Lanner

Industrial Communication Platforms

Energy Management and Industrial Cyber Security Solutions

ICS-I370 User Manual

Preliminary Draft

Version: 1.3

Date of Release:2023-07-10

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

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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

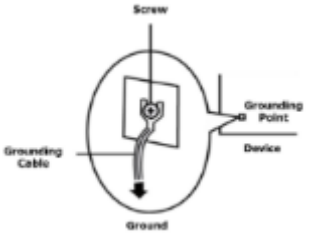
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect 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.

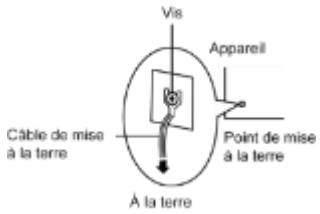
Grounding Procedure for Power Source

- 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 hould 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 16 AWG



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CHAPTER 1: PRODUCT OVERVIEW

ICS-I370 is the next-generation compact fanless industrial cyber security appliance with Intel® Atom™ E3900 CPU (Apollo Lake). Deployed in remote, unmanned, and harsh environments, ICS-I370 supports rich LAN ports with advanced Gen3 LAN bypass, SFP, and extended operating temperature from -40ºC to 70ºC. It also boosts a flexible design with versatile mounting options (wall mount or DIN-rail), onboard TPM, wireless connectivity options, and front access I/O ports, making it perfect for performing OT cybersecurity measures at critical infrastructures such as oil refineries, substations, power plants, and manufacturing factories.

Key Features

- Industrial-Grade Cyber Security Platform
- Intel® Atom™ X7-E3950 / X5-E3940 (formerly Apollo Lake)
- 8x, or 6x GbE RJ45 Ports with 1 or 2 pairs Bypass (SKU A/B/E)
- 6x, or 4x GbE RJ45 Ports and 2x GbE SFP Ports (SKU C/D/F)
- Onboard 64GB eMMC and TPM 2.0 Security
- I/O Ports: 2x USB 3.0 Ports, 1x DB9 Console Port, 2x DIO
- 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-I370 Industrial-Grade Cyber Security Platform
- 1x Phoenix Connector Kits

Ordering Information

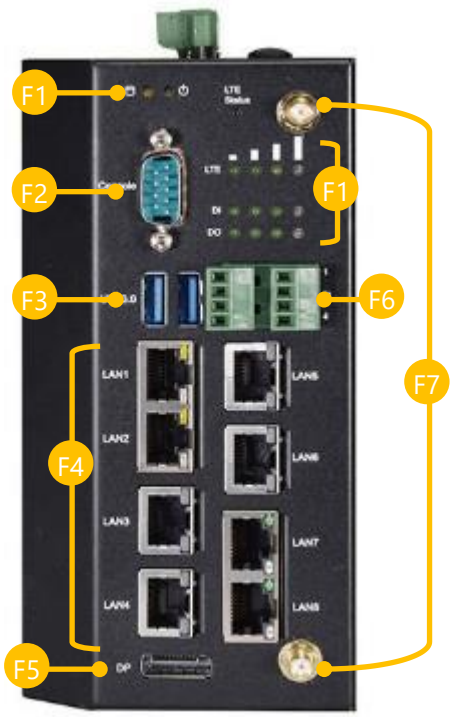
SKU No.	Main Features
ICS-I370A	Industrial-Grade Cyber Security Platform with Intel® Atom™ E3950, 8x RJ45 w/ 1 pair Bypass
ICS-I370B	Industrial-Grade Cyber Security Platform with Intel® Atom™ E3950, 8x RJ45 w/ 2 pair Bypass
ICS-I370C	Industrial-Grade Cyber Security Platform with Intel® Atom™ E3950, 6x RJ45, 2x SFP w/ 1 pair Bypass
ICS-I370D	Industrial-Grade Cyber Security Platform with Intel® Atom™ E3950, 6x RJ45, 2x SFP w/ 2 pair Bypass
ICS-I370E	Industrial-Grade Cyber Security Platform with Intel® Atom™ E3940, 6x RJ45 w/ 1 pair Bypass
ICS-I370F	Industrial-Grade Cyber Security Platform with Intel® Atom™ E3940, 4x RJ45, 2x SFP w/ 1 pair Bypass

System Specifications

Processor System	Processor Options	SKU A/B/C/D: Intel® Atom™ E3950 SKU E/F: Intel® Atom™ E3940
	Frequency	1.60 GHz
	Core Number	4
	Chipset	SoC
	BIOS	AMI SPI Flash BIOS
Memory	Technology	DDR3L, non ECC
	Max. Capacity	Up to 8GB
	Socket	1x SODIMM
Ethernet	Controller	LAN3 & LAN4 by Intel® i210-IS/IT/AT; LAN1 & LAN 2 by Intel i210-IT/AT
	Speed	10/100/1000 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
	Isolation Protection	1.5 KV magnetic isolation protection
Storage	Type	Onboard eMMC 64GB; 1x mSATA; 1x SATA for 2.5" SSD/HDD or mSATA via m-SATA board (Optional); 1x 2.5" SSD/HDD Drive (Optional)
I/O Interface	Serial Port	1x D89 Console Port
	USB Port	2x USB 3.0, Type A Port
	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
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)	160 x 156.5 x 81mm (6.29" x 6.16" x 3.18")
	Fanless	Yes
	Weight	2kg
	Mounting	DIN rail,
Environmental	Operating Temperature	-40°C ~70°C
	Storage Temperature	-40°C ~70°C
	Relative Humidity	10% ~ 90%, Non-condensing
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
	Linux	Kernal 3.X
Certification	**EMC**	CE/FCC Class A, UL
	Compliance	RoHS

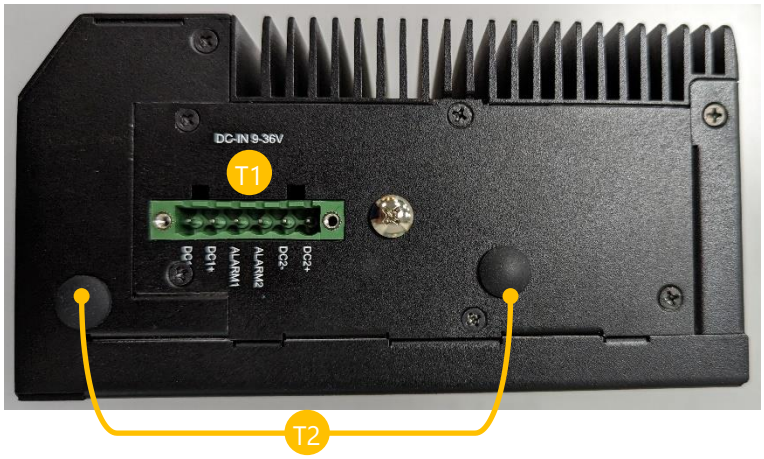
Physical Overview

Front & Rear Panel



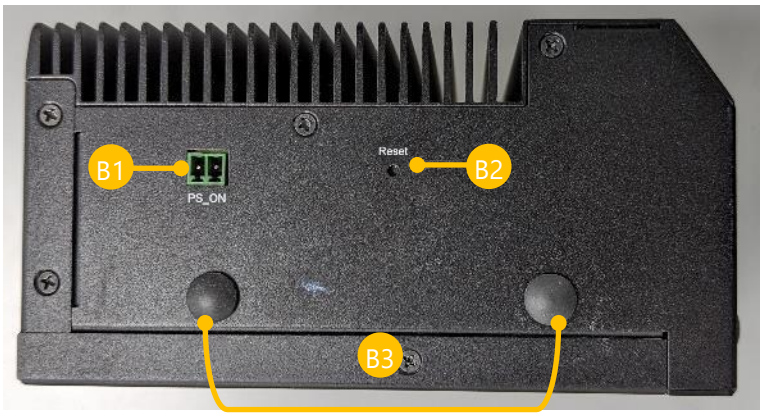
No.	Description	
F1	LED Indicators	LED Indicator: Power Status/ Storage Access/ SFP Status/ LTE Status  4x LTE Signal Level Status 2x4 Programmable
F2	Console Port	1x DB9 Console Port
F3	USB Port	2x USB 3.0 Type A Ports
F4	LAN/SFP Port	SKU A/B: 8x GbE RJ45 (1 or 2 pair bypass) Ports SKU C/D: 6x GbE RJ45;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

Top Panel



No.	Description	
T1	Power Input	1x 2-pin Terminal Block for Dual DC input 12~36V (Typical 12V/24Vdc)
T2	Antenna	2x Antenna Holes

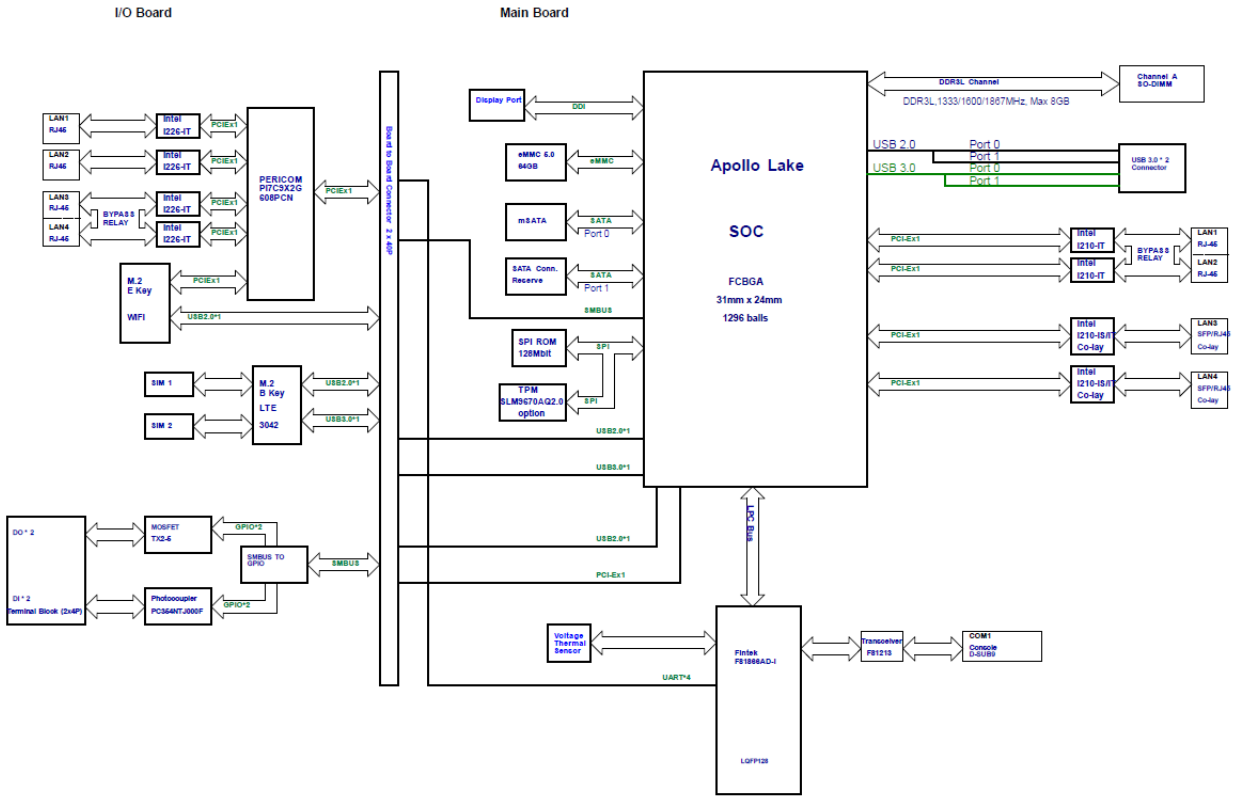
Bottom Panel



No.	Description	
B1	Power Control	1x 2-pin Terminal Block for Power On/Off Control
B2	Reset Button	1x Reset Button. Use a pin to reset the system
B3	Antenna	2x Antenna Hole

Motherboard Information

Block Diagram



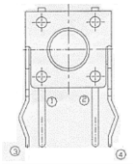
Internal Jumpers and Connector

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 disable. When changing the jumpers, make sure your system is completely turned off.

Motherboard

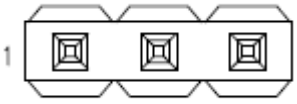
1. RST2: Reset Button

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



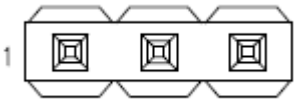
2. RST1: HW/SW Reset Select

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



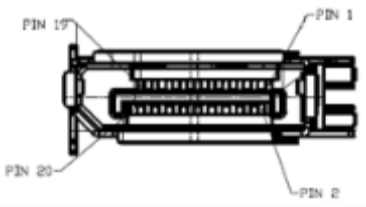
3. JCMOS 1/2: Clear CMOS

Jumper	Description
1-2 (Default)	Normal
2-3	Clear CMOS



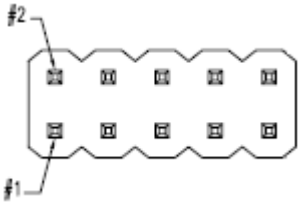
4. DP1: Display Port Connector

Pin No.	Description	Pin No.	Description
1	DP0_TXP0	2	GND
3	DP0_TXN0	4	DP0_TXP1
5	GND	6	DP0_TXN1
7	DP0_TXP2	8	GND
9	DP0_TXN2	10	DP0_TXP3
11	GND	12	DP0_TXN3
23	DPP_AUX_EN_N	14	CONFIG2
25	DPP_AUX_CHP	16	GND
17	DPP_AUX_CHN	18	HPD
19	RETURN	20	DP_PWR



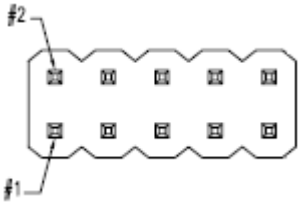
5. JSPI1: SPI ROM Connector (For RD Debug)

Pin No.	Description	Pin No.	Description
1	SPI0_HOLD_N	2	NC
3	SPI0_CS_N	4	V1P8_A_SPI
5	SPI0_MISO_R	6	NC
7	NC	8	SPI0_CLK
9	GND	10	SPI0_MOSI



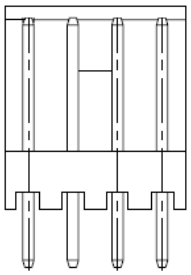
6. LPC1: LPC Connector (For RD Debug)

Pin No.	Description	Pin No.	Description
1	DEBUG_CLK_24M	2	LPC_AD1
3	PLTRST_BUF2_N	4	LPC_AD0
5	L_FRAME_N	6	V3P3_S
7	LPC_AD3	8	GND
9	LPC_AD2	10	GND



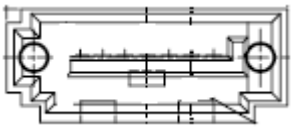
7. SATAPWR1: SATA Power Connector

Pin No.	Description
1	V12_S
2	GND
3	GND
4	V5_S



8. SATA1: SATA Connector

Pin No.	Description	Pin No.	Description
1	GND	5	SATA_RXN1_C
2	SATA_TXP1_C	6	SATA_RXP1_C
3	SATA_TXN1_C	7	GND
4	GND		

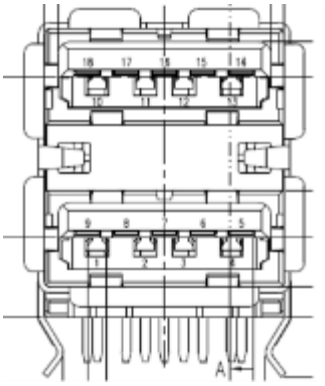


9. COM1: BO2WI Mini D-Sub

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		

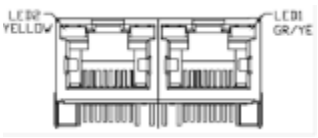
10. USB1: Dual USB 3.0 Type A Connector

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+



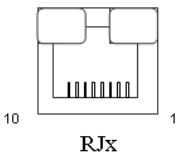
13. RJ1: LAN 1/2 Connector

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	V3P3_S	21	V3P3_S
10	P1_LED_LINK_N	22	P2_LED_LINK_N
11	P1_LINK1000	23	P2_LINK1000
12	P1_LINK100	24	P2_LINK100



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

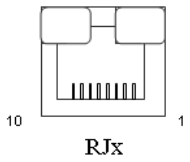
Pin No.	Description
1	LAN3_MDI0P
2	LAN3_MDI0N
3	LAN3_MDI1P
4	LAN3_MDI1N
5	P1V5_LAN3
6	P1V5_LAN3
7	LAN3_MDI2P
8	LAN3_MDI2N
9	LAN3_MDI3P
10	LAN3_MDI3N



11	LAN3_L100_N
12	LAN3_L1000_N
13	P3V3_LAN3
14	LAN3_ACTLED_N

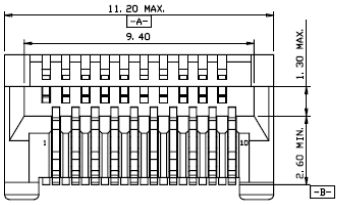
15. RJ4: LAN 10/100/1000 RJ45 Connector

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

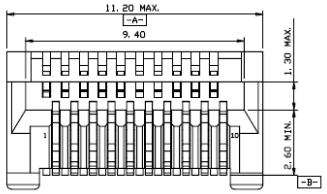
Pin No.	Description	Pin No.	Description
1	GND	11	GND
2	SFP3_TX_FAULT	12	SFP3_RD_N
3	SFP3_TX_DIS	13	SFP3_RD_P
4	SFP3_I2C_SDA	14	GND
5	SFP3_I2C_SCL	15	P3V3_SFP3_R
6	SFP3_MOD_ABS	16	P3V3_SFP3_T
7	SFP3_RS0	17	GND
8	SFP3_RX_LOS	18	SFP3_TD_P
9	SFP3_RS1	19	SFP3_TD_N
10	GND	20	GND



17. FIBER2: SFP Connector

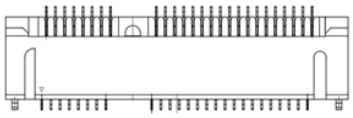
Pin No.	Description	Pin No.	Description
1	GND	11	GND
2	SFP4_TX_FAULT	12	SFP4_RD_N

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. MSATA1: MSATA Connector

Pin No.	Description	Pin No.	Description
1	NC	2	V3P3_S
3	NC	4	GND
5	NC	6	NC
7	NC	8	NC
9	GND	10	NC
11	NC	12	NC
13	NC-	14	NC
15	GND	16	NC
Mechanical Key			
17	NC	18	GND
19	NC	20	NC
21	GND	22	NC
23	SATA_RXP0_C	24	V3P3_S
25	SATA_RXN0_C	26	GND
27	GND	28	NC
29	GND	30	NC
31	SATA_TXN0_C	32	NC
33	SATA_TXP0_C	34	GND
35	GND	36	NC-
37	GND	38	NC
39	V3P3_S	40	GND
41	V3P3_S	42	NC
43	NC	44	NC
45	NC	46	NC
47	NC	48	NC
49	NC	50	GND
51	NC	52	V3P3_S

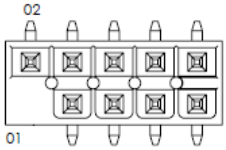


19. PSBTN1: External Power Button (2-pin Phoenix Connector)

Pin No.	Description	Pin No.	Description
1	EXT_PWRBTN	2	GND

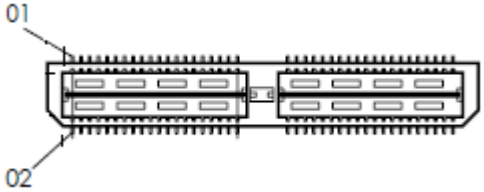
20. JP10: Board to Board Power Connector

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



21. J9: Board to Board Connector

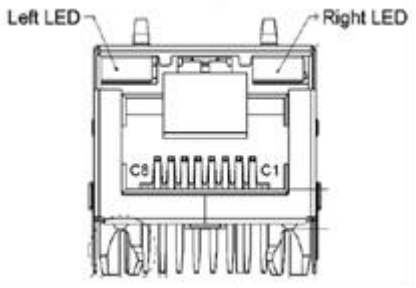
Pin No.	Description	Pin No.	Description	Pin No.	Description	Pin No.	Description
1	GND	41	GND	2	V3P3_S	42	P1_S0_2
3	GND	43	CTS#2	4	GND	44	LAN34GND
5	USB2_DP4	45	RTS#2	6	USB2_DP3	46	GND
7	USB2_DN4	47	SOUT#2	8	USB2_DN3	48	CTS#3
9	GND	49	SIN#2	10	GND	50	RTS#3
11	PCIE5_TXP	51	GND	12	USB3_TX3_P	52	SOUT#3
13	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



I/O Board

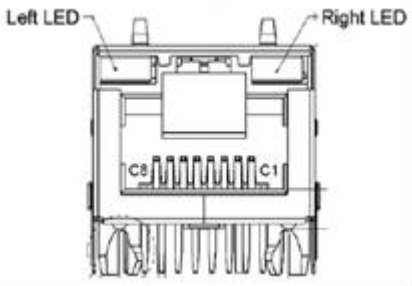
1. RJ2: RJ45 Jack with LED

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



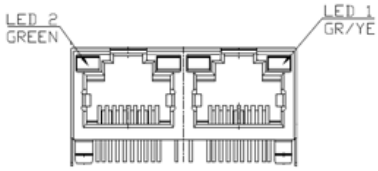
2. RJ3: RJ45 Jack with LED

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

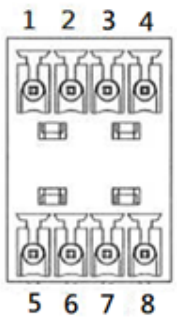
Pin No.	Description	Pin No.	Description
1	P3_MDXP0	13	P4_MDXP0
2	P3_MDXN0	14	P4_MDXN0



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

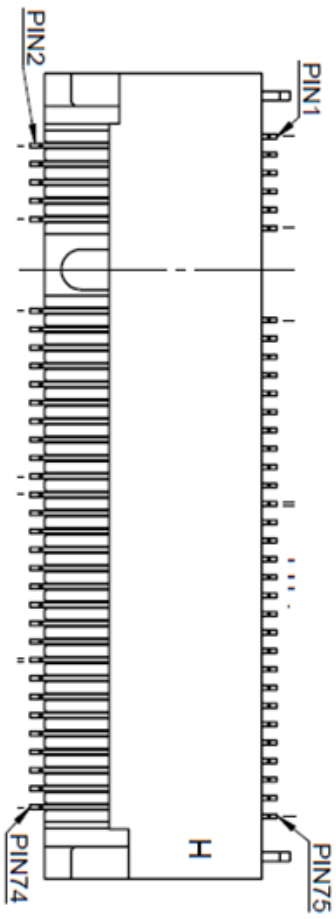
4. DIO1: DIO Connector

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

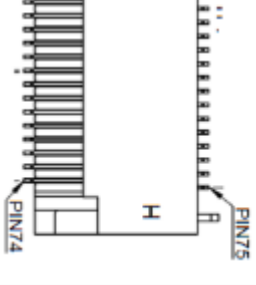


5. M2_1: M.2 NGFF Connector (B-Key)

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

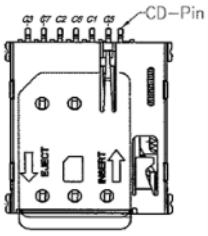


41	NC	42	NC
43	NC	44	NC
45	GND	46	NC
47	NC	48	NC
49	NC	50	NC
51	GND	52	NC
53	NC	54	NC
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	NC	68	NC
69	NC	70	V3P3_G1
71	GND	72	V3P3_G1
73	GND	74	V3P3_G1
75	NC		



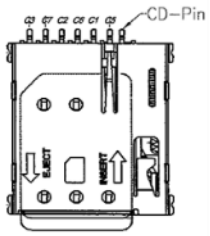
6. SIM1: SIM Card Socket

Pin No.	Description	Pin No.	Description
C1	UIM1_PWR	C5	GND
C2	UIM1_RST1	C6	NC
C3	UIM1_CLK1	C7	UIM1_DAT1



7. SIM2: SIM Card Socket

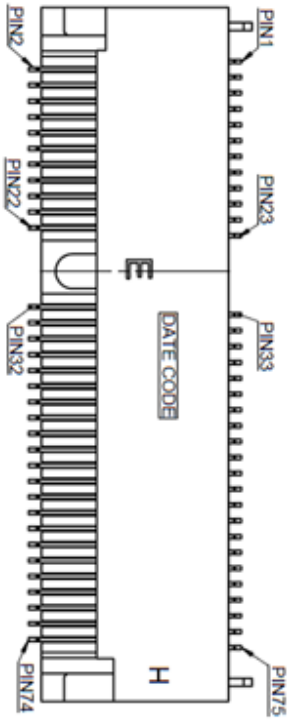
Pin No.	Description	Pin No.	Description
C1	UIM1_PWR2	C5	GND
C2	UIM1_RST2	C6	NC
C3	UIM1_CLK2	C7	UIM1_DAT2



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

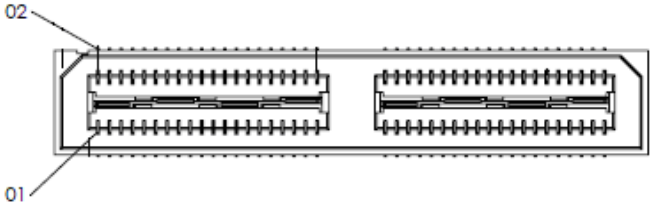
13	NC	14	NC
15	NC	16	LED_WLAN2-
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	NC		
		32	NC
33	GND	34	NC
35	SW_C_PCIE_TX_P5	36	NC
37	SW_C_PCIE_TX_N5	38	NC
39	GND	40	NC
41	SW_C_PCIE_TX_N5	42	NC
43	SW_C_PCIE_RX_N5	44	NC
45	GND	46	NC
47	CLK_LAN5_DP	48	NC
49	CLK_LAN5_DN	50	NC
51	GND	52	PERST#EKEY
53	NC	54	NC
55	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

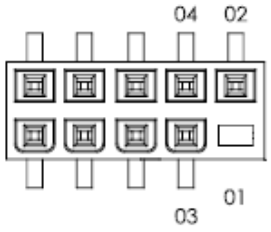
Pin No.	Description	Pin No.	Description	Pin No.	Description	Pin No.	Description
1	GND	41	GND	2	V3P3_S	42	P1_S0_2
3	GND	43	CTS#2	4	GND	44	LAN34GND
5	USB2_DP4	45	RTS#2	6	USB2_DP3	46	GND
7	USB2_DN4	47	SOUT#2	8	USB2_DN3	48	CTS#3
9	GND	49	SIN#2	10	GND	50	RTS#3
11	PCIE5_TXP	51	GND	12	USB3_TX3_P	52	SOUT#3

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



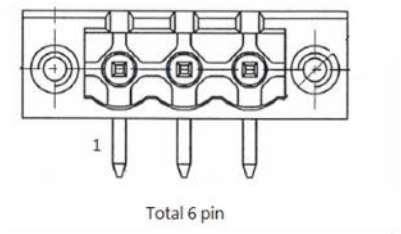
10. JP1: Board to Board Power Connector

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 (12V~36V)
2	DC_GND
3	ALARM2
4	ALARM1
5	DC_PWR1 (12V~36V)
6	DC_GND



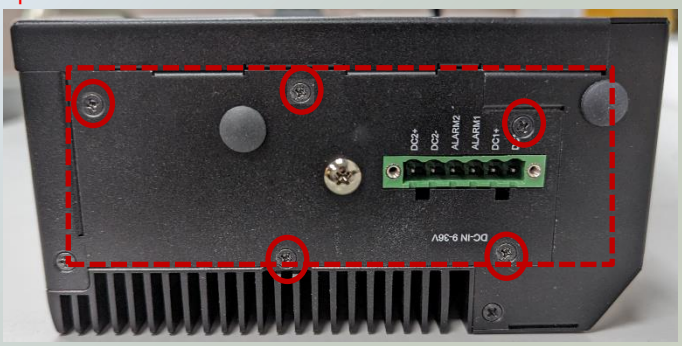
CHAPTER 2: HARDWARE INSTALLATION

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

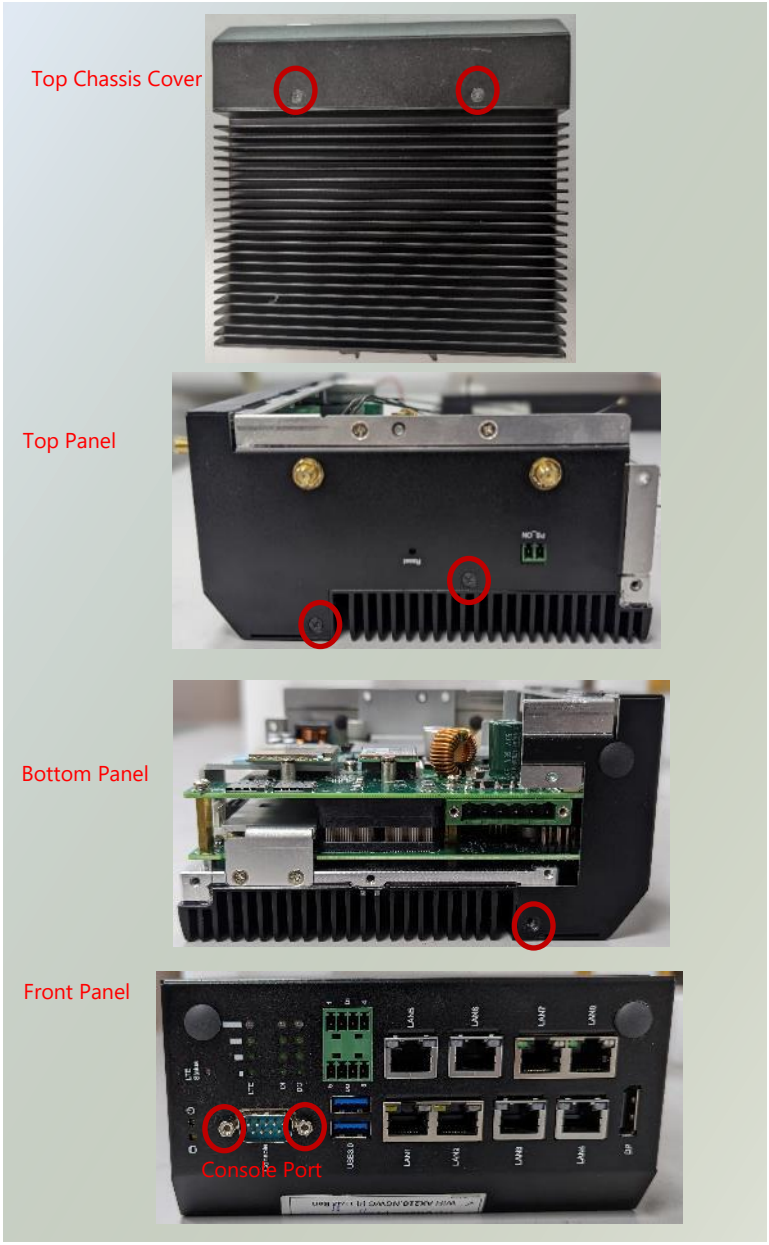
Rear Panel

4. Lift the cover to remove.

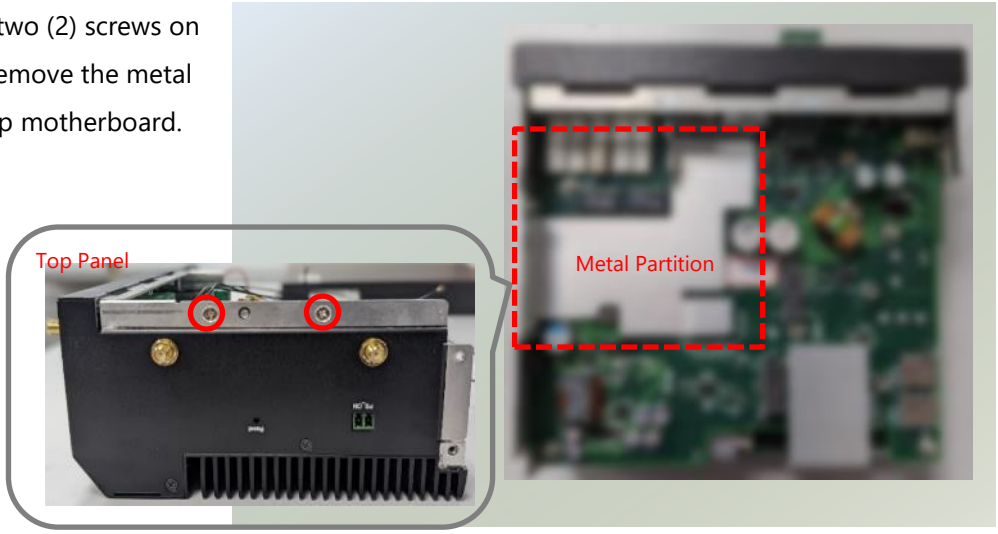
Opening the Top Chassis

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

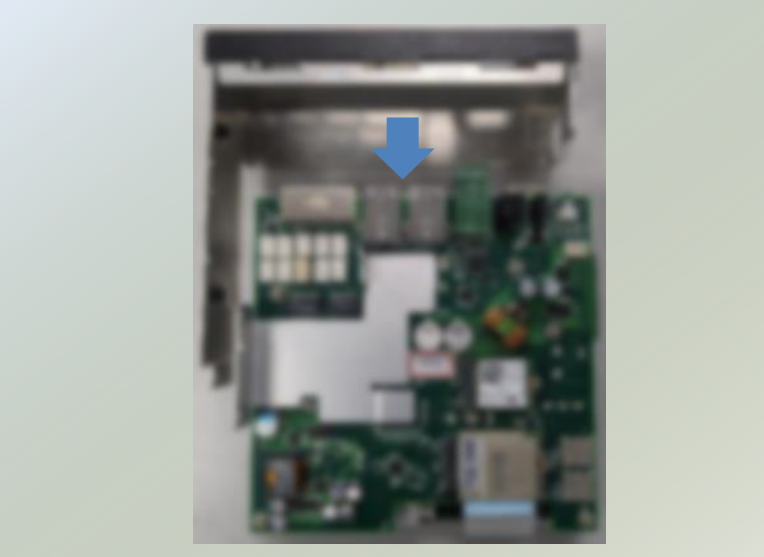
1. Power off the system and remove the bottom chassis cover.
2. Unscrew the two (2) screws on the system's top chassis cover, the two (2) screws on the top panel, the one (1) screw on the bottom panel, the two (2) screws on the Console Port on the front panel.



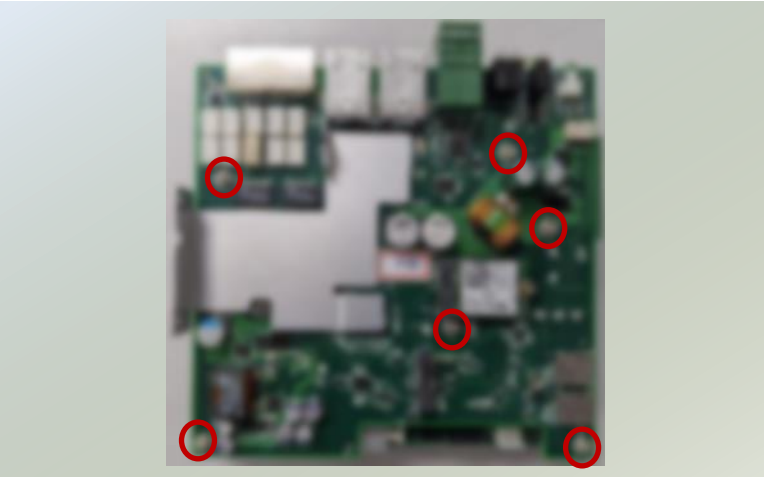
3. Then, remove the two (2) screws on the top panel, to remove the metal partition on the top motherboard.



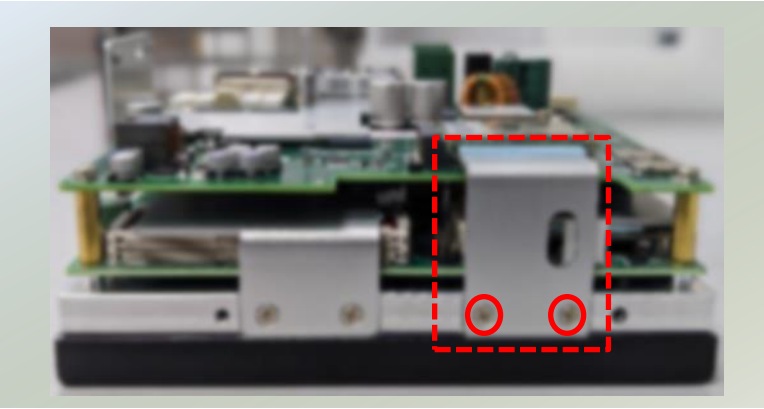
4. Gently remove the top chassis cover from the motherboard layers.



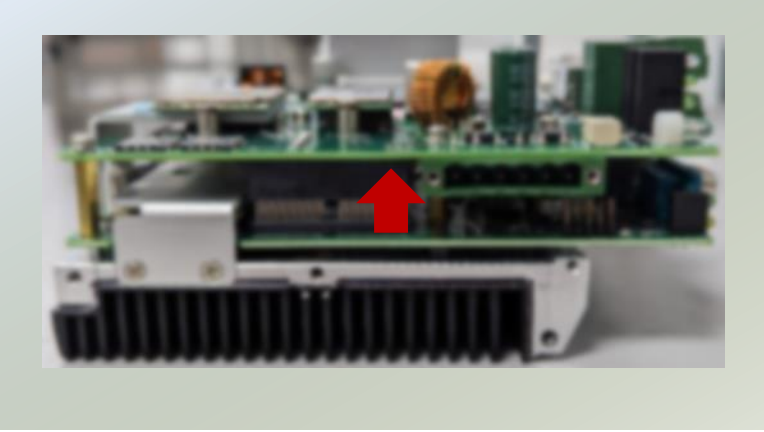
5. Remove the six (6) screws on the top motherboard section.



6. Remove the two (2) screws on the metal partition on the side and lift up the metal partition.



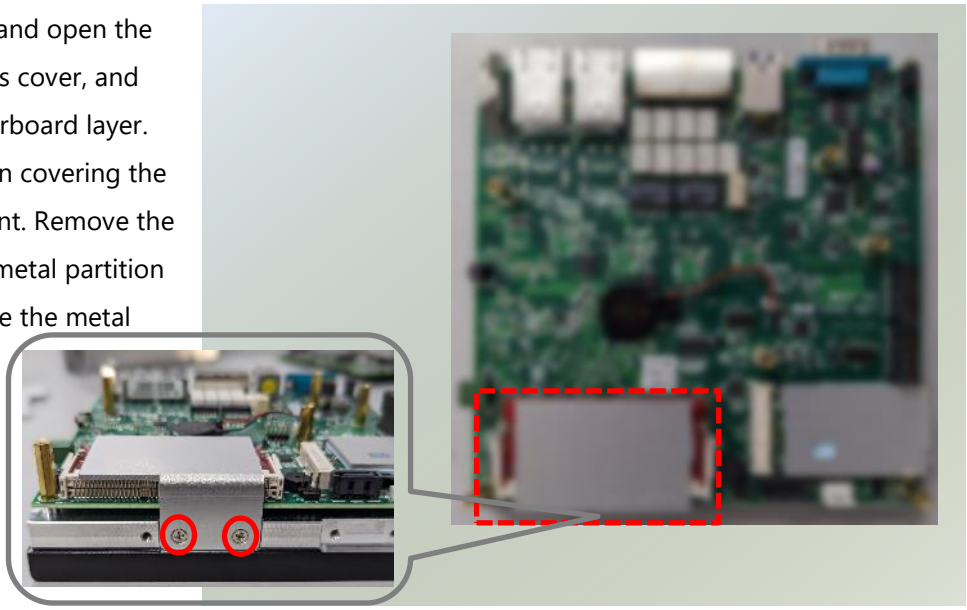
7. Gently lift up the top motherboard section.



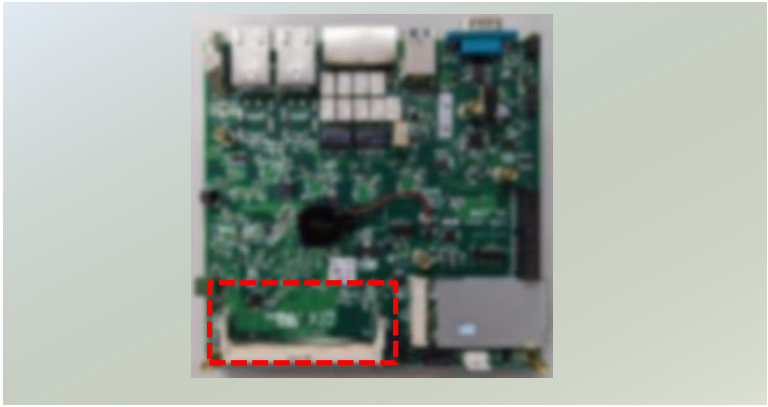
Installing the System Memory

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.

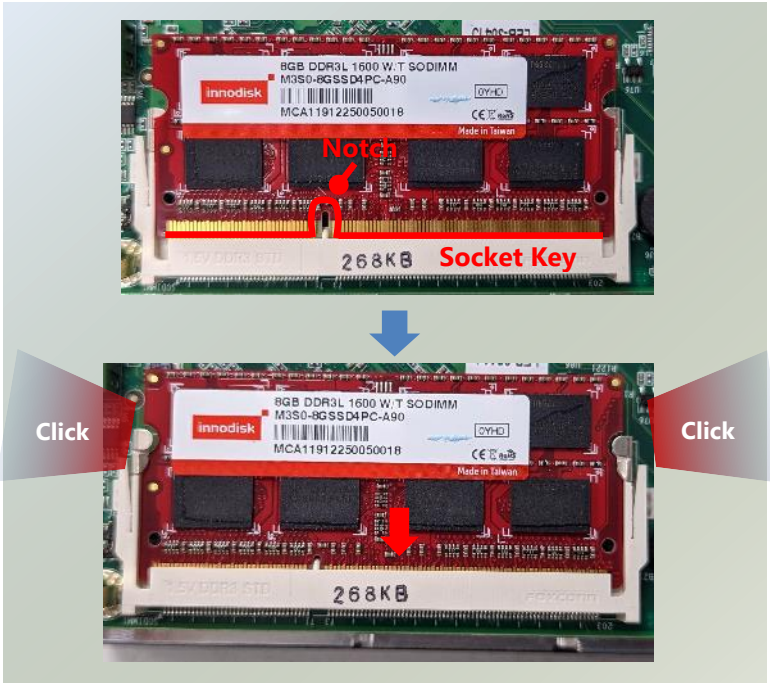


3. Locate the DIMM socket on the motherboard.

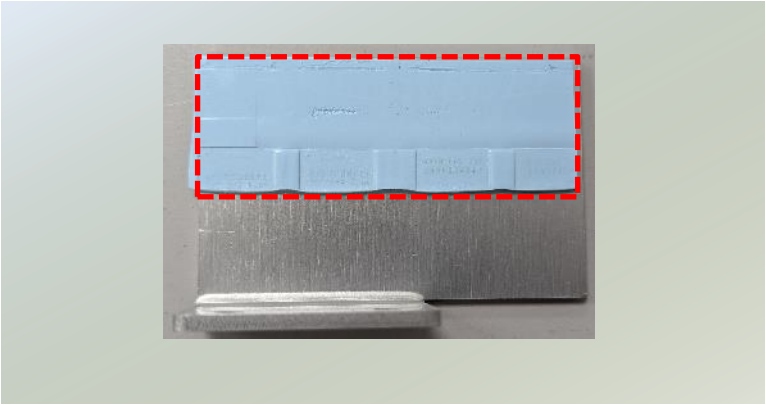


4. Align the notches of the DIMM module with the socket key in the pin slot.

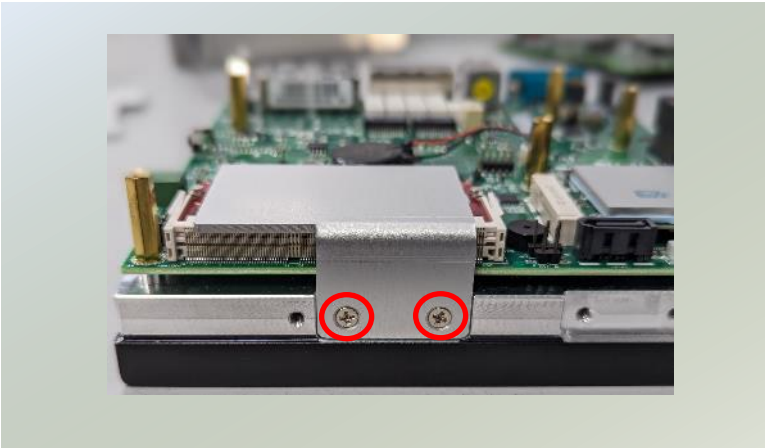
5. Insert the module into the slot at a diagonal angle and gently press down until it is firmly seated by the clips on both sides.



6. Next, thermal pad placement. Remove the protective film on the thermal pad (included in the accessory pack) and gently place on the metal partition.



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

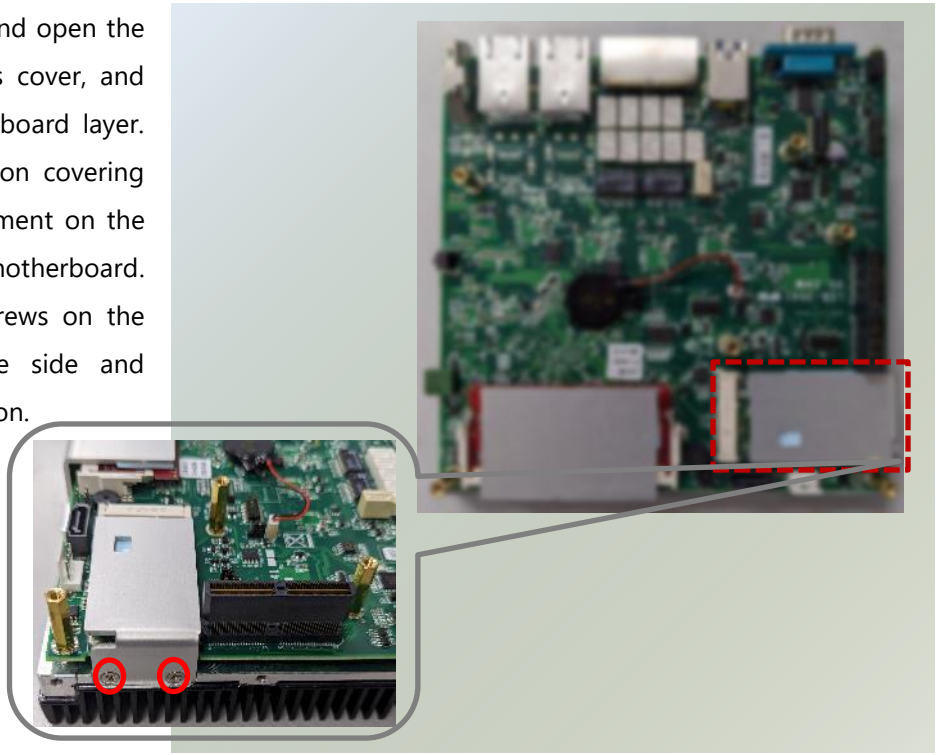


8. Gently place the top motherboard section back on top and secure with the original six (6) screws. Then, enclose the top chassis cover with the motherboard section, secure with the original seven (7) screws. After all expansion or optional modules have been installed, then place the bottom chassis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

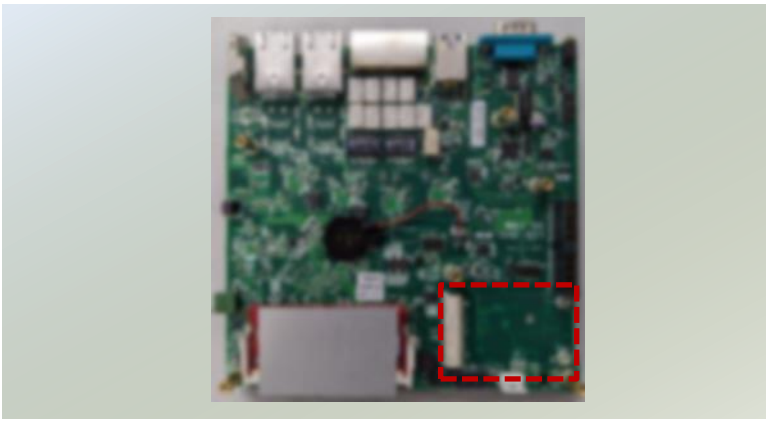
Installing the mSATA Storage (Optional)

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

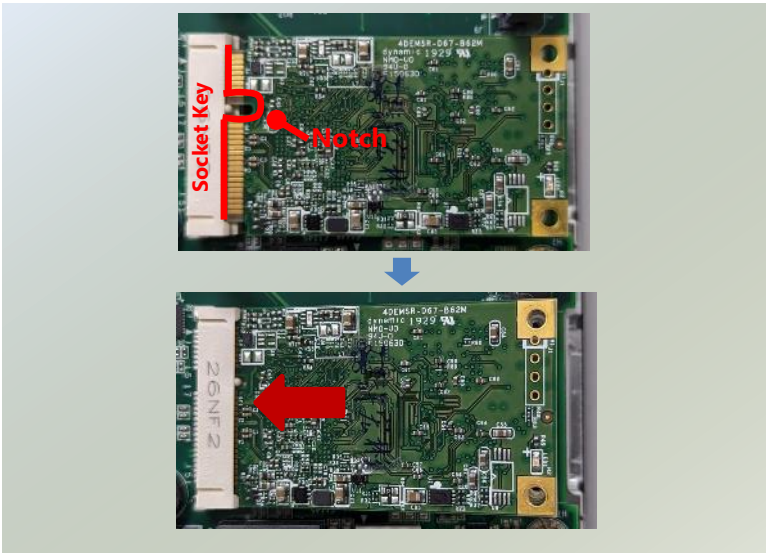
1. Power off the system, and open the top and bottom chassis cover, and remove the top motherboard layer. Locate the metal partition covering the DIMM socket placement on the bottom (second layer) motherboard. Remove the two (2) screws on the metal partition on the side and remove the metal partition.



2. Locate the mSATA slot on the motherboard.

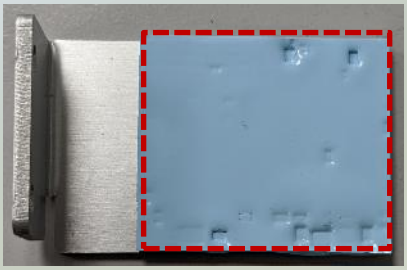


3. Align the notch of the mSATA storage card with the socket key in the pin slot.
4. Insert the storage card pins at 30 degrees into the socket until it is fully seated.

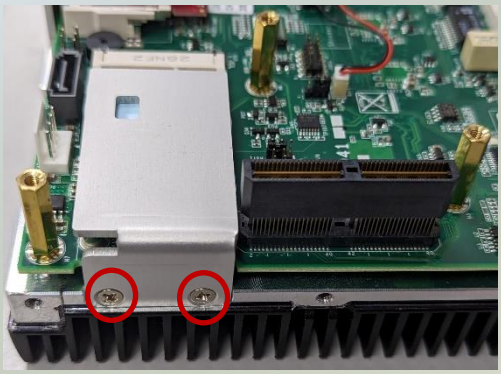


5. Push down on the module card and secure it with two (2) screws.

6. Next, thermal pad placement. Remove the protective film on the thermal pad (included in the accessory pack) and gently place on the metal partition.



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

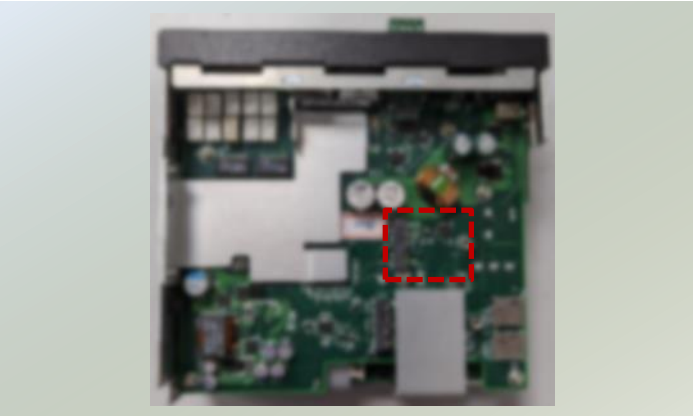


8. Gently place the top motherboard section back on top and secure with the original six (6) screws. Then, enclose the top chassis cover with the motherboard section, secure with the original seven (7) screws. After all expansion or optional modules have been installed, then place the bottom chassis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

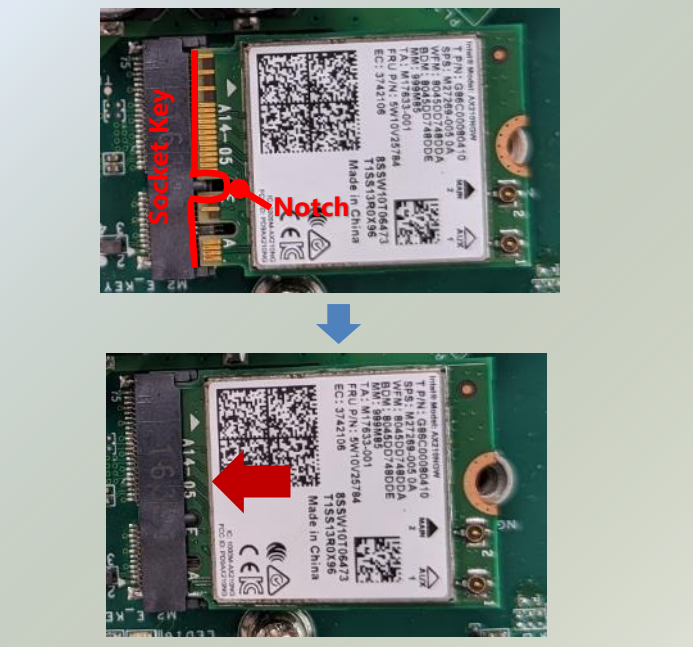
Installing the Wi-Fi Module (Optional)

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.

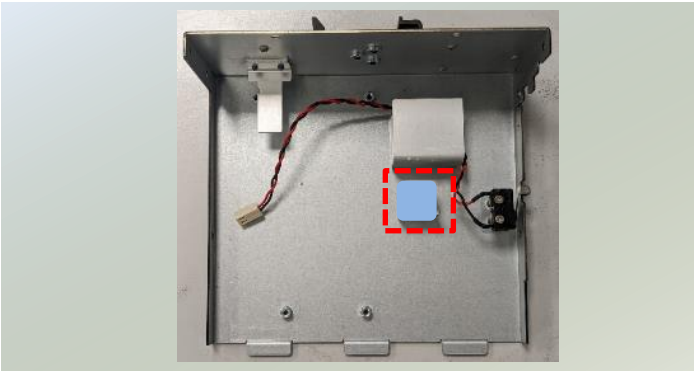


2. Align the notch of the module card with the socket key in the pin slot.
3. Insert the module card at 30 degrees into the socket until it is fully seated.



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

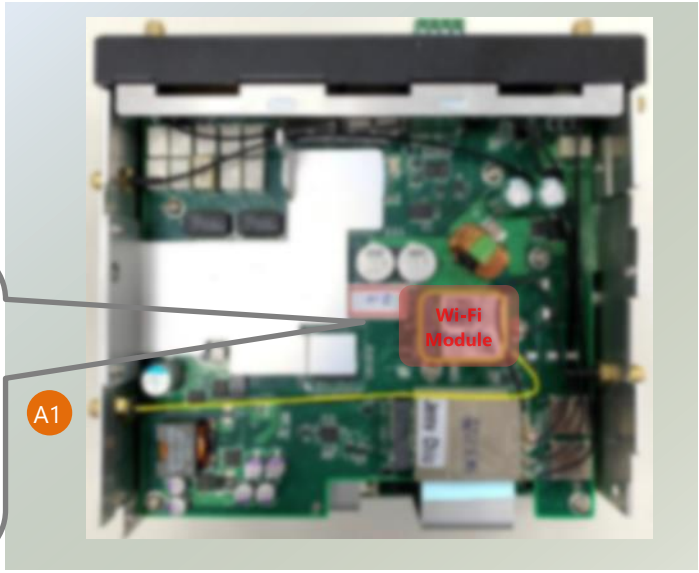
5. Next, thermal pad placement. Remove the protective film on the thermal pad (included in accessory pack) and gently place on the smaller square piece on the bottom chassis cover (which once covered, will be placed over Wi-Fi module card).



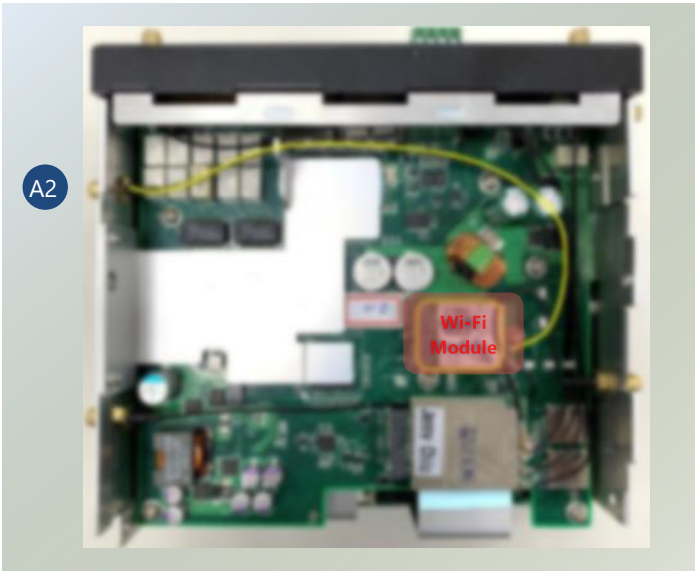
Installing Wi-Fi Antenna

Top 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.



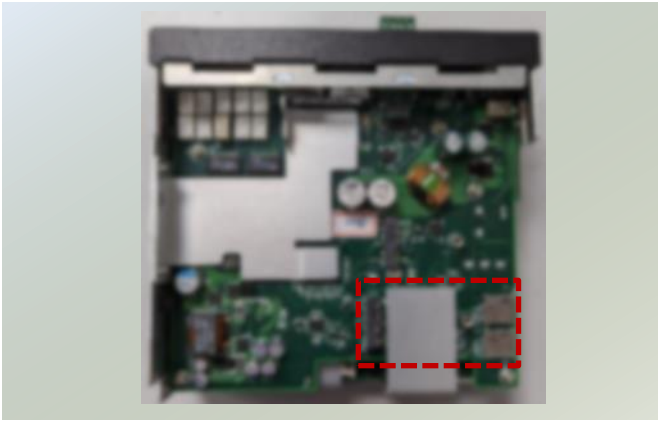
3. Place the chassis cover back and screw to secure. Then, secure the two antennas to the top panel of the system.

Installing the LTE/5G Module (Optional)

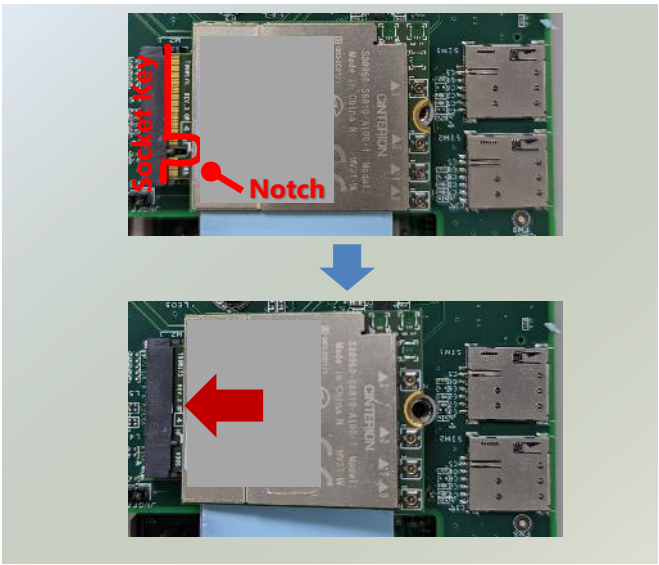
The system supports one M.2 B-Key for LTE/5G module card expansion. LTE module requires two antennas. 5G module requires four antennas. Please follow the procedures for installation.

Note: 5G module requires the metal partition and thermal pad to sufficiently dissipate heat. The metal partition blocks the SSD cables, therefore ICS-I370 system cannot support both 5G module and SSD expansion at the same time. LTE module does NOT require the metal partition and thermal pad to sufficiently dissipate heat, therefore, ICS-I370 system supports both LTE and SSD expansion.

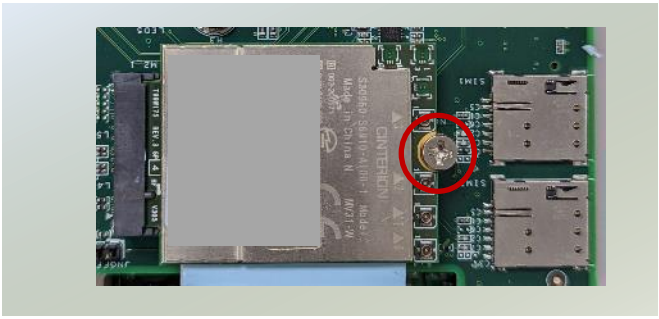
1. Locate the M.2 slot on the motherboard.



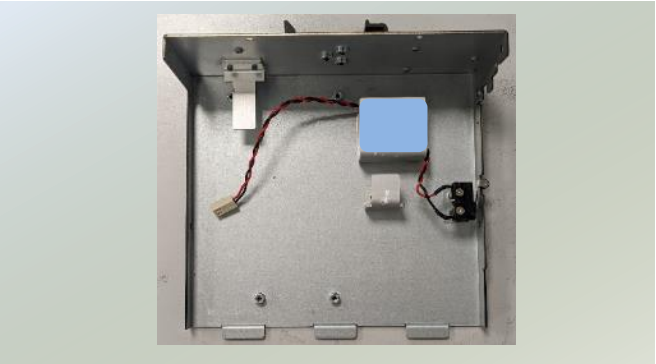
2. Align the notch of the module card with the socket key in the pin slot.
3. Insert the module card at 30 degrees into the socket until it is fully seated.



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 larger square piece on the bottom chassis cover (which once covered, will be placed over LTE/5G module card).

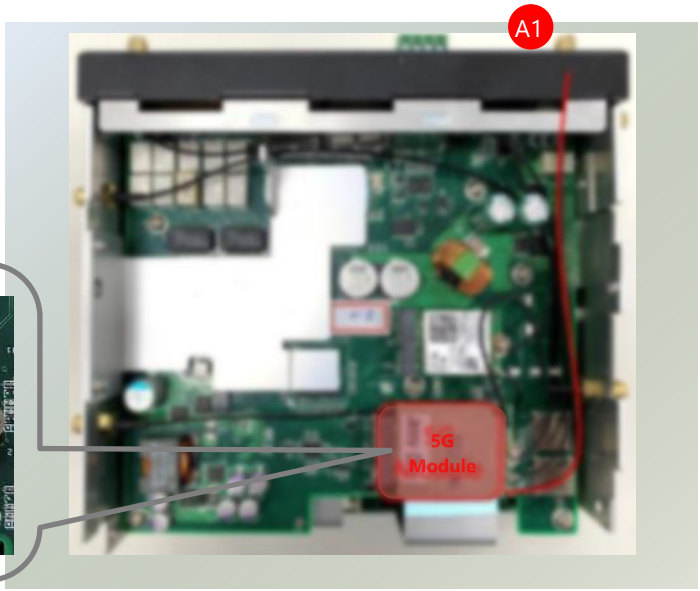


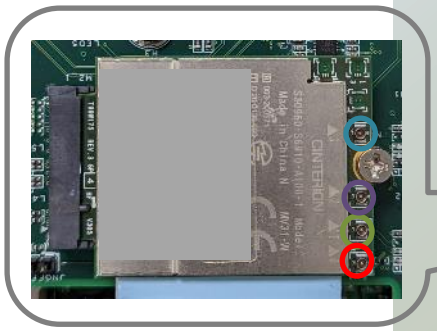
Installing 5G Antenna

Front Panel

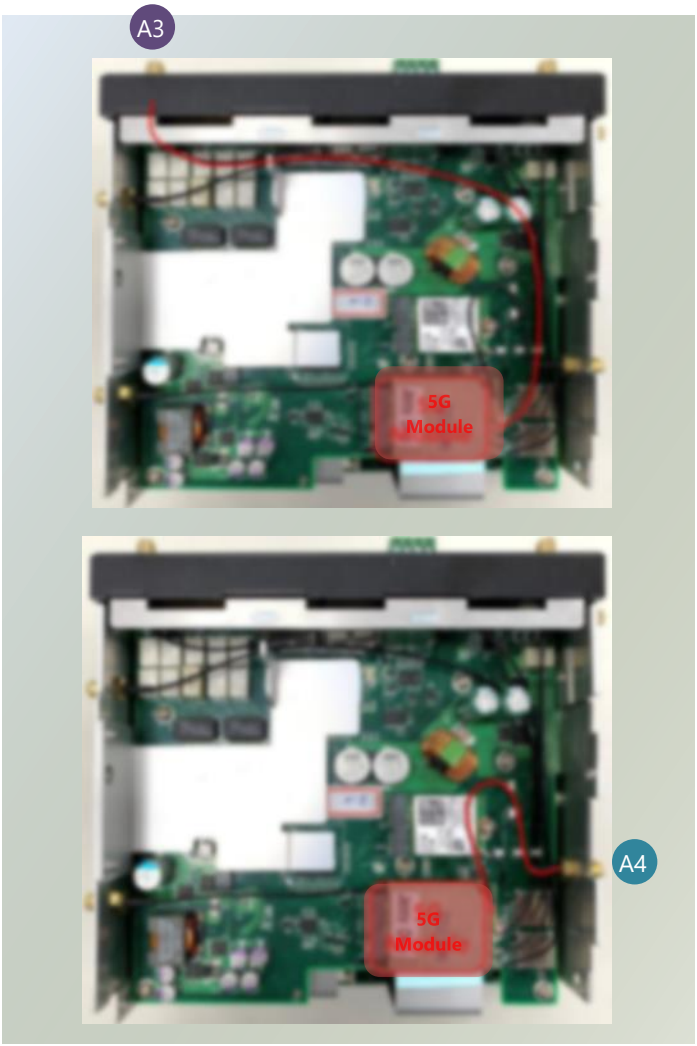
Top Panel

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

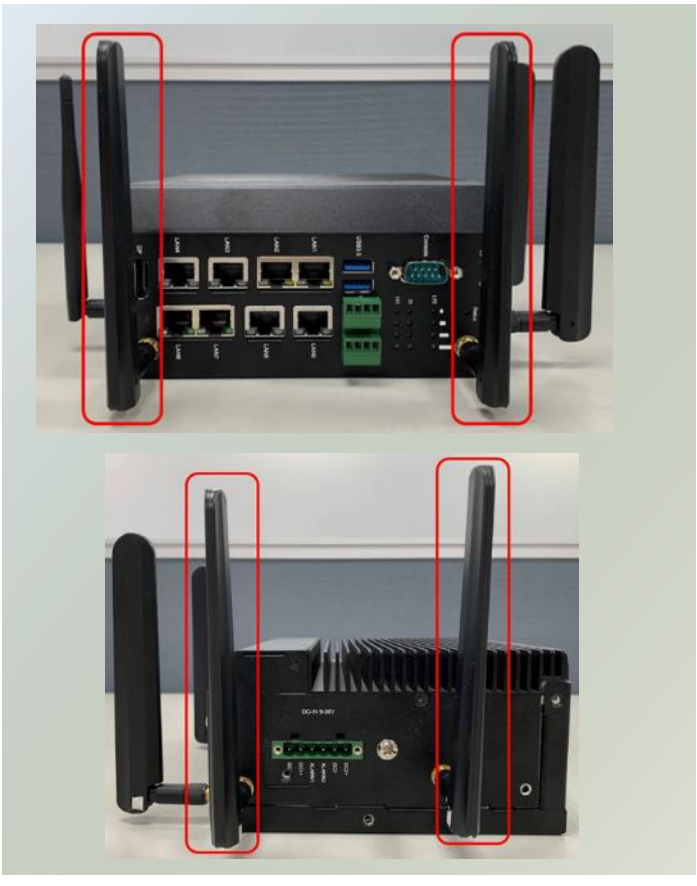




2. Connect the RF cables to the IPEX connectors on the 5G module card and screw the other end of the cables in the antenna holes.

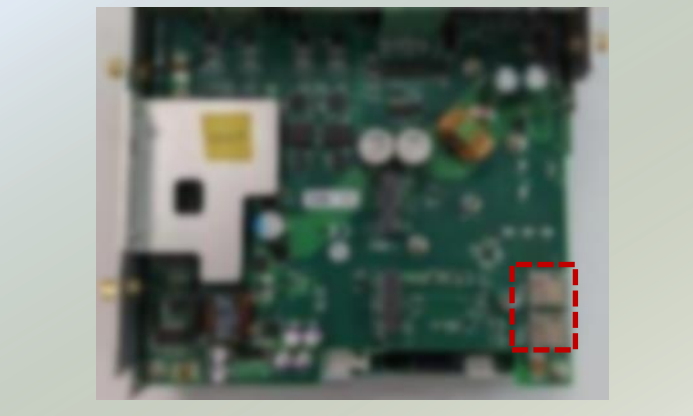


3. Then, screw on the four antennas to the system.

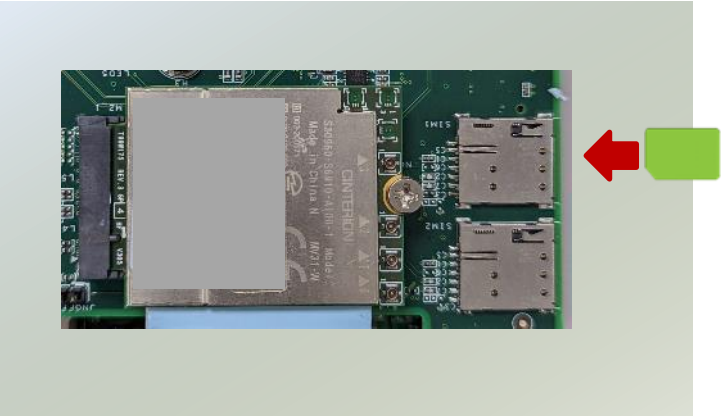


Installing SIM Cards

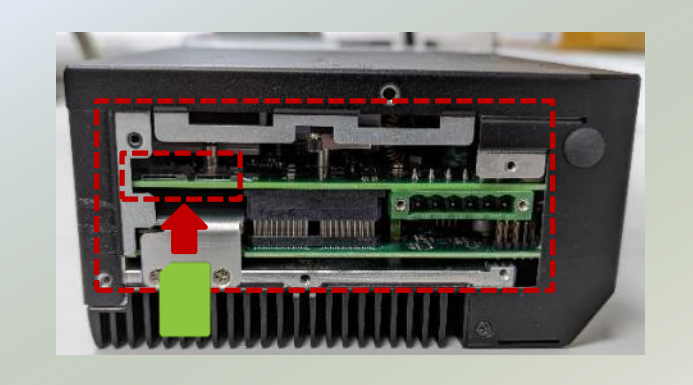
1. The dual-SIM card slot is located right next to the LTE/5G module card.



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.

Installing the SSD (Optional)

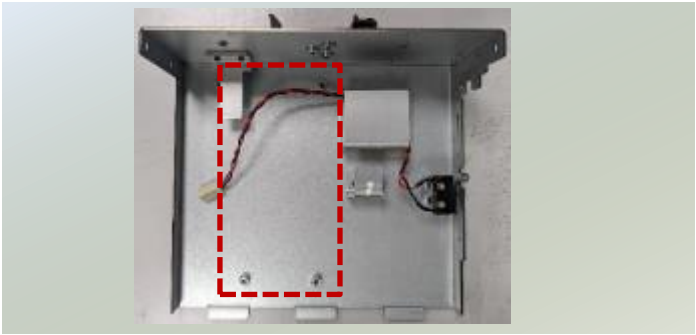
The system supports one 2.5" HDD/SSD slot (SSD preferred) drive bay. The following will discuss disk drive installation procedures.

Note: The system only supports LTE module and HDD/SSD expansion at the same time. The system does NOT support 5G module and HDD/SSD expansion at the same time, due to cable port accessibility.

1. The SSD kit includes:

- 1x 2.5" SSD
- 1x SATA Cables
- 1x SSD Bracket
- 1x Bracket Holder

2. Power off the system and open the bottom chassis cover. Locate where the SSD bracket will be placed on the bottom chassis cover.



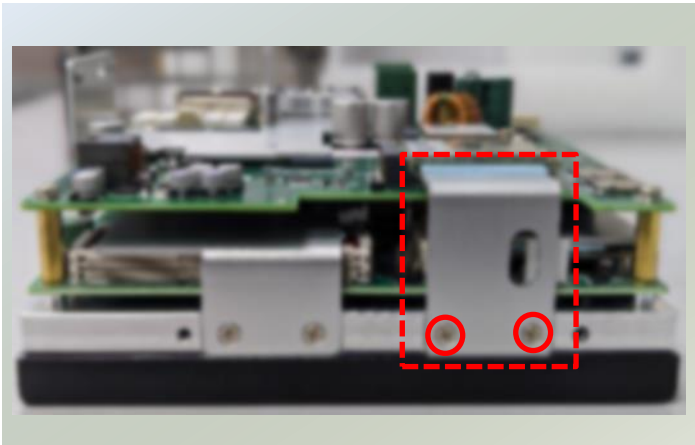
3. Place the 2.5" SSD on the bracket and secure with two (2) screws on each side.

4. Insert the SATA cables to the SATA contact on the disk.

5. Place the bracket holder on the bracket and secure with two (2) screws.

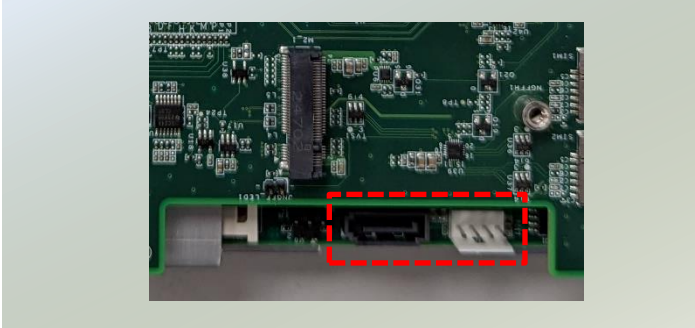
6. Place the bracket (with installed SSD) on the chassis cover, secure with four (4) screws.

7. Make sure the metal partition on the motherboard has been removed to provide access to SATA1 & SATAPWR1 port. Remove the metal partition by unscrewing the two (2) screws.



8. Insert the other end of the SATA data cable to SATA1 port on the motherboard and the end of the SATA power cable to SATAPWR1 port.

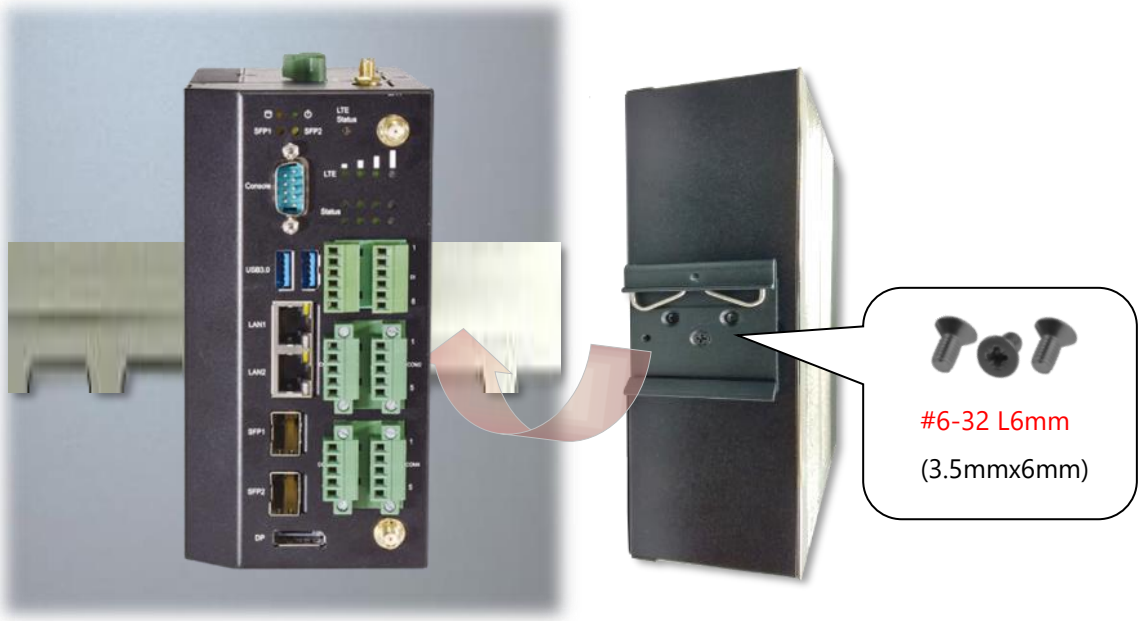
   Arrange the cables neatly to avoid them from getting tangled when closing the chassis cover.



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.

CHAPTER 3: BIOS SETUP

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

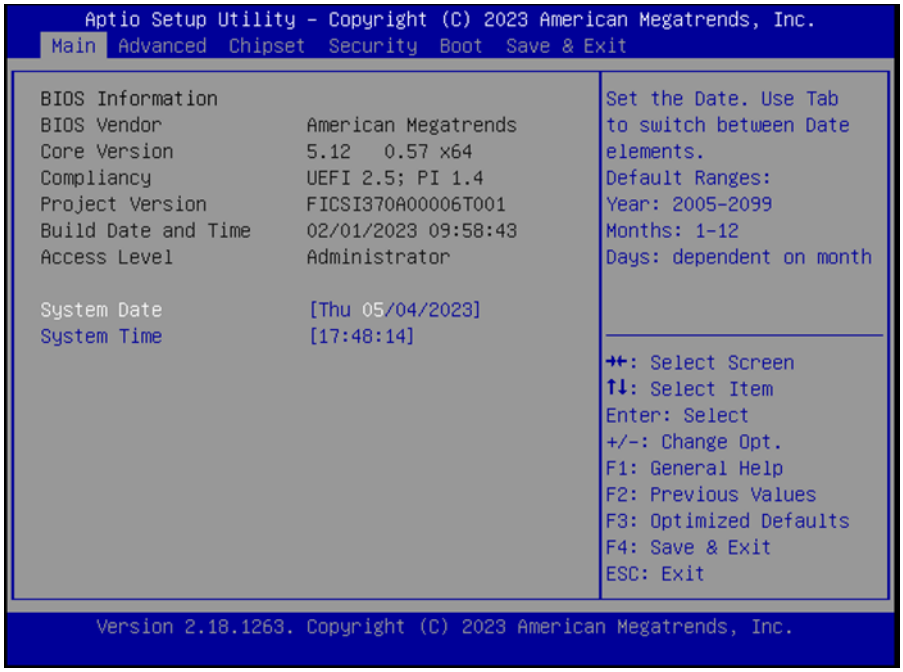
1. Boot up the system.
2. Pressing the **<Tab>** or **<Del>** key immediately allows you to enter the Setup utility, then you will be directed to the BIOS main screen. The instructions for BIOS navigations are as below:

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

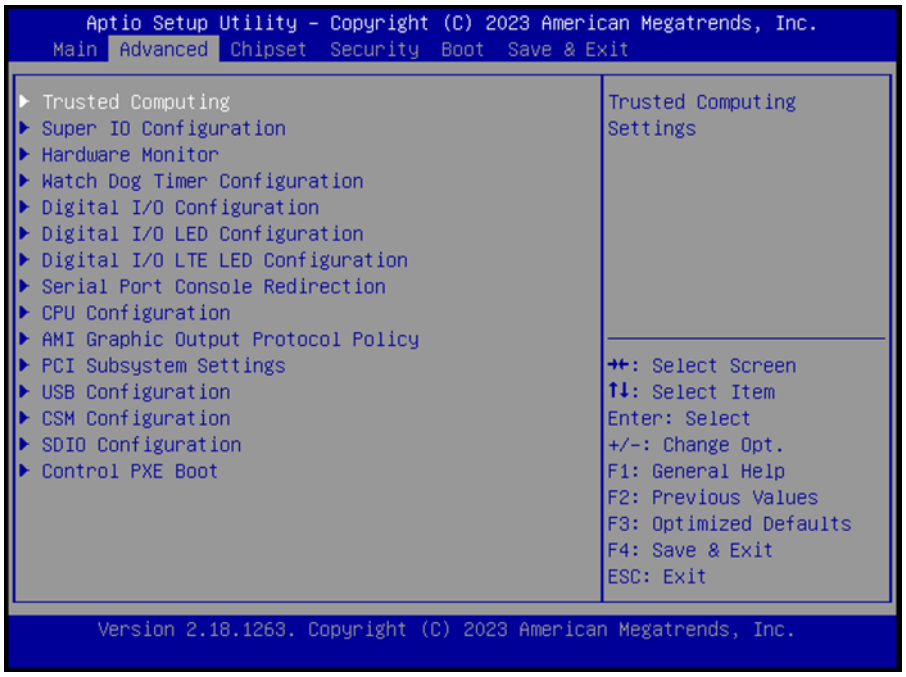
Setup main page contains BIOS information and project version information.



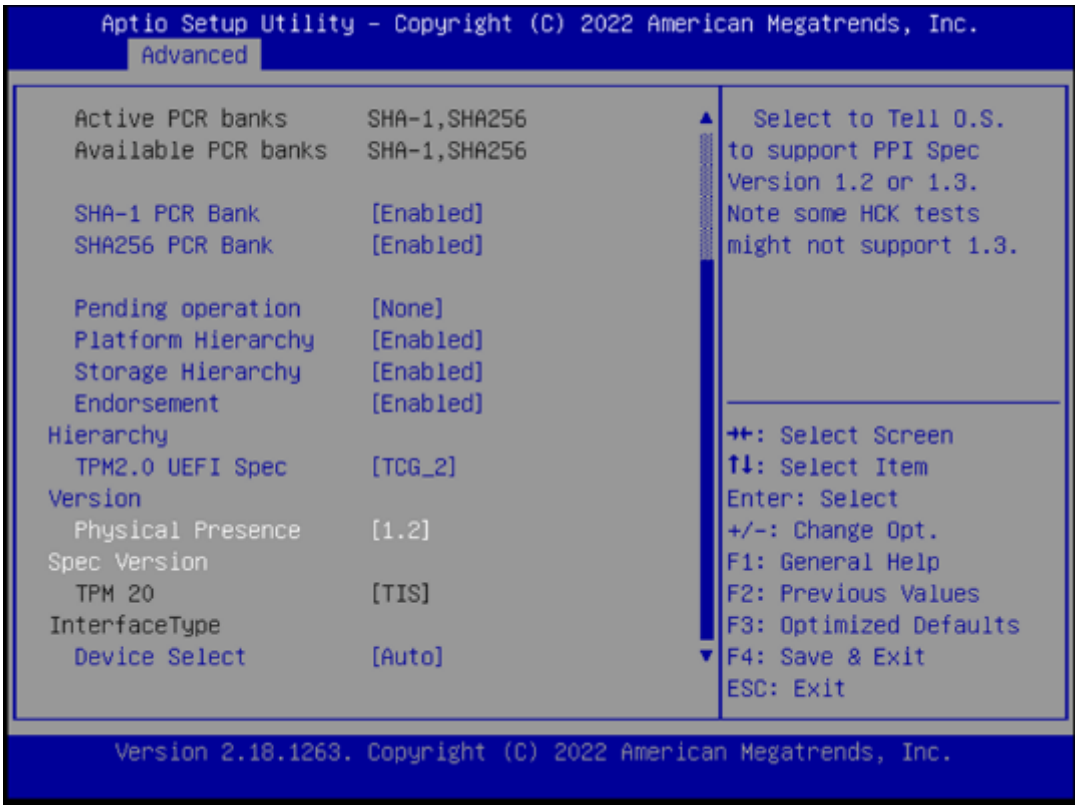
Item	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User
System Date	To set the Date, use **<Tab>** to switch between Date elements. Default range of Year: 2005-2099 Default range of Month: 1-12 Days: dependent on Month.
System Time	To set the Date, use **<Tab>** to switch between Date 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.

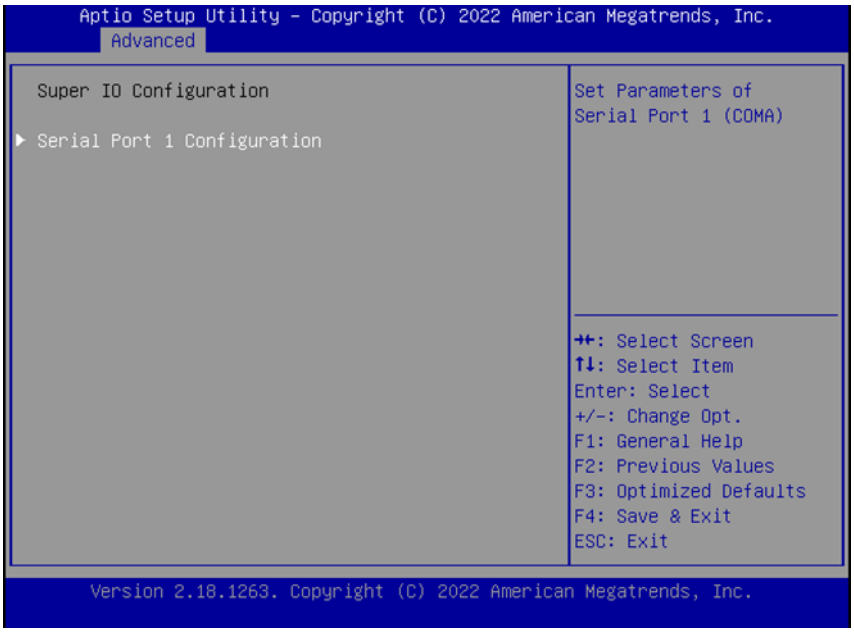


Trusted Computing (TPM 2.0)

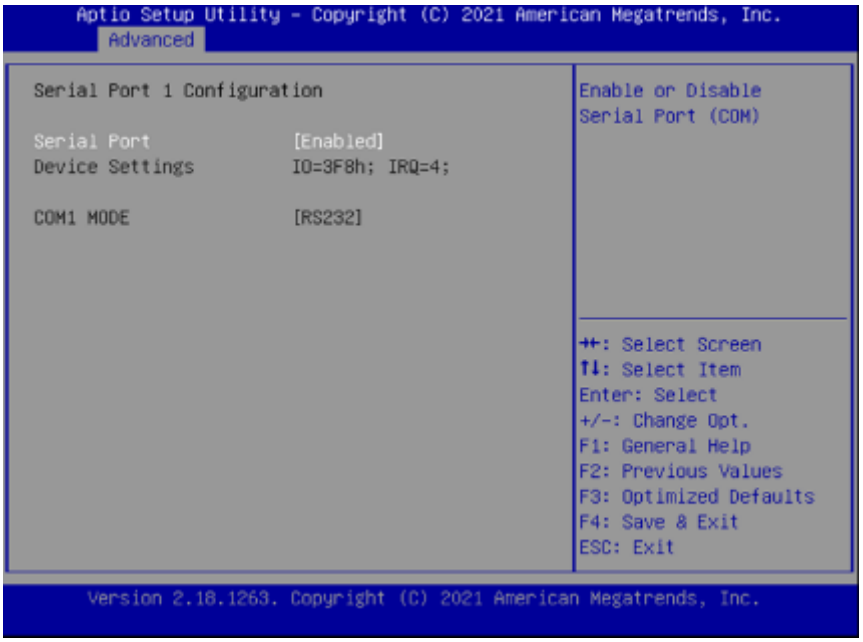


Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA-1 PCR Bank	Enabled Disabled	Enables or disables SHA-1 PCR Bank.
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 Interface Type	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.

Super IO Configuration

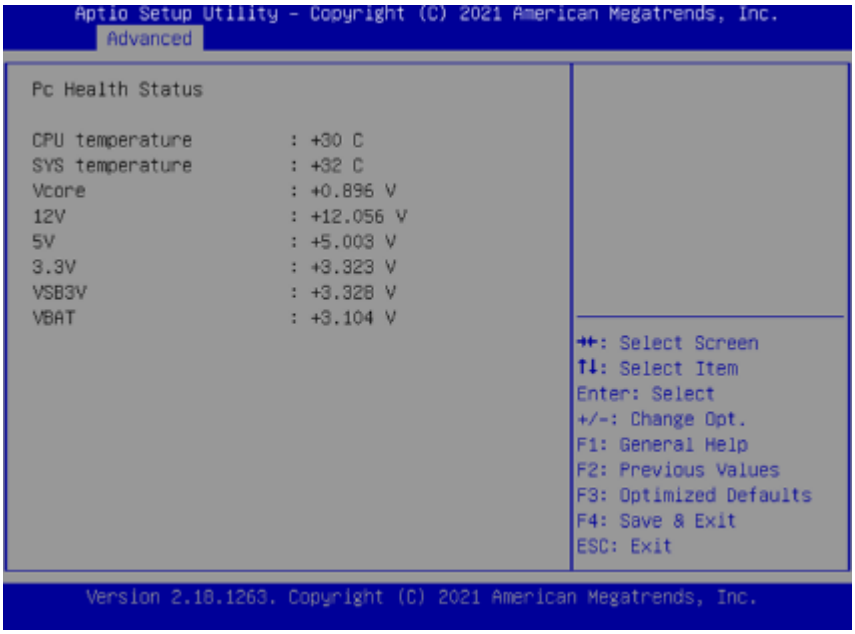


Serial Port1 Configuration



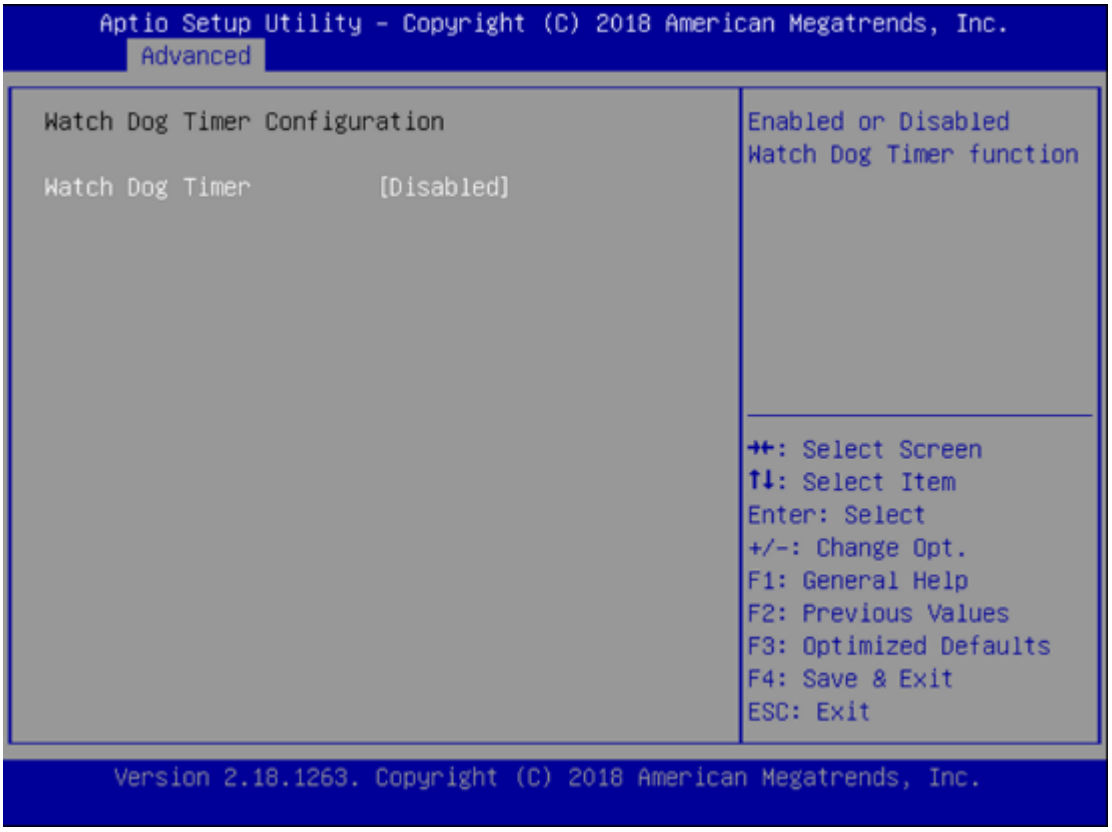
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 1.
Device Settings	NA	IO=3F8h; IRQ = 4
COM1 MODE	RS232	Select Com Mode as RS232

Hardware Monitor



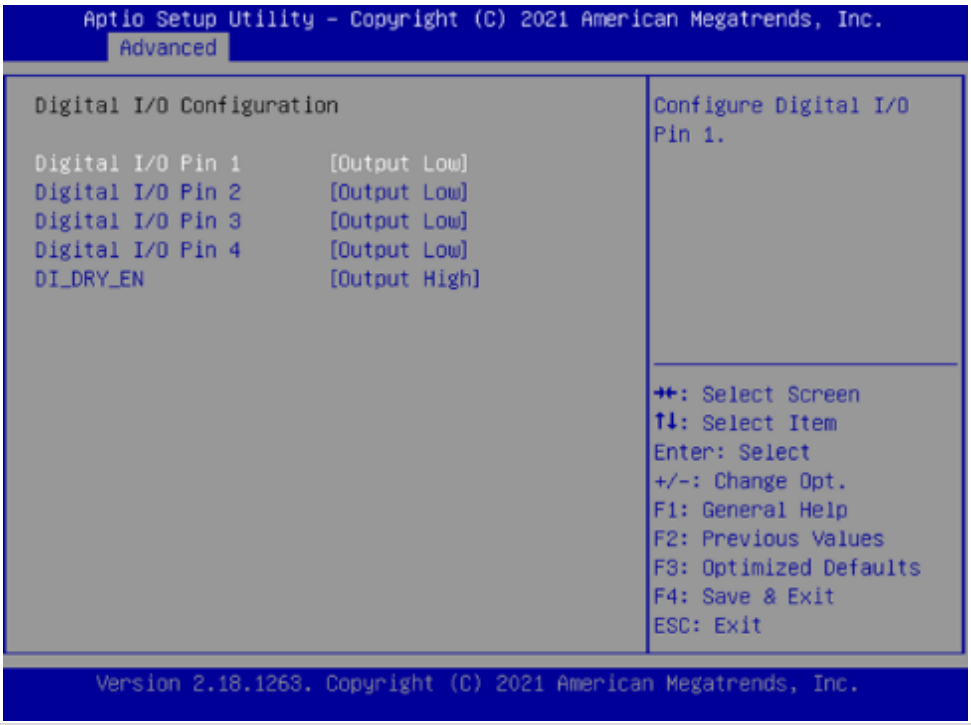
Item	Description
CPU Temp	This value reports the CPU temperature.
SYS Temp	This value reports the System temperature.
VCORE	This value reports the CPU VCORE.
12V	This value reports the 12V Input voltage
5V	This value reports the 5V Input voltage.
3.3V	This value reports the 3.3V Input voltage.
VSB3V	This value reports the VSB3V Input voltage.
VBAT	This value reports the VBAT Input voltage.

Watch Dog Timer Configuration



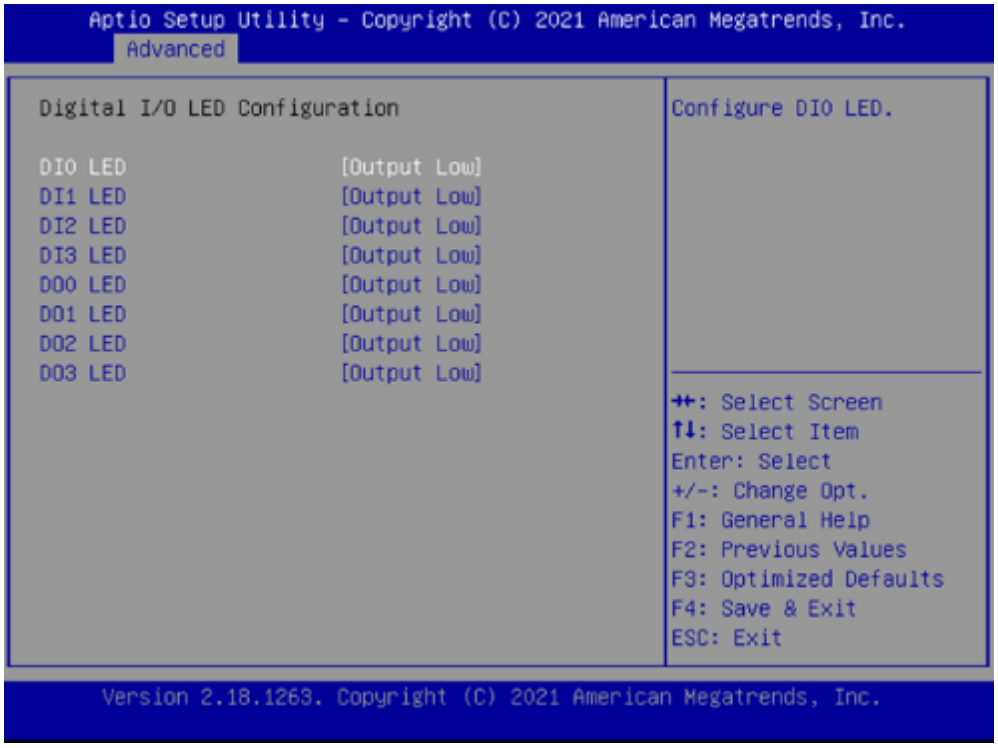
Feature	Options	Description
Watch Dog Timer	Enabled Disabled	Enable or Disable Watch Dog function

Digital I/O Configuration



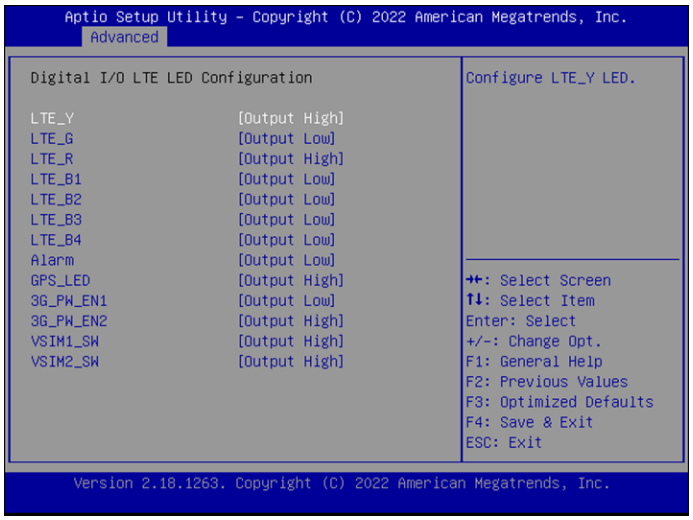
Feature	Options	Description
Digital I/O Pin 1	Output High Output Low	Configure Digital I/O Pin High or Low
Digital I/O Pin 2	Output High Output Low	Configure Digital I/O Pin High or Low
Digital I/O Pin 3	Output High Output Low	Configure Digital I/O Pin High or Low
Digital I/O Pin 4	Output High Output Low	Configure Digital I/O Pin High or Low
DI_DRY_EN	Output High Output Low	Configure Digital I/O Pin High or Low

Digital I/O LED Configuration



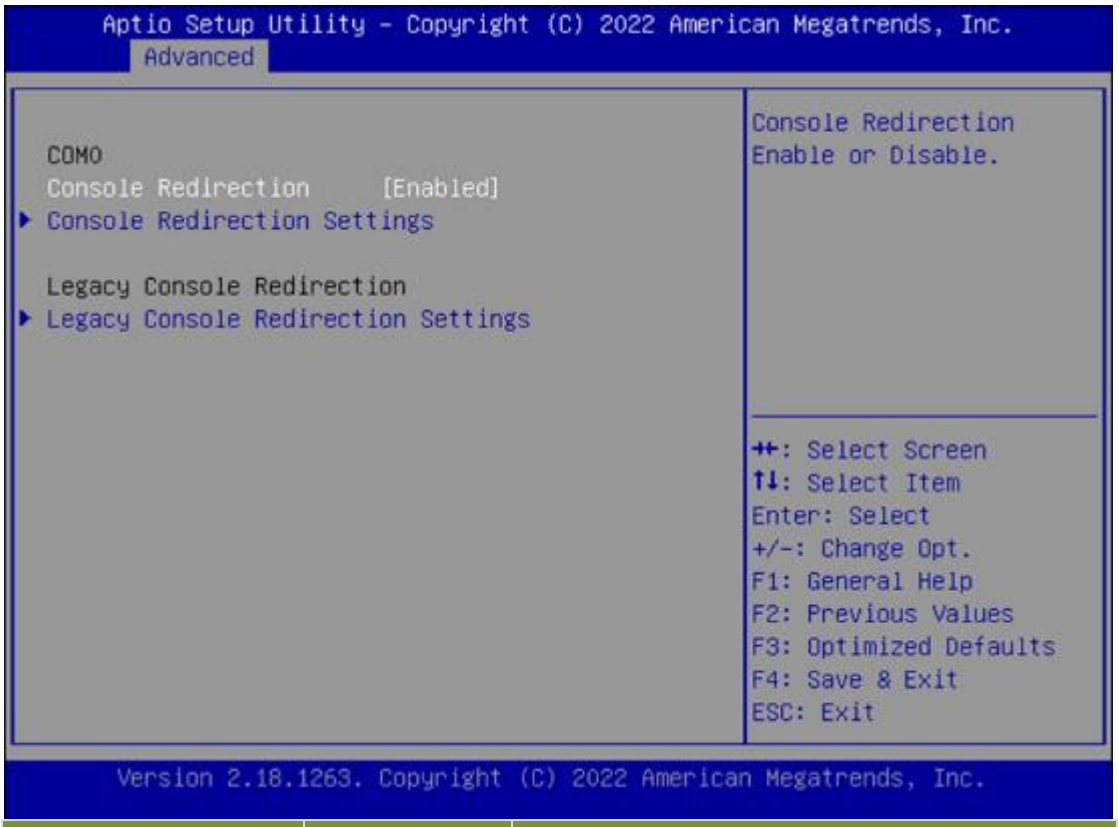
Feature	Options	Description
DI0 LED	Output High Output Low	Configure DIO LED High or Low
DI1 LED	Output High Output Low	Configure DIO LED High or Low
DI2 LED	Output High Output Low	Configure DIO LED High or Low
DI3 LED	Output High Output Low	Configure DIO LED High or Low
DO0 LED	Output High Output Low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

Digital I/O LTE LED Configuration



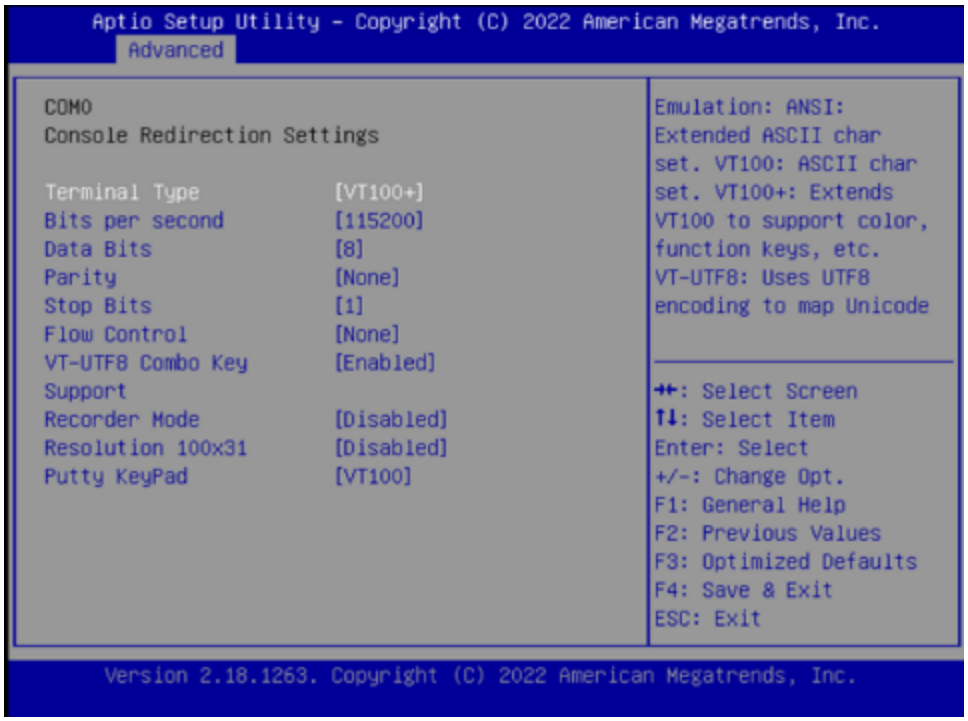
Feature	Options	Description
LTE_Y	Output High Output Low	Configure LTE_Y LED High or Low
LTE_G	Output High Output Low	Configure LTE_G LED High or Low
LTE_R	Output High Output Low	Configure LTE_R LED High or Low
LTE_B1	Output High Output Low	Configure LTE_B1 LED High or Low
LTE_B2	Output High Output Low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

Serial Port Console Redirection



Feature	Options	Description
COM0 Console Redirection	Enabled Disabled	Enables or disables Console Redirection

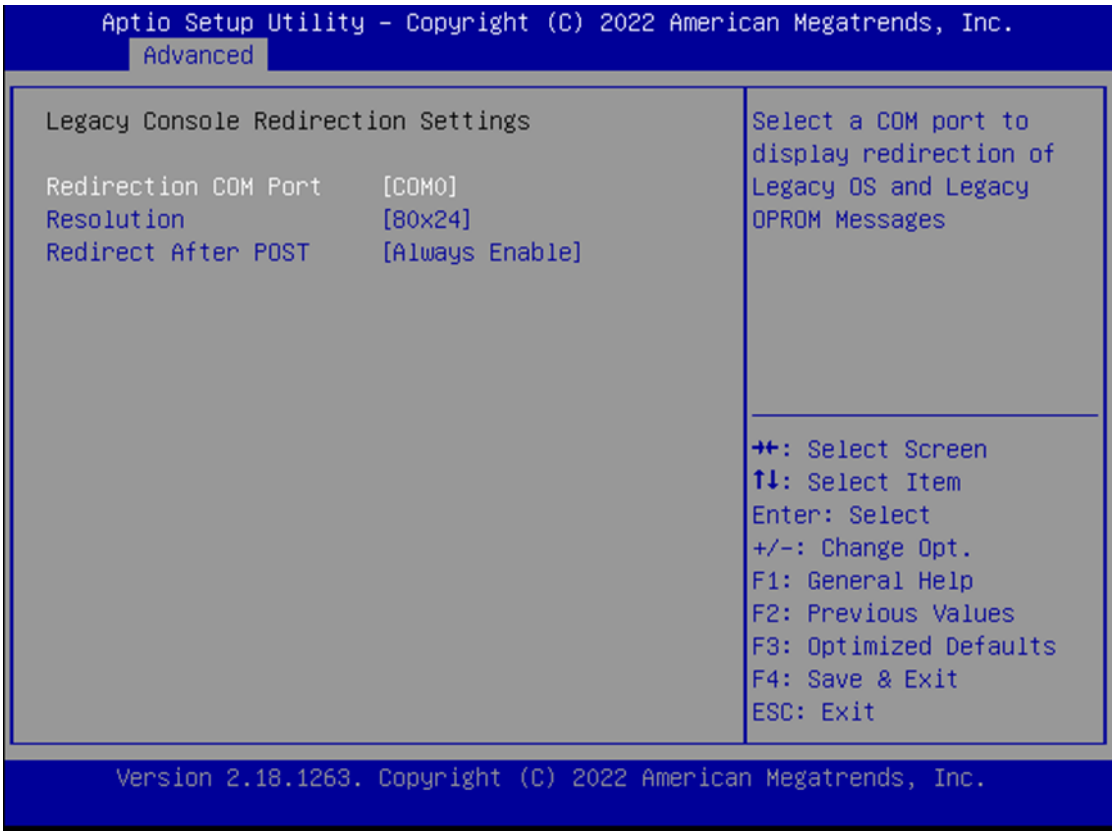
Console Redirection Settings



Feature	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	ANSI: Extended ASCII char set. 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.
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 indicate the end of a serial data packet.
Flow Control	None Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow.

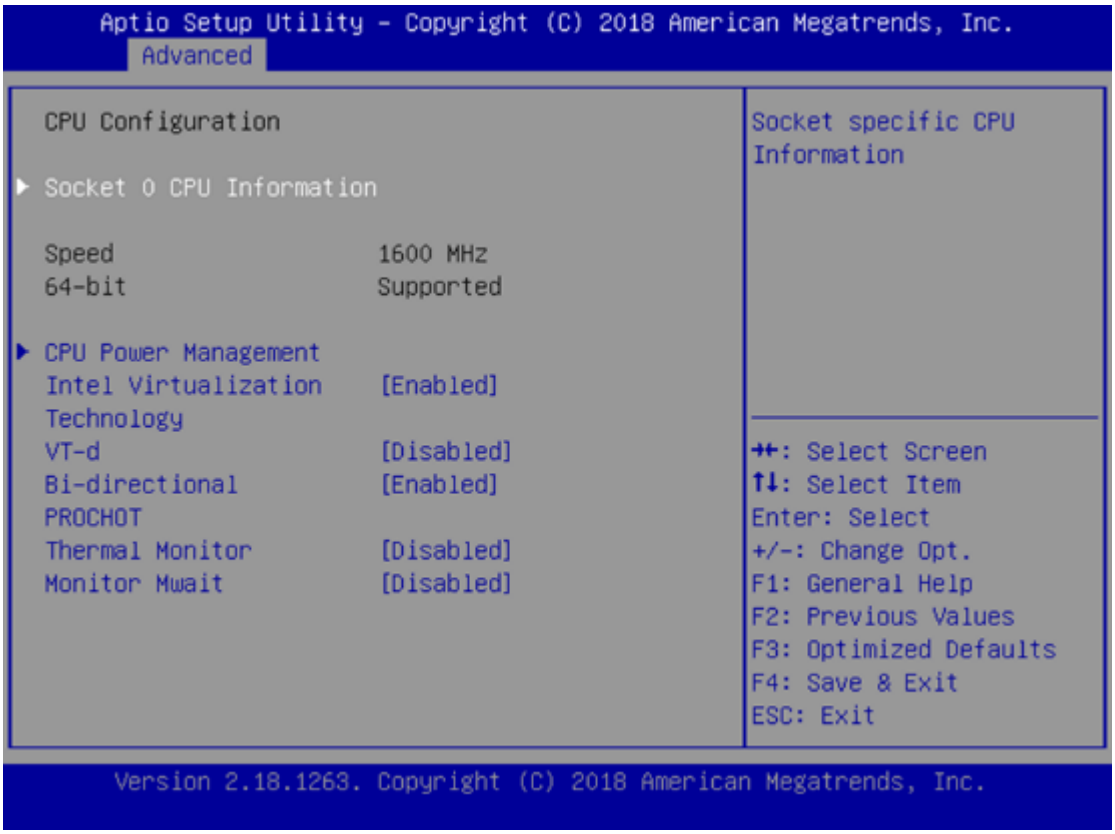
VT-UTF8 Combo Key Support	Disabled Enabled	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution.
Putty KeyPad	VT100 Intel Linux XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.

Legacy Console Redirection Setting



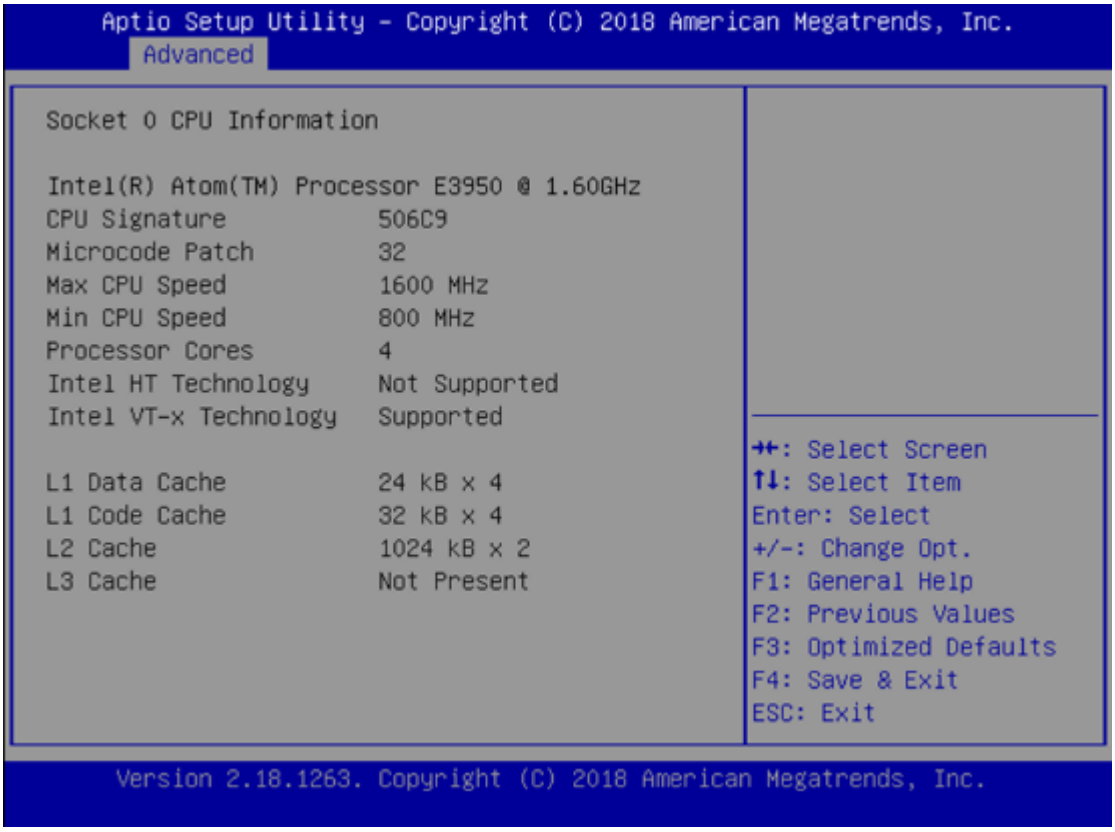
Feature	Options	Description
Redirection COM Port	COM0	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages
Resolution	80x24 80x25	On Legacy OS, the Number of Rows and Columns supported redirection
Redirection After BIOS POST	Always Enable BootLoader	When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

CPU Configuration

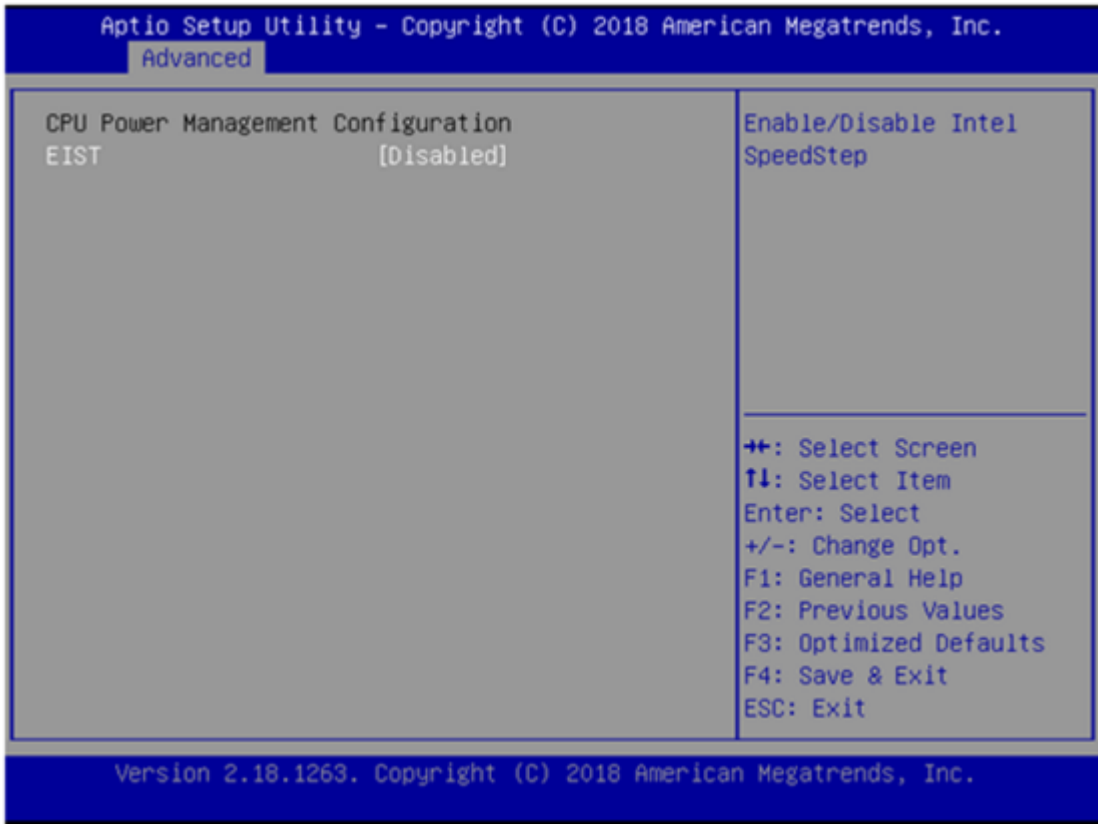


Feature	Options	Description
Intel Virtualization Technology	Disabled Enabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology
VT-d	Disabled Enabled	Enable/Disable CPU VT-d
Bi-directional PROCHOT	Disabled Enabled	When a processor thermal sensor trips (either core), the PROCHOT# will be driven. If bi-direction is enabled, external agents can drive PROCHOT# to throttle the processor.
Thermal Monitor	Disabled Enabled	Enable/Disable Thermal Monitor
Monitor Mwait	Disabled Enabled	Enable/Disable Monitor Mwait

Socket 0 CPU Information

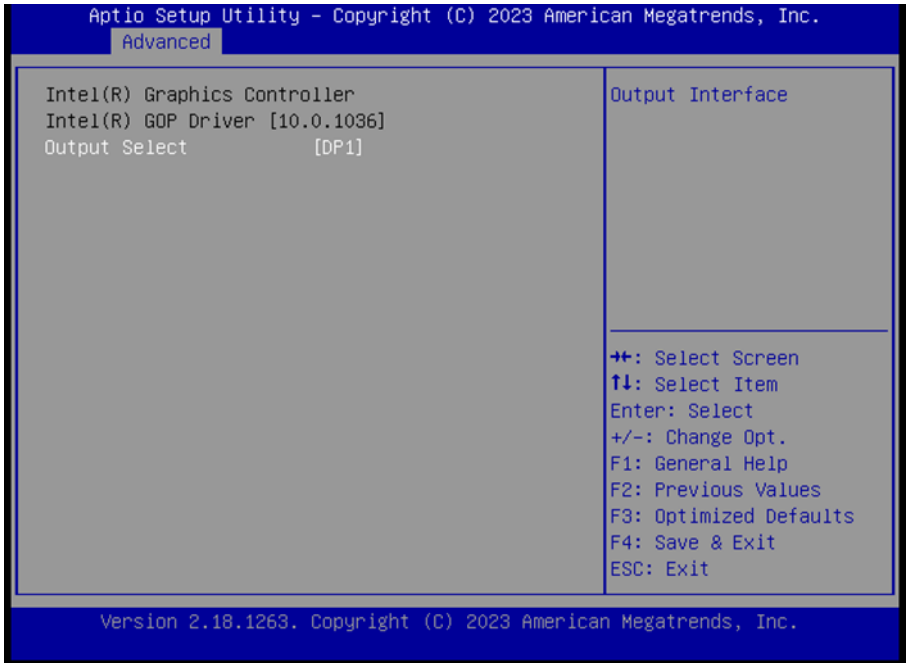


CPU Power Management



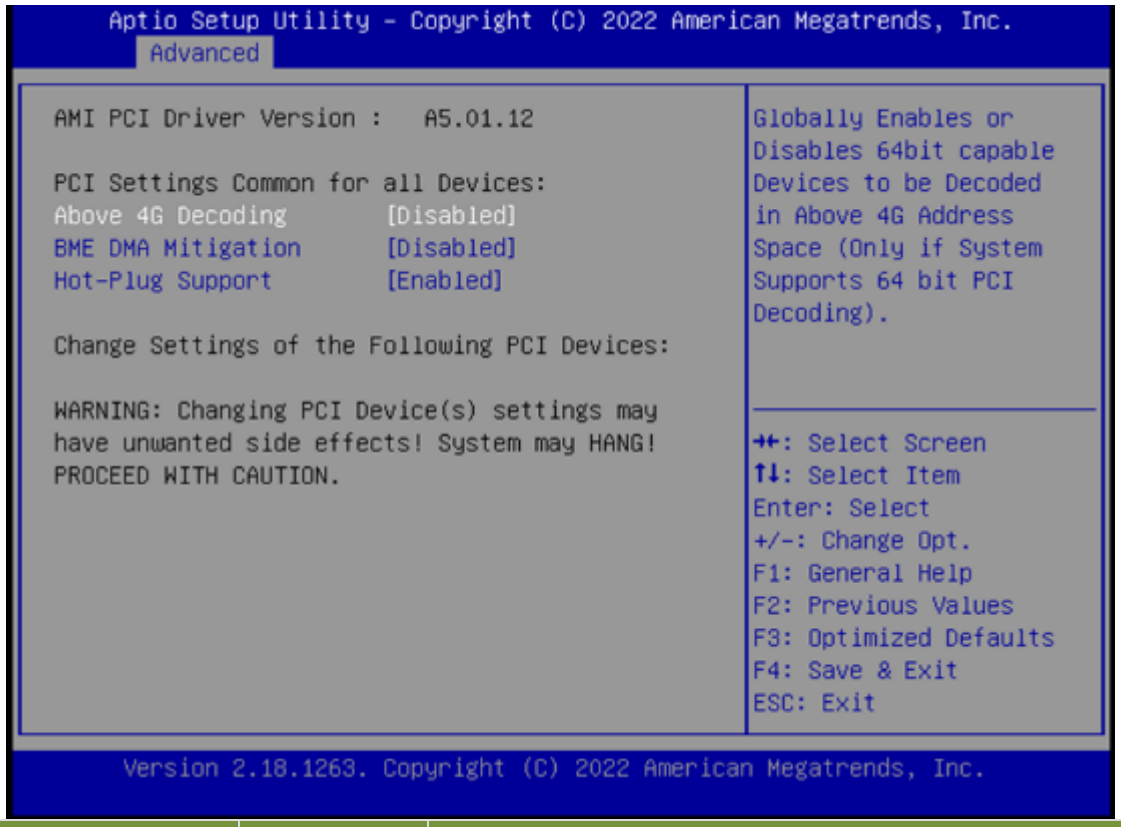
Feature	Options	Description
EIST	Disabled Enabled	Enable/Disable Intel SpeedStep

AMI Graphic Output Protocol Policy



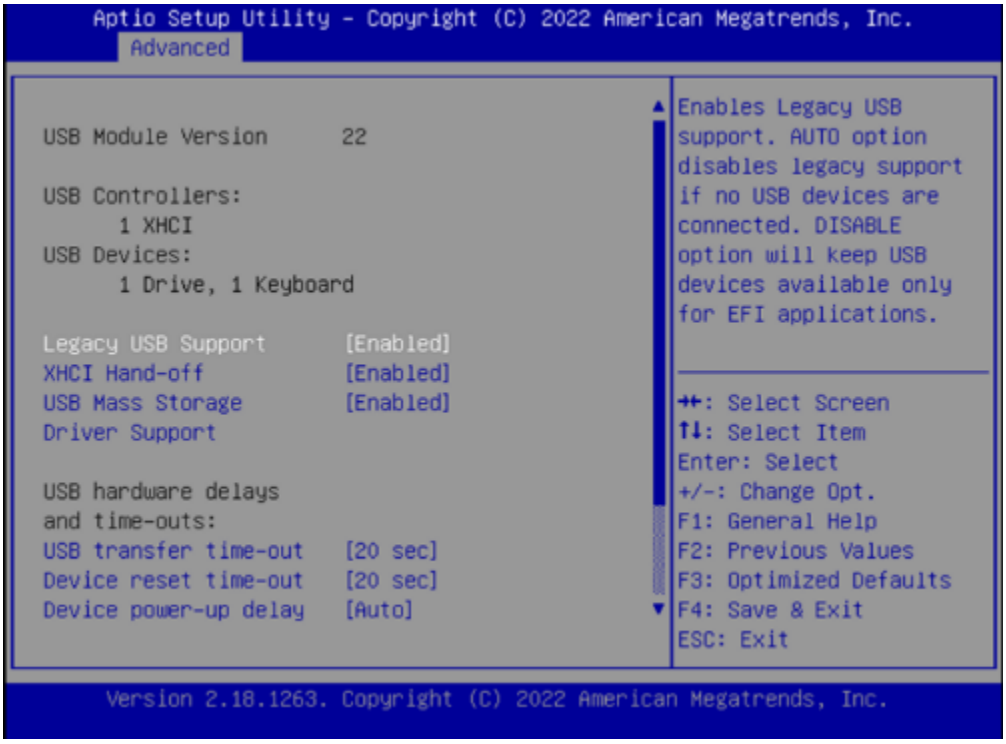
Feature	Options	Description
Output Select	DP1	Output Interface (detected)

PCI Subsystem Settings



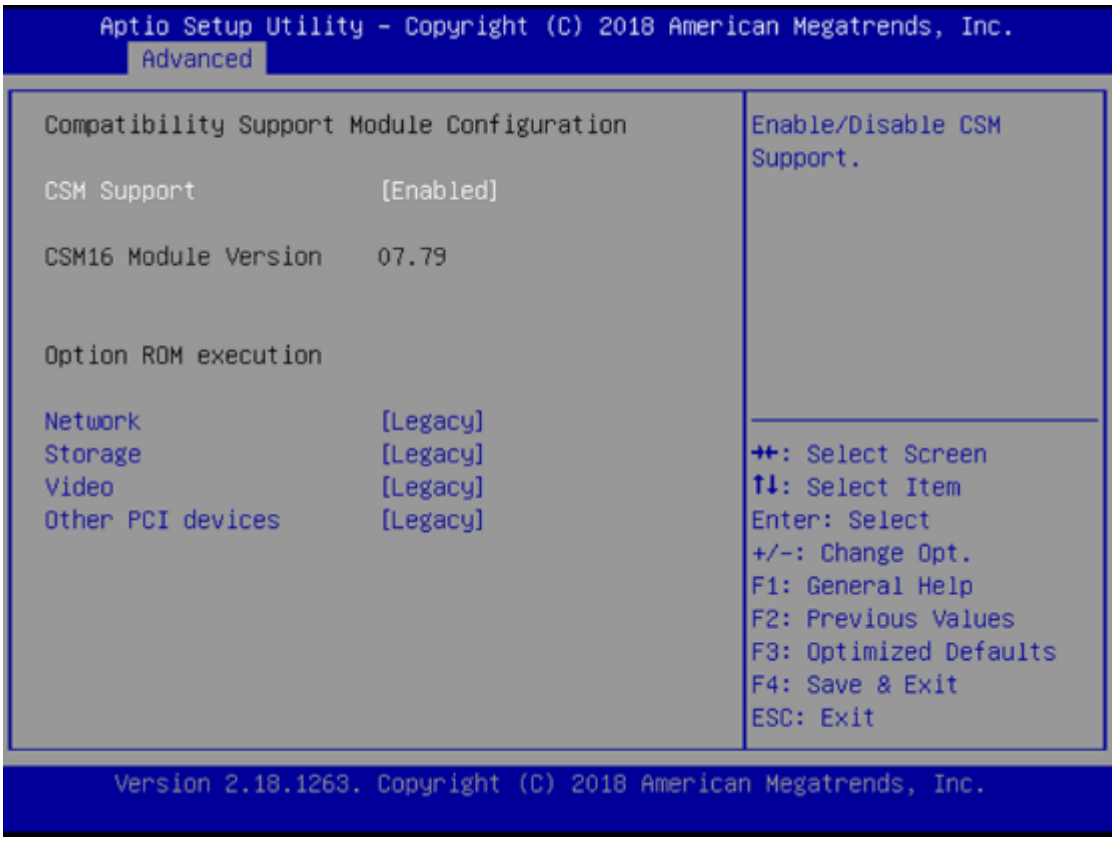
Feature	Options	Description
Above 4G Decoding	Disabled Enabled	Globally Enables or Disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding).
BME DMA Mitigation	Disabled Enabled	Re-enable Bus Master Attribute disabled during Pci enumeration for PCI Bridges after SMM Locked
Hot-Plug Support	Enabled Disabled	Globally Enables or Disables Hot-Plug support for the entire System. If System has Hot-Plug capable Slots and this option set to Enabled, it provides a Setup screen for selecting PCI resource padding for Hot-Plug.

USB Configuration



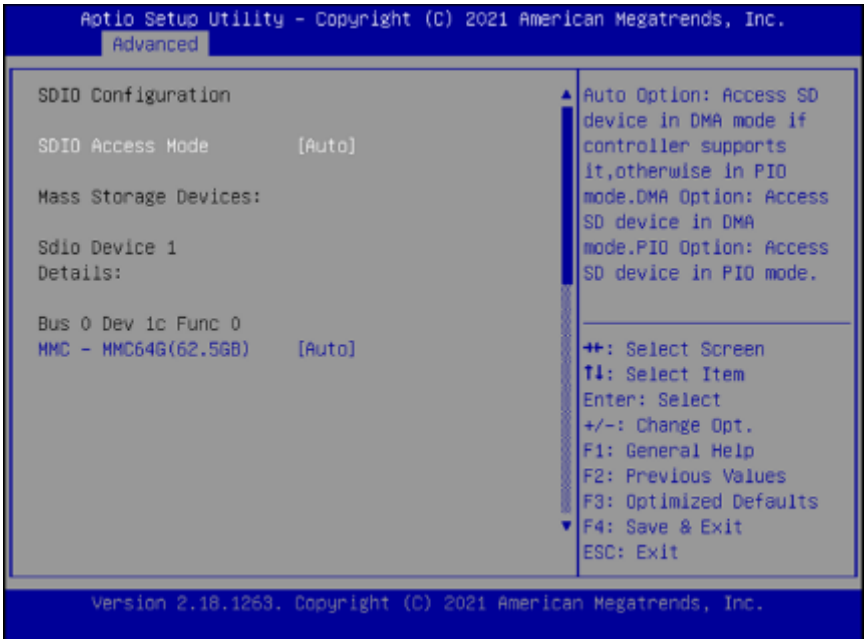
Feature	Options	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. **Auto** option disables legacy support if no USB devices are connected; **Disabled** option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enabled Disabled	Enables or disables 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	1 sec 5 sec 10 sec 20 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.

CSM Configuration

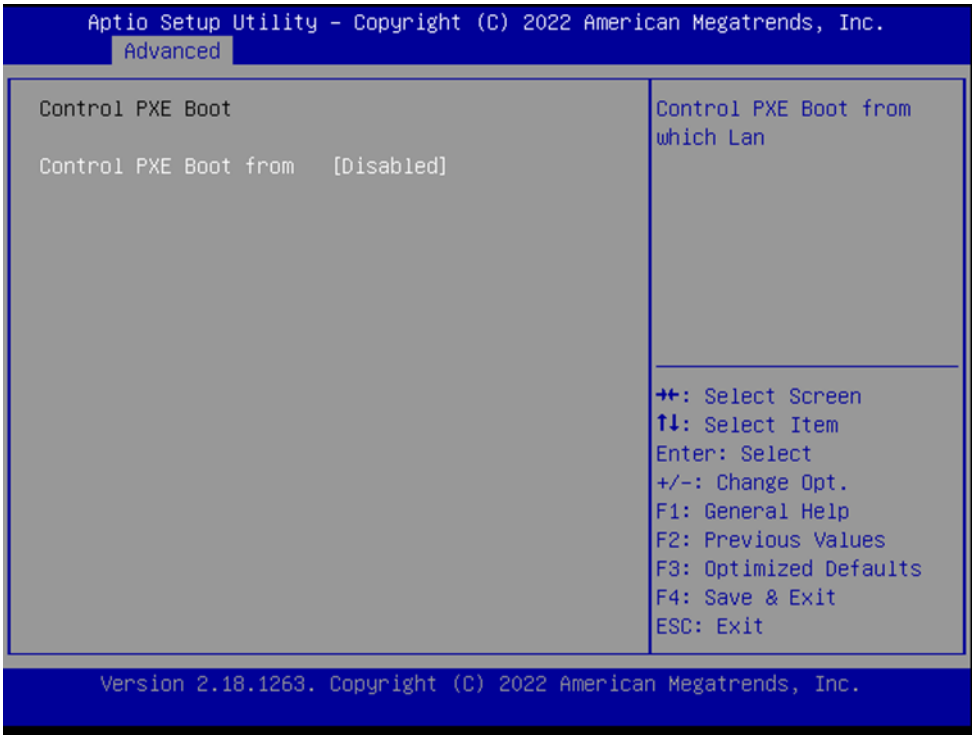


Feature	Options	Description
CSM Support	Disabled Enabled	Enables or disables CSM Support
Network	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM
Storage	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy Storage OpROM
Video	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy Video OpROM
Other PCI device	Do Not Launch UEFI Legacy	Determines OpROM execution policy for devices other than Network, Storage, or Video

SDIO Configuration



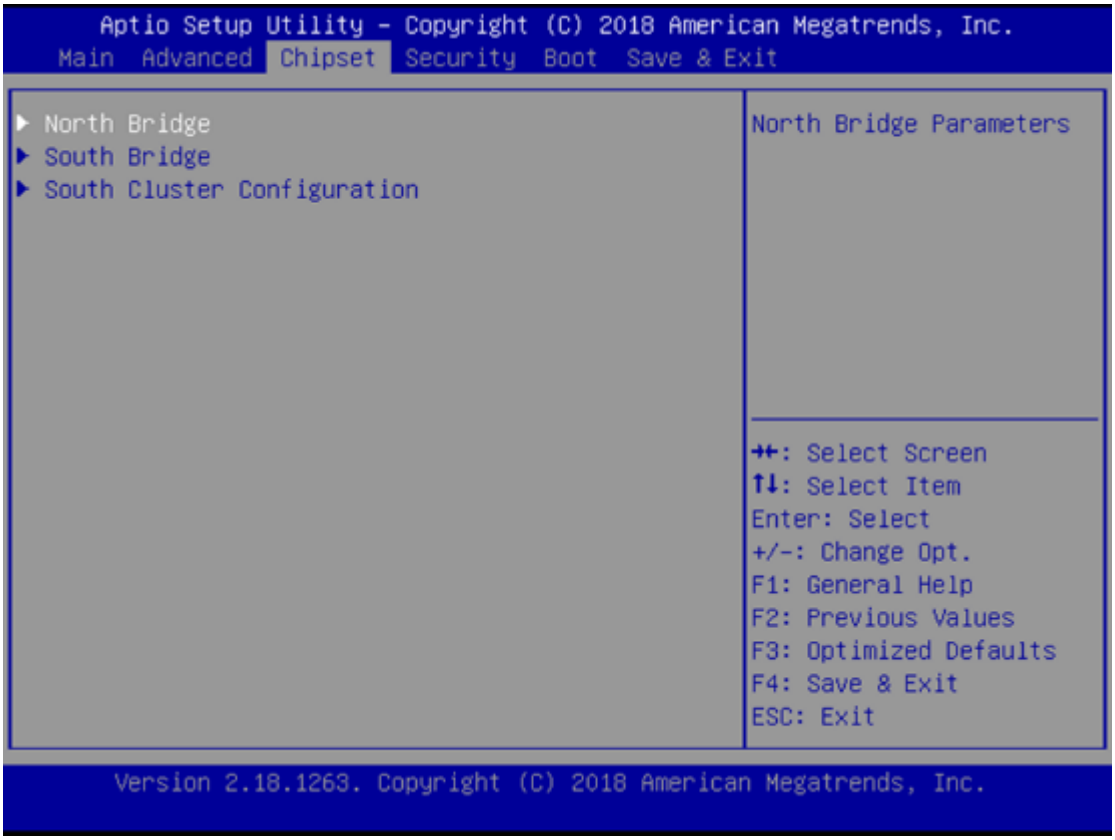
Control PXE Boot



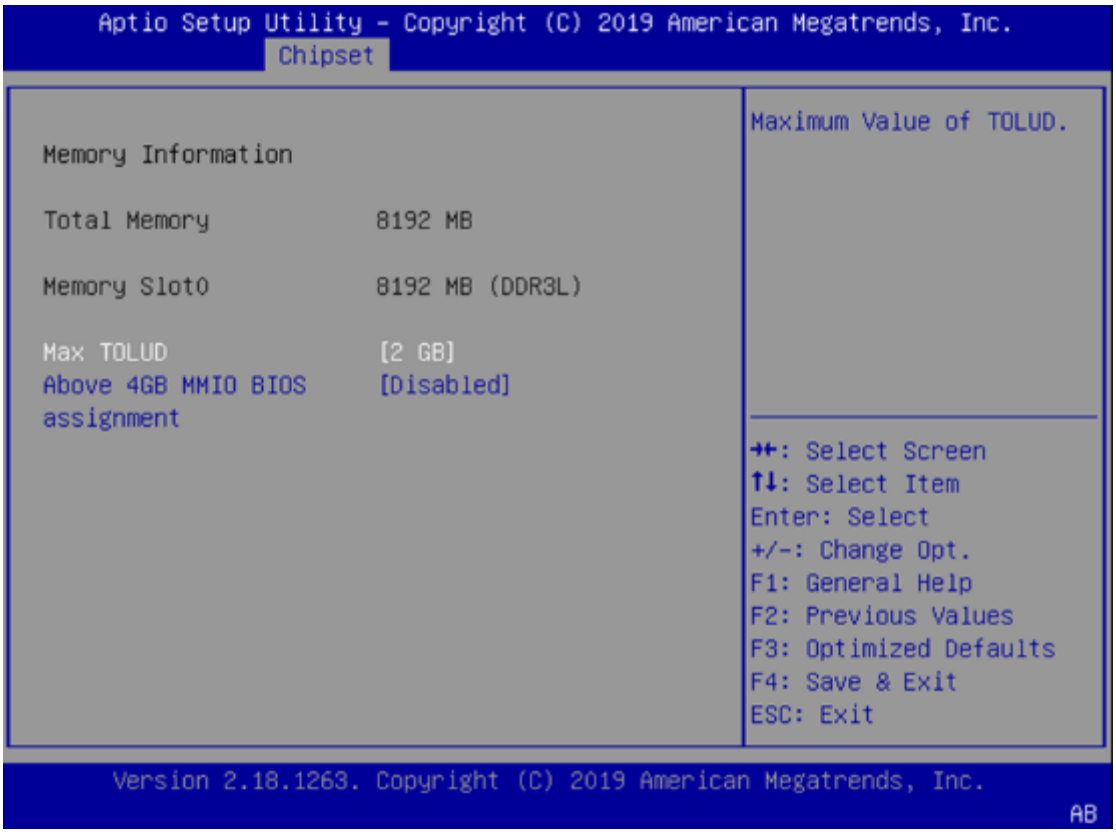
Feature	Options	Description
Control Legacy PXE Boot from	Disabled LAN1 LAN2	Control Legacy PXE Boot from which Lan

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.

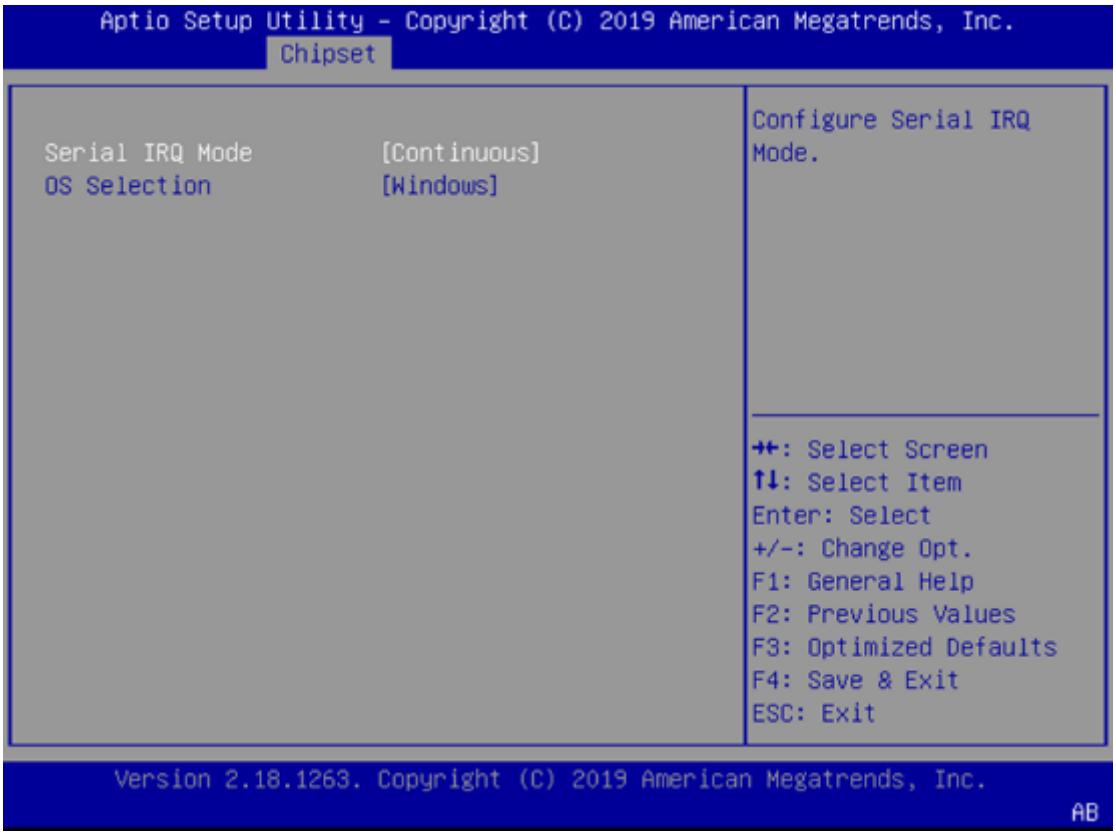


North Bridge



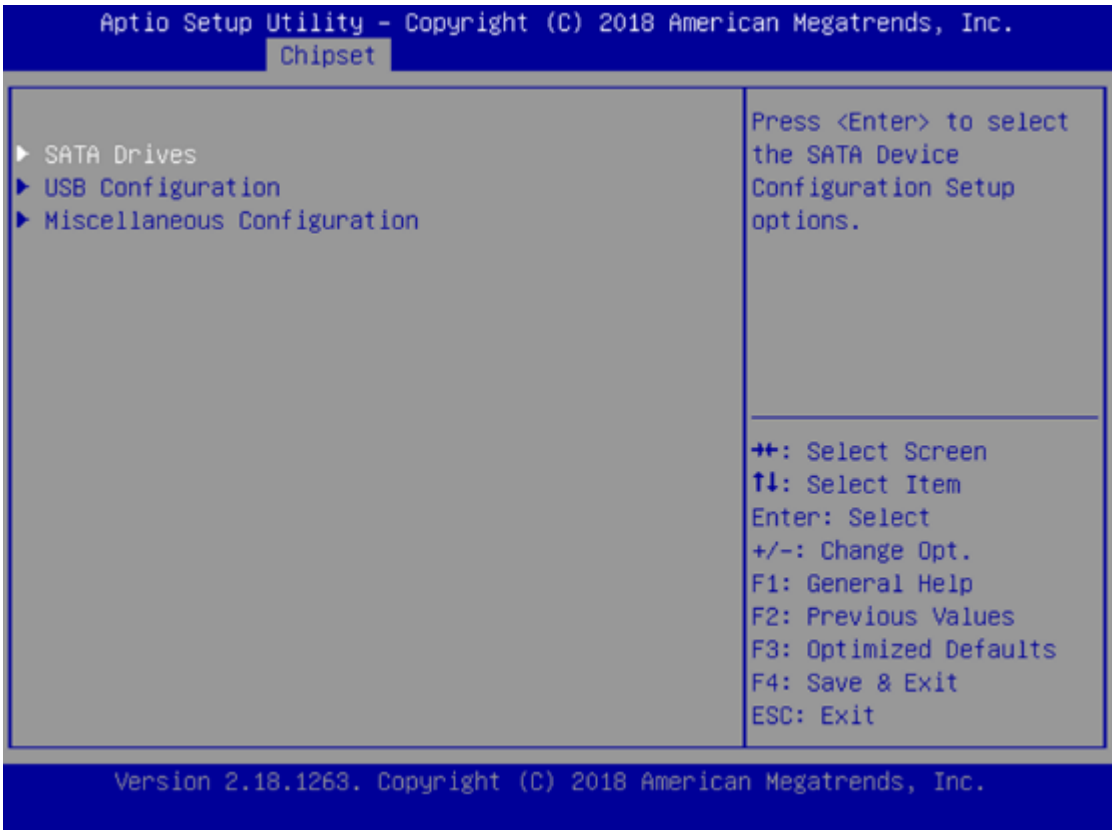
Feature	Options	Description
Max TOLUD	2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB	Maximum Value of TOLUD.
Above 4GB MMIO BIOS assignment	Enabled Disabled	Enable/Disable above 4GB MemoryMappedIO BIOS assignment This is disabled automatically when Aperture Size is set to 2048MB

South Bridge

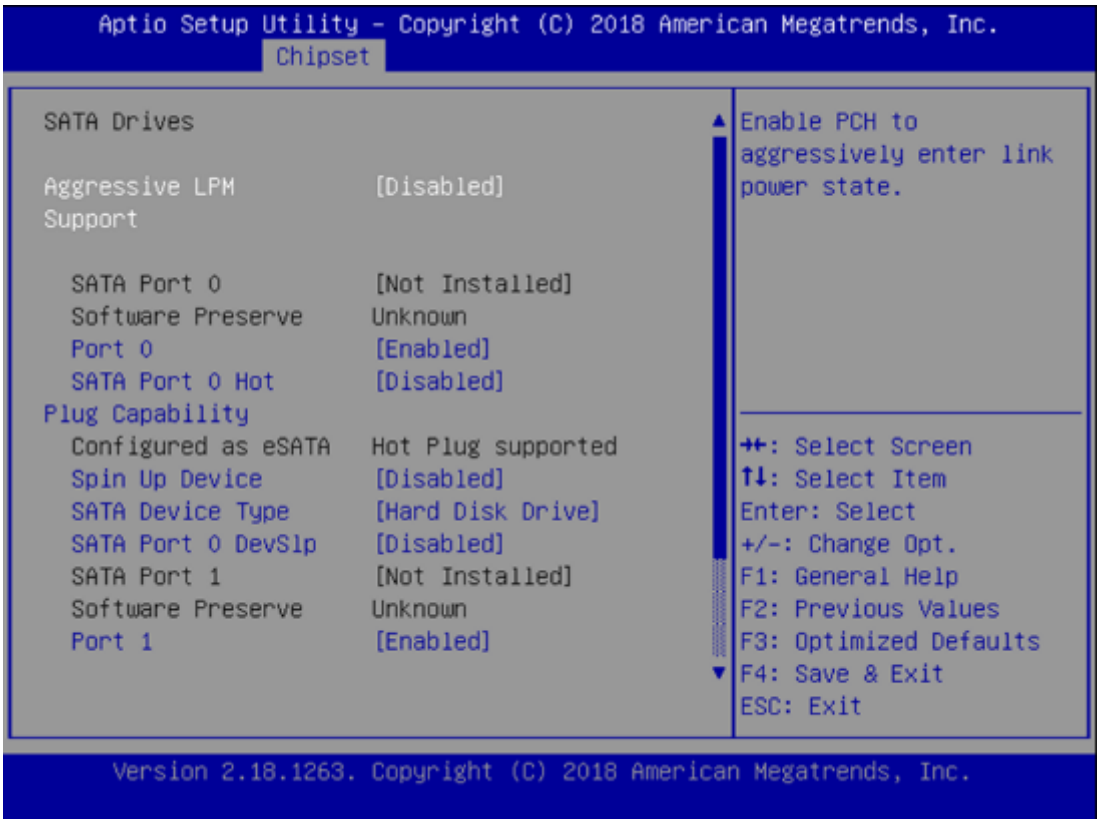


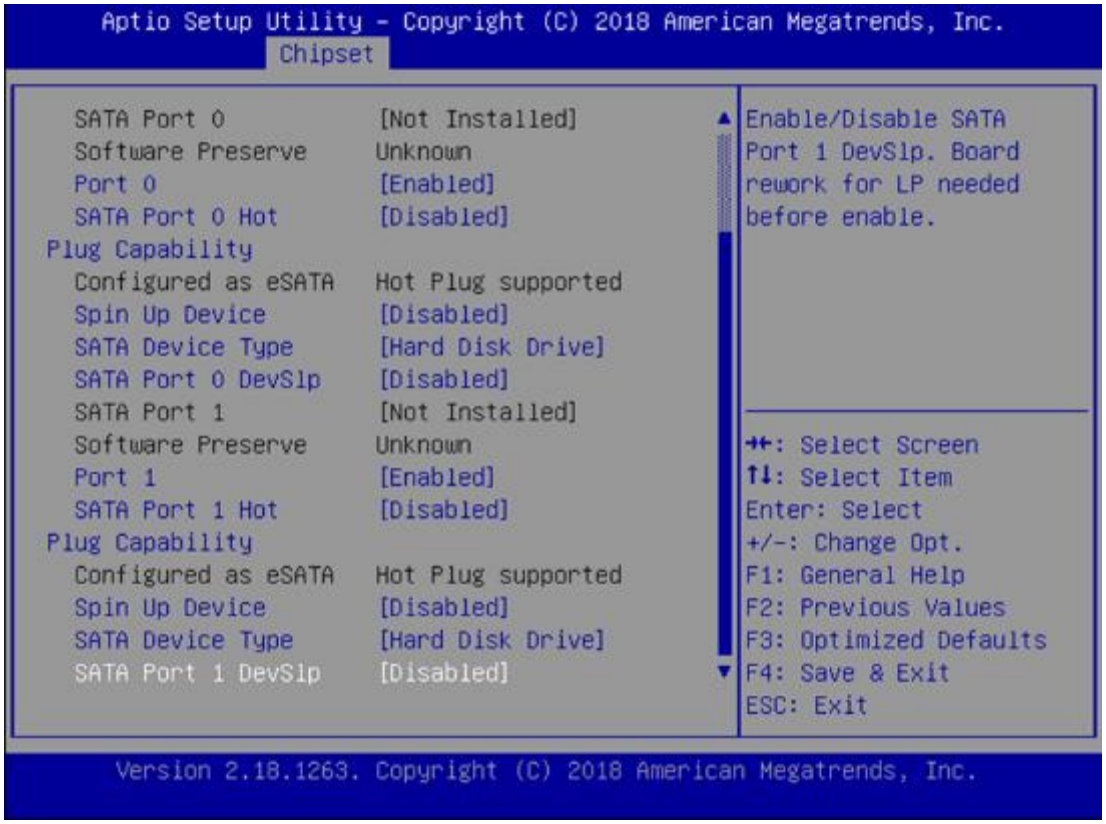
Feature	Options	Description
Serial IRQ Mode	Quiet Continuous	Configure Serial IRQ Mode.
OS Selection	Windows Android Win7 Intel Linux	Select the target OS

South Cluster Configuration



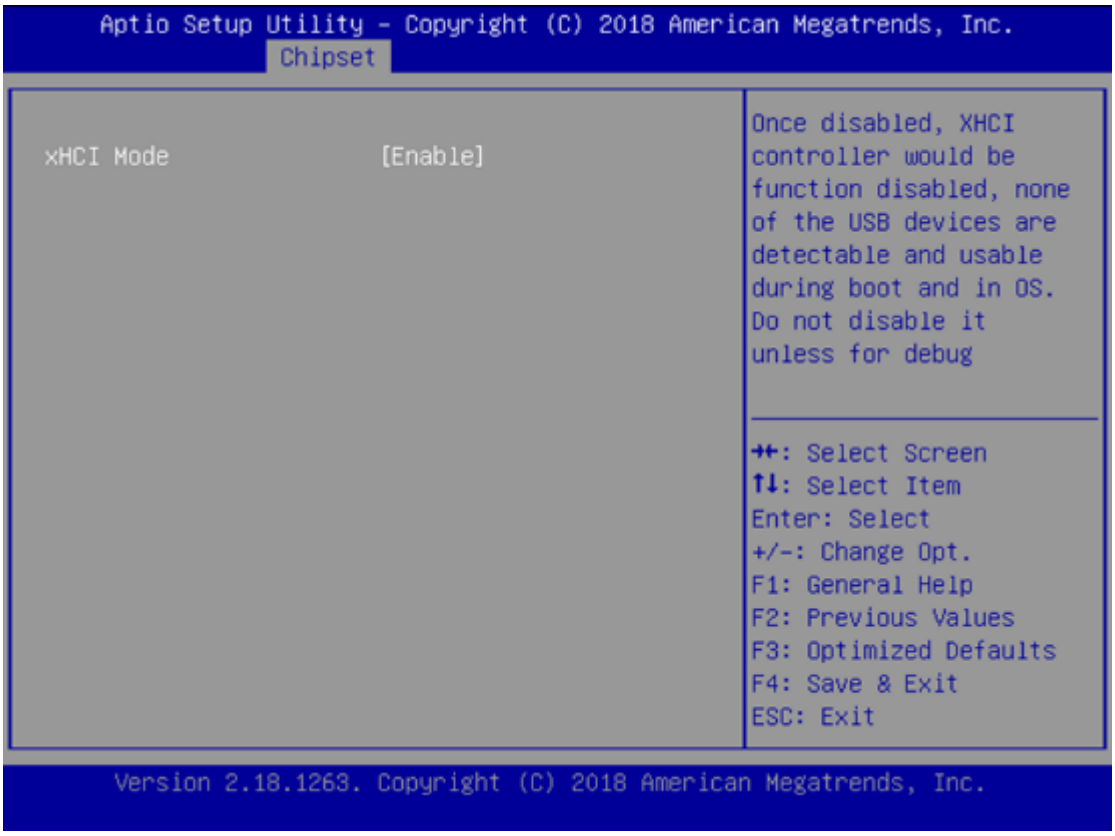
SATA Drives


Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Chipset
SATA Drives
Aggressive LPM Support [Disabled]
SATA Port 0 [Not Installed]
Software Preserve Unknown
Port 0 [Enabled]
SATA Port 0 Hot Plug Capability [Disabled]
Configured as eSATA Hot Plug supported
Spin Up Device [Disabled]
SATA Device Type [Hard Disk Drive]
SATA Port 0 DevSlp [Disabled]
SATA Port 1 [Not Installed]
Software Preserve Unknown
Port 1 [Enabled]
Enable PCH to aggressively enter link power state.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Chipset
SATA Port 0 [Not Installed]
Software Preserve Unknown
Port 0 [Enabled]
SATA Port 0 Hot Plug Capability [Disabled]
Configured as eSATA Hot Plug supported
Spin Up Device [Disabled]
SATA Device Type [Hard Disk Drive]
SATA Port 0 DevSlp [Disabled]
SATA Port 1 [Not Installed]
Software Preserve Unknown
Port 1 [Enabled]
SATA Port 1 Hot Plug Capability [Disabled]
Configured as eSATA Hot Plug supported
Spin Up Device [Disabled]
SATA Device Type [Hard Disk Drive]
SATA Port 1 DevSlp [Disabled]
Enable/Disable SATA Port 1 DevSlp. Board rework for LP needed before enable.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.

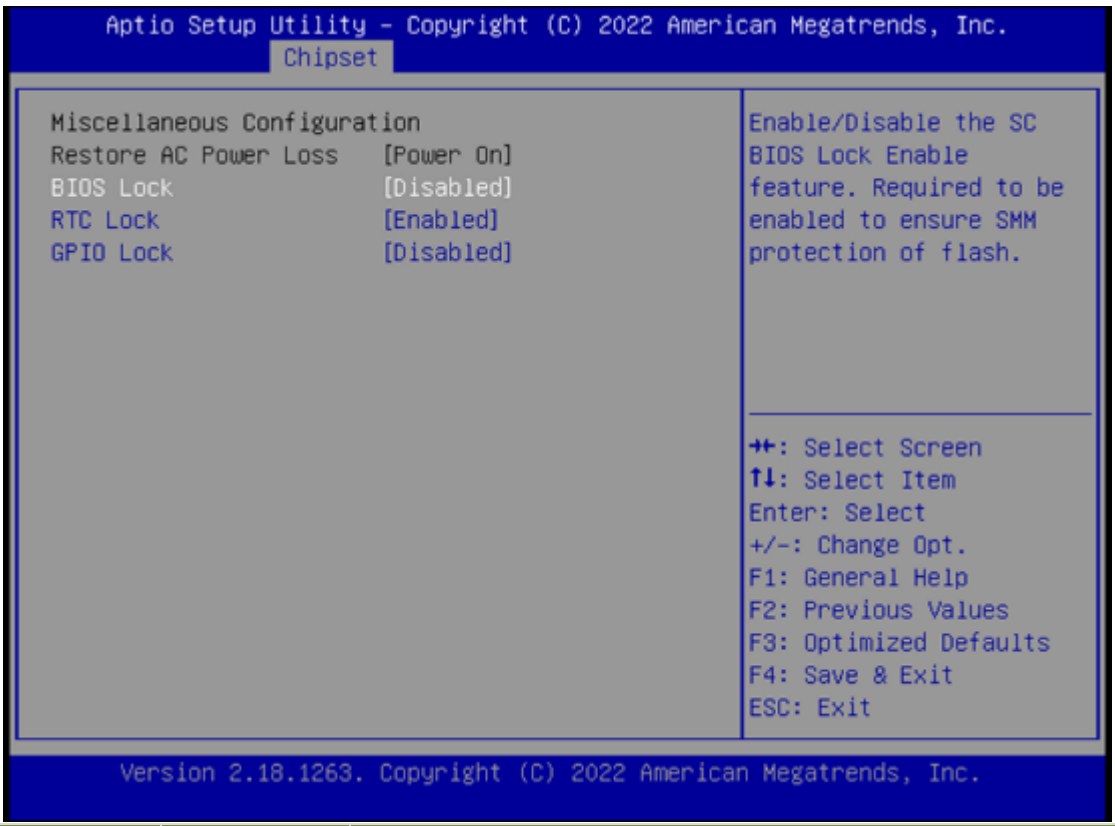
Feature	Options	Description
Aggressive LPM Support	Enabled Disabled	Enable PCH to aggressively enter link power state.
Port 0	Enabled Disabled	Enable or Disable SATA Port
SATA Port 0 Hot Plug Capability	Enabled Disabled	If enabled, SATA port will be reported as Hot Plug capable.
Spin Up Device	Enabled Disabled	If enabled for any of ports Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive
SATA Port 0 DevSlp	Enabled Disabled	Enable/Disable SATA Port 0 DevSlp. Board rework for LP needed before enable.
Port 1	Enabled Disabled	Enable or Disable SATA Port
SATA Port 1 Hot Plug Capability	Enabled Disabled	If enabled, SATA port will be reported as Hot Plug capable.
Spin Up Device	Enabled Disabled	If enabled for any of ports Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive
SATA Port 1 DevSlp	Enabled Disabled	Enable/Disable SATA Port 1 DevSlp. Board rework for LP needed before enable.

USB Configuration



Feature	Options	Description
xHCI Mode	Enable Disable	Once disabled, XHCI controller would be function disabled, none of the USB devices are detectable and usable during boot and in OS. Do not disable it unless for debug purpose.

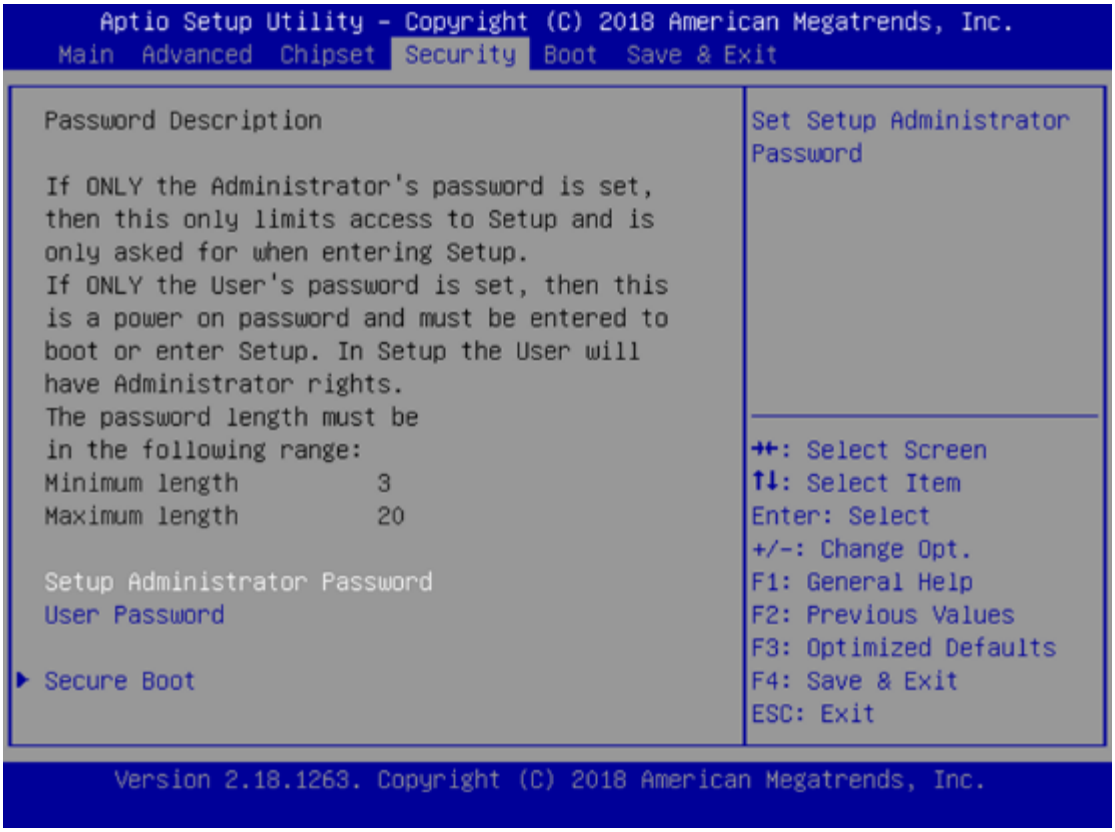
Miscellaneous Configuration



Feature	Options	Description
Restore AC Power Loss	Power On Power Off Last State	Specify what state to go to when power is re-applied after a power failure (G3 state). S0 State: System will boot directly as soon as power applied. S5 State: System keeps in power-off state until power button is pressed.
BIOS Lock	Enabled Disabled	Enable/Disable the SC BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.
RTC Lock	Enabled Disabled	Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM
GPIO Lock	Enabled Disabled	Enable to set GPIO Pad Configuration Lock for security

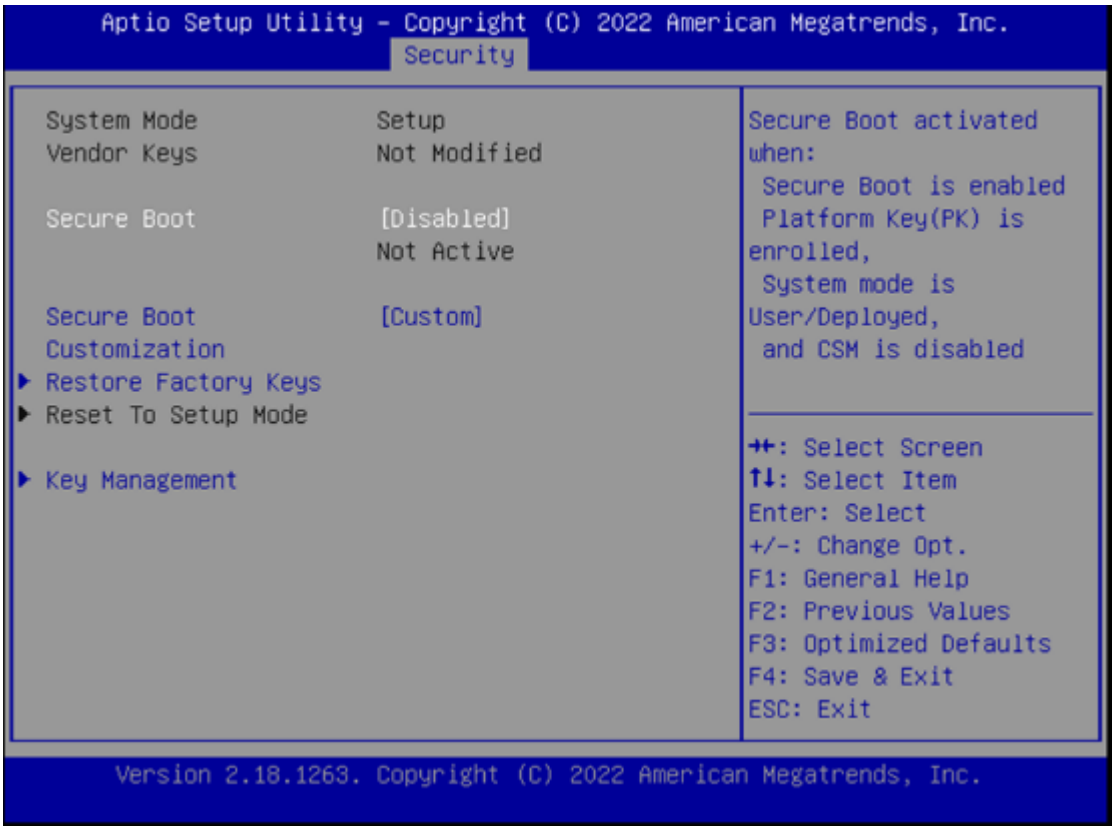
Security

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.



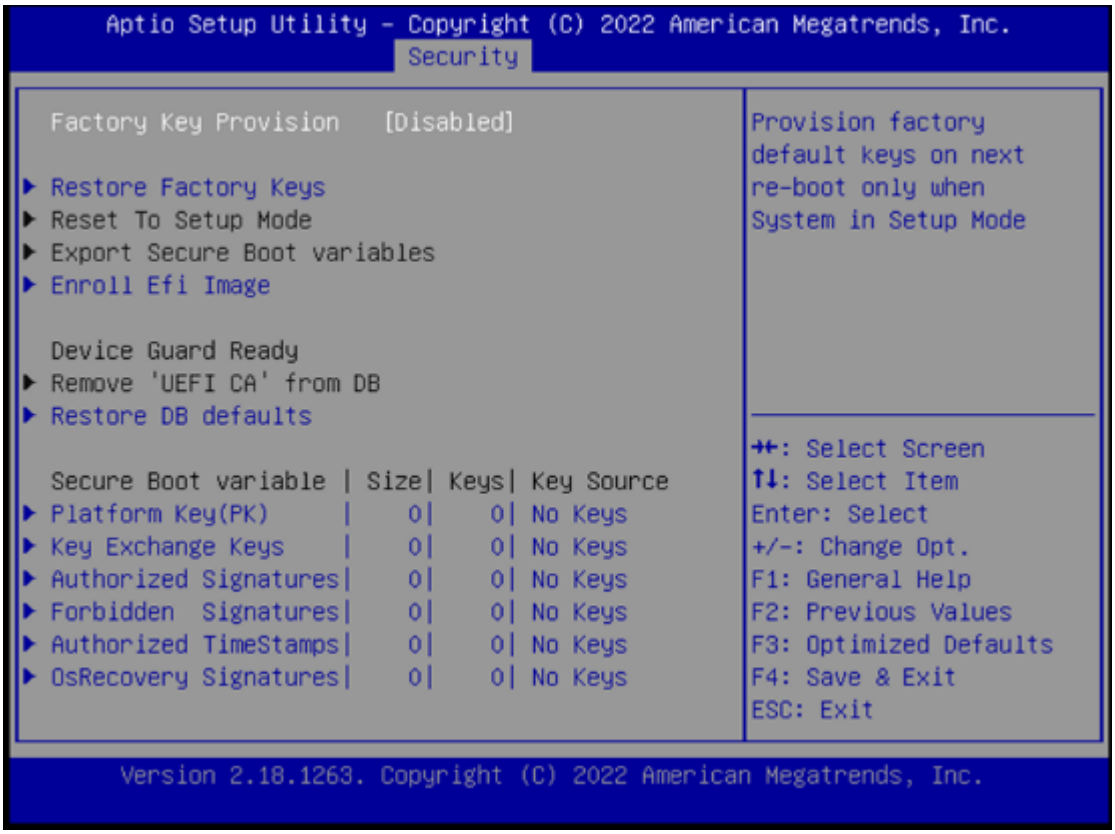
Feature	Description
Setup Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup,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

Secure Boot



Feature	Options	Description
Secure Boot	Disabled Enabled	Secure Boot is activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.
Secure Boot Customization	Standard Customized	Secure Boot Mode - Custom & Standard, Set UEFI Secure Boot Mode to STANDARD mode or CUSTOM mode, this change is effect after save. And after reset, the mode will return to STANDARD mode

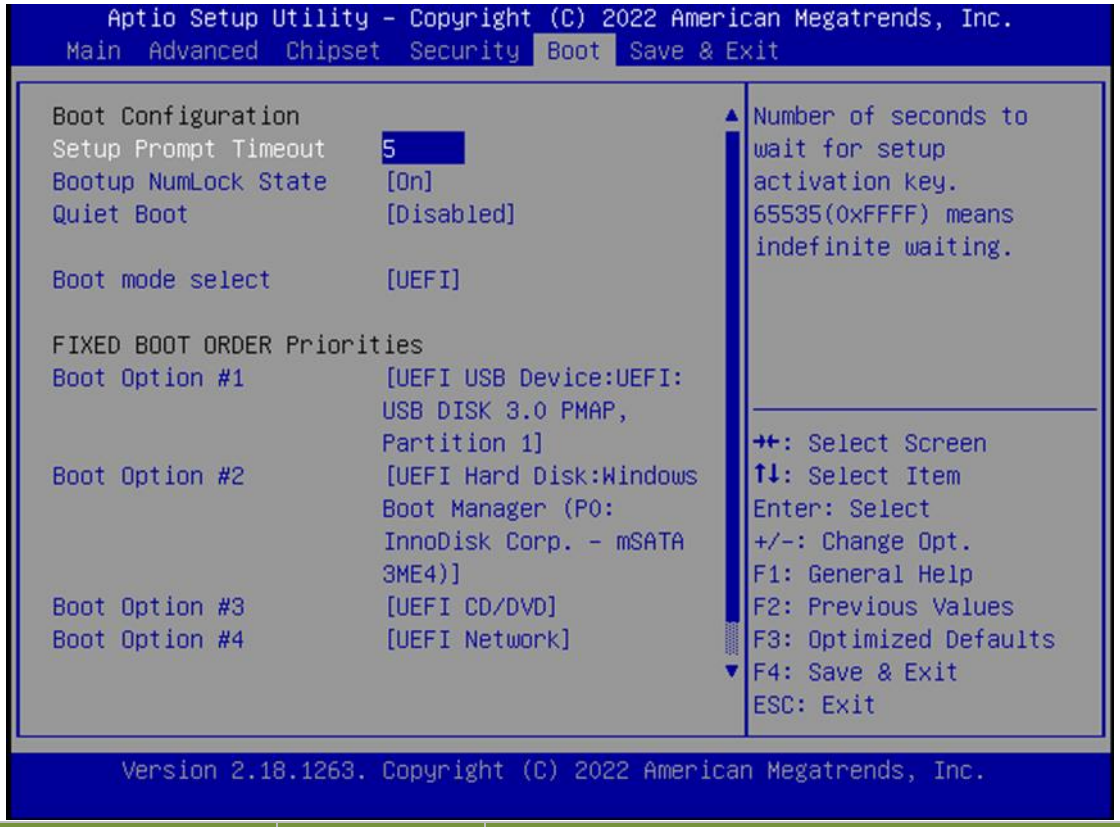
Key Management



Feature	Options	Description
Factory keys Provision	Disabled Enabled	Allow to provision factory default Secure Boot keys when System is in Setup Mode
Restore Factory keys	None	Force System to User Mode - install all Factory Default keys
Enroll Efi Image	None	Allows the image to run in Secure Boot mode. Enroll SHA256 hash of the binary into Authorized Signature Database (db)

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.

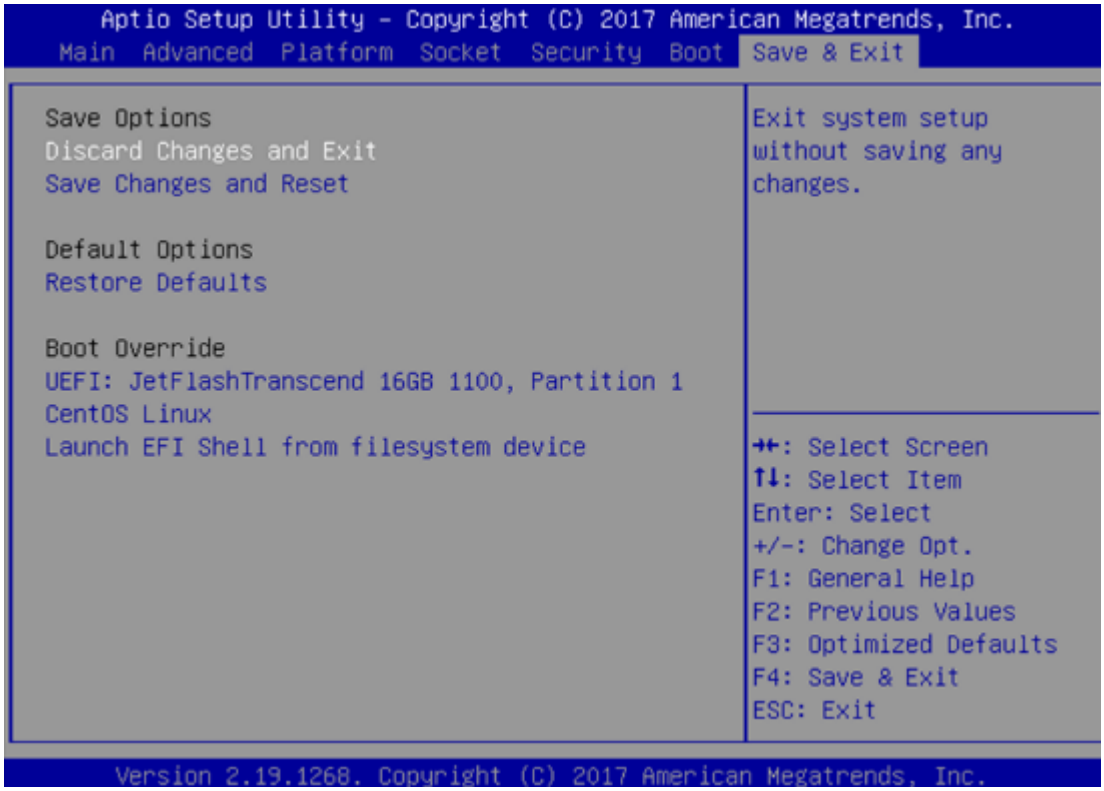


Feature	Options	Description
Setup Prompt Timeout	5	The number of seconds to wait for setup activation key. 65535 means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.
Boot mode select	LEGACY UEFI DUAL	Select boot mode for LEGACY or UEFI.

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

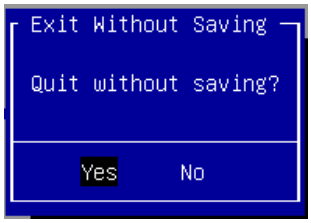
Save and Exit Menu

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.



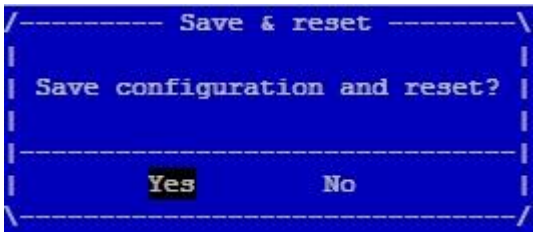
■ Discard Changes and Exit

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.



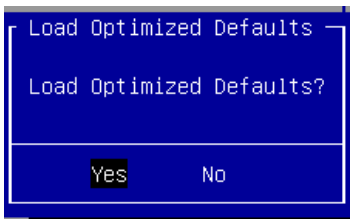
■ Save Changes and Reset

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: ▫ Repair(Please include failure details) ▫ Testing Purpose
Company:	Contact Person:
Phone No.	Purchased Date:
Fax No.:	Applied Date:
Return Shipping Address: _____ Shipping by: ▫ Air Freight ▫ Sea ▫ Express_____ ▫ 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
	09: Cache RMA Problem	15: PS2	21: Shut Down
03: CMOS Data Lost	10: Memory Socket Bad	16: LAN	22: Panel Fail
04: FDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
05: HDC Fail	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)
06: Bad Slot			

Request Party

Authorized Signature / Date

Confirmed By Supplier

Authorized Signature / Date