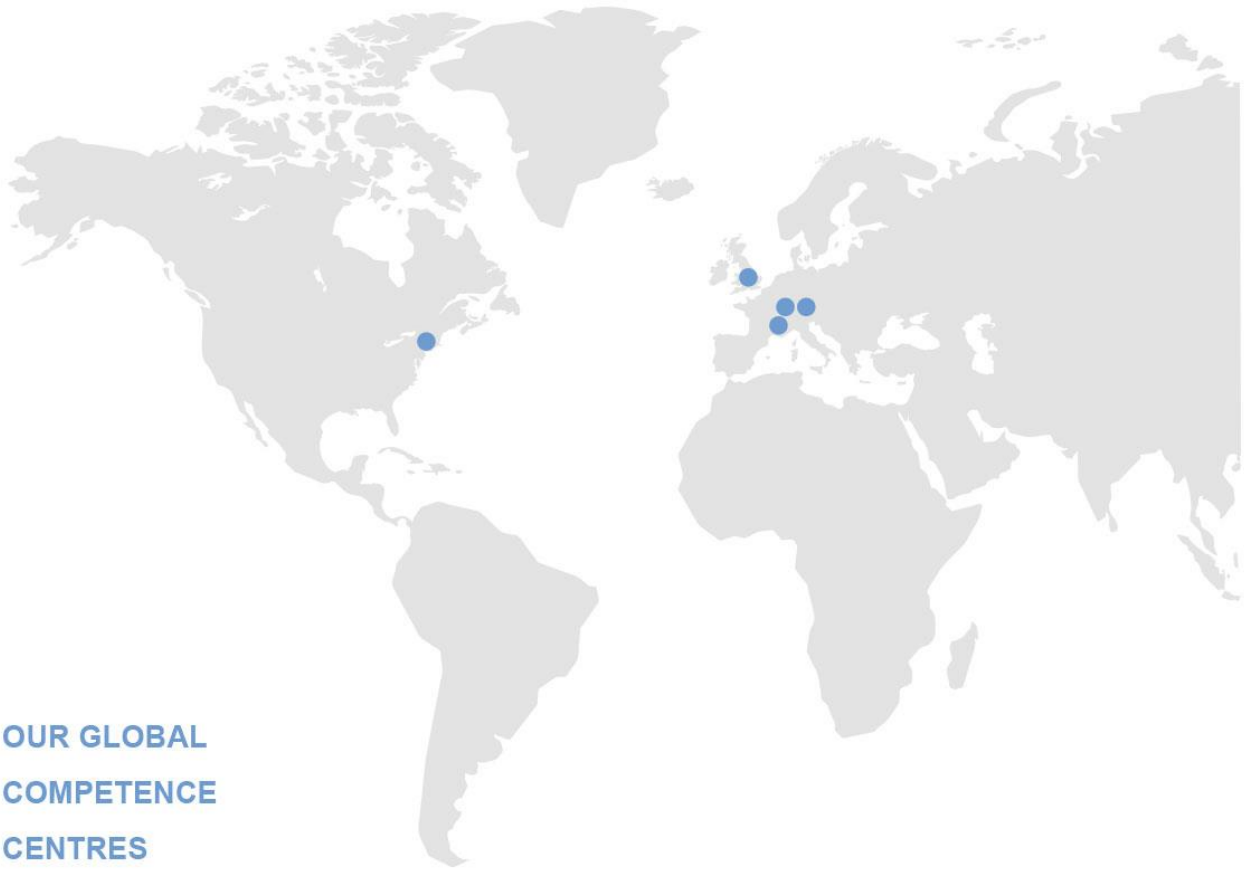
FORTEC
ELEKTRONIK AG



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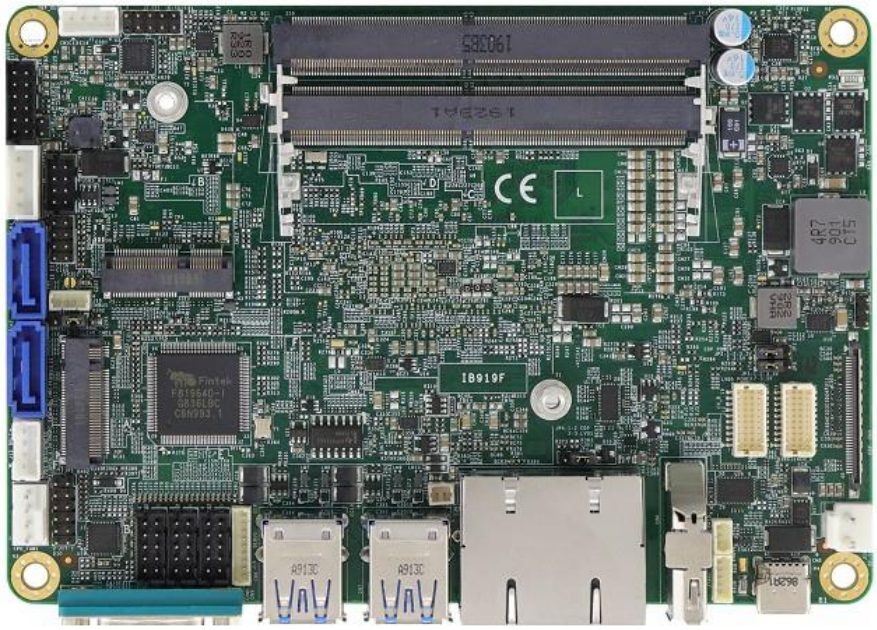
Manual

iBASE

IB919

Industrial 3,5“Single-Board Computer with 8th Gen. Intel®Core™i U-Series processor



IB919 Series

Intel® 8th Gen. Core™
U-series / Celeron® SoC
3.5" Disk-Size SBC

User's Manual

Version 1.0A
(March 2020)

Compliance

CE

This product has passed CE Class B tests for environmental specifications and limits. This product is in accordance with the directives of the European Union (EU). In a domestic environment, this product may cause radio interference in which case users may be required to take adequate measures.

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 board.

Environmental conditions:

- Use this product in environments with ambient temperatures between 0˚C and 60˚C.
- Do not leave this product in an environment where the storage temperature may be below -20° C or above 80° C. To prevent from damages, the product must be used in a controlled environment.

Care for your IBASE products:

- Before cleaning the PCB, unplug all cables and remove the battery.
- Clean the PCB with a circuit board cleaner or degreaser, or use cotton swabs and alcohol.
- Vacuum the dust with a computer vacuum cleaner to prevent the fan from being clogged.

WARNING

Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on this product.
- Do not place heavy objects on the top of this product.

Anti-static precautions

- Wear an anti-static wrist strap to avoid electrostatic discharge.
- Place the PCB on an anti-static kit or mat.
- Hold the edges of PCB when handling.
- Touch the edges of non-metallic components of the product instead of the surface of the PCB.
- Ground yourself by touching a grounded conductor or a grounded bit of metal frequently to discharge any static.

CAUTION

There is danger of explosion if the 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 or recycle them at a local recycling facility or battery collection point.

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, CPU cooler, memory, storage devices, power adapter, panel and touchscreen.

* PRODUCTS, HOWEVER, THAT FAIL 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.

Table of Contents

Chapter 1
General Information

The information provided in this chapter includes:

- Features
- Packing List
- Optional Accessories
- Specifications
- Block Diagram
- Board Overview
- Board Dimensions

1.1 Introduction

- IB919 series is a 3.5” disk-size single board computer based on the platform of Intel® 8th Gen. Core™ U-series or Celeron® processor. It features both HDMI and Display Port at I/O coastline, and onboard headers for dual channel LVDS interface for video display. Advanced features include four USB 3.0, two SATA III, configurable watchdog timer, digital I/O, and TPM 2.0.

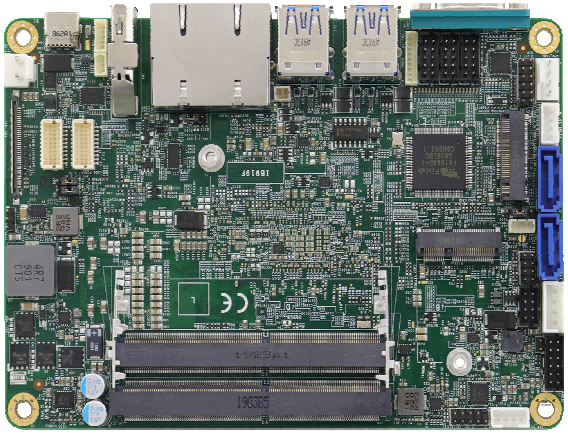


Photo of IB919

1.2 Features

- 3.5” disk-size SBC with Intel® 8th Gen. Core™ U-series or Celeron® processor
- 2 x DDR4-2400/2133 SO-DIMM slots, expandable up to 32 GB
- Video output through LVDS or EDP connector, Display Port, and USB Type C
- 2 x GbE LAN ports, 2 x USB 2.0, 4 x USB 3.0, 4 x COM, 2 x SATA III, 1 x M.2 (M-Key), 1 x M.2 (E-Key)
- Configurable watchdog timer, digital I/O, TPM 2.0

1.3 Packing List

Your IB919 package should include the items listed below. If any of the items below is missing, contact the distributor or dealer from whom you purchased the product.

- IB919 SBC x 1
- Disk x 1
  (including chipset drivers and flash memory utility)
- This User's Manual x 1

1.4 Optional Accessories

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

- Cable Kit (IB76A-1)

  Including:
  DC-In power cable (PW87) x 1
  COM ports cable (PK1H) x 1
  SATA & HDD power cable (SATA-53A) x 1
  USB 2.0 cable (USB29) x 1
- Audio cable (Audio-18)
- Heat spreader (HSIB919-A)

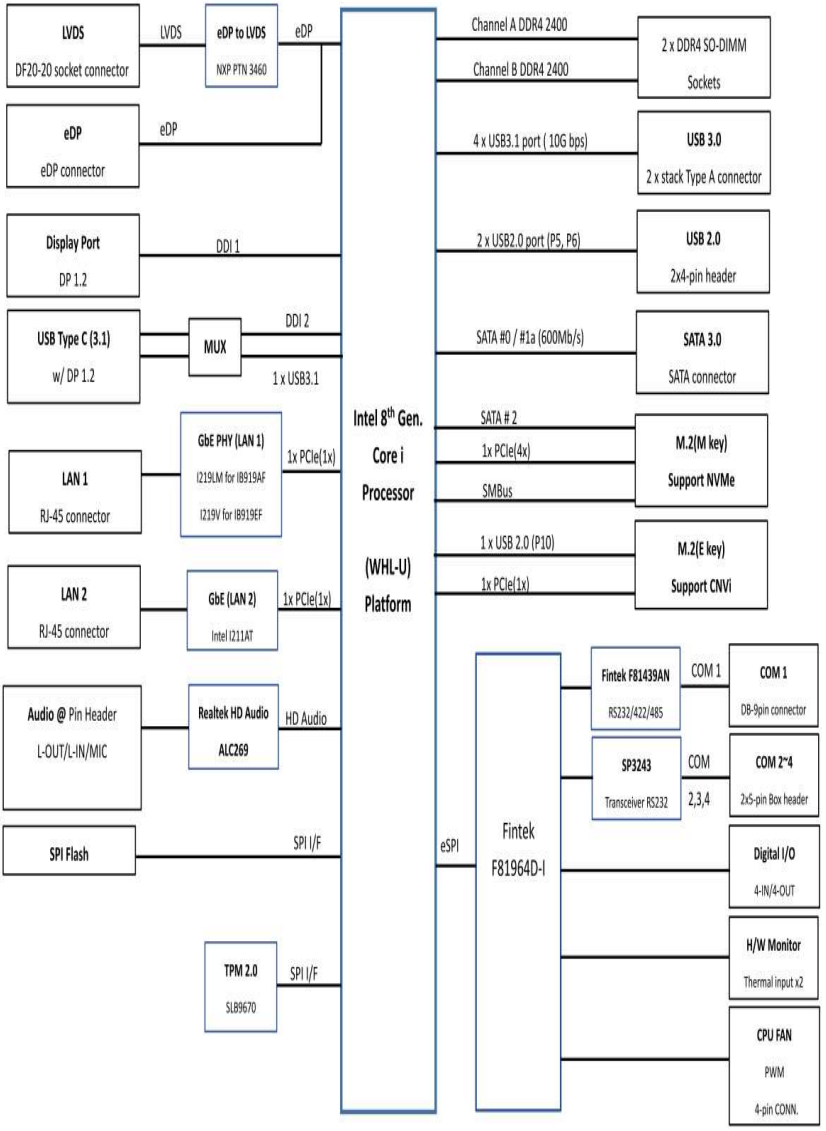
1.5 Specifications

Product Name	IB919AF-8665	IB919AF-8365	IB919EF-8145	IB919EF-4305
Form Factor	3.5" disk-size SBC			
System				
Operating System	• Windows 10 • Linux Ubuntu / Fedora			
CPU Type	Intel® 8th Gen. Core™ i7-8665UE	Intel® 8th Gen. Core™ i5-8365UE	Intel® 8th Gen. Core™ i3-8145UE	Intel® Celeron® 4305UE
CPU Speed	1.7 GHz / 4.4 GHz	1.6 GHz / 4.1 GHz	2.2 GHz / 3.9 GHz	2.0 GHz
Cache	8MB, 6MB, 4MB, 2MB			
Chipset	Integrated in Intel® U-series processor			
Memory	2 x DDR4-2400/2133 SO-DIMM, expandable up to 32 GB (Non-ECC)			
Storage	M.2 socket x 1(M-Key, type 2280) SSD			
Graphics	Intel® 8th Gen. Core™ U-series integrated graphics			
Network	Intel® I219LM & I211AT		Intel® I219V & I211AT	
Super I/O	Fintek F81964D-I			
Audio Codec & Controller	Intel® U-series processor built-in HD audio controller Realtek ALC269Q codec			
Power Requirement	9 ~ 24V DC-In			
iAMT	12.X		N/A	
USB Type C	USB 3.1 (Gen.2)			
TPM	2.0			
RAID	Yes			
Watchdog Timer	Yes (256 segments, 0, 1, 2…255 sec / min)			

BIOS	AMI BIOS
H/W Monitor	Yes
Dimensions	102.22 x 147.01 mm (4.02” x 5.8”)
RoHS	Yes
Certification	CE, FCC Class B
I/O Ports	
Display	• 1 x USB Type C (DisplayPort 1.2) 3840 x 2160 at 60Hz • 1 x DisplayPort (1.2) 3840 x 2160 at 60 Hz • 1 x dual-channel LVDS,1920 x 1080 at 60 Hz or EDP (1.4) 4096 x 2304 at 60 Hz
LAN	2 x RJ45 GbE LAN
USB	• **4 x USB 3.1:** I/O coastline connectors • **2 x USB 2.0:** via an on-board pin headers
Serial	**4 x COM ports:** • COM1: RS-232/422/485 (I/O coastline DB9 connector, jumper-less selection) • COM2, COM3, COM4: RS-232 only (via on-board box-headers)
SATA	2 x SATA III
Audio	On-board audio connector for Line-In, Line-Out, and Mic-In
Digital IO	4-In & 4-Out
Expansion Slots	M.2 socket x 1(M-Key, type 2280), M.2 socket x 1(E-Key, type 2230)
Environment	
Temperature	• Operation: 0 ~ 60 °C (32 ~ 140 °F) • Storage: -20 ~ 80 °C (-4 ~ 176 °F)
Relative Humidity	0 ~ 90 %, non-condensing at 60 °C

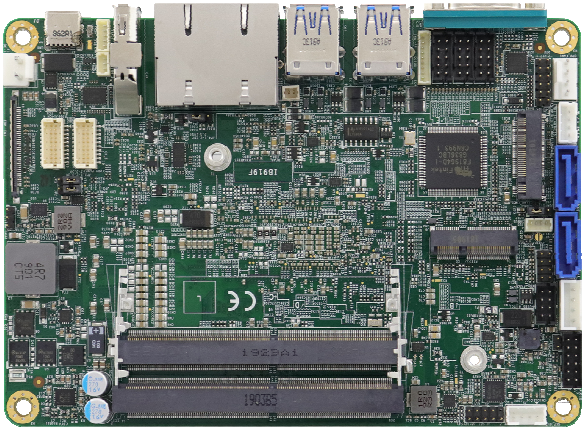
All specifications are subject to change without prior notice.

1.6 Block Diagram

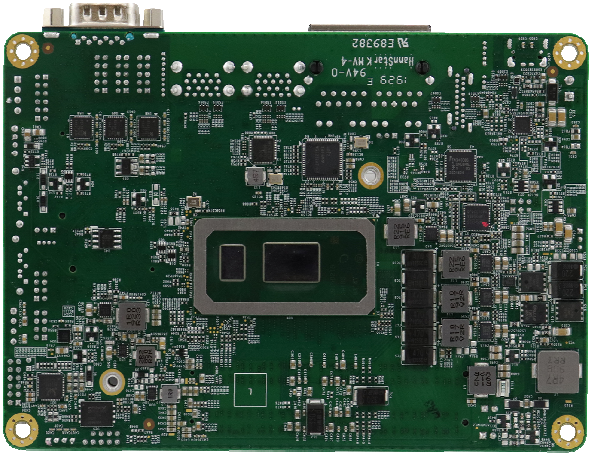


1.7 Overview

Top View



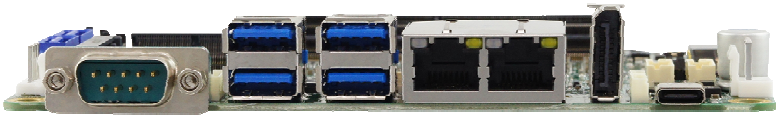
Bottom View



Photos of IB919

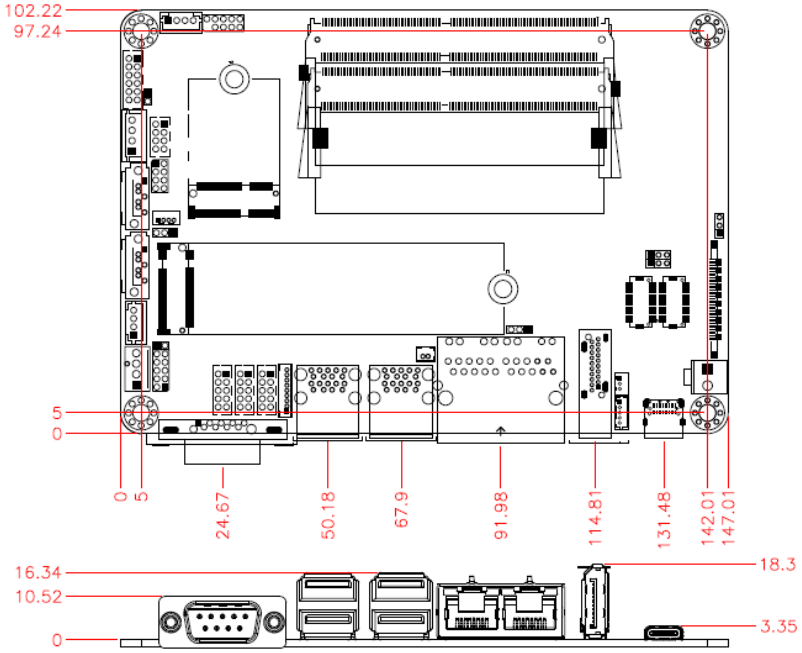
* The photos above are for reference only. Some minor components may differ.

I/O View



No.	Name	No.	Name
1	COM1 RS-232/422/485 Port	4	Display Port
2	USB 3.0 Ports	5	USB Type-C
3	LAN Port		

1.8 Dimensions



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Chapter 2
Hardware Configuration

This section provides information on jumper settings and connectors on the IB919 in order to set up a workable system. On top of that, you will also need to install crucial pieces such as the CPU and the memory before using the product. The topics covered are:

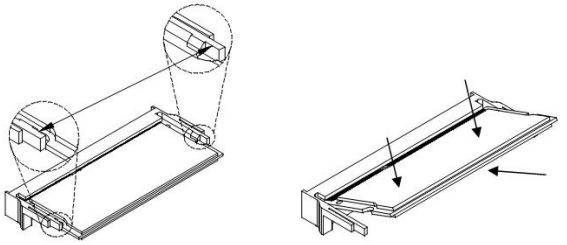
- Essential installations before you begin
- Jumper and connector locations
- Jumper settings and information of connectors

2.1 Essential Installations Before You Begin

Follow the instructions below to install the memory.

2.1.1 Installing the Memory

The IB919 series supports two DDR4 memory sockets for a maximum total memory of 32 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 insert 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.

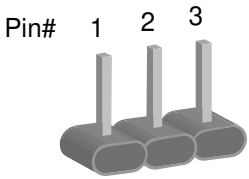
To remove the module, press the clips outwards with both hands, and the module will pop-up.

2.2 Setting the Jumpers

Set up and configure your IB919 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

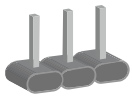
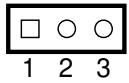
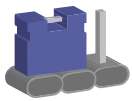
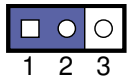
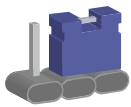
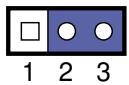
Jumpers are short-length conductors consisting of several metal pins with a non-conductive base mounted on the circuit board. Jumper caps are used to have the functions and features enabled or disabled. If a jumper has 3 pins, you can connect either PIN1 to PIN2 or PIN2 to PIN3 by shorting.



A 3-pin jumper

A jumper cap

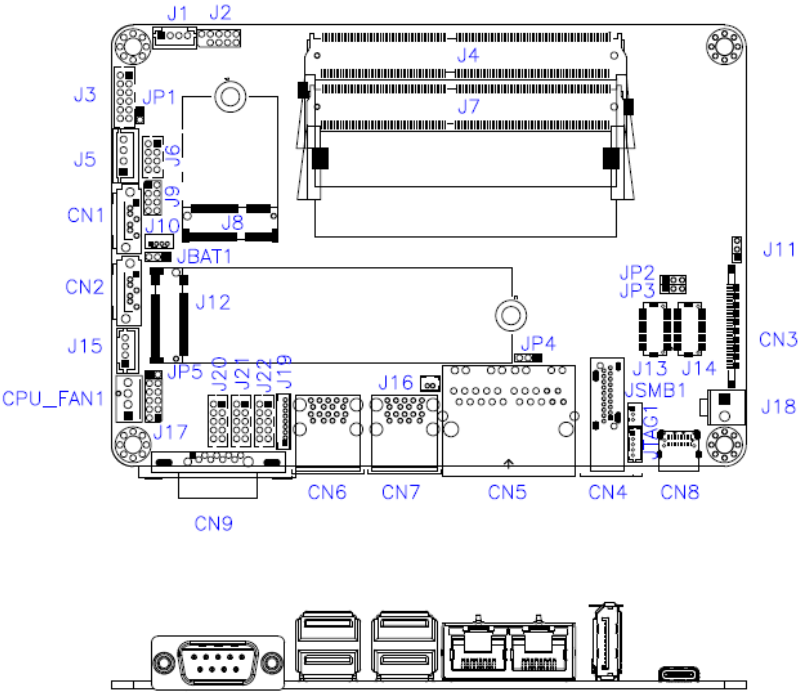
Refer to the illustration below to set jumpers.

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

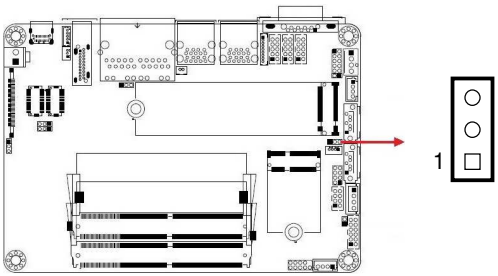


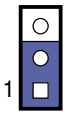
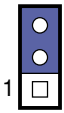
Board diagram of IB919

2.4 Jumpers Quick Reference

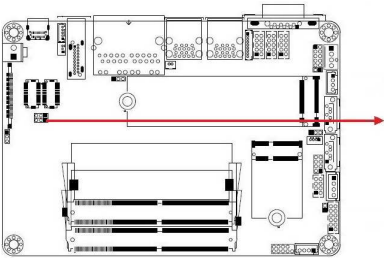
Function	Jumper Name	Page
CMOS Data Clearance	JBAT1	15
EDP Panel Power Selections	JP2	16
LVDS Panel Power / Brightness Selections	JP3(For power) / JP5 (For brightness)	16
EDP / LVDS Selections	JP4	17
Factory Use Only	JP1	- -

2.4.1 CMOS Data Clearance (JBAT1)



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

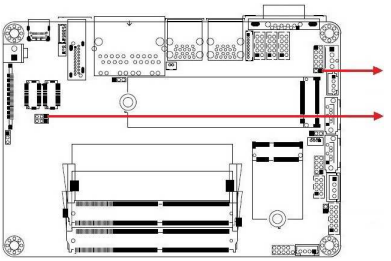
2.4.2 EDP Panel Power Selections (JP2)



JP2: 1

Jumper	Function	Pin closed	Illustration
JP2	3.3V (default)	1-2	1
	5V	2-3	1

2.4.3 LVDS Panel Power / Brightness Selections (JP3 / JP5)

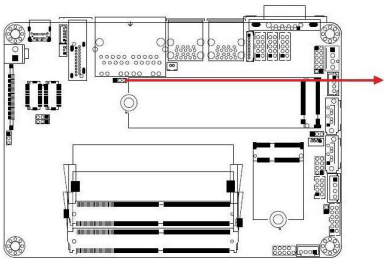


JP5: 1

JP3: 1

Jumper	Function	Pin closed	Illustration
JP3	3.3V (default)	1-2	1
	5V	2-3	1
JP5	3.3V (default)	Open	1
	5V	Close	1

2.4.4 EDP / LVDS Selections (JP4)



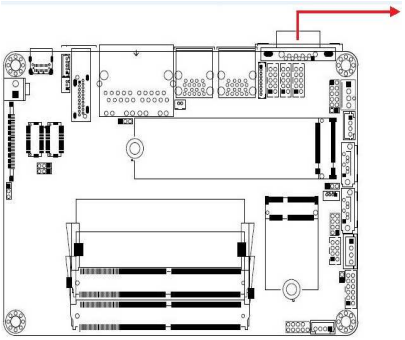
JP4:

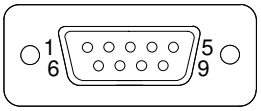
Jumper	Function	Pin closed	Illustration
JP4	EDP (default)	1-2	1 
	LVDS	2-3	1 

2.5 Connectors Quick Reference

Function	Connector Name	Page
COM1 RS-232/422/485 Port	CN9	19
Amplify Connector	J1	19
Audio Connector	J3	20
SATA HDD Power Connector	J5	21
SMBUS Connector	J10	21
Front Panel Setting Connector	J9	22
USB 2.0 Connector	J6	23
Battery Connector	J16	23
COM 2, COM3, COM4 RS-232 Ports	J20, J21, J22	24
DC Power Input Connector	J18	24
Digital I/O Connector	J17	25
LCD Backlight Connector	J15	25
LVDS Connectors	J14 (1st channel), J13 (2nd channel)	26
CPU Fan connector	CPU_FAN1	26
SATA III Port	CN1, CN2	- -
Display Port	CN4	- -
GbE LAN Ports	CN5	- -
USB 3.0 Port	CN6, CN7	- -
USB Type-C	CN8	- -
DDR4 SO-DIMM Slot	J4, J7	- -
M.2 E-Key / M.2 M-KEY	J8, J12	- -
Factory Use Only	J2, J19, J11	- -

2.5.1 COM1 RS-232/422/485 Port (CN9)



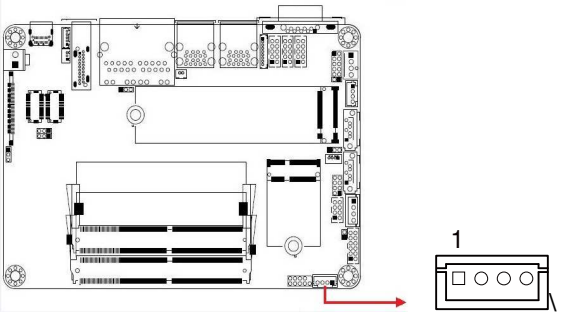


COM1 port is jumper-less and configurable in BIOS.

Pin	Assignment	Pin	Assignment
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		

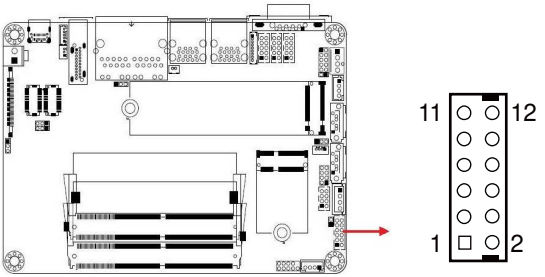
Pin	Assignment		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

2.5.2 Amplify Connector (J1)



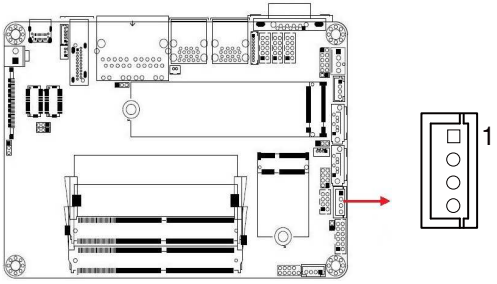
Pin	Assignment	Pin	Assignment
1	SPK_L+	3	SPK_R-
2	SPK_L-	4	SPK_R+

2.5.3 Audio Connector (J3)



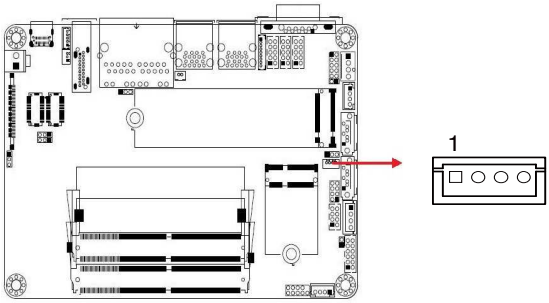
Pin	Assignment	Pin	Assignment
1	Lineout_L	2	Lineout_R
3	JD_FRONT	4	Ground
5	LINEIN_L	6	Linein_R
7	JD_LINEIN	8	Ground
9	MIC_L	10	MIC-R
11	JD_MIC1	12	Ground

2.5.4 SATA HDD Power Connector (J5)



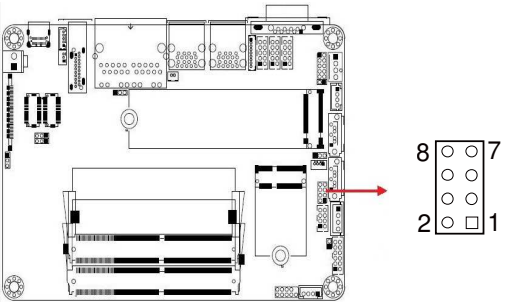
Pin	Assignment	Pin	Assignment
1	+5V	3	Ground
2	Ground	4	+12V

2.5.5 SMBUS Connector (J10)



Pin	Assignment	Pin	Assignment
1	+3.3V	3	SMB_DATA
2	SMB_CLK-	4	Ground

2.5.6 Front Panel Connector (J9)



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

J9 is utilized for system indicators to provide light indication of the computer activities and switches to change the computer status. It provides interfaces for the following functions.

- **ATX Power ON Switch (Pins 1 and 2)**

  The 2 pins makes an “ATX Power Supply On/Off Switch” for the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will power off the system.

- **Hard Disk Drive LED Connector (Pins 3 and 4)**

  This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.

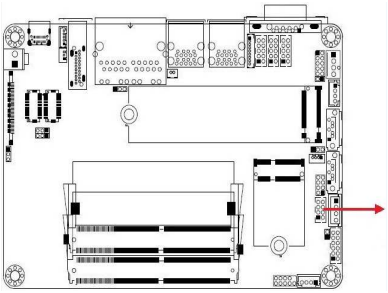
- **Reset Switch (Pins 5 and 6)**

  The reset switch allows you to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.

- **Power LED: Pins 7 and 8**

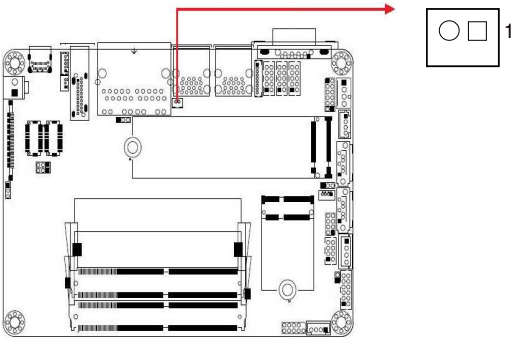
  This connector connects to the system power LED on control panel. This LED will light when the system turns on.

2.5.7 USB 2.0 Connector (J6)



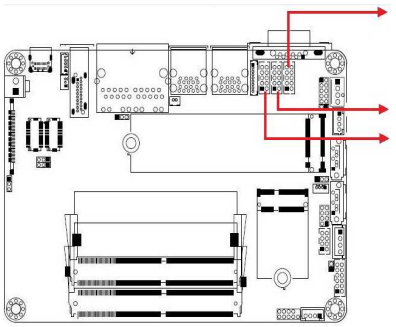
Pin	Assignment	Pin	Assignment
1	VCC	2	Ground
3	D0-	4	D1+
5	D0+	6	D1-
7	Ground	8	VCC

2.5.8 Battery Connector (J16)



Pin	Assignment
1	Battery+
2	Ground

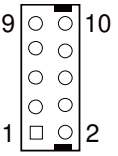
2.5.9 COM2, COM3, COM4 RS-232 Ports (J20, J21, J22)



J20 (COM2):

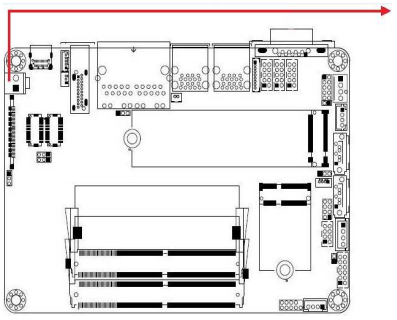
J21 (COM3):

J22 (COM4):



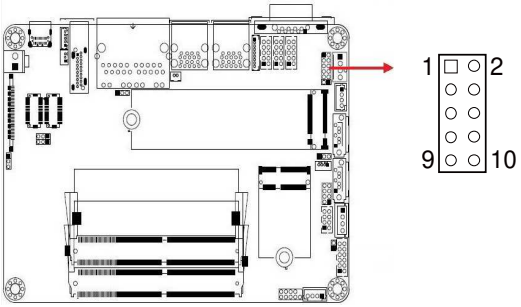
Pin	Assignment	Pin	Assignment
1	DCD, Data carrier detect	2	RXD, Receive data
3	TXD, Transmit data	4	DTR, Data terminal ready
5	Ground	6	DSR, Data set ready
7	RTS, Request to send	8	CTS, Clear to send
9	RI, Ring indicator	10	Not Used

2.5.10 DC Power Input Connector (J18)



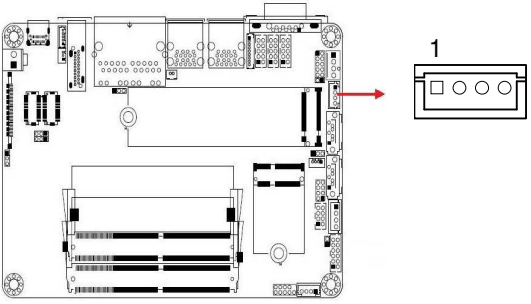
Pin	Assignment
1	+9V ~ +24V
2	Ground

2.5.11 Digital I/O Connector (J17)



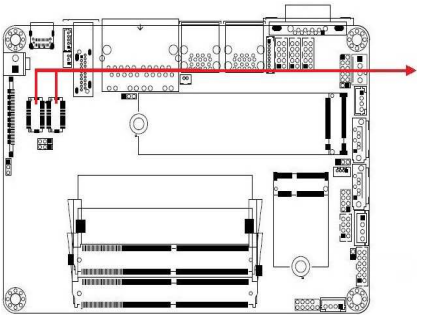
Pin	Assignment	Pin	Assignment
1	Ground	2	VCC
3	OUT3	4	OUT1
5	OUT2	6	OUT0
7	IN3	8	IN1
9	IN2	10	IN0

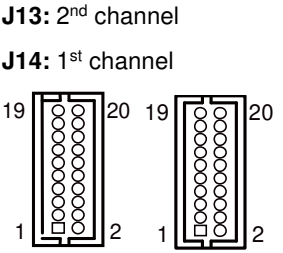
2.5.12 LCD Backlight Connector (J15)



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

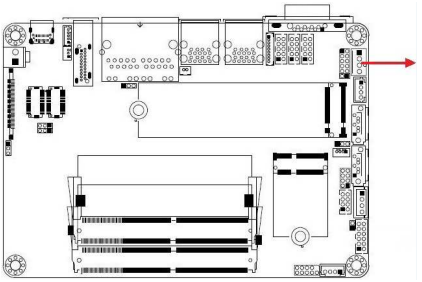
2.5.13 LVDS Connector (J14, J13)

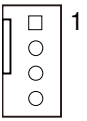




Pin	Assignment	Pin	Assignment
1	TX0P	2	TX0N
3	Ground	4	Ground
5	TX1P	6	TX1N
7	Ground	8	Ground
9	TX2P	10	TX2N
11	Ground	12	Ground
13	CLKP	14	CLKN
15	Ground	16	Ground
17	TX3P	18	TX3N
19	Power	20	Power

2.5.14 CPU Fan Connector (CPU_FAN1)





Pin	Assignment	Pin	Assignment
1	Ground	3	CPU Fan In
2	12V	4	CPU Fan Out

Chapter 3
Drivers Installation

This chapter introduces installation of the following drivers:

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

3.1 Introduction

This section describes the installation procedures for software and drivers. The software and drivers are included with the motherboard. If you find anything missing, please contact the distributor where you made the purchase. The contents of this section include the following:

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 Intel chipset components. Follow the instructions below to complete the installation.

1. Insert the disk enclosed in the package with the board. Click **Intel** on the left pane and then **Intel(R) Whiskeylake-U Chipset Drivers** on the right pane.

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

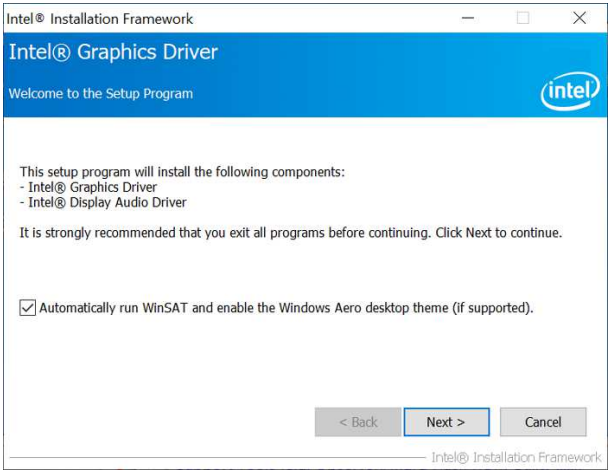
3. When the *Welcome* screen to the Intel® Chipset Device Software appears, click **Next** to continue.
4. Accept the software license agreement and proceed with the installation process.
5. On the *Readme File Information* screen, click **Install**.
6. After the installation, click **Finish** to complete the setup process.

3.3 VGA Driver Installation

1. Insert the disk enclosed in the package with the board. Click **Intel** on the left pane and then **Intel(R) Whiskeylake-U Chipset Drivers** on the right pane.

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

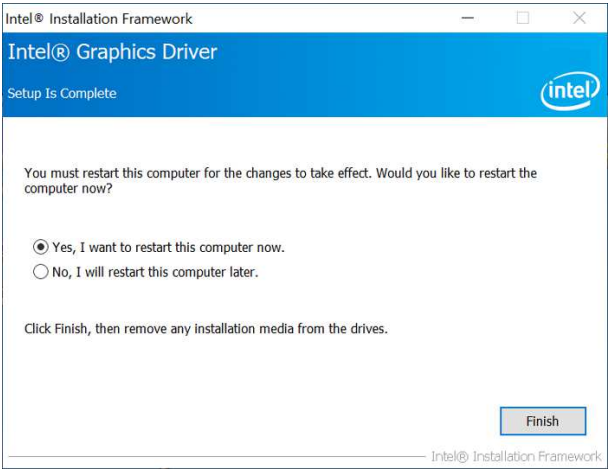
3. When the *Welcome* screen appears, click **Next** to continue.



4. Click **Yes** to accept the license agreement and click **Next** until the installation starts.

5. On the *Readme File Information* screen, click **Next** until the installation starts. On the following screens, click **Next** when prompted.

6. After the installation, restart the computer for changes to take effect.

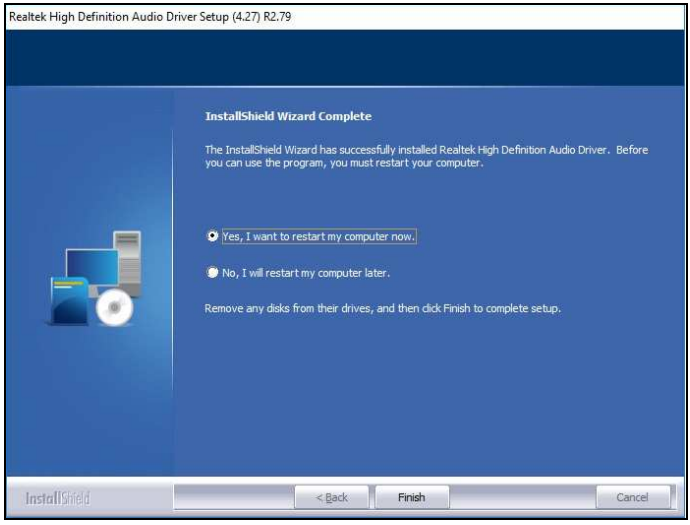


3.4 HD Audio Driver Installation

1. Insert the disk enclosed in the package with the board. Click **Intel** on the left pane and then **Intel(R) Whiskeylake-U Chipset Drivers** on the right pane.

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

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



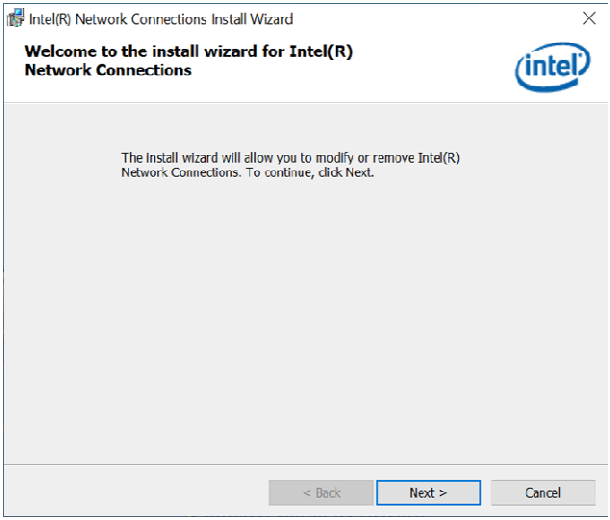
4. Click **Next** until the installation starts.
5. After the installation, restart the computer for changes to take effect.

3.5 LAN Driver Installation

1. Insert the disk enclosed in the package with the board. Click **Intel** on the left pane and then **Intel(R) Whiskeylake-U Chipset Drivers** on the right pane.

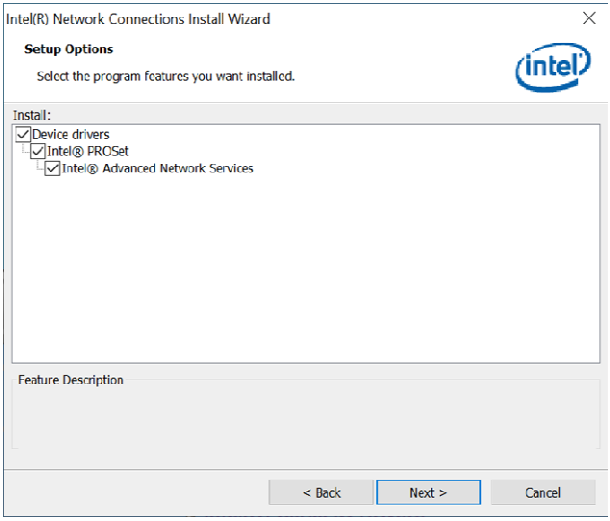
2. Click **Intel(R) PRO LAN Network Drivers**..

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



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

5. On the *Setup Options* screen, click the checkbox to select the desired driver(s) for installation. Then click **Next** to continue.



6. The wizard is ready for installation. Click **Install**.

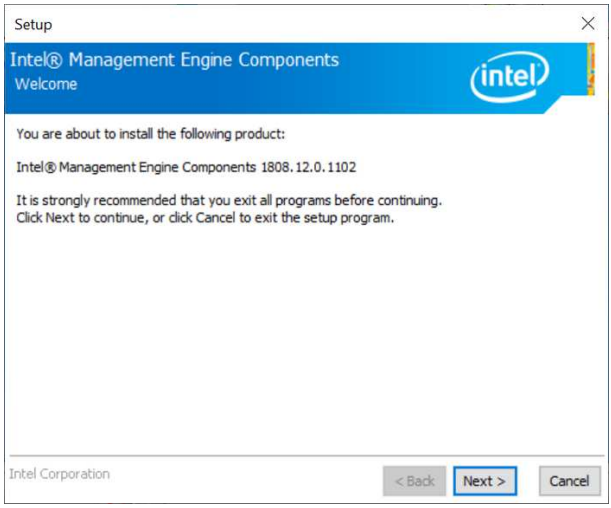
7. When the Install wizard is completed, click **Finish**.

3.6 Intel® Management Engine Drivers Installation

1. Insert the disk enclosed in the package with the board. Click **Intel** on the left pane and then **Intel(R) Whiskeylake-U Chipset Drivers** on the right pane.

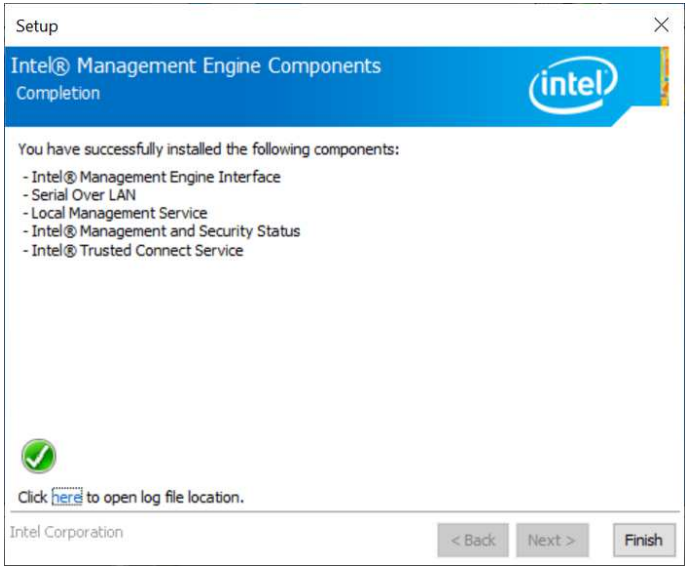
2. Click **Intel(R) ME 12.x Drivers**.

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



4. Accept the license agreement and click **Next** until the installation starts.

5. After Intel Management Engine Components have been successfully installed, click **Finish**.

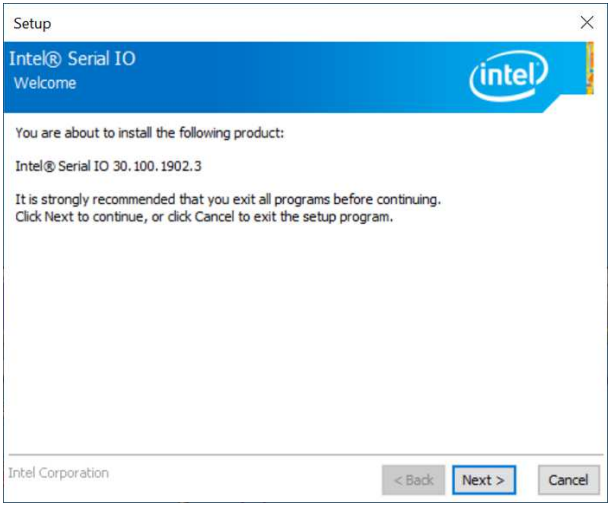


3.7 Intel® Serial IO Drivers Installation

1. Insert the disk enclosed in the package with the board. Click **Intel** on the left pane and then **Intel(R) Whiskeylake-U Chipset Drivers** on the right pane.

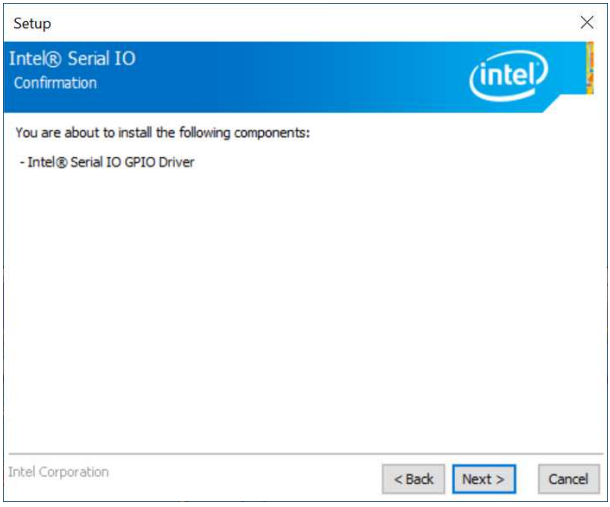
2. Click **Intel(R) Serial IO Drivers**.

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



4. Accept the license agreement and click **Next** until the installation starts.

5. When prompted to install the driver, click **Next**.



6. After completing the installation, restart the computer for changes to take effect.

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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.

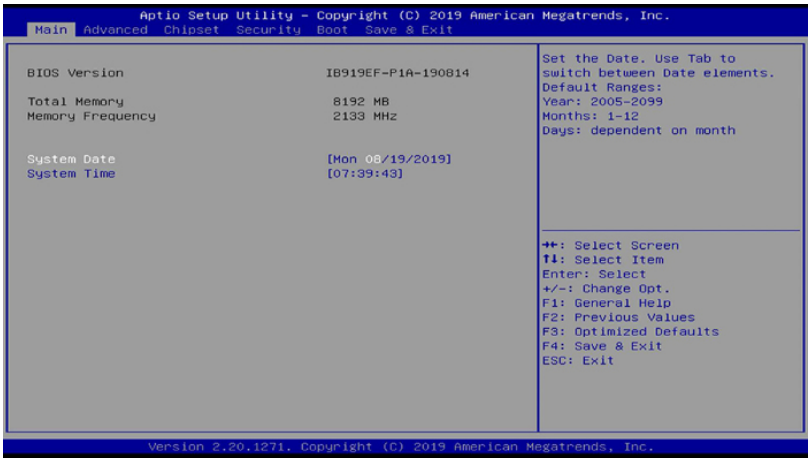
Warning: It is strongly recommended that you avoid making any changes to the chipset defaults.

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

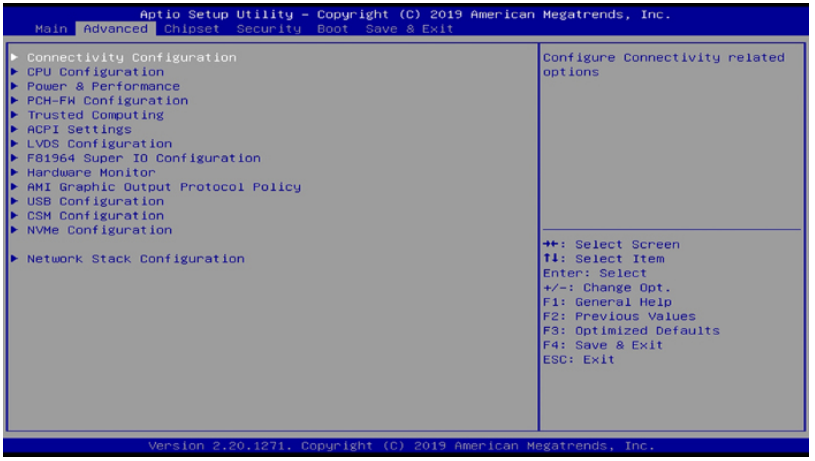
BIOS Setting	Description
System Date	Sets the date. Use the <Tab> key to switch between the data elements.
System Time	Set the time. Use the <Tab> key to switch between the data elements.

NOTE: Below is the corresponding screen for the IB919EF BIOS

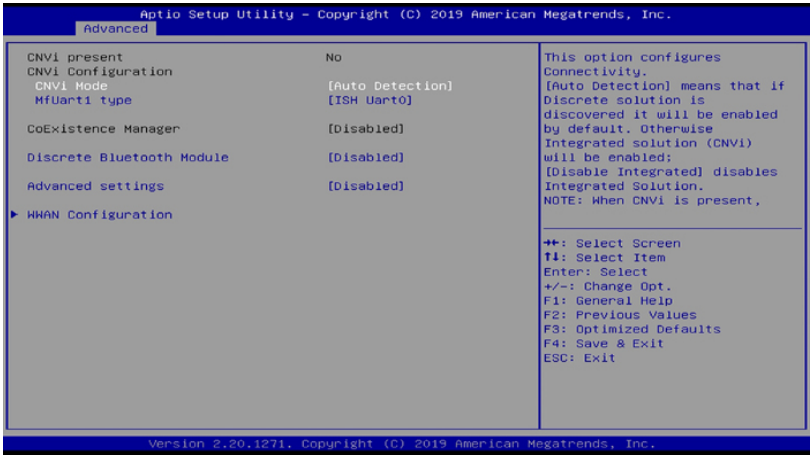


4.4 Advanced Settings

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

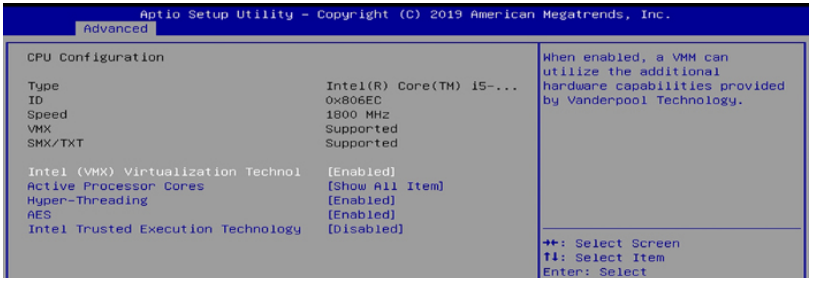


4.4.1 Connectivity Configuration



BIOS Setting	Description
CNVI Mode	This option configures Connectivity. ***Auto Detection*** – means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; ***Disable Integrated*** – disables Integrated Solution.
MfUart1 type	This is a test option which allows configuration of UART type for WiFI side band communication. Options are ISH Uart0 / SerialIO Uart2 / Uart over external pads / Not connected.
Discrete Bluetooth Module	Seiral IO UART0 needs to be enabled to select BT Module. Default: Disabled
Advanced Settings	Configure ACPI objects for wireless devices Default: Disabled
WWAN Configuration	Configure WWAN related options. WWAN Device: enable or disable M.2 WWAN device
WWAN Reset Workaround	Default: Enabled

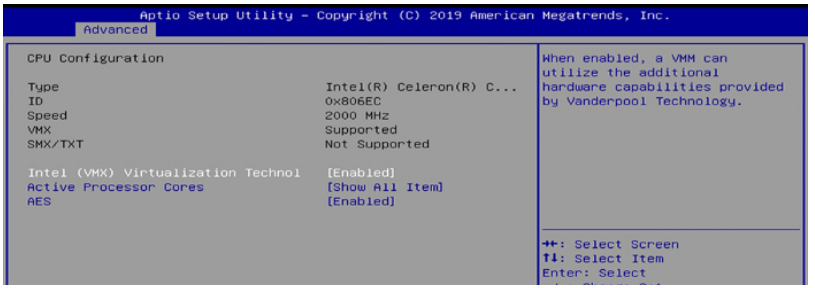
4.4.2 CPU Configuration



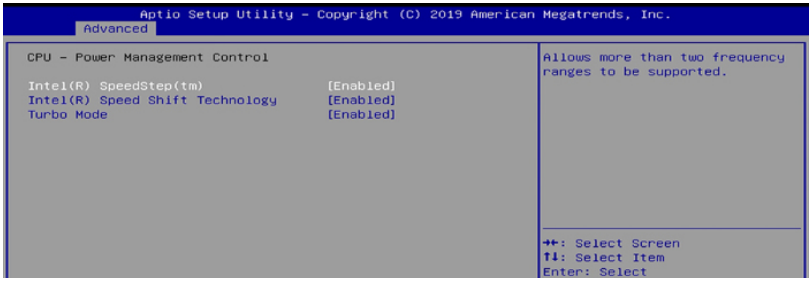
This section displays the type, ID and speed of the CPU.

BIOS Setting	Description
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	Number of cores to enable in each processor package
Hyper-Threading	Options; Enables or Disabled
AES	Enable/Disable AES (Advanced Encryption Standard)
Intel Trusted Execution Technology	Enables utilization of additional hardware capabilities provided by Intel® Trusted Execution Technology. Changes require a full power cycle to take effect.

NOTE: The selections for Hyper-Threading Intel Trusted Execution Technology are not available on the IB919EF BIOS as shown below.

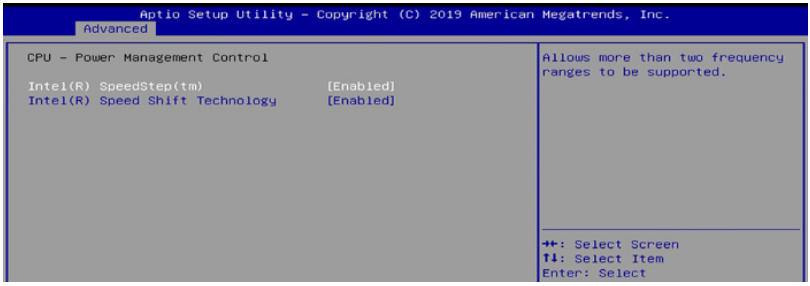


4.4.3 Power & Performance

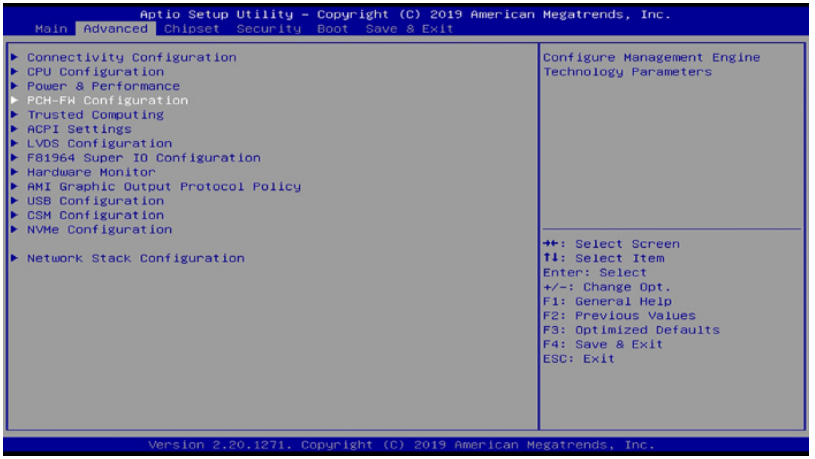


BIOS Setting	Description
Intel Speedstep	Allows more than two frequency ranges to be supported
Intel Speed Shift Technology	Enable/Disable Intel Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Enable/Disable processor Turbo Mode (requires Intel Speed Steop or Intel Speed Dhift to be available and enabled.)

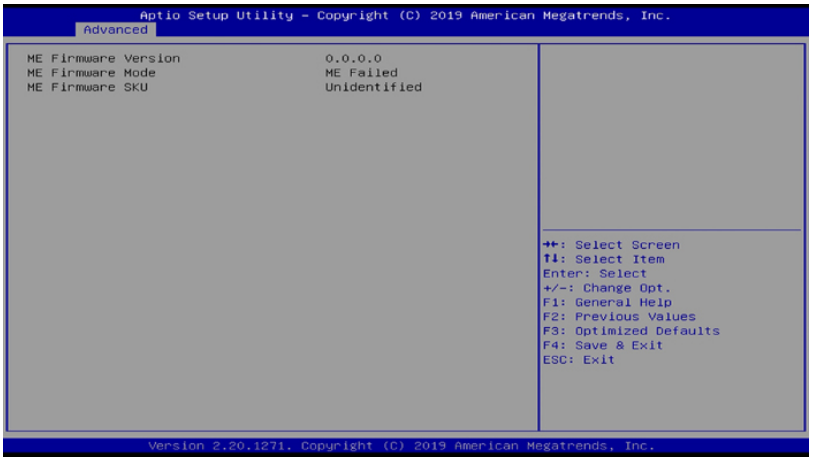
NOTE: The selections for Turbo Mode is not available on the IB919EF BIOS as shown below.



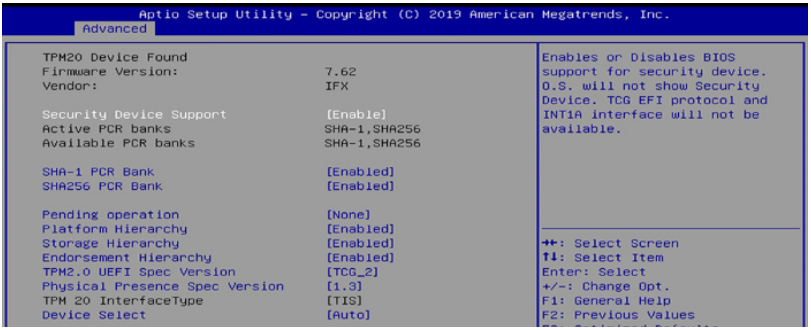
4.4.4 PCH-FW Configuration



Configure Management Engine Technology Parameters

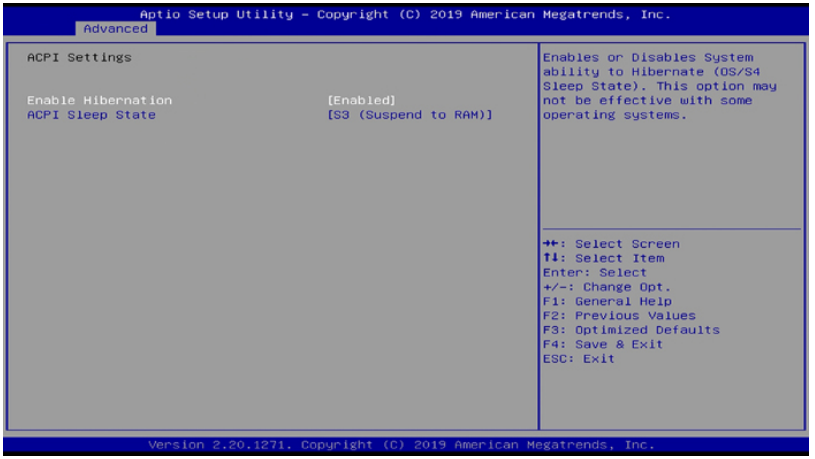


4.4.5 Trusted Computing



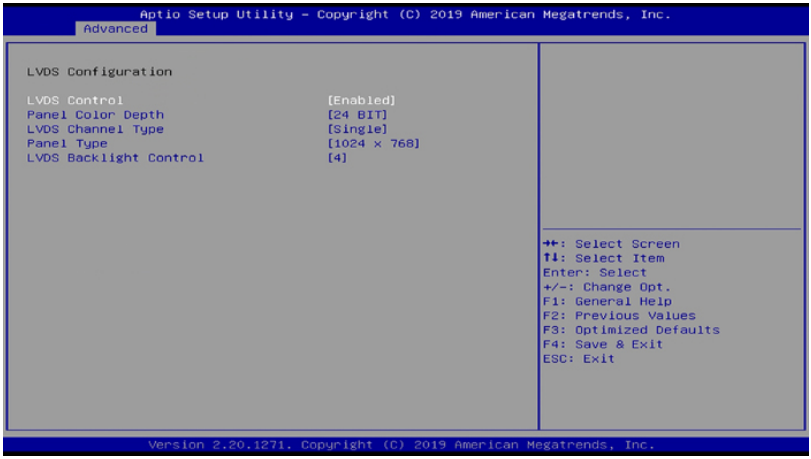
BIOS Setting	Description
Security Device Support	Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.
SHA-1 PCR Bank	Enables / Disables SHA-1 PCR Bank.
SHA256 PCR Bank	Enables / Disables SHA256 PCR Bank.
Pending operation	Schedule an operation for the security device. Note: Your computer will reboot during restart in order to change state of security device.
Platform Hierarchy	Enables / Disables platform hierarchy.
Storage Hierarchy	Enables / Disables storage hierarchy.
Endorsement Hierarchy	Enables / Disables endorsement hierarchy.
TPM2.0 UEFI Spec Version	Selects the supported TCG version based o your OS. • **TCG_1_2:** supports Win8/Win10. • **TCG_2:** supports new TCG2 protocol and event format for Windows 10 or later.
Physical Presence Spec Version	Select to tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.
Device Select	TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.

4.4.6 ACPI Settings



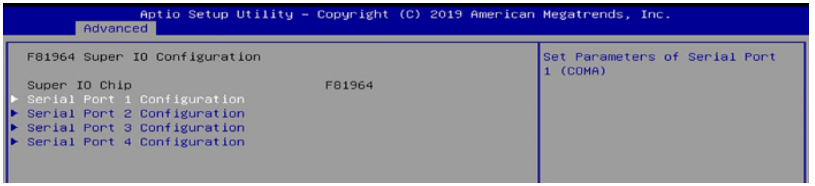
BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Selects an ACPI sleep state (Suspend Disabled or S3) where the system will enter when the Suspend button is pressed.

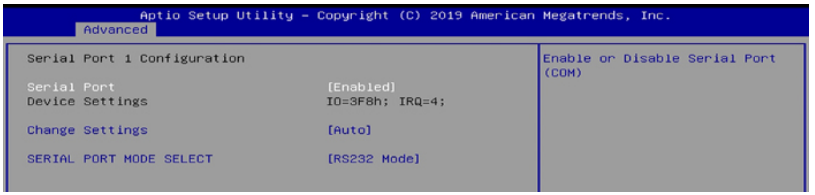
4.4.7 LVDS Configuration

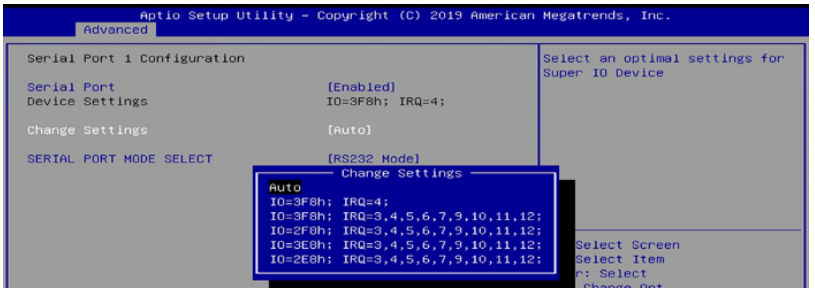


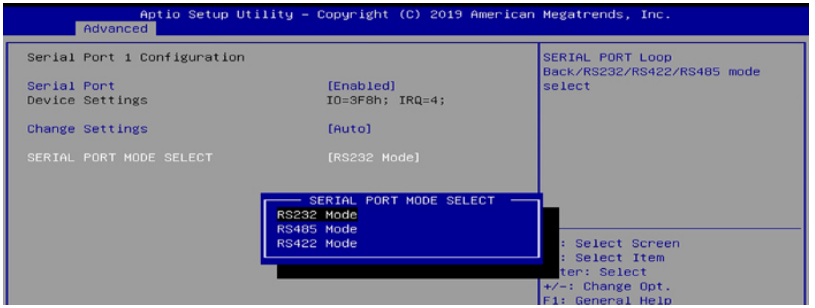
BIOS Setting	Description
LVDS Control	Default: Enabled
Panel Color Depth	Selects the panel color depth. Options: 18 bit, 24 bit
LVDS Channel Type	Chooses the LVDS as single or dual channel.
LCD Panel Type	Panel Type (Resolution) Options: 640 x 480, 800 x 600, 1024 x 768, 1280 x 768, 1280 x 800, 1280 x 960, 1280 x 1024, 1366 x 768, 1440 x 900, 1600 x 900, 1600 x 1200, 1680 x 1050, 1920 x 1080, 1920 x 1200
LVDS Brightness Control	Options: 0(Min), 1, 2, 3, 4, 5, 6, 7(Max)

4.4.8 F81964 Super IO Configuration



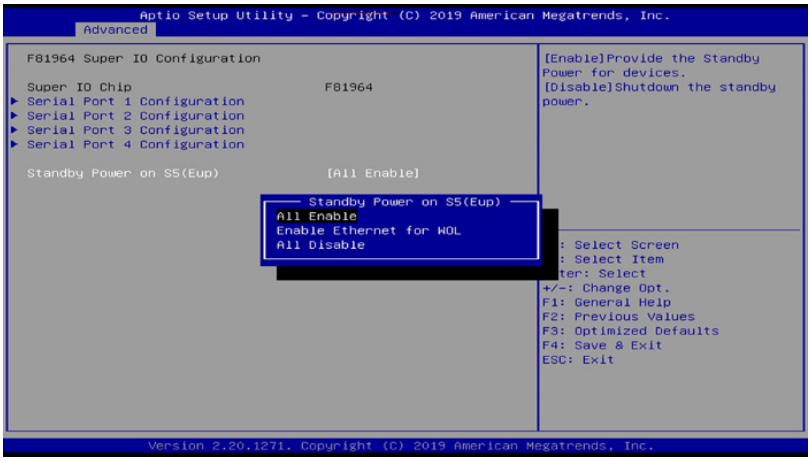






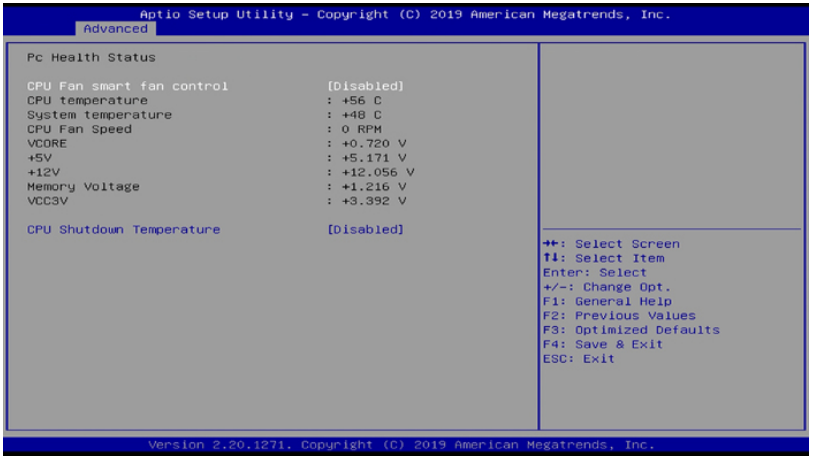
BIOS Setting	Description
Serial Ports Configuration	Sets parameters of serial ports. Enables / Disables the serial port and select an optimal setting for the Super IO device.

4.4.9 F81964 Super IO Configuration for IB919EF



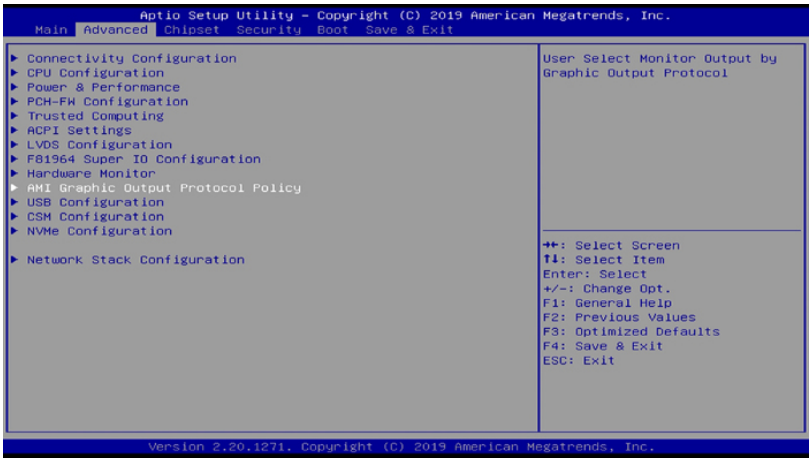
BIOS Setting	Description
Serial Ports Configuration	Sets parameters of serial ports. Enables / Disables the serial port and select an optimal setting for the Super IO device.
Standby Power on S5(Eup)	Enable: Provide the Standby Power for devices Disable: Shutdown the standby power

4.4.10 Hardware Monitor

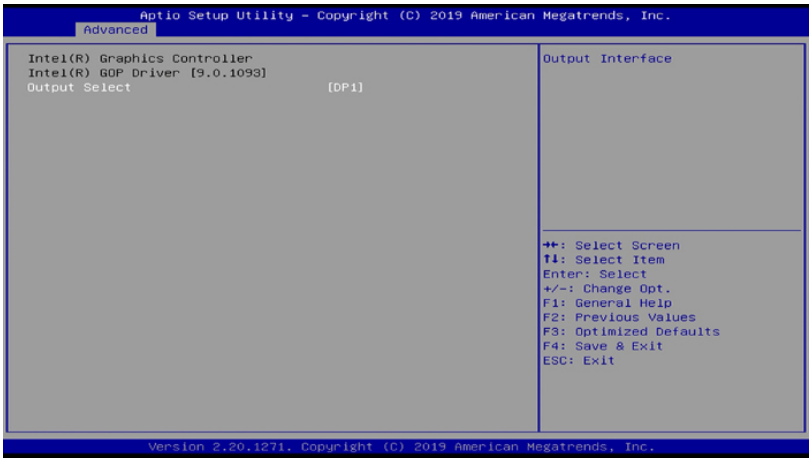


BIOS Setting	Description
CPU Fan smart fan control	Enables / Disables smart fan control.
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.
CPU Shutdown Temperature	Sets a threshold of temperature to shut down if CPU goes overheated. Options: Disabled / 70 °C / 75 °C / 80 °C / 85 °C / 90 °C / 95 °C

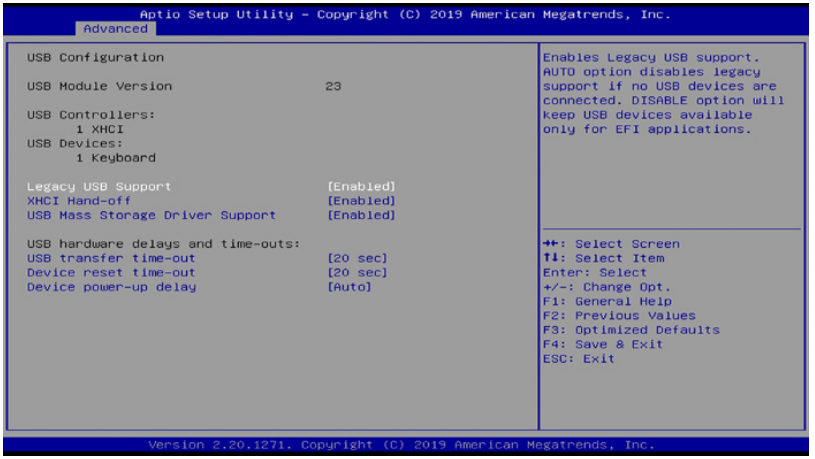
4.4.11 AMI Graphic Output Protocol Policy



Configure Management Engine Technology Parameters

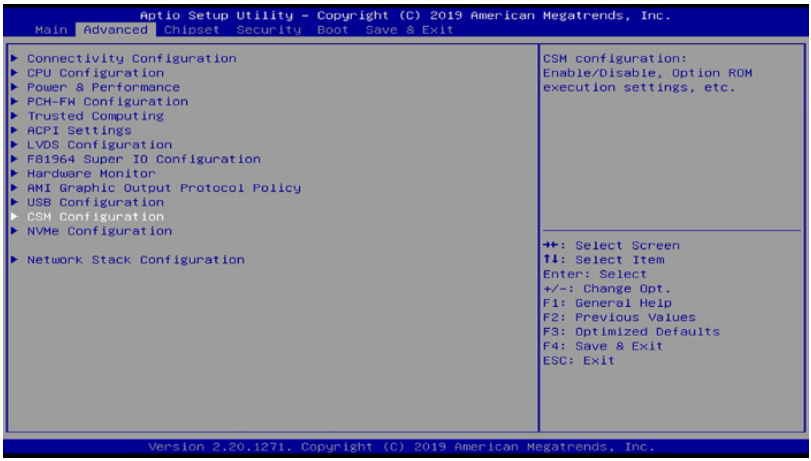


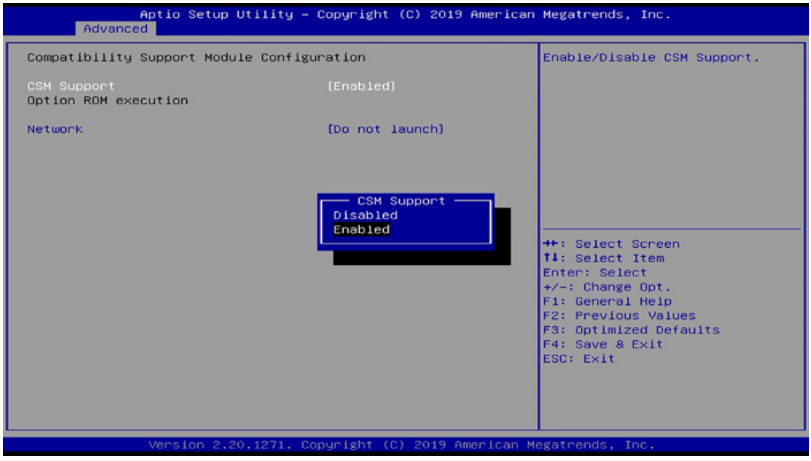
4.4.12 USB Configuration



BIOS Setting	Description
Legacy USB Support	• **Enabled** enables Legacy USB support. • **Auto** disables legacy support if there is no USB device connected. • **Disabled** 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.
USB Mass Storage Driver Support	Enables / Disables the support for USB mass storage driver.
Port 60/64 Emulation	Enables / Disables the support for I/O port 60h / 64h emulation. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
USB Transfer time-out	The time-out value (1 / 5 10 / 20 secs) for Control, Bulk, and Interrupt transfers.
Device reset time-out	Gives seconds (10 / 20 / 30 / 40 secs) to delay execution of Start Unit command to USB mass storage device.
Device power-up delay	Max.time the device will take before it properly reports itself to the Host Controller. '**Auto**' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

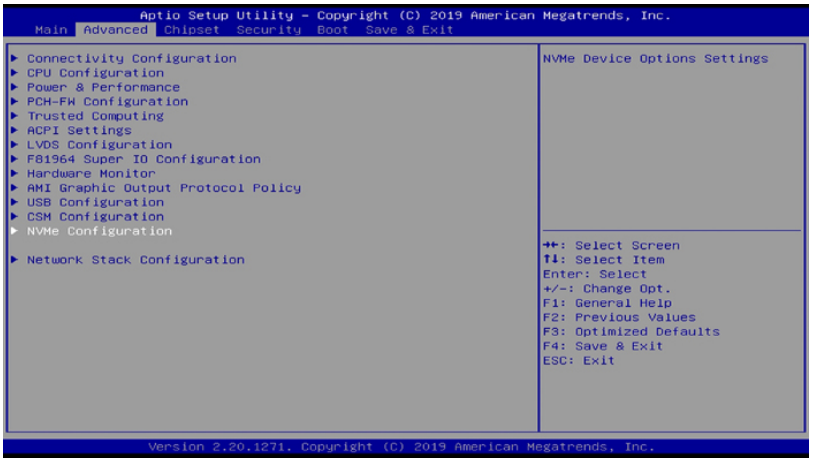
4.4.13 CSM Configuration

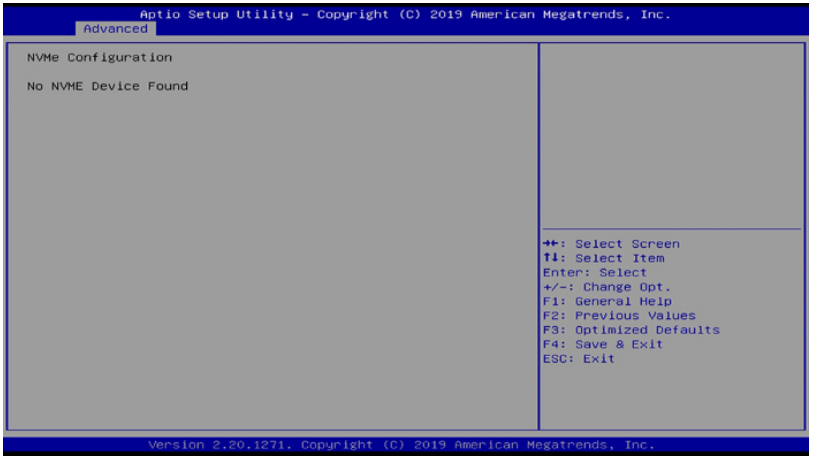




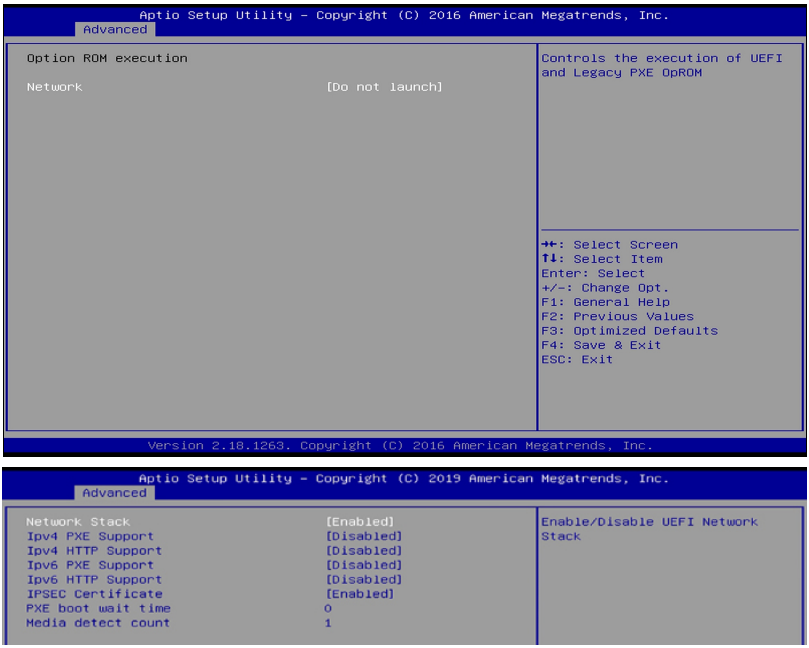
BIOS Setting	Description
Network	Controls the execution of UEFI and Legacy PXE OpROM.

4.4.14 NVMe Configuration



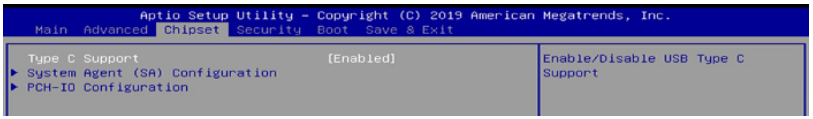


4.4.15 Network Stack Configuration

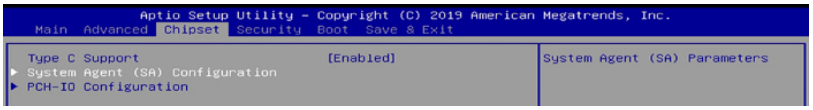


BIOS Setting	Description
Network Stack	Enable/Disable UEFI Network Stack
Ipv4 PXE Support	If disabled, IPv4 PXE boot support will not be available.
Ipv4 HTTP Support	If disabled, IPv4 HTTP boot support will not be available.
Ipv6 PXE Support	If disabled, IPv6 PXE boot support will not be available.
Ipv6 HTTP Support	If disabled, IPv6 HTTP boot support will not be available.
IPSEC Certificate	Support to Enable/Disable IPEC certificate.
PXE boot wait time	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value
Media detect count	Number of times the presence of media will be checked. Use either +/- nurmeric keys to set the value.

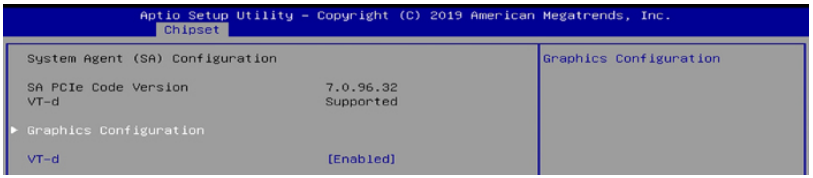
4.5 Chipset Settings

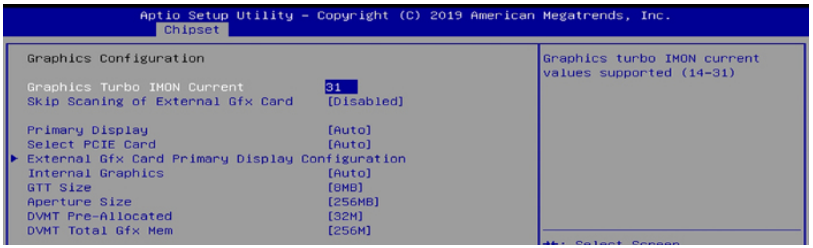


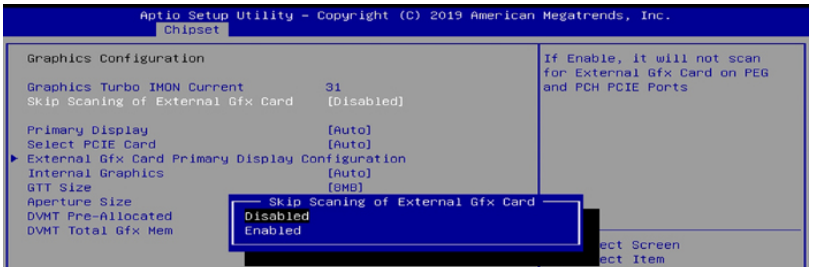
4.5.1 System Agent (SA) Configuration

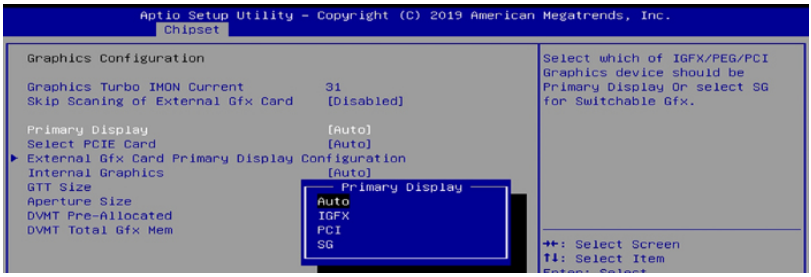


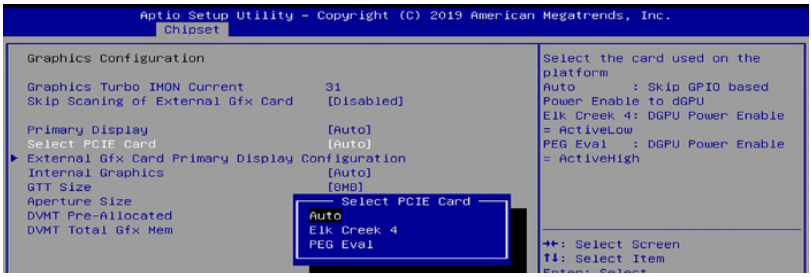
4.5.1.1. Graphics Configuration:

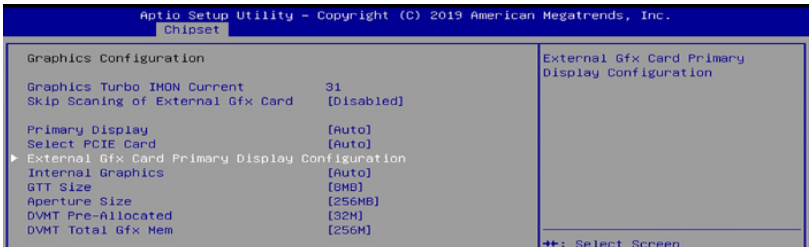


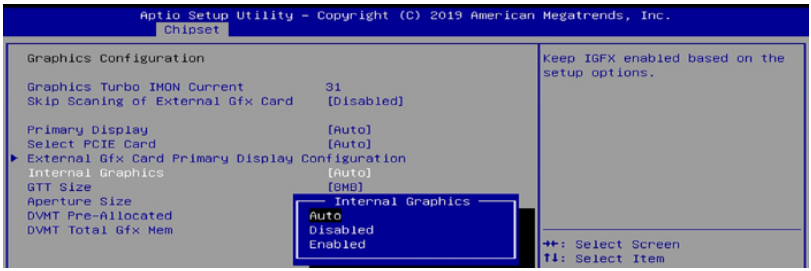


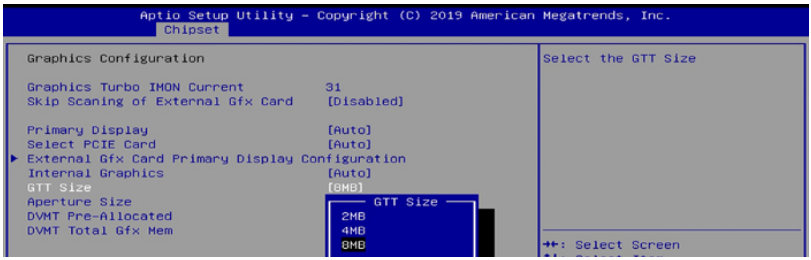


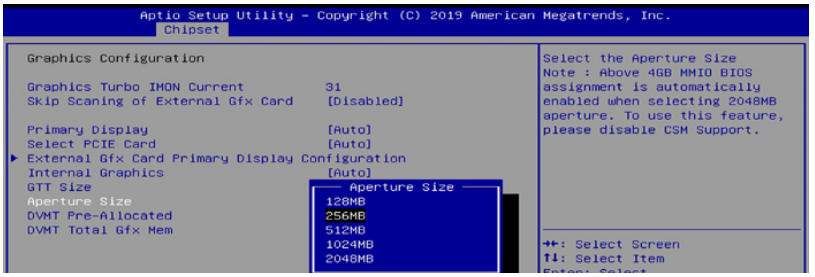

Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
Chipset
Graphics Configuration
Graphics Turbo IMON Current 31
Skip Scaning of External Gfx Card [Disabled]
Primary Display [Auto]
Select PCIE Card [Auto]
External Gfx Card Primary Display Configuration
Internal Graphics [Auto]
GTT Size
Aperture Size
DVMT Pre-Allocated
DVMT Total Gfx Mem
Primary Display
Auto
IGFX
PCI
SG
Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
→←: Select Screen
↑↓: Select Item

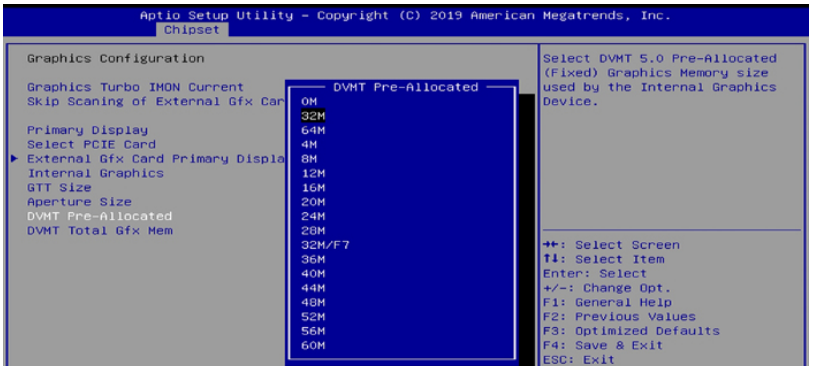

Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
Chipset
Graphics Configuration
Graphics Turbo IMON Current 31
Skip Scaning of External Gfx Card [Disabled]
Primary Display [Auto]
Select PCIE Card [Auto]
External Gfx Card Primary Display Configuration
Internal Graphics [Auto]
GTT Size [8MB]
Aperture Size
DVMT Pre-Allocated
DVMT Total Gfx Mem
Select PCIE Card
Auto
Elk Creek 4
PEG Eval
Select the card used on the platform
Auto : Skip GPIO based Power Enable to dGPU
Elk Creek 4: DGPU Power Enable = ActiveLow
PEG Eval : DGPU Power Enable = ActiveHigh
→←: Select Screen
↑↓: Select Item

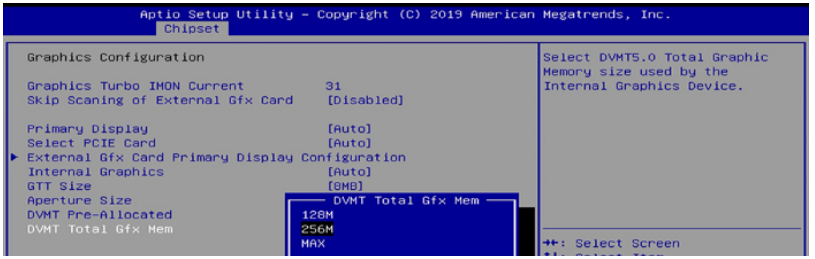

Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
Chipset
Graphics Configuration
Graphics Turbo IMON Current 31
Skip Scaning of External Gfx Card [Disabled]
Primary Display [Auto]
Select PCIE Card [Auto]
External Gfx Card Primary Display Configuration
Internal Graphics [Auto]
GTT Size [8MB]
Aperture Size [256MB]
DVMT Pre-Allocated [32M]
DVMT Total Gfx Mem [256M]
External Gfx Card Primary Display Configuration


Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
Chipset
Graphics Configuration
Graphics Turbo IMON Current 31
Skip Scaning of External Gfx Card [Disabled]
Primary Display [Auto]
Select PCIE Card [Auto]
External Gfx Card Primary Display Configuration
Internal Graphics [Auto]
GTT Size [8MB]
Aperture Size
DVMT Pre-Allocated
DVMT Total Gfx Mem
Internal Graphics
Auto
Disabled
Enabled
Keep IGFX enabled based on the setup options.
→←: Select Screen
↑↓: Select Item

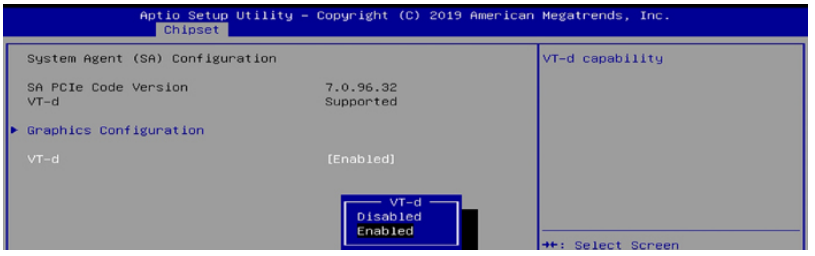

Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
Chipset
Graphics Configuration
Graphics Turbo IMON Current 31
Skip Scaning of External Gfx Card [Disabled]
Primary Display [Auto]
Select PCIE Card [Auto]
External Gfx Card Primary Display Configuration
Internal Graphics [Auto]
GTT Size [8MB]
Aperture Size
DVMT Pre-Allocated
DVMT Total Gfx Mem
GTT Size
2MB
4MB
8MB
Select the GTT Size
→←: Select Screen


Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
Chipset
Graphics Configuration
Graphics Turbo IMON Current 31
Skip Scaning of External Gfx Card [Disabled]
Primary Display [Auto]
Select PCIE Card [Auto]
External Gfx Card Primary Display Configuration
Internal Graphics [Auto]
GTT Size
Aperture Size
DVMT Pre-Allocated
DVMT Total Gfx Mem
Aperture Size
128MB
256MB
512MB
1024MB
2048MB
Select the Aperture Size
Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.
→←: Select Screen
↑↓: Select Item

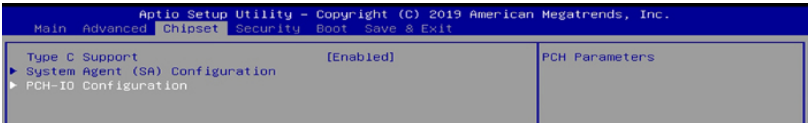

Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
Chipset
Graphics Configuration
Graphics Turbo IMON Current
Skip Scaning of External Gfx Car
Primary Display
Select PCIE Card
External Gfx Card Primary Displa
Internal Graphics
GTT Size
Aperture Size
DVMT Pre-Allocated
DVMT Total Gfx Mem
DVMT Pre-Allocated
0M
32M
64M
4M
8M
12M
16M
20M
24M
28M
32M/F7
36M
40M
44M
48M
52M
56M
60M
Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

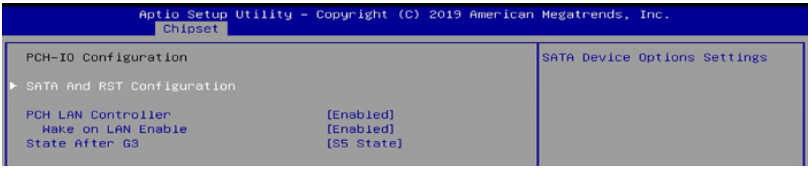

Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
Chipset
Graphics Configuration
Graphics Turbo IMON Current 31
Skip Scaning of External Gfx Card [Disabled]
Primary Display [Auto]
Select PCIE Card [Auto]
External Gfx Card Primary Display Configuration
Internal Graphics [Auto]
GTT Size [0MB]
Aperture Size
DVMT Pre-Allocated
DVMT Total Gfx Mem
DVMT Total Gfx Mem
128M
256M
MAX
Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
→←: Select Screen

4.5.1.2. VT-d


Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
Chipset
System Agent (SA) Configuration
SA PCIe Code Version 7.0.96.32
VT-d Supported
Graphics Configuration
VT-d [Enabled]
VT-d
Disabled
Enabled
VT-d capability
→←: Select Screen

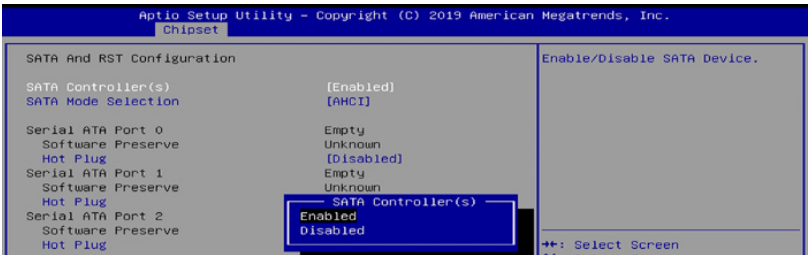
4.5.2 PCH-IO Configuration

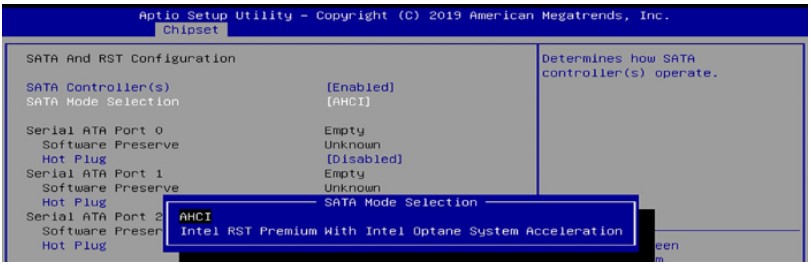


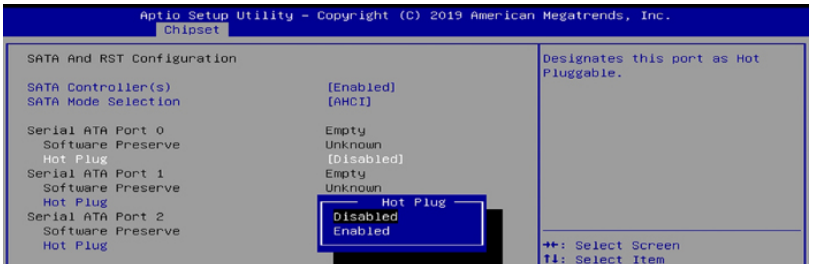


4.5.2.1 SATA and RST Configuration:

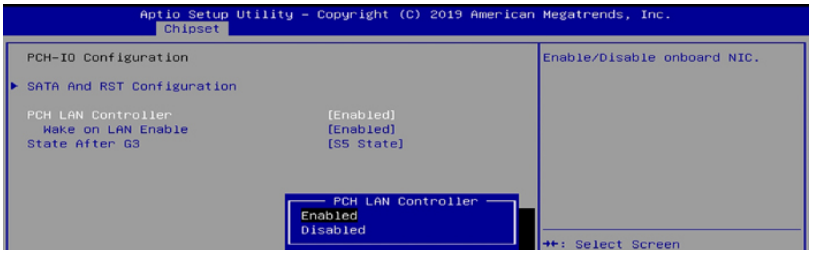
BIOS Setting	Description
SATA and RST Configuration	SATA device options and settings
SATA Controller(s)	Enables / Disables the Serial ATA.
SATA Mode Selection	Selects IDE or AHCI Mode.
Serial ATA Port 0~2	Enables / Disables Serial Port 0 ~ 2.
SATA Ports Hot Plug	Enables / Disables SATA Ports HotPlug.

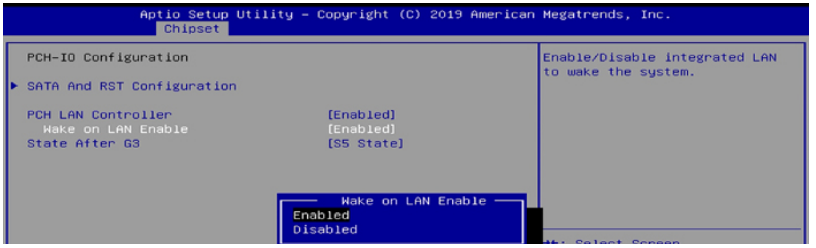


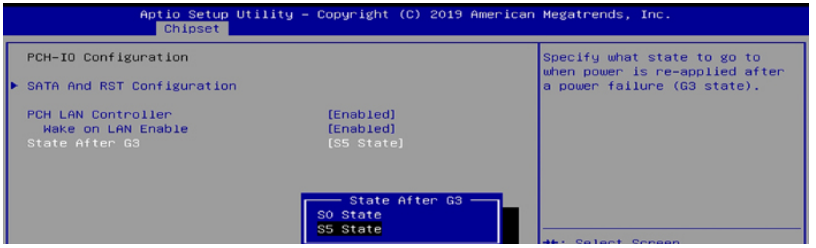




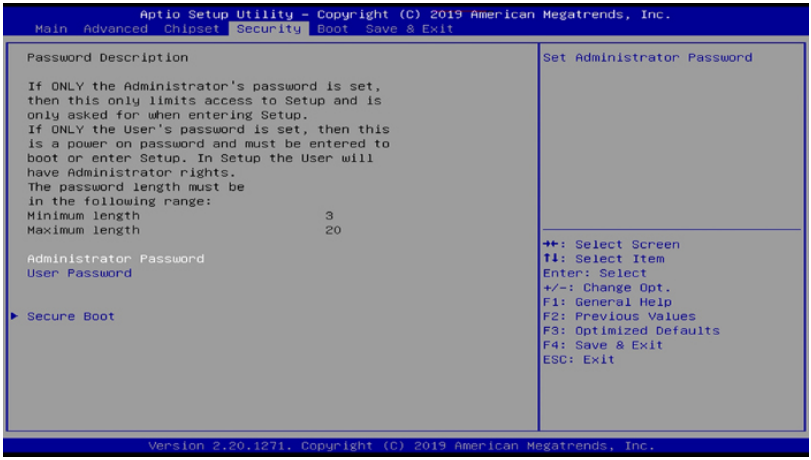
BIOS Setting	Description
PCH LAN Controller	Enables / Disables onboard NIC.
Wake on LAN Enable	Enables / Disables integrated LAN to wake the system.
State After G3	Specify what state to go when power is re-applied afater a power failure (G3 state).



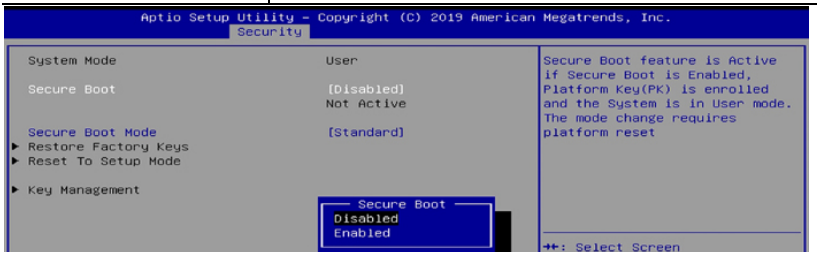




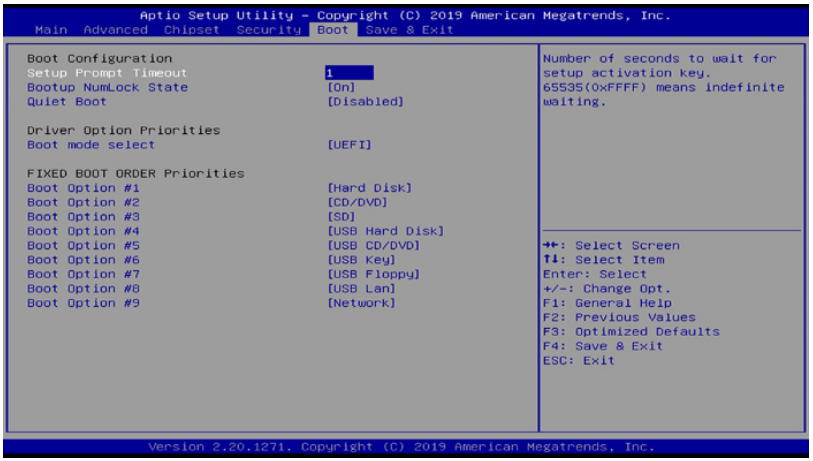
4.6 Security Settings



BIOS Setting	Description
Setup Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.
Secure Boot	Secure Boot feature is Active if Secure Boot is enabled. Platform Key(PK) is enrolled and the system is in user mode. The mode change requires platform reset.

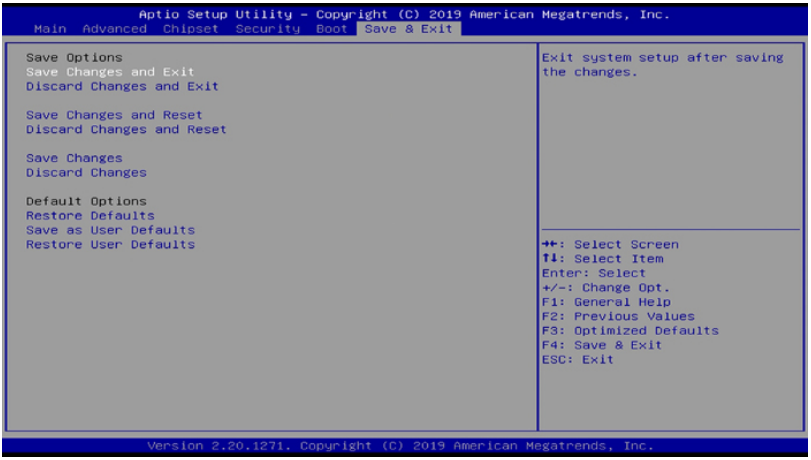


4.7 Boot Settings



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.
Boot Mode Select	Selects boot mode LEGACY/UEFI
FIXED BOOT ORDER Priorities	Configures the boot order priorities. Up to 9 boot options can be configured.

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.

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.

For IB919AF:

Address	Device Description
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A10-0x00000A1F	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
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x00001800-0x000018FE	Motherboard resources
0x00004000-0x0000403F	Intel(R) UHD Graphics 620
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x00003000-0x00003FFF	Intel(R) PCI Express Root Port #8 - 9DBF
0x0000EFA0-0x0000EFBF	Intel(R) SMBus - 9DA3
0x00002000-0x000020FE	Motherboard resources
0x00004090-0x00004097	Standard SATA AHCI Controller
0x00004080-0x00004083	Standard SATA AHCI Controller
0x00004060-0x0000407F	Standard SATA AHCI Controller
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

Address	Device Description
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
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00001854-0x00001857	Motherboard resources

For IB919EF:

Address	Device Description
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A10-0x00000A1F	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
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x00004000-0x0000403F	Intel(R) UHD Graphics 610
0x00003000-0x0000301F	Ethernet Controller
0x00003000-0x0000301F	PCI Express Root Port #8 - 9DBF for mobile 8th Gen Intel(R) Core(TM) processor family
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x00000040-0x00000043	System timer

Address	Device Description
0x00000050-0x00000053	System timer
0x00001800-0x000018FE	Motherboard resources
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000EFA0-0x0000EFBF	SMBus - 9DA3 for mobile 8th Gen Intel(R) Core(TM) processor family
0x00002000-0x000020FE	Motherboard resources
0x00004090-0x00004097	Standard SATA AHCI Controller
0x00004080-0x00004083	Standard SATA AHCI Controller
0x00004060-0x0000407F	Standard SATA AHCI Controller
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
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00001854-0x00001857	Motherboard resources

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.

For IB919AF:

Level	Function
IRQ 4294967292	Intel(R) Ethernet Connection (6) I219-LM
IRQ 4294967283	Intel(R) Management Engine Interface
IRQ 4	Communications Port (COM1)
IRQ 3	Communications Port (COM2)
IRQ 5	Communications Port (COM3)
IRQ 6	Communications Port (COM4)
IRQ 0	System timer
IRQ 11	Intel(R) Thermal Subsystem - 9DF9
IRQ 11	Intel(R) SMBus - 9DA3
IRQ 4294967291	Intel(R) UHD Graphics 620
IRQ 16	High Definition Audio Controller
IRQ 16	Intel SD Host Controller
IRQ 4294967294	Intel(R) PCI Express Root Port #8 - 9DBF
IRQ 55 - 511	Microsoft ACPI-Compliant System
IRQ 4294967289	Intel(R) I211 Gigabit Network Connection #2
IRQ 4294967288	Intel(R) I211 Gigabit Network Connection #2
IRQ 4294967287	Intel(R) I211 Gigabit Network Connection #2
IRQ 4294967286	Intel(R) I211 Gigabit Network Connection #2
IRQ 4294967285	Intel(R) I211 Gigabit Network Connection #2
IRQ 4294967284	Intel(R) I211 Gigabit Network Connection #2
IRQ 4294967293	Standard SATA AHCI Controller
IRQ 1	Standard PS/2 Keyboard
IRQ 12	Microsoft PS/2 Mouse
IRQ 4294967290	Intel(R) USB 3.1 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 14	Intel(R) Serial IO GPIO Host Controller - INT34BB

For IB919EF:

Level	Function
IRQ 4294967291	Intel(R) UHD Graphics 610
IRQ 11	Ethernet Controller
IRQ 11	Thermal Subsystem - 9DF9 for mobile 8th Gen Intel(R) Core(TM) processor family
IRQ 11	SMBus - 9DA3 for mobile 8th Gen Intel(R) Core(TM) processor family
IRQ 4294967289	Intel(R) Management Engine Interface
IRQ 4	Communications Port (COM1)
IRQ 3	Communications Port (COM2)
IRQ 5	Communications Port (COM3)
IRQ 6	Communications Port (COM4)
IRQ 0	System timer
IRQ 16	High Definition Audio Controller
IRQ 16	Intel SD Host Controller
IRQ 4294967294	PCI Express Root Port #8 - 9DBF for mobile 8th Gen Intel(R) Core(TM) processor family
IRQ 55 - 511	Microsoft ACPI-Compliant System
IRQ 4294967292	Intel(R) Ethernet Connection (6) I219-V
IRQ 4294967293	Standard SATA AHCI Controller
IRQ 1	Standard PS/2 Keyboard
IRQ 12	Microsoft PS/2 Mouse
IRQ 4294967290	Intel(R) USB 3.1 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 14	Intel(R) Serial IO GPIO Host Controller - INT34BB

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 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
}
//---------------------------------------------------------------------------


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

```
//
// 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 "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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// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// 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
```

D. Onboard Connector Reference Types

Function	Connector Name	Onboard Type	Compatible Mating Type
Audio Connector	J1	Hao Guo Xing Ye DF11-12S-PA66H	Hirose DF11-12DS-2C
SATA HDD Power Connector	J5	E-call 0110-071-040	JST XHP-4
SMBUS Connector	J10	Molex 53047-0410	Molex 51021-0400
Front Panel Setting Connector	J9	Dupon 2.0 mm-pitch pin header (Male)	Dupon 2.0 mm-pitch (Female)
USB 2.0 Connector	J6	Hao Guo Xing Ye DF11-8S-PA66H	Hirose DF11-8DS-2C
Battery Connector	J16	Molex 53047-0210	Molex 51021-0200
COM 2, COM3, COM4 RS-232 Ports	J20, J21, J22	Hao Guo Xing Ye DF11-10S-PA66H	Hirose DF11-10DS-2C
DC Power Input Connector	J18	Hao Guo Xing Ye WAFER396-2S-WV	JST VHR-2N
Digital I/O Connector	J17	Dupon 2.00 mm-pitch pin header (Male)	Dupon 2.00 mm-pitch (Female)
LCD Backlight Connector	J15	E-CALL 0110-161-040	JST PHR-4.
LVDS Connectors	J14 (1st channel), J13 (2nd channel)	Hirose DF20G-20DP-1V	Hirose DF20A-20DS-1C

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