MAF800 Series

Machine Automation Fanless System

User's Manual

Version 1.0
(October 2021)

iBASE

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Compliance

CE

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

FC

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

WEEE

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

Green IBASE

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

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

Important Safety Information

Carefully read the precautions before using the device.

Environmental conditions:

- Lay the device horizontally on a stable and solid surface in case the device may fall, causing serious damage.
- Make sure you leave plenty of space around the device for ventilation.
- Use the product in ambient temperatures of -10˚C ~ 50˚C with airflow.
- DO NOT LEAVE THIS DEVICE IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20˚C OR ABOVE 80˚C. This could damage the device. The device must be used in a controlled environment.

Care for your IBASE products:

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

WARNING

Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on your device.
- Do not place heavy objects on the top of the device.
- Ensure that you apply correctly the power supply voltage.
- Do not walk on the power cord or allow anything to rest on it.
- If you use an extension cord, make sure that the total ampere rating of the product plugged into the extension cord does not exceed its limits.

Avoid Disassembly

Disassembly, modification, or any attempt at repair could generate hazards and cause damage to the device, even bodily injury or property damage, and will void any warranty.

CAUTION

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

Warranty Policy

- **IBASE standard products:**

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

- **3rd-party parts:**

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

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

Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
2. If you need any further assistance from your distributor or sales representative, prepare the following information of your product and elaborate upon the problem.
   - Product model name
   - Product serial number
   - Detailed description of the problem
   - The error messages in text or in screenshots if there is any
   - The arrangement of the peripherals
   - Software in use (such as OS and application software, including the version numbers)
3. If repair service is required, you can download the RMA form at http://www.ibase.com.tw/english/Supports/RMAService/. Fill out the form and contact your distributor or sales representative.

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Table of Contents

Chapter 1
General Information

The information provided in this chapter includes:

- Features
- Packing List
- Optional Accessories
- Specifications
- Product View
- Dimensions

1.1 Introduction

The MAF800 base model is a high-performance, compact and fanless box PC supporting Intel®-8th Gen. Core™ i7 / i5 / i3 processors and extensive connectivity with three GigE LAN and six USB 3.0 ports for easy integration in multi-camera machine vision applications including locating and aligning parts for assembly with greater speed and accuracy than manual positioning.

Three other configurations of the modular MAF800 series, MAF800-E and MAF800-2E and MAF800-L2E, are built with a SUMIT module that supports four POE ports. The MAF800-2E and MAF800-L2E, however, offers an additional I/O expansion compartment with a PCI/PCIe slot for I/O control cards, a PCIe(x16) slot for an graphics card, and an M.2 / miniPCIe slot for WiFi / Profibus cards. The MAF800 has a 9V~36V wide-range DC input, as well as an extra power input for graphics card or PoE module.

MAF800-2E

1.2 Features

- Compact fanless system with IBASE MBA800 customized board
- Supports 8th Gen Intel® Core™ processors TDP<= 65W
- 3x GigE ports, 6x USB3.0
- Optional 4-Port PoE/PoE+ (Max. 80W in total)
- Front-accessible I/O for simplified installation and maintenance
- Supports PCI(x16), PCI-E(x4)
- Operating temperature range of -10°C to 50°C
- Supports wall mount installation

1.3 Packing List

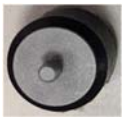
Your product package should include the items listed below. If any of the items below is missing, contact the distributor or the dealer from whom you purchased the product.

MAF800-E

- MAF800-E x 1
- Terminal Block for DC-In Power Adapter (3 pins) x 2
- Wall Mount Kit x 1
- Round Head Screw (for Wall Mount Kit) x 6

- Round Head Screw (for HDD / SDD) x 8

- Shock pad x6



- Suspension nut x 6

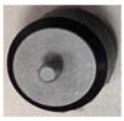
- Disk (including drivers and this user manual) x 1

MAF800-2E

- MAF800-2E x 1
- Terminal Block for DC-In Power Adapter (3 pins) x 2
- Wall Mount Kit x 1
- Round Head Screw (for Wall Mount Kit) x 6

- Round Head Screw (for HDD / SDD) x 8

- Shock pad x6



- Suspension nut x 6

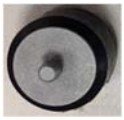
- Disk (including drivers and this user manual) x 1

MAF800-L2E

- MAF800-L2E x 1
- Terminal Block for DC-In Power Adapter (3 pins) x 2
- Wall Mount Kit x 1
- Round Head Screw (for Wall Mount Kit) x 10

- Round Head Screw (for HDD / SDD) x 8

- Shock pad x8



- Suspension nut x 8

- Disk (including drivers and this user manual) x 1

1.4 Optional Accessories

The following optional accessories are provided:

- DC-In Power Adaptor
- Power Cord
- DC-In Power Cable

- 2nd SSD/HDD and SATA Cable

1.5 Specifications – MAF800-E

Product Name	MAF800-E
System	
Motherboard	MBA800
CPU	8th Gen Intel® Core™ processors TDP<=65W LGA1151 CPU
Operating System	• Windows10 (64-bit) • Linux Ubuntu
CPU Speed	Up to 3.2 GHz
Chipset	Intel® Q370
Memory	2 x DDR4-2400 SO-DIMM 4GB, expandable to 32 GB (Non-ECC)
Storage	• 2 x 2.5” SSD/HDD • 1 x M.2
Super I/O	Fintek F81966D-I
Audio Codec	Realtek ALC662
Network	Onboard : • 1 x Intel® I219LM GbE PHY • 2 x Intel® I211AT GbE PoE module : (optional) • 4 x Intel I210AT GbE
Power Supply	240W power adaptor (optional)
BIOS	AMI BIOS
Watchdog	Watchdog Timer 256 segments, 0, 1, 2…255 sec/min
iAMT	11.6
Chassis	Aluminum & steel, silver & blue
Mounting	• Desktop mount / Wall mount (wall mount kit included)
Dimensions (W x H x D)	284 x 80 x 262 mm
Weight	5.4 kg
Certificate	CE / LVD / FCC Class B

I/O Ports	
DC Input	• 1 x 9V~36V DC-in through a 3-pin terminal block (for system power) • 1 x 12V 6-pin DC-in power input (for GPU card)
LAN	Onboard : • 3 x RJ45 GbE LAN PoE module : (optional) • 4 x RJ45 GbE LAN
USB	• 6 x USB 3.0
Serial	**4 x COM ports:** • COM1~2: RS-232/422/485, selectable from BIOS • COM3~4 : RS-232
Digital I/O	4-In & 4-Out (onboard)
Display Output	• 1 x DVI-I • 1 x HDMI
Audio Jack	• 1 x Microphone Input • 1 x Line-Out
SATA	2 x SATA III connector
Expansion	• 1 x Mini-PCIe (full-size) • 1 x M.2 (M key@2280)
Environment	
Temperature	• **Operating:** -10 ~ 50 °C (14 ~ 140 °F) with airflow -10 ~ 45 °C (14 ~ 122 °F) without airflow • **Storage:** -20~ 80 °C (-4 ~ 176 °F)
Relative Humidity	5 ~ 90% at 45 °C (non-condensing)
Vibration Protection	Shinewave tests: • **Operating:** 0.25 Grms / 5 ~ 500 Hz • **Non-operating:** 1 Grms / 5 ~ 500Hz
Shock Protection	• **Operating:** 20 g / 11 ms • **Non-operating:** 40 g / 11 ms

1.6 Specifications – MAF800-2E

Product Name	MAF800-2E
System	
Motherboard	MBA800
CPU	8th Gen Intel® Core™ processors TDP<=65W LGA1151 CPU
Operating System	• Windows10 (64-bit) • Linux Ubuntu
CPU Speed	Up to 3.2 GHz
Chipset	Intel® Q370
Memory	2 x DDR4-2400 SO-DIMM 4GB, expandable to 32 GB (Non-ECC)
Storage	• 2 x 2.5” SSD/HDD • 1 x M.2
Super I/O	Fintek F81966D-I
Audio Codec	Realtek ALC662
Network	Onboard : • 1 x Intel® I219LM GbE PHY • 2 x Intel® I211AT GbE PoE module : (optional) • 4 x Intel I210AT GbE
Power Supply	240W power adaptor (optional)
BIOS	AMI BIOS
Watchdog	Watchdog Timer 256 segments, 0, 1, 2…255 sec/min
iAMT	11.6
Chassis	Aluminum & steel, silver & blue
Mounting	• Desktop mount / Wall mount (wall mount kit included)
Dimensions (W x H x D)	284 x 160 x 262 mm
Weight	9 kg
Certificate	CE / LVD / FCC Class B

I/O Ports	
DC Input	• 1 x 9V~36V DC-in through a 3-pin terminal block (for system power) • 1 x 12V 6-pin DC-in power input (for GPU card)
LAN	Onboard : • 3 x RJ45 GbE LAN PoE module : (optional) • 4 x RJ45 GbE LAN
USB	• 6 x USB 3.0
Serial	**6 x COM ports:** • COM1~2: RS-232/422/485, selectable from BIOS • COM3~6 : RS-232
Digital I/O	4-In & 4-Out (onboard)
Display Output	• 1 x DVI-I • 1 x HDMI
Audio Jack	• 1 x Microphone Input • 1 x Line-Out
SATA	2 x SATA III connector
Expansion	• 1 x Mini-PCIe (full-size) • 1 x M.2 (M key@2280) • 1 x PCIe x16 slot • 1 x PCIe x8 slot (PCIe x4 signal)
Environment	
Temperature	• **Operating:** -10 ~ 50 °C (14 ~ 140 °F) with airflow -10 ~ 45 °C (14 ~ 122 °F) without airflow • **Storage:** -20~ 80 °C (-4 ~ 176 °F)
Relative Humidity	5 ~ 90% at 45 °C (non-condensing)
Vibration Protection	Shinewave tests: • **Operating:** 0.25 Grms / 5 ~ 500 Hz • **Non-operating:** 1 Grms / 5 ~ 500Hz
Shock Protection	• **Operating:** 20 g / 11 ms • **Non-operating:** 40 g / 11 ms

1.7 Specifications – MAF800-L2E

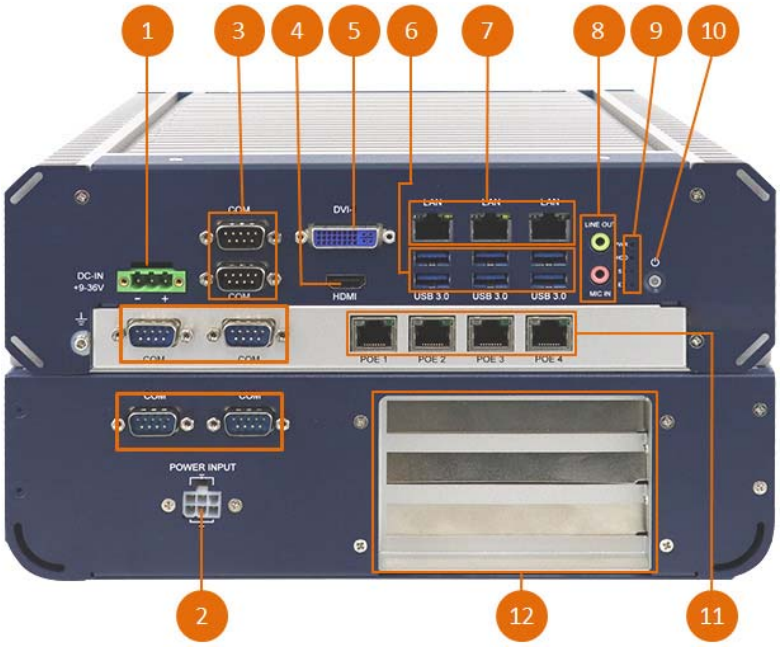
Product Name	MAF800-L2E
System	
Motherboard	MBA800
CPU	8th Gen Intel® Core™ processors TDP<=65W LGA1151 CPU
Operating System	• Windows10 (64-bit) • Linux Ubuntu
CPU Speed	Up to 3.2 GHz
Chipset	Intel® Q370
Memory	2 x DDR4-2400 SO-DIMM 4GB, expandable to 32 GB (Non-ECC)
Storage	• 2 x 2.5” SSD/HDD • 1 x M.2
Super I/O	Fintek F81966D-I
Audio Codec	Realtek ALC662
Network	Onboard : • 1 x Intel® I219LM GbE PHY • 2 x Intel® I211AT GbE PoE module : (optional) • 4 x Intel I210AT GbE
Power Supply	240W power adaptor (optional)
BIOS	AMI BIOS
Watchdog	Watchdog Timer 256 segments, 0, 1, 2…255 sec/min
iAMT	11.6
Chassis	Aluminum & steel, silver & blue
Mounting	• Desktop mount / Wall mount (wall mount kit included)
Dimensions (W x H x D)	284 x 160 x 363 mm
Weight	10 kg
Certificate	CE / LVD / FCC Class B

I/O Ports	
DC Input	• 1 x 9~36V DC-in through a 3-pin terminal block (for system power) • 1 x 12V 6-pin DC-input (for GPU card)
LAN	Onboard : • 3 x RJ45 GbE LAN PoE module : (optional) • 4 x RJ45 GbE LAN
USB	• 6 x USB 3.0
Serial	**6 x COM ports:** • COM1~2: RS-232/422/485, selectable from BIOS • COM3~6 : RS-232
Digital I/O	4-In & 4-Out (onboard)
Display Output	• 1 x DVI-I • 1 x HDMI
Audio Jack	• 1 x Microphone Input • 1 x Line-Out
SATA	2 x SATA III connector
Expansion	• 1 x Mini-PCIe (full-size) • 1 x M.2 (M key@2280) • 1 x PCIe x16 slot 1 x PCIe x8 slot (PCIe x4 signal)
Environment	
Temperature	• **Operating:** -10 ~ 50 °C (14 ~ 140 °F) with airflow -10 ~ 45 °C (14 ~ 122 °F) without airflow • **Storage:** -20~ 80 °C (-4 ~ 176 °F)
Relative Humidity	5 ~ 90% at 45 °C (non-condensing)
Vibration Protection	Shinewave tests: • **Operating:** 0.25 Grms / 5 ~ 500 Hz • **Non-operating:** 1 Grms / 5 ~ 500Hz
Shock Protection	• **Operating:** 20 g / 11 ms • **Non-operating:** 40 g / 11 ms

All specifications are subject to change without prior notice.

1.8 Product View

Front View

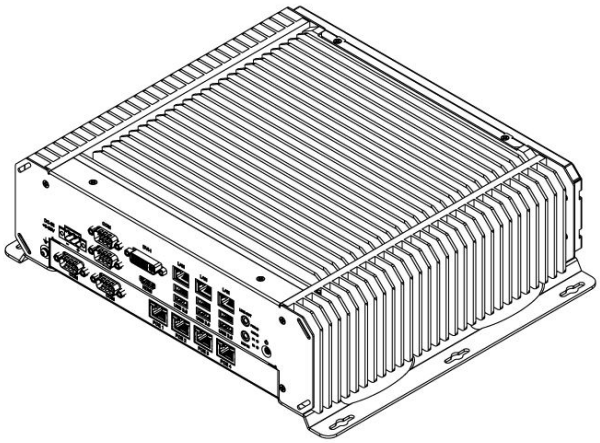


No.	Name	No.	Name
1	DC-In Power Connector for system power (12~24V)	7	Gigabit LAN Ports
2	Power Input for GPU cards (Use only 12V.)	8	Audio Jacks (red for Mic-In, green for Line- Out)
3	COM Ports (COM1/2 RS-232/422/485, COM3~6 RS-232)	9	LED Indicator (from top to bottom: S1*, E1*, SSD/HDD, Power)
4	HDMI	10	Power Button
5	DVI-I Port	11	SUMIT module PoE GbE Ports
6	USB 3.0 Ports	12	Expansion Card Cable Organizer

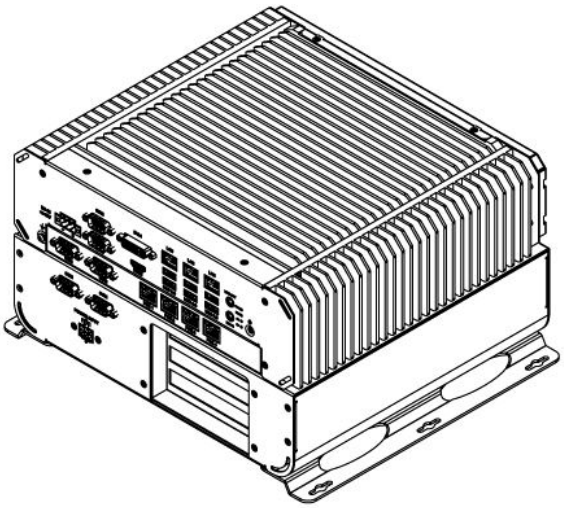
* The LED indicators S1 (for status) and E1 (for errors) are configurable by users.

Wall Mount

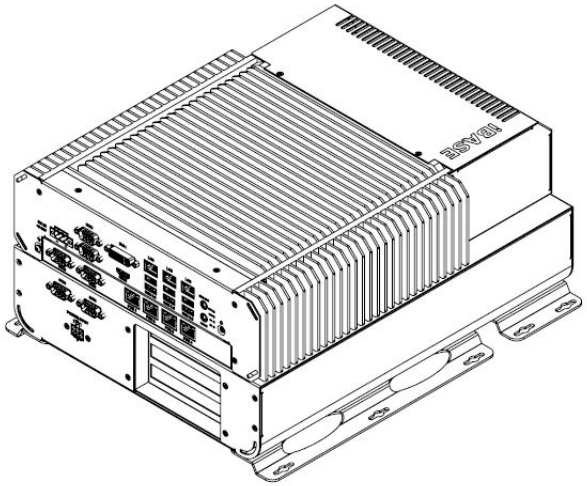
MAF800-E



MAF800-2E



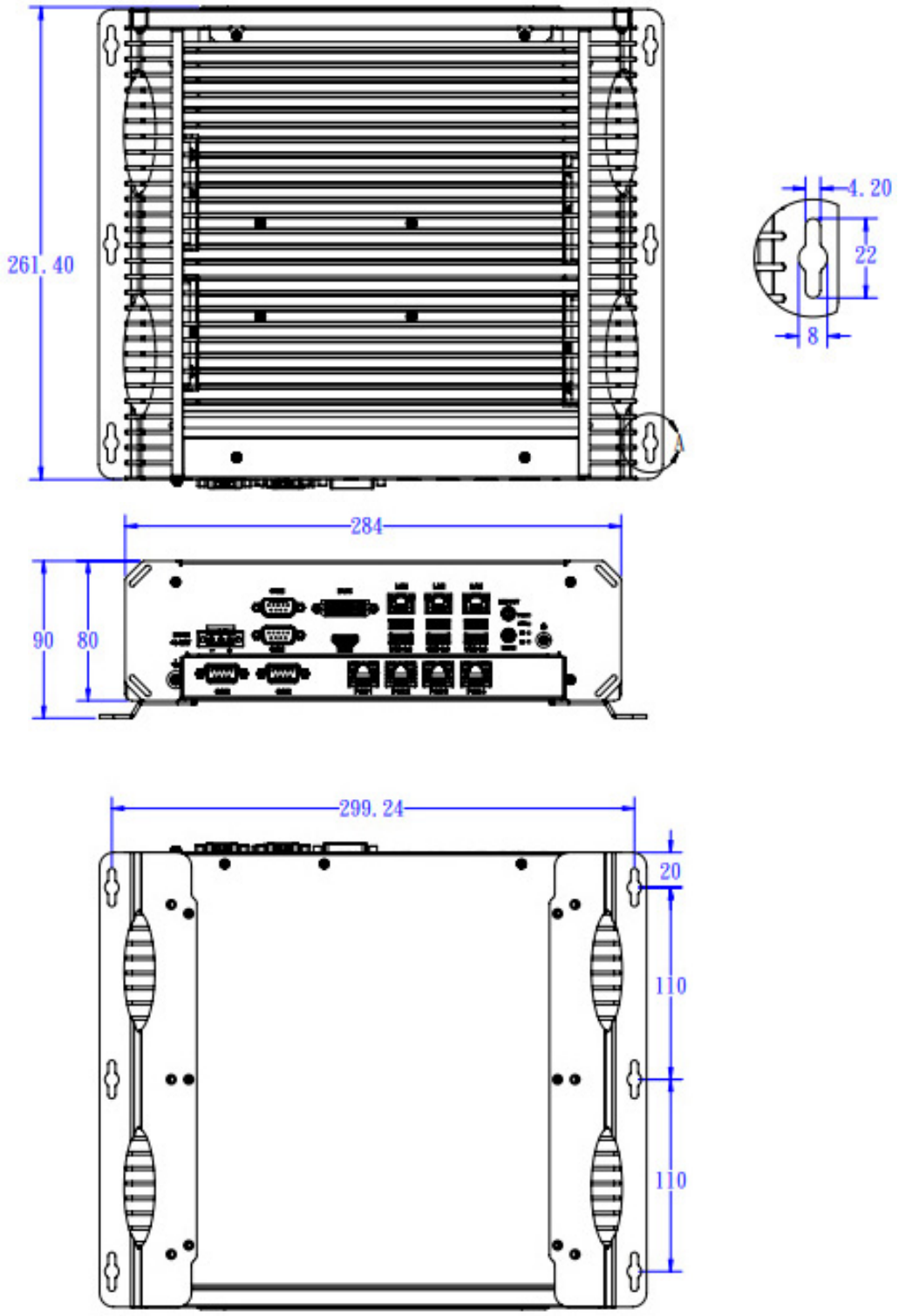
MAF800-L2E



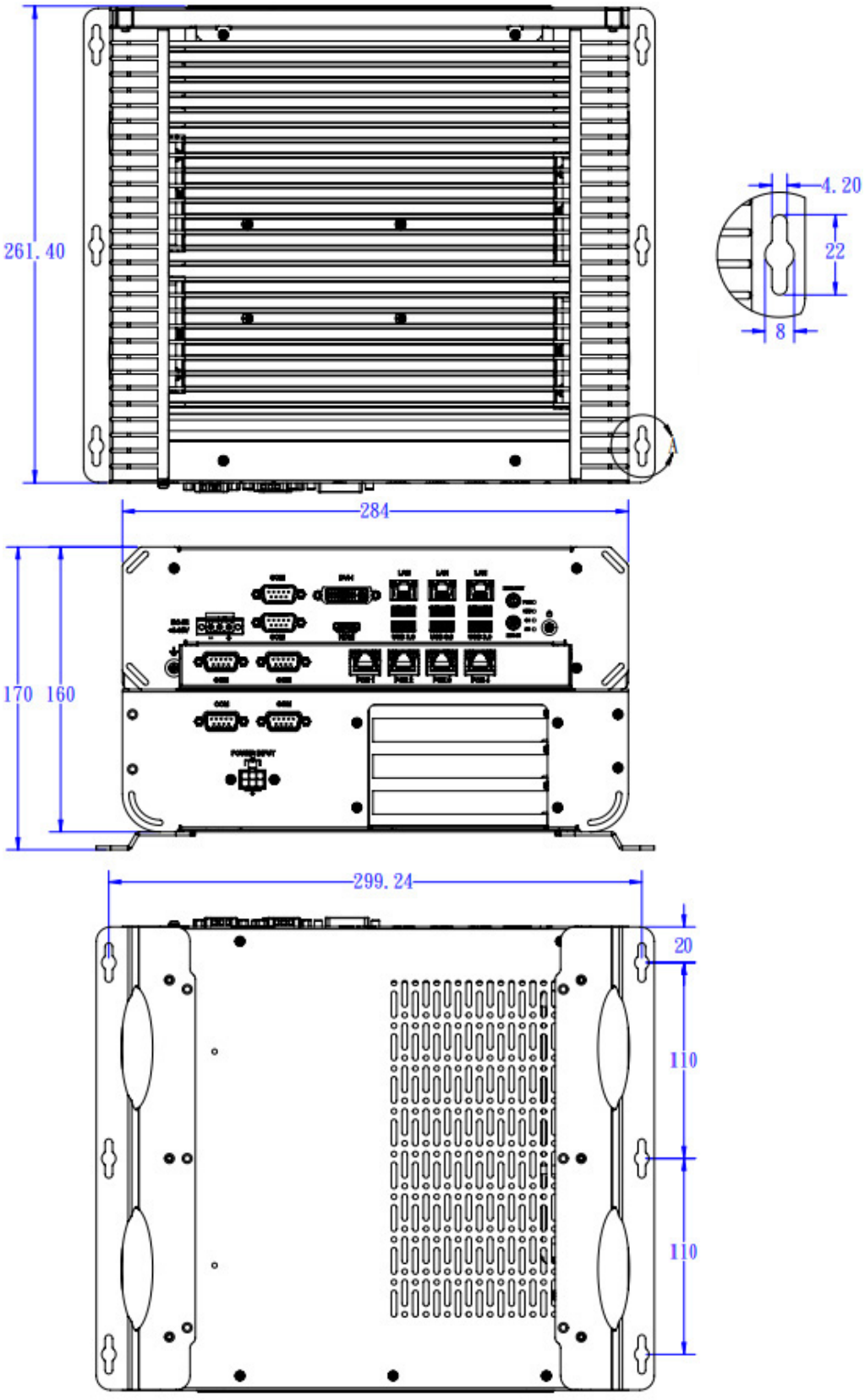
1.9 Dimensions

Unit: mm

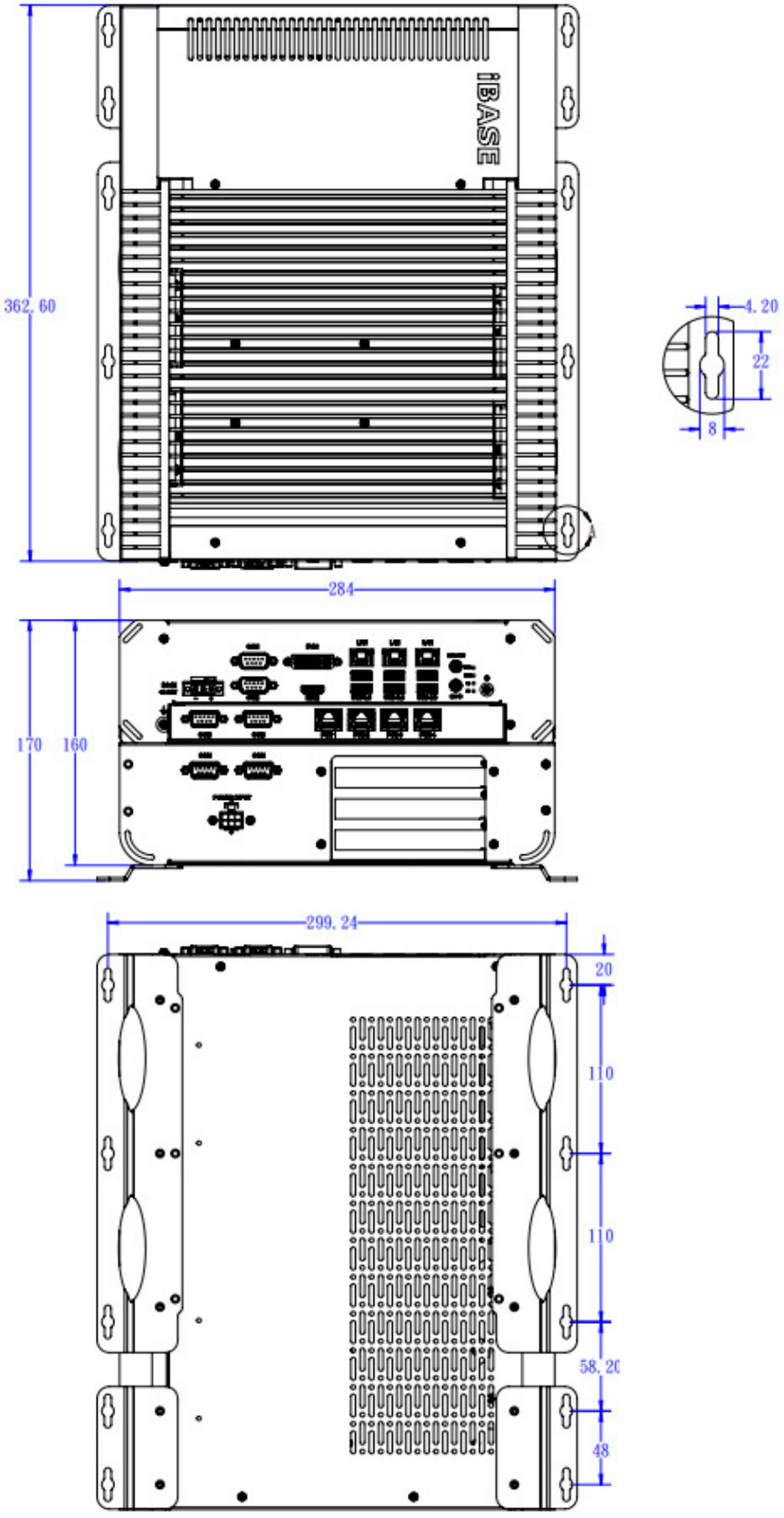
MAF800-E



MAF800-2E



MAF800-L2E



Chapter 2
Hardware Configuration

The information provided in this chapter includes:

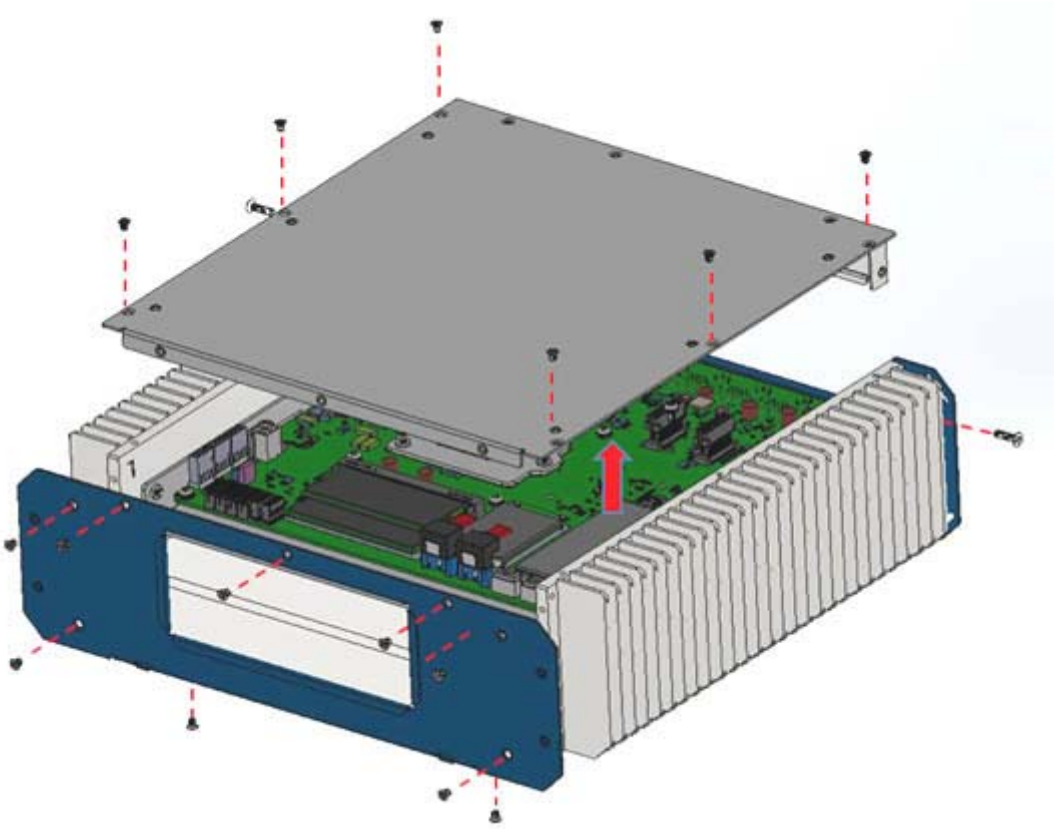
- Installation / Replacement
- Information and locations of connectors

2.1 Installation / Replacement

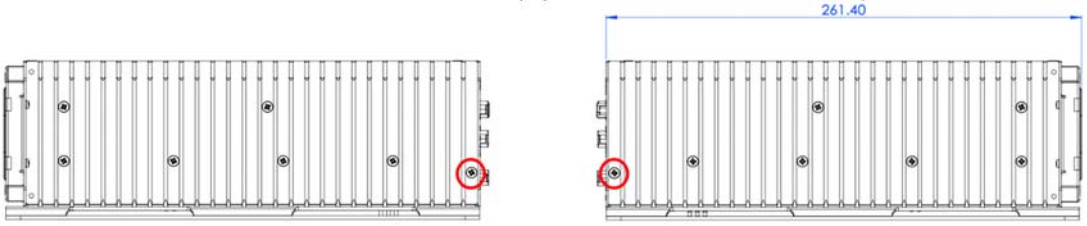
Remove the bottom cover before performing installation / replacement of memory module cards and expansion cards except for the SSD/HDD. After the installation/replacement, secure the bottom cover.

MAF800-E

Release the bottom cover screws as shown below.

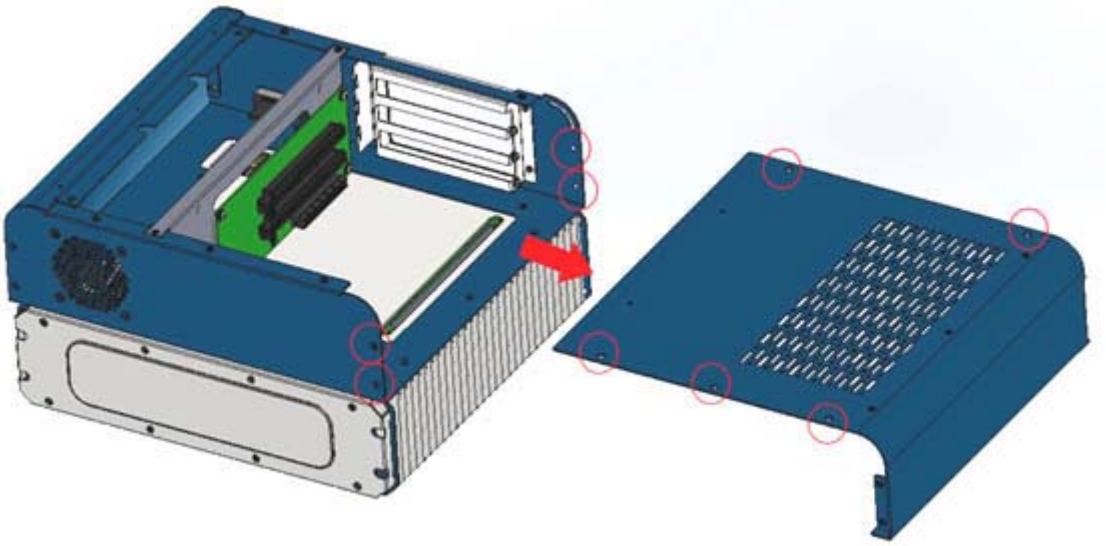


Release the screws as shown below (1pc screw for each side).

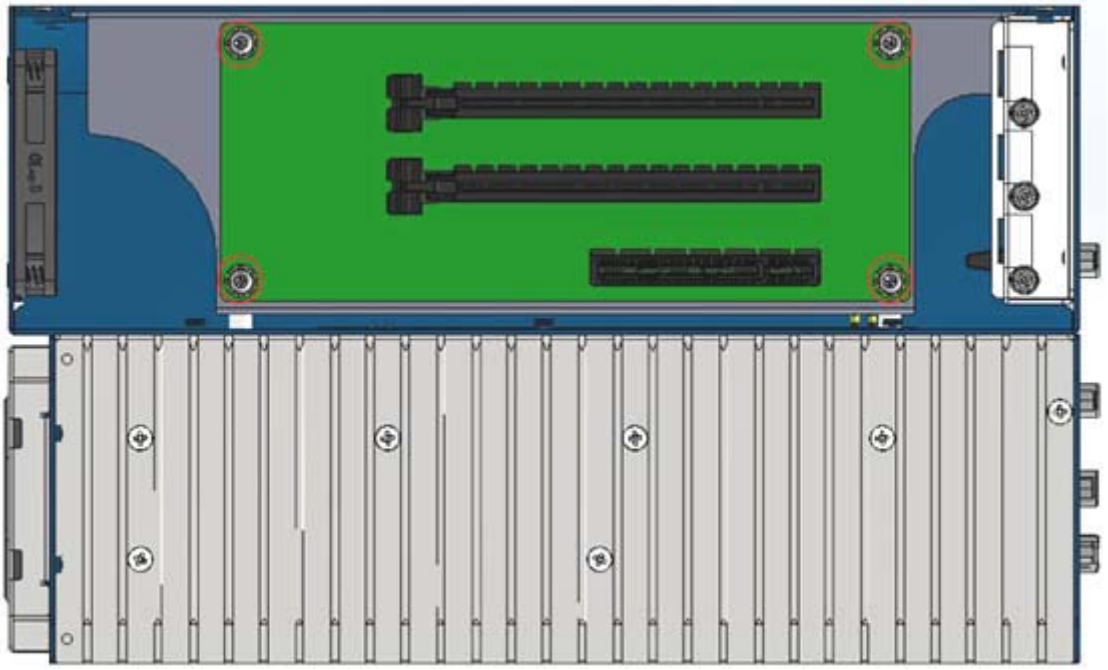


MAF800-2E

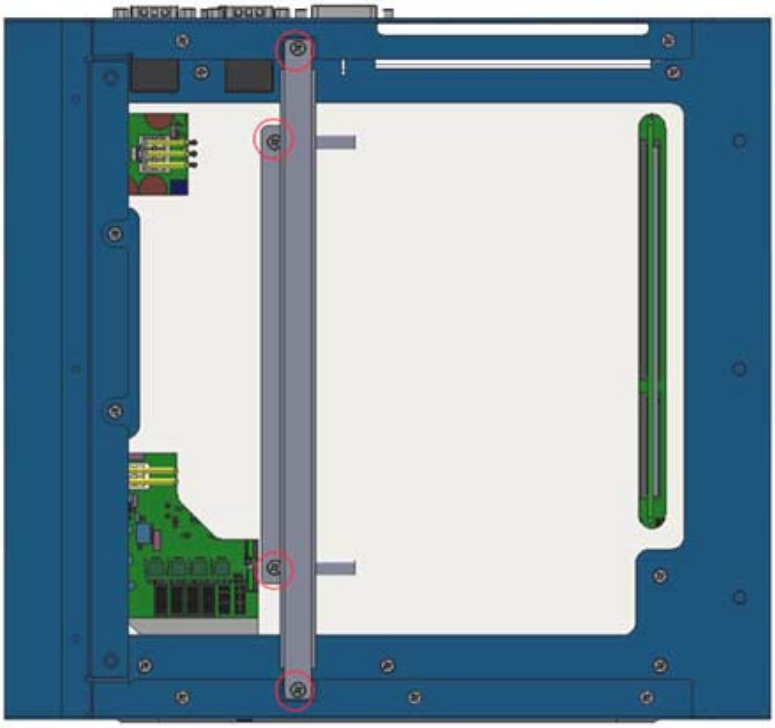
Disassemble the L-shaped cover by removing the M3 screws in the red circle below, and move the cover in the direction of the arrow as shown below.



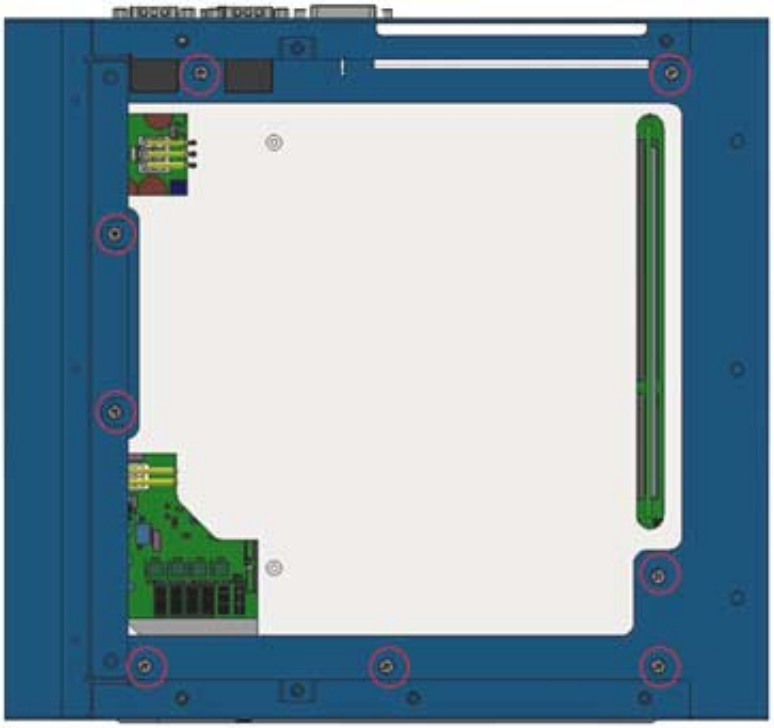
Remove the 4pcs screws shown below to remove the PCI-E riser card.



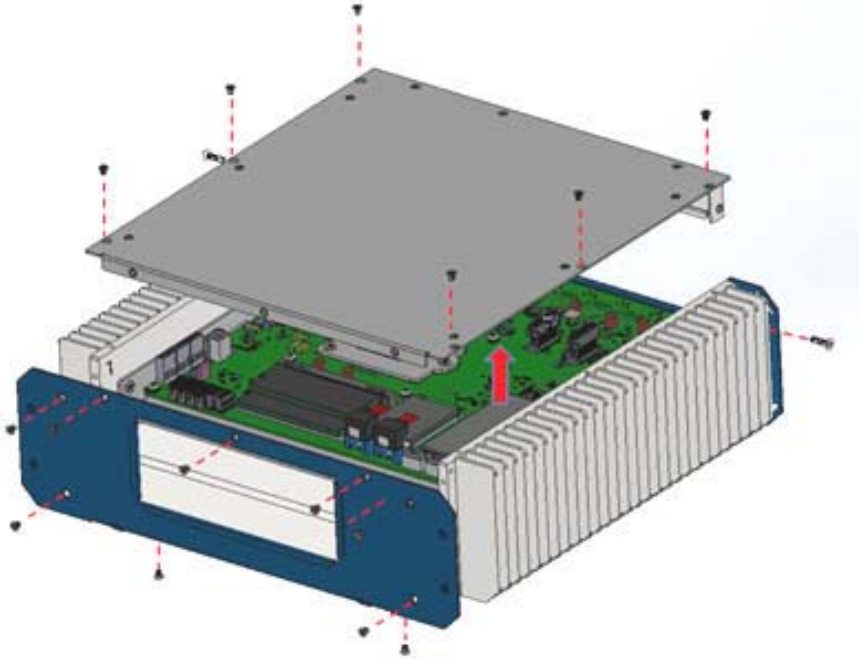
Remove the riser card bracket screws (4pcs) as shown below.



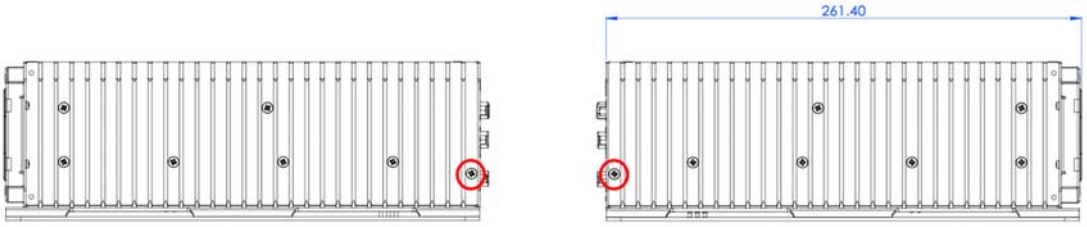
Remove the slot base screws in red circle as shown below.



Release the screws as shown below.

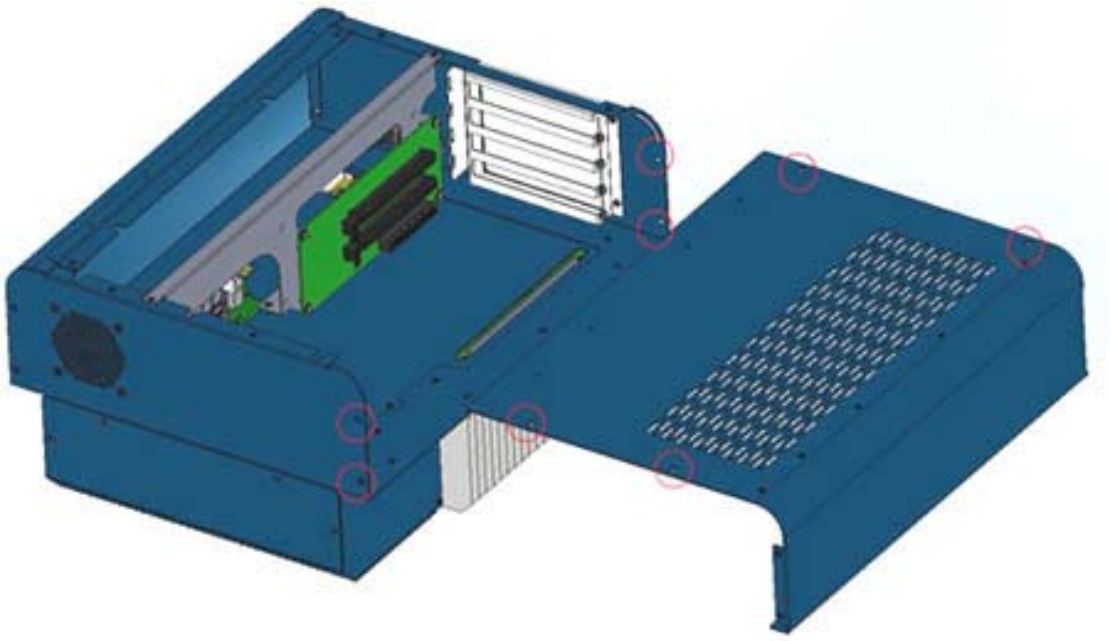


Release the screws as shown below (1pc screw for each side).

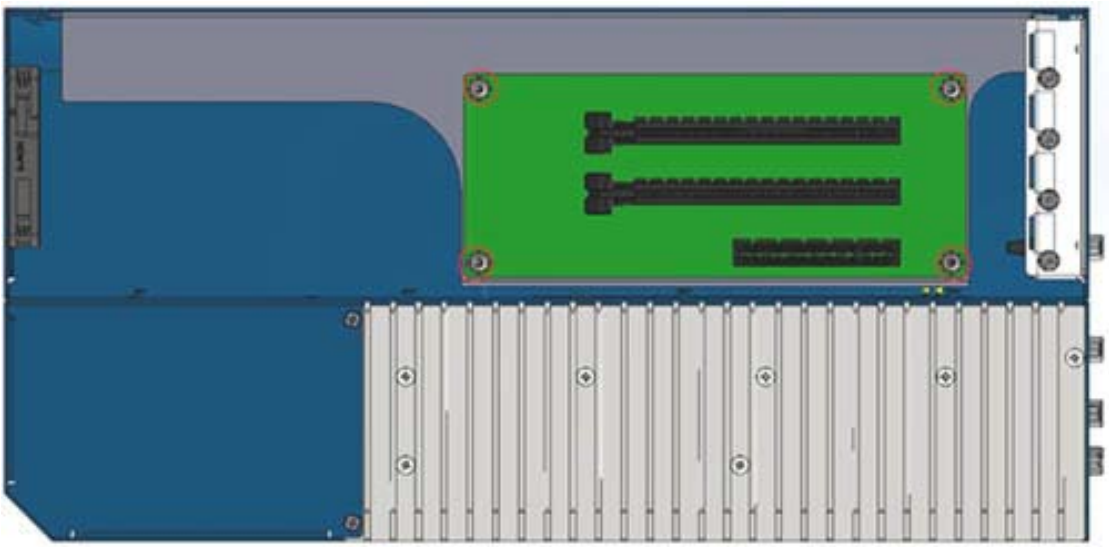


MAF800-L2E

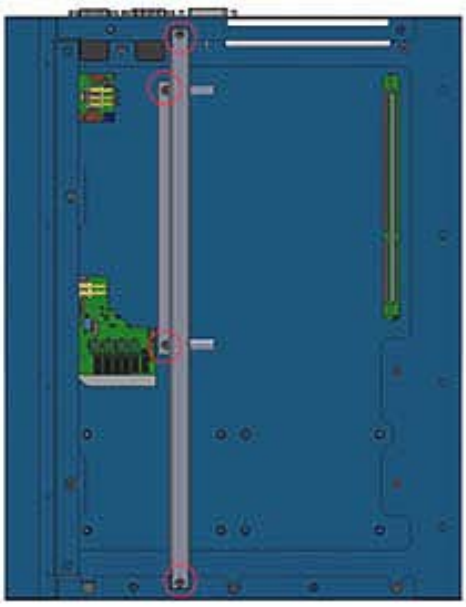
Disassemble the L-shaped cover by removing the M3 screws as shown below, and move the cover to the right as shown.

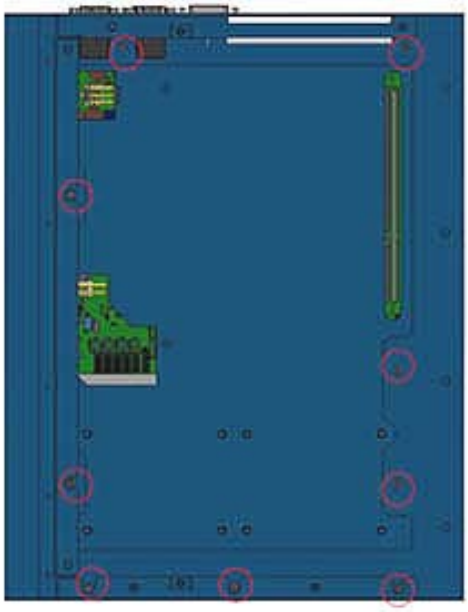


Remove the 4pcs screws shown below to remove the PCI-E riser card.

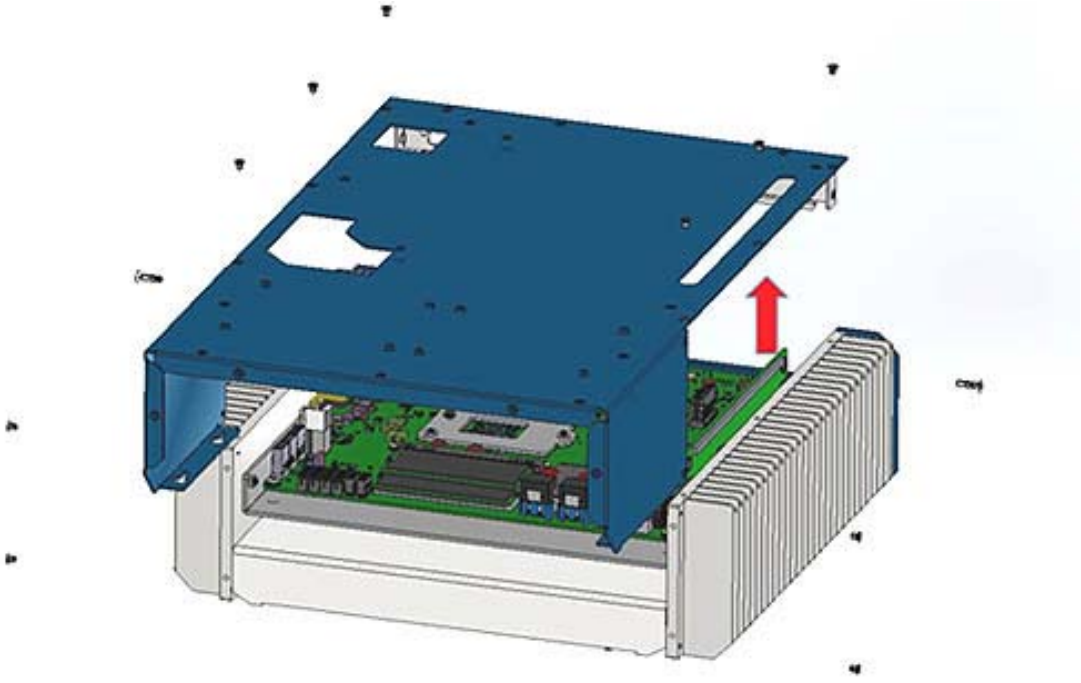


Remove the PCIE bracket screws as shown by the left picture, and remove the slot base seat screws as shown by the right picture.





Remove the bottom cover (blue) by releasing the screws as shown below.

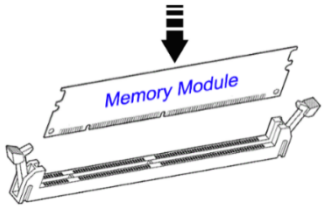


2.1.1 Memory Installation or Replacement

If you need to install or replace a memory module, follow the instructions below for installation after you have removed the device cover.

1. Locate the memory slots in your device.
2. Press the ejector tab of the memory slot outwards with your fingertips.

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



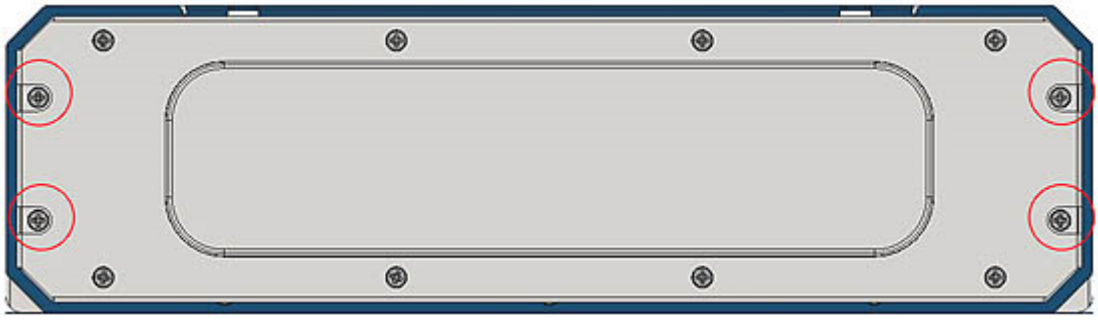
To remove the module, press the ejector tabs outwards with your fingertips to eject the module.

2.1.2 SSD/HDD Installation or Replacement

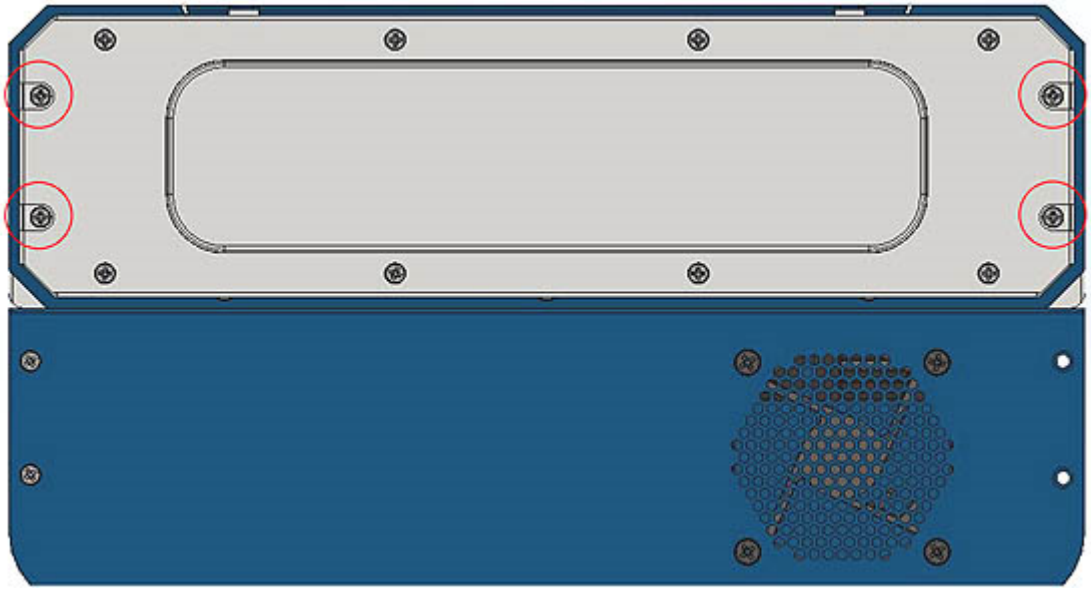
SSD/HDD:

1. MAF800-E/ MAF800-2E

   Release the 4pcs screws to pull out the chassis.

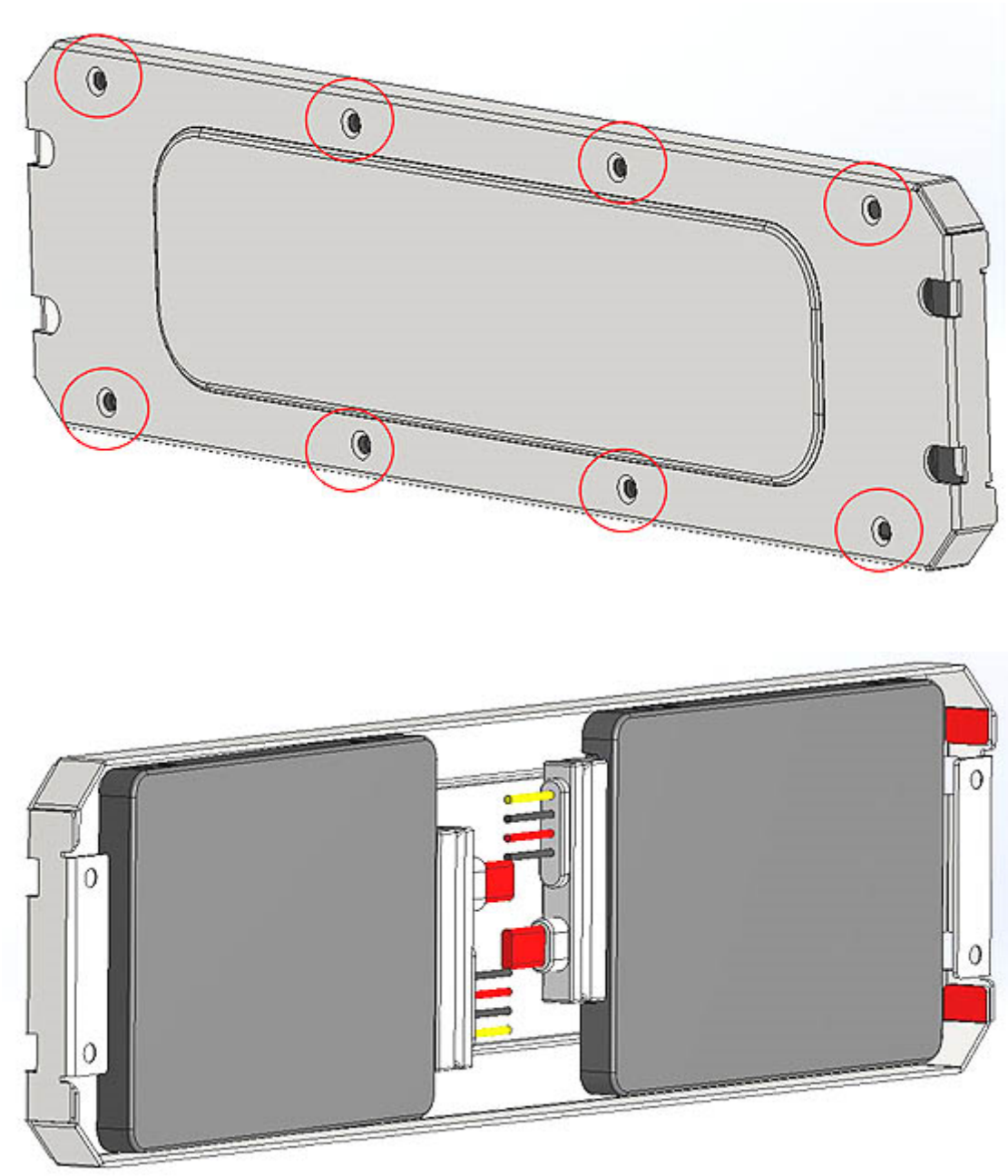


(MAF800-E)



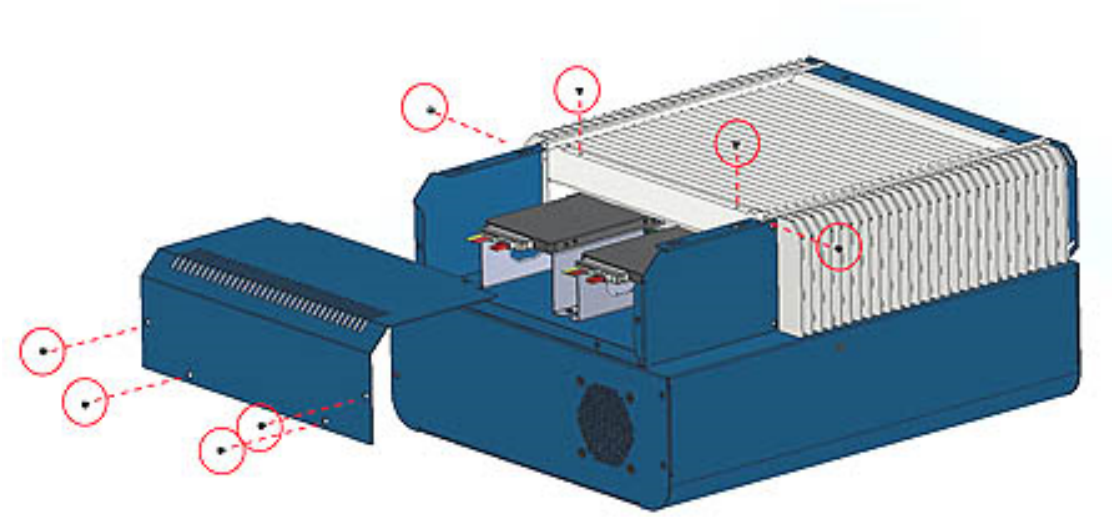
(MAF800-2E)

Put the 2.5” SSD/HDD into the tray and secure it with the supplied screws

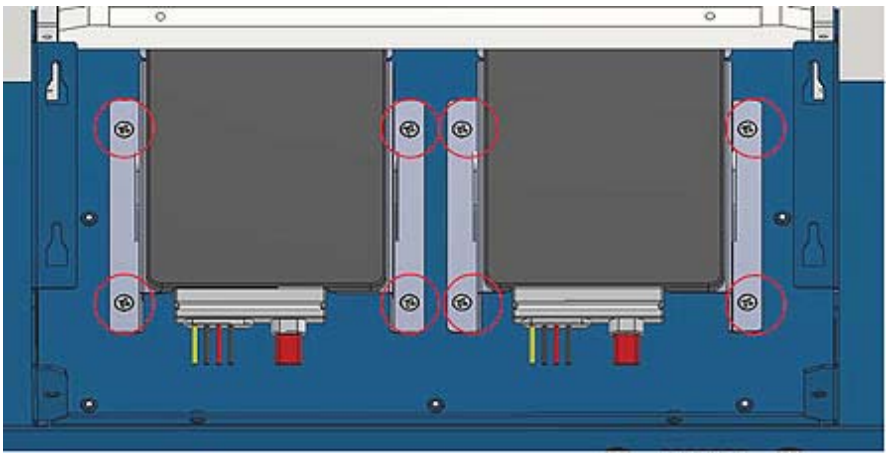


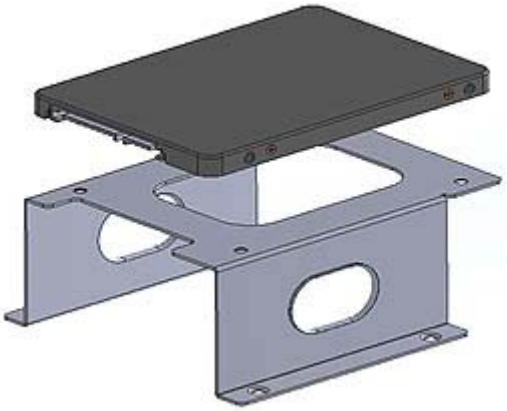
2. MAF800-L2E

Release the 8pcs screws to pull out the chassis



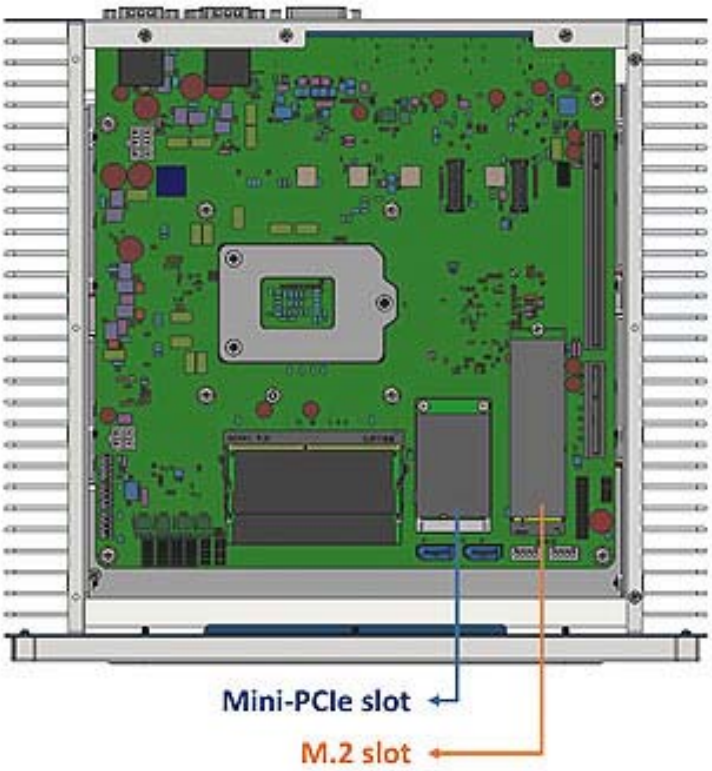
Release the 8pcs screws to pull out the SSD stent.



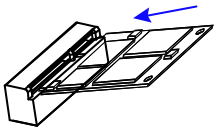


2.1.3 Mini-PCIe Network Cards & M.2 Card Installation or Replacement

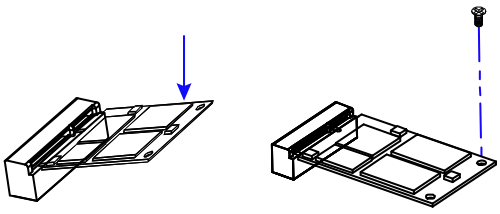
1. The installation illustrated using the MAF800-E.
2. Before you start, pay attention to the mini-PCIe slot and M.2 slot.



3. Locate the mini-PCIe slot. Align the key of the mini-PCIe card to the interface, and insert the card slantwise.



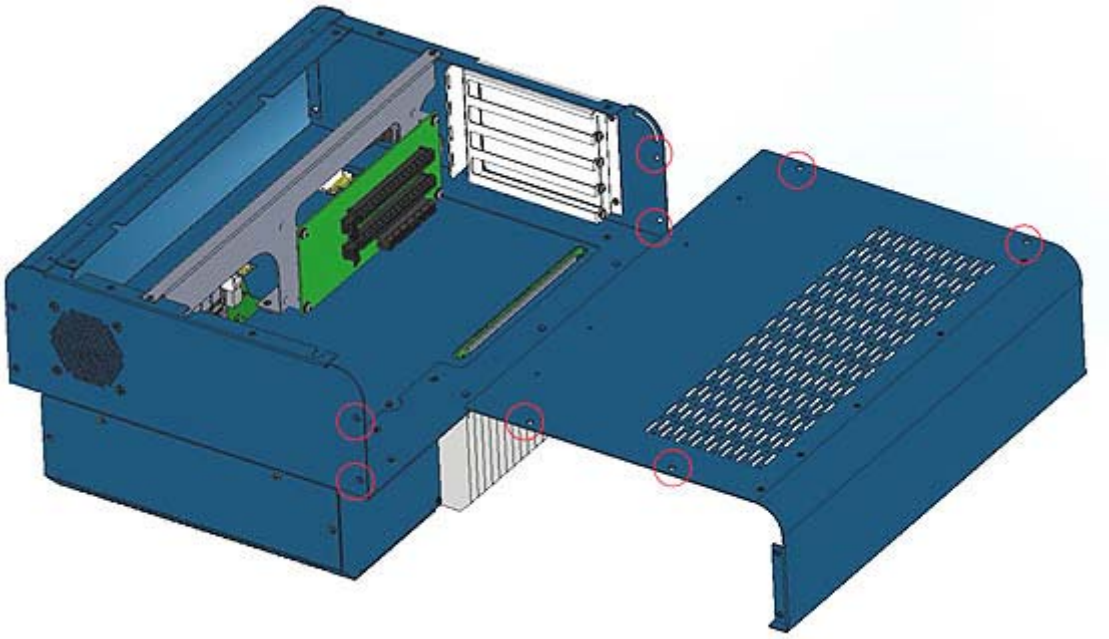
4. Push the mini-PCIe card down. Fix it with the supplied flat head screws(x2) for full-size card, and screw(x1) for half-size card.



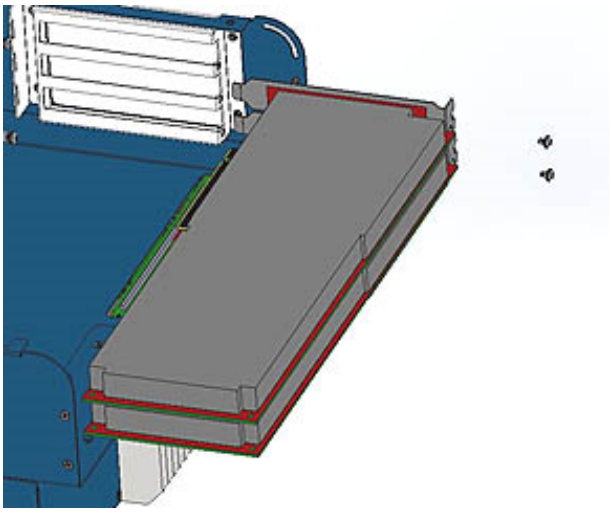
2.1.4 Expansion Card Installation or Replacement

MAF800-2E and MAF800-L2E support an expansion card slot while MAF800-E does not feature any expansion slot.

1. Remove the device bottom cover.



2. Install the expansion card and fix the card with the screws.

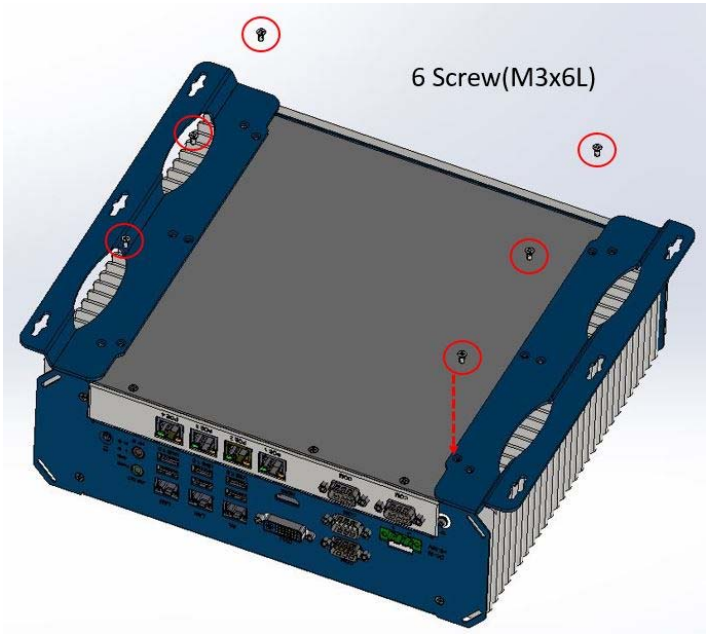


2.1.5 Mounting Installation

Requirements:

Before mounting the brackets, ensure that you have enough room for power and signal cable routing. The method of mounting must be able to support weight of the system plus the suspend weight of all the cables to be attached to the system.

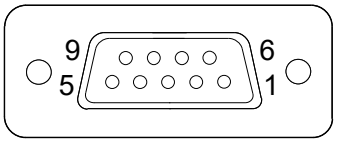
1. Attach the mounting brackets with six (M3x6L) screws shown in the picture below.



2. Prepare 4 screws (M3) to install the device onto the wall .

2.1.6 Pinout for COM Ports, DC-In & Power Button Connectors

- **COM1 / COM2 RS232/422/485 Port**

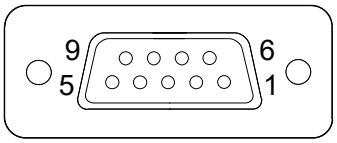


COM1~2 port is jumper-less and configurable in BIOS.

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

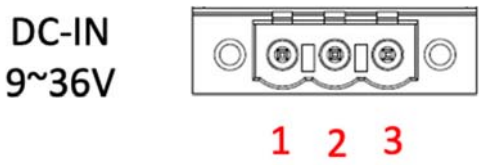
- **COM3 / COM4 / COM5 /COM6 RS-232 Port**



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		

Note: You can externally use COM5 & COM6 for MAF800-2LE by connecting them from the motherboard.

- **DC-In Power Connector (3-pin terminal block)**



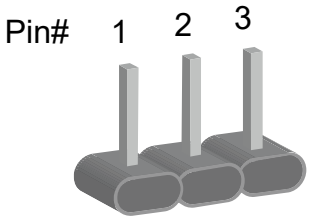
Pin	Assignment
1	Ground
2	NC
3	9V ~ 36V

2.2 Setting the Jumpers

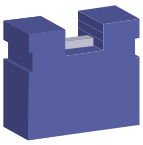
Set up and configure your device by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

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.

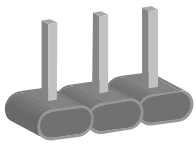
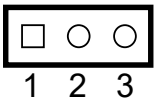
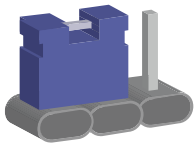
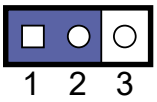
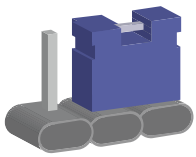
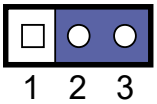


A 3-pin jumper



A jumper cap

Refer to the illustration below to set jumpers.

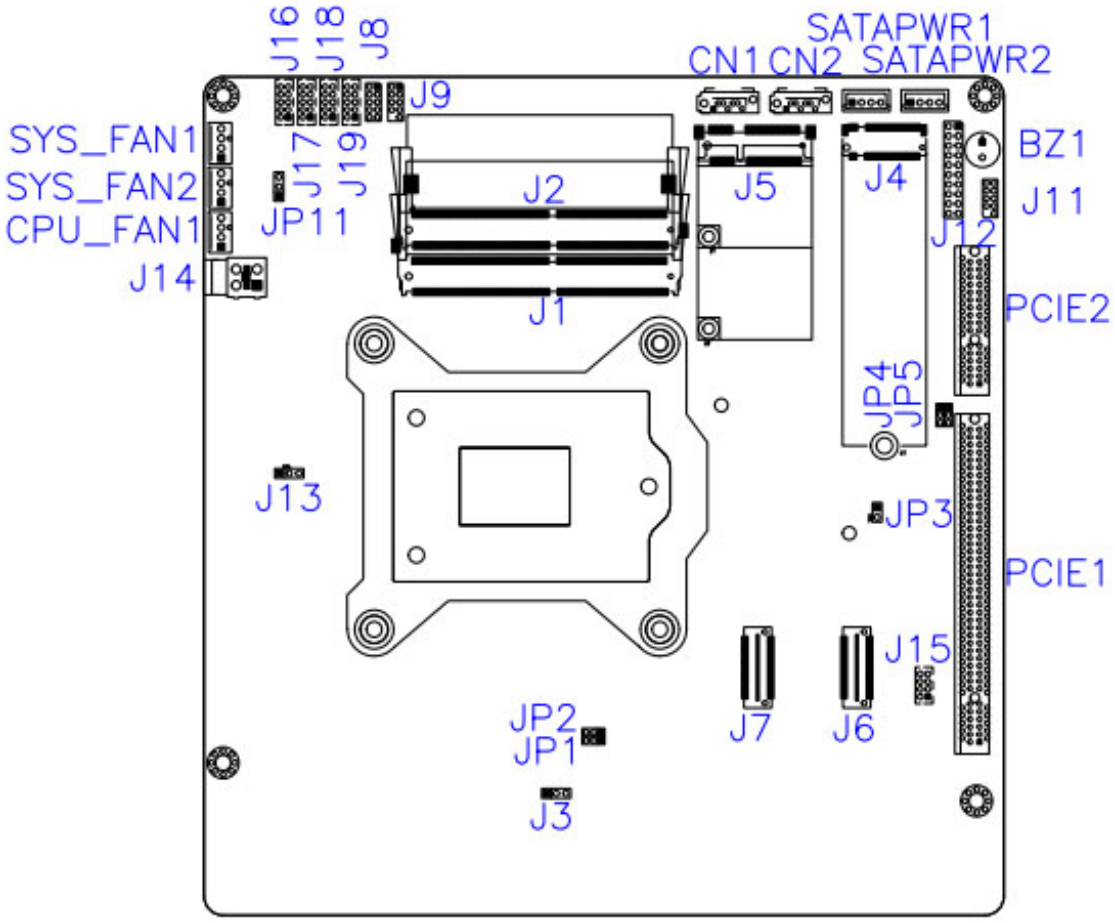
Pin closed	Oblique View	Setting
Open		
1-2		
2-3		

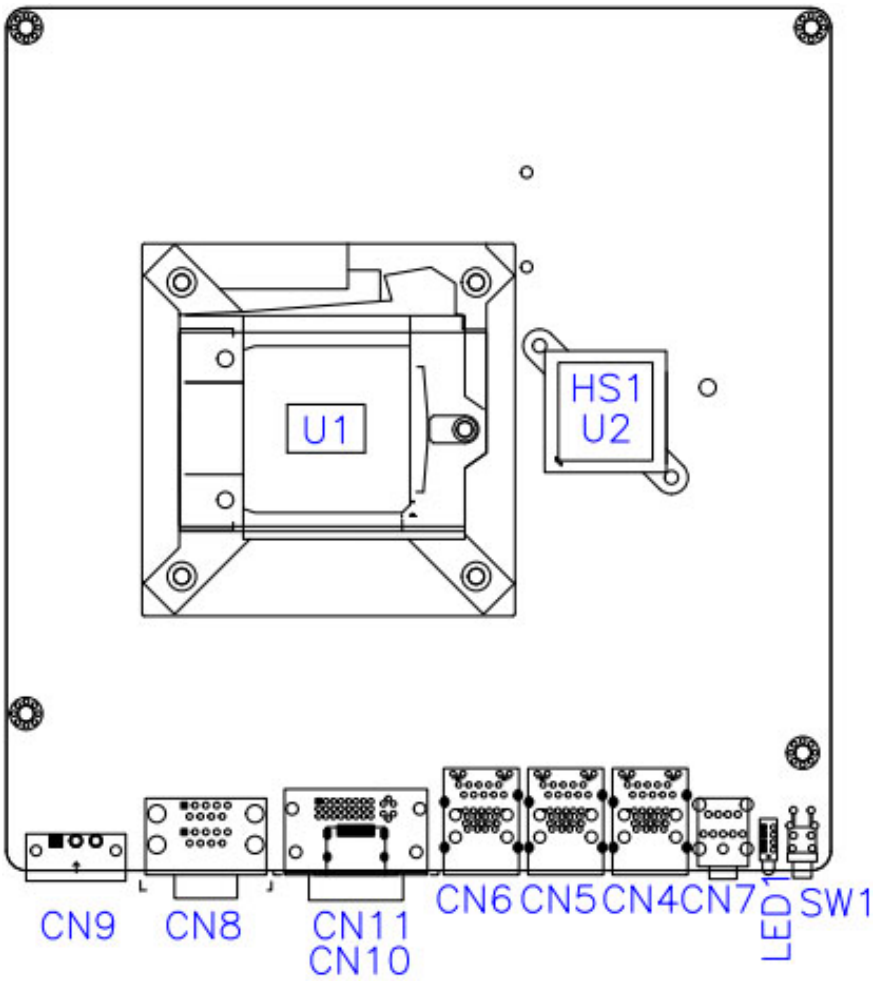
When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e. turned **On**.

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

2.3 Jumper & Connector Locations on Motherboard

Motherboard: MBA800

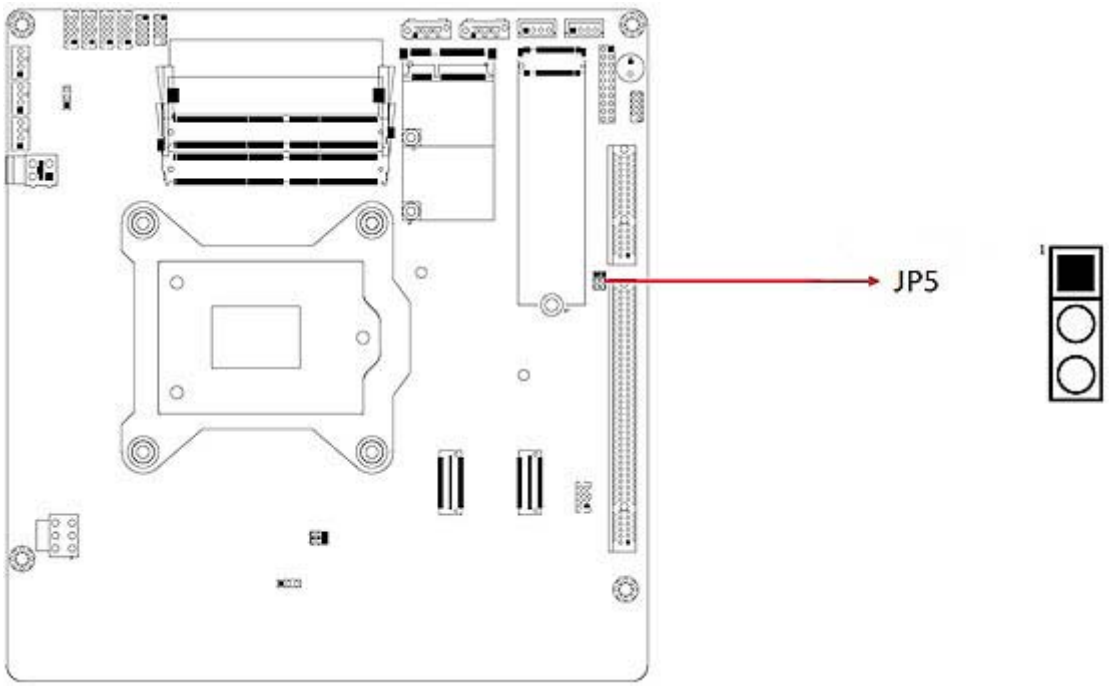


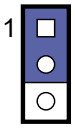
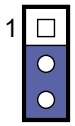

U1
HS1
U2
CN9
CN8
CN11
CN10
CN6
CN5
CN4
CN7
LED1
SW1

2.4 Jumpers Quick Reference

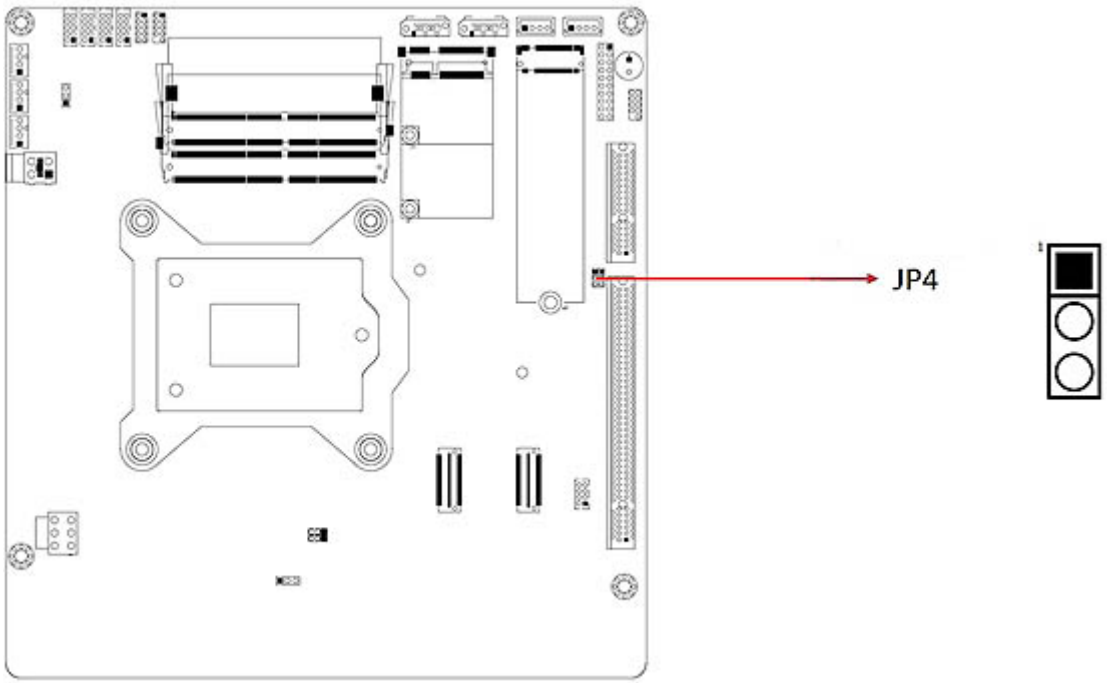
Function	Connector	Page
CMOS Data Clearance	JP5	36
ME Data Clearance	JP4	37
AT / ATX Mode Setting	JP11	38
PCIe (x16) Bifurcation Selection	JP1, JP2	39
Factory Use Only	JP3, JP9, JP11	40

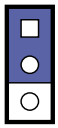
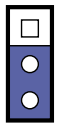
2.4.1 CMOS Data Clearance (JP5)



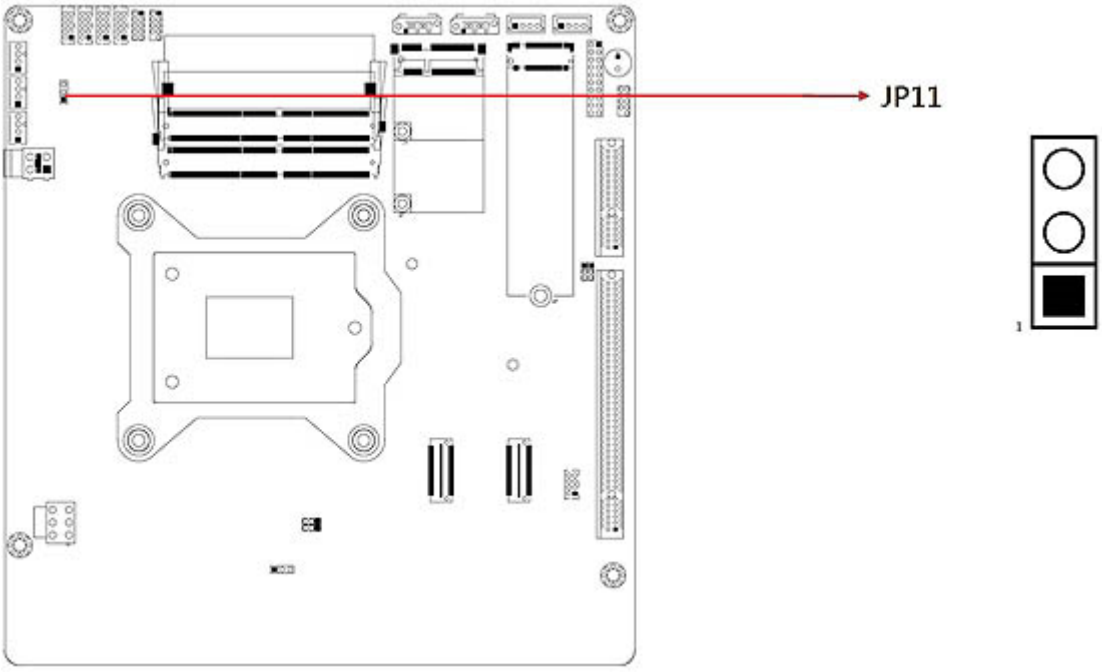
Function	Pin closed	Illustration
Normal (default)	1-2	
Clear CMOS	2-3	

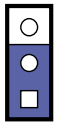
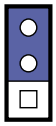
2.4.2 ME Data Clearance (JP4)



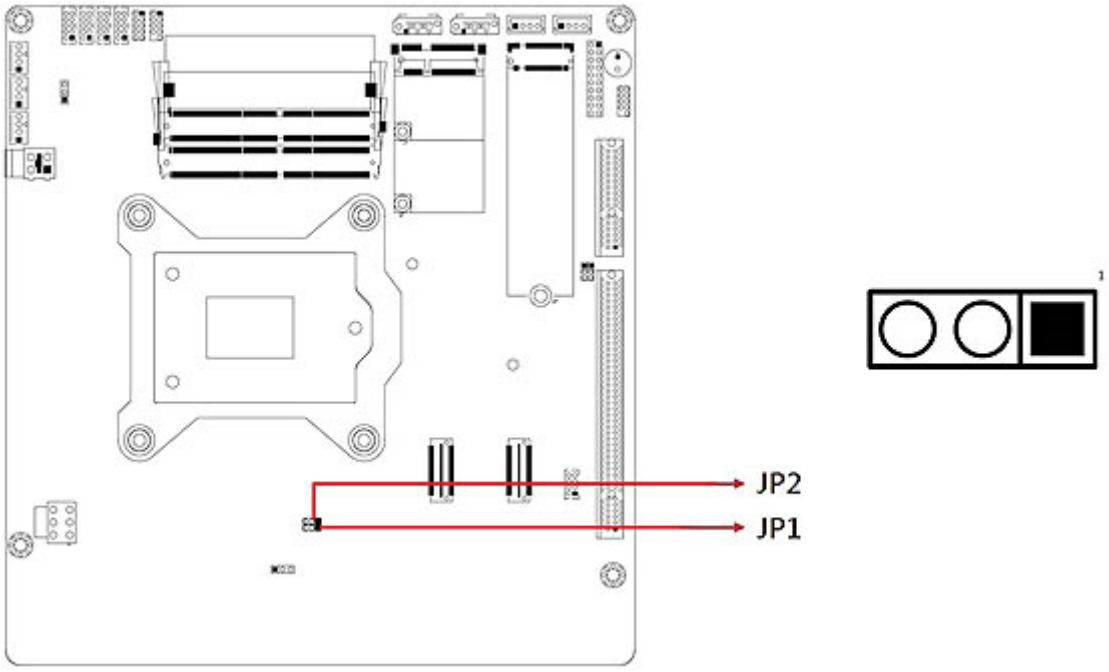
Function	Pin closed	Illustration
Normal (default)	1-2	
Clear CMOS	2-3	

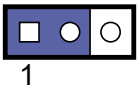
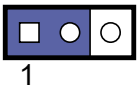
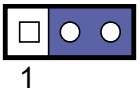
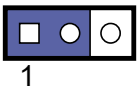
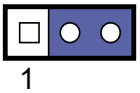
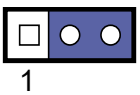
2.4.3 AT / ATX Mode Setting (JP11)



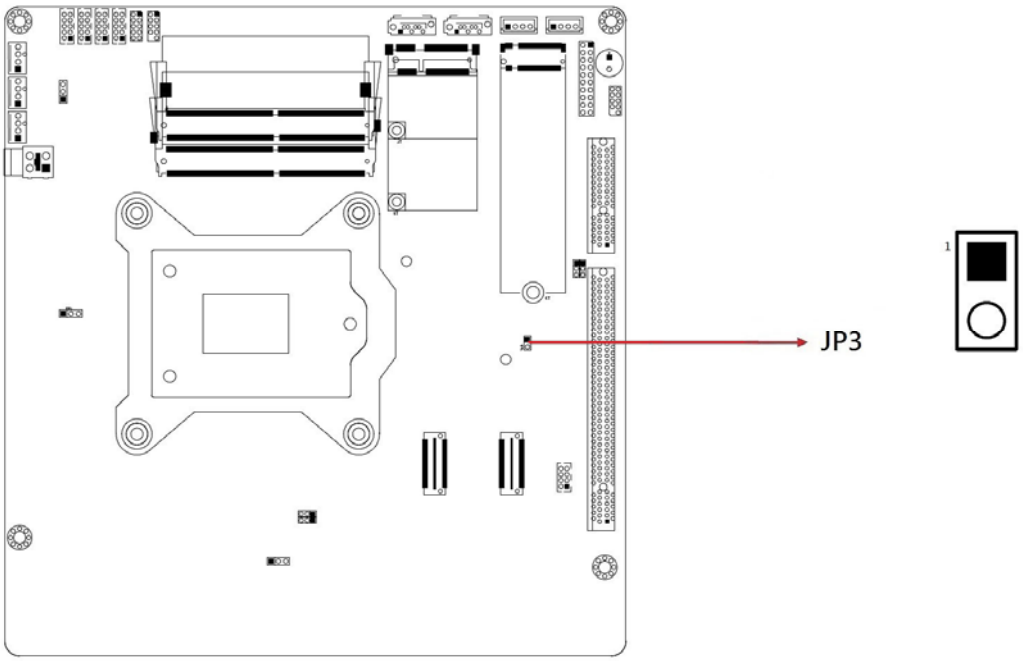
Function	Pin closed	Illustration
AT Mode	1-2	
ATX Mode (default)	2-3	

2.4.4 PCIe (x16) Bifurcation Selection (JP1 / JP2)



Function	Pin closed	Illustration
1 x PCIe (x16) (default)	**JP1:** 1-2	
	JP2: 1-2	
2 x PCIe (x8)	**JP1:** 2-3	
	JP2: 1-2	
1 x PCIe (x8), 1 x PCIe (x4), 1 x PCIe (x4)	**JP1:** 2-3	
	JP2: 2-3	

2.4.5 Flash Descriptor Security Override (Factory use only, JP3)



JP3	Function
Open	Disable*
Close	Upgrade Mode

2.4.6 80 Port Debug Tool Connectors (Factory use only, JP9)

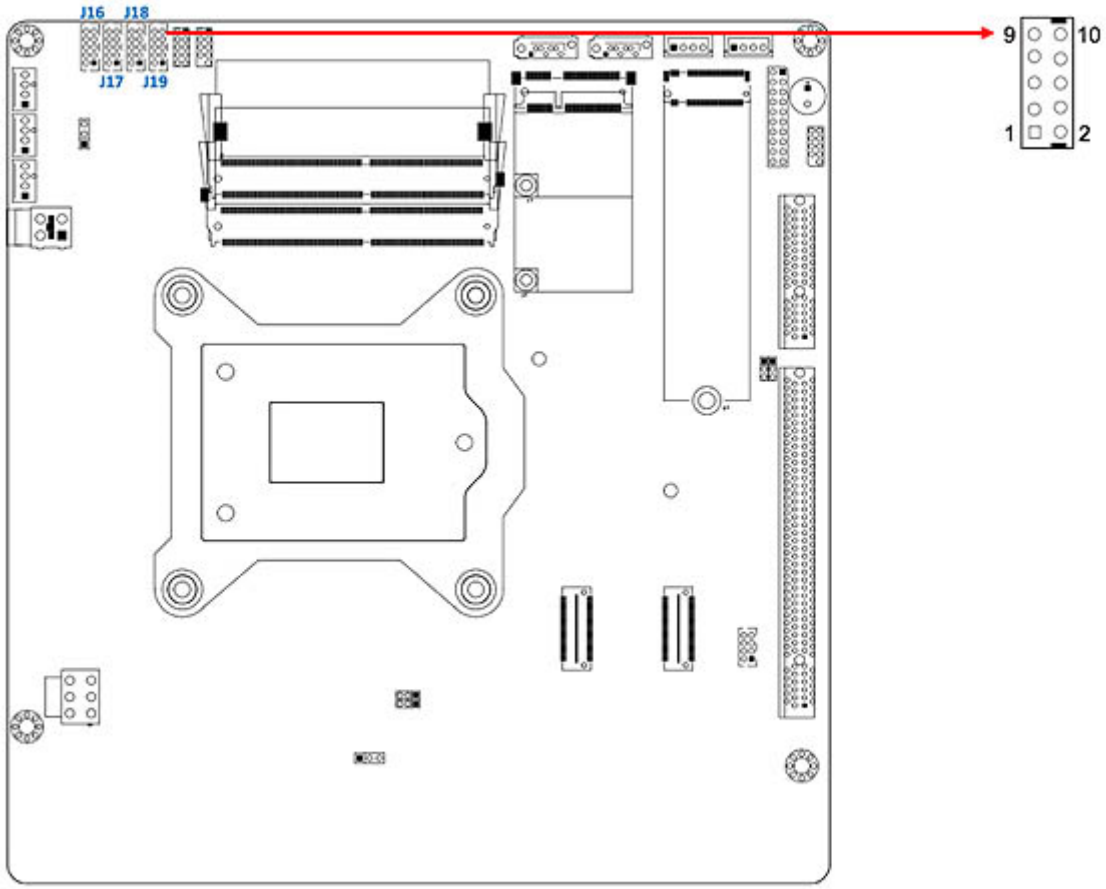
2.4.7 SPI Flash Tool Header (Factory use only, JP11)

2.4.8 Connectors Quick Reference

Function	Connector	Page
COM3, COM4, COM5 & COM6 Ports [3]	J16, J17, J18, J19	42
4 pin + 12V Power Connector	J14	43
Digital I/O 4 In/4 Out	J8	44
SATA HDD Power Connectors	SATAPWR1, SATAPWR2	44
Dual USB 2.0 Connector	J15	45
FAN Power Connector	CPU_FAN1 & SYS_FAN1 & SYS_FAN2	45
SUMIT B Connector	J7	46
LAN & USB3.0 Ports	CN4, CN5, CN6	--
Audio Jacks	CN7	--
DC-In Power Connector [1]	CN9	--
COM1 & COM2 Ports [2]	CN8	--
HDMI Port	CN10	--
DVI-D Port	CN11	--
Power Button	SW1	--
LED Indicators	LED1	--
PCIe (x16) Slot	PCIE1	--
PCIe (x4) Slot	PCIE2	--

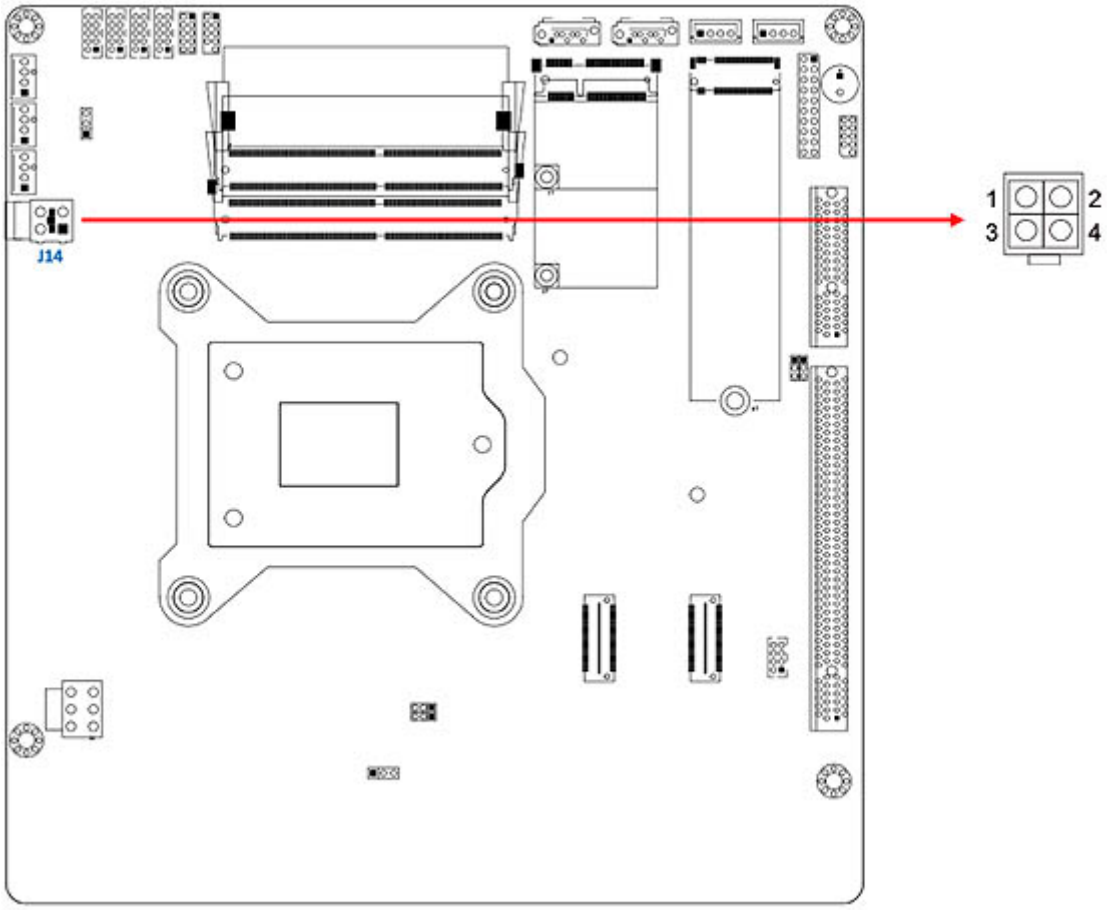
[1], [2], [3]: Refer to *2.1.6 Pinout for COM Ports, DC-In & Power Button Connectors*.

2.5.1 COM3, COM4, COM5 & COM6 Ports (J16, J17, J18, J19)



Pin	Signal Name	Pin	Signal Name
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	Key

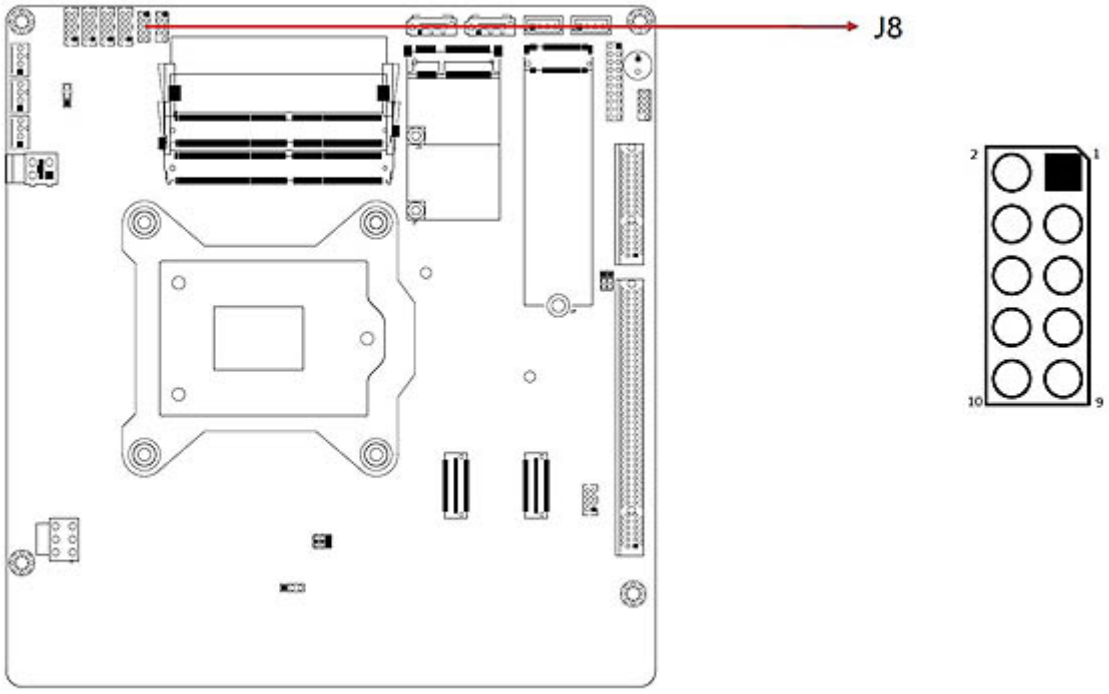
2.5.2 4 pin + 12V Power Connector (J14)



Pin	Assignment	Pin	Assignment
1	Ground	2	Ground
3	+12V – Out	4	+12V – Out

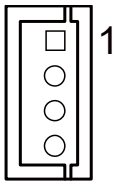
*** The power source by system power (9-36V power connecter input)**

2.5.3 Digital I/O 4 In/4 Out (J8)



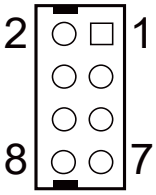
Pin	Assignment	Pin	Assignment
1	Ground	2	VCC
3	OUT3	4	OUT1
5	OUT2	6	OUT2
7	IN3	8	IN1
9	IN2	10	IN0

2.5.4 SATA HDD Power Connectors (SATAPWR1, SATAPWR2)



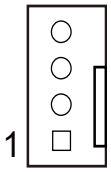
Pin	Assignment	Pin	Assignment
1	+5V	3	Ground
2	Ground	4	+12V

2.5.5 Dual USB 2.0 Connector (J15)



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

2.5.6 FAN Power Connector (CPU_FAN1 & SYS_FAN1 & SYS_FAN2)



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

2.5.7 SUMIT B Connector (J7)

Pin	Assignment	Pin	Assignment
1	Ground	2	Ground
3	B_PETp0	4	B_PERp0
5	B_PETn0	6	B_PERn0
7	Ground	8	Ground
9	C_CLKp	10	C_CLKp
11	C_CLKn	12	C_CLKn
13	Ground	14	Ground
15	C_PETp0	16	C_PERp0
17	C_PETn0	18	C_PERn0
19	Ground	20	Ground
21	C_PETp1	22	C_PERp1
23	C_PETn1	24	C_PERn1
25	Ground	26	Ground
27	C_PETp2	28	C_PERp2
29	C_PETn2	30	C_PERn2
31	Ground	32	Ground
33	C_PETp3	34	C_PERp3
35	C_PETn3	36	C_PERn3
37	Ground	38	Ground
39	PERST#	40	WAKE#
41	Reserved	42	Reserved
43	+5V	44	Reserved
45	+5V	46	+3.3V
47	+5V	48	+3.3V
49	+5V	50	+3.3V
51	+5V	52	+5VSB

Chapter 3
Driver Installation

The information provided in this chapter includes:

- Intel® Chipset Software Installation Utility
- HD Audio Driver Installation
- LAN Driver Installation
- Intel® Management Engine Driver Installation
- USB 3.1 Driver 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:

1. After installing your Windows operating system, you must install the Intel® Chipset Software Installation Utility first before proceeding with the drivers installation.
2. Drivers are supported under Microsoft Windows 10 64-bit (RS3/RS4/ RS5) and Server 2016 (RS1) only.

3.2 Intel® Chipset Software Installation Utility

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

1. Insert the disk enclosed in the package with the board. Click **Intel** on the left pane and then **Intel(R) Coffeelake 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** and then **Next** for installation.
6. When the driver is completely installed, restart the computer for changes to take effect.

3.3 HD Graphics Driver Installation

1. Click **Intel(R) Coffeelake 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. When the driver is completely installed, restart the computer for changes to take effect.

3.4 HD Audio Driver Installation

1. Click **Intel(R) Coffeelake 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. When the driver is completely installed, restart the computer for changes to take effect.

3.5 LAN Driver Installation

1. Click **Intel(R) Coffeelake Chipset Drivers** on the right pane.

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

3. When the *Welcome* screen appears, click **Next** to continue.
4. Accept the license agreement and click **Next** to continue.
5. Tick the checkbox for **Drivers** to select the related drivers and click **Next**.
6. When the wizard is ready for installation, click **Install**.
7. Installation is now complete. Restart the system for changes to take effect.

3.6 Intel® Management Engine Components Driver Installation

1. Click **Intel(R) Coffeelake Chipset Drivers** on the right pane.

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

3. When the *Welcome* screen appears, click **Next** to continue.
4. Accept the licence agreement and click **Next** to continue.
5. When installation complete, restart the system for changes to take effect.

Chapter 4
BIOS Setup

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

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

4.1 Introduction

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

4.2 BIOS Setup

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

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

The following message will appear on the screen:

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

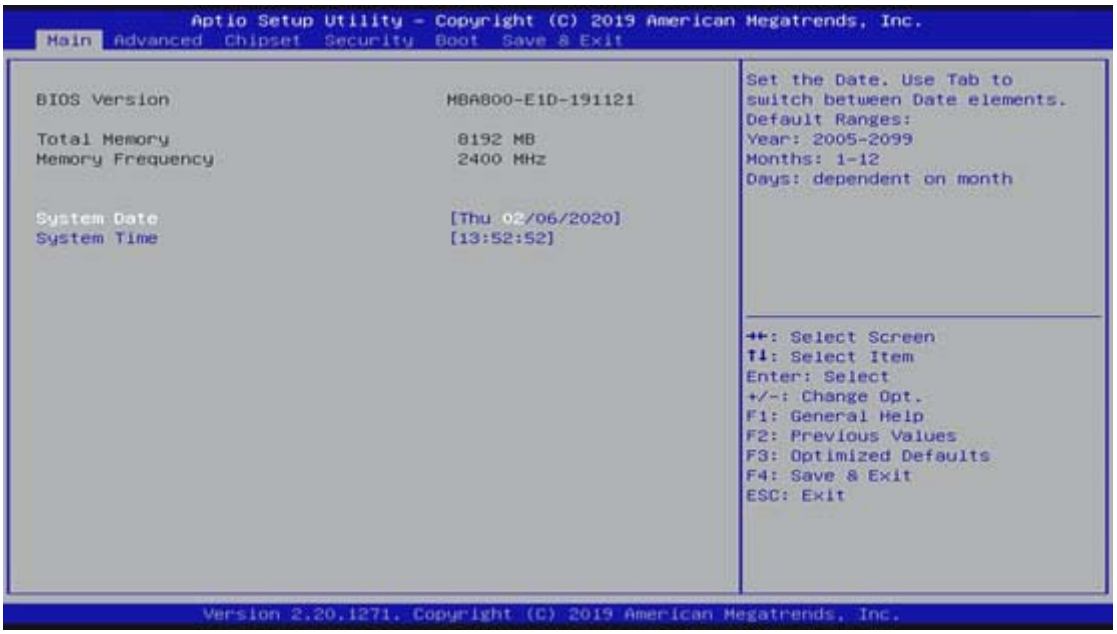
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

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

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

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

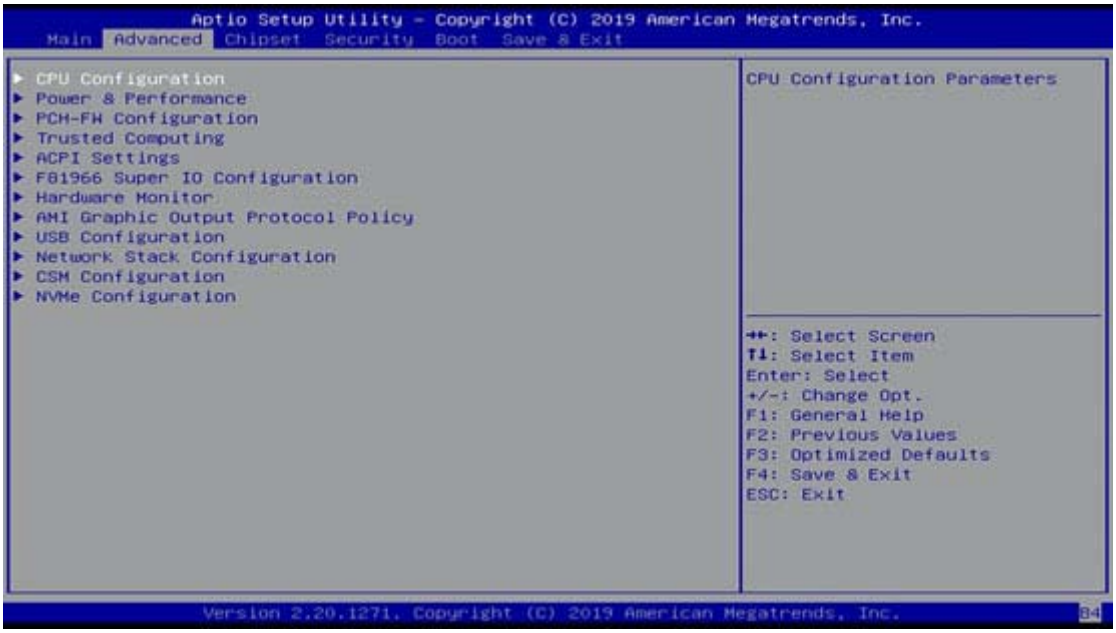
4.3 Main Settings



BIOS Setting	Description
System 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.

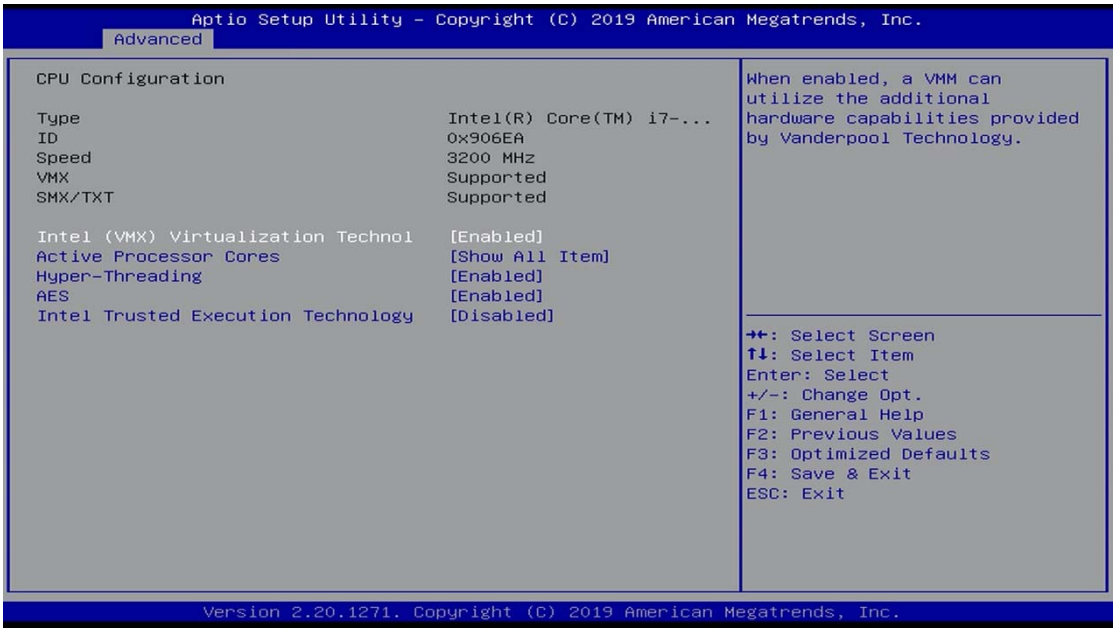
4.4 Advanced Settings

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



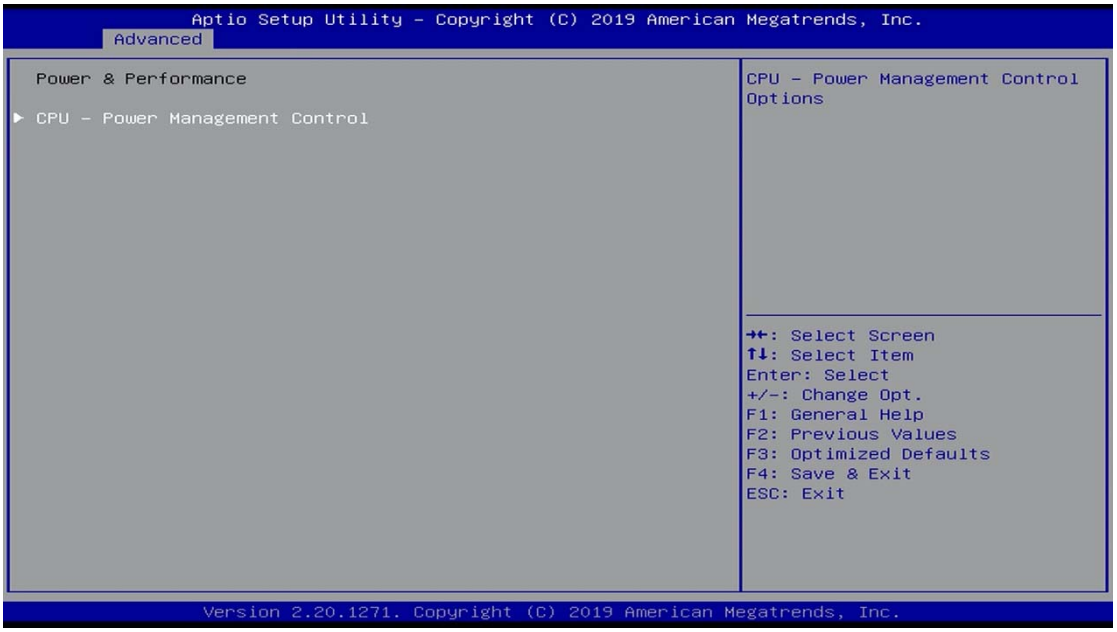
BIOS Setting	Description
CPU Configuration	Displays CPU configuration parameters.
Power & Performance	Shows power and performance options.
Trusted Computing	Trusted computing settings.
ACPI Settings	Displays system ACPI parameters.
F81966 Super IO Configuration	Displays super IO chip parameters.
Hardware Monitor	Shows super IO monitor hardware status.
USB Configuration	Displays USB configuration parameters.
Network Stack Configuration	Network Stack settings.
CSM Configuration	Enables / Disables option ROM execution settings, etc.
NVMe Configuration	NVMe device option settings.

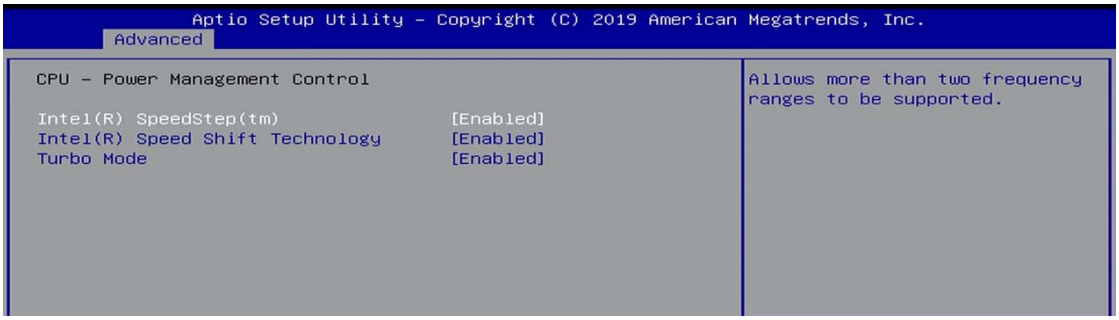
4.4.1 CPU Configuration



BIOS Setting	Description
Intel (VMX) Virtualization Technology	Enables / Disables a VMM can 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, 4, 5
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 Encryption Standard).
Intel Trusted Execution Technology	Enables / Disables unilization of additional hardware capabilities provided by Intel(R) Trusted Execution Technology. Changes require a full power cycle to take effect.

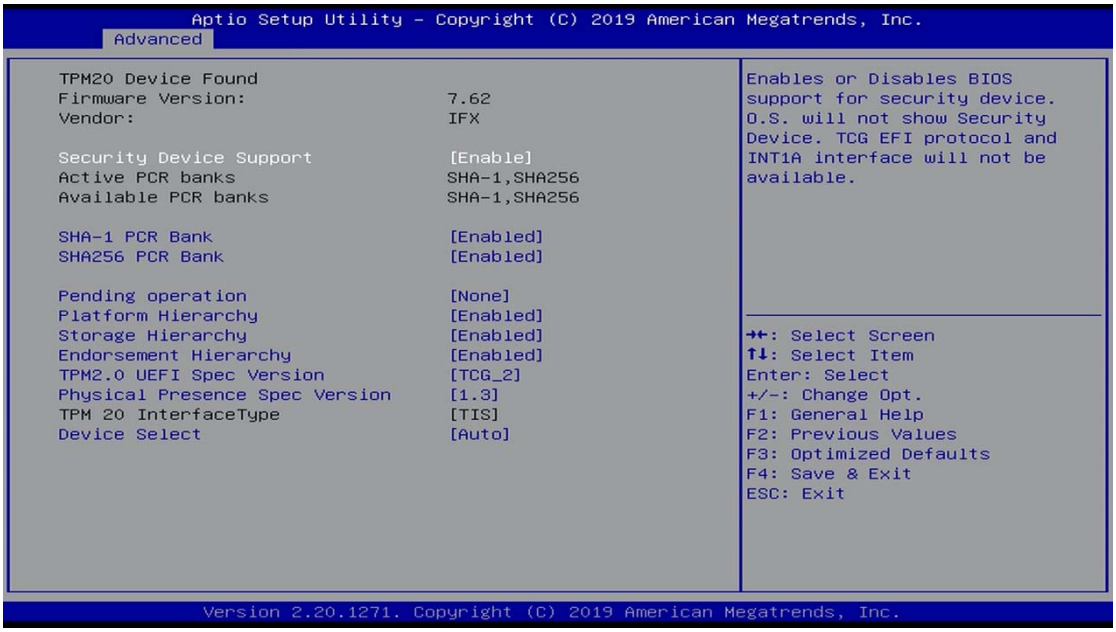
4.4.2 Power & Performance





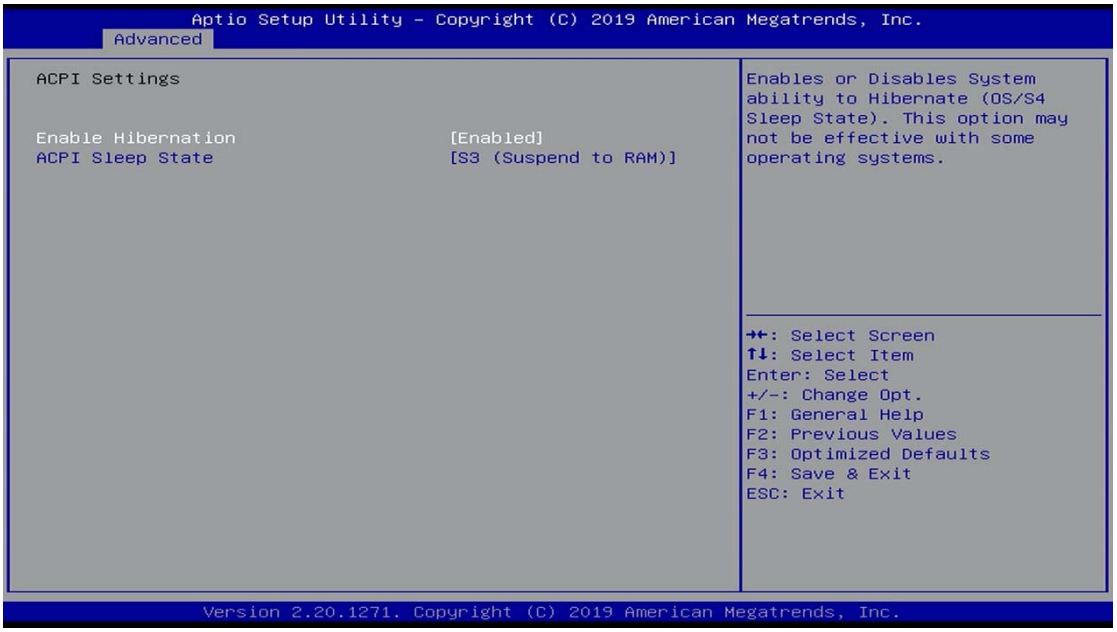
BIOS Setting	Description
Intel(R) SpeedStep(tm)	Allows more than two frequency ranges to be supported.
Intel(R) Speed Shift Technology	Enables / Disables the support of Intel(R) Speed Shift Technology. Enabling the function will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Enables / Disables processor Turbo Mode (requires EMTTM enabled too). “Auto” means enabled unless max turbo ratio is bigger than 16-SKL A0 W/A.

4.4.3 Trusted Computing



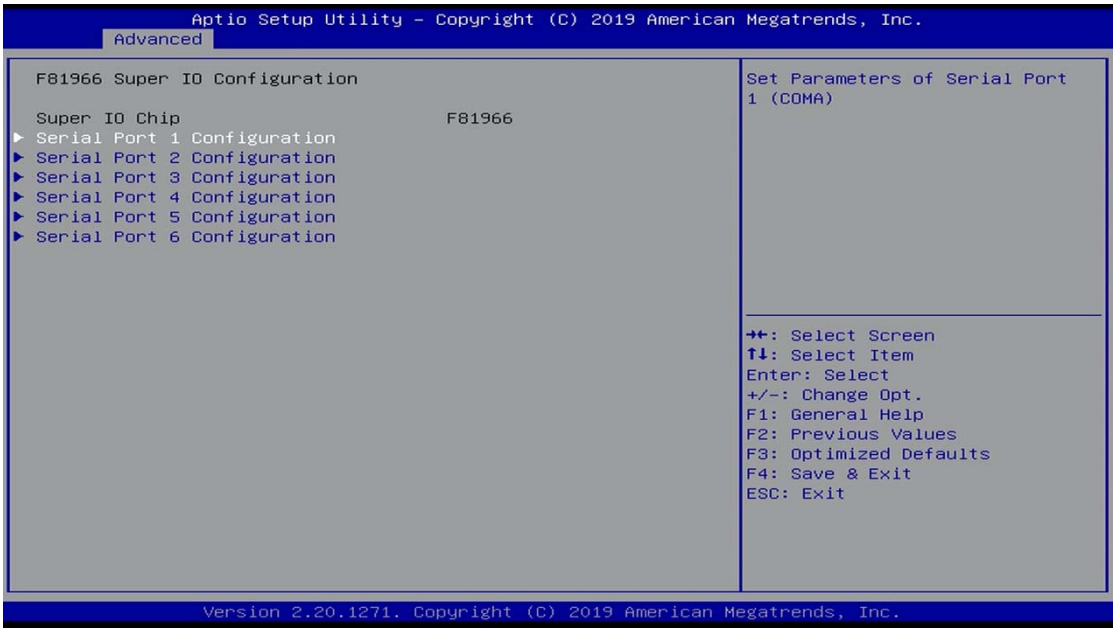
BIOS Setting	Description
Security Device Support	Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INTIA interface will not be available.
SHA-1 PCR Bank	Enables / Disables SHA-1 PCR Bank.
SHA256 PCR Bank	Enables / Disables SHA256 PCR Bank.
Pending 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	Selects to show the PPI Spec Version (1.2 or 1.3) that the OS supports. Note: Some HCK tests might not support 1.3.
Device Select	● TPM 1.2 will restrict support to TPM 1.2 devices only. ● TPM 2.0 will restrict support to TPM 2.0 devices only. ● Auto will support both with the default being set to TPM 2.0 deices if not found, and TPM 1.2 device will be enumerated.

4.4.4 ACPI Settings



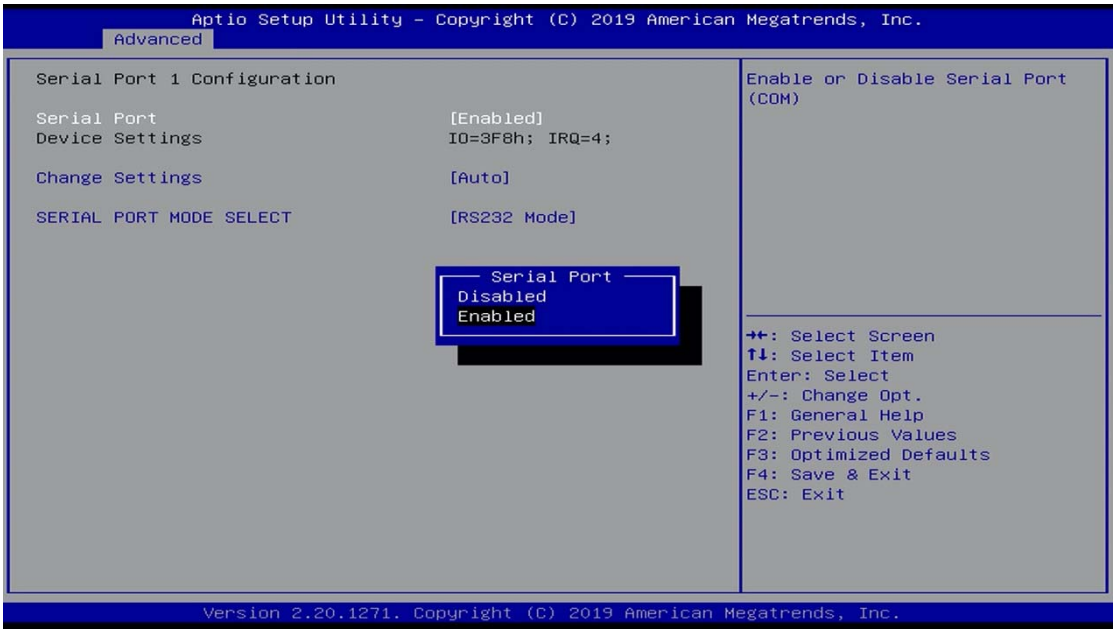
BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
ACPI Sleep State	Selects a ACPI sleep state for the system to enter. Options: Suspend Disabled, S3 (Suspend to RAM)

4.4.5 F81966 Super IO Configuration



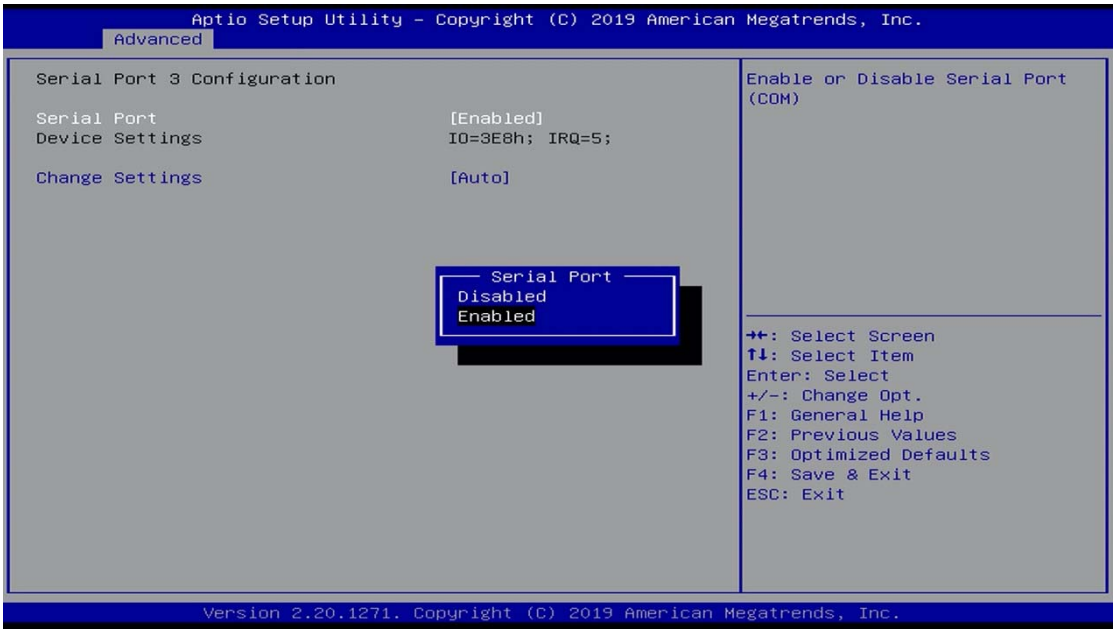
BIOS Setting	Description
Serial Port Configuration	Sets Parameters of Serial Ports. You can enable / disable the serial port and select an optimal settings for the Super IO device.

4.4.5.1. Serial Port 1~2 Configuration



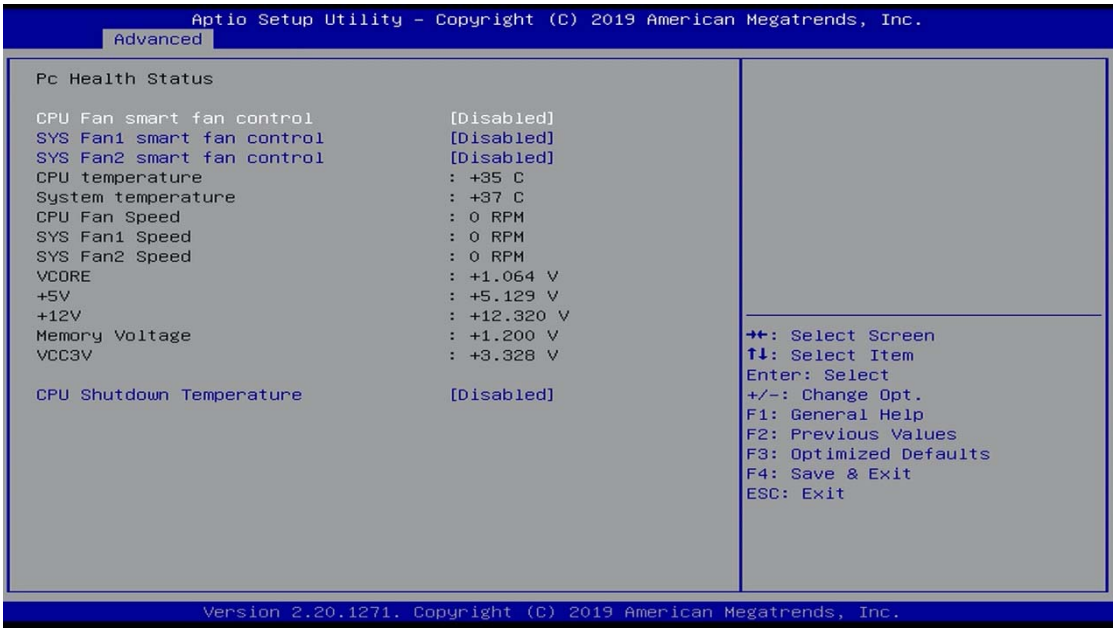
BIOS Setting	Description
Serial Port	Enables / Disables serial port (COM).
Change Settings	Selects an optimal settings for Super I/O device. Options: • Auto • IO = 3F8h; IRQ = 4 • IO = 3F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12
SERIAL PORT MODE SELECT	F81966 serial port 1~2 loop RS232 / RS422 / RS485 model select.

4.4.5.2. Serial Port 3~6 Configuration



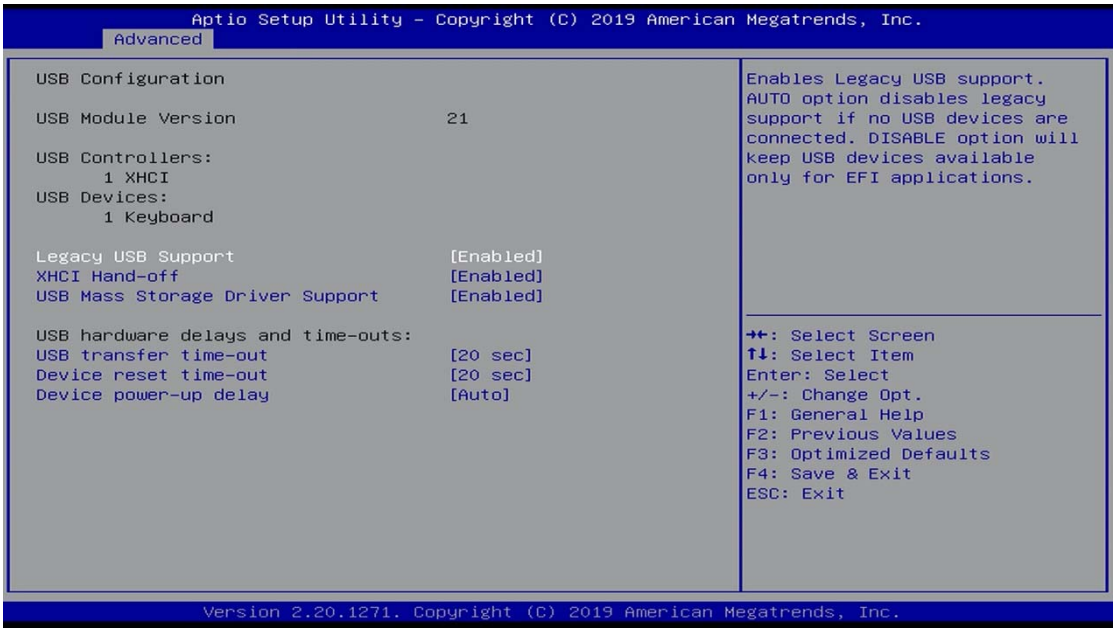
BIOS Setting	Description
Serial Port	Enables / Disables serial port (COM).
Change Settings	Selects an optimal settings for Super I/O device. Options: • Auto • IO = 2F8h; IRQ = 4 • IO = 3F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12

4.4.6 Hardware Monitor



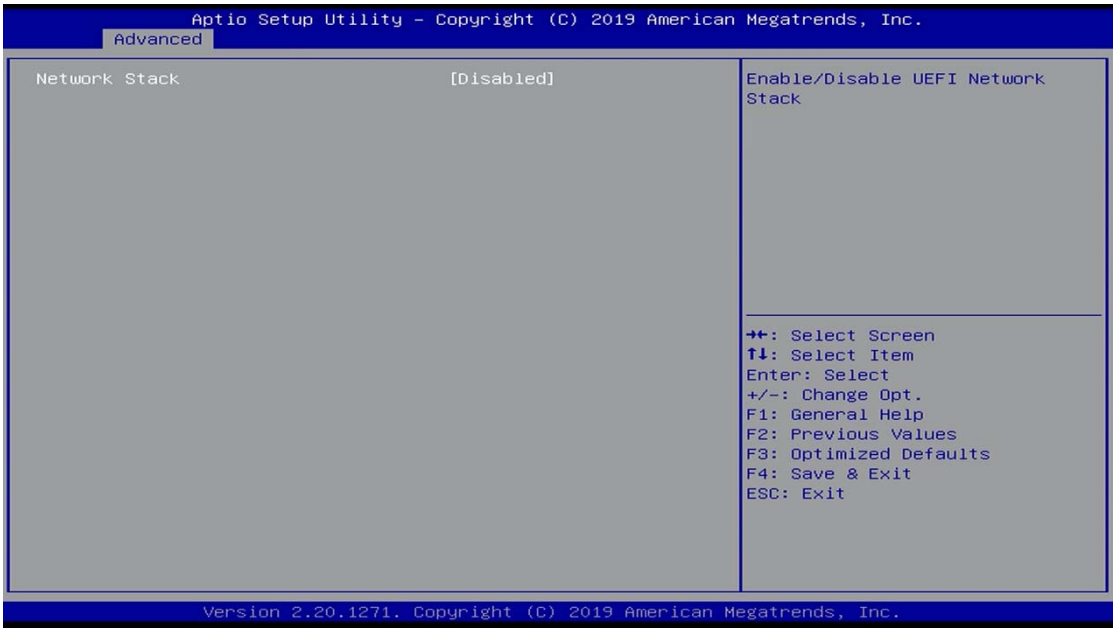
BIOS Setting	Description
CPU Smart Fan Control	Enables / Disables the CPU smart fan feature. Options: Disabled / 50 °C / 60 °C / 70 °C / 80 °C
SYS_FAN1 Smart Fan Control	Controls the system fan temperature by setting up a threashold temperature. Options: Disabled (default),. 50°C, 60°C, 70°C, 80°C
SYS_FAN2 Smart Fan Control	Controls the system fan temperature by setting up a threashold temperature. Options: Disabled (default),. 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 as monitored by the system and showing the PC health status
CPU Shutdown Temperature	This field enables or disables the Shutdown Temperature Options: Disabled (default),. 70°C, 75°C, 80°C, 85°C, 90°C, 95°C

4.4.7 USB Configuration



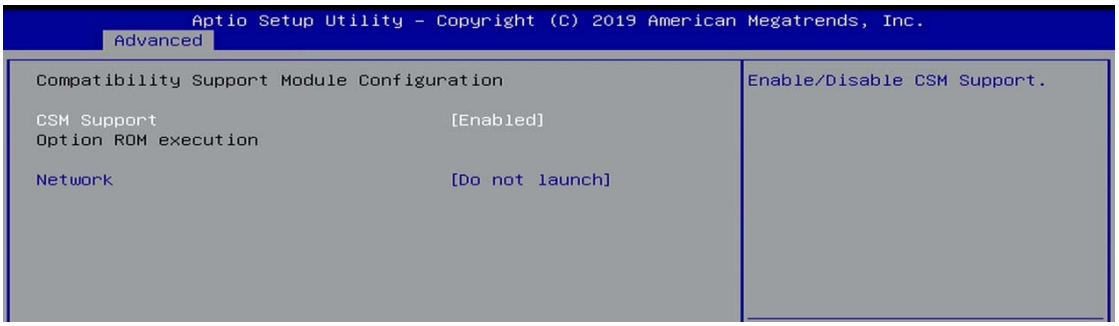
BIOS Setting	Description
Legacy USB Support	Enables / Disables Legacy USB support. • **Auto** disables legacy support if there is no USB device connected. • **Disable** keeps USB devices available only for EFI applications.
XHCI Hand-pff	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enables / Disables USB mass storage driver support.
USB Transfer time-out	Sets the time-out value 1, 5, 10 or 20 sec(s) for Control, Bulk, and Interrupt transfers.
Device reset time-out	Sets the seconds (10, 20, 30, 40 secs) of delaying execution of start unit command to USB mass storage device.
Device power-up delay	The maximum time the device will take before it properly reports itself to the Host Controller. **Auto** uses default value for a Root port it is 100ms. But for a Hub port, the delay is taken from Hub descriptor. Options: Auto / Manual

4.4.8 Network Stack Configuration



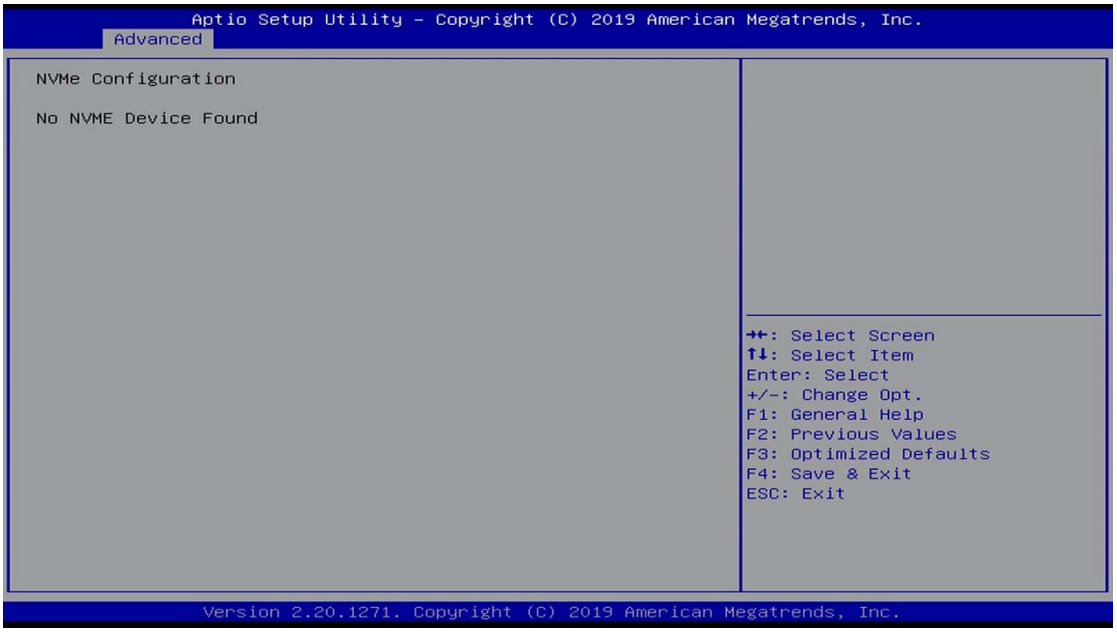
BIOS Setting	Description
Network Stack	Enables / Disables UEFI Network Stack.

4.4.9 CSM Configuration

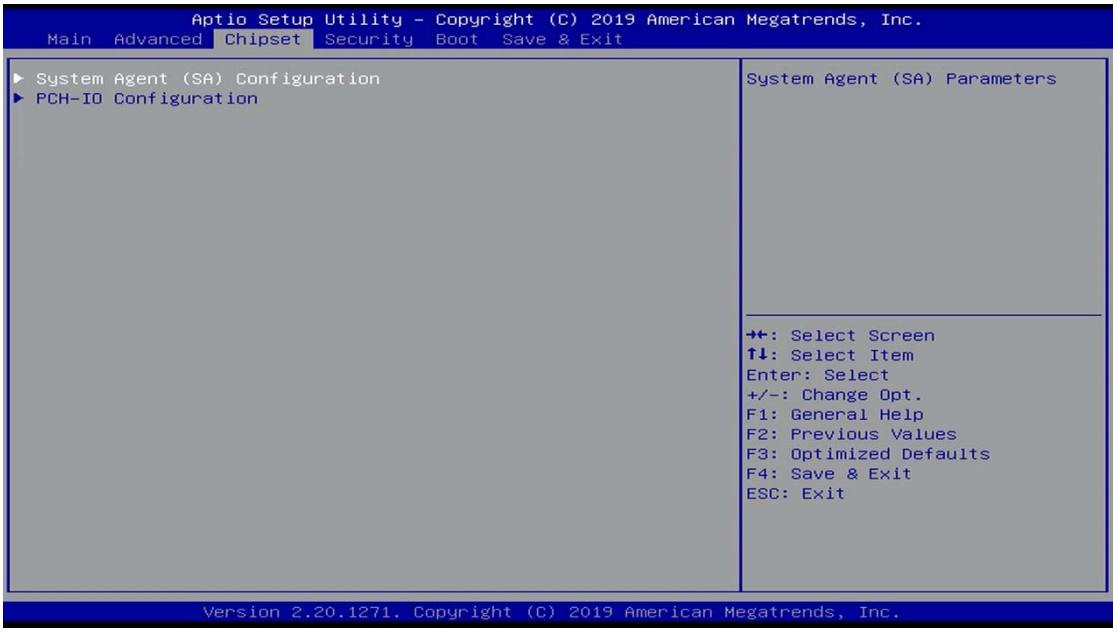


BIOS Setting	Description
CSM Support	Enables / Disables CSM support.
Network	Controls the execution of UEFI and Legacy PXE OpROM. Options: Do not launch / UEFI / Legacy

4.4.10 NVMe Configuration



4.5 Chipset Settings

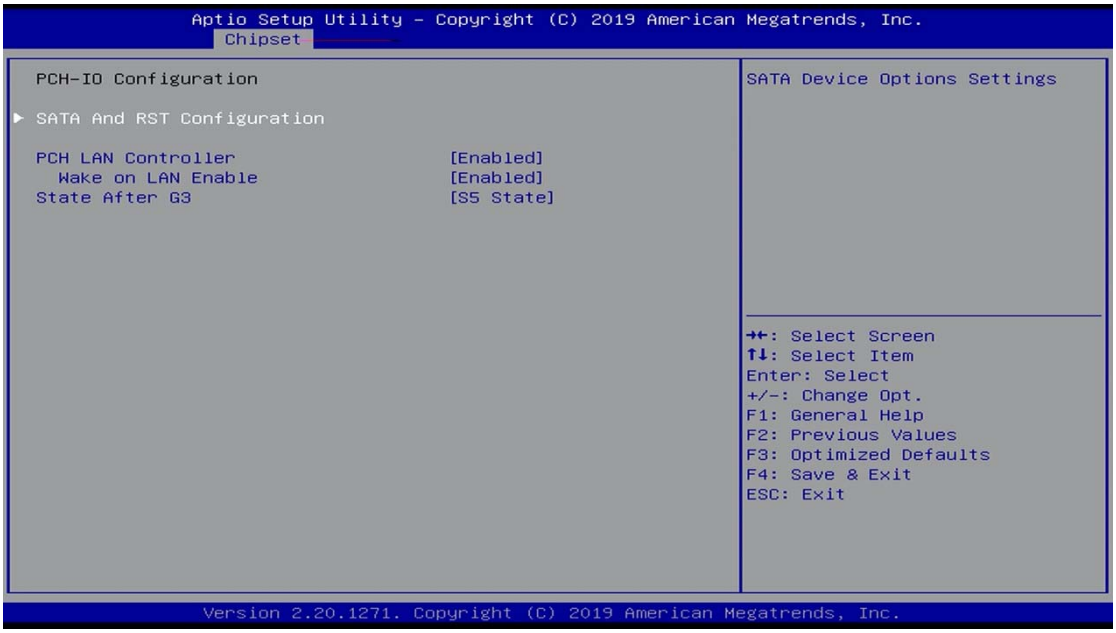


BIOS Setting	Description
System Agent (SA) Configuration	System Agent (SA) parameters
PCH-IO Configuration	PCH parameter

4.5.1 System Agent (SA) Configuration

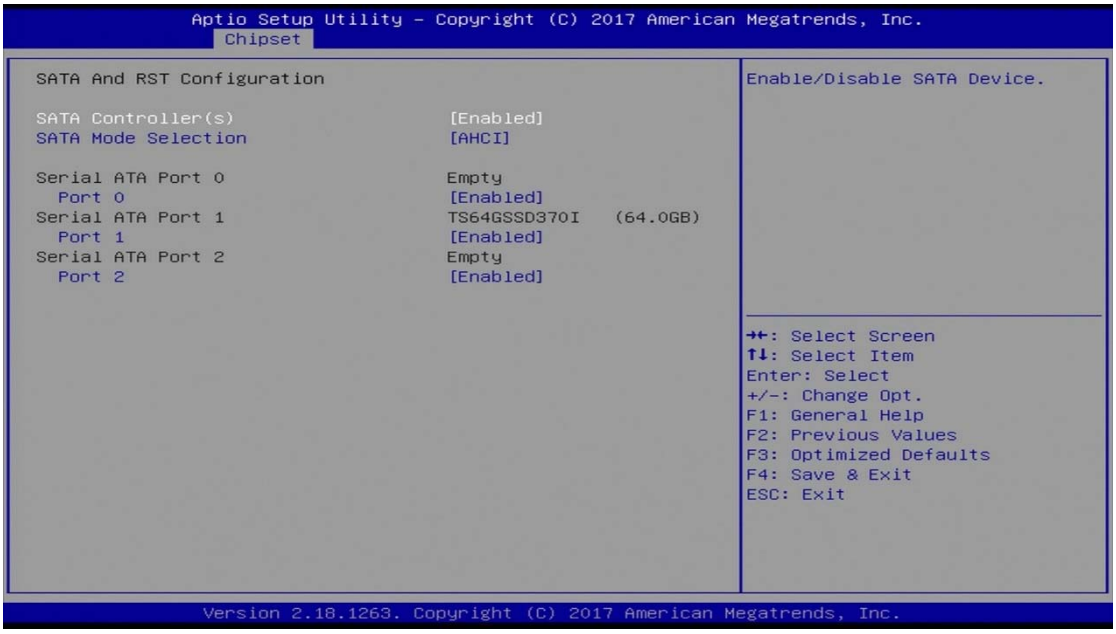
BIOS Setting	Description
Graphics Configuration	Configures the graphics settings.
VT-d	Checks if VT-d function on MCH is supported.

4.5.2 PCH-IO Configuration



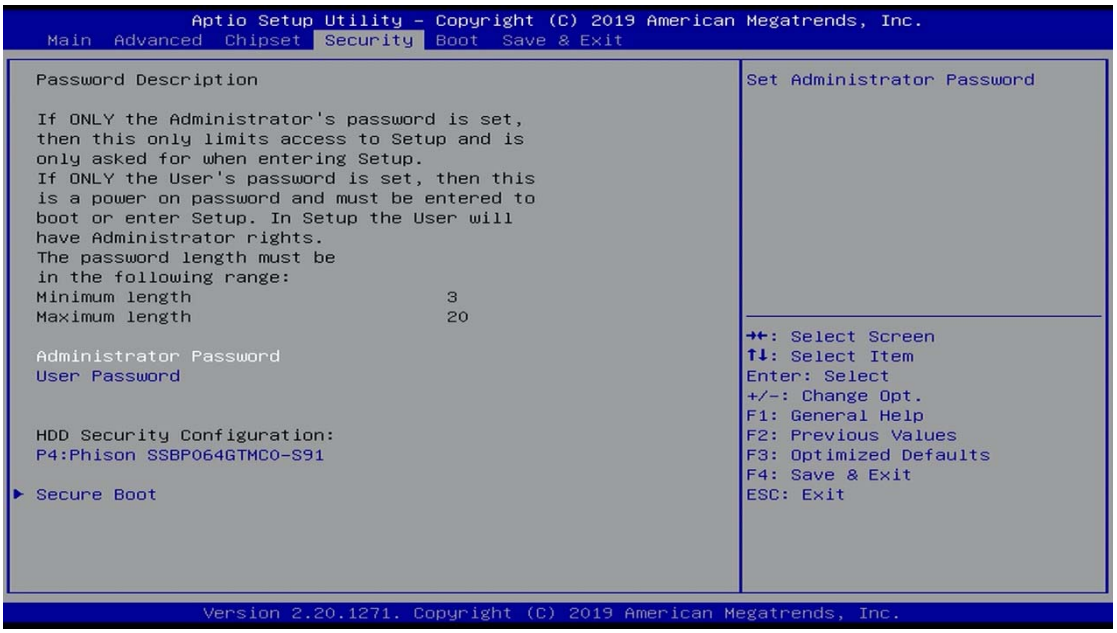
BIOS Setting	Description
SATA and RST Configuration	SATA device options and settings
PCH LAN Controller	Enables / Disables onboard NIC.
Wake on LAN Enable	Enables / Disables integrated LAN to wake the system.
State After G3	

4.5.2.1. SATA and RST Configuration



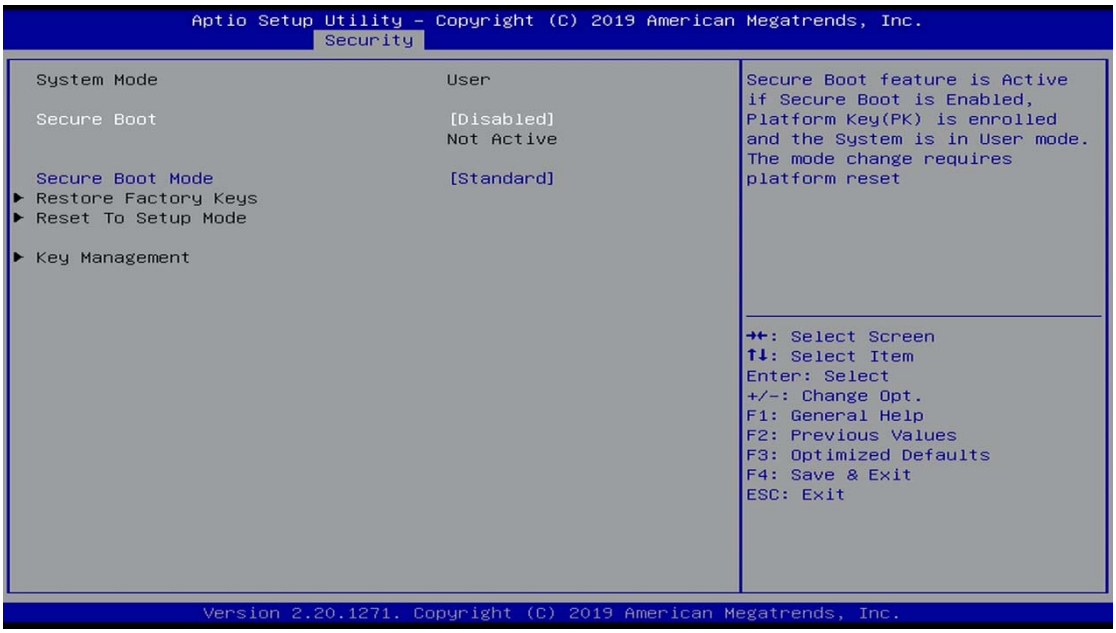
BIOS Setting	Description
SATA Controller(s)	Enables / Disables the Serial ATA.
SATA Mode Selection	Determines how SATA controller(s) operate. Options: AHCI / Intel RST Premium
Serial ATA Port	Enables / Disables Serial Port
SATA Ports Hot Plug	Enables / Disables SATA Ports HotPlug.

4.6 Security Settings



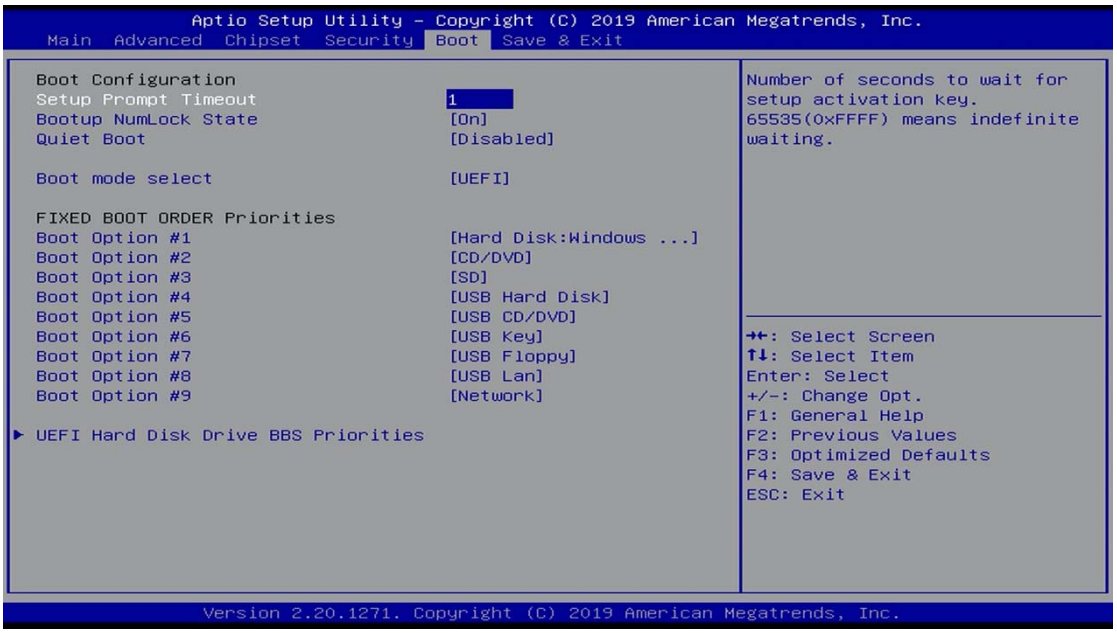
BIOS Setting	Description
Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.
Secure Boot	Configures Secure Boot.

4.6.1 Secure Boot



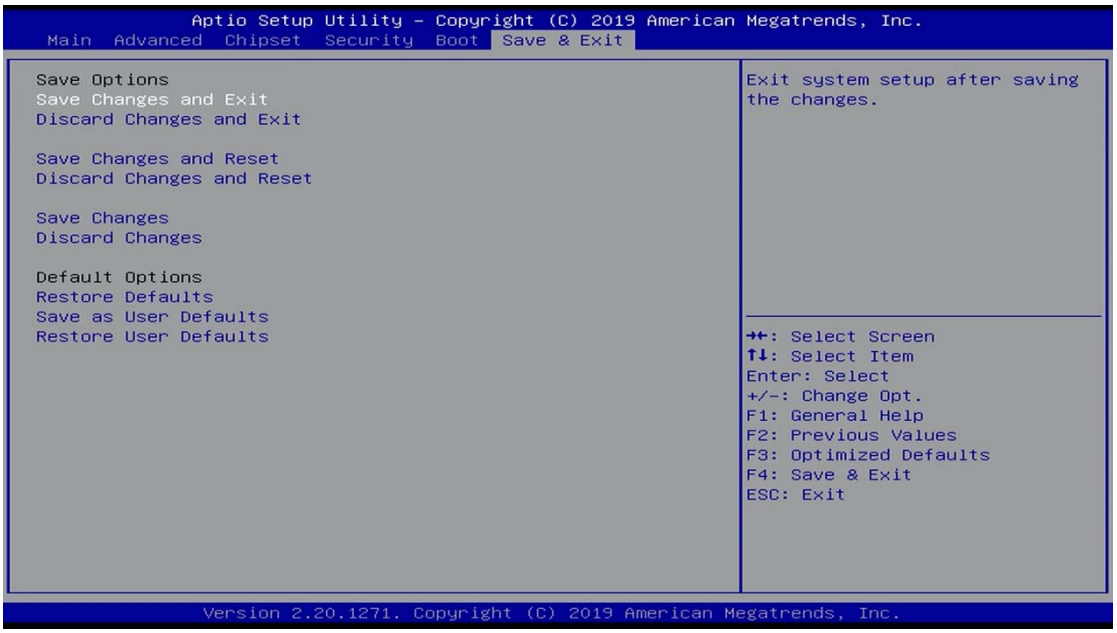
BIOS Setting	Description
Secure Boot	Secure Boot feature is Active if Secure Boot is enabled. Platform Key (PK) Is enrolled and the system is in User mode. The mode change requires platform reset.
Secure Boot Mode	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot policy variables can be configured by a physically present user without full authentication.
Restore Factory Keys	Forces system to user mode. Install factory default Secure Boot key databases.
Key Management	Enables expert users to modify Secure Boot Policy variables without full authentication.

4.7 Boot Setting



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 a Boot mode, Legacy / UEFI.
Boot Option Priorities	Sets the system boot order.

4.8 Save & Exit Settings



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

Appendix A
System Additional Information

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

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

A.1 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
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
0x00000070-0x00000070	System CMOS/real time clock
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources

Address	Device Description
0x00000680-0x0000069F	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
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
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)

Address	Device Description
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x00001854-0x00001857	Motherboard resources
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000F0A0-0x0000F0A7	Intel(R) Active Management Technology - SOL (COM5)
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

A.2 Interrupt Request Lines (IRQ)

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

Level	Function
IRQ 0	System timer
IRQ 1	Standard PS/2 Keyboard
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 5	Communications Port (COM3)
IRQ 7	Communications Port (COM4)
IRQ 8	System CMOS/real time clock
IRQ 11	Intel(R) 100 Series/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	High Definition Audio Controller
IRQ 19	Intel(R) Active Management Technology - SOL (COM5)
IRQ 54 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967283	Intel(R) Management Engine Interface
IRQ 4294967284	Intel(R) I211 Gigabit Network Connection
IRQ 4294967285	Intel(R) I211 Gigabit Network Connection
IRQ 4294967286	Intel(R) I211 Gigabit Network Connection
IRQ 4294967287	Intel(R) I211 Gigabit Network Connection
IRQ 4294967288	Intel(R) I211 Gigabit Network Connection
IRQ 4294967289	Intel(R) I211 Gigabit Network Connection
IRQ 4294967290	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967291	Intel(R) HD Graphics 630
IRQ 4294967292	Intel(R) Ethernet Connection (2) I219-LM
IRQ 4294967293	Standard SATA AHCI Controller
IRQ 4294967294	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115

A.3 Watchdog Timer Configuration

The Watchdog Timer (WDT) is used to generate a variety of output signals after a user programmable count. The WDT is suitable for the use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven.

Under normal circumstance, you will need to restart the WDT at regular intervals before the timer counts to zero.

Sample Code:

```
//---------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "F81846.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 81846 watch dog program\n"); SIO = Init_F81846();
if (SIO == 0)
{
printf("Can not detect Fintek 81846, 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_F81846_Reg(0x2B); bBuf &= (~0x20);
Set_F81846_Reg(0x2B, bBuf);   //Enable WDTO

Set_F81846_LD(0x07);      //switch to logic device 7
Set_F81846_Reg(0x30, 0x01);   //enable timer

bBuf = Get_F81846_Reg(0xF5); bBuf &= (~0x0F);
bBuf |= 0x52;
Set_F81846_Reg(0xF5, bBuf);           //count mode is second  Set_F81846_Reg(0xF6,
interval);    //set timer
bBuf = Get_F81846_Reg(0xFA); bBuf |= 0x01;
Set_F81846_Reg(0xFA, bBuf);   //enable WDTO output

bBuf = Get_F81846_Reg(0xF5); bBuf |= 0x20;
Set_F81846_Reg(0xF5, bBuf);   //start counting
}
//-------------------------------------------------------------------------
void DisableWDT(void)
{
unsigned char bBuf;
Set_F81846_LD(0x07);      //switch to logic device 7  bBuf = Get_F81846_Reg(0xFA);
bBuf &= ~0x01;
Set_F81846_Reg(0xFA, bBuf);   //disable WDTO output

bBuf = Get_F81846_Reg(0xF5); bBuf &= ~0x20;
bBuf |= 0x40;
Set_F81846_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 "F81846.H"
#include <dos.h>
//---------------------------------------------------------------------------
unsigned int F81846_BASE; void Unlock_F81846 (void); void Lock_F81846 (void);
//---------------------------------------------------------------------------
unsigned int Init_F81846(void)
{
unsigned int result; unsigned char ucDid;

F81846_BASE = 0x4E;
result = F81846_BASE;

ucDid = Get_F81846_Reg(0x20);
if (ucDid == 0x07)      //Fintek 81846
{       goto Init_Finish; }

F81846_BASE = 0x2E;
result = F81846_BASE;

ucDid = Get_F81846_Reg(0x20);
if (ucDid == 0x07)      //Fintek 81846
{       goto Init_Finish; }

F81846_BASE = 0x00;
result = F81846_BASE;

Init_Finish:
return (result);
}
//---------------------------------------------------------------------------
void Unlock_F81846 (void)
{
outportb(F81846_INDEX_PORT, F81846_UNLOCK); outportb(F81846_INDEX_PORT,
F81846_UNLOCK);
}
//---------------------------------------------------------------------------
void Lock_F81846 (void)
{
outportb(F81846_INDEX_PORT, F81846_LOCK);
}
//---------------------------------------------------------------------------
void Set_F81846_LD( unsigned char LD)
{
Unlock_F81846();
outportb(F81846_INDEX_PORT, F81846_REG_LD);
outportb(F81846_DATA_PORT, LD);  Lock_F81846();
```

```
}
//---------------------------------------------------------------------------
void Set_F81846_Reg( unsigned char REG, unsigned char DATA)
{
Unlock_F81846(); outportb(F81846_INDEX_PORT, REG); outportb(F81846_DATA_PORT,
DATA); Lock_F81846();
}
//---------------------------------------------------------------------------
unsigned char Get_F81846_Reg(unsigned char REG)
{
unsigned char Result; Unlock_F81846();
outportb(F81846_INDEX_PORT, REG); Result = inportb(F81846_DATA_PORT);
Lock_F81846();
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       F81846_H
#define        F81846_H     1
//---------------------------------------------------------------------------
#defineF81846_INDEX_PORT   (F81846_BASE)
#defineF81846_DATA_PORT    (F81846_BASE+1)
//---------------------------------------------------------------------------
#defineF81846_REG_LD   0x07
//---------------------------------------------------------------------------
#define F81846_UNLOCK  0x87
#defineF81846_LOCK       0xAA
//---------------------------------------------------------------------------
unsigned int Init_F81846(void);
void Set_F81846_LD( unsigned char);
void Set_F81846_Reg( unsigned char, unsigned char); unsigned char
Get_F81846_Reg( unsigned char);
//---------------------------------------------------------------------------
#endif //      F81846_H
```