2.0 Connector	JP3	34
Audio Connector	J5	34
LVDS Connector	J3, J4	35
DDR3L SO-DIMM Slot	J6, J11	36
Battery Connector	J9	36
SATA HDD Power Connector	J10	37
Mini-PCIe / mSATA Slot	J13	37
COM3 & COM4 Connectors	J14, J17	38
Front Panel Function Connector	J15	38
COM2 Connector	J16	39
Digital I/O Connector	J18	39
DC-In Connector	J19	40
Factory Use Only	J1, J12	--

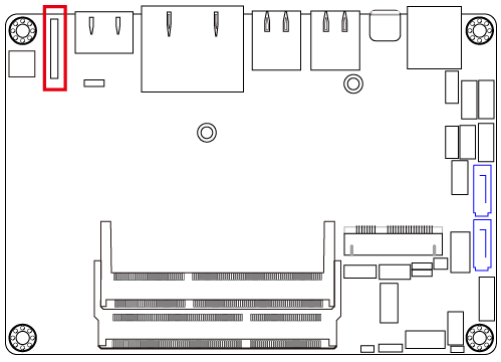
2.5.1 SATA III Connector (CN1, CN2)



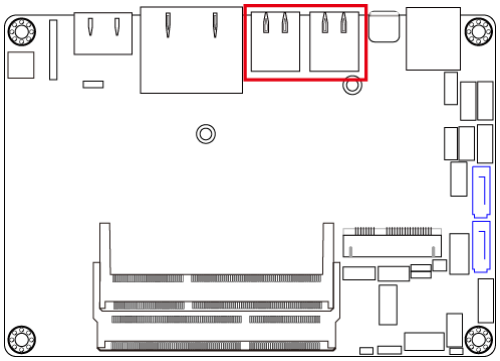
2.5.2 Dual LAN Ports (GbE) (CN3)



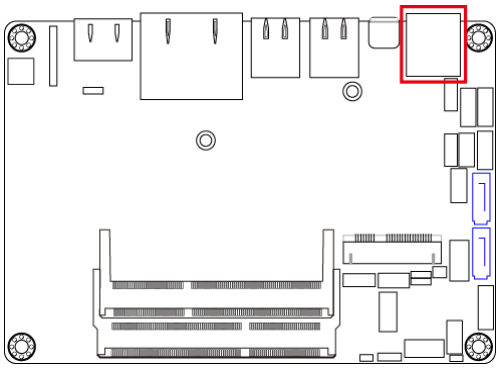
2.5.3 eDP Connector (CN4)



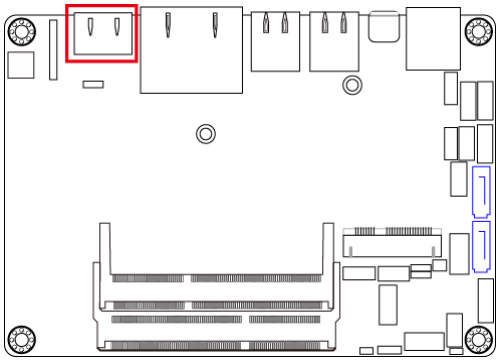
2.5.4 USB 3.0 Connector (CN5, CN6)



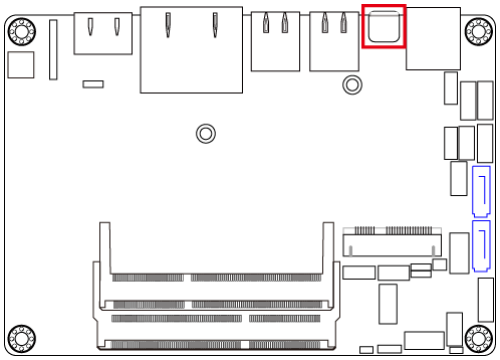
2.5.5 COM1 (RJ50) RS-232/422/485 Port (CN7)



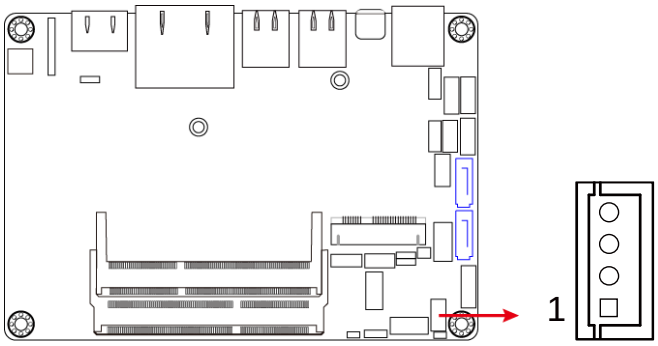
2.5.6 DisplayPort (CN8)



2.5.7 USB 3.1 Type-C Port (CN9)

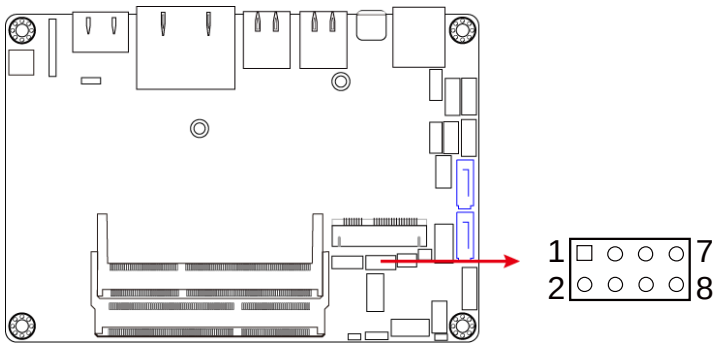


2.5.8 LCD Backlight Connector (JP2)



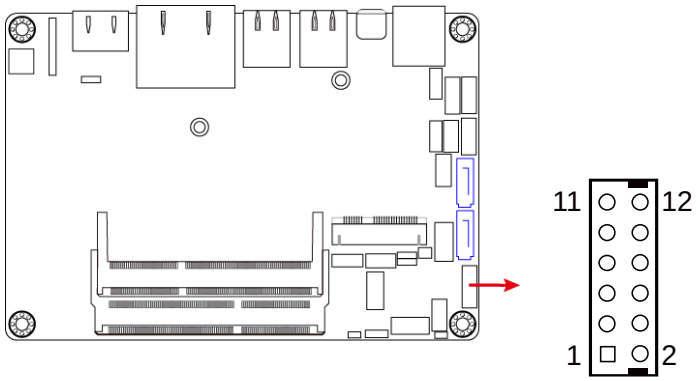
Pin	Assigment	Pin	Assigment
1	12V	3	Brightness Control
2	Backlight Enable	4	Ground

2.5.9 USB 2.0 Connector (JP3)



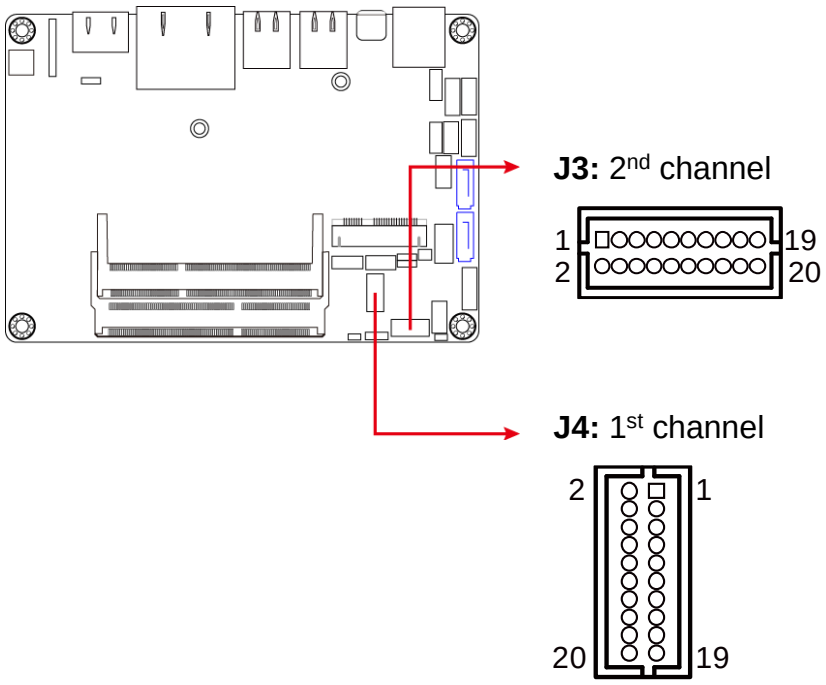
Pin	Assigment	Pin	Assigment
1	Vcc	5	D0+
2	Ground	6	D1-
3	D0-	7	Ground
4	D1+	8	Vcc

2.5.10 Audio Connector (J5)



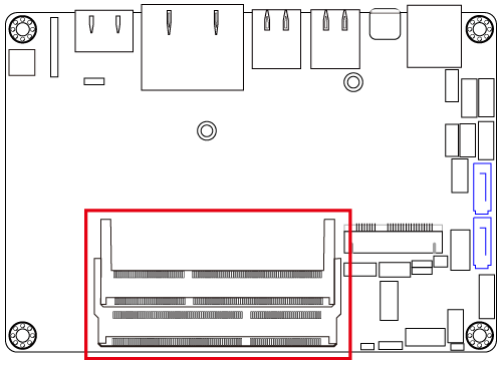
Pin	Assigment	Pin	Assigment
1	LINEOUT_L	7	JD_LINEIN
2	LINEOUT_R	8	Ground
3	JD_FRONT	9	MIC_L
4	Ground	10	MIC-R
5	LINEIN_L	11	JD_MIC1
6	LINEIN_R	12	Ground

2.5.11 LVDS Connector (J3, J4)

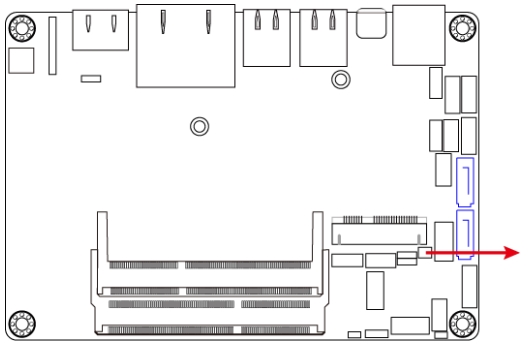


Pin	Assigment	Pin	Assigment
1	TX0P	11	Ground
2	TX0N	12	Ground
3	Ground	13	CLKP
4	Ground	14	CLKN
5	TX1P	15	Ground
6	TX1N	16	Ground
7	Ground	17	TX3P
8	Ground	18	TX3N
9	TX2P	19	Power
10	TX2N	20	Power

2.5.12 DDR3L SO-DIMM Slot (J6, J11)

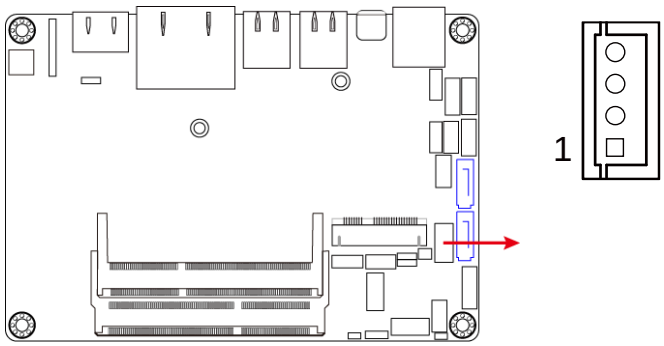


2.5.13 Battery Connector (J9)



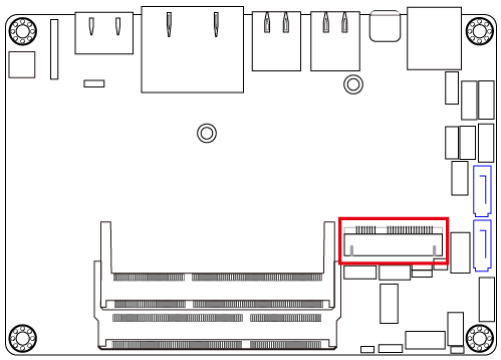
Pin	Assigment
1	Battery+
2	Ground

2.5.14 SATA HDD Power Connector (J10)

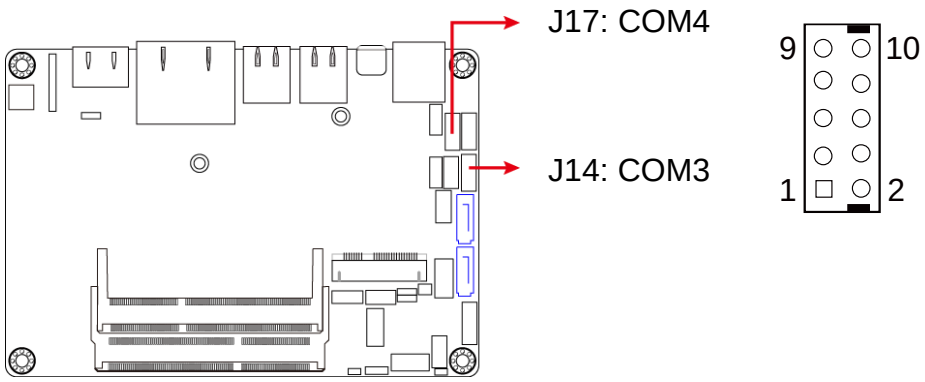


Pin	Assigment	Pin	Assigment
1	+5V	3	Ground
2	Ground	4	+12V

2.5.15 Mini-PCIe / mSATA Slot (J13)

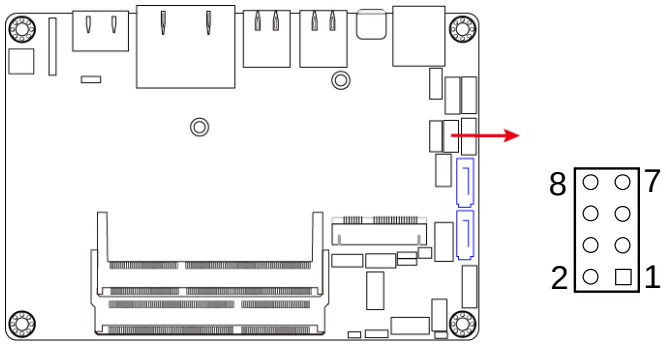


2.5.16 COM3 & COM4 Connectors (J14, J17)



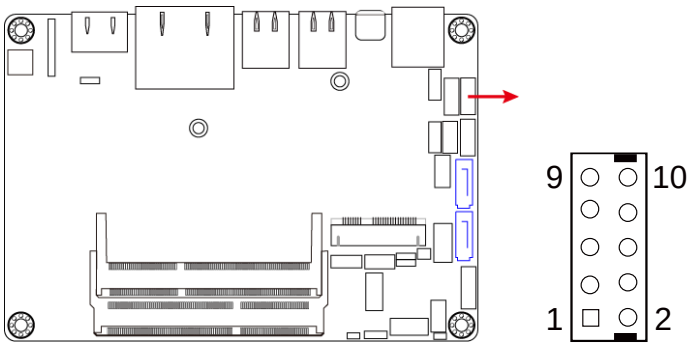
Pin	Assigment	Pin	Assigment
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground	10	Not used

2.5.17 Front Panel Function Connector (J15)



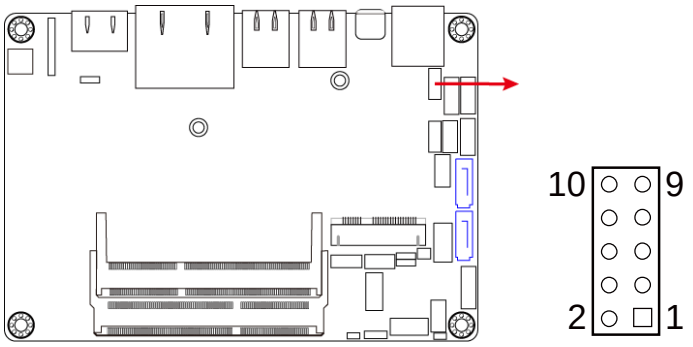
Pin	Assigment	Pin	Assigment
1	Ground	5	Ground
2	PWR_BTN	6	Reset
3	3.3V	7	+5V
4	HDD Active	8	Ground

2.5.18 COM2 Connector (J16)



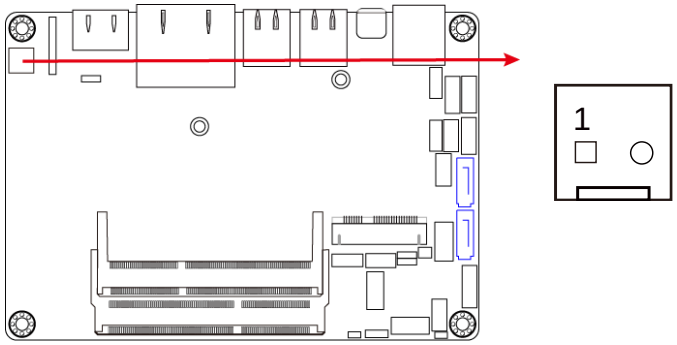
Pin	Assigment	Pin	Assigment
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground	10	Not Used

2.5.19 Digital I/O Connector (J18)



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 DC-In Connector (J19)



Pin	Assigment
1	9V ~ 24V
2	Ground

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 Driver Installation
- USB 3.0 Driver Installation
- USB 3.1 Driver Installation

3.1 Introduction

This section describes the installation procedures for software drivers.

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. Go to the download page of the product. Copy the compressed drivers file to your computer. Double click the file to decompress it. Run “CDGuide” to go to the main drivers page as shown. Click **Intel** and then **Intel(R) Skylake-U 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. Click **Yes** to accept the software license agreement and proceed with the installation process.

4. On the *Readme File Information* screen, click **Next** for installation.

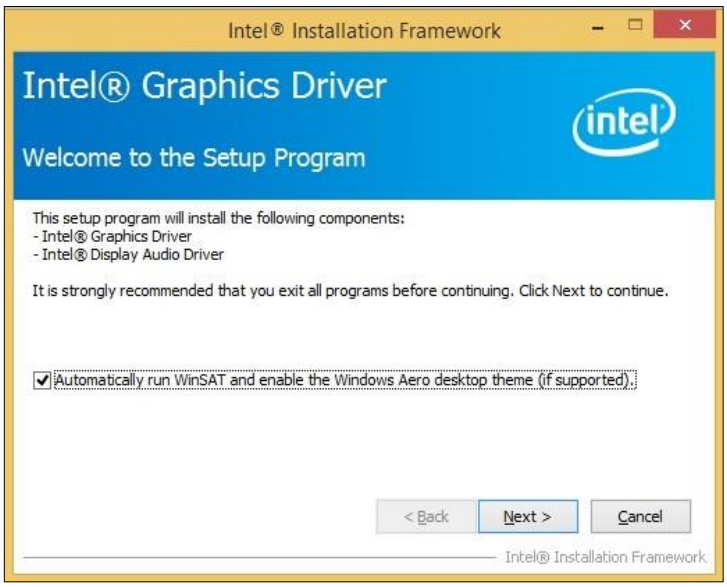
5. The driver has been completely installed. You are suggested to restart the computerfor changes to take effect.

3.3 VGA Driver Installation

1. Click **Intel** and then **Intel(R) Skylake-U 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 click **Install** for installation.

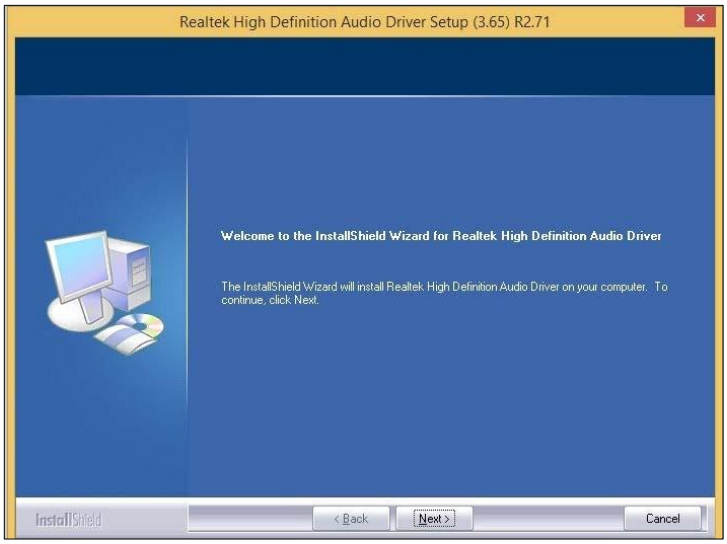
5. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

3.4 HD Audio Driver Installation

1. Insert the disk enclosed in the package. Click **Intel** and then **Intel(R) Skylate-U Chipset Drivers**.

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

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



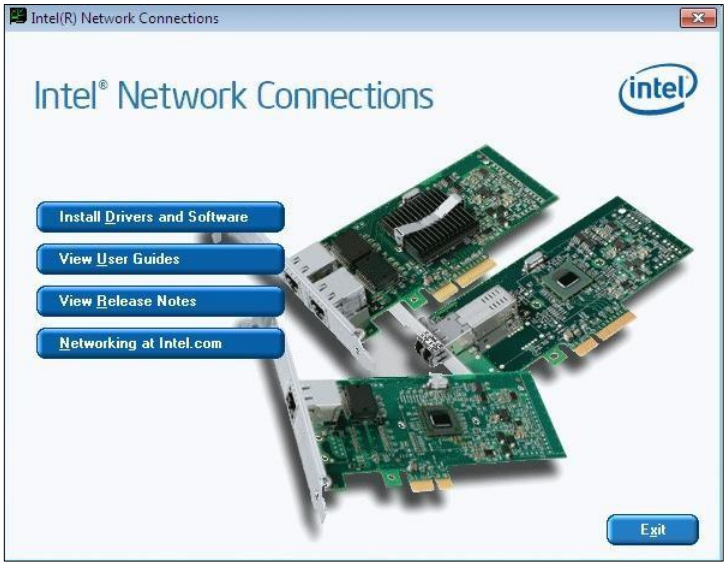
4. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

3.5 LAN Driver Installation

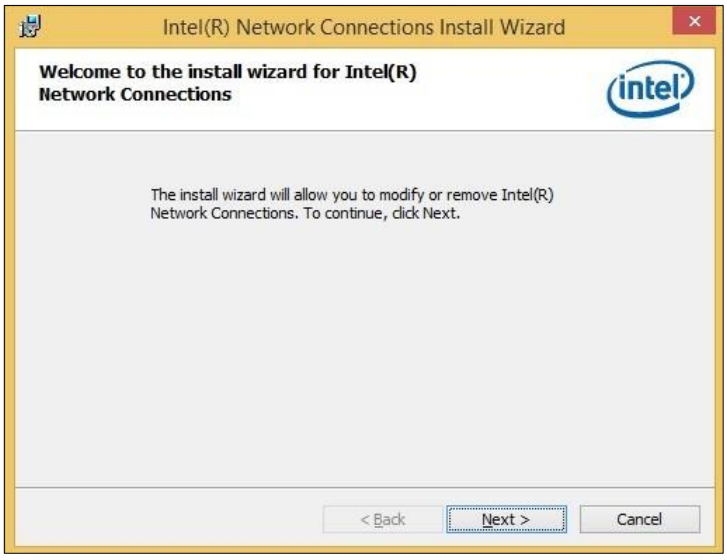
1. Click **LAN Card** and then **Intel(R) Skylake-U Chipset Drivers**

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

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

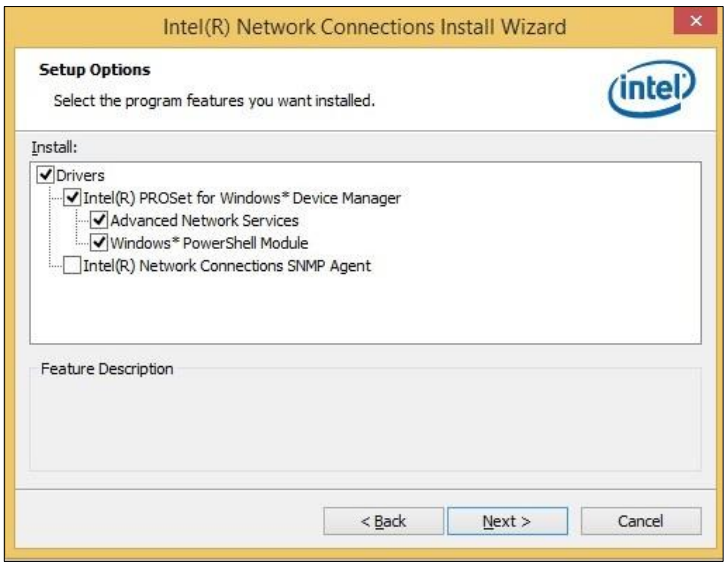


4. When the *Welcome* screen appears, click **Next** to continue.



5. Accept the license agreement and click **Next** to continue.

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



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

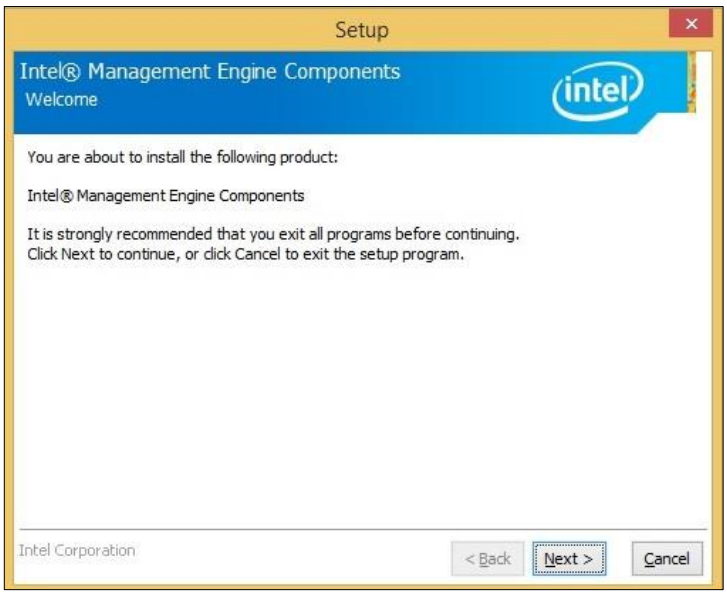
8. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

3.6 Intel® Management Engine Driver Installation

1. Click **Intel** and then **Intel(R) Skylake-U Chipset Drivers**.

2. Click **Intel(R) ME 11.x Drivers**.

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



4. Accept the licence agreement and click **Next** to continue.

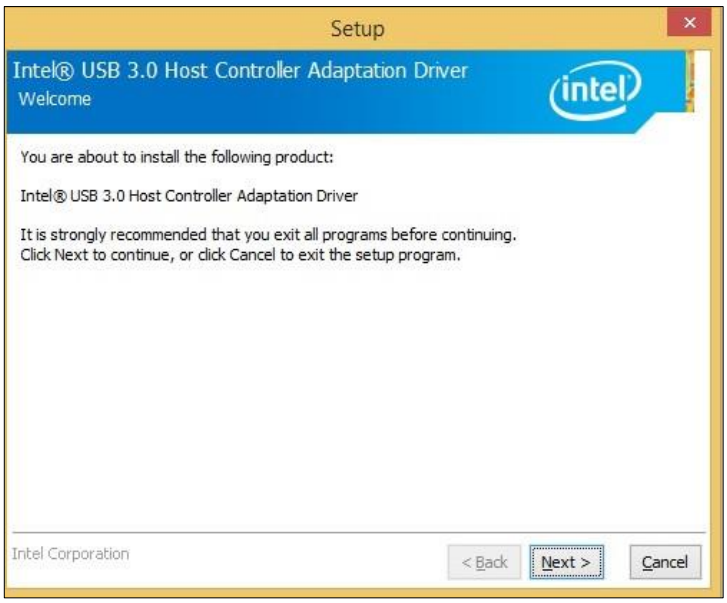
5. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

3.7 USB 3.0 Driver Installation

1. Click **Intel** and then **Intel(R) Skylake-U Chipset Drivers**.

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

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



4. Accept the license agreement and click **Next** to continue.

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.

3.8 USB 3.1 Driver Installation

1. Click **Intel** and then **Intel(R) Skylake-U Chipset Drivers**.

2. Click **ASMedia USB 3.1 Drivers**.

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

4. 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
- Boot 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
```

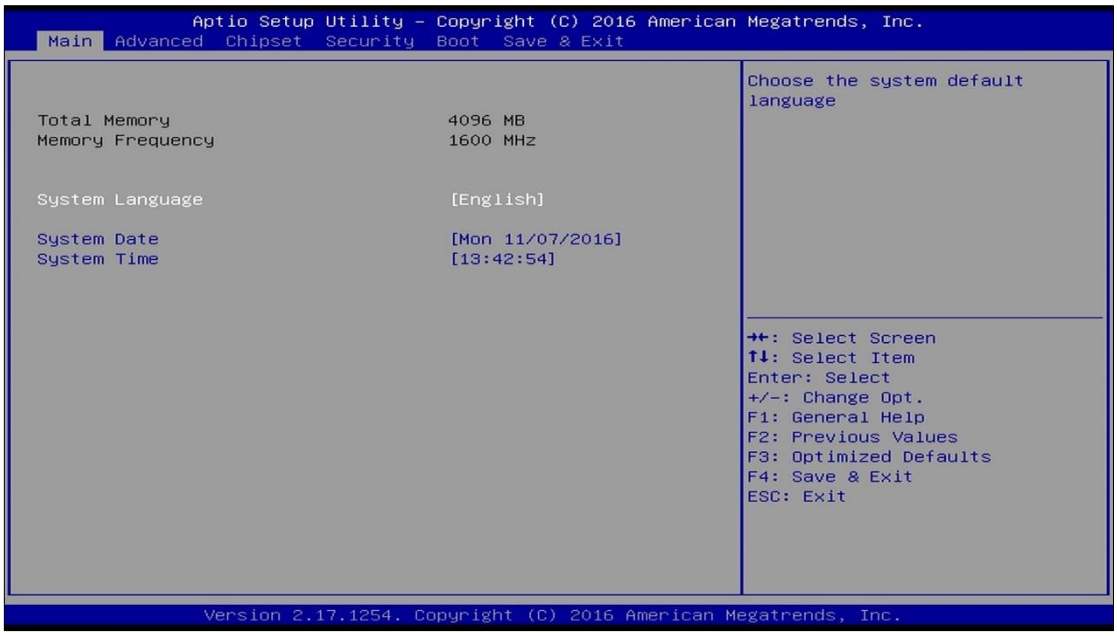
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

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.

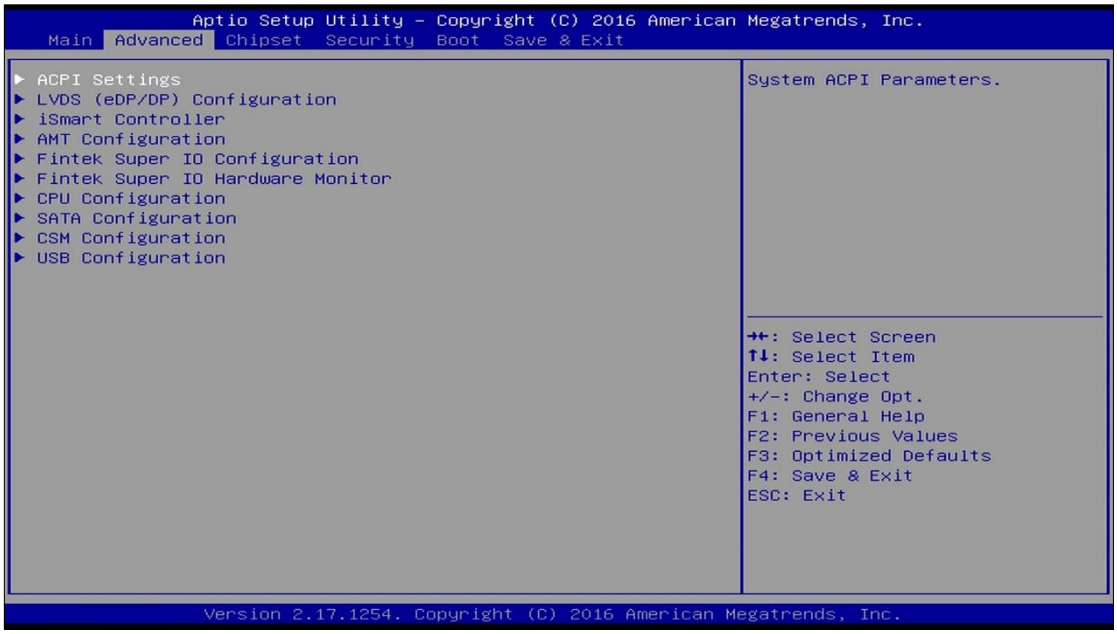
4.3 Main Settings



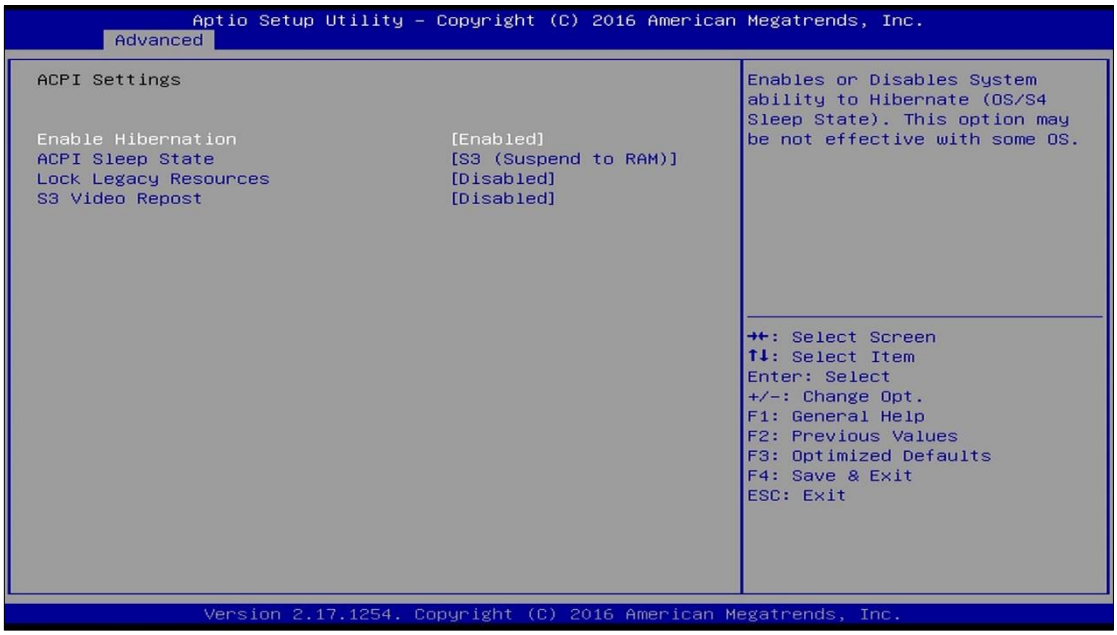
BIOS Setting	Description
System Language	Choose the system default language.
System Date	Sets the date. Use the <Tab> key to switch between the date elements.
System Time	Set the time. Use the <Tab> key to switch between the time elements.

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.

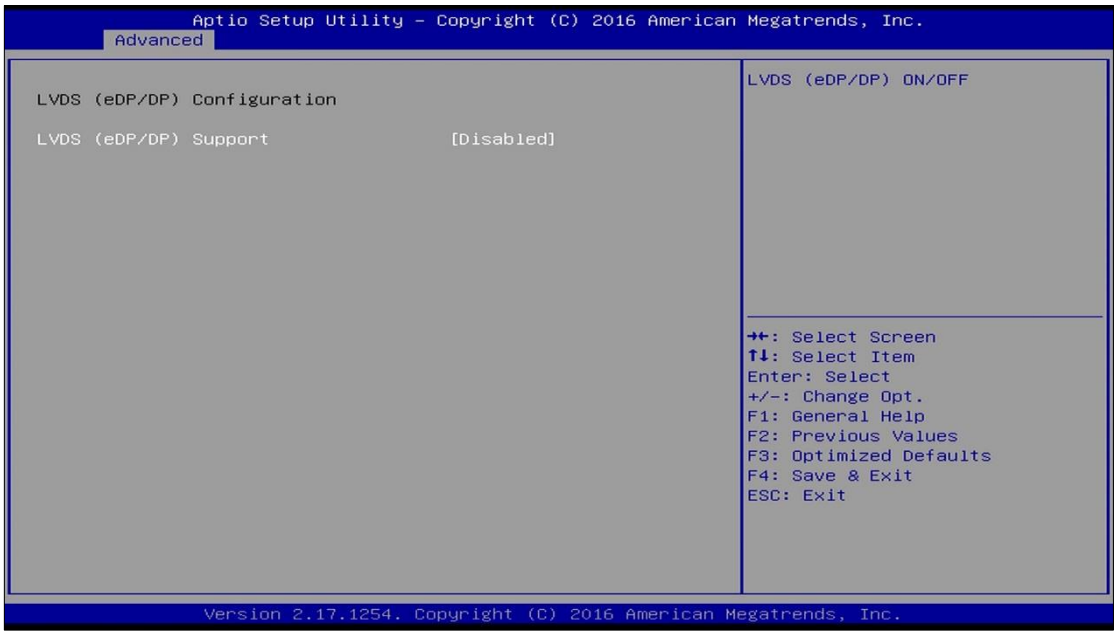


4.4.1 ACPI Settings



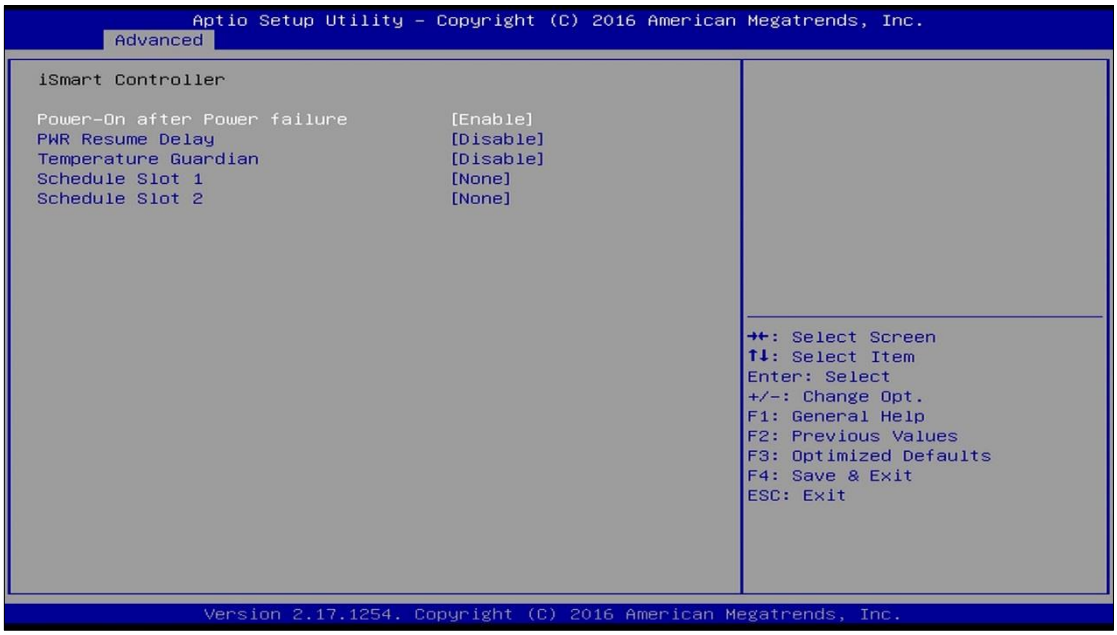
BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
ACPI Sleep State	Selects a ACPI sleep state for the system to enter. Options: Suspend Disabled S3 (Suspend to RAM)
Lock Legacy Resources	Enables / Disables Lock of Legacy Resources.
S3 Video Repost	Enables / Disables S3 Video Repost.

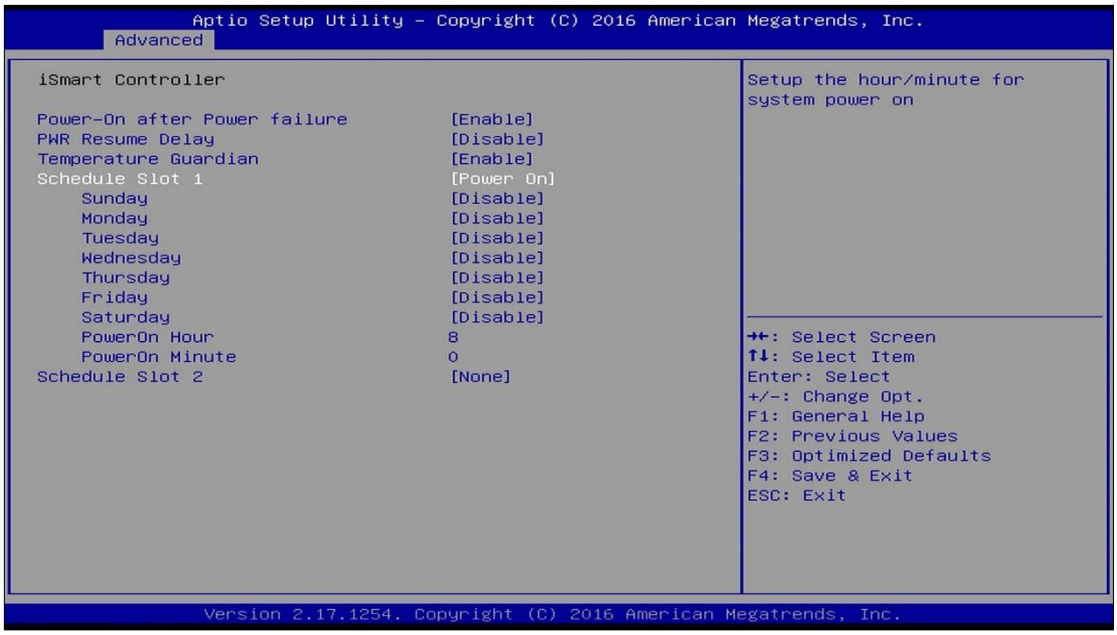
4.4.2 LVDS (eDP/DP) Configuration



BIOS Setting	Description
LVDS (eDP/DP) Support	Enables / Disables LVDS (eDP/DP).
Panel Color Depth	Sets a panel color depth of 18 bit or 24 bit (VESA/JEIDA).
LVDS Channel Type	Selects the LVDS channel as single or dual channel.
Panel Type	Selects the resolution of your panel. Options: • 800 x 600 • 1024 x 768 • 1366 x 768 • 1440 x 900 • 1600 x 900 • 1280 x 1024 • 1920 x 1080
Brightness Control	Enables / Disables the brightness control.

4.4.3 iSmart Controller

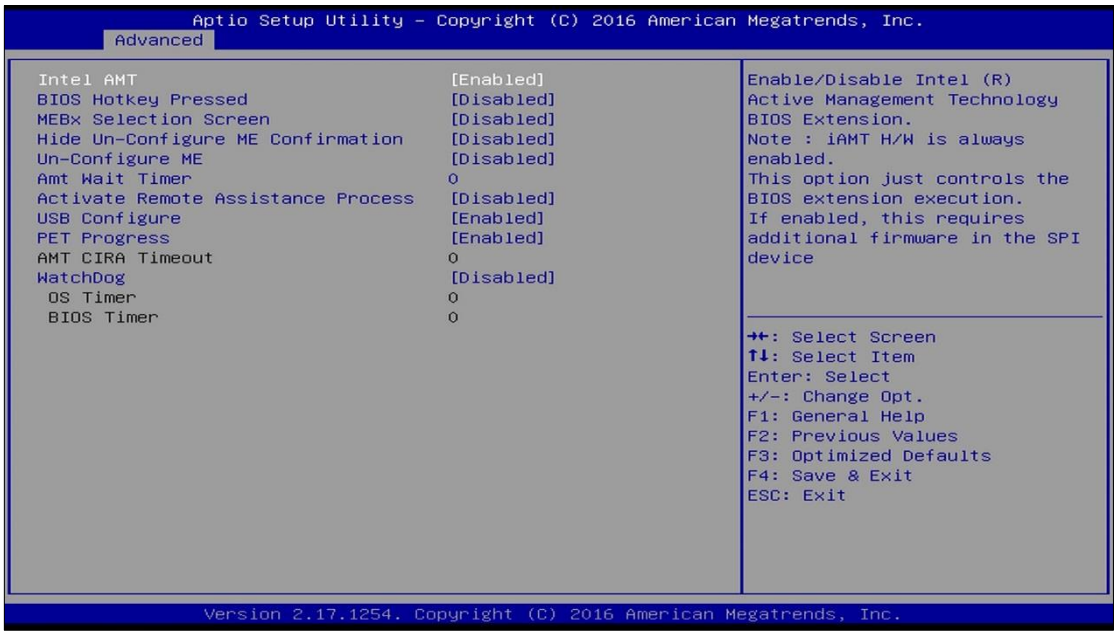




BIOS Setting	Description
Power-On after Power failure	Enables / Disables the system to be turned on automatically after a power failure.
Power Resume Delay	Enables / Disables to delay the time for system to turn on.

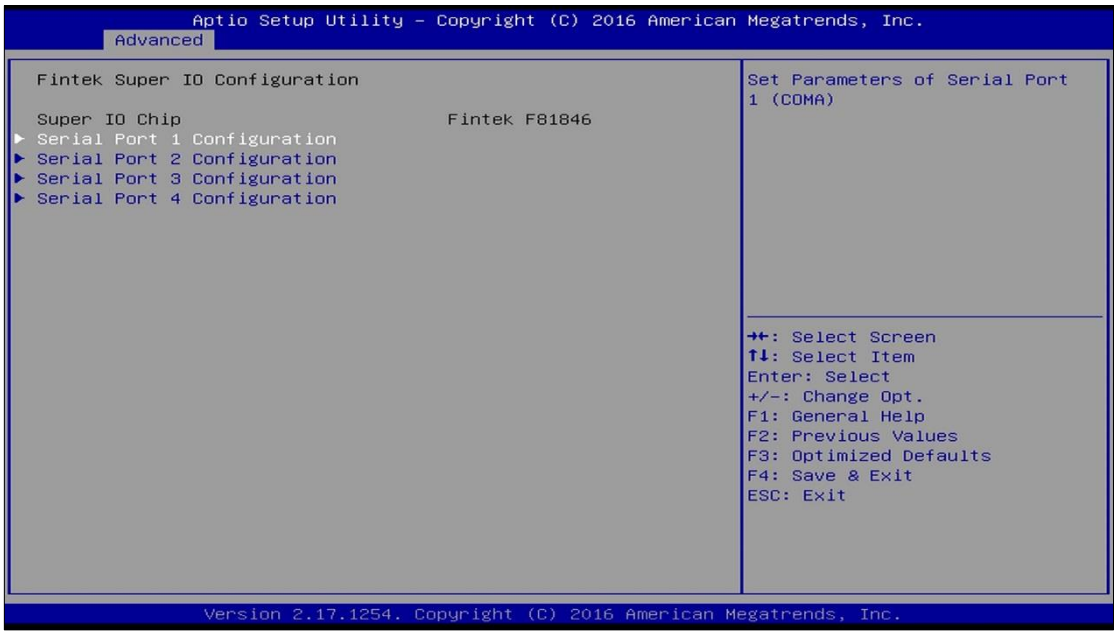
BIOS Setting	Description
Power Resume Delay Value (Seconds)	Sets the delay timer for the system to resume power if power failure occurs. The minimum delay timer is 5 seconds, and the maximum is 255 seconds.
Temperature Guardian	Generate the reset signal when system hands up on POST.
Schedule Slot 1 / 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



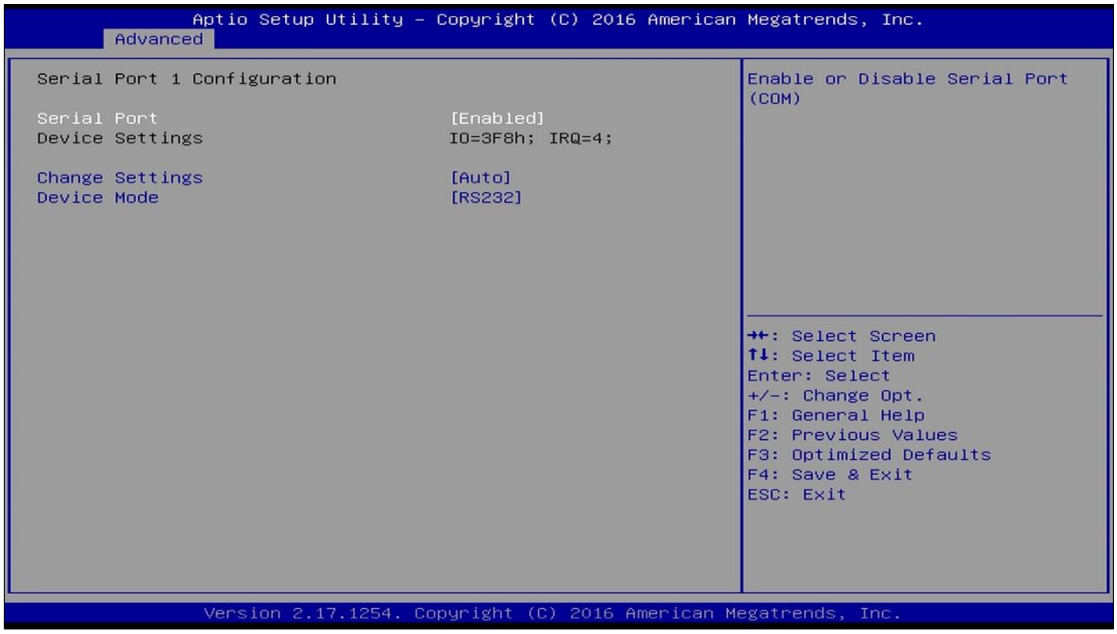
BIOS Setting	Description
Intel AMT	Enables / Disables Intel(R) Active Management Tecnology BIOS Extension. Note: iAMT H/W is alwas enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.
BIOS Hotkey Pressed	OEMFlag Bit 1: enables 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 unconfigure ME without passowrd confirmation prompt.
Unconfigure Me	OEMFlag Bit 15: unconfigure ME without passowrd.
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 Fintek Super IO Configuration



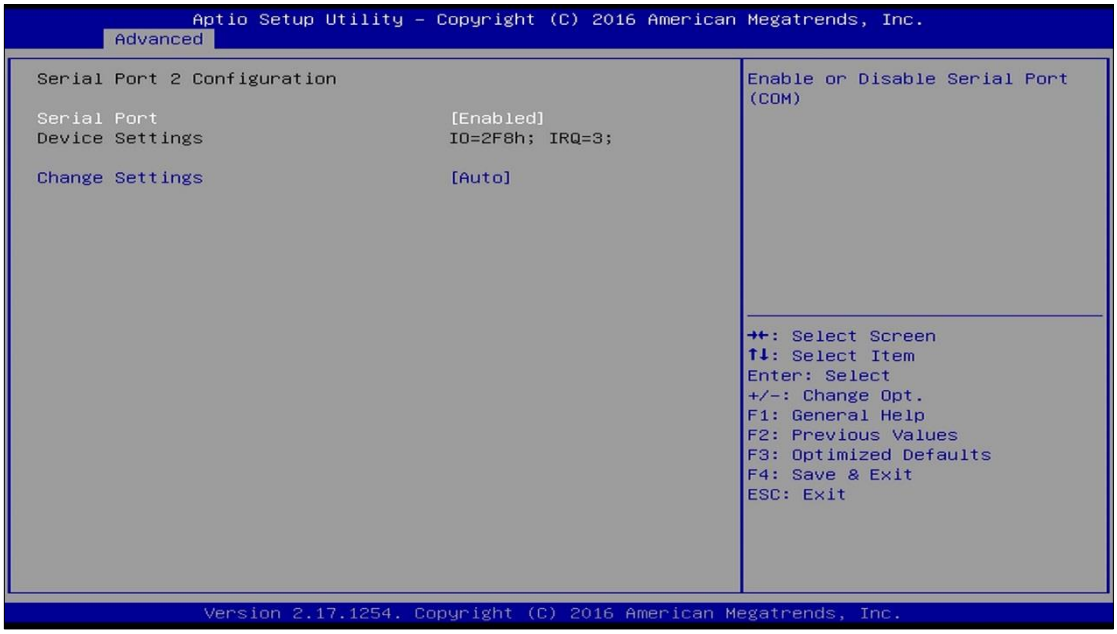
BIOS Setting	Description
Serial Port Configuration	Sets Parameters of Serial Ports. You can enable / disable the serial port and select an optimal settings for the Super IO device.

4.4.5.1. Serial Port 1 Configuration



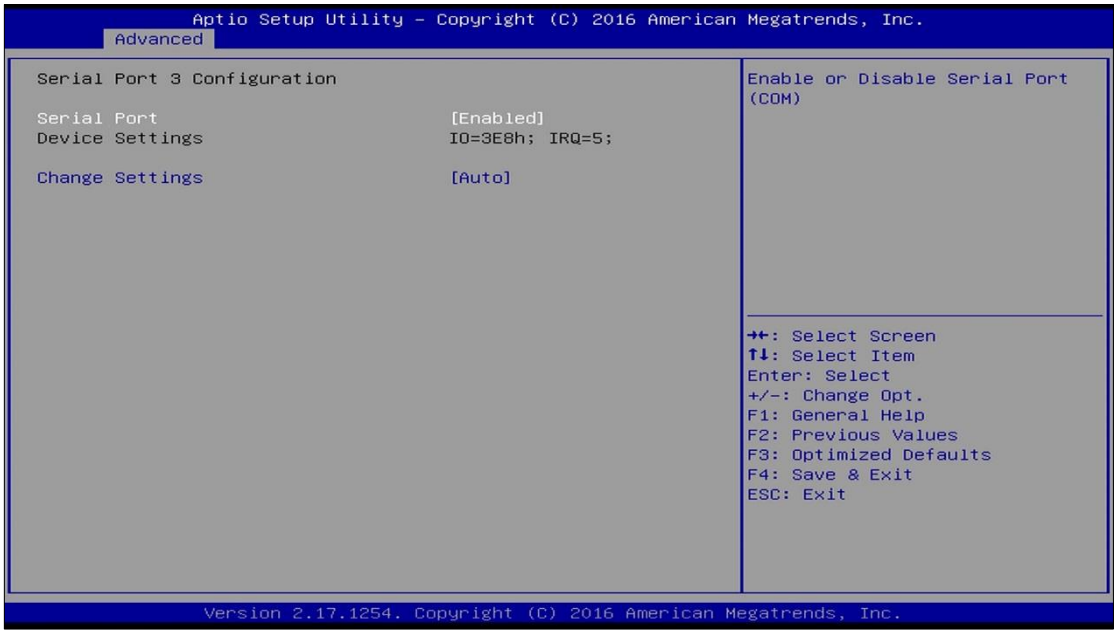
BIOS Setting	Description
Change Settings	Selects an optimal settings for the Super I/O device. Options: • Auto • IO=3F8h ; IRQ=4 • IO=3F8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2F8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=3E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2E8h ; IRQ=3, 4, 5, 6, 7, 9. 10,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

4.4.5.2. Serial Port 2 Configuration



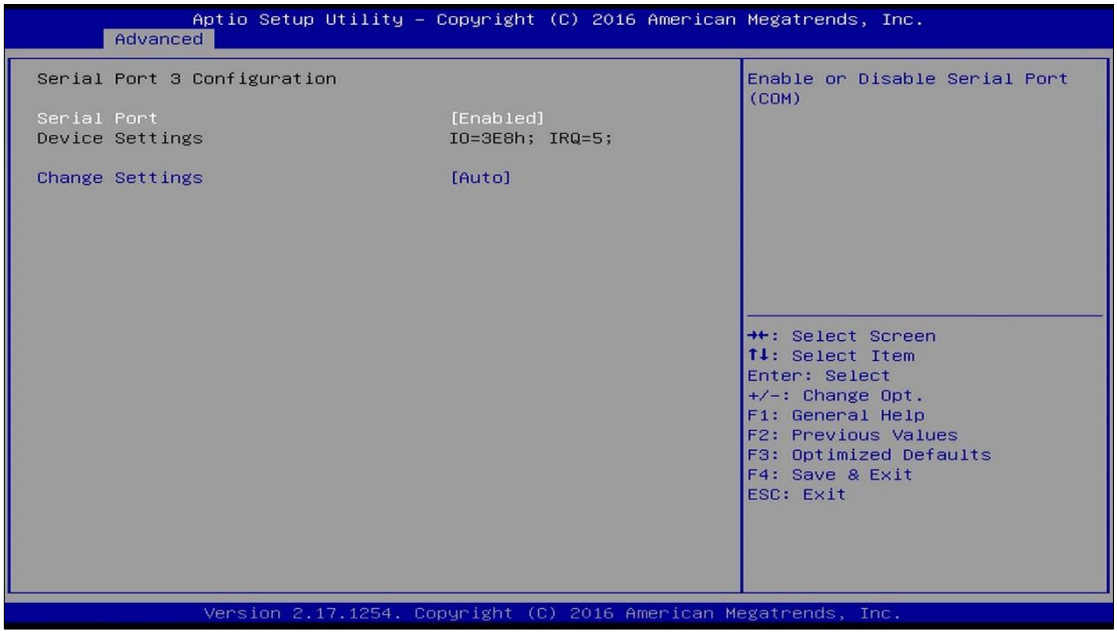
BIOS Setting	Description
Change Settings	Selects an optimal settings for the Super I/O device. Options: • Auto • IO=2F8h ; IRQ=3 • IO=3F8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2F8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=3E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2E8h ; IRQ=3, 4, 5, 6, 7, 9. 10,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

4.4.5.3. Serial Port 3 Configuration



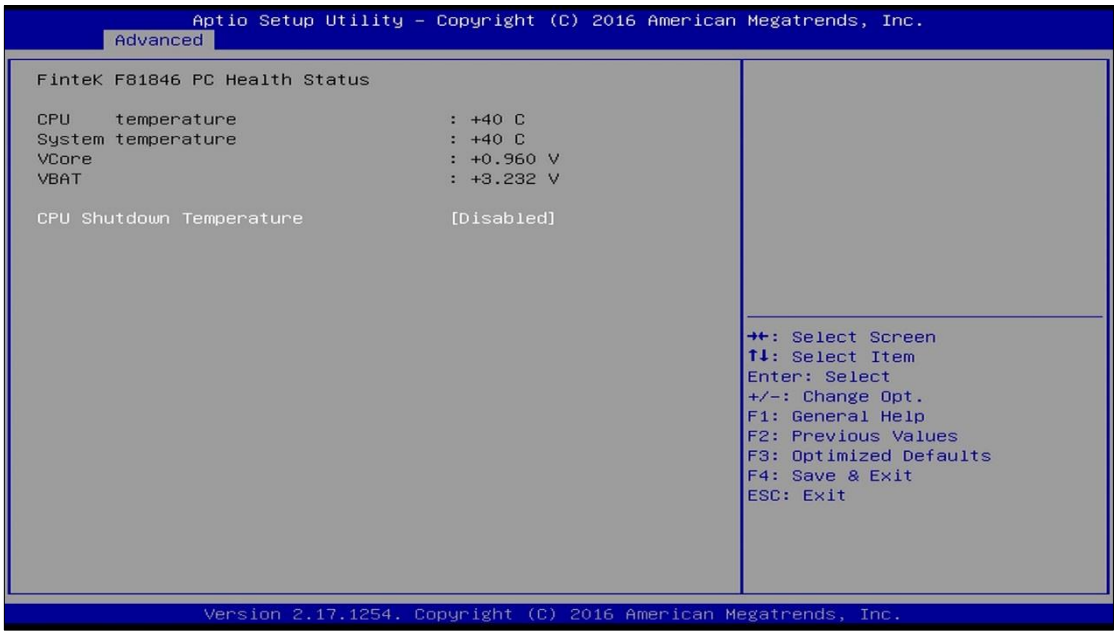
BIOS Setting	Description
Change Settings	Selects an optimal settings for the Super I/O device. Options: • Auto • IO=3E8h ; IRQ=7 • IO=3E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2F0h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2E0h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12

4.4.5.4. Serial Port 4 Configuration



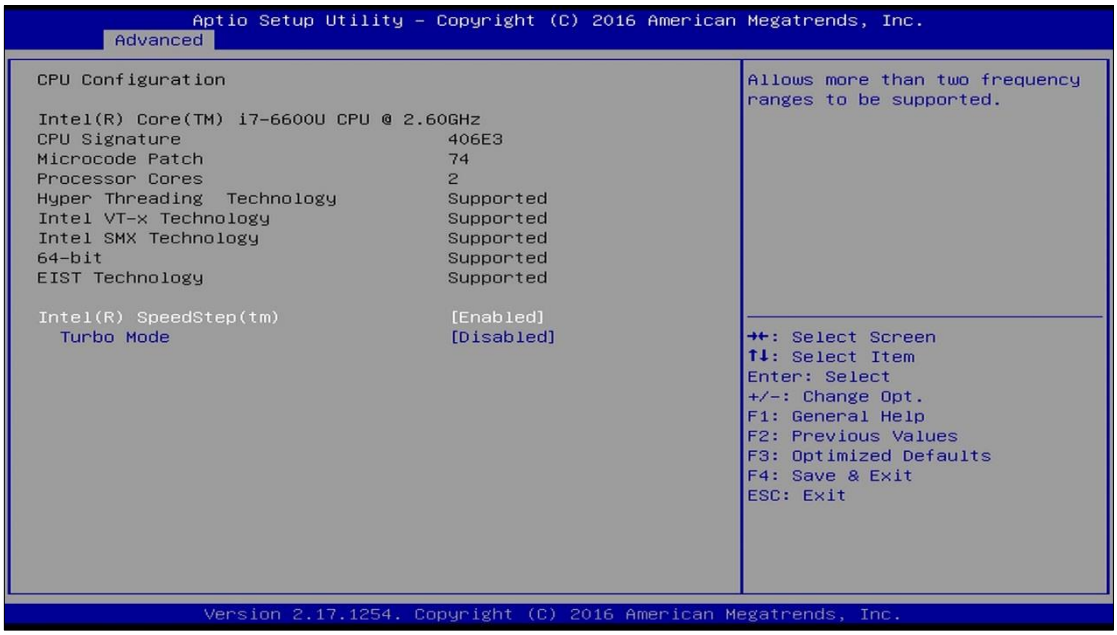
BIOS Setting	Description
Change Settings	Selects an optimal settings for the Super I/O device. Options: • Auto • IO=2E8h ; IRQ=7 • IO=3E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2F0h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2E0h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12

4.4.6 Fintek Hardware Monitor



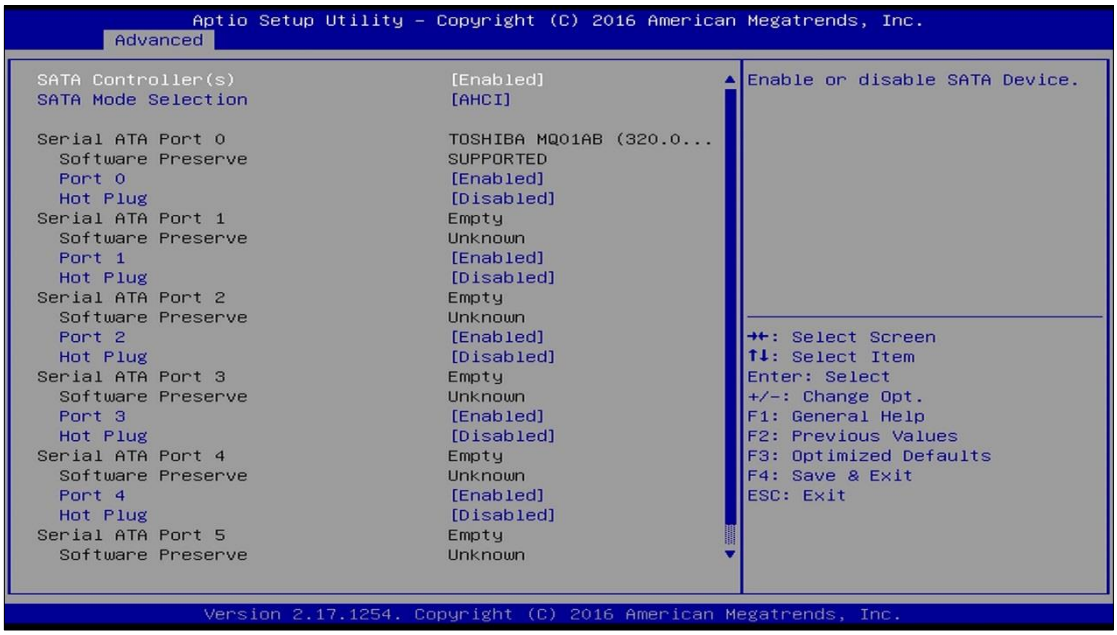
BIOS Setting	Description
Shutdown Temperature	This field enables or disables the Shutdown Temperature Options: Disabled (default),. 70 ℃, 75 ℃, 80 ℃, 85 ℃, 90 ℃, 95 ℃
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are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

4.4.7 CPU Configuration



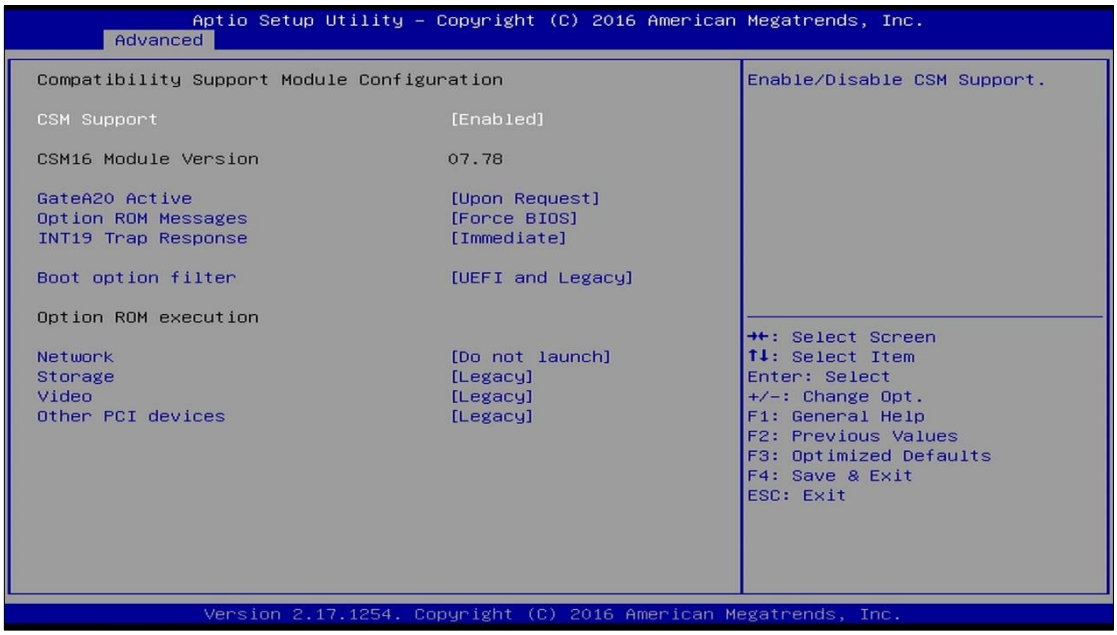
BIOS Setting	Description
Intel(R) SpeedStep (tm)	Enables / Disables the function to allow more than two frequency ranges to be supported.
Turbo Mode	Enables / Disables Turbo Mode.

4.4.8 SATA Configuration



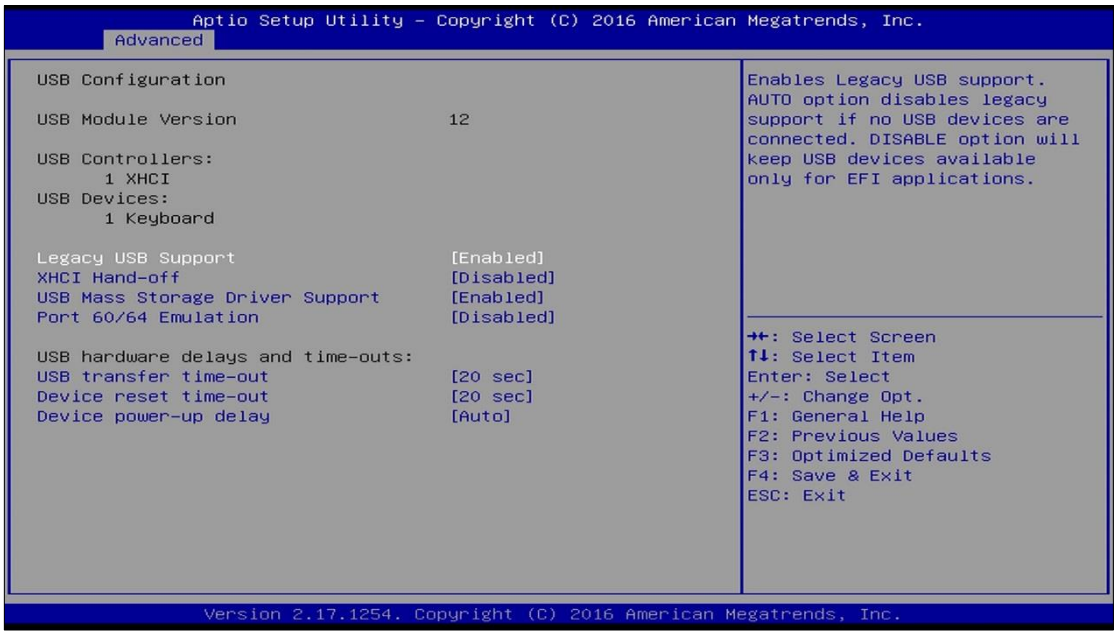
BIOS Setting	Description
SATA Controller(s)	Enables / Disables SATA device.
SATA Mode Selection	Selects IDE / AHCI Mode.
SATA Controller Speed	Selects the SATA controller speed as Default / Gen1 / Gen2 / Gen3.
Serial ATA Port 0~5	Enables / Disables Serial Port 0 ~ 5.
SATA Port 0 ~ 5 HotPlug	Enables / Disables SATA Port 0 ~ 5 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.
INT19 Trap Response	Selects the way that BIOS reacts on INT19 trapping by Option ROM. • **Immediate** executes the trap right away • **Postponed** executes the trap during legacy boot.
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.

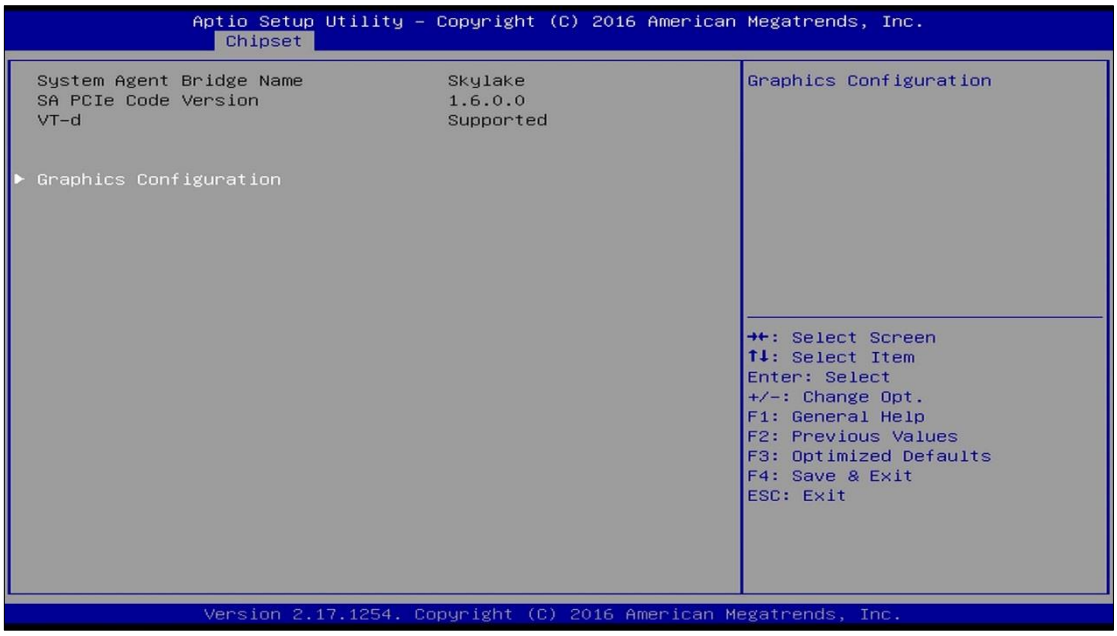
4.4.10 USB Configuration

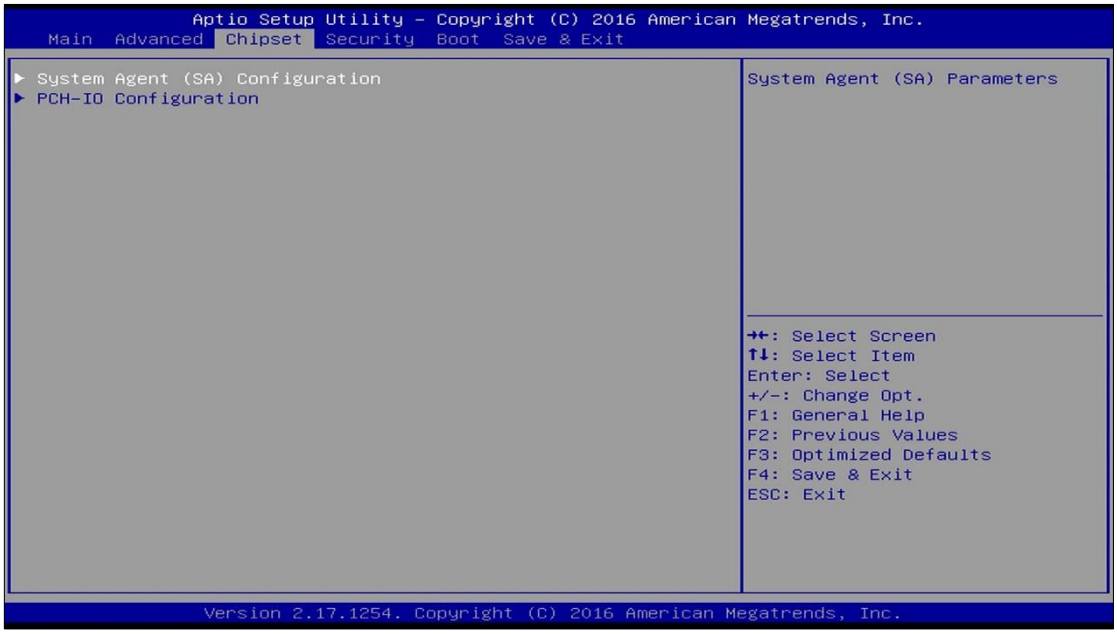


BIOS Setting	Description
Legacy USB Support	Enables / Disables Legacy USB support. • **Auto** disables legacy support if there is no USB device connected. • **Disable** keeps USB devices available only for EFI applications.
XHCI Hand-pff	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enables / Disables USB mass storage driver support.
Port 60/64 Emulation	Enables / Disables 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	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.

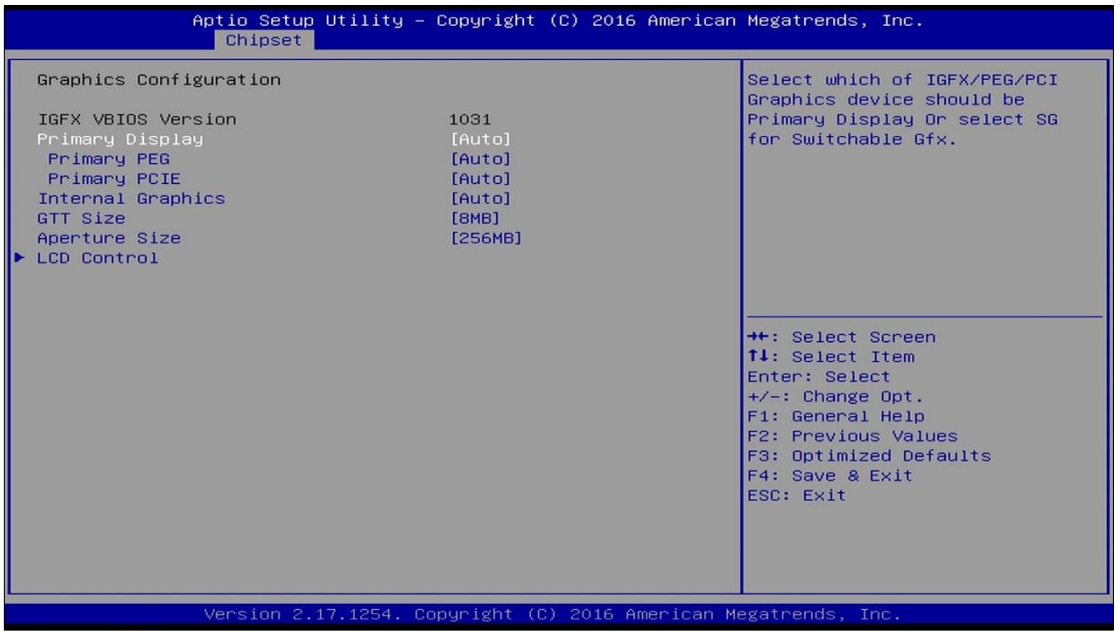
BIOS Setting	Description
Device power-up delay	The maximum time the device will take before it properly reports itself to the Host Controller. **Auto** uses default value. For a Root port, it is 100 ms. For a Hub port, the delay is taken from Hub descriptor.

4.5 Chipset Settings



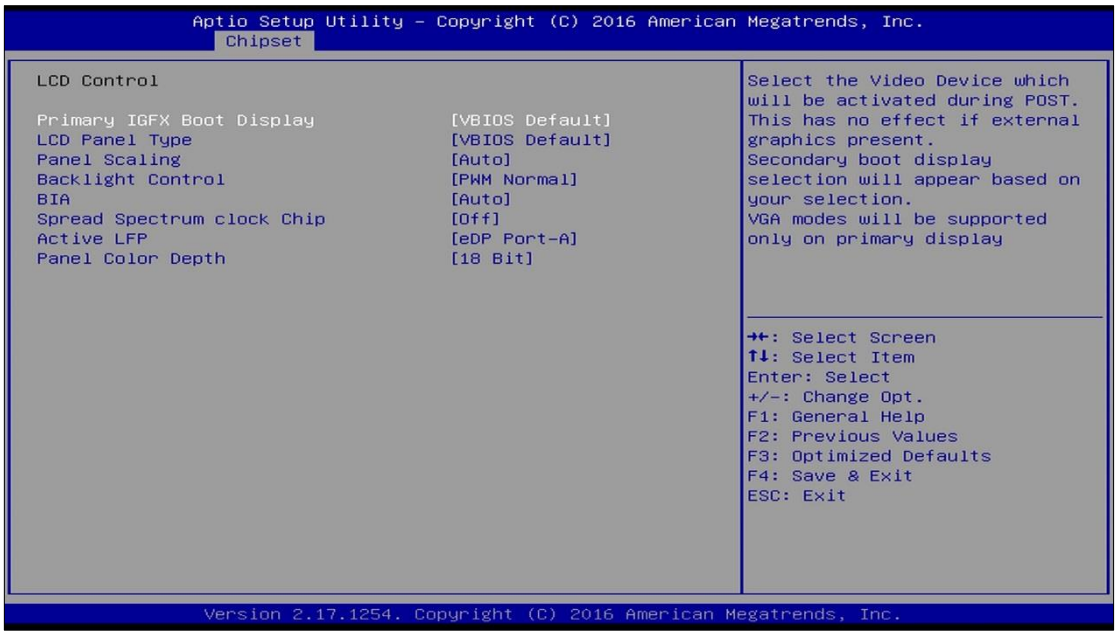


4.5.1 System Agent (SA) Configuration



BIOS Setting	Description
Primary Display	Selects which of IGFX / PEG / PCI Grapihcs device should be primary display or SG for switchable Gfx. Options: Auto, IGFX, PCIE, SG
Primary PEG	Selects PEG0 / PEG1 / PEG2 / PEG3 Graphics device should be primary PEG. Options: Auto, PEG11, PEG12
Primary PCIE	Selects a Graphics device should be the primary PCIE. Options: Auto, PCIE1 ~ PCIE19
Internal Graphics	Enables / Disables the interal graphics. Keep IGFX enabled according to the setup options. Options: Auto, Disabled, Enabled
GTT Size	Selects the size of GTT as 2 / 4 / 8 MB.

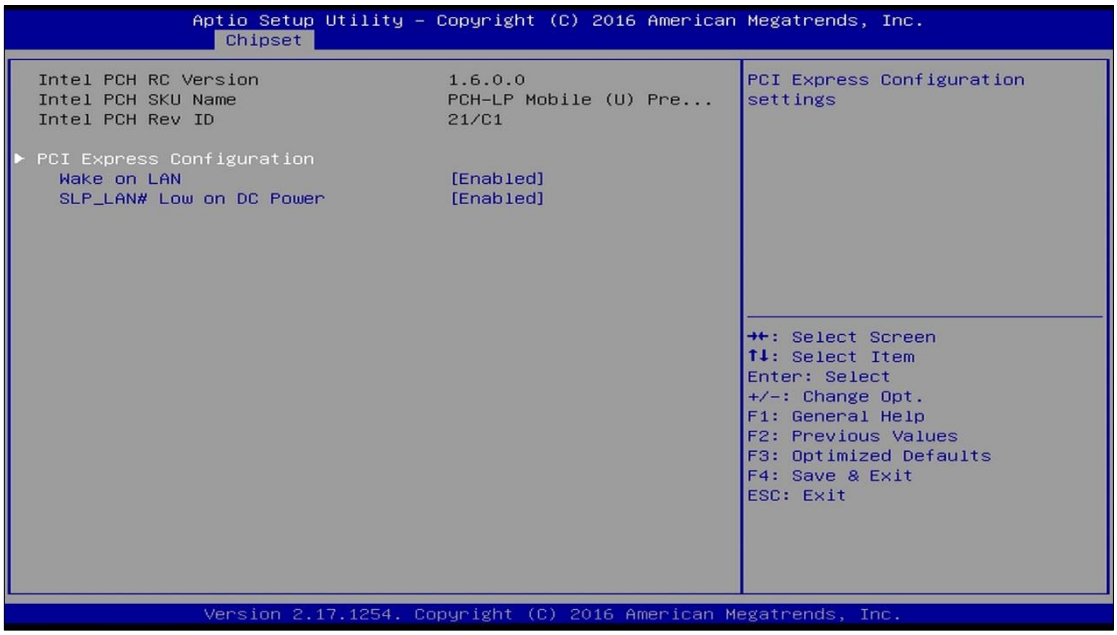
BIOS Setting	Description
Aperture Size	Selects the Aperture Size. Options: 128 / 256 / 512 / 1024 / 2048 / 4096 **Note:** Above 4 GB MMIO BIOS assignment is automatically enabled when selecting 2048 MB aperture. To use this feature, be sure to disable CSM support.
LCD Control	Sets the type, scaling, backlight, and color depth for your LCD panel.



BIOS Setting	Description
Primary IGFX Boot Type	Selects the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display. Options: VBIO Default, CRT, EFP, LFP, EFP3, EFP2, LFP2

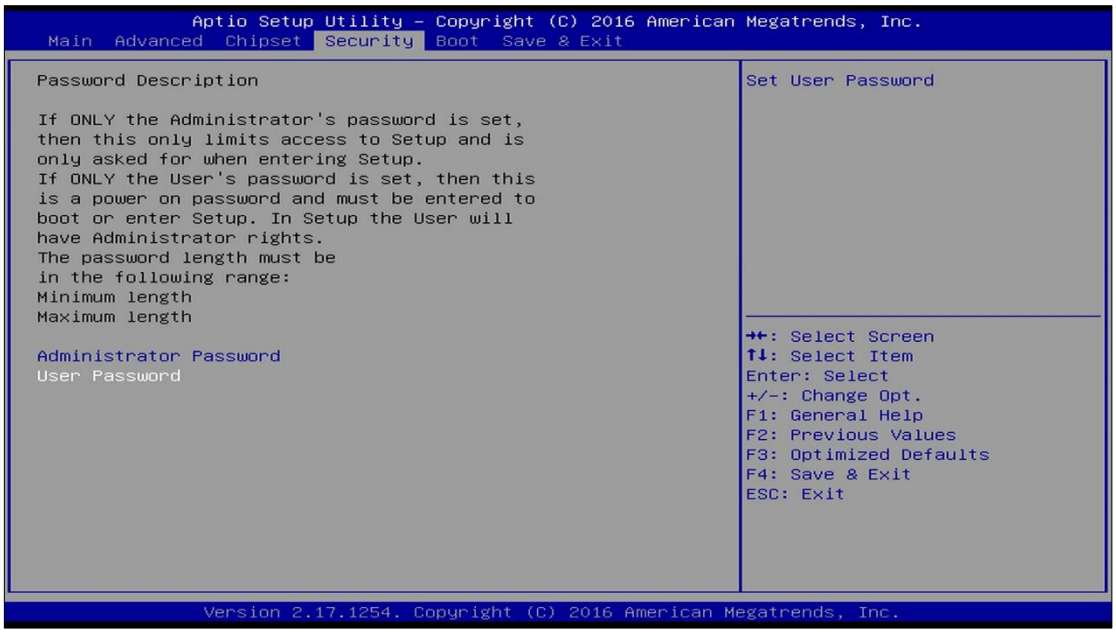
BIOS Setting	Description
LCD Panel Type	Selects a LCD panel type used by the internal graphics device. Options: VBIOS Default, 640 x 480, 800 x 600, 1024 x 678, 1280 x 1024, 1400 x 1050, 1600 x 1200, 1366 x 768, 1680 x 1050, 1920 x 1200, 1440 x 900, 1600 x 900, 1024 x 768, 1280 x 800, 1920 x 1080, 2048 x 1536
Panel Scaling	Selects the LCDS panel scaling option used by the internal graphics device.
Back Light Control	Selects the mode for backlight control: PWM Inverted or PWM Normal.
BIA	• **Auto:** GMCH uses VBT default. • **Disable:** Disables the function. • **Level 1 ~ 5:** Enablses with the selected aggressiveness level.
Spread Specturm clock Chiop	• **Off:** Disables spread control. • **Hardware:** Spread is controlled by chip. • **Software:** Spread is controlled by BIOS.
Active LFP	Configures the LFP usage. Options: No LVDS, eDP Port A, eDP Port D
Panel Color Depth	Selects the LFP panel color depth as 18 or 24 bit.

4.5.2 PCH-IO Configuration



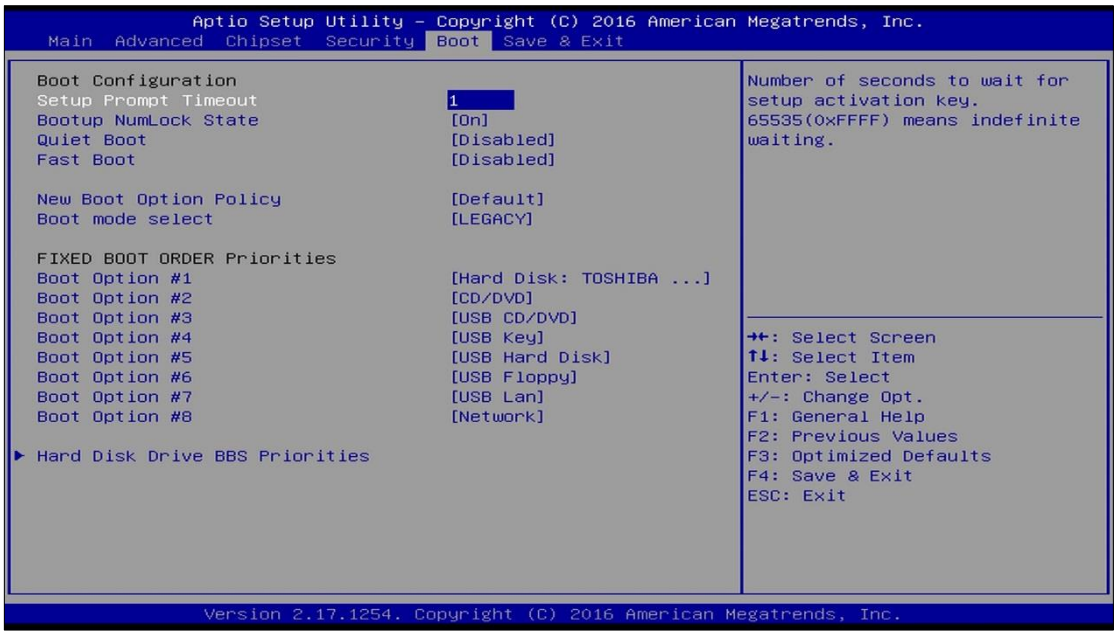
BIOS Setting	Description
Wake on LAN	Enables / Disables integrated LAN to wake the system. (The Wake on LAN cannot be disabled if ME is at Sx state.)
SLP_LAN# Low on DC Power	Enables / Disables SLP_LAN# Low on DC Power.

4.6 Security Settings



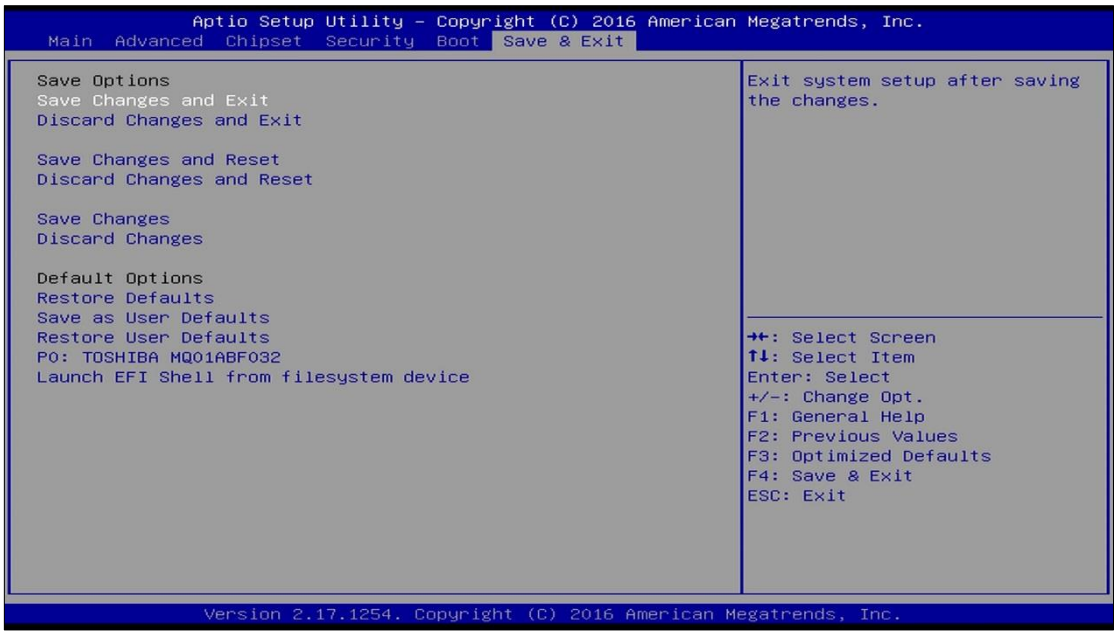
BIOS Setting	Description
Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.

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.
New Boot Option Policy	Controls the placement of newly detected UEFI boot options. Options: Default, Place First, Place Last
Boot mode select	Selects a Boot mode, Legacy / UEFI.
Boot Option Priorities	Sets the system boot order priorities for hard disk, CD/DVD, USB, Network.
Option ROM Messages	Sets a display mode, Force BIOS or Keep Current, for Option ROM.
Interrupt 19 Capture	Allows Option ROMs to trap Interrupt 19.

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
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
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A20-0x00000A2F	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
0x00000070-0x00000070	Motherboard resources

Address	Device Description
0x00000070-0x00000070	System CMOS/real time clock
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x00001854-0x00001857	Motherboard resources
0x0000F000-0x0000F03F	Intel(R) HD Graphics 520
0x000003B0-0x000003BB	Intel(R) HD Graphics 520
0x000003C0-0x000003DF	Intel(R) HD Graphics 520
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x0000F0A0-0x0000F0A7	Intel(R) Active Management Technology - SOL (COM5)
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x0000E000-0x0000EFFF	Intel(R) 100 Series Chipset Family PCI Express Root Port #11 - 9D1A
0x0000F040-0x0000F05F	Intel(R) 100 Series Chipset Family SMBUS - 9D23
0x0000FF00-0x0000FFFE	Motherboard resources
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x0000F090-0x0000F097	Standard SATA AHCI Controller

Address	Device Description
0x0000F080-0x0000F083	Standard SATA AHCI Controller
0x0000F060-0x0000F07F	Standard SATA AHCI Controller

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	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 5	Communications Port (COM3)
IRQ 7	Communications Port (COM4)
IRQ 8	System CMOS/real time clock
IRQ 11	Intel(R) 100 Series Chipset Family Integrated Sensor Hub - 9D35
IRQ 11	Intel(R) 100 Series Chipset Family SMBUS - 9D23
IRQ 11	Intel(R) 100 Series Chipset Family Thermal subsystem - 9D31
IRQ 12	Microsoft PS/2 Mouse
IRQ 14	Motherboard resources
IRQ 16	High Definition Audio Controller
IRQ 19	Intel(R) Active Management Technology - SOL (COM5)
IRQ 54 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967283	Intel(R) Management Engine Interface
IRQ 4294967284	Intel(R) I211 Gigabit Network Connection
IRQ 4294967285	Intel(R) I211 Gigabit Network Connection
IRQ 4294967286	Intel(R) I211 Gigabit Network Connection
IRQ 4294967287	Intel(R) I211 Gigabit Network Connection
IRQ 4294967288	ASMedia USB3.1 eXtensible Host Controller
IRQ 4294967289	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967290	Intel(R) HD Graphics 520
IRQ 4294967291	Intel(R) Ethernet Connection I219-LM

Level	Function
IRQ 4294967292	Standard SATA AHCI Controller
IRQ 4294967293	Intel(R) 100 Series Chipset Family PCI Express Root Port #11 - 9D1A
IRQ 4294967294	Intel(R) 100 Series Chipset Family PCI Express Root Port #1 - 9D10

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

```
//---------------------------------------------------------------------------
//
// 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.
//
//---------------------------------------------------------------------------
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "F81866.H"
//---------------------------------------------------------------------------
int main (int argc, char *argv[]); void EnableWDT(int);
void DisableWDT(void);
//---------------------------------------------------------------------------
int main (int argc, char *argv[])
{
	unsigned char bBuf;
	unsigned char bTime;
	char **endptr;

	char SIO;
	printf("Fintek 81866 watch dog program\n");
	SIO = Init_F81866();
	if (SIO == 0)
	{
		printf("Can not detect Fintek 81866, program abort.\n");
		return(1);
	}//if (SIO == 0)

	if (argc != 2)
	{
		printf(" Parameter incorrect!!\n");
		return (1);
	}
```

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

        if (bTime)
        {       EnableWDT(bTime); }
        else
        {       DisableWDT();  }
        return 0;
}
//-------------------------------------------------------------------------
void EnableWDT(int interval)
{
        unsigned char bBuf;

        bBuf = Get_F81866_Reg(0x2B);
        bBuf &= (~0x20);
        Set_F81866_Reg(0x2B, bBuf);             //Enable WDTO

        Set_F81866_LD(0x07);                    //switch to logic device 7
        Set_F81866_Reg(0x30, 0x01);             //enable timer

        bBuf = Get_F81866_Reg(0xF5);
        bBuf &= (~0x0F);
        bBuf |= 0x52;
        Set_F81866_Reg(0xF5, bBuf);             //count mode is second
        Set_F81866_Reg(0xF6, interval);         //set timer
        bBuf = Get_F81866_Reg(0xFA);
        bBuf |= 0x01;
        Set_F81866_Reg(0xFA, bBuf);             //enable WDTO output

        bBuf = Get_F81866_Reg(0xF5);
        bBuf |= 0x20;
        Set_F81866_Reg(0xF5, bBuf);             //start counting
}
//-------------------------------------------------------------------------
void DisableWDT(void)
{
        unsigned char bBuf;
        Set_F81866_LD(0x07);                    //switch to logic device 7
        bBuf = Get_F81866_Reg(0xFA);
        bBuf &= ~0x01;
        Set_F81866_Reg(0xFA, bBuf);             //disable WDTO output

        bBuf = Get_F81866_Reg(0xF5);
        bBuf &= ~0x20;
        bBuf |= 0x40;
        Set_F81866_Reg(0xF5, bBuf);             //disable WDT
}
//-------------------------------------------------------------------------
```

```
//---------------------------------------------------------------------------
//
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// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A
PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#include "F81866.H"
#include <dos.h>
//---------------------------------------------------------------------------
unsigned int F81866_BASE; void Unlock_F81866 (void); void Lock_F81866 (void);
//---------------------------------------------------------------------------
unsigned int Init_F81866(void)
{
	unsigned int result;
	unsigned char ucDid;

	F81866_BASE = 0x4E;
	result = F81866_BASE;

	ucDid = Get_F81866_Reg(0x20);
	if (ucDid == 0x07)			//Fintek 81866
	{	goto Init_Finish;}

	F81866_BASE = 0x2E;
	result = F81866_BASE;

	ucDid = Get_F81866_Reg(0x20);
	if (ucDid == 0x07)			//Fintek 81866
	{	goto Init_Finish;}

	F81866_BASE = 0x00;
	result = F81866_BASE;

Init_Finish:
	return (result);
}
//---------------------------------------------------------------------------
void Unlock_F81866 (void)
{
	outportb(F81866_INDEX_PORT, F81866_UNLOCK);
	outportb(F81866_INDEX_PORT, F81866_UNLOCK);
}
//---------------------------------------------------------------------------
void Lock_F81866 (void)
{
	outportb(F81866_INDEX_PORT, F81866_LOCK);
}
//---------------------------------------------------------------------------
void Set_F81866_LD( unsigned char LD)
{
	Unlock_F81866();
```

```
        outportb(F81866_INDEX_PORT, F81866_REG_LD);
        outportb(F81866_DATA_PORT, LD); Lock_F81866();
}
//----------------------------------------------------------------------------
void Set_F81866_Reg( unsigned char REG, unsigned char DATA)
{
        Unlock_F81866();
        outportb(F81866_INDEX_PORT, REG);
        outportb(F81866_DATA_PORT, DATA);
        Lock_F81866();
}
//----------------------------------------------------------------------------
unsigned char Get_F81866_Reg(unsigned char REG)
{
        unsigned char Result;
        Unlock_F81866();
        outportb(F81866_INDEX_PORT, REG);
        Result = inportb(F81866_DATA_PORT);
        Lock_F81866();
        return Result;
}
//----------------------------------------------------------------------------
```

```
//----------------------------------------------------------------------------
//
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// PURPOSE.
//
//----------------------------------------------------------------------------
#ifndef        F81866_H
#define        F81866_H     1
//----------------------------------------------------------------------------
#define     F81866_INDEX_PORT      (F81866_BASE)
#define     F81866_DATA_PORT       (F81866_BASE+1)
//----------------------------------------------------------------------------
#define     F81866_REG_LD      0x07
//----------------------------------------------------------------------------
#define F81866_UNLOCK 0x87
#define     F81866_LOCK  0xAA
//----------------------------------------------------------------------------
unsigned int Init_F81866(void);
void Set_F81866_LD( unsigned char);
void Set_F81866_Reg( unsigned char, unsigned char); unsigned char
Get_F81866_Reg( unsigned char);
//----------------------------------------------------------------------------
#endif //     F81866_H
```