



Industrial Communication Platforms

Energy Management and Industrial Cyber Security Solutions

ICS-I372 User Manual

Version: 1.2

Date of Release: 2024-03-13

About this Document



This manual describes the overview of the various functionalities of this product, and the information you need to get it ready for operation. It is intended for those who are:

- responsible for installing, administering and troubleshooting this system or Information Technology professionals.
- assumed to be qualified in the servicing of computer equipment, such as professional system integrators, or service personnel and technicians.

The latest version of this document can be found on Lanner's official website, available either through the product page or through the [Lanner Download Center](#) page with a login account and password.

Conventions & Icons

The icons are used in the manual to serve as an indication of interest topics or important messages.

Icon	Usage
 Note or Information	This mark indicates that there is something you should pay special attention to while using the product.
 Warning or Important	This mark indicates that there is a caution or warning and it is something that could damage your property or product.

Online Resources

To obtain additional documentation resources and software updates for your system, please visit the [Lanner Download Center](#). As certain categories of documents are only available to users who are logged in, please be registered for a Lanner Account at <http://www.lannerinc.com/> to access published documents and downloadable resources.

Technical Support

In addition to contacting your distributor or sales representative, you could submit a request at our [Lanner Technical Support](#) and fill in a support ticket to our technical support department.

Documentation Feedback

Your feedback is valuable to us, as it will help us continue to provide you with more accurate and relevant documentation. To provide any feedback, comments or to report an error, please email contact@lannerinc.com. Thank you for your time.

Contact Information

Taiwan Corporate Headquarters

Lanner Electronics Inc.

7F, No.173, Sec.2, Datong Rd.
Xizhi District, New Taipei City 22184,
Taiwan

立端科技股份有限公司

221 新北市汐止區
大同路二段 173 號 7 樓

T: +886-2-8692-6060

F: +886-2-8692-6101

E: contact@lannerinc.com

USA

Lanner Electronics Inc.

47790 Westinghouse Drive
Fremont, CA 94539

T: +1-855-852-6637

F: +1-510-979-0689

E: sales_us@lannerinc.com

Europe

Lanner Europe B.V.

Wilhelmina van Pruysenweg 104
2595 AN The Hague
The Netherlands

T: +31 70 701 3256

E: sales_eu@lannerinc.com

China

Beijing L&S Lancom Platform Tech. Co., Ltd.

Guodong LOFT 9 Layer No. 9 Huinan Road,
Huilongguan Town, Changping District, Beijing
102208 China

T: +86 010-82795600

F: +86 010-62963250

E: service@ls-china.com.cn

Canada

Lanner Electronics Canada Ltd

3160A Orlando Drive
Mississauga, ON
L4V 1R5 Canada

T: +1 877-813-2132

F: +1 905-362-2369

E: sales_ca@lannerinc.com

Copyright and Trademarks

This document is copyrighted © 2024 by Lanner Electronics Inc. All rights are reserved. The original manufacturer reserves the right to make improvements to the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written permission of the original manufacturer. Information provided in this manual is intended to be accurate and reliable. However, the original manufacturer assumes no responsibility for its use, nor for any infringements upon the rights of third parties that may result from such use.

Acknowledgment

Intel® and Intel® Atom® are trademarks of Intel Corporation or its subsidiaries in the U.S. and/or other countries. Microsoft Windows and MS-DOS are registered trademarks of Microsoft Corp. All other product names or trademarks are properties of their respective owners.

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of 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 the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ▶ Reorient or relocate the receiving antenna.
- ▶ Increase the separation between the equipment and receiver.
- ▶ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ▶ Consult the dealer or an experienced radio/TV technician for help.

FCC Caution

- ▶ Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- ▶ This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.



Note

1. An unshielded-type power cord is required to meet FCC emission limits and to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.
2. Use only shielded cables to connect I/O devices to this equipment.
3. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



Important

1. Operations in the 5.15-5.25GHz band are restricted to indoor usage only.
2. This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

Safety Guidelines

Follow these guidelines to ensure general safety:

- ▶ Keep the chassis area clear and dust-free during and after installation.
- ▶ Do not wear loose clothing or jewelry that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- ▶ Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- ▶ Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- ▶ Disconnect all power by turning off the power and unplugging the power cord before installing or removing a chassis or working near power supplies
- ▶ Do not work alone if potentially hazardous conditions exist.
- ▶ Never assume that power is disconnected from a circuit; always check the circuit.

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :

- ▶ Laissez la zone du châssis propre et sans poussière pendant et après l'installation.
- ▶ Ne portez pas de vêtements amples ou de bijoux qui pourraient être pris dans le châssis. Attachez votre cravate ou écharpe et remontez vos manches.
- ▶ Portez des lunettes de sécurité pour protéger vos yeux.
- ▶ N'effectuez aucune action qui pourrait créer un danger pour d'autres ou rendre l'équipement dangereux.
- ▶ Coupez complètement l'alimentation en éteignant l'alimentation et en débranchant le cordon d'alimentation avant d'installer ou de retirer un châssis ou de travailler à proximité de sources d'alimentation.
- ▶ Ne travaillez pas seul si des conditions dangereuses sont présentes.
- ▶ Ne considérez jamais que l'alimentation est coupée d'un circuit, vérifiez toujours le circuit. Cet appareil génère, utilise et émet une énergie radiofréquence et, s'il n'est pas installé et utilisé conformément aux instructions des fournisseurs de composants sans fil, il risque de provoquer des interférences dans les communications radio.

Lithium Battery Caution

- ▶ There is risk of Explosion if Battery is replaced by an incorrect type.
- ▶ Dispose of used batteries according to the instructions.
- ▶ Installation only by a skilled person who knows all Installation and Device Specifications which are to be applied.
- ▶ Do not carry the handle of power supplies when moving to another place.
- ▶ Please conform to your local laws and regulations regarding safe disposal of lithium BATTERY.
- ▶ Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.
- ▶ Leaving a battery in an extremely high temperature surrounding environment can result in an explosion or the leakage of flammable liquid or gas.
- ▶ A battery subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas.

Avertissement concernant la pile au lithium

- ▶ Risque d'explosion si la pile est remplacée par une autre d'un mauvais type.
- ▶ Jetez les piles usagées conformément aux instructions.
- ▶ L'installation doit être effectuée par un électricien formé ou une personne formée à l'électricité connaissant toutes les spécifications d'installation et d'appareil du produit.
- ▶ Ne transportez pas l'unité en la tenant par le câble d'alimentation lorsque vous déplacez l'appareil.

Operating Safety

- ▶ Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
- ▶ Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
- ▶ Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.
- ▶ Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- ▶ Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

Sécurité de fonctionnement

- ▶ L'équipement électrique génère de la chaleur. La température ambiante peut ne pas être adéquate pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.
- ▶ Vérifiez que le couvercle du châssis est bien fixé. La conception du châssis permet à l'air de refroidissement de bien circuler. Un châssis ouvert laisse l'air s'échapper, ce qui peut interrompre et rediriger le flux d'air frais destiné aux composants internes.
- ▶ Les décharges électrostatiques (ESD) peuvent endommager l'équipement et gêner les circuits électriques. Des dégâts d'ESD surviennent lorsque des composants électroniques sont mal manipulés et peuvent causer des pannes totales ou intermittentes. Suivez les procédures de prévention d'ESD lors du retrait et du remplacement de composants.
- ▶ Portez un bracelet anti-ESD et veillez à ce qu'il soit bien au contact de la peau. Si aucun bracelet n'est disponible, reliez votre corps à la terre en touchant la partie métallique du châssis.
- ▶ Vérifiez régulièrement la valeur de résistance du bracelet antistatique, qui doit être comprise entre 1 et 10 mégohms (Mohms).

Mounting Installation Precaution

- ▶ Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- ▶ If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- ▶ Installation of the equipment (especially in a rack) should consider the ventilation of the system's intake (for taking chilled air) and exhaust (for emitting hot air) openings so that the amount of airflow required for safe operation of the equipment is not compromised.
- ▶ To avoid a hazardous load condition, be sure the mechanical loading is even when mounting.
- ▶ Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- ▶ Reliable earthing should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

Installation & Operation:

- ▶ This equipment must be grounded. The power cord for product should be connected to a socket-outlet with earthing connection.
Cet équipement doit être mis à la terre. La fiche d'alimentation doit être connectée à une prise de terre correctement câblée
- ▶ Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.
Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.
- ▶ The machine can only be used in a restricted access location and must be installed by a skilled person.
Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.

Warning

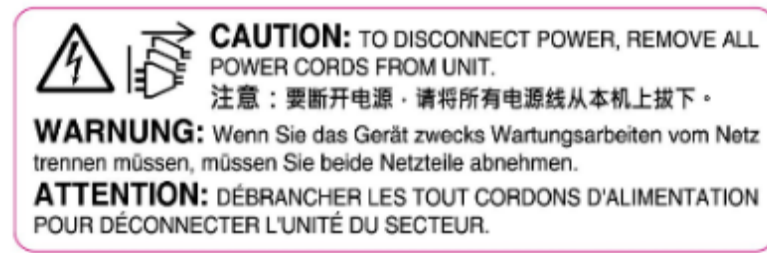
Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts.

"Product shall be used with Class 1 laser device modules."

Avertissement

Équipement de classe I. Ce matériel doit être relié à la terre. La fiche d'alimentation doit être raccordée à une prise de terre correctement câblée. Une prise de courant mal câblée pourrait induire des tensions dangereuses sur des parties métalliques accessibles.

"Le produit doit être utilisé avec des modules de dispositifs laser de classe 1."



Electrical Safety Instructions

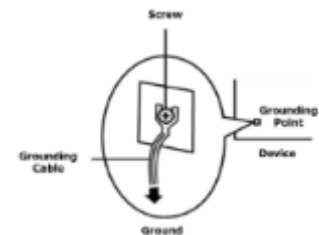
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect the ground wire after turning off the power. A ground wire is required and the part connecting the conductor must be greater than 4 mm² or 10 AWG.

Consignes de sécurité électrique

- ▶ Avant d'allumer l'appareil, reliez le câble de mise à la terre de l'équipement à la terre.
- ▶ Une bonne mise à la terre (connexion à la terre) est très importante pour protéger l'équipement contre les effets néfastes du bruit externe et réduire les risques d'électrocution en cas de foudre.
- ▶ Pour désinstaller l'équipement, débranchez le câble de mise à la terre après avoir éteint l'appareil.
- ▶ Un câble de mise à la terre est requis et la zone reliant les sections du conducteur doit faire plus de 4 mm² ou 10 AWG.

Grounding Procedure for Power Source

- ▶ Loosen the screw of the earthing point.
- ▶ Connect the grounding cable to the ground.
- ▶ The protection device for the power source must provide 30 A current.
- ▶ This protection device must be connected to the power source before power.
- ▶ The cable should be 16 AWG



Procédure de mise à la terre pour source d'alimentation

- ▶ Desserrez la vis du terminal de mise à la terre.
- ▶ Branchez le câble de mise à la terre à la terre.
- ▶ L'appareil de protection pour la source d'alimentation doit fournir 30 A de courant.
- ▶ Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation.
- ▶ Le câble doit être 16 AWG

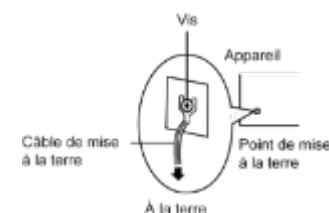


Table of Contents

Chapter 1: Product Overview	9
Package Content.....	9
Ordering Information	9
Optional Accessories	9
System Specifications	10
Physical Overview.....	11
Motherboard Information.....	13
Chapter 2: Hardware Installation.....	26
Opening the Bottom Chassis	26
Opening the Top Chassis	28
Installing the System Memory.....	30
Installing the mSATA Storage (Optional).....	32
Installing the Wi-Fi Module (Optional).....	34
Installing the LTE/5G Module (Optional).....	36
DIN Rail Mounting (Optional)	40
Wall Mounting (Optional)	41
Chapter 3: Software Setup	43
Main Page	44
Advanced Page	45
Chipset.....	70
Security	75
Boot Menu.....	78
Save and Exit Menu	79
Appendix A: Terms and Conditions	81
Warranty Policy	81

CHAPTER 1: PRODUCT OVERVIEW

The ICS-I372 series is a DIN-mount platform featuring an Intel® Elkhart Lake Embedded SKU, equipped with either a 2-core or 4-core CPU and boasting 8x 2.5G RJ45, 6x 2.5G RJ45 plus 2x SFP, or even 4x 2.5GbE RJ45 plus 2x SFP ports with one or two pairs of Bypass functionality. This system is designed for use as an Intel® X-86 IoT Gateway, particularly tailored for industrial security applications. Furthermore, it is designed to an impressive operating temperature range of -40°C to 70°C and meets UL/IEC 62368-1 certified and C1D2 compliant for highest safety standards and ensuring reliability in even the harshest environments.

Key Features

- ▶ Intel® Elkhart Lake Embedded SKU
- ▶ Up to 6x 2.5GbE RJ45 & 2x GbE SFP with 2 Pairs of Bypass (By SKU)
- ▶ Onboard 64GB eMMC Memory and TPM 2.0 Security
- ▶ 2x USB 3.0 Ports, 1x DB9 Console Port, 2x DI & 2x DO Ports
- ▶ 1x M.2 B-Key for LTE/5G Sub6 with dual SIM, and 1x M.2 E-Key for Wi-Fi

Package Content

Your package contains the following items:

- ▶ 1x ICS-I372 Industrial-Grade Cyber Security Platform
- ▶ 1x Phoenix Connector Kits

Note

The Phoenix Connector terminal block suitable for 12-24 AWG, Torque value 7 Lb In. and use copper conductors only.

Ordering Information

SKU No.	Main Features
ICS-I372A	Industrial-grade Cyber Security Platform with Intel® Atom™ X6425E, 8x RJ45 w/ 1 Pair of Bypass
ICS-I372B	Industrial-grade Cyber Security Platform with Intel® Atom™ X6425E, 8x RJ45 w/ 2 Pairs of Bypass
ICS-I372C	Industrial-grade Cyber Security Platform with Intel® Atom™ X6425E, 6x RJ45 + 2x SFP w/ 1 Pair of Bypass
ICS-I372D	Industrial-grade Cyber Security Platform with Intel® Atom™ X6425E, 6x RJ45 + 2x SFP w/ 2 Pairs of Bypass
ICS-I372E	Industrial-grade Cyber Security Platform with Intel® Atom™ X6413E, 6x RJ45 w/ 1 Pair of Bypass
ICS-I372F	Industrial-grade Cyber Security Platform with Intel® Atom™ X6413E, 4x RJ45 + 2x SFP w/ 1 Pair of Bypass

Optional Accessories

Model	Description
080W000783000	Console Cable Kit


System Specifications

Processor System	Processor Options	SKU A/B/C/D: Intel® Atom® X6425E (Elkhart Lake) SKU E/F: Intel® Atom® X6413E (Elkhart Lake)
	Frequency	2.0GHz / 1.5GHz
	Core Number	4 Cores
	Chipset	Intel® i226-IT
	BIOS	AMI SPI Flash BIOS
Memory	Technology	DDR4 3200, In Band ECC
	Max. Capacity	Up to 32GB
	Socket	1x SODIMM
Ethernet	Controller	LAN3 & LAN4 by Intel® i210-IS/IT/AT; LAN1,2 & LAN5~8 by Intel® i226-IT
	Speed	LAN3 & LAN4: 100/1000 Mbps; LAN1,2 & LAN5~8: 10/100/1000/2500 Mbps
	Interface	SKU A: 8x GbE RJ45, 1x Pair Bypass; SKU B: 8x GbE RJ45, 2x Pair Bypass; SKU C: 6x GbE RJ45; 2x SFP, 1x Pair Bypass; SKU D: 6x GbE RJ45; 2x SFP, 2x Pair Bypass; SKU E: 6x GbE RJ45, 1x Pair Bypass; SKU F: 4x GbE RJ45; 2x SFP, 1x Pair Bypass
Storage	Interface	Onboard eMMC 64GB; 1x M.2 M-Key SATA SSD; 1x SATA for 2.5" SSD/HDD or 1x M.2 M-Key SATA SSD (Optional)
I/O Interface	Serial Port	1x D89 Console Port
	USB Port	2x USB 3.0, Type A Ports
	Reset Button	Default H/W Reset, Selectable by Jumper to SW Reset
	Power Input	2-pin Terminal Block for Power On/Off Control
	LED	Power Status, Storage Access, LTE Status, LTE Signal, DI/DO, LAN TX/RX
Expansion Interface	M.2	1x M.2 3042 B-Key w/ Dual SIM for LTE/5G Sub6; 1x M.2 2230 E-Key for Wi-Fi 5/6 Note: If a 5G Module is installed, there is no more space for a 2.5" SSD expansion
Watchdog Timer		Watchdog Timer 256 level time interval system reset, software programmable
Graphics	Controller	Intel® HD Graphics 500
	VGA	1x DP Port
Mechanical	Dimension (W x H x D)	180 x 156.5 x 81mm
	Fanless	Yes
	Weight	2kg
	Mounting	DIN rail or Wall mount
Environmental	Operating Temperature	-40°C ~70°C with LTE
	Storage Temperature	-40°C ~70°C
	Relative Humidity	10% ~ 90%, Non-condensing; Non-Operating Humidity: 5%~95%
Power	Power Supply Voltage	Dual DC Input from 12~36V
	Connector	1x 6-pin Terminal Block for Dual DC Input
	Dual Power Inputs	Yes
Driver Support	Microsoft Windows	Windows 10 IoT 64bits / 11 IoT
	Linux	Kernel 3.12 / Ubuntu 18.10 64bit above
Certification	EMC	CE/FCC Class A
	Safety	UL/IEC 62368-1 certified, C1D2 compliant

Physical Overview

Front & Rear Panel



No.		Description	
		LED Indicator: Storage Access/Power Status/SFP Status/LTE Status	
F1	LED Indicators		4x LTE Signal Level Status 2x4 Programmable
F2	Console Port	1x DB9 Console Port	
F3	USB Port	2x USB 3.0 Type A Ports	
F4	LAN/SFP Port	SKU A/B: 8x GbE RJ45 (1 or 2 pair bypass) Ports SKU C/D: 6x GbE RJ45; 2x GbE SFP (1 or 2 pair bypass) Ports SKU E: 6x GbE RJ45 (one pair bypass) Ports SKU F: 4x GbE RJ45; 2x GbE SFP (one pair bypass) Ports	
F5	Display Port	1x Display Port	
F6	Reset Button	1x Reset Button. Use a pin to reset the system	
F7	DIO	2x4-pin Terminal block for 2x DI & 2x DO	
F8	Antenna	2x Antenna Holes	

Top Panel



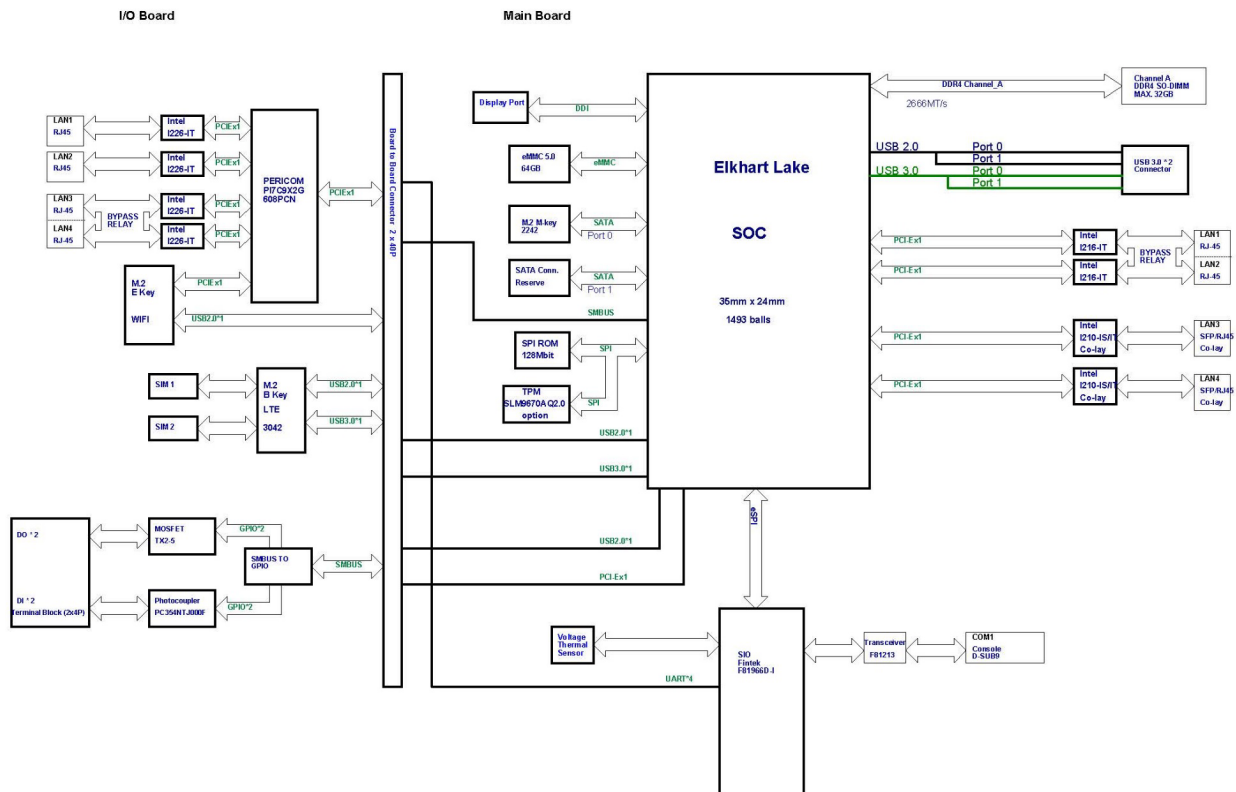
No. Description		
T1	Power Input	1x 6-pin Terminal Block for Dual DC Input 12~36V
T2	Antenna	2x Antenna Holes

Bottom Panel



Motherboard Information

Block Diagram



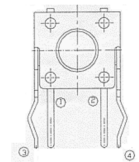
Internal Jumpers and Connector

The pin headers on the motherboard are often associated with important functions. With the shunt (Jumper) pushed down on the designated pins (the pin numbers are printed on the circuit board, surrounding the pin header), certain feature can be enabled or disabled. When changing the jumpers, make sure your system is completely turned off.

Motherboard

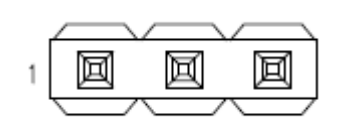
1. RST2: Reset Button

Push SW No Lock TS-02PV-130, 4-pin, H:7.1mm, Dip Zeetek



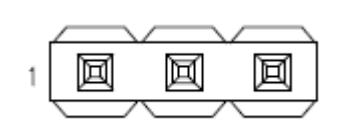
2. RST1: HW/SW Reset Select

Jumper	Description
1-2	Software reset
2-3 (Default)	Hardware reset



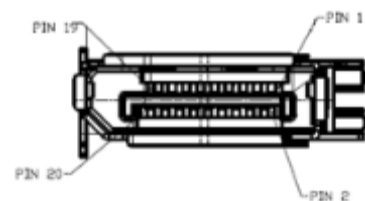
3. JCMOS 1: RTC Reset

Jumper	Description
1-2	RTC_RST#
2-3	SRRTC_RST#



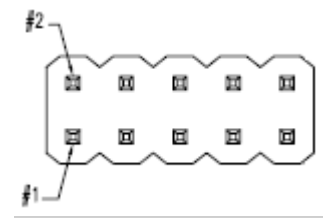
4. DP1: Display Port Connector

Pin No.	Description	Pin No.	Description
1	DP1_TXP0	2	GND
3	DP1_TXN0	4	DP1_TXP1
5	GND	6	DP1_TXN1
7	DP1_TXP2	8	GND
9	DP1_TXN2	10	DP1_TXP3
11	GND	12	DP1_TXN3
13	DPP_AUX_EN_N	14	CONFIG2
15	DPP_AUX_CHP	16	GND
17	DPP_AUX_CHN	18	HPD
19	RETURN	20	DP_PWR

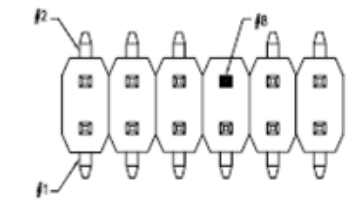


5. SPI1: SPI ROM Connector (For RD Debug)

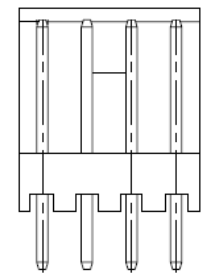
Pin No.	Description	Pin No.	Description
1	SPI0_IO3_HOLD#	2	NC
3	SPI0_CS0_R#	4	V3P3A_1P8A_SPI
5	SPI0_IO1_MISO_R	6	NC
7	NC	8	SPI0_CLK_R
9	GND	10	SPI0_IO0_MOSI_R

**6. ESPI1:** ESPI Connector (For RD Debug)

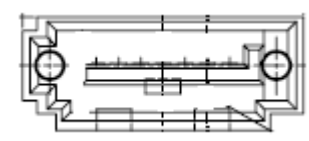
Pin No.	Description	Pin No.	Description
1	ESPI_CLK	2	ESPI_IO1
3	ESPI_RST#	4	ESPI_IO0
5	ESPI_CS0#	6	+P3V3_S
7	ESPI_IO3		
9	ESPI_IO2	10	GND
11	+P3V3_A	12	NC

**7. SATAPWR1:** SATA Power Connector

Pin No.	Description
1	+P12V_S
2	GND
3	GND
4	+P5V_S

**8. SATA1:** SATA Connector

Pin No.	Description	Pin No.	Description
1	GND	5	SATA_C_RXN1
2	SATA_C_TXP1	6	SATA_C_RXP1
3	SATA_C_TXN1	7	GND
4	GND		

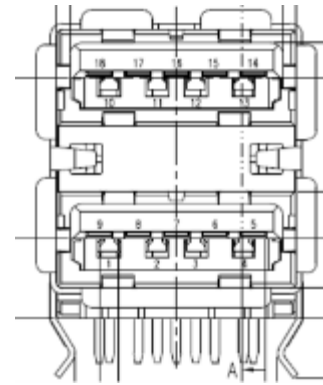
**9. COM1:** BO2WI Mini D-Sub

Pin No.	Description	Pin No.	Description
1	NC	2	COM1_R_RXD
3	COM1_R_TXD	4	NC
5	GND	6	NC
7	NC	8	NC
9	NC		

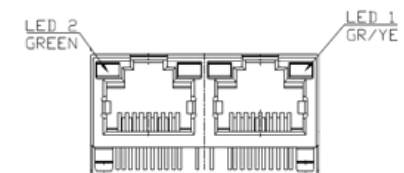


10. USB1: Dual USB 3.0 Type A Connector

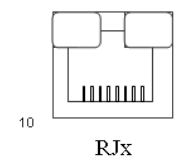
Pin No.	Description	Pin No.	Description
1	V5S_USB3_1	10	V5S_USB3_2
2	USB2_0-	11	USB2_1-
3	USB2_0+	12	USB2_1+
4	GND	13	GND
5	USB3_R0-	14	USB3_R1-
6	USB3_R0+	15	USB3_R1+
7	GND	16	GND
8	USB3_T0-	17	USB3_T1-
9	USB3_T0+	18	USB3_T1+

**13. RJ1:** LAN 1/2 Connector

Pin No.	Description	Pin No.	Description
1	P1_MDXP0	13	P2_MDXP0
2	P1_MDXN0	14	P2_MDXN0
3	P1_MDXP1	15	P2_MDXP1
4	P1_MDXP2	16	P2_MDXP2
5	P1_MDXN2	17	P2_MDXN2
6	P1_MDXN1	18	P2_MDXN1
7	P1_MDXP3	19	P2_MDXP3
8	P1_MDXN3	20	P2_MDXN3
9	+P3V3_S	21	+P3V3_S
10	P1_LED_LINK_N	22	P2_LED_LINK_N
11	P1_LINK1000_N	23	P2_LINK1000_N
12	P1_LINK2500_N	24	P2_LINK2500_N

**14. RJ2:** LAN 10/100/1000 RJ45 Connector

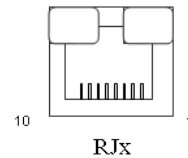
Pin No.	Description
1	LAN3_MDI0P
2	LAN3_MDI0N
3	LAN3_MDI1P
4	LAN3_MDI1N
5	P1V5_LAN3
6	P1V5_LAN3
7	LAN3_MDI2P
8	LAN3_MDI2N
9	LAN3_MDI3P



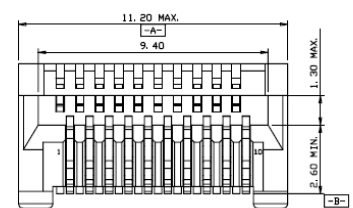
10	LAN3_MDI3N
11	LAN3_L100_N
12	LAN3_L1000_N
13	P3V3_LAN3
14	LAN3_ACTLED_N

15. RJ3: LAN 10/100/1000 RJ45 Connector

Pin No.	Description
1	LAN4_MDI0P
2	LAN4_MDI0N
3	LAN4_MDI1P
4	LAN4_MDI1N
5	P1V5_LAN4
6	P1V5_LAN4
7	LAN4_MDI2P
8	LAN4_MDI2N
9	LAN4_MDI3P
10	LAN4_MDI3N
11	LAN4_L100_N
12	LAN4_L1000_N
13	P3V3_LAN4
14	LAN4_ACTLED_N

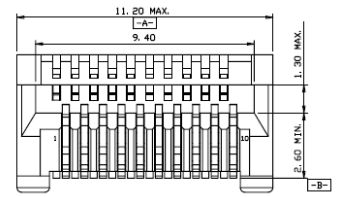
**16. FIBER1: SFP Connector**

Pin No.	Description	Pin No.	Description
1	GND	11	GND
2	SFP3_TX_FAULT	12	SFP3_RD_N
3	SFP3_TX_DIS	13	SFP3_RD_P
4	SFP3_I2C_SDA	14	GND
5	SFP3_I2C_SCL	15	P3V3_SFP3_R
6	SFP3_MOD_ABS	16	P3V3_SFP3_T
7	SFP3_RS0	17	GND
8	SFP3_RX_LOS	18	SFP3_TD_P
9	SFP3_RS1	19	SFP3_TD_N
10	GND	20	GND

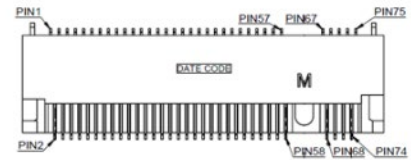


17. FIBER2: SFP Connector

Pin No.	Description	Pin No.	Description
1	GND	11	GND
2	SFP4_TX_FAULT	12	SFP4_RD_N
3	SFP4_TX_DIS	13	SFP4_RD_P
4	SFP4_I2C_SDA	14	GND
5	SFP4_I2C_SCL	15	P3V3_SFP4_R
6	SFP4_MOD_ABS	16	P3V3_SFP4_T
7	SFP4_RS0	17	GND
8	SFP4_RX_LOS	18	SFP4_TD_P
9	SFP4_RS1	19	SFP4_TD_N
10	GND	20	GND

**18. M2_M_KEY1:** M.2 M-Key SATA Connector

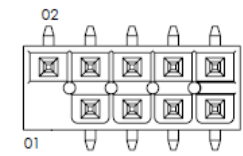
Pin No.	Description	Pin No.	Description
1	GND	2	+P3V3_S
3	GND	4	+P3V3_S
5	NC	6	NC
7	NC	8	NC
9	GND	10	M2_ACT_LED#
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	NC
21	GND	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	NC	30	NC
31	NC	32	NC
33	GND	34	NC
35	NC	36	NC
37	NC	38	NC
39	GND	40	NC
41	SATA_C_RXP0	42	NC
43	SATA_C_RXN0	44	NC
45	GND	46	NC
47	SATA_C_TXN0	48	NC



49	SATA_C_TXP0	50	NC
51	GND	52	NC
53	NC	54	NC
55	NC	56	
57	GND	58	
Mechanical Key			
67	NC	68	NC
69	M2_PEDT	70	+P3V3_S
71	GND	72	+P3V3_S
73	GND	74	+P3V3_S
75	GND		

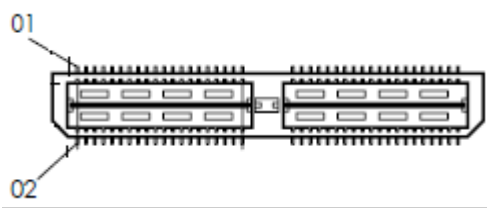
19. JP10: Board to Board Power Connector

Pin No.	Description	Pin No.	Description
1	NC	2	V12_A
3	GND	4	V12_A
5	GND	6	V12_A
7	GND	8	V12_A
9	GND	10	V12_A

**20. J11:** Board to Board Connector

Pin No.	Description	Pin No.	Description	Pin No.	Description	Pin No.	Description
1	GND	41	GND	2	+P3V3_S	42	P1_S0_2
3	GND	43	CTS#2	4	GND	44	LAN34GND
5	USB2_DP4	45	RTS#2	6	USB2_DP3	46	GND
7	USB2_DN4	47	SOUT#2	8	USB2_DN3	48	CTS#3
9	GND	49	SIN#2	10	GND	50	RTS#3
11	PCIE_C_TXP5	51	GND	12	USB3_TX2_P	52	SOUT#3
13	PCIE_C_TXN5	53	CTS#4	14	USB3_TX2_N	54	SIN#3
15	GND	55	RTS#4	16	GND	56	GND
17	PCIE_RXP5	57	SOUT#4	18	USB3_RX2_P	58	CTS#5
19	PCIE_RXN5	59	SIN#4	20	USB3_RX2_N	60	RTS#5
21	GND	61	GND	22	GND	62	SOUT#5
23	PCIE_CLK_P5	63	SOUT#6	24	PCIE_CLK_P4	64	SIN#5
25	PCIE_CLK_N5	65	SIN#6	26	PCIE_CLK_N4	66	GND
27	GND	67	+P5V_S	28	GND	68	NC
29	PLTRST_BUF3_N	69	GND	30	NC	70	+P3V3_S
31	NC	71	+P3V3_S	32	LATCH_EN_GPH	72	+P3V3_S

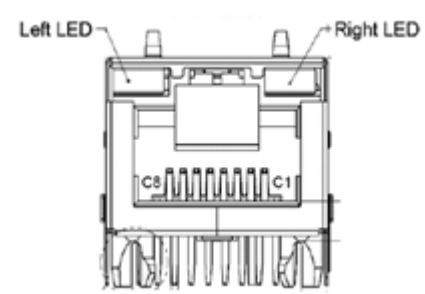
33	NC	73	GND	34	LATCH_DIS_GPL	74	GND
35	GND	75	+P5V_S	36	GPIO_BYPASS_EN	76	+P3V3_A
37	SMB_CLK_BUF2	77	GND	38	P1_RT_1	78	GND
39	SMB_DATA_BUF2	79	+P5V_S	40	P1_S0_1	80	+P12V_S



I/O Board

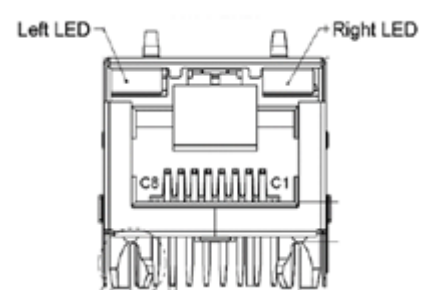
1. RJ2: RJ45 Jack with LED

Pin No.	Description
1	LAN1_MDI0P
2	LAN1_MDI0N
3	LAN1_MDI1P
4	LAN1_MDI1N
5	TCL1
6	TCL2
7	LAN1_MDI2P
8	LAN1_MDI2N
9	LAN1_MDI3P
10	LAN1_MDI3N
11	LAN1_LINK_2500_N
12	LAN1_LINK_1000_N
13	LAN1_LINK_ACT_N
14	P3V3_LAN1



2. RJ3: RJ45 Jack with LED

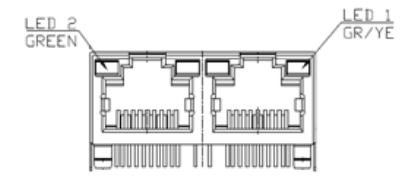
Pin No.	Description
1	LAN2_MDI0P
2	LAN2_MDI0N
3	LAN2_MDI1P
4	LAN2_MDI1N
5	TCL1
6	TCL2
7	LAN2_MDI2P
8	LAN2_MDI2N
9	LAN2_MDI3P
10	LAN2_MDI3N



11	LAN2_LINK_2500_N
12	LAN2_LINK_1000_N
13	LAN2_LINK_ACT_N
14	P3V3_LAN2

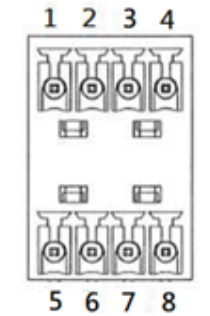
3. RJ1: LAN 1/2 Connector, RJ45 Jack with LED

Pin No.	Description	Pin No.	Description
1	P3_MDXP0	13	P4_MDXP0
2	P3_MDXN0	14	P4_MDXN0
3	P3_MDXP1	15	P4_MDXP1
4	P3_MDXP2	16	P4_MDXP2
5	P3_MDXN2	17	P4_MDXN2
6	P3_MDXN1	18	P4_MDXN1
7	P3_MDXP3	19	P4_MDXP3
8	P3_MDXN3	20	P4_MDXN3
9	V3P3_S	21	V3P3_S
10	LAN3_LINK_ACT_N	22	LAN4_LINK_ACT_N
11	LAN3_LINK_1000_N	23	LAN4_LINK_1000_N
12	LAN3_LINK_2500_N	24	LAN4_LINK_2500_N



4. DIO1: DIO Connector

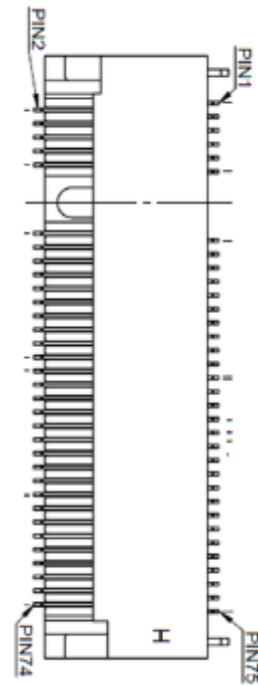
Pin No.	Description	Pin No.	Description
1	I_COM	5	GND
2	DI_0	6	DO_0
3	DI_1	7	DO_1
4	GND	8	GND



5. M2_1: M.2 NGFF Connector (B-Key)

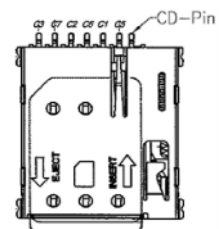
Pin No.	Description	Pin No.	Description
1	NC	2	V3P3_G1
3	GND	4	V3P3_G1
5	GND	6	PWROFF1#
7	USB2_DP3	8	NC
9	USB2_DN3	10	NC
11	GND		
		20	NC

21	NC	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	M2_USB3_RXN	30	UIM1_RST
31	M2_USB3_RXP	32	UIM1_CLK
33	GND	34	UIM1_DAT
35	M2_USB3_TXN	36	UIM1_PWR
37	M2_USB3_TXP	38	NC
39	GND	40	NC
41	NC	42	NC
43	NC	44	NC
45	GND	46	NC
47	NC	48	NC
49	NC	50	NC
51	GND	52	NC
53	NC	54	NC
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	NC	68	NC
69	NC	70	V3P3_G1
71	GND	72	V3P3_G1
73	GND	74	V3P3_G1
75	NC		



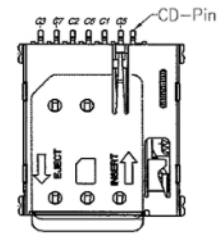
6. SIM1: SIM Card Socket

Pin No.	Description	Pin No.	Description
C1	UIM1_PWR1	C5	GND
C2	UIM1_RST1	C6	NC
C3	UIM1_CLK1	C7	UIM1_DAT1

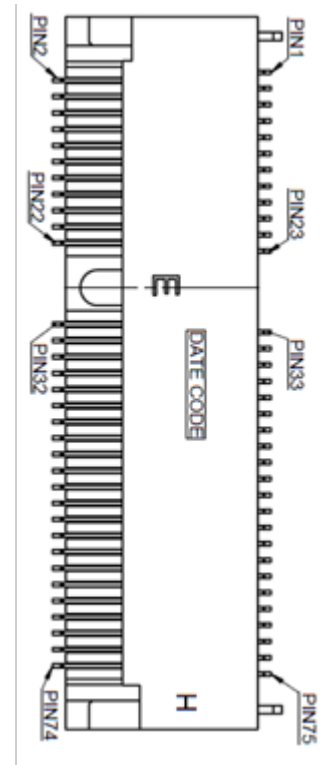


7. SIM2: SIM Card Socket

Pin No.	Description	Pin No.	Description
C1	UIM1_PWR2	C5	GND
C2	UIM1_RST2	C6	NC
C3	UIM1_CLK2	C7	UIM1_DAT2

**8. M2_E_KEY1:** M.2 NGFF Connector (E-Key)

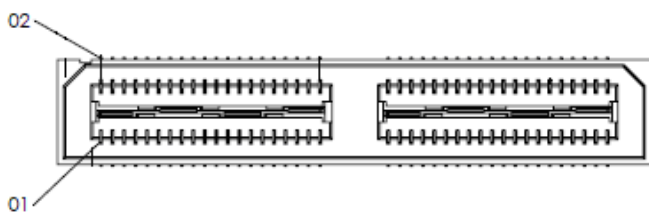
Pin No.	Description	Pin No.	Description
1	GND	2	V3P3_S
3	USB2_DP4	4	V3P3_S
5	USB2_DN4	6	LED_WLAN1-
7	GND	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	LED_WLAN2-
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	NC		
		32	NC
33	GND	34	NC
35	SW_C_PCIE_TX_P5	36	NC
37	SW_C_PCIE_TX_N5	38	NC
39	GND	40	NC
41	SW_C_PCIE_TX_N5	42	NC
43	SW_C_PCIE_RX_N5	44	NC
45	GND	46	NC
47	CLK_LAN5_DP	48	NC
49	CLK_LAN5_DN	50	NC
51	GND	52	PERST#EKEY
53	NC	54	NC
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC



63	GND	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	72	V3P3_S
73	NC	74	V3P3_S
75	GND		

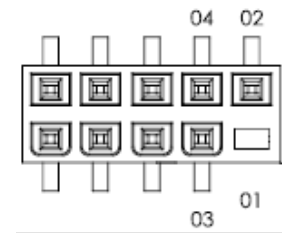
9. J2: Board to Board Connector

Pin No.	Description	Pin No.	Description	Pin No.	Description	Pin No.	Description
1	GND	41	GND	2	V3P3_S	42	P1_S0_2
3	GND	43	CTS#2	4	GND	44	LAN34GND
5	USB2_DP4	45	RTS#2	6	USB2_DP3	46	GND
7	USB2_DN4	47	SOUT#2	8	USB2_DN3	48	CTS#3
9	GND	49	SIN#2	10	GND	50	RTS#3
11	PCIE5_TXP	51	GND	12	USB3_TX3_P	52	SOUT#3
13	PCIE5_TXN	53	CTS#4	14	USB3_TX3_N	54	SIN#3
15	GND	55	RTS#4	16	GND	56	GND
17	PCIE5_RXP	57	SOUT#4	18	USB3_RX3_P	58	CTS#5
19	PCIE5_RXN	59	SIN#4	20	USB3_RX3_N	60	RTS#5
21	GND	61	GND	22	GND	62	SOUT#5
23	BUF_PCIE5_CLKP	63	SOUT#6	24	BUF_PCIE4_CLKP	64	SIN#5
25	BUF_PCIE5_CLKN	65	SIN#6	26	BUF_PCIE4_CLKN	66	GND
27	GND	67	V5_S	28	GND	68	NC
29	PLTRST_BUF3_N	69	GND	30	NC	70	V3P3_S
31	NC	71	V3P3_S	32	LATCH_EN_GPH	72	V3P3_S
33	NC	73	GND	34	LATCH_DIS_GPL	74	GND
35	GND	75	V5_S	36	GPIO_BYPASS_EN	76	V3P3_A
37	SMB_CLK_BUF2	77	GND	38	P1_RT_1	78	GND
39	SMB_DATA_BUF2	79	V5_S	40	P1_S0_1	80	V12_S

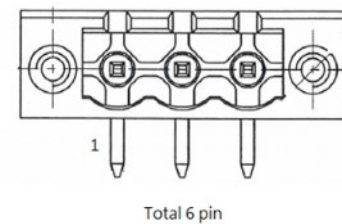


10. JP1: Board to Board Power Connector

Pin No.	Description	Pin No.	Description
1	NC	2	V12_A
3	GND	4	V12_A
5	GND	6	V12_A
7	GND	8	V12_A
9	GND	10	V12_A

**11. PCN1:** DCIN Terminal Block

Pin No.	Description
1	DC_PWR2 (9V~36V)
2	DC_GND
3	ALARM2
4	ALARM1
5	DC_PWR1 (9V~36V)
6	DC_GND



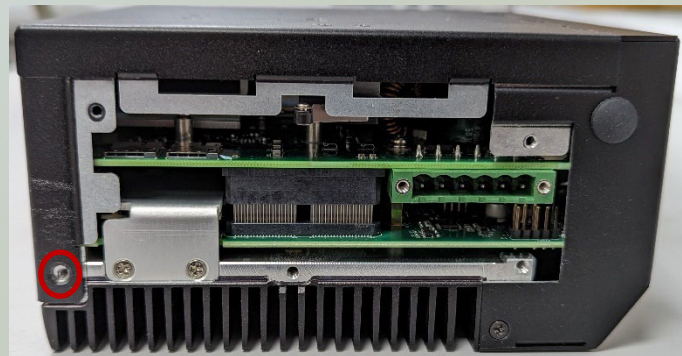
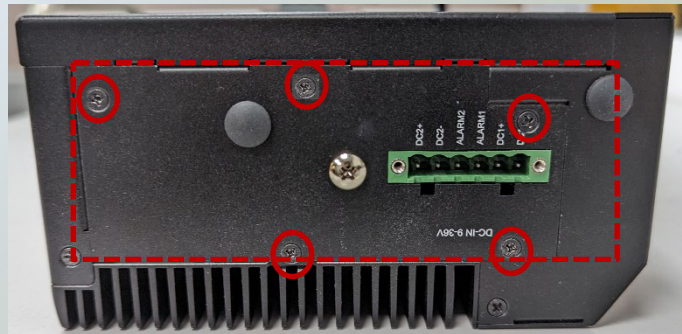
CHAPTER 2: HARDWARE INSTALLATION

To reduce the risk of personal injury, electric shock, or damage to the system, please remove all power connections to shut down the device completely. Also, please wear ESD protection gloves when conducting the steps in this chapter.

Opening the Bottom Chassis

1. Power off the system and unplug the power cord. Turn the system upside down.
2. Unscrew the five (5) screws on the system's top panel and remove the metal cover.
3. Then, unscrew the one (1) screw on the top panel.

Top Panel



4. Unscrew the five (5) screws on the system's rear and bottom panel.

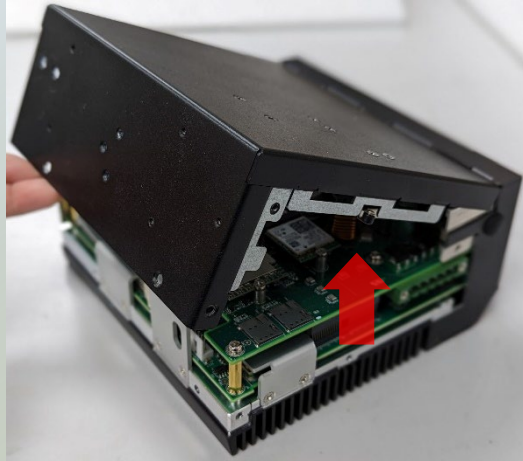
Bottom Panel



Rear Panel



4. Lift the bottom cover chassis to remove.



Opening the Top Chassis

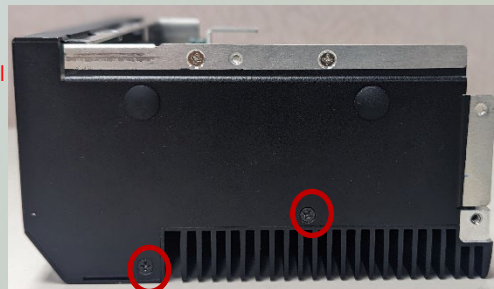
To install the system memory and optional mSATA storage card expansion, we need to access the bottom (second layer) section of the system.

1. Power off the system and remove the bottom chassis cover.
2. Unscrew the two (2) screws on the system's top chassis cover, the two (2) screws on the top panel, the one (1) screw on the bottom panel, the two (2) screws on the Console Port on the front panel.

Top Chassis Cover



Bottom Panel



Top Panel



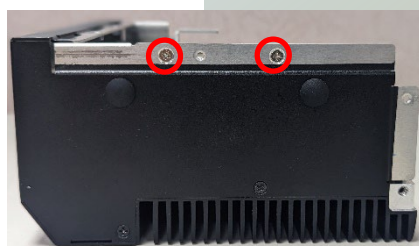
Front Panel



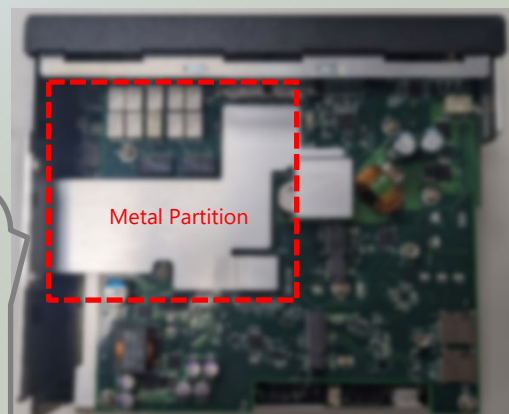
Console Port

3. Then, remove the two (2) screws on the top panel, to remove the metal partition on the top motherboard.

Bottom Panel



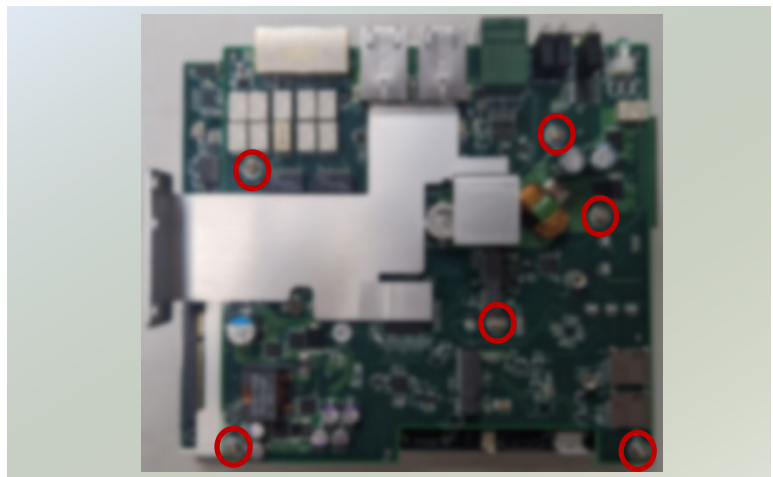
Metal Partition



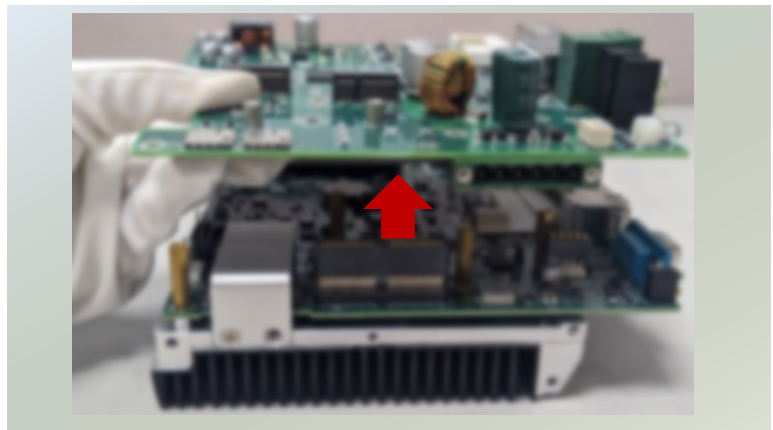
4. Gently remove the top chassis cover from the motherboard layers.



5. Remove the six (6) screws on the top motherboard section.



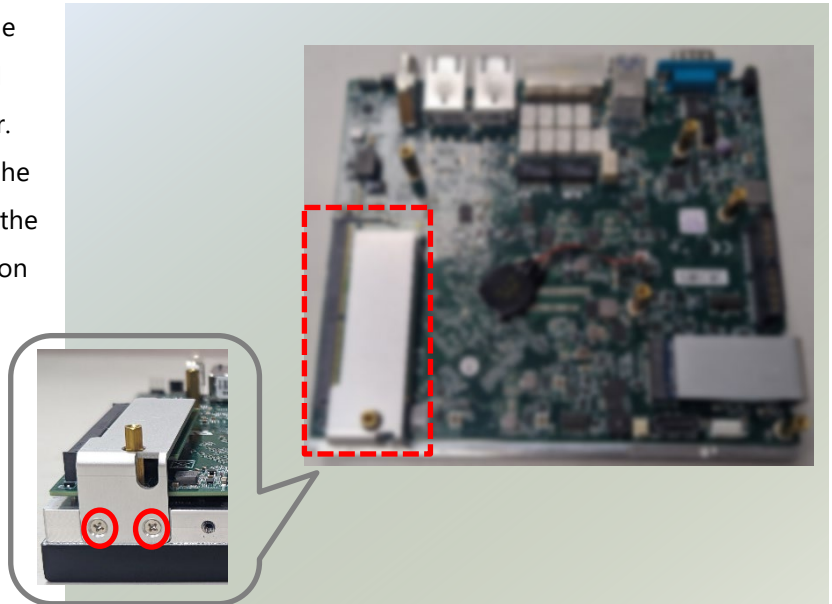
6. Gently lift up the top motherboard section.



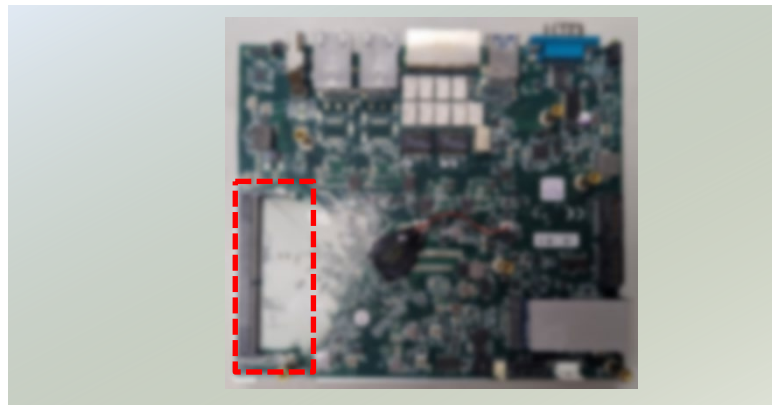
Installing the System Memory

The system supports one system memory slot, please follow the steps for installation.

1. Power off the system, and open the top and bottom chassis cover, and remove the top motherboard layer. Locate a metal partition covering the DIMM socket placement. Remove the two (2) screws on the metal partition on the side and remove the metal partition.

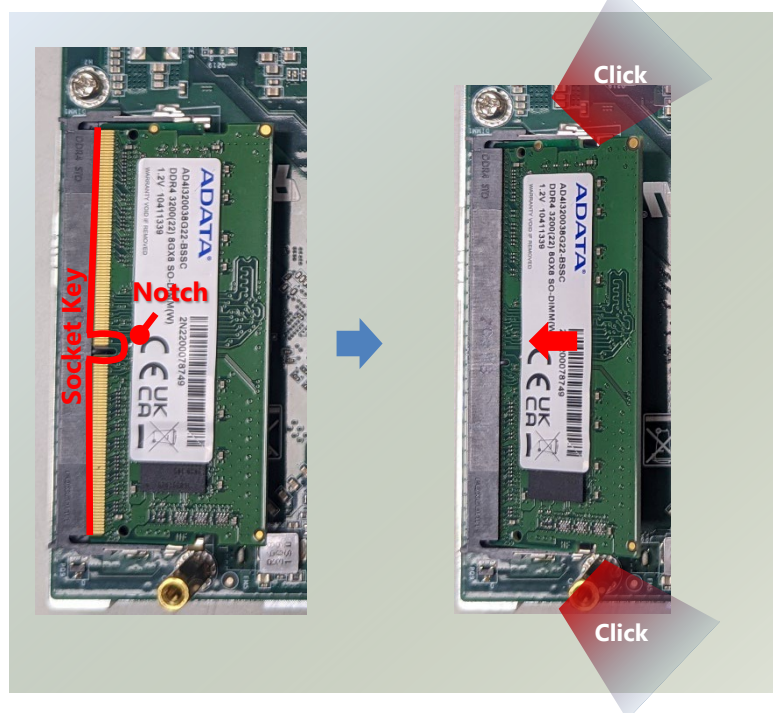


3. Locate the DIMM socket on the motherboard.

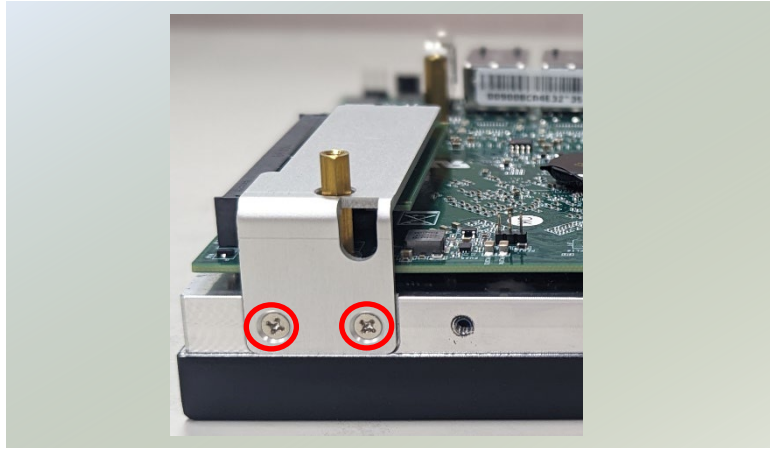


4. Align the notches of the DIMM module with the socket key in the pin slot.

5. Insert the module into the slot at a diagonal angle and gently press down until it is firmly seated by the clips on both sides.



6. Then place the metal partition over the DIMM module, and secure with two (2) screws.

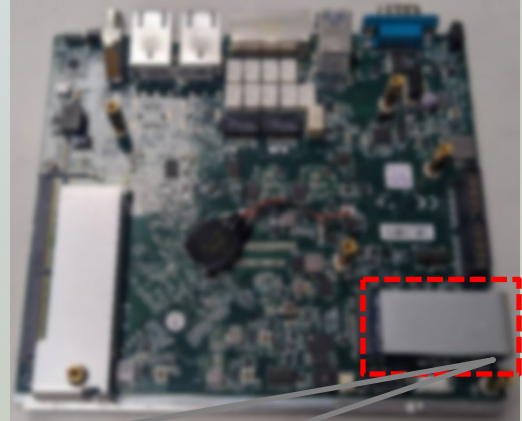
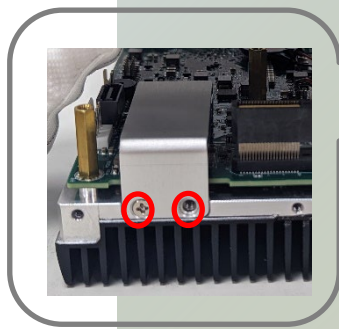


8. Gently place the top motherboard section back on top and secure with the original six (6) screws. Then, enclose the top chassis cover with the motherboard section, secure with the original seven (7) screws. After all expansion or optional modules have been installed, then place the bottom chassis cover back on and secure with the required screws.

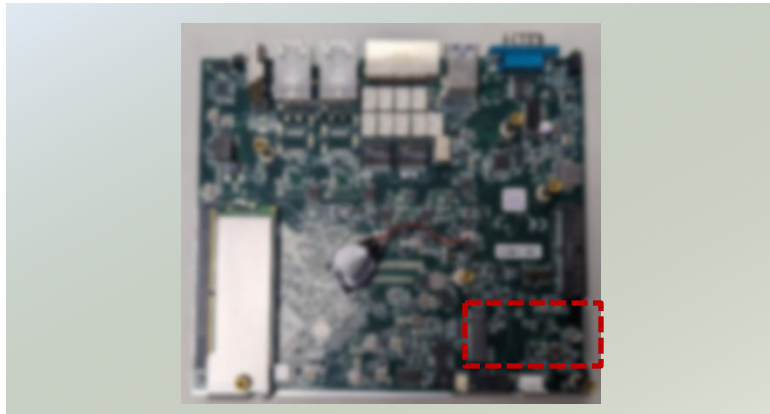
Installing the mSATA Storage (Optional)

The system supports one mSATA slot. Follow the procedures below for installing a mSATA storage module card.

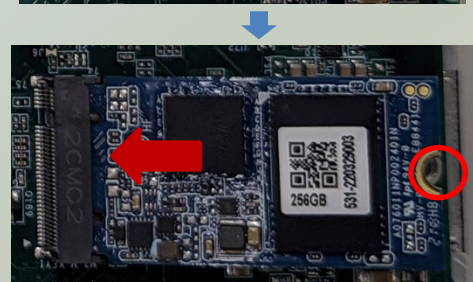
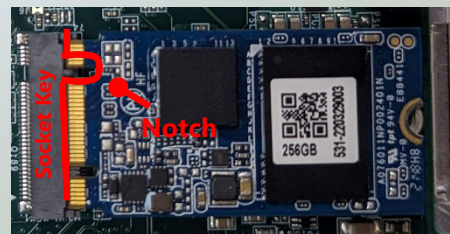
1. Power off the system, and open the top and bottom chassis cover, and remove the top motherboard layer. Locate the metal partition covering the module placement on the bottom (second layer) motherboard. Remove the two (2) screws on the metal partition on the side and remove the metal partition.



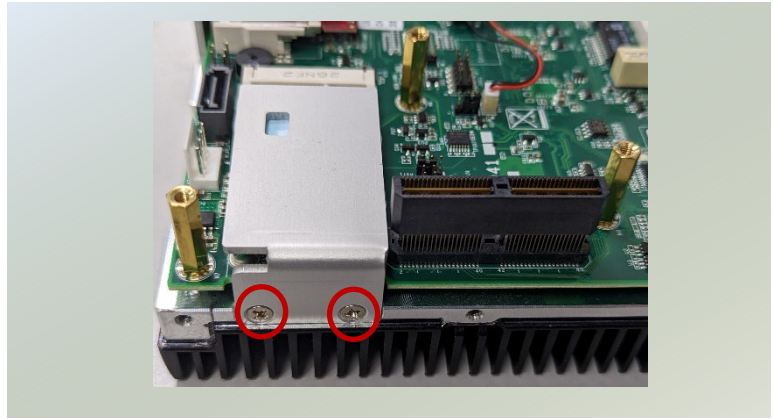
2. Locate the mSATA slot on the motherboard.



3. Align the notch of the mSATA storage card with the socket key in the pin slot.
4. Insert the storage card pins at 30 degrees into the socket until it is fully seated.
5. Push down on the module card and secure it with one (1) screw.



6. Then place the metal partition over the storage module, and secure with two (2) screws.

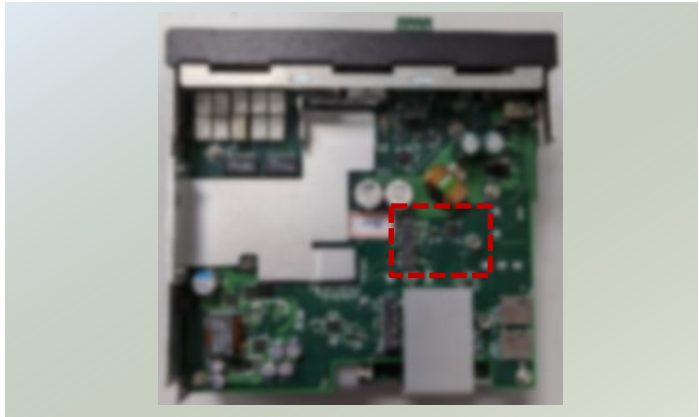


7. Gently place the top motherboard section back on top and secure with the original six (6) screws. Then, enclose the top chassis cover with the motherboard section, secure with the original seven (7) screws. After all expansion or optional modules have been installed, then place the bottom chassis cover back on and secure with the required screws.

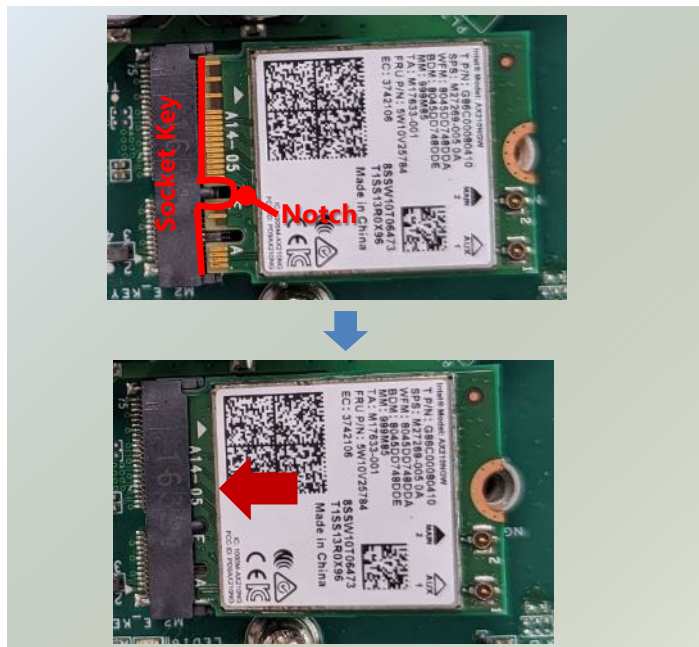
Installing the Wi-Fi Module (Optional)

The motherboard provides one M.2 E-Key slot for a Wi-Fi module card. Wi-Fi module requires two antennas. Please follow the procedures for installation.

1. Power off the system and remove the bottom chassis cover. Locate the M.2 slot on the (top) motherboard.



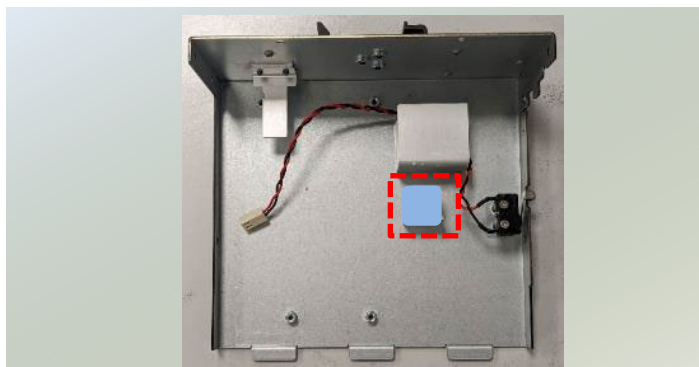
2. Align the notch of the module card with the socket key in the pin slot.
3. Insert the module card at 30 degrees into the socket until it is fully seated.



4. Push down on the module card and secure it with a screw.



5. Next, thermal pad placement. Remove the protective film on the thermal pad (included in accessory pack) and gently place on the smaller square piece on the bottom chassis cover (which once covered, will be placed over Wi-Fi module card).

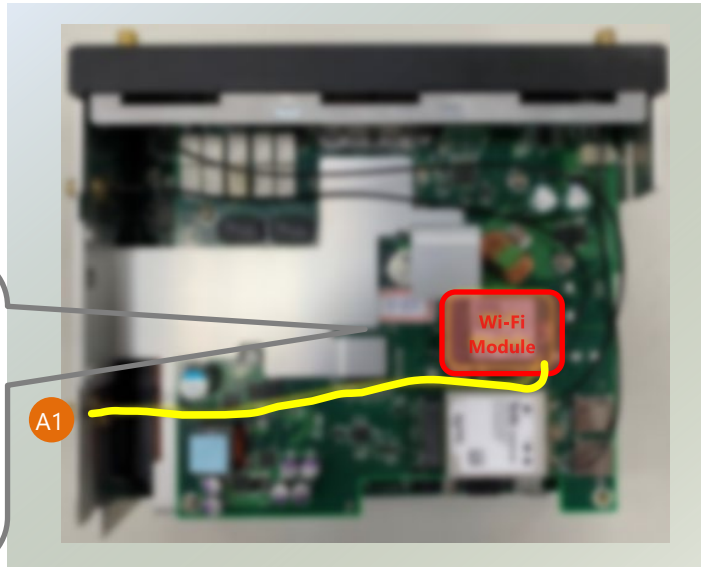


Installing Wi-Fi Antenna

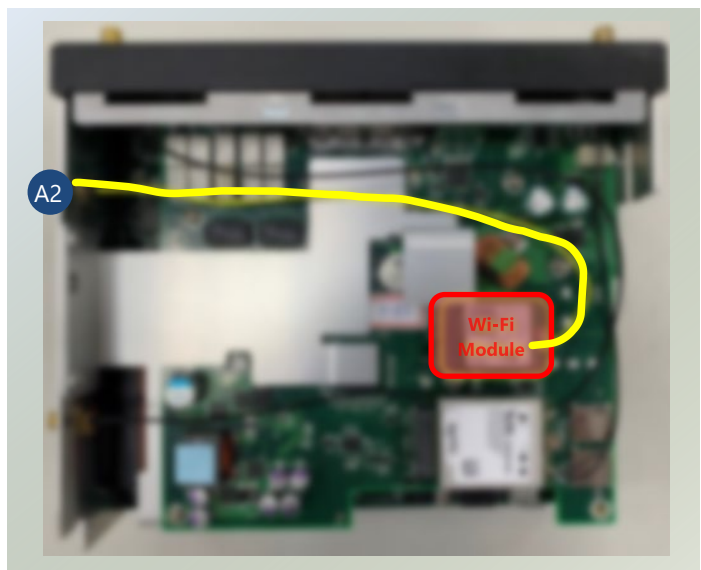
Bottom Panel



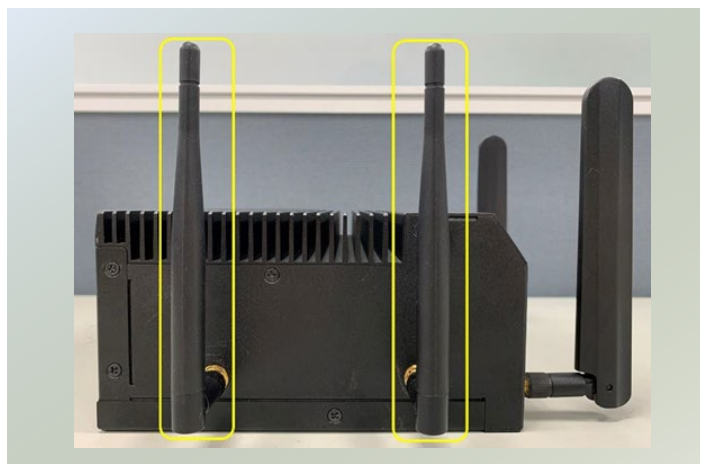
1. Locate the two (2) antenna hole placements (A1, A2). Locate the two (2) IPEX connectors on the Wi-Fi module card.



2. Connect the RF cables to the IPEX connectors on the Wi-Fi module card and screw the other end of the cable in the antenna holes.



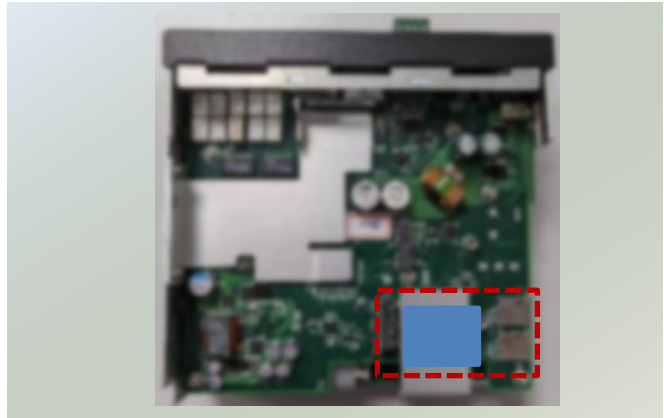
3. Place the chassis cover back and screw to secure. Then, secure the two antennas to the top panel of the system.



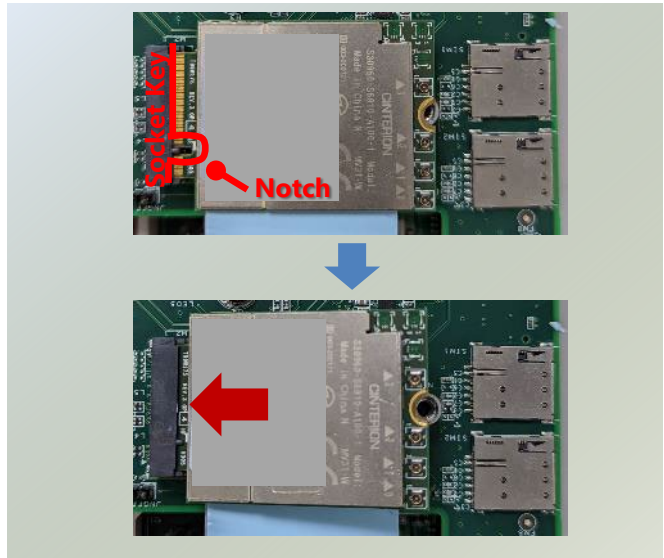
Installing the LTE/5G Module (Optional)

The system supports one M.2 B-Key for LTE/5G module card expansion. If a 5G module is installed, there will be no more room for 2.5" SSD expansion. LTE module requires two antennas. 5G module requires four antennas. Please follow the procedures for installation.

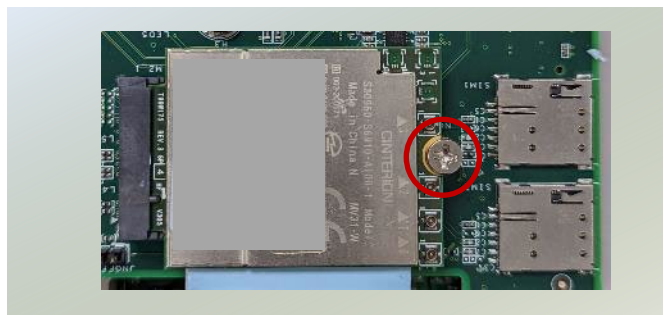
1. Power off the system and remove the bottom chassis cover. Locate the M.2 slot on the (top) motherboard.
2. Remove the protective film on the blue thermal pad (included in accessory pack) and gently place on the metal partition.



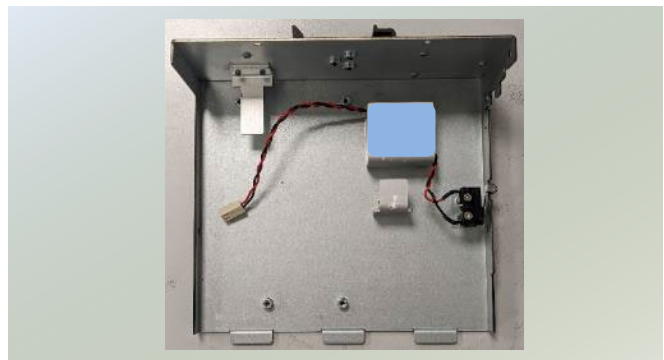
3. Align the notch of the module card with the socket key in the pin slot.
4. Insert the module card at 30 degrees into the socket until it is fully seated.



5. Push down on the module card and secure it with a screw.



6. Next, thermal pad placement. Remove the protective film on the thermal pad (included in accessory pack) and gently place on the larger square piece on the bottom chassis cover (which once covered, will be placed over the LTE/5G module card).



Installing 5G Antenna

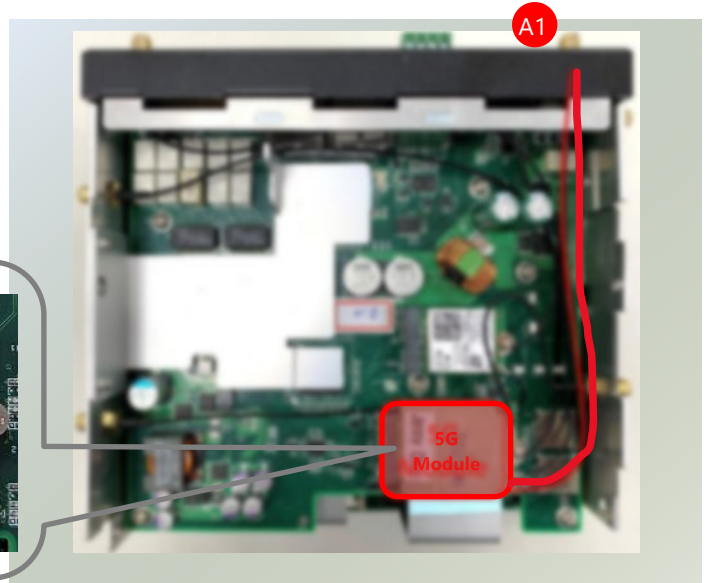
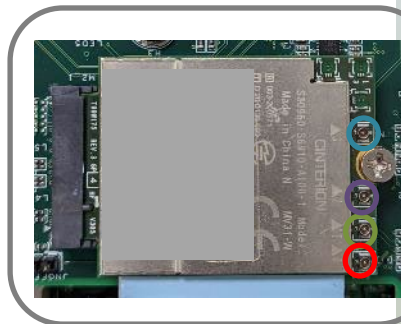
Front Panel



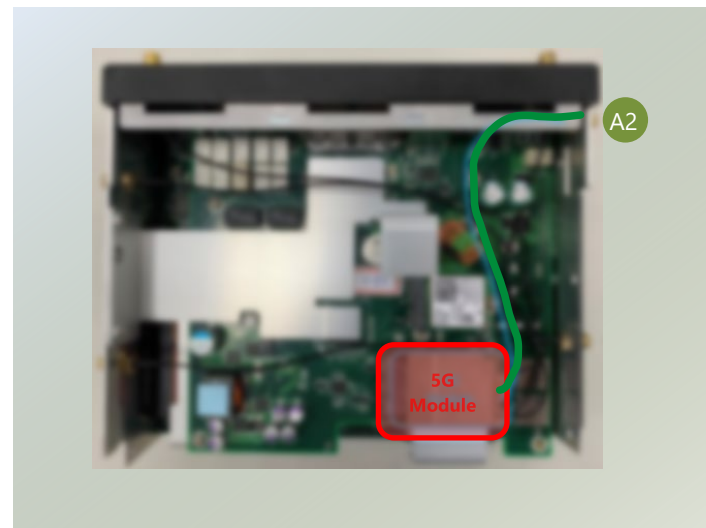
Top Panel

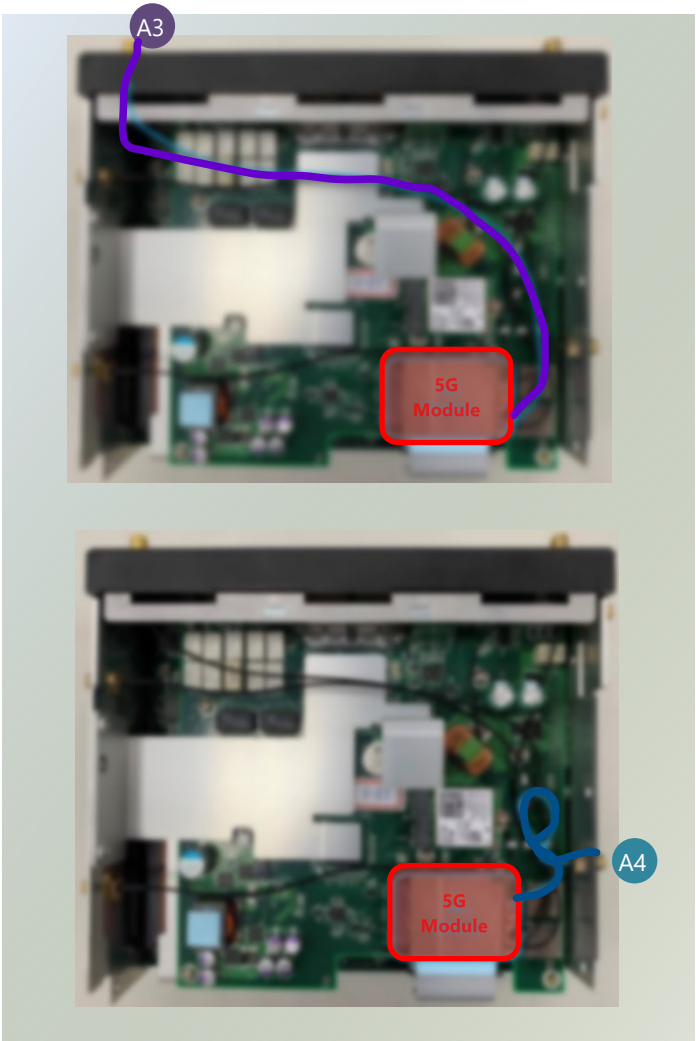


1. Locate the four (4) antenna hole placement (A1, A2, A3, A4). Locate the four (4) IPEX connectors on the 5G module card.



2. Connect the RF cables to the IPEX connectors on the 5G module card and screw the other end of the cables in the antenna holes.



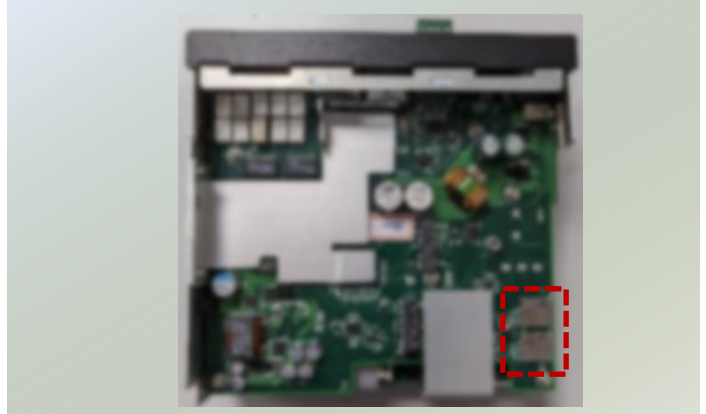


3. Then, screw on the four antennas to the system.

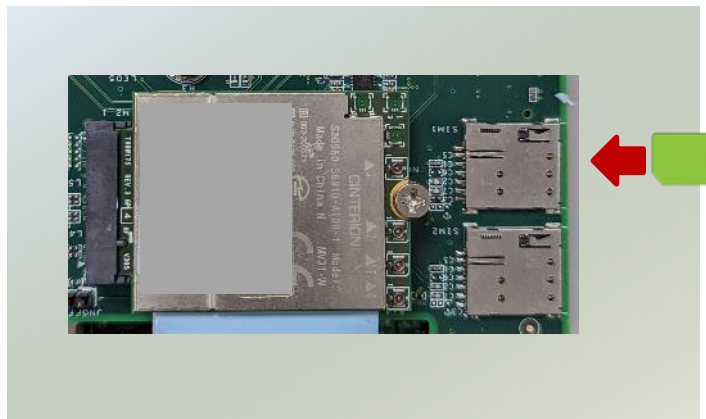


Installing SIM Cards

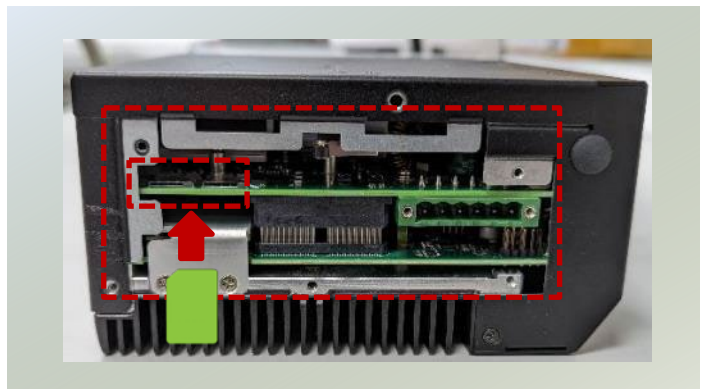
1. The dual-SIM card slot is located right next to the LTE/5G module card.



2. Insert and push the SIM card, gold contacts facing downwards, all the way in until it clicks into place. Repeat if dual SIM cards will be placed.



3. Another SIM card installation option is by removing the side metal partition on the bottom side panel. Locate the SIM card slots and insert accordingly.



4. To remove/replace the SIM card, use your fingertips to push it once, to have the card automatically eject.

DIN Rail Mounting (Optional)

The system can be mounted via DIN Rail method with an optional DIN Rail kit.

1. Attach the DIN rail bracket to the rear of the system with **three** (3) screws.
2. Hang the system onto a rail by engaging the hook of the Bracket into the DIN Rail until it is totally fixed.



Note: After the unit is mounted, make sure to check that the installation provides strong and appropriate support and that each part is assembled correctly.

Wall Mounting (Optional)

The system can be mounted on a flat surfaced wall. Please take the following into consideration when mounting the system onto the wall.

1. Check the kit contents for the following items:

- ▶ 1x pair of Wall Brackets



2. Unscrew four (4) screws on the right and left side of the system.



3. Attach the wall mount brackets onto the system with the two (2) screws on each side.



4. On the wall, measure the exact place where you want to hang the system, and drill four holes that match the four mounting holes on the brackets.

NOTE: the demonstrated screw type can fit in general drywall or shelves. Please identify the wall type and select a suitable fixing approach to fix this system to the wall and consult qualified trained person if you are uncertain.

5. Insert the expansion anchor bolts into the holes, and then insert the long screws into the wall screws.

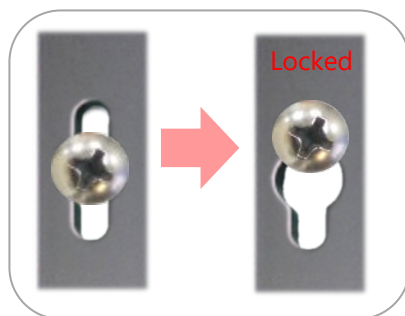


M4 x 2mm



M3 x 19.5mm

6. Align the system's wall bracket holes, and engage the four screws in the bracket holes and push the system downwards to lock the screws into position.



CHAPTER 3: SOFTWARE SETUP

BIOS Setup

BIOS (Basic Input / Output System) is the program that controls the computer boot process. The purpose of the BIOS is to identify and initialize processor, memory, hard drives, optical drives, and other hardware. The system has AMI BIOS built-in, with a setup utility that allows users to configure required settings or to activate certain system features.

To enter the BIOS setup utility, follow the steps below:

1. Boot up the system.
2. Pressing the **<Tab>** or **** key immediately allows you to enter the Setup utility, then you will be directed to the BIOS main screen. The instructions for BIOS navigations are as below:

Control Keys	Description
→←	select a setup screen
↑↓	select an item/option on a setup screen
<Enter>	select an item/option or enter a sub-menu
+/-	adjust values for the selected setup item/option
F1	display General Help screen
F2	retrieve previous values, such as the last configured parameters during the last time you entered BIOS
F3	load optimized default values
F4	save configurations and exit BIOS
<Esc>	exit the current screen

NOTE: The screenshots presented in this section are for reference only.

Main Page

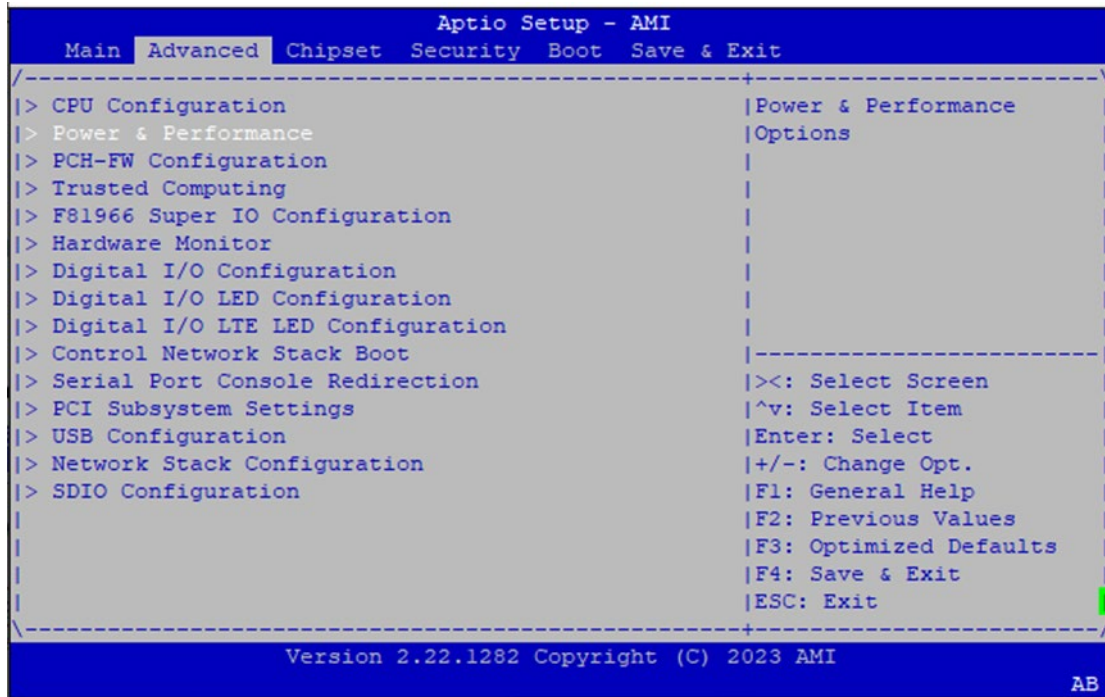
Setup main page contains BIOS information and project version information.



Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliance: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User
FSP Information	FSP version: Intel FSP binary version. RC version: Intel reference code version.
Processor Information	Information of platform processor
System Date	Set the Date. Use <Tab> to switch between Date elements. Default Range of Year: 1900-9999 Default Range of Month: 1-12 Days: dependent on Month.
System Time	Set the Time. Use <Tab> to switch between Time elements.

Advanced Page

Select the **Advanced** menu item from the BIOS setup screen to enter the “Advanced” setup screen. Users can select any of the items in the left frame of the screen.

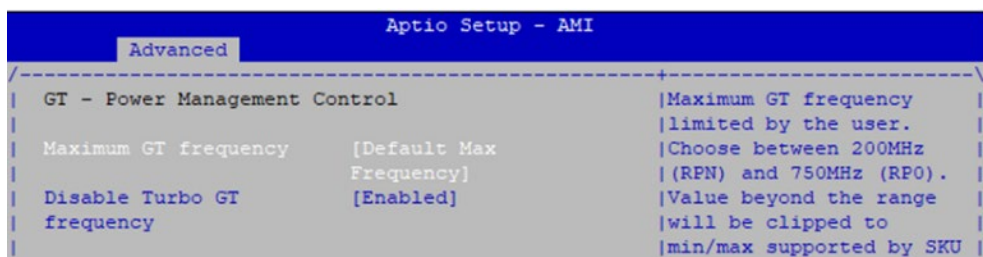
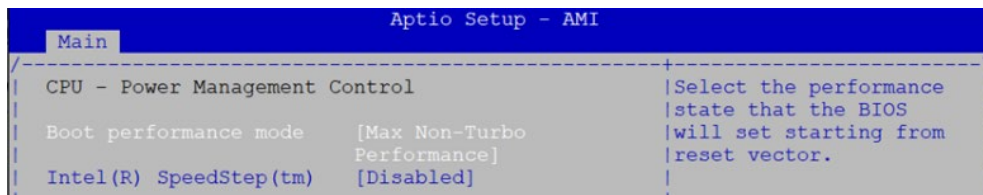
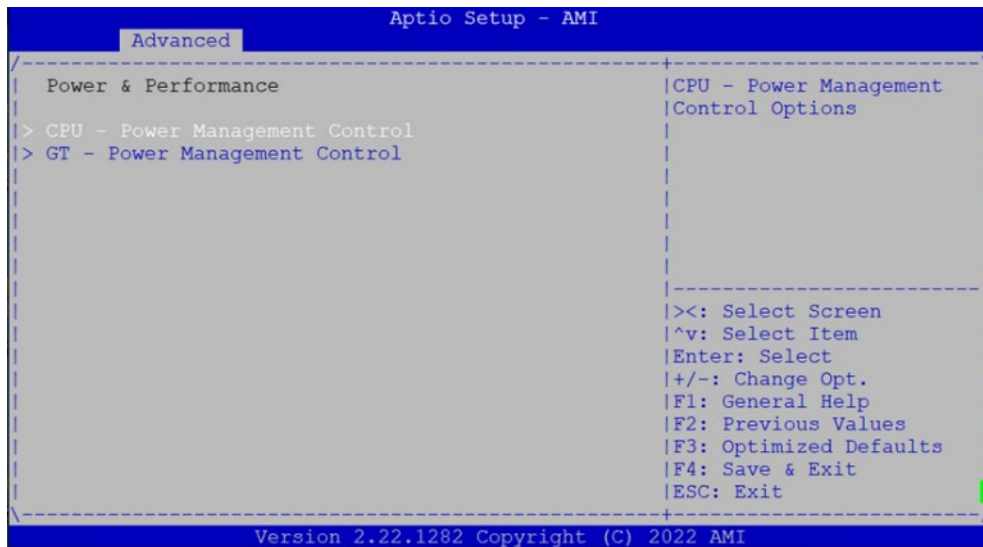


CPU Configuration



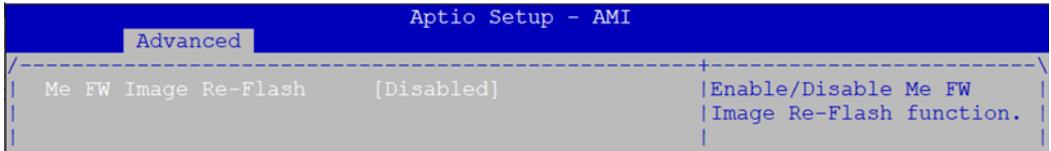
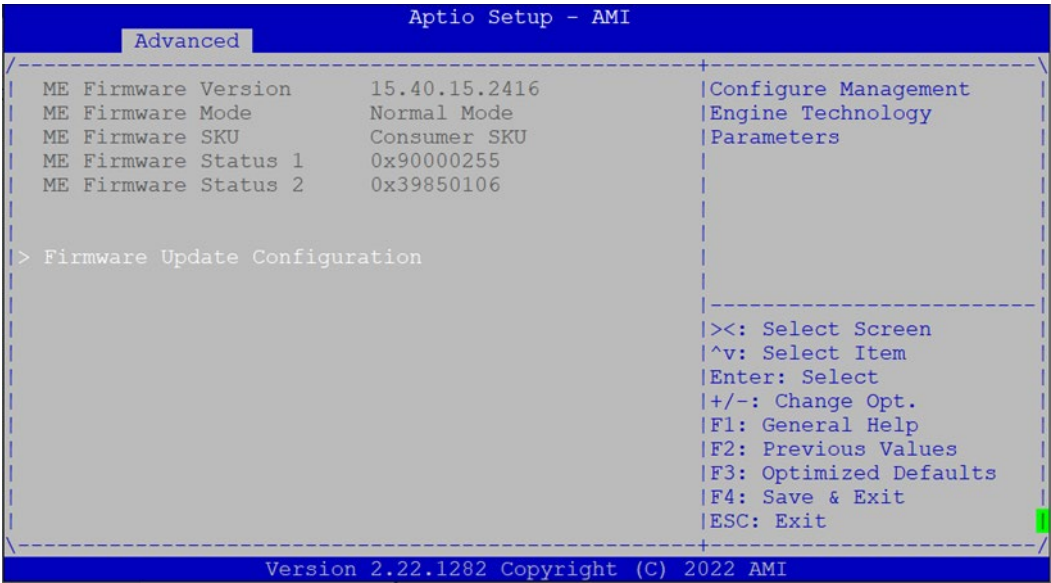
Feature	Options	Description
Hardware Prefetcher	Disabled Enabled	To turn on/off the MLC streamer prefetcher.
Intel (VMX) Virtualization Technology	Disabled Enabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
AES	Disabled Enabled	Enable/Disable AES (Advanced Encryption Standard)
MonitorMWait	Disabled Enabled	Enable/Disable MonitorMWait
#AC Split Lock	Enabled Disabled	Enable/Disable Alignment Check Exception (#AC). When enabled, this will assert an #AC when any atomic operation has an operand that crosses two cache lines.

Power & Performance



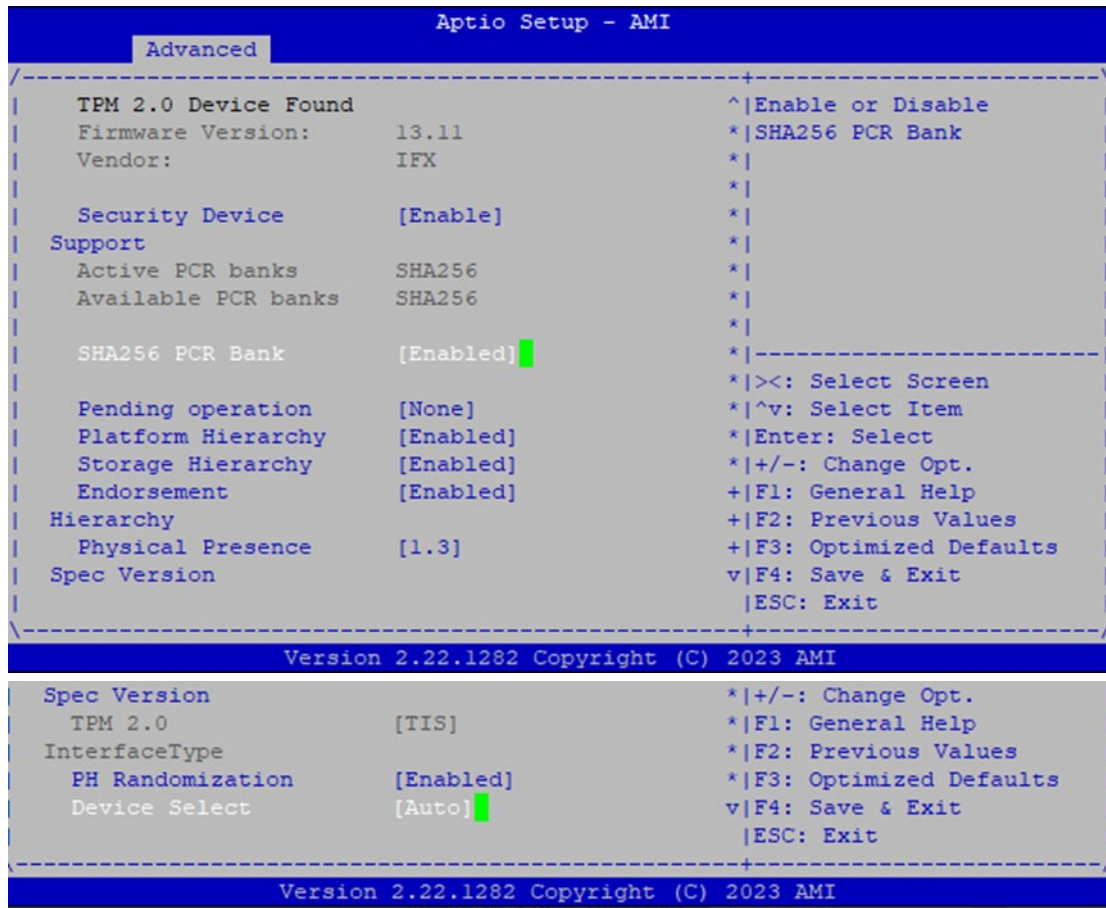
Feature	Options	Description
Boot performance mode	Max Battery Max Non-Turbo Performance Turbo Performance	Select the performance state that the BIOS will set starting from reset vector.
Intel(R) SpeedStep(tm)	Disabled Enabled	Allows more than two frequency ranges to be supported.
Maximum GT frequency	Default Max Frequency 100Mhz 150Mhz . . 1200Mhz	Maximum GT frequency limited by the user. Choose between 200MHz (RPN) and 800MHz (RP0). Value beyond the range will be clipped to min/max supported by SKU
Disable Turbo GT frequency	Enabled Disabled	Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited

PCH-FW Configuration



Feature	Options	Description
Me FW Image Re-Flash	Disabled Enabled	Enable/Disable ME FW Image Re-Flash function.

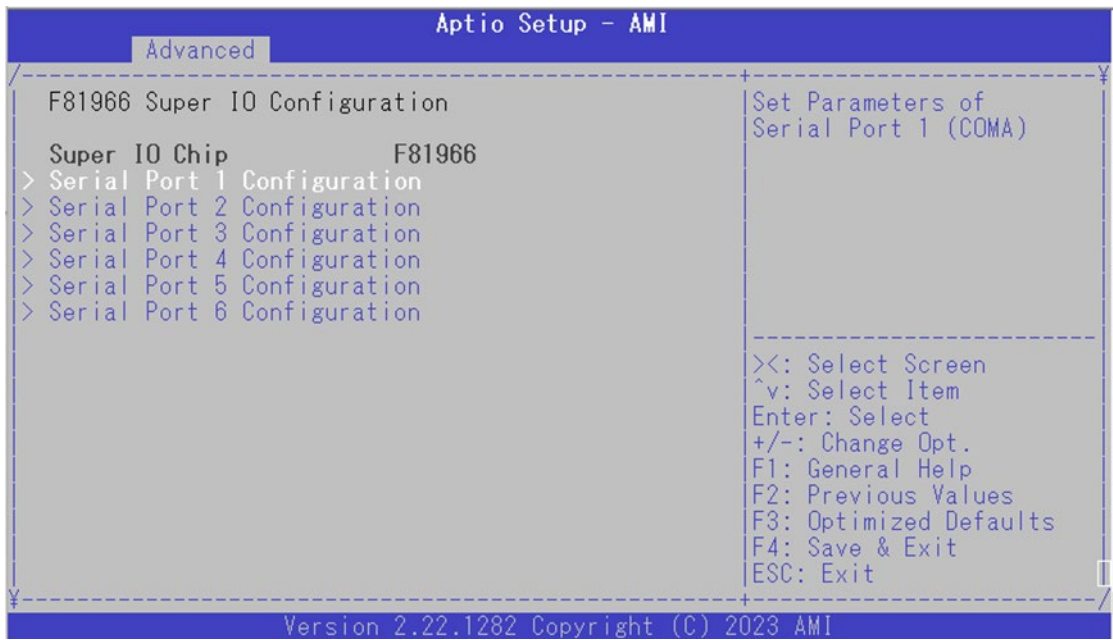
Trusted Computing



Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA256 PCR Bank	Enabled Disabled	Enables or disables SHA256 PCR Bank.
Pending operation	None TPM Clear	Schedules an Operation for the Security Device. NOTE: Your computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Enabled Disabled	Enables or disables Platform Hierarchy.
Storage Hierarchy	Enabled Disabled	Enables or disables Storage Hierarchy.
Endorsement Hierarchy	Enabled Disabled	Enables or disables Endorsement Hierarchy.
TPM2.0 UEFI Spec Version	TCG_1_2 TCG_2	Select the TCG2 Spec Version, TCG_1_2: Supports the Compatible mode for Win8/Win10 TCG_2: Supports new TCG2 protocol and event format for Win10 or later.

Physical Presence Spec Version	1.2 1.3	Select to tell OS to support PPI Spec Version 1.2 or 1.3. NOTE: Some HCK tests might not support 1.3.
TPM 20 InterfaceType	TIS	Select TPM 20 Device for the Communication Interface.
Device Select	TPM 1.2 TPM 2.0 Auto	TPM 1.2 will restrict support to TPM 1.2 devices; while TPM 2.0 will restrict support to TPM 2.0 devices; Auto will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated.

F81966 Super IO Configuration



Serial Port 1 Configuration



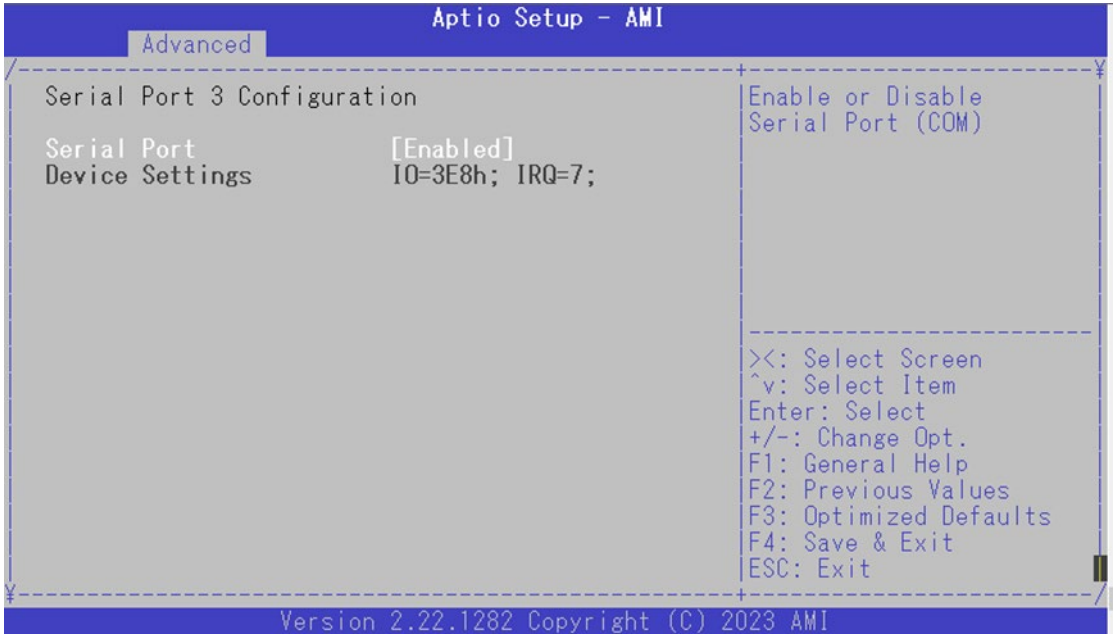
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port (COM)

Serial Port 2 Configuration



Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port (COM)

Serial Port 3 Configuration



Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port (COM)

Serial Port 4 Configuration



Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port (COM)

Serial Port 5 Configuration



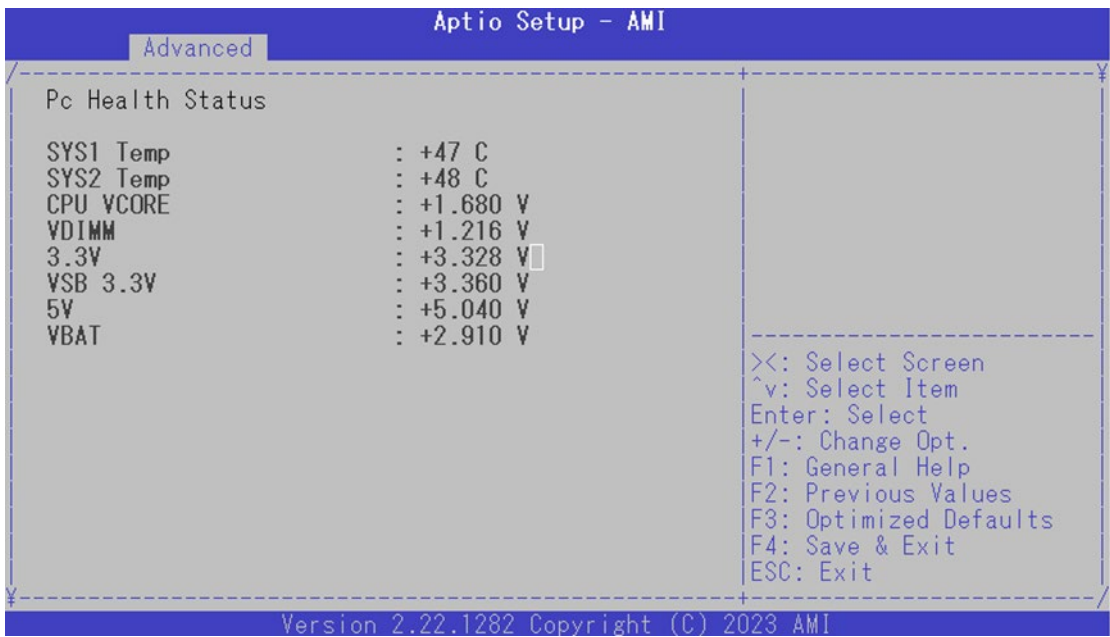
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port (COM)

Serial Port 6 Configuration

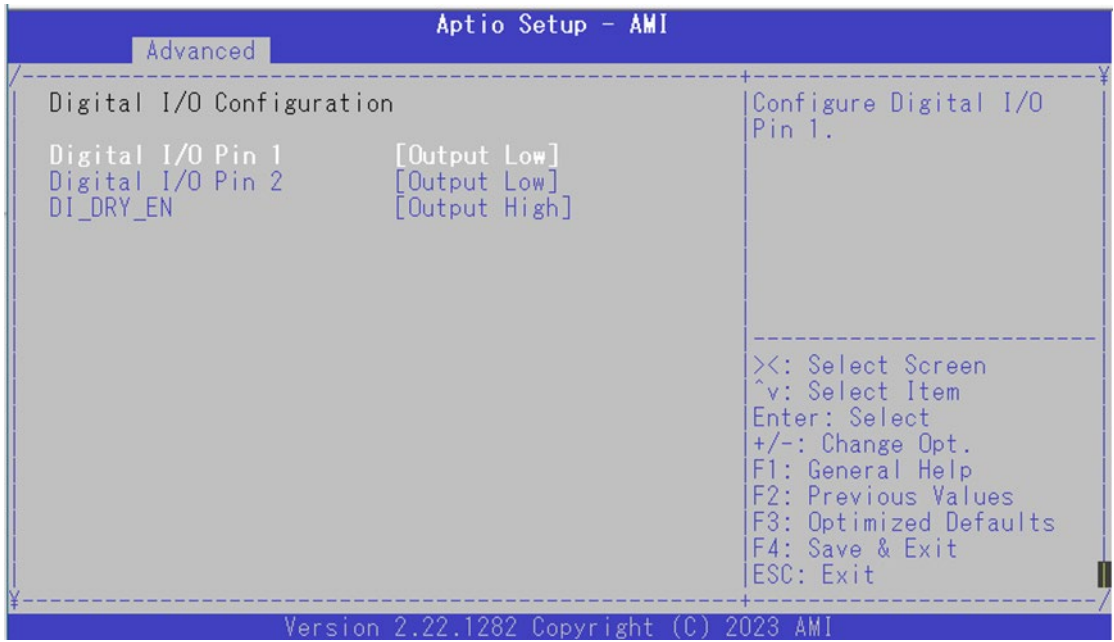


Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port (COM)

Hardware Monitor

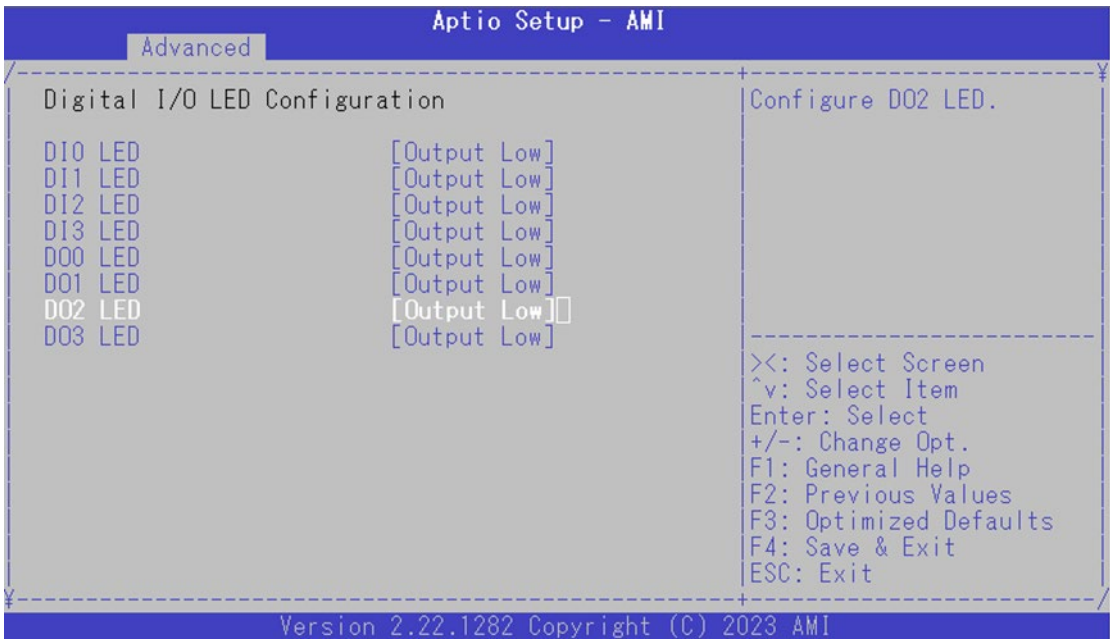


Digital I/O Configuration



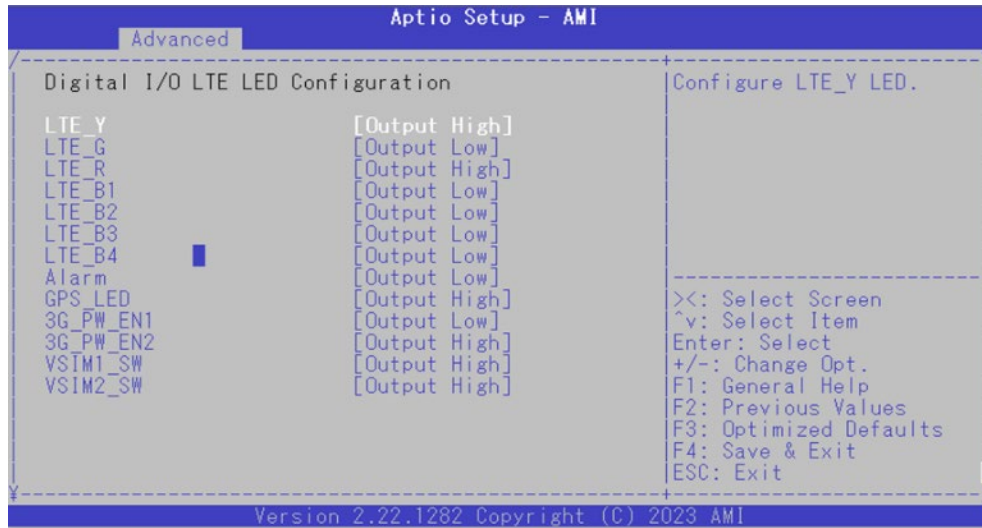
Feature	Options	Description
Digital I/O Pin 1	Output High Output Low	Configure Digital I/O Pin 1.
Digital I/O Pin 2	Output High Output Low	Configure Digital I/O Pin 2.
DI_DRY_EN	Output High Output Low	Configure DI_DRY_EN.

Digital I/O LED Configuration



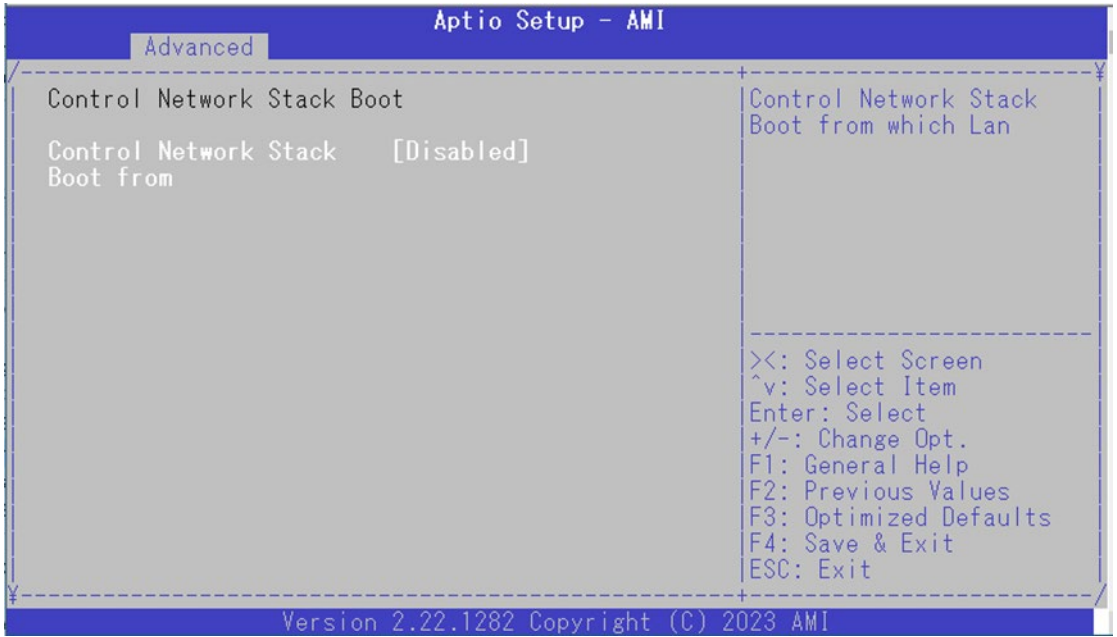
Feature	Options	Description
DI0 LED	Output High Output Low	Configure DI0 LED.
DI1 LED	Output High Output Low	Configure DI1 LED.
DI2 LED	Output High Output Low	Configure DI2 LED.
DI3 LED	Output High Output Low	Configure DI3 LED.
DO0 LED	Output High Output Low	Configure DO0 LED.
DO1 LED	Output High Output Low	Configure DO1 LED.
DO2 LED	Output High Output Low	Configure DO2 LED.
DO3 LED	Output High Output Low	Configure DO3 LED.

Digital I/O LTE LED Configuration



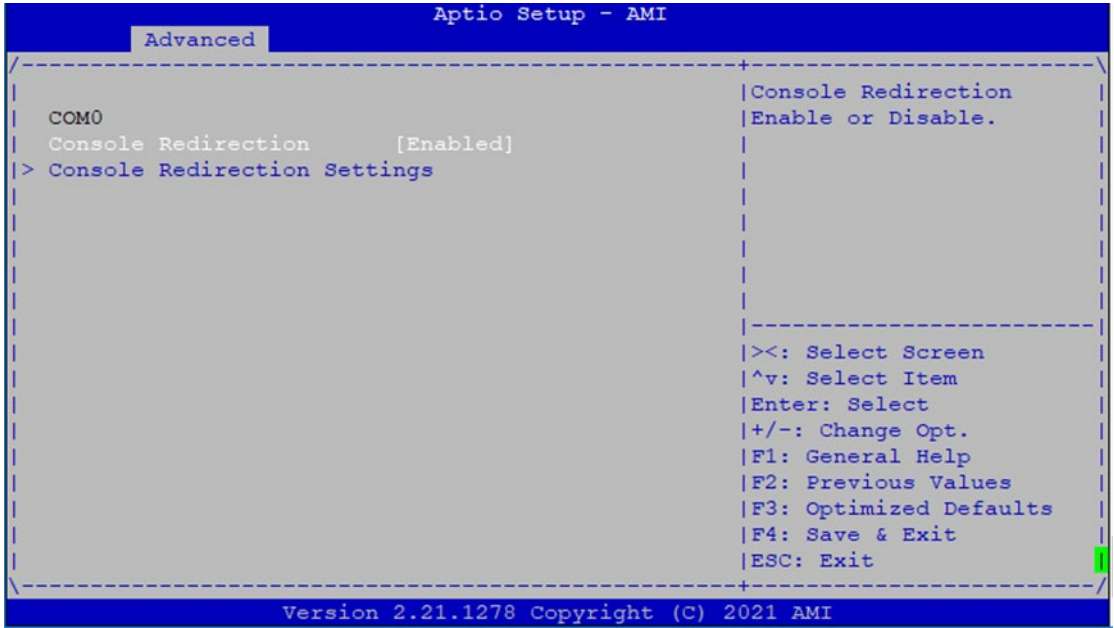
Feature	Options	Description
LTE_Y	Output High Output Low	Configure LTE_Y LED.
LTE_G	Output High Output Low	Configure LTE_G LED.
LTE_R	Output High Output Low	Configure LTE_R LED.
LTE_B1	Output High Output Low	Configure LTE_B1 LED.
LTE_B2	Output High Output Low	Configure LTE_B2 LED.
LTE_B3	Output High Output Low	Configure LTE_B3 LED.
LTE_B4	Output High Output Low	Configure LTE_B4 LED.
Alarm	Output High Output Low	Configure Alarm LED.
GPS_LED	Output High Output Low	Configure GPS_LED LED.
3G_PW_EN1	Output High Output Low	Configure 3G_PW_EN1 LED.
3G_PW_EN2	Output High Output Low	Configure 3G_PW_EN2 LED.
VSIM1_SW	Output High Output Low	Configure VSIM1_SW LED.
VSIM2_SW	Output High Output Low	Configure VSIM2_SW LED.

Control Network Stack Boot



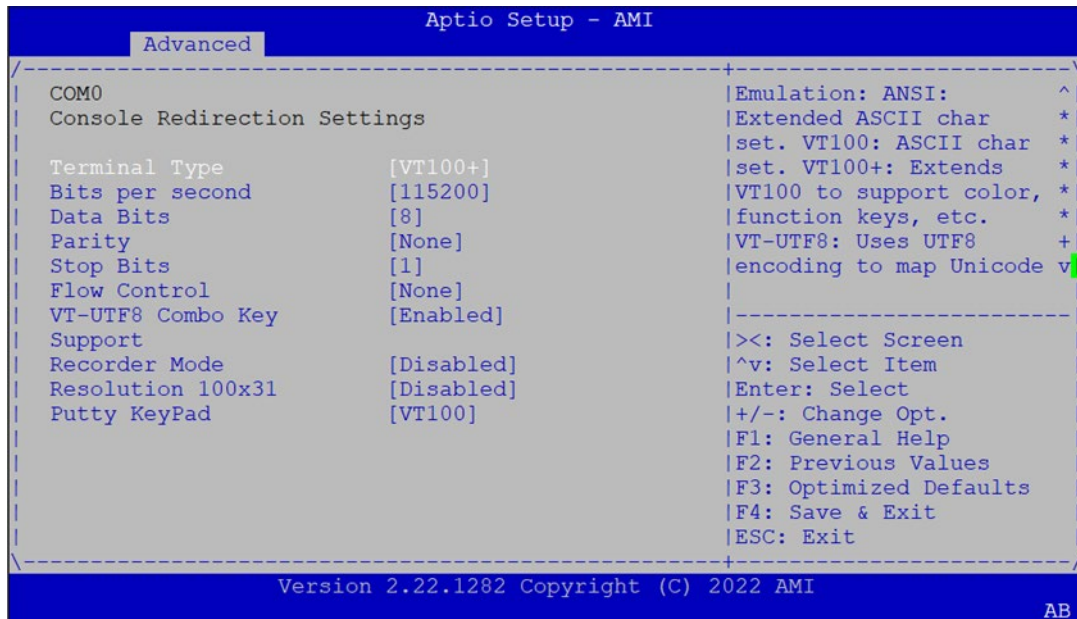
Feature	Options	Description
Control Network Stack Boot from	Disabled LAN3 LAN4	Control Network Stack Boot from which Lan

Serial Port Console Redirection



Feature	Options	Description
Console Redirection	Disabled Enabled	Console Redirection Enable or Disable.

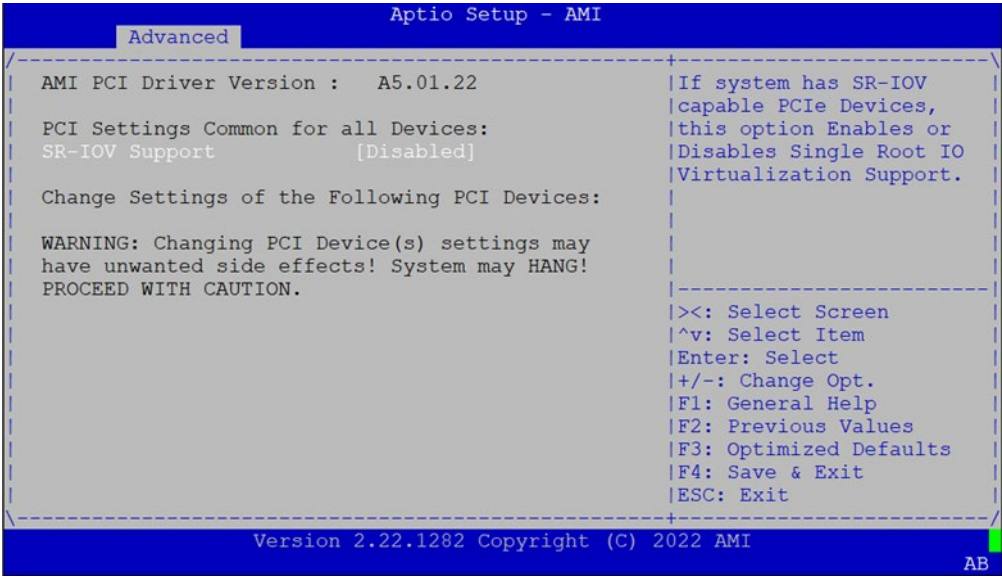
Console Redirection Settings



Feature	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	Emulation: VT100: ASCII char set VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes ANSI: Extended ASCII char set
Bits per second	9600 19200 38400 57600 115200	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Data Bits	7 8	Data Bits
Parity	None Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors.
Stop Bits	1 2	Stop bits indicates the end of a serial data packet.
Flow Control	None Hardware RTS/CTS	Flow Control can prevent data loss from buffer overflow.
VT-UTF8 Combo Key Support	Disabled Enabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals

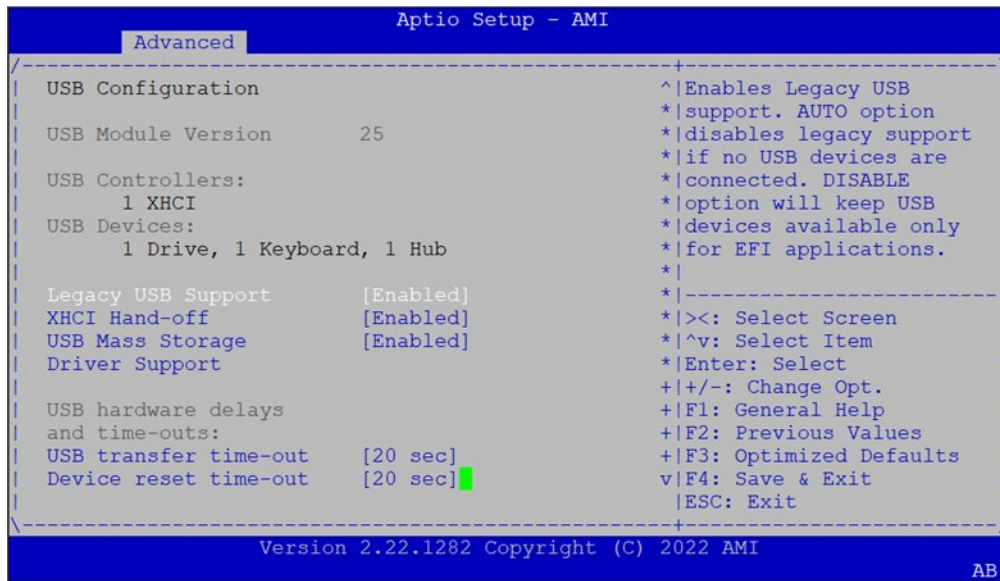
Recorder Mode	Disabled Enabled	With this mode enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution.
Putty KeyPad	VT100 LINUX XTERM86 SCO ESCN VT400	Selects FunctionKey and KeyPad on Putty.

PCI Subsystem Settings



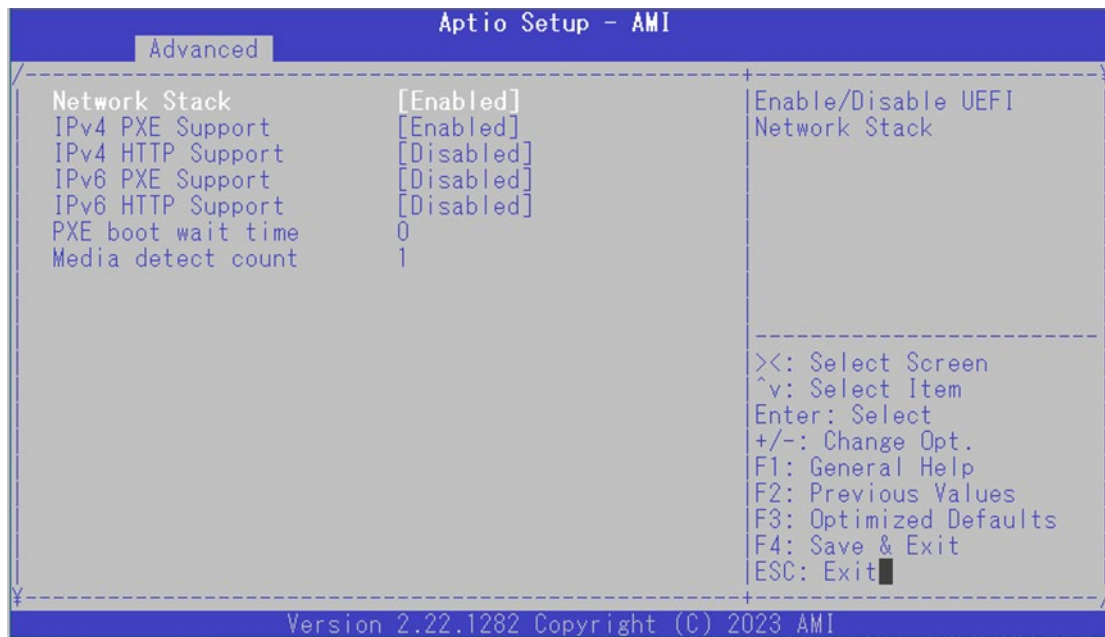
Feature	Options	Description
SR-IOV Support	Disabled Enabled	If the system has SR-IOV capable PCIe Devices, this option Enables or Disables Single Root IO Virtualization Support.

USB Configuration



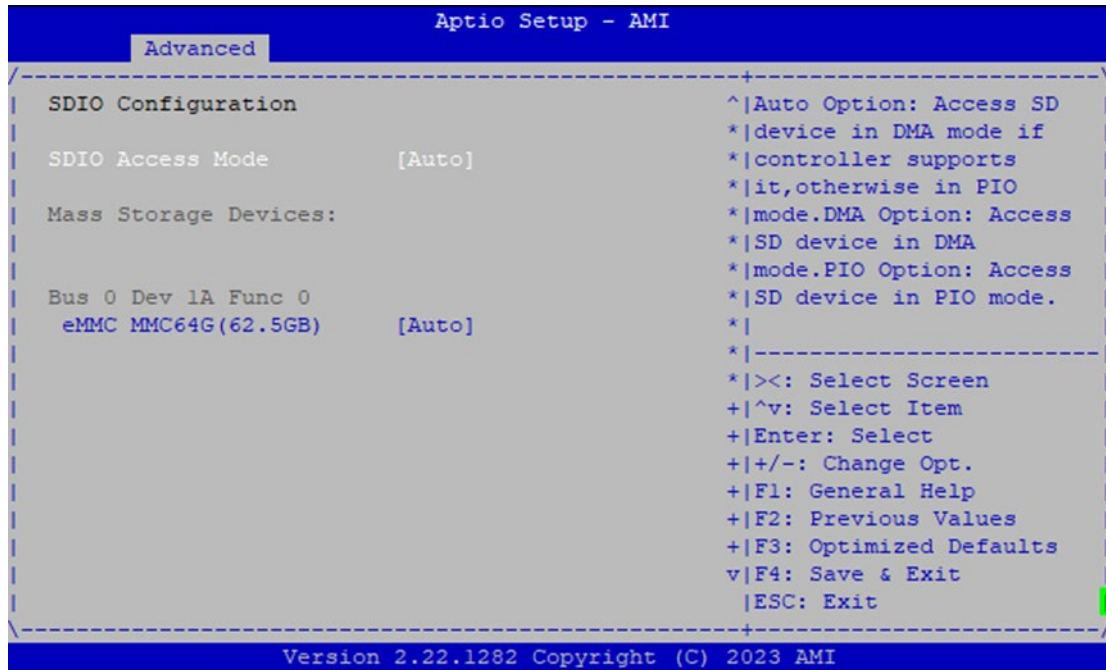
Feature	Options	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. Auto option disables legacy support if no USB devices are connected. Disabled option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled Disabled	This is a workaround for OSeS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Disabled Enabled	Enable/Disable USB Mass Storage Driver Support.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port, it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

Network Stack Configuration



Feature	Options	Description
Network Stack select	Disabled Enable	Select UEFI Network Stack
IPv4 PXE Support	Disabled Enable	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
IPv4 HTTP Support	Disabled Enable	Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.
IPv6 PXE Support	Disabled Enable	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
IPv6 HTTP Support	Disabled Enable	Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.
PXE boot wait time	0	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.
Media detect count	1	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

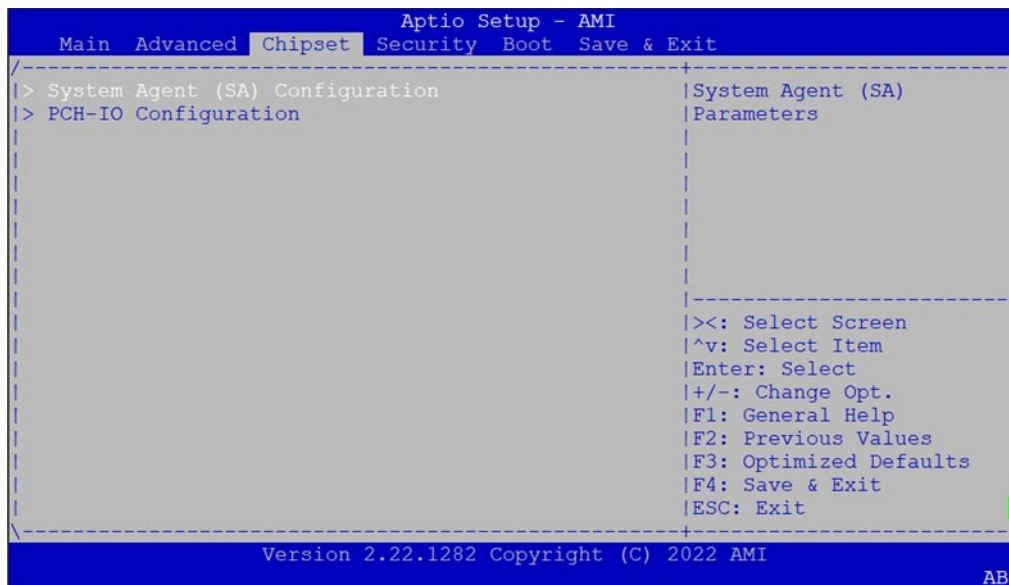
SDIO Configuration



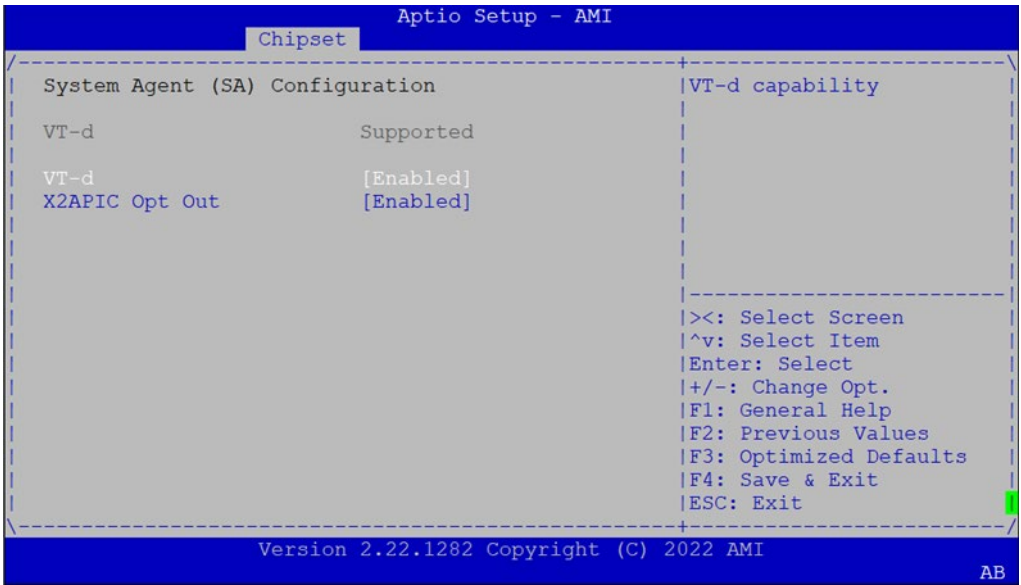
Feature	Options	Description
SDIO Access Mode	Auto ADMA SDMA PIO	Auto Option: Access SD device in DMA mode if controller supports it, otherwise in PIO mode. DMA Option: Access SD device in DMA mode. PIO Option: Access SD device in PIO mode.
eMMC MMC64G(62.5GB)	Auto Floppy Forced FDD Hard Disk	Mass storage device emulation type. 'AUTO' enumerates device less than 530MB as floppies. Forced FDD option can be used to force HDD formatted drive to boot as FDD.

Chipset

Select the **Chipset** menu item from the BIOS setup screen to enter the “Chipset” setup screen. Users can select any of the items in the left frame of the screen.



System Agent (SA) Configuration

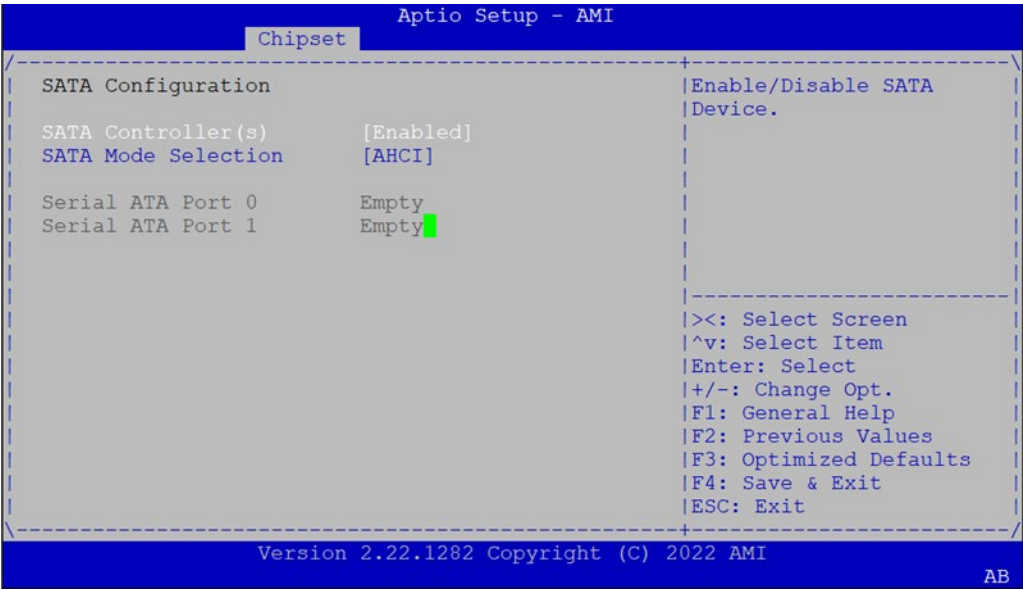


Feature	Options	Description
VT-d	Disabled Enabled	VT-d capability.
X2APIC Opt Out	Enabled Disabled	Enable/Disable X2APIC_OPT_OUT bit.

PCH-IO Configuration

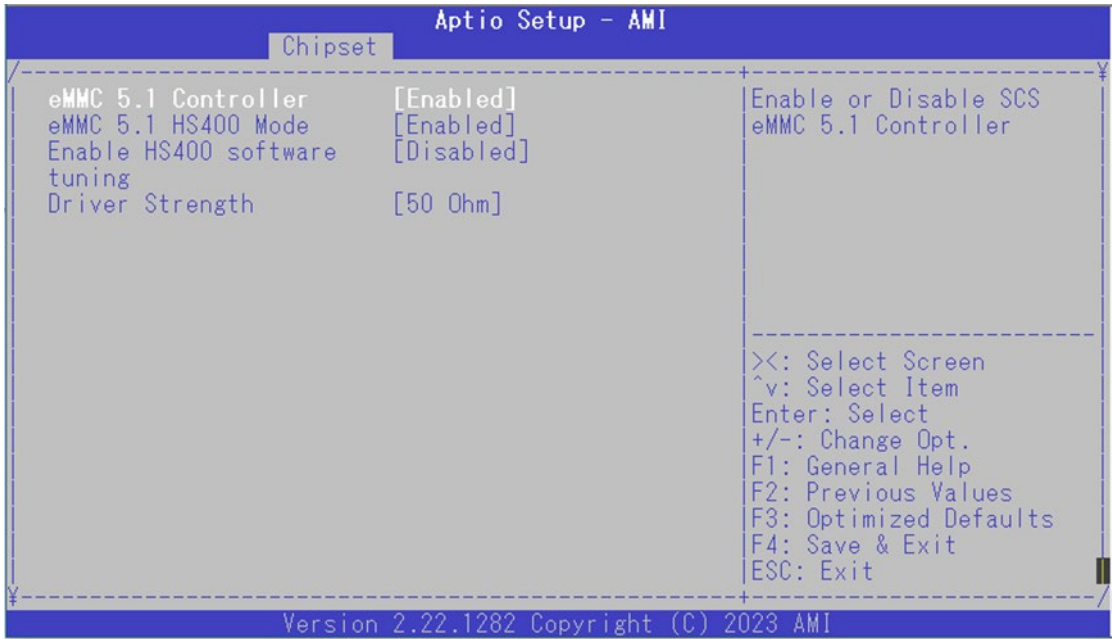


SATA Configuration



Feature	Options	Description
SATA Controller(s)	Enabled Disabled	Enable/Disable SATA Device.
SATA Mode Selection	AHCI	Determines how SATA controller(s) operate.

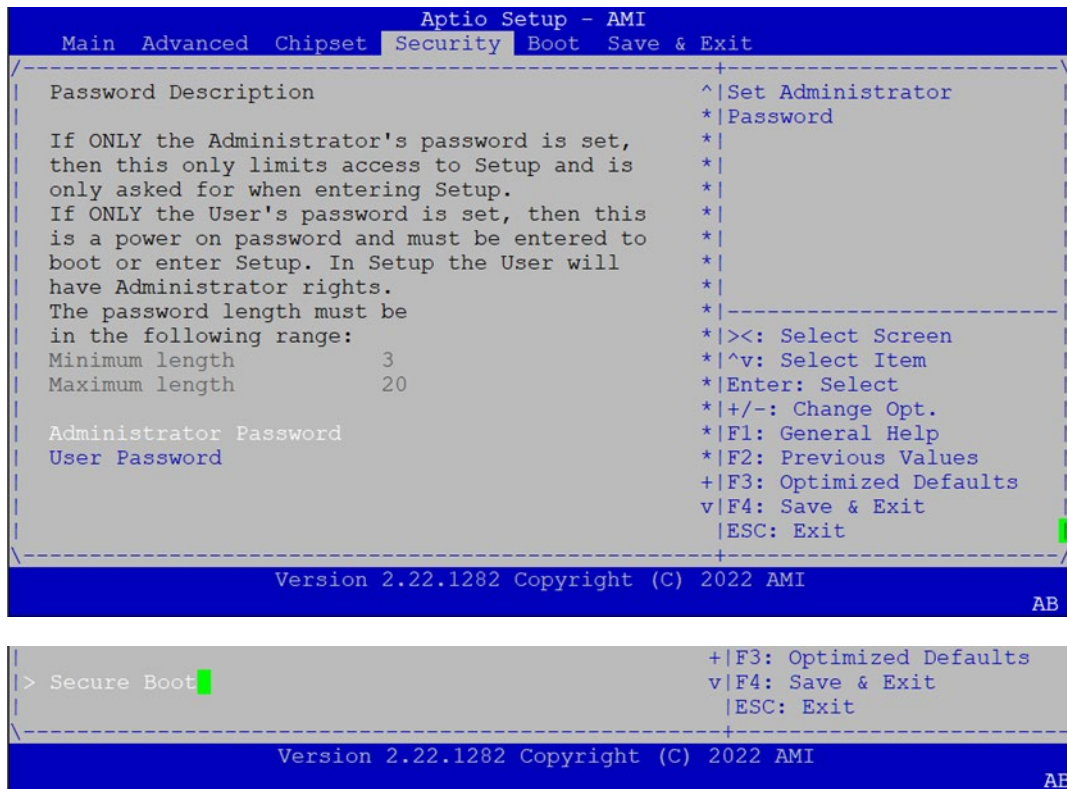
SCS Configuration



Feature	Options	Description
eMMC 5.1 Controller	Enabled Disabled	Enable or Disable SCS eMMC 5.1 Controller
eMMC 5.1 HS400 Mode	Enabled Disabled	Enable or Disable SCS eMMC 5.1 HS400 Mode
Enable HS400 software tuning	Enabled Disabled	Software tuning should improve eMMC HS400 stability at the expense of boot time
Driver Strength	33 Ohm 40 Ohm 50 Ohm	Sets I/O driver strength

Security

Select the Security menu item from the BIOS setup screen to enter the Security Setup screen. Users can select any of the items in the left frame of the screen.



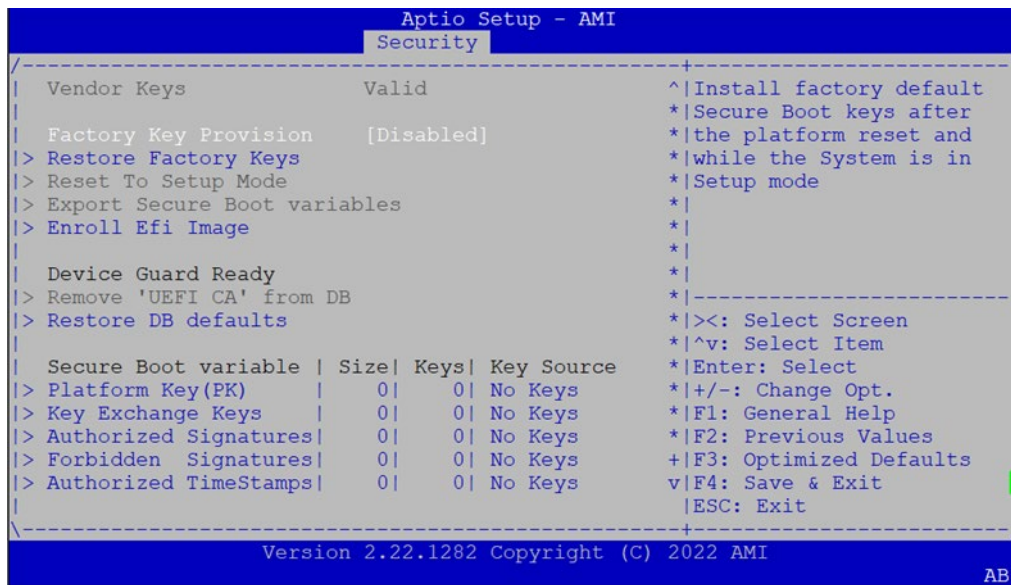
Feature	Description
Administrator Password	If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup, the User will have Administrator rights.

Secure Boot



Feature	Options	Description
Secure Boot	Disabled Enabled	Secure Boot feature is Activated if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is User mode. The mode change requires platform reset.
Secure Boot Mode	Standard Custom	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.

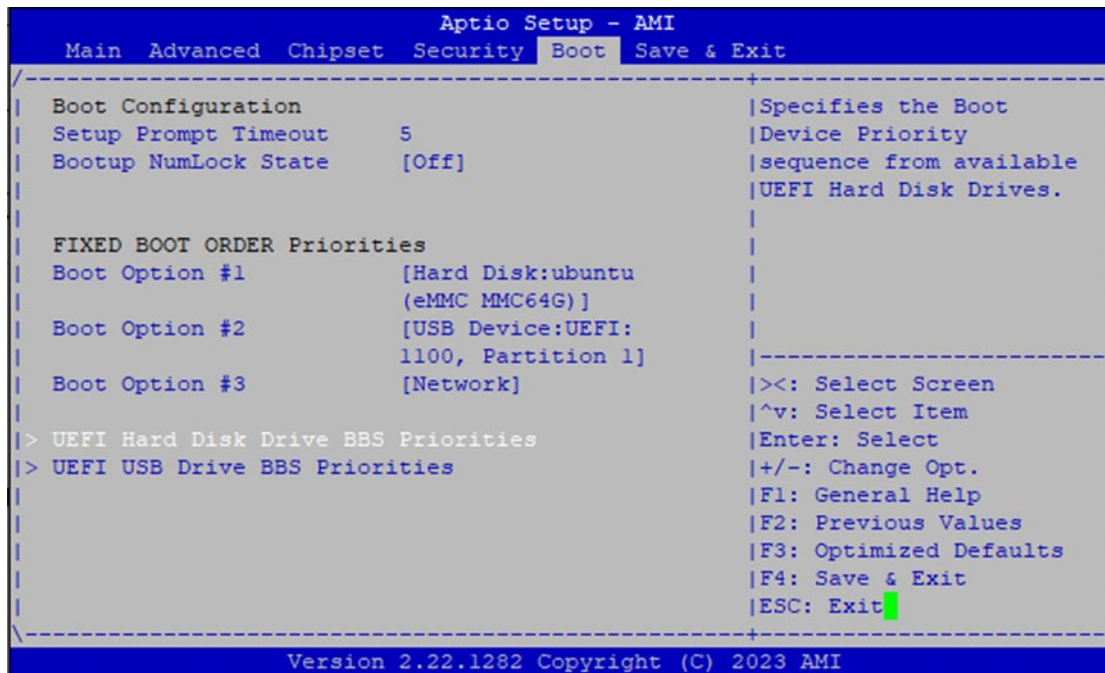
Key Management



Feature	Options	Description
Factory Key Provision	Disabled Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.
Restore Factory keys	None	Force System to User Mode. Install factory default Secure Boot key databases
Enroll Efi Image	None	Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db)
Restore DB defaults	None	Restore DB variable to factory defaults

Boot Menu

Select the Boot menu item from the BIOS setup screen to enter the Boot Setup screen. Users can select any of the items in the left frame of the screen.



Feature	Options	Description
Setup Prompt Timeout	5	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state.
FIXED BOOT ORDER Priorities	USB Device -> Hard Disk	Sets the system boot order.

- Choose boot priority from boot option group.
- Choose specifies boot device priority sequence from available Group device.

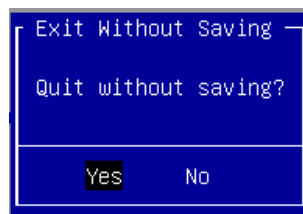
Save and Exit Menu

Select the Save and Exit menu item from the BIOS setup screen to enter the Save and Exit Setup screen. Users can select any of the items in the left frame of the screen.



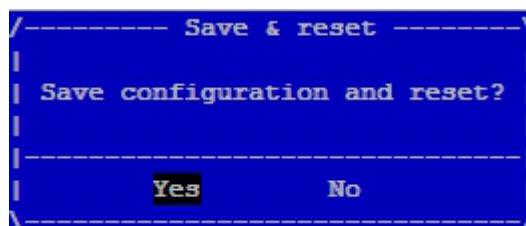
■ Discard Changes and Exit

Select this option to quit Setup without saving any modifications to the system configuration. The following window will appear after the **"Discard Changes and Exit"** option is selected. Select **"Yes"** to Discard changes and Exit Setup.



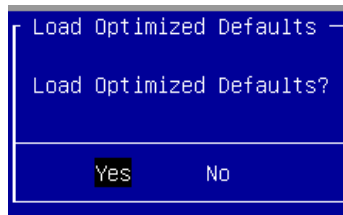
■ Save Changes and Reset

When Users have completed the system configuration changes, select this option to save the changes and reset from BIOS Setup in order for the new system configuration parameters to take effect. The following window will appear after selecting the **"Save Changes and Reset"** option is selected. Select **"Yes"** to Save Changes and reset.



■ Restore Defaults

Restore default values for all setup options. Select “**Yes**” to load Optimized defaults.



Note

The items listed under Boot Override will depend on the devices connected to this system.

APPENDIX A: TERMS AND CONDITIONS

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after service freight charges for goods returned to the user.
3. The buyer will pay for the repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service," RMA goods will be returned at customer's expense.
5. The following conditions are excluded from this warranty:
 - ▶ Improper or inadequate maintenance by the customer
 - ▶ Unauthorized modification, misuse, or reversed engineering of the product
 - ▶ Operation outside of the environmental specifications for the product.

RMA Service

Requesting an RMA#

1. To obtain an RMA number, fill out and fax the "RMA Request Form" to your supplier.
2. The customer is required to fill out the problem code as listed. If your problem is not among the codes listed, please write the symptom description in the remarks box.
3. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
4. Mark the RMA# clearly on the box.



Note

Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected.

RMA Service Request Form

When requesting RMA service, please fill out the following form. Without this form enclosed, your RMA cannot be processed.

RMA No:		Reasons to Return: <input type="checkbox"/> Repair(Please include failure details)	
		<input type="checkbox"/> Testing Purpose	
Company:		Contact Person:	
Phone No.		Purchased Date:	
Fax No.:		Applied Date:	
Return Shipping Address: _____			
Shipping by: <input type="checkbox"/> Air Freight <input type="checkbox"/> Sea <input type="checkbox"/> Express _____			
<input type="checkbox"/> Others: _____			
Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

***Problem Code:**

01: D.O.A.	07: BIOS Problem	13: SCSI	19: DIO
02: Second Time R.M.A.	08: Keyboard Controller Fail	14: LPT Port	20: Buzzer
03: CMOS Data Lost	09: Cache RMA Problem	15: PS2	21: Shut Down
04: FDC Fail	10: Memory Socket Bad	16: LAN	22: Panel Fail
05: HDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
06: Bad Slot	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)

Request Party

Confirmed By Supplier

Authorized Signature / Date

Authorized Signature / Date