MB991AF

Intel® Xeon® / 7th/6th Core™ / Pentium® / Celeron® Micro-ATX Motherboard

User's Manual

Version 1.0a
(Aug. 2018)

Compliance

CE

This is a class B product. 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

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
- Specifications
- Block Diagram
- Board Overview
- Board Dimensions

1.1 Introduction

MB991AF is a Micro ATX motherboard based on the platform of Intel® Xeon® / 7th/6th Gen. Core™ / Pentium® / Celeron® QC or DC processor. It offers high-definition visual experience and high performance on graphics processing. It can also be well utilized for designs of low power consumption in a board range of markets, including industrial control & automation, digital signage, thin client, electronic gaming machines, and SMB storage appliances.

Photo of MB991AF

1.2 Features

- Intel® Xeon® / 7th/6th Gen. Core™ i7/i5/i3 / Pentium® / Celeron® QC / DC processor, up to 4.2 GHz
- 4 x DDR4 DIMM, expandable up to 64 GB
- Intel® processor integrated graphics device for HDMI (1.4) and LVDS
- 2 x GbE LAN, 4 x USB 2.0, 6 x USB 3.0, 8 x COM, 5 x SATA III
- 1 x PCIe (x16) [(x8) Link], 1x PCIe (x8), 1x PCIe (x4)
- 1 x mini-PCIe, 1 x M.2 (M-key)
- Configurable watchdog timer and digital I/O
- iAMT (11.6), iSmart

1.3 Packing List

Your MB991AF 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.

- MB991AF Motherboard x 1
- I/O Shield x 1
- SATA Cable (SATA-3F) x 1
- COM Port Cable (PK1-20BK) x 1
- Disk (including chipset drivers) x 1
- 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.

- USB Cable (USB-29)
- DVI-D Cable (DVIK-3)

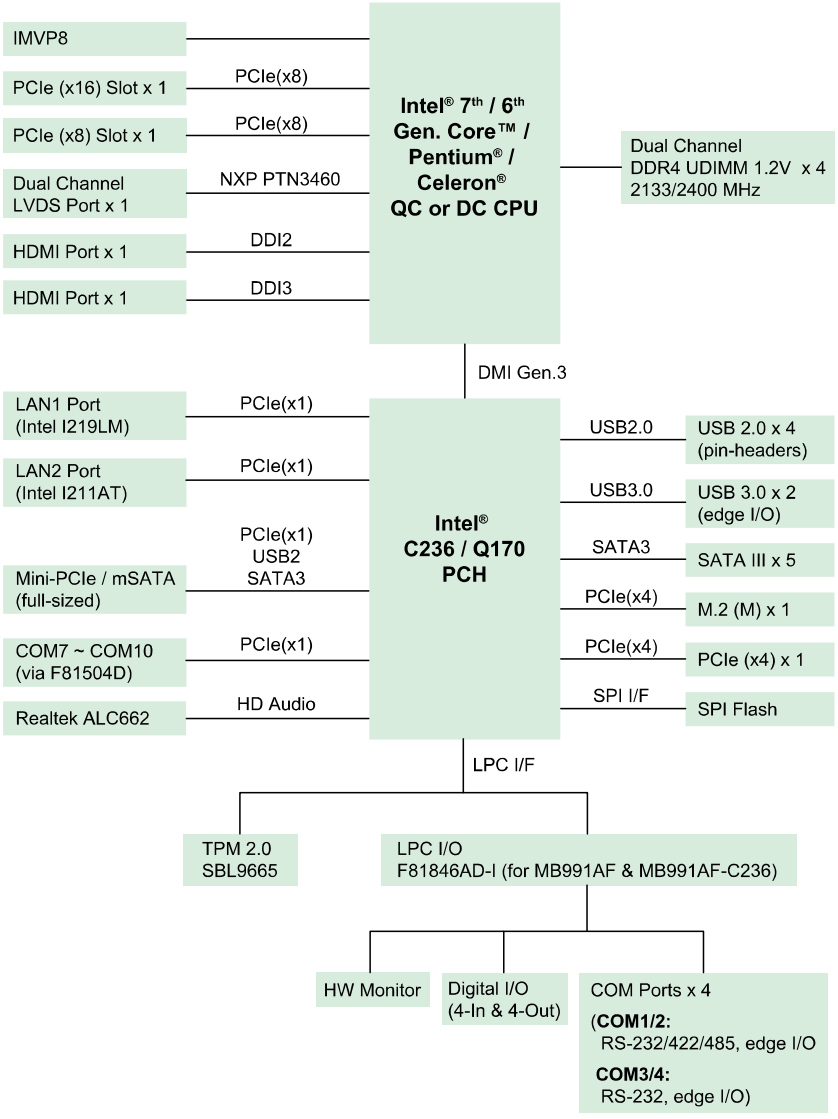
1.5 Specifications

Product Name	MB991AF-C236	MB991AF
Form Factor	Micro-ATX motherboard	
System		
Operating System	• Windows 10 (64-bit) • Linux Fedora (64-bit) & Ubuntu (64-bit) * Windows 7 (64-bit) is only for Intel® 6th Gen. Core™ i-Series.	
CPU Type	Intel® Xeon® / 7th/6th Gen. Core™ i7/i5/i3 / Pentium® / Celeron® LGA1151 QC (35W / 65W / 80W) or DC (35W / 65W) processor	
CPU Speed	Up to 4 GHz	
Cache	8 MB	
Chipset	Intel® C236 PCH	Intel® Q170 PCH
Memory	4 x DDR4 UDIMM 2133 / 2400 MHz, expandable up to 64 GB * ECC will be supported with C236 PCH.	
Storage	mSATA / M.2 (M-key)	
Graphics	Integrated into the processor with the max. shared memory 1024 MB	
Network	• Intel® I219LM Gigabit LAN PHY • Intel® I211AT PCIe Gigabit Ethernet	
Super I/O	• Fintek F81846AD-I • Fintek F81504D (PCIe to UART)	
Audio Codec	Realtek ALC662	
Power Supply	ATX Power, 12V	
Watchdog Timer	Yes (256 segments, 0, 1, 2…255 sec / min)	
BIOS	AMI BIOS	
iAMT	11.6 (supported by identified Intel® DT CPU SKUs)	
iSMART	3.2 & EuP / ErP (Reserved)	
TPM	2.0	
RAID	RAID 0/1/5/10	
Dimensions	244 x 244 mm (9.6” x 9.6”)	

Product Name	MB991AF-C236	MB991AF
RoHS	Yes	
Certification	CE, FCC Class B, LVD	
I/O Ports		
Display	• 2 x HDMI 1.4 (4096 x 2160 at 24 Hz) • 1 x LVDS (1920 x 1200 at 60 Hz, 18-bit / 24-bit, dual channel)	
LAN	2 x RJ45 GbE LAN	
USB	• 6 x USB 3.0 (I/O coastline connectors) • 4 x USB 2.0 (on-board pin headers)	
Serial	**8 x COM ports:** • COM1 & COM2: RS-232/422/485 (I/O coastline connectors, jumper-less selection) • COM3 ~ COM4: RS-232 only (I/O coastline connector) • COM7 ~ COM10: RS-232 only (via on-board box-headers)	
SATA	5 x SATA III (6.0 Gb/s)	
Audio Jack	• 1 x Line-In • 1 x Line-Out • 1 x Mic-In	
Digital IO	4 In & 4 Out	
Expansion Slots	• 1 x PCIe (x16) [(x8) link] • 1 x PCIe (x8) • 1 x PCIe (x4) • 1 x full-size Mini-PCIe with SATA & USB 2.0 • 1 x M.2 (M-key)	
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	

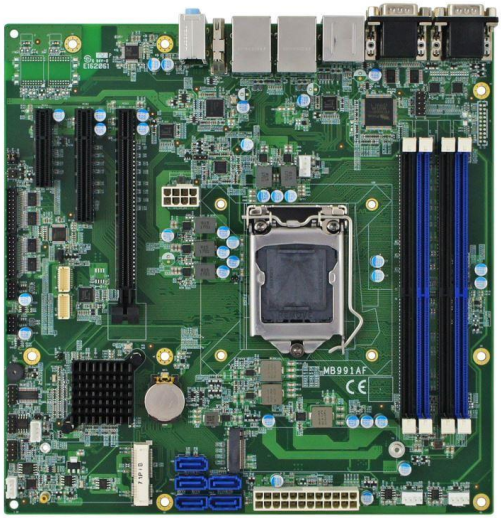
All specifications are subject to change without prior notice.

1.6 Block Diagram



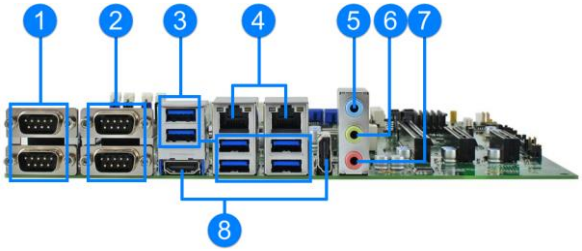
1.7 Overview

Top View



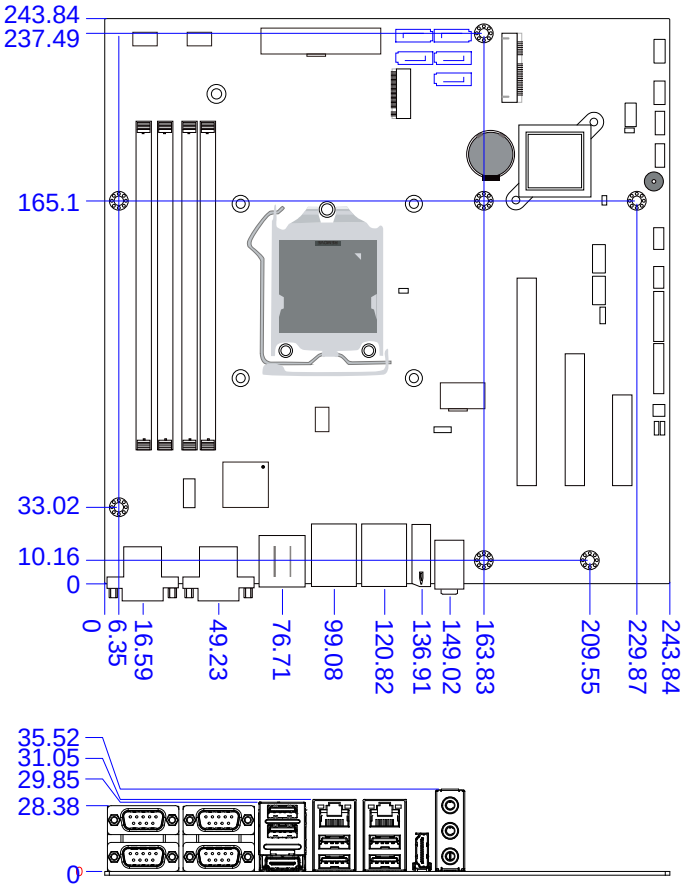
* The photos above are for reference only. Some minor components may differ.

I/O View



No.	Name	No.	Name
1	COM1 & COM2 Ports (from top to bottom)	5	Audio Line-In
2	COM3 & COM4 Ports (from top to bottom)	6	Audio Line-Out
3	USB 3.0 Ports	7	Microphone-In
4	LAN Ports	8	HDMI Port

1.8 Dimensions



Chapter 2
Hardware Configuration

This section provides information on jumper settings and connectors on the MB991AF 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:

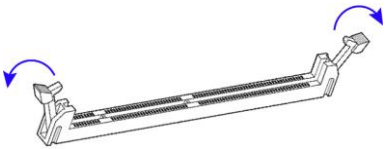
- Installations
  CPU and the memory
- Jumper and connector locations
- Jumper settings and information of connectors

2.1 Installations

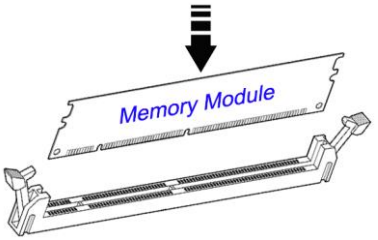
2.1.1 Installing the Memory

The MB991AF board supports four DDR4 memory sockets for a maximum total memory of 64 GB. To install the modules, locate the memory slot on the board and perform the following steps:

1. Press the ejector tab of the memory slot down and outwards with your fingertips.



2. Hold the meomry module and align the key of the module with that on the memory slot.
3. Gently push the module in an upright position unitl the ejector tabs of the memory slot close to hold the module in place whne the module touches the bottom of the slot.



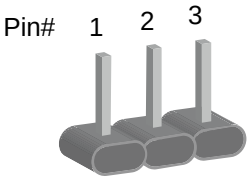
To remove the module, press the ejector tabs outwards with your fintertips to eject the module.

2.2 Setting the Jumpers

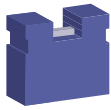
Set up and configure your MB991AF by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

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.

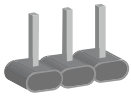
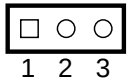
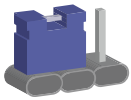
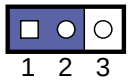
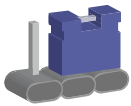
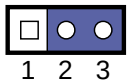


A 3-pin jumper



A jumper cap

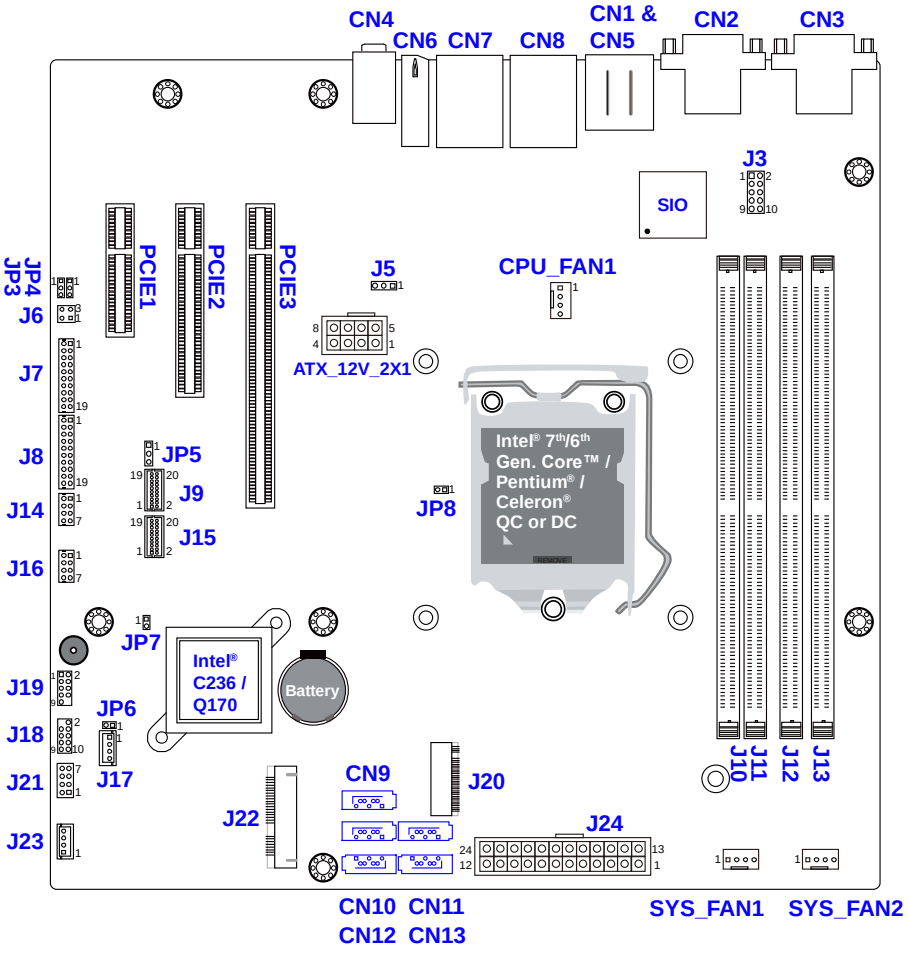
Refer to the illustration below to set jumpers.

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 MB991AF

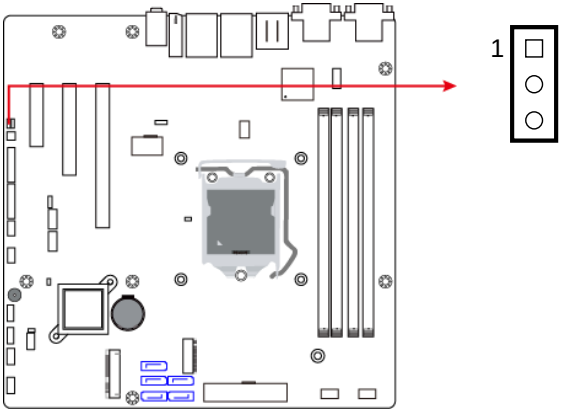


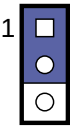
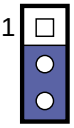
Board diagram of MB991AF

2.4 Jumpers Quick Reference

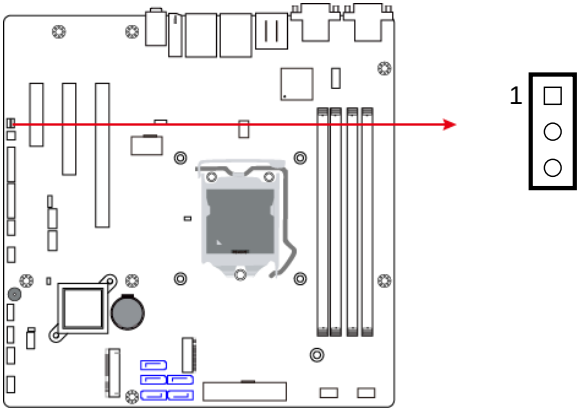
Function	Jumper Name	Page
CMOS Data Clearance	JP3	13
RTC Data Clearance	JP4	14
LVDS Power Selection	JP5	15
LVDS Backlight Power Selection	JP6	16
PCIe (x16) Bifurcation	JP8	17
Factory Use Only	JP7	- -

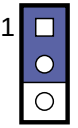
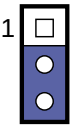
2.4.1 CMOS Data Clearance (JP3)



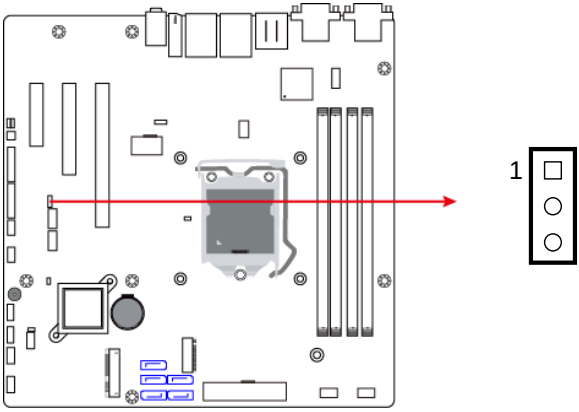
Function	Pin closed	Illustration
Normal (default)	1-2	
Clear CMOS	2-3	

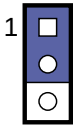
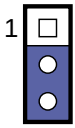
2.4.2 RTC Data Clearance (JP4)



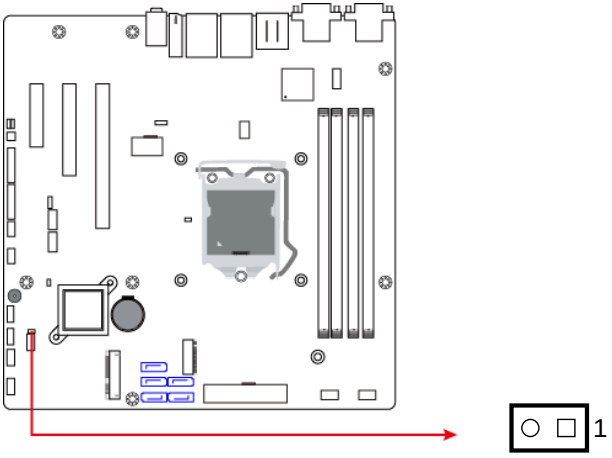
Function	Pin closed	Illustration
Normal (default)	1-2	
Clear RTC	2-3	

2.4.3 LVDS Power Selection (JP5)



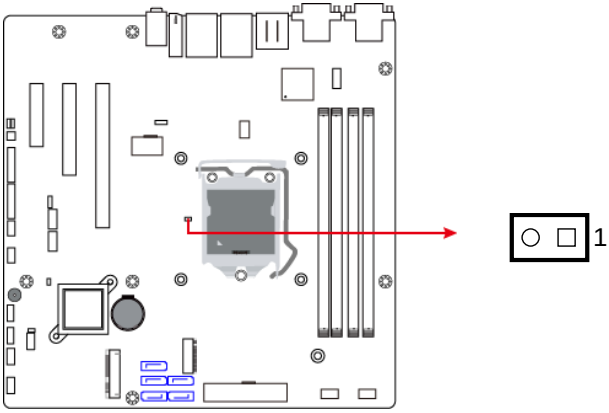
Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

2.4.4 LVDS Backlight Power Selection (JP6)



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

2.4.5 PCIe (x16) Bifurcation (JP8)

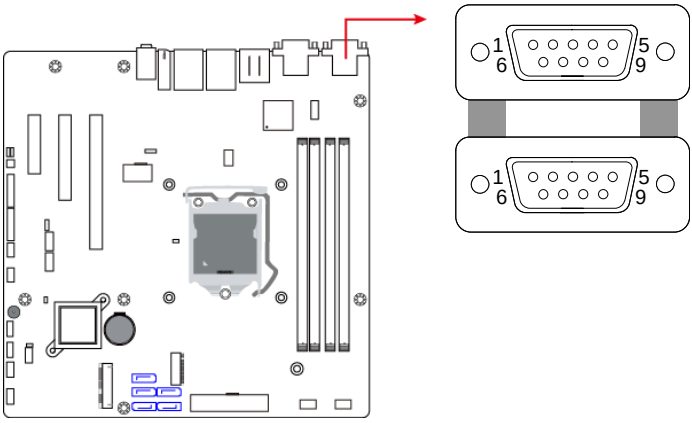


Function	Pin closed	Illustration
x8 (default)	Open	1
x4, x4	Close	1

2.5 Connectors Quick Reference

Function	Connector Name	Page
COM1 & COM2 RS-232/422/485 Ports	CN3	19
COM3 & COM4 RS-232 Ports	CN2	20
Digital I/O Connector	J3	21
COM7 ~ COM10 Ports	J7 (COM7 & COM8), J8 (COM9 & COM10)	22
LVDS Connector	J9 (2nd channel), J15 (1st channel)	23
USB 2.0 Ports	J14, J16	24
LVDS Backlight Connector	J17	25
Front Panel Setting Connector	J21	26
ATX Power Connector	J24	27
AT 12V Power Connector	ATX_12V_2X1	28
CPU Fan Power Connector	CPU_FAN1	29
System Fan Power Connector	SYS_FAN1, SYS_FAN2	29
HDMI Port	CN1	- -
HD Audio Jacks	CN4	- -
USB 3.0 Ports	CN5	- -
HDMI Port	CN6	- -
LAN & USB 3.0 Stacked Ports	CN7, CN8	- -
SATA III Ports	CN9, CN10, CN11, CN12, CN13	- -
S3 Status Connector (reserved)	J6	- -
DDR4 UDIMM Slot	J10, J11, J12, J13	- -
M.2 (M-key) Slot (PCIe only)	J20	- -
mPCIe / mSATA Slot	J22	- -
Factory Use Only	J5, J18, J19, J23	- -

2.5.1 COM1 & COM2 RS-232/422/485 Ports (CN3)

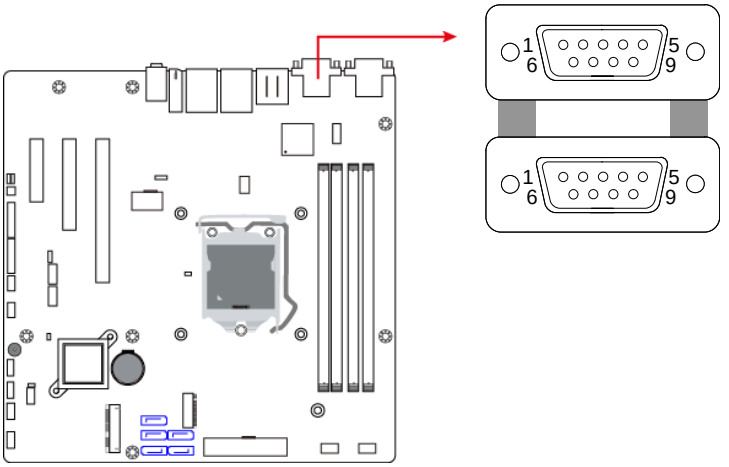


COM1 & COM2 ports are jumper-less and configurable in BIOS.

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

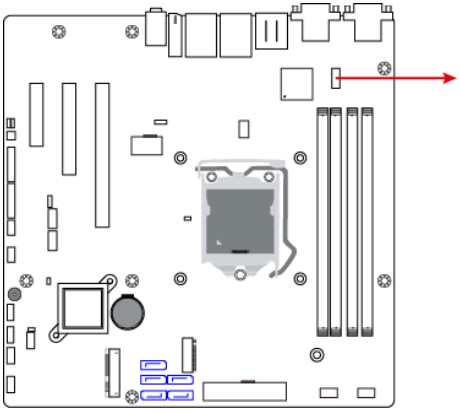
Pin	Assignment		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

2.5.2 COM3 & COM4 Ports (CN2)



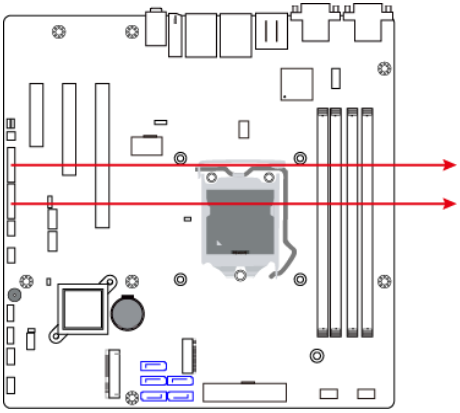
Pin	Assigment	Pin	Assigment
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

2.5.3 Digital I/O Connector (J3)



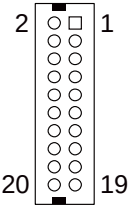
Pin	Assigment	Pin	Assigment
1	Ground	2	+5V
3	Out3	4	Out1
5	Out2	6	Out0
7	IN3	8	IN1
9	IN2	10	IN0

2.5.4 COM7 ~ COM10 Ports (J7, J8)



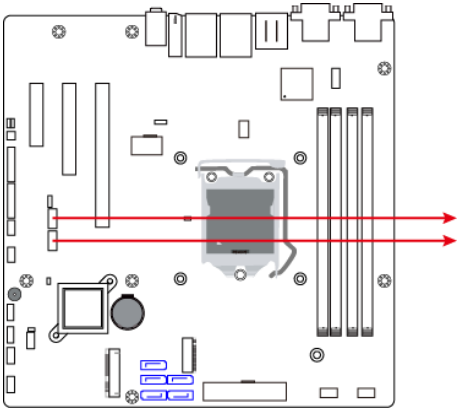
J7: (for COM7 & COM8)

J8: (for COM9 & COM10)

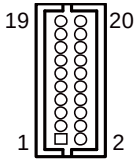


Pin	Assigment	Pin	Assigment
1	DCD#_A	2	DSR#_A
3	SIN#_A	4	RTS#_A
5	SOUT_A	6	CTS#_A
7	DTR#_A	8	RI#_A
9	GND	10	N/C
11	DCD#_B	12	DSR#_B
13	SIN#_B	14	RTS#_B
15	SOUT_B	16	CTS#_B
17	DTR#_B	18	RI#_B
19	GND	20	N/C

2.5.5 LVDS Connector (J9, J15)

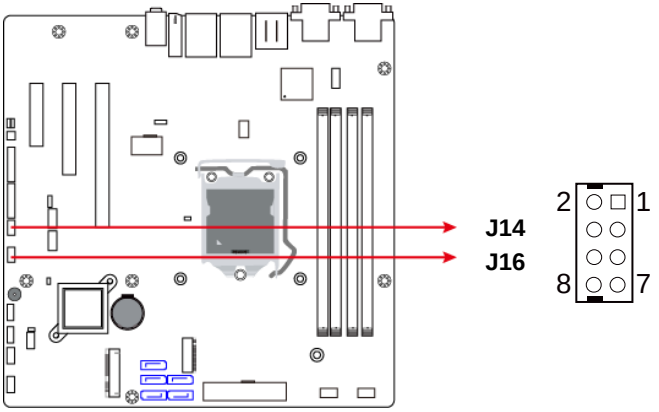


J9: 2nd channel
J15: 1st channel



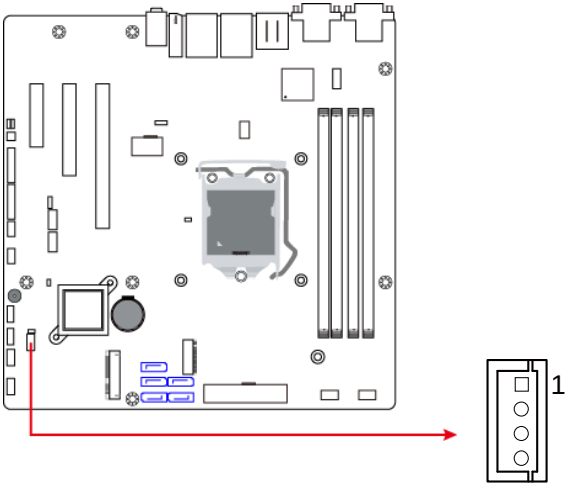
Pin	Assigment	Pin	Assigment
1	LVSA_P	2	LVSA_N
3	GND	4	GND
5	LVSB_P	6	LVSB_N
7	GND	8	GND
9	LVSC_P	10	LVSC_N
11	GND	12	GND
13	LVSCK_P	14	LVSCK_N
15	GND	16	GND
17	LVSD_P	18	LVSD_N
19	3.3V	20	3.3V

2.5.6 USB 2.0 Ports (J14, J16)



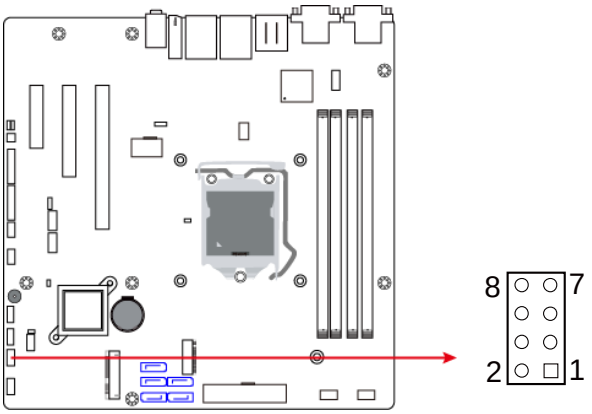
Pin	Assigment	Pin	Assigment
1	VCC	2	Ground
3	D0-	4	D1+
5	D0+	6	D1-
7	Ground	8	VCC

2.5.7 LVDS Backlight Connector (J17)



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

2.5.8 Front Panel Setting Connector (J21)



Pin	Assigment	Pin	Assigment
1	Power BTN	2	Power BTN
3	HDD LED+	4	HDD LED-
5	Reset BTN	6	Reset BTN
7	Power LED+	8	Power LED-

J21 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.

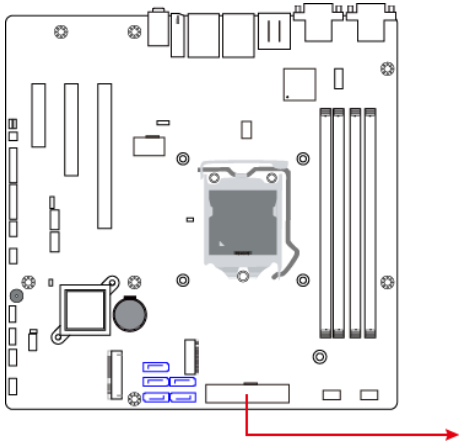
- **Reset Switch (Pins 5 and 6)**

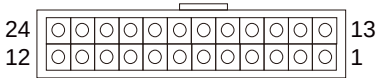
  The reset switch allows you to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.

- **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.

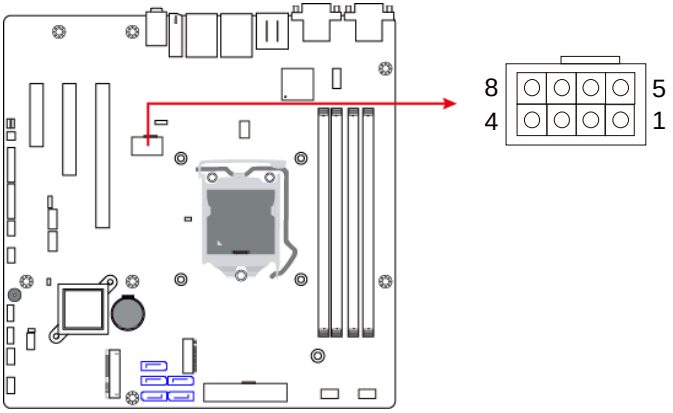
2.5.9 ATX Power Connector (J24)





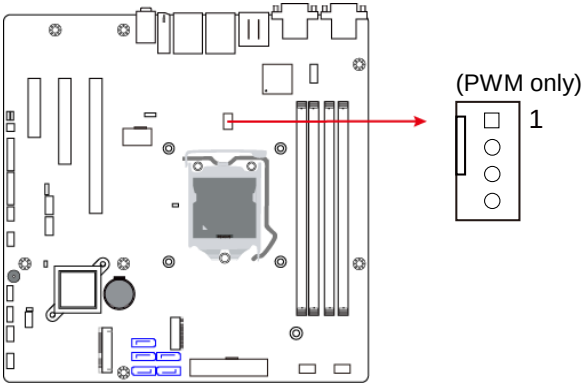
Pin	Assigment	Pin	Assigment
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	Ground	15	Ground
4	+5V	16	PS-ON
5	Ground	17	Ground
6	+5V	18	Ground
7	Ground	19	Ground
8	Power good	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	Ground

2.5.10 AT 12V Power Connector (ATX_12V_2X1)



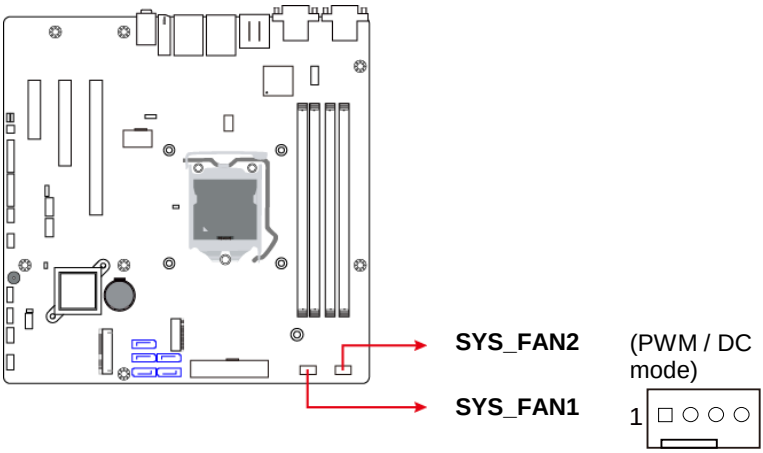
Pin	Assigment	Pin	Assigment
1	Ground	5	+12V
2	Ground	6	+12V
3	Ground	7	+12V
4	Ground	8	+12V

2.5.11 CPU Fan Power Connector (CPU_FAN1)



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

2.5.12 System Fan Power Connector (SYS_FAN1, SYS_FAN2)



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

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Chapter 3
Drivers Installation

This chapter introduces installation of the following drivers:

- Intel® Chipset Software Installation Utility
- HD Graphics Driver
- HD Audio Driver
- LAN Driver
- Intel® Management Engine Drivers Installation
- Fintek 8150s Serial Port Drivers

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 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.

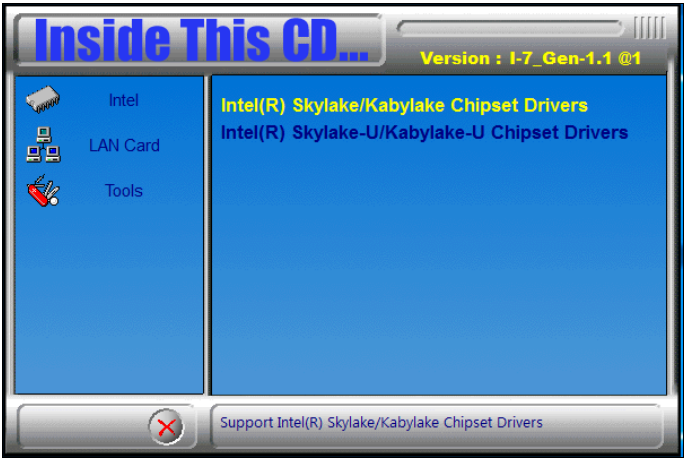
1. Insert the disk enclosed in the package with the board. Click **Intel** on the left pane and then **Intel(R) Skylake/Kabylake Chipset Drivers** on the right pane.

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** for installation.
6. The driver has been completely installed.Restart the computer for changes to take effect.

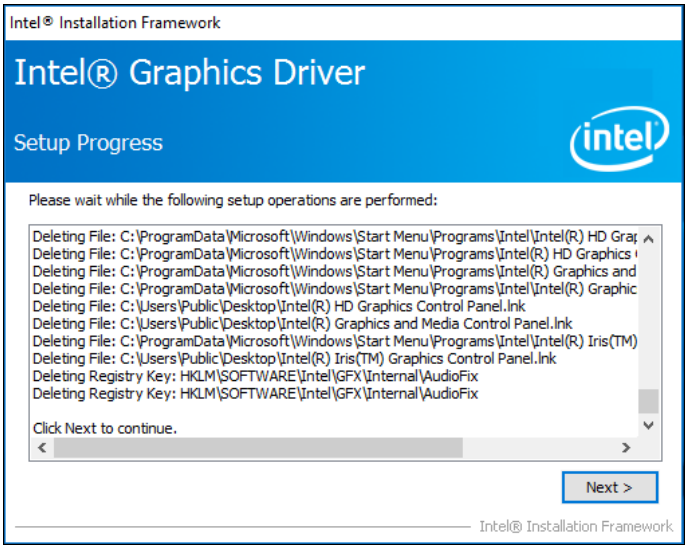
3.3 HD Graphics Driver Installation

1. Click **Intel** on the left pane and then **Intel(R) Skylake/Kabylake Chipset Drivers** on the right pane.



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

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



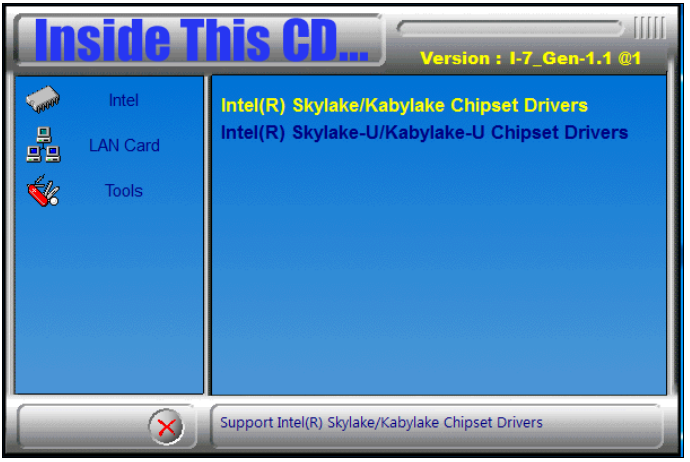
4. Accept the license agreement and click **Next**.

5. On the *Readme File Information* screen, click **Next** until the installation starts.

6. The driver has been completely installed. Restart the computer for changes to take effect.

3.4 HD Audio Driver Installation

1. Click **Intel** on the left pane and then **Intel(R) Skylake/Kabylake Chipset Drivers** on the right pane.



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

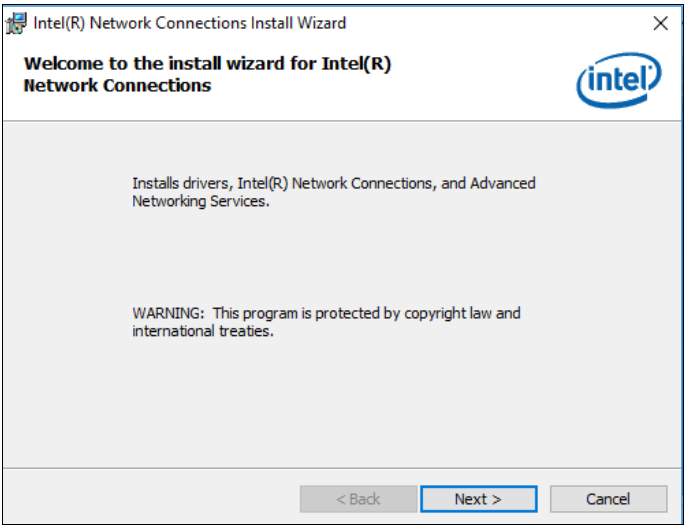
3. On the *Welcome* screen of the InstallShield Wizard, click **Next**.
4. Click **Next** until the installation starts.
5. The driver has been completely installed. Restart the computer for changes to take effect.

3.5 LAN Driver Installation

1. Click **Intel** on the left pane and then **Intel(R) Skylake/Kabylake Chipset Drivers** on the right pane.

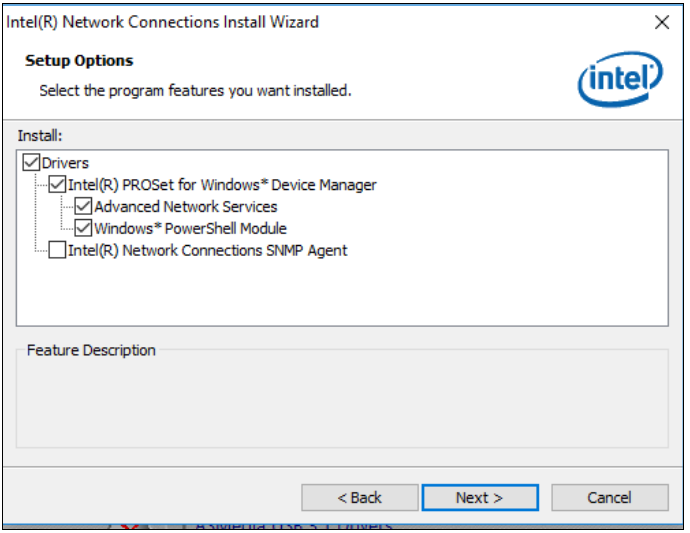
2. Click **Intel(R) PRO LAN Network Drivers**..

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**.

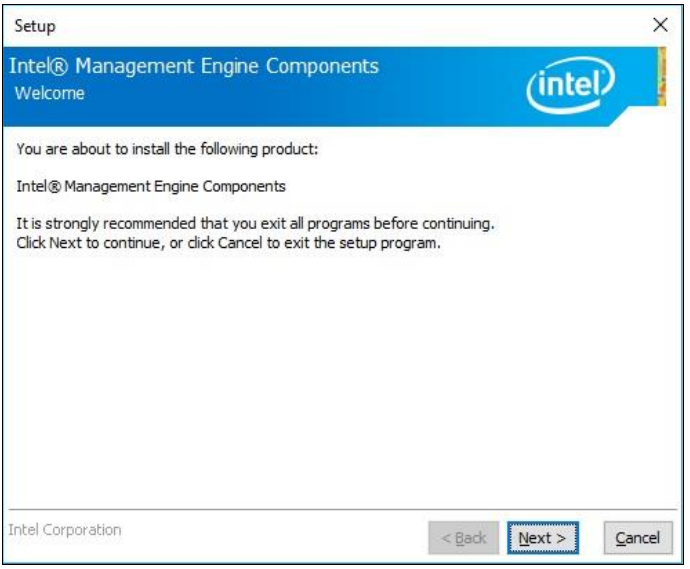
7. As the installation is complete, restart the computer for changes to take effect.

3.6 Intel® Management Engine Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) Skylake/Kabylake Chipset Drivers** on the right pane.

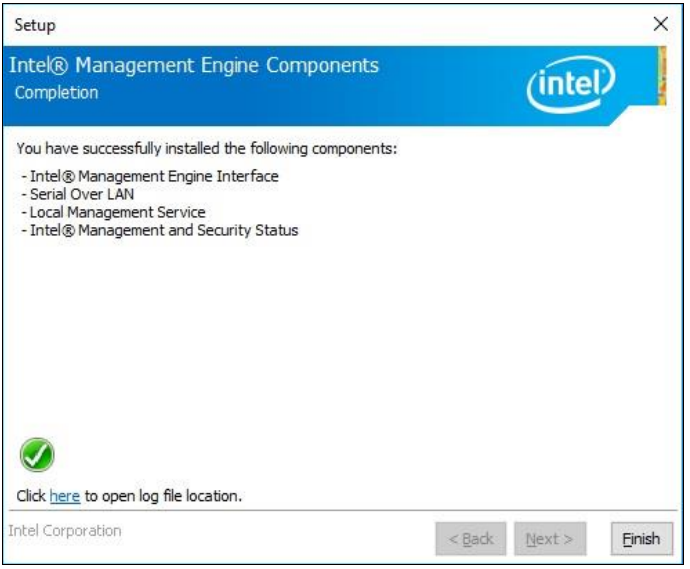
2. Click **Intel(R) ME 11.x Drivers**.

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



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

5. As the driver has been sccessfully installed, you are suggested to restart the computer for changes to take effect.

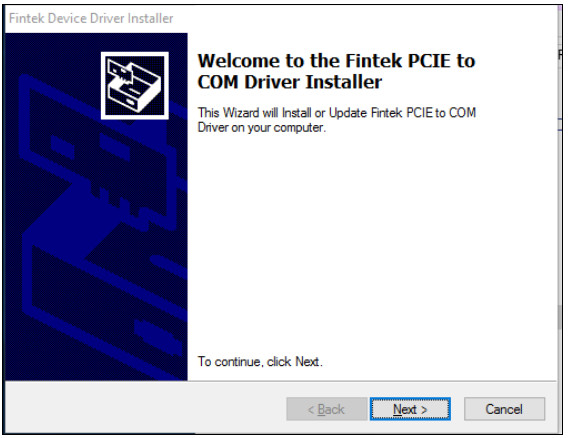


3.7 Fintek 8150x Serial Port Drivers Installation

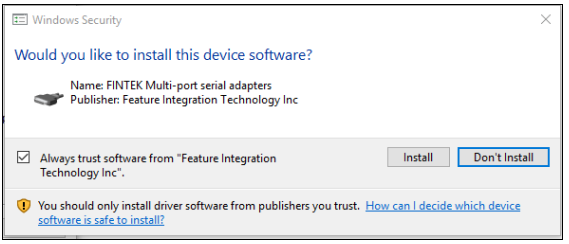
1. Click **Intel** on the left pane and then **Intel(R) Skylake/Kabylake Chipset Drivers** on the right pane.

2. Click **Fintek 8150x Serial Port Drivers**.

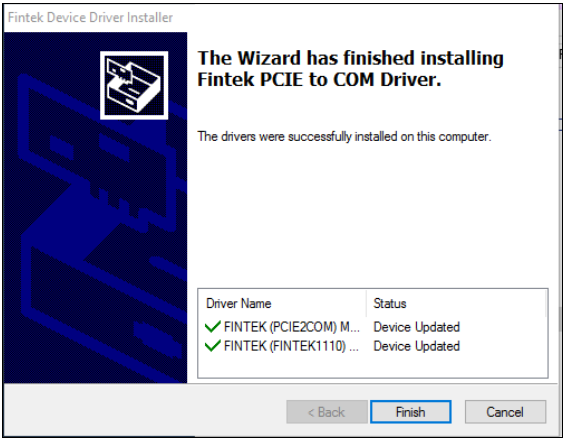
3. When the *Welcome* screen appears, click **Next**.



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



5. As the driver has been sccessfully installed, 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
- Boot Settings
- Security Settings
- Save & Exit

4.1 Introduction

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

4.2 BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Press the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup.

If you still need to enter Setup, restart the system by pressing the ”Reset” button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again.

The following message will appear on the screen:

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

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

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

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

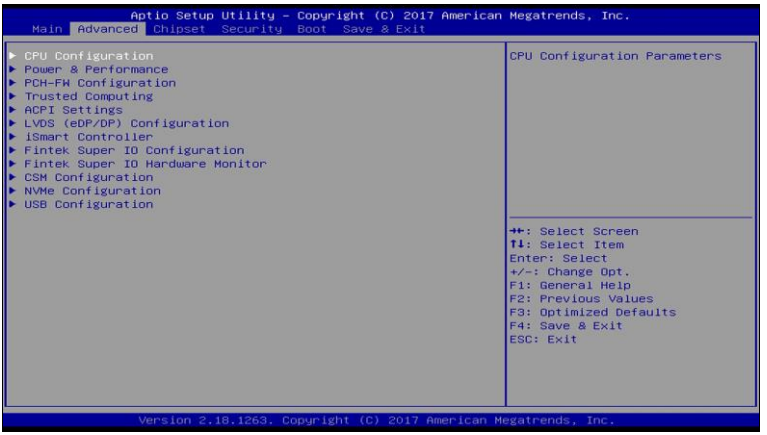
These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could make the system unstable and crash in some cases.

4.3 Main Settings

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

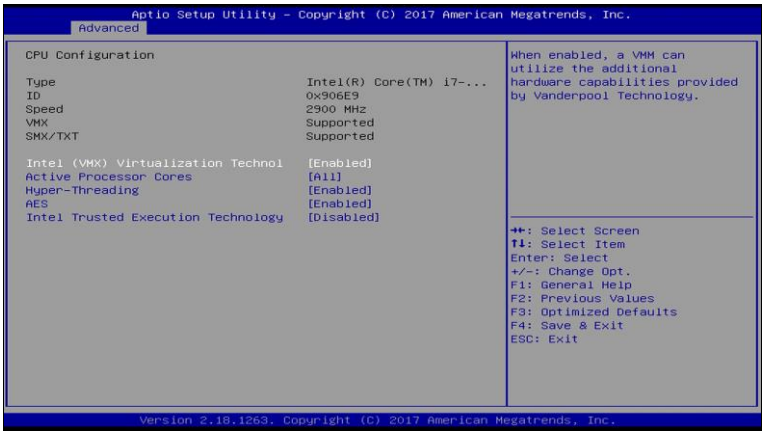
4.4 Advanced Settings

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



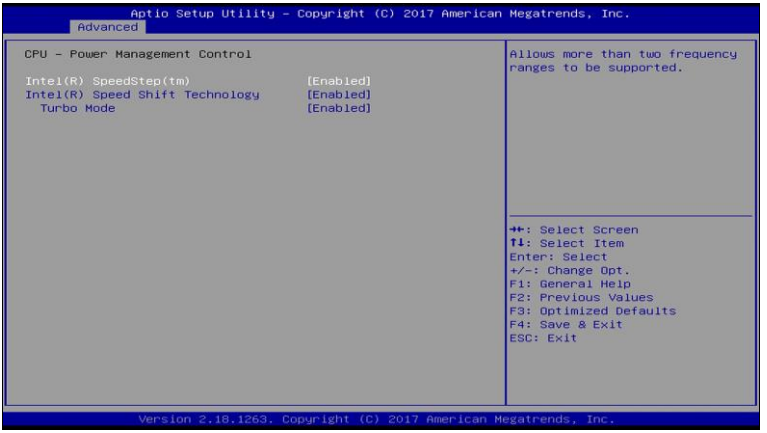
BIOS Setting	Description
CPU Configuration	Displays CPU configuration parameters.
Power & Performance	Shows power and performance options.
PCH-FW Configuration	Configures management engine technology parameters.
Trusted Computing	Trusted computing settings.
ACPI Settings	Displays system ACPI parameters.
LVDS (eDP/DP) Configuration	Configures LVDS (eDP/DP).
iSmart Controller	Sets up the power on time for the system.
Fintek Super IO Configuration	Displays super IO chip parameters.
Fintek Super IO Hardware Monitor	Shows super IO monitor hardware status.
CSM Configuration	Enables / Disables option ROM execution settings, etc.
NVMe Configuration	NVMe device option settings.
USB Configuration	Displays USB configuration parameters.

4.4.1 CPU Configuration



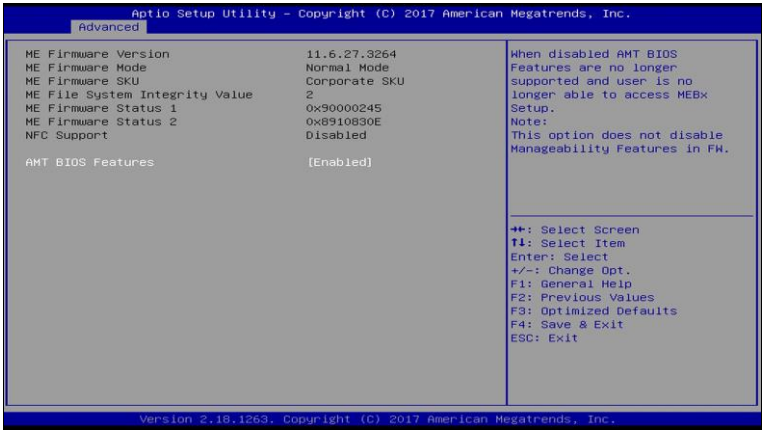
BIOS Setting	Description
Intel(VMX) Virtualization Technology	Enables / Disables a VMM to utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	Number of cores to enable in each processor package. Options: All, 1, 2, 3
Hyper-Threading	**Enabled** for Windows XP and Linux (OS optimized for Hhyper-Threading Technology) and **Disabled** for other OS (OS not optimized for Hyper-Threading Technology).
AES	Enables / Disables AES (Advanced Encription Standard).
Intel Trusted Execution Technology	Enables / Disables utilization of additional hardware capabilities provided by Intel(R) Trusted Execution Technology. Changes require a full power cycle to take effect.

4.4.2 Power & Performance



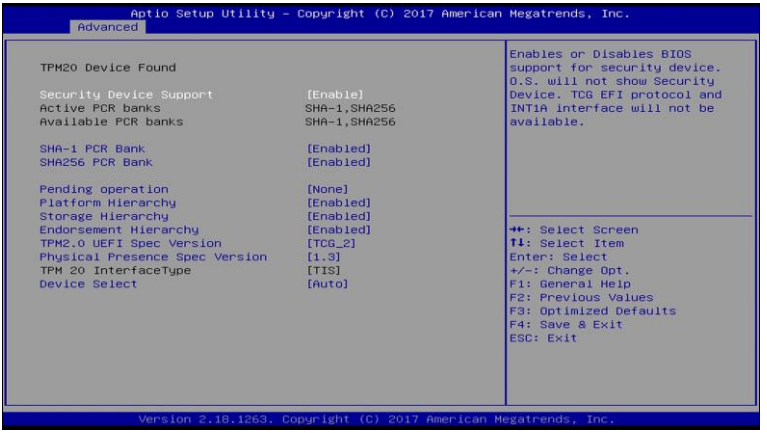
BIOS Setting	Description
Intel(R)	Allows more than two frequency ranges to be supported.
Intel® Speed Shift Technology	Enables / Disables Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Enables / Disables processor Turbo Mode (requires EMMTTM enabled too). **Auto** means enabled, unless max. turbo ration is bigger than 16-SKL AO W/A.

4.4.3 PCH-FW Configuration



BIOS Setting	Description
AMT BIOS Features	When disabled AMT BIOS features are no longer supported and user is no longer able to access MEBx Setup. Note: This option does not disable Manageability features in FM.

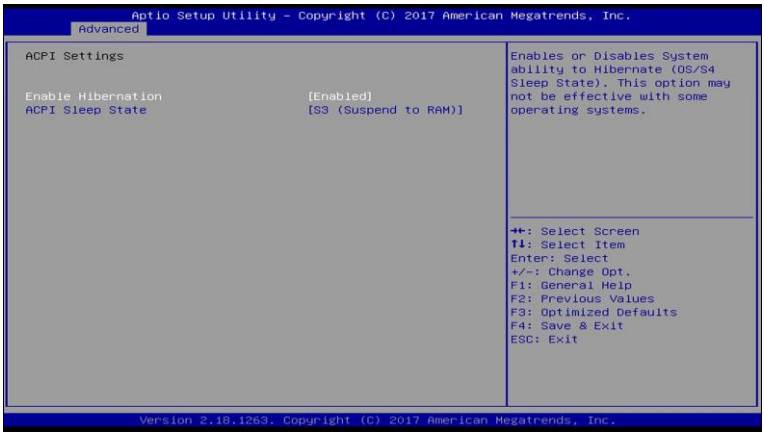
4.4.4 Trusted Computing



BIOS Setting	Description
Security Device Support	Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INTIA 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 Windows 8 /10. • TCG_2: supports new TCG2 protocol and event format for Windows 10 or later.
Physical Presence Spec Version	Select to tell OS to support PPI spec version 1.2 or 1.3. Note: some HCK tests might not support 1.3.

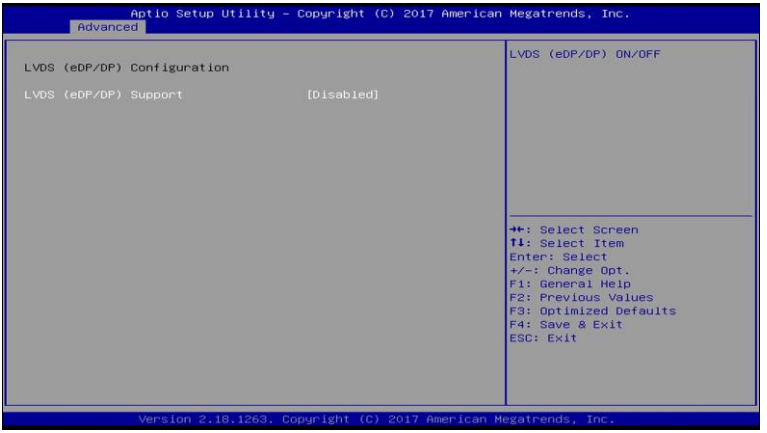
BIOS Setting	Description
Device Select	**TPM 1.2** will restrict support to TPM 1.2 devices. **TPM 2.0** will restrict support ot TPM 2.0 devices. **Auto** will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.

4.4.5 ACPI Settings



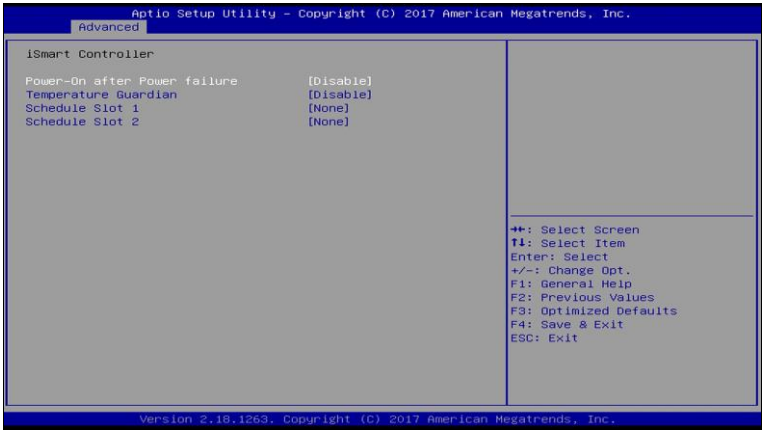
BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Selects an ACPI sleep state where the system will enter when the Suspend button is pressed. Options: Suspend Disabled, S3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

4.4.6 LVDS (eDP/DP) Configuration



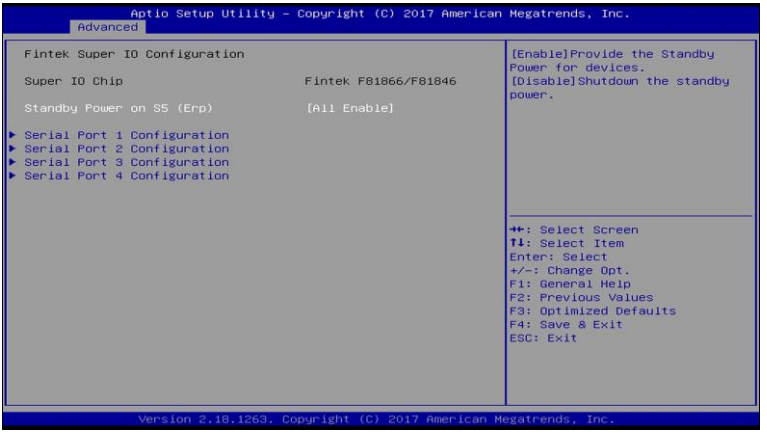
BIOS Setting	Description
LVDS (eDP/DP) Support	Enables / Disables LVDS (eDP/DP).

4.4.7 iSmart Controller



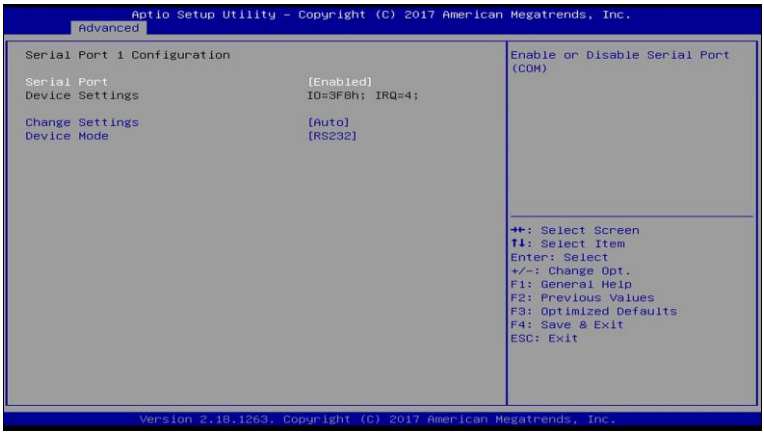
BIOS Setting	Description
Power-On after Power failure	Enables / Disables the system to be turned on automatically after a power failure.
Temperature Guardian	Generate the reset signal when system hands up on POST.
Schedule Slots	Sets up the hour / minute / day for the power-on schedule for the system. Options: • None • Power On • Power On / Off

4.4.8 Fintek Super IO Configuration



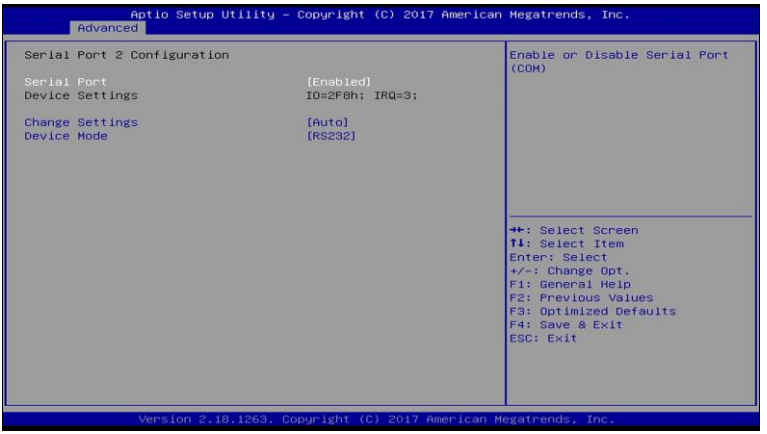
BIOS Setting	Description
Standby Power on S5 (ErP)	Enable the function to provide the standby power for device. Disable the function to shutdown the standby power. Options: All Enable, Enable Ethernet for WOL, All Disable.
Serial Port Configuration	Sets parameters of Serial Ports. Enables / Disables the serial port and select an optimal setting for the Super IO device.

4.4.8.1. Serial Port 1 Configuration



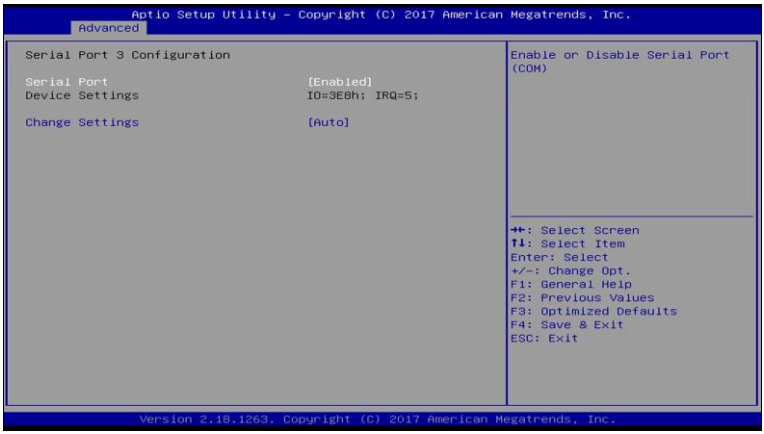
BIOS Setting	Description
Serial Port	Enables / Disables the serial port.
Change Settings	Selects an optimal settings for Super I/O device. Options: • Auto • IO = 3F8h; IRQ = 4 • IO = 3F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12
Serial Port 1 Mode Select	Changes the serial port mode to RS-232 / 422 / 485. Options: • RS232 • RS485 TX Low Active • RS485 with Termination TX Low Active • RS422 • RS422 with Termination

4.4.8.2. Serial Port 2 Configuration



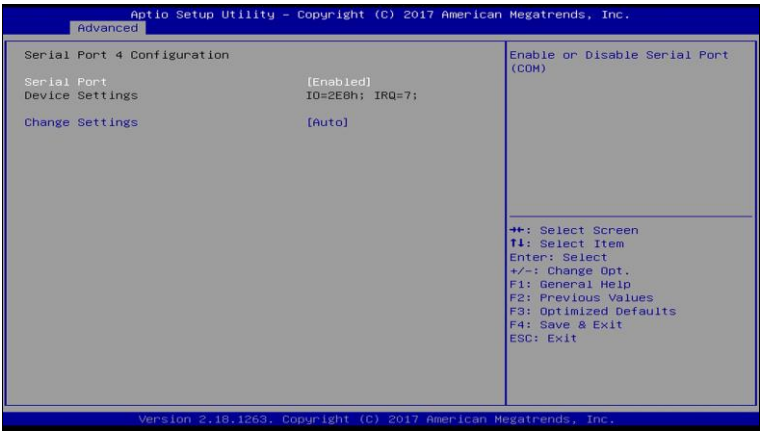
BIOS Setting	Description
Serial Port	Enables / Disables the serial port.
Change Settings	Selects an optimal settings for Super I/O device. Options: • Auto • IO = 2F8h; IRQ = 3 • IO = 3F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12
Serial Port 1 Mode Select	Changes the serial port mode to RS-232 / 422 / 485. Options: • RS232 • RS485 TX Low Active • RS485 with Termination TX Low Active • RS422 • RS422 with Termination

4.4.8.3. Serial Port 3 Configuration



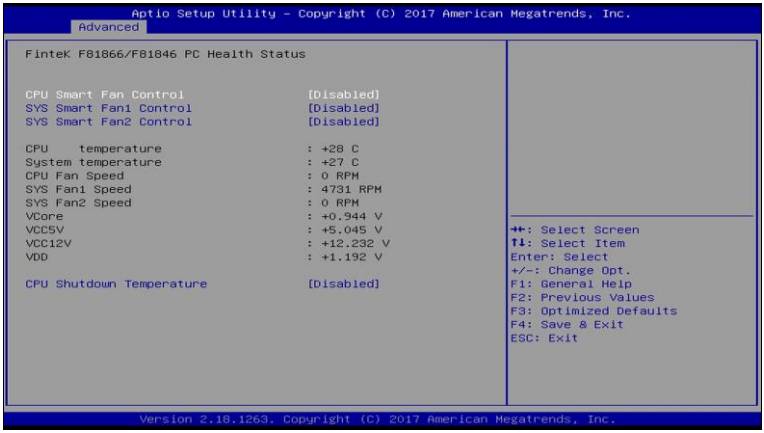
BIOS Setting	Description
Serial Port	Enables / Disables the serial port.
Change Settings	Selects an optimal settings for Super I/O device. Options: • Auto • IO = 3E8h; IRQ = 7 • IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2F0h; IRQ = 3, 4, 5, 6,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

4.4.8.4. Serial Port 4 Configuration



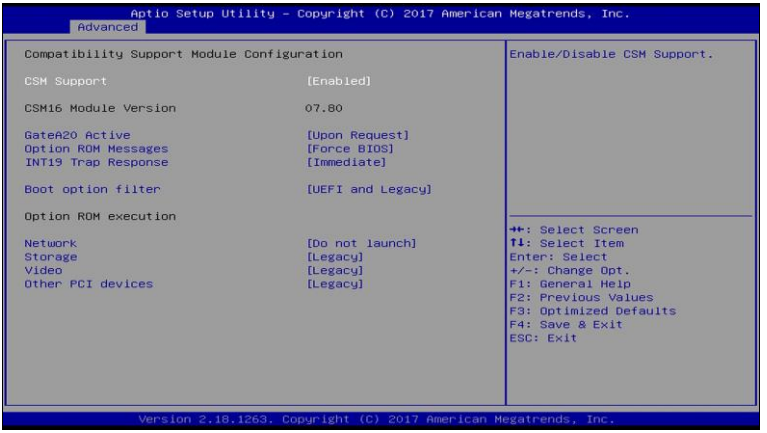
BIOS Setting	Description
Serial Port	Enables / Disables the serial port.
Change Settings	Selects an optimal settings for Super I/O device. Options: • Auto • IO = 2E8h; IRQ = 7 • IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2F0h; IRQ = 3, 4, 5, 6,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

4.4.9 Fintek Super IO Hardware Monitor



BIOS Setting	Description
CPU Smart Fan Control	Enables / Disables the CPU smart fan feature. Options: Disabled / 50 °C / 60 °C / 70 °C / 80 °C
CPU Smart Fan Control	Enables / Disables the system smart fan feature. Options: Disabled / 50 °C / 60 °C / 70 °C / 80 °C
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	Options: Disabled / 70 °C / 75 °C / 80 °C / 85 °C / 90 °C / 95 °C

4.4.10 CSM Configuration

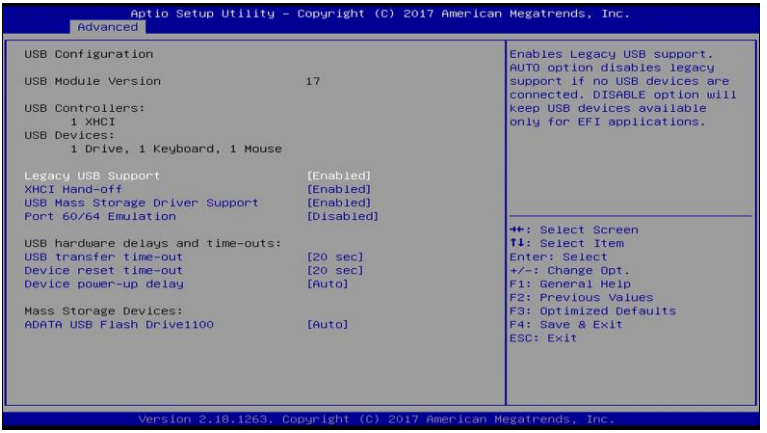


BIOS Setting	Description
CSM Support	Enables / Disables CSM support.
GateA20 Active	• **Upon Request** disables GA20 when using BIOS services. • **Always** cannot disable GA20, but is useful when any RT code is executed above 1 MB.
Option ROM Messages	Sets display mode for Option ROM. Options: Force BIOS, Keep Current
INT19 Trap Response	Sets how BIOS reacts on INT19 trap 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 ROMs. Options: UEFI and Legacy / Legacy only / UEFI only
Network	Controls the execution of UEFI and Legacy PXE OpROM. Options: Do not launch / Legacy

BIOS Setting	Description
Storage	Controls the execution of UEFI and Legacy Storage OpROM. Options: Do not lanuch / UEFI / Legacy
Video	Controls the execution of UEFI and Legacy Video OpROM. Options: Do not lanuch / UEFI / Legacy
Other PCI devices	Determines OpROM execution policy for devices other than network, storage or video. Options: Do not lanuch / UEFI / Legacy

4.4.11 NVMe Configuration

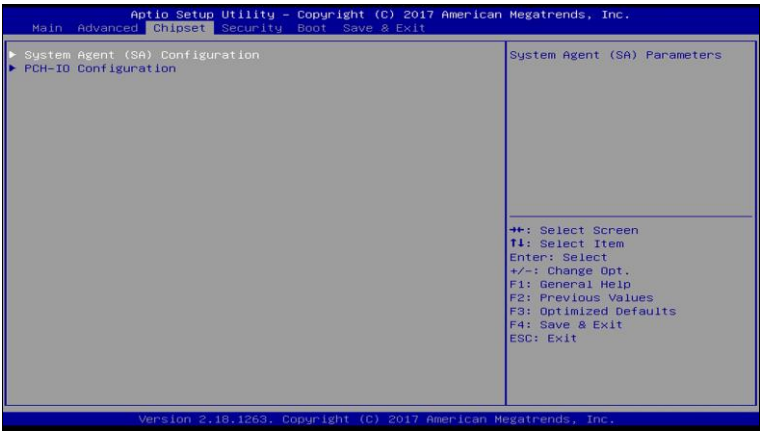
4.4.12 USB Configuration



BIOS Setting	Description
Legacy USB Support	Enables Legacy USB support. • **Auto** disables legacy support if there is no USB device connected. • **Disable** keeps USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enables / Disables the support for USB mass storage driver.
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	The time-out value for control, bulk, and Interrupt transfers. Options: 1 sec / 5 sec / 10 sec / 20 sec
Device reset time-out	Seconds of delaying execution of start unit command to USB mass storage device. Options: 10 sec / 20 sec / 30 sec / 40 sec

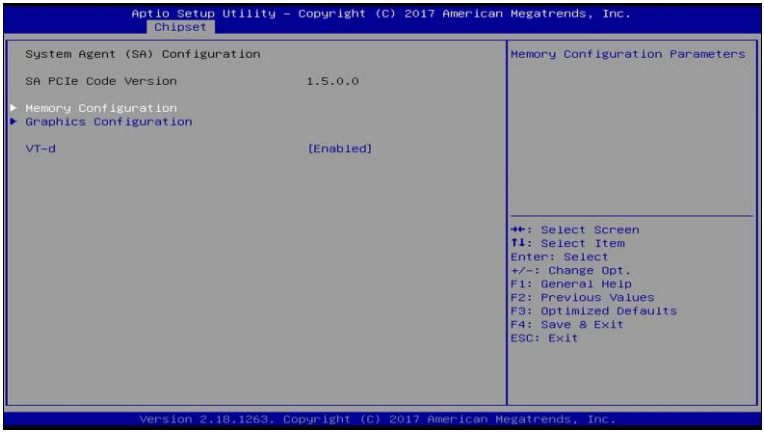
BIOS Setting	Description
Device power-up delay	The maximum time the device will take before it properly reports itself to the Host Controller. **Auto** uses default value for a Root port it is 100ms. But for a Hub port, the delay is taken from Hub descriptor. Options: Auto / Manual
AdATA USB Flash Driver1100	Mass storage device emulation type. **Auto** enumerates devices according to their media format. Optional drives are emulated as CDROM drives with no media will be emulated according to a drive type. Options: Auto / Floppy / Forced FDD / Hard Disk / CD-ROM

4.5 Chipset Settings



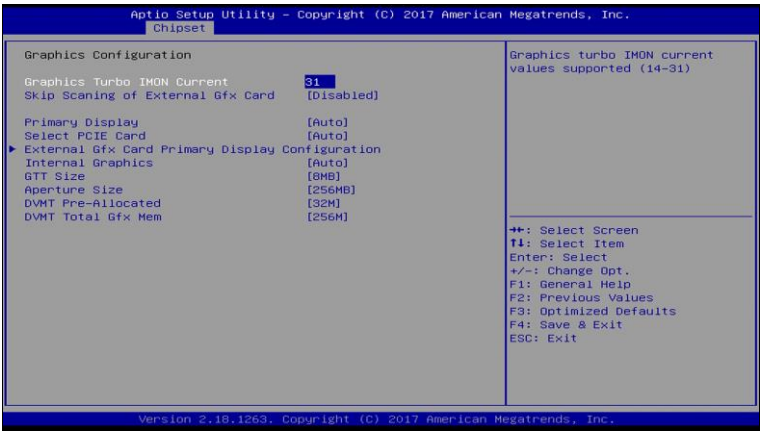
BIOS Setting	Description
System Agent (SA) Configuration	System Agent (SA) parameters
PCH-IO Configuration	PCH parameters

4.5.1 System Agent (SA) Configuration



BIOS Setting	Description
Memory Configuration	Displays the memory configuration parameters.
Graphics Configuration	Configures the graphics settings.
VT-d	Checks if VT-d function on MCH is supported.

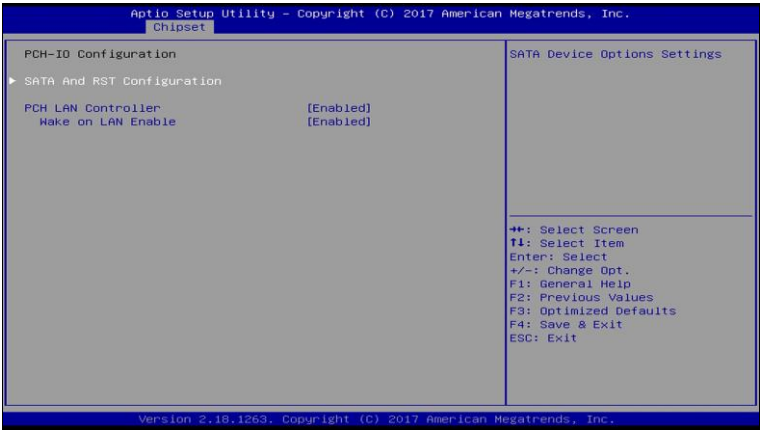
4.5.1.1. Graphics Configuration



BIOS Setting	Description
Graphics Turbo IMON Current	Graphics turbo IMON current values supported (14-31).
Skip Scanning of External Gfx Card	If enabled, it will not scan for external Gfx Card on PEG and PCH PCIE ports.
Primary Display	Selects which of IGFX/PEG/PCI graphics device should be primary display, or selects SG for switchable Gfx. Options: Auto / IGFX / PEG / PCI / SG
Select PCIE Card	Select the card used on the platofrm. • Auto skips GPIO based Power Enable to dGPU. • E1k Creek 4: DGPU Power Enable = Active Low • PEG Eva1: DGPU Power Enable = ActiveHigh
External Gfx Card Primary Display Configuration	Configures the external Gfx card primary display. • Primary PEG: Selects the primary PEG (options: Auto / PEG11 / PEG12). • Primary PCIE: Selects the primary PCIe (options: Auto / PCIE1 ~ PCIE18)

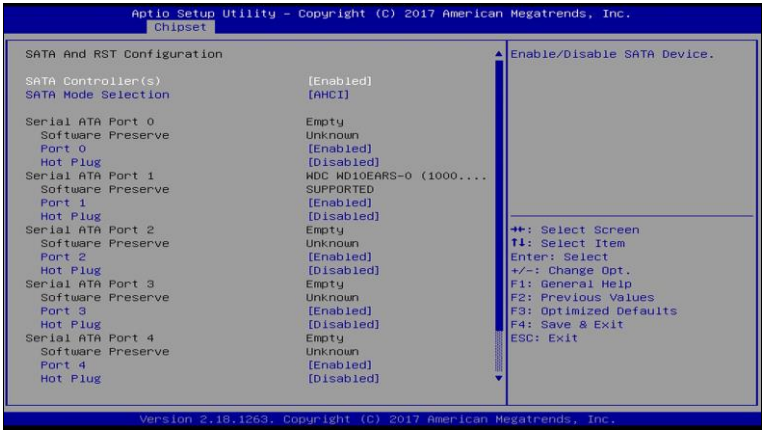
BIOS Setting	Description
Internal Graphics	Keep IGFX enabled based on the setup options. Options: Auto / Disabled / Enabled
GTT Size	Sets the GTT size as 2 MB, 4 MB, or 8 MB.
Aperture Size	Sets the aperture size as 128 MB / 256 MB / 512 MB / 1024 MB / 2048 MB. Note: Above 4 GB MMIO BIOS assignment is automatically enabled when selecting 2048 MB aperture. To use this feature, disable CSM support.
DVMT Pre-Allocated	Sets DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics devce. Options: 0M / 32M / 64M / 4M / 8M / 12M / 16M / 20M / 24M / 28M / 32M/F7 / 36M / 40M / 44M / 48M / 52M / 56M / 60M
DVMT Total Gfx Mem	Selects DVMT 5.0 total graphic memory size used by the internal graphcis device. Options: 256M / 128M / MAX

4.5.2 PCH-IO Configuration



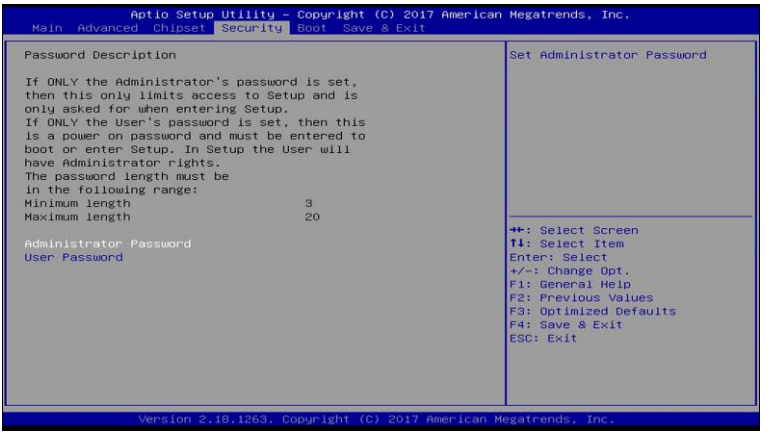
BIOS Setting	Description
SATA and RST Configuration	Configures SATA devices.
PCH LAN Controller	Enables / Disables the onboard NIC.
Wake on LAN Enable	Enables / Disables the integrated LAN to wake up the system.
SLP_LAN# Low on DC Power	Enables / Disables the SLP_LAN# Low on DC Power

4.5.2.1. SATA and RST Configuration:



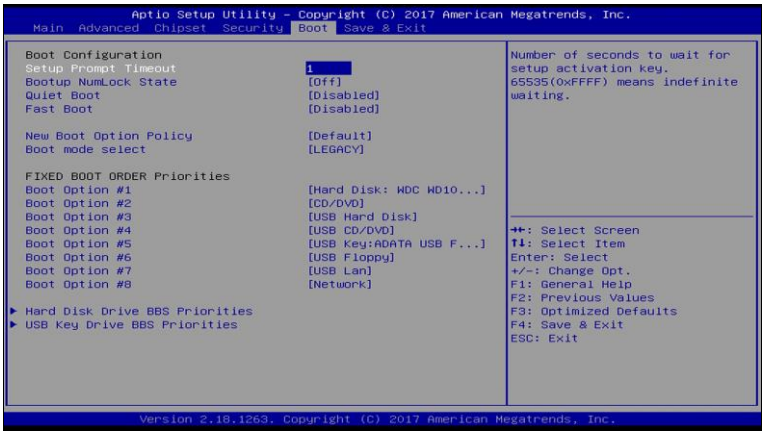
BIOS Setting	Description
SATA Controller(s)	Enables / Disables the SATA device.
SATA Mode Selection	Determines how SATA controller(s) operate. Options: AHCI / Intel RST Premium
Serial ATA Port 0~2	Enables / Disables Serial Port 0 ~ 2.
SATA Ports Hot Plug	Enables / Disables SATA Ports HotPlug.

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 active boot option. Has no effect for BBS boot options.
New Boot Option Policy	Controls the placement of newly detected UEFI boot option.
FIXED BOOT ORDER Priorities	Sets the system boot order.

4.8 Save & Exit Settings

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

Appendix

This section provides the mapping addresses of peripheral devices, the sample code of watchdog timer configuration, and types of on-board connectors.

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
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
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
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller

Address	Device Description
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
0x00000800-0x0000087F	Motherboard resources
0x0000E000-0x0000EFFF	Intel(R) 100 Series / C230 Series Chipset Family PCI Express Root Port #6 - A115
0x000000F0-0x000000F0	Numeric data processor
0x0000F090-0x0000F097	Standard SATA AHCI Controller
0x0000F080-0x0000F083	Standard SATA AHCI Controller
0x0000F060-0x0000F07F	Standard SATA AHCI Controller
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
0x00001854-0x00001857	Motherboard resources
0x00000000-0x00000CF7	PCI Express Root Complex

Address	Device Description
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000F0A0-0x0000F0A7	Intel(R) Active Management Technology - SOL (COM7)
0x0000F000-0x0000F03F	Intel(R) HD Graphics 630
0x000003B0-0x000003BB	Intel(R) HD Graphics 630
0x000003C0-0x000003DF	Intel(R) HD Graphics 630
0x0000FF00-0x0000FFFE	Motherboard resources
0x0000F040-0x0000F05F	Intel(R) 100 Series / C230 Series Chipset Family SMBus - A123
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x0000D000-0x0000DFFF	Intel(R) 100 Series / C230 Series Chipset Family PCI Express Root Port #7 - A116
0x0000D000-0x0000DFFF	FINTEK PCIe To Serial
0x0000D080-0x0000D08F	FINTEK PCIe To Serial
0x0000D060-0x0000D07F	FINTEK PCIe To Serial
0x0000D040-0x0000D05F	FINTEK PCIe To Serial
0x0000D020-0x0000D03F	FINTEK PCIe To Serial

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) Xeon(R) E3 - 1200/1500 v5/6th Gen Intel(R) Core(TM) Gaussian Mixture Model - 1911
IRQ 11	Intel(R) 100 Series / C230 Series Chipset Family SMBus - A123
IRQ 11	Intel(R) 100 Series / C230 Series Chipset Family Thermal subsystem - A131
IRQ 12	Microsoft PS/2 Mouse
IRQ 13	Numeric data processor
IRQ 14	Motherboard resources
IRQ 16	Intel(R) Serial IO I2C Host Controller - A160
IRQ 16	High Definition Audio Controller
IRQ 18	Communications Port (COM7)
IRQ 18	Communications Port (COM8)
IRQ 18	Communications Port (COM9)
IRQ 18	FINTEK Pcie To Serial
IRQ 18	Communications Port (COM6)
IRQ 19	Intel(R) Active Management Technology - SOL (COM5)

Level	Function
IRQ 54 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967282	Intel(R) Management Engine Interface
IRQ 4294967283 ~ IRQ 4294967288	Intel(R) I211 Gigabit Network Connection
IRQ 4294967289	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967290	Intel(R) HD Graphics 630
IRQ 4294967291	Intel(R) Ethernet Connection (2) I219-LM
IRQ 4294967292	Standard SATA AHCI Controller
IRQ 4294967293	Intel(R) 100 Series / C230 Series Chipset Family PCI Express Root Port #7 - A116
IRQ 4294967294	Intel(R) 100 Series / C230 Series Chipset Family PCI Express Root Port #6 - A115

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;
}
//---------------------------------------------------------------------------
```

```
//---------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#ifndef   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. On-Board Connector Types

Function	Connector Name	Type
COM5 & COM6 RS-485 Port * Only available for MB991AF-D	J1, J2	E-CALL_0110-2610030
DVI-D Port * Only available for MB991AF-D	J4	HK_DF11-20S-PA66H
LVDS Connector	J9, J15	HIROSE_DF20G-20DP-1V(56)
COM7 ~ COM10 Ports	J7, J8	HK_DF11-20S-PA66H
USB 2.0 Ports	J14, J16	HK_DF11-8S-PA66H
LCD Backlight Connector	J17	E-CALL_0110-161-040
M.2 (M-key) Slot	J20	LOTES_APCI0107-P001A
mPCIe / mSATA	J22	FOXCONN_AS0B226-S99Q-7H