Lanner

Vehicle Computing

Rugged Platforms for Vehicles and Railway Computing

ICS-R570
User Manual

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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.

Icon Descriptions

This document utilizes icons in order to make selected text more transparent and explicable to users. Please note that this document contains the following conventions:

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.

For troubleshooting the issues with your system, please check the Lanner Q&A page for a diagnostic procedure and troubleshooting steps.

Technical Support

In addition to contacting your distributor or sales representative, you could submit a request to our Lanner Technical Support page to 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 to 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

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

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

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

Europe

Lanner Europe B.V.

Wilhelmina van Pruisenweg 104

2595 AN The Hague

The Netherlands

T: +31 70 701 3256

E: sales_eu@lannerinc.com

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Acknowledgement

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 in order to meet FCC emission limits and also 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 Precautions

The following should be put into consideration for rack-mount or similar mounting installations:

- Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- The installation of this product must be performed by trained specialists; otherwise, a non-specialist might create the risk of the system's falling to the ground or other damages.
- Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the system or use of inappropriate installation components.
- Elevated Operating Ambient - 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.
- Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading - 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 overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Grounding - Reliable grounding of rack mounted equipment 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 Avertissement

- 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.
  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.
- Product shall be used with Class 1 laser device modules
  Le produit doit être utilisé avec des modules de dispositifs laser de classe 1.

Electrical Safety Instructions

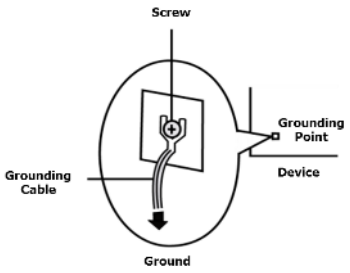
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect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

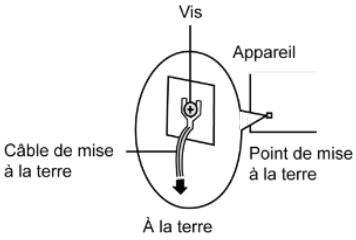
Grounding Procedure for Power Source

- 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

The primary purpose of the ICS-R570 series is to serve the majority of the market in Railway Security appliances by functioning as an Industrial Cybersecurity solution, Network Communication device, and Firewall. This series is engineered with the AMD Ryzen™ Embedded V1404I processor featuring Radeon™ Vega 8 Graphics, enclosed in an IP40 rated fanless casing. It operates on a power input ranging from DC 24V to 110V, with an impressive temperature range of -40°C to 70°C (up to 85°C for 10 minutes), and it complies with all necessary regulations and certifications, as detailed below.

Package Content

Your package contains the following items:

- 1x ICS-R570 ICS Railway Edge Computer

Note: If you should find any components missing or damaged, please contact your dealer immediately for assistance.

Ordering Information

SKU No.	Description
ICS-R570A	IP40 Fanless, AMD Ryzen™ V1404I, OOB, 2x DDR4 SODIMM, TPM 2.0 onboard, 1x GPS with ADR, 1x Console, 3x USB 3.2 without isolated, 6x 2.5GbE LAN isolated M12 X-coded with one pair of LAN bypass, 2x HDMI, 6x isolated DIO, 8x isolated RS232/422/485, 2x isolated CAN 2.0, 1x M.2 2242/2280 M-Key socket for Storage, 2x M.2 3042/3052 B-Key socket for 5G with dual SIM slots each, 1x M.2 2230 E-Key socket, Supports dual DC 24-110V input by M12 K-coded
ICS-R570B	IP40 Fanless, AMD Ryzen™ V1404I, 2x DDR4 SODIMM, TPM 2.0 onboard, 1x GPS with UDR, 1x Console, 3x USB 3.2 without isolated, 6x 2.5GbE LAN isolated M12 X-coded with one pair of LAN bypass, 2x HDMI, 6x isolated DIO, 8x isolated RS232/422/485, 2x isolated CAN 2.0, Supports DC 24-110V input by M12 K-coded

Optional Accessories

Model	Description
Slide Rail Mount Kit	Slide Rail Mount Kit with screws

System Specifications

Platform	CPU	AMD Ryzen™ Embedded V1404I
	Frequency	Up to 3.6GHz
	Core Number	Quad-core
	BIOS	AMI SPI Flash BIOS
	Chipset	SoC
	Processor Graphics	Radeon™ Vega 8 Graphics
Form Factor		1U 19" Rackmount
Memory	Technology	2x DDR4 SODIMM with ECC
	Max. Capacity	Up to 32GB
Ethernet	Controller	Intel® i226
	Speed	100M/1G/2.5GbE
	Interface	6x M12 X-coded
Storage	Type	1x M.2 2242/2280 M-Key for SATA and NVMe Storage
I/O	Display Port	2x HDMI, Resolution Up to 4K @30Hz (SKU A Only)
	LAN Port	6x 2.5GbE Isolated M12 X-coded Connector
	OOB Port	1x RJ45 for OOB (SKU A Only)
	Serial I/O	6x Isolated DIO; 8x Isolated RS-232/422/485
	GPS	SKU A: BeiDou, Galileo, GLONASS, GPS / QZSS (3 concurrent GNSS, NEO-M8L) with ADR SKU B: BeiDou, Galileo, GLONASS, GPS/QZSS (4 concurrent GNSS, NEO-M9V) with UDR
	CAN Port	2x Isolated CAN 2.0 (Default); or J1939/J1708 (Optional)
	DIO	6x DI (Support PNP/NPN/Dry Contact); 6x DO (Support Dry / Sink), IEC 61131-2, 24V w/ Max 200mA
	USB	3x USB 3.2 without Isolated
	Antenna	SKU A: 10x Antennas, 1x GNSS Antenna SKU B: 1x GNSS Antenna
Expansion Interface	M.2	2x M.2 3042/3052 B-Key socket for 5G w/ dual SIM (SKU A Only); 1x M.2 2230 E-Key for Wi-Fi (SKU A Only)
Cooling	Processor	Passive CPU heatsink
	System	Fanless design with corrugated aluminum
Power	Connector/Input	SKU A: 2x M12 K-coded Connector (5-Pin Male), Input Rated at 24~110VDC; SKU B: 1x M12 K-coded Connector (5-Pin Male), Input Rated at 24~110VDC
Environment	Operating Temperature	-40°C ~ 75°C continuous run with conformal; 85°C for 10 mins (EN 50155 Class TX); Non-Operating Temperature: -40°C ~ 85°C
	Storage Temperature	-40~85°C
	Relative Humidity	5%~95%
Mechanical	Dimension (WxHxD)	438 x 44 x 300mm
	Weight	6kg
	Mounting	Rackmount
Driver Support	Microsoft Windows	Win10 IoT
	Linux	Linux Kernel 2.6X or later
Certification	EMC	CE/FCC Class A, RoHS
	Safety	UL/CB 62368-1, IEC 60950-1, IEC 62368 (Below 60V)
	Compliance	EN50155, EN45545-2, EN50121-3-2, EN50121-4, EN50125-3, EN50153, IP-40 Compliant, MIL-STD-810G anti-vibration & shock

Front Panel

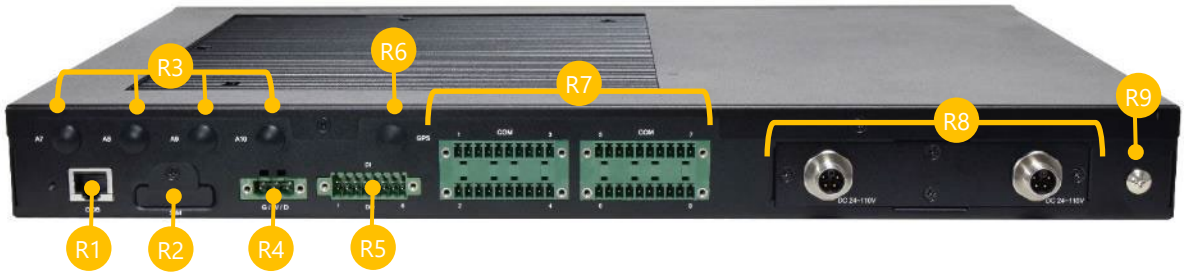
ICS-R570A

ICS-R570B

No.	Description	
F1	Reset Button	1x Reset Button (Save/Load/Reset GPIO Pin Interface)
F2	CAN Port	2x Isolated CAN 2.0 (Default); or Optional (J1939/J1708)
F3	LED Indicator	Power/Storage/Status/COMs/LANs, refer to Appendix A
F4	LAN Port	6x 2.5GbE LAN Isolated M12 X-coded with 1 Pair of LAN Bypass (SKU A Only)
F5	Console Port	1x RS-232 (RJ45 connector)
F6	USB Port	3x USB 3.2 without Isolated
F7	Display Port	2x HDMI, Resolution Up to 4K@30Hz (SKU A Only)
F8	SIM Card Cover	Dual SIM card slots (SKU A Only)
F9	Antenna Holes	6x SMA Antenna Holes (SKU A Only)

Rear Panel

ICS-R570A

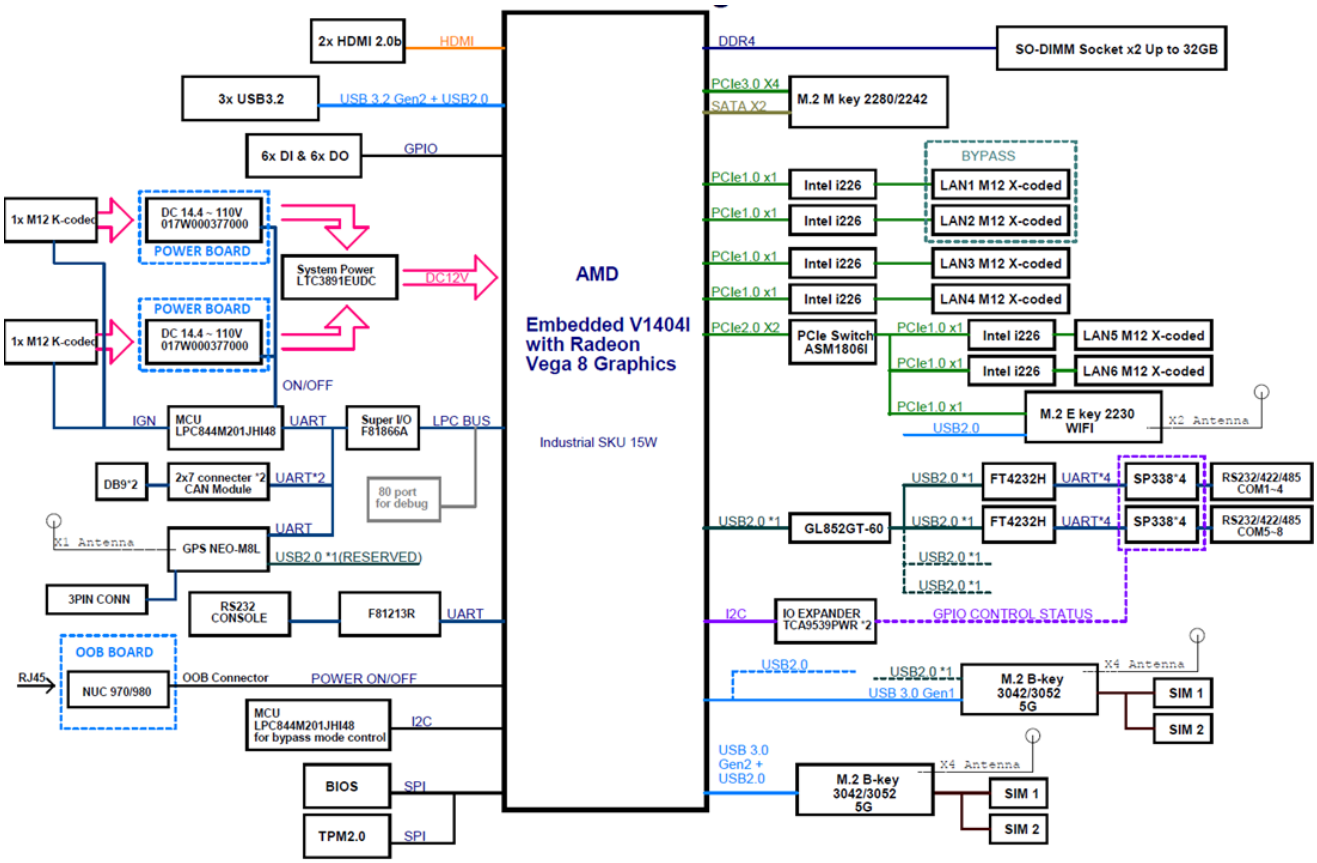


ICS-R570B

No.	Description	
R1	OOB	1x RJ45 for OOB (SKU A Only)
R2	SIM Card Cover	Dual SIM card slots (SKU A Only)
R3	Antenna	4x SMA Antenna Holes (SKU A Only)
R4	GPS	BeiDou, Galileo, GLONASS, GPS / QZSS (3 concurrent GNSS, NEO-M8L) with ADR (SKU A Only) 1x 3-pin Terminal Block for WT (Wheel Tick Pin4), Speed (Pin15), Ground
R5	DIO	6x DI (Support PNP/ NPN / Dry Contact) & 6x DO (Support Dry / Sink)
R6	Antenna	1x Antenna for 3 Concurrent GNSS
R7	COM Port	8x RS232/422/485
R8	Power Input	A SKU: 2x M12 K-coded 5-Pin Male Connector; Input Rated: 24~110Vdc B SKU: 1x M12 K-coded 5-Pin Male Connector; Input Rated: 24~110Vdc (Ground, DC_IN, Ground, IGN, Chassis Ground)
R9	Ground Hole	1x Grounding hole

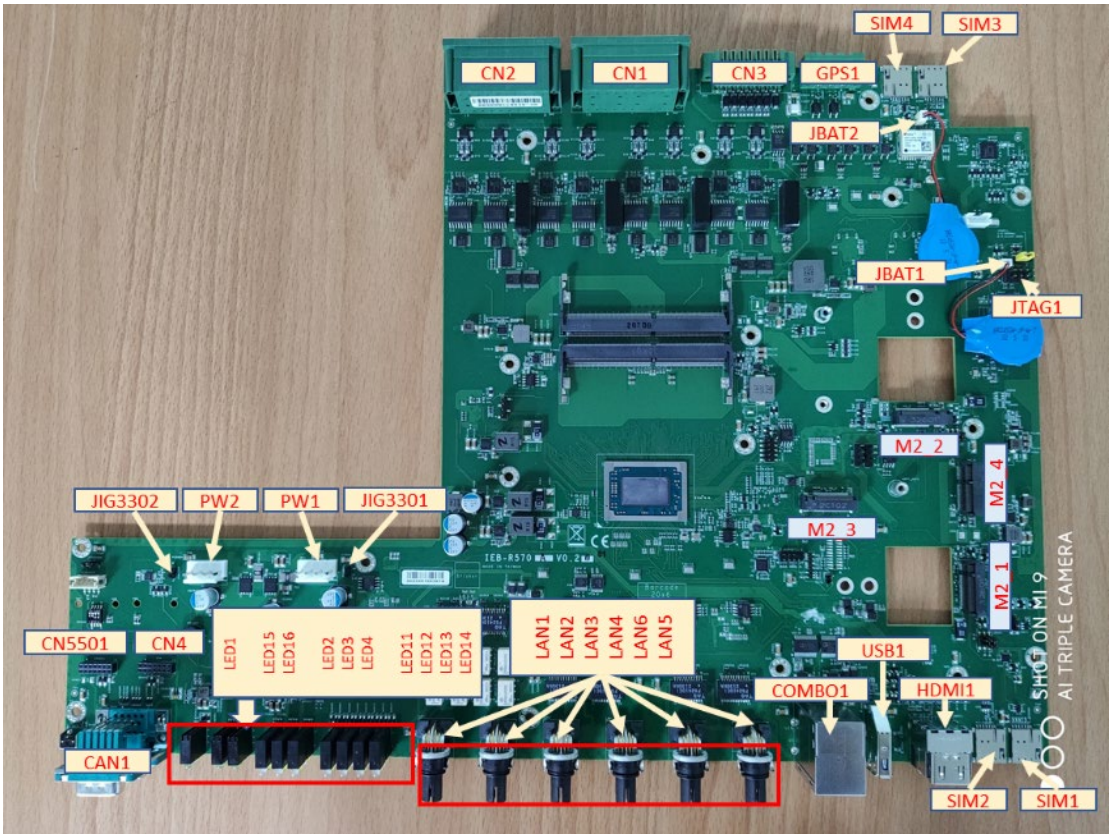
Motherboard Information

Block Diagram

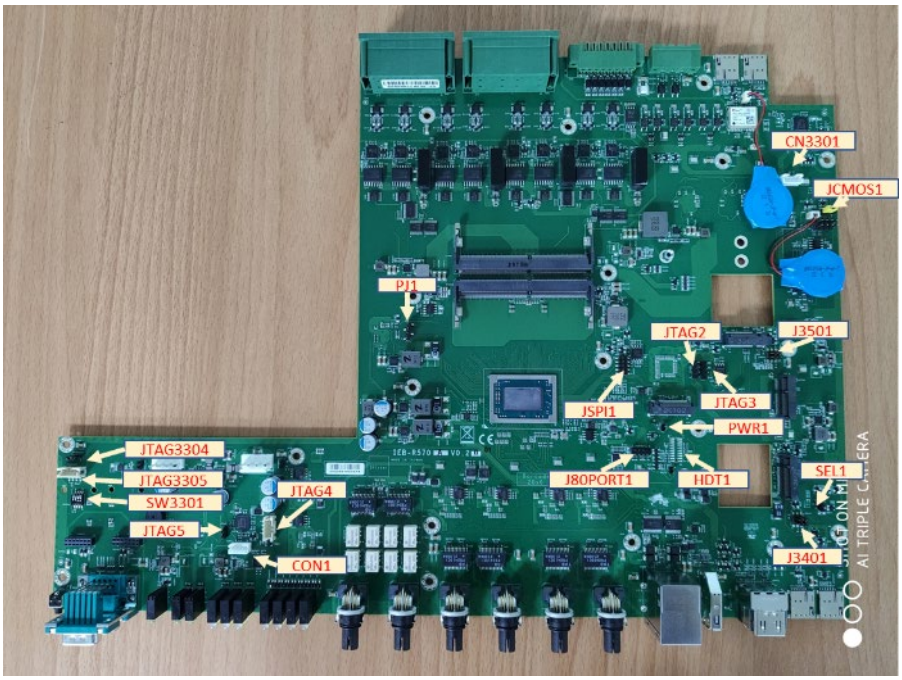


Motherboard Layout

The motherboard layout shows the connectors and jumpers on the board. Refer to the following picture as a reference for the pin assignments and the internal connectors.



Jumper and Debug Connector



Jumper Setting and Internal Connector

System MCU

SW3301: MCU UART Trace Switch

Latch 1 & Latch 2 turn ON, Latch 3 & Latch 4 turn OFF for Normal operation. (Default)

Latch 1 & Latch 2 turn OFF, Latch 3 & Latch 4 turn ON for MCU upgrade Program.

Latch	Normal Mode	MCU Program Mode
1	ON	OFF
2	ON	OFF
3	OFF	ON
4	OFF	ON

Description	PIN		Description
IMCU_RXD	1	2	SIO_SOUT1
IMCU_TXD	3	4	SIO_SIN1
IMCU_RXD	5	6	MCU_RX_ISP
IMCU_TXD	7	8	MCU_TX_ISP

J3304: MCU ISP Mode

(1-2) = Normal Operation (Default)

(2-3) = ISP Mode

PIN	Description
1	IMCU_ISP_MODE_PU
2	IMCU_PROG
3	GND

JTAG3305: MCU Burn-in Connector

PIN	Description
1	IGN3V3_SB
2	MCU_RX_ISP
3	GND
4	MCU_TX_ISP

CN3301: MCU JTAG Debug Connector

PIN	Description
1	IGN3V3_SB
2	GND
3	IMCU_CLK
4	IMCU_DIO

Bypass MCU

JTAG5: MCU ISP Mode

(1-2) = Normal Operation (Default)

(2-3) = ISP Mode

PIN	Description
1	IMCU_ISP_MODE_PU
2	IMCU_PROG
3	GND

JTAG4: MCU Burn-in Connector

PIN	Description
1	+P3V3_MCU
2	MCU_UART_RX
3	GND
4	MCU_UART_TX

CON1: MCU JTAG Debug Connector

PIN	Description
1	+P3V3_MCU
2	GND
3	MCU_CLK
4	MCU_DIO

System

JSPI1: BIOS ROM Update Connector

Description	PIN		Description
SPI0_HOLD_N	1	2	NC
SPI0_CS_N	3	4	V1P8_A_SPI
SPI0_MISO	5	6	NC
NC	7	8	SPI0_CLK
GND	9	10	SPI0_MOSI

JTAG2: PCIE Switch Debug Port

PIN	Description
1	GND
2	PCIESW_SMCL
3	PCIESW_SMDA
4	PCIESW_INT_HP

JTAG3: PCIE Switch UART Port

PIN	Description
1	PCIESW_UART_3V3
2	GND
3	PCIESW_UART_TX
4	PCIESW_UART_RX

JCMOS1: Clear CMOS

(1-2) = Normal Operation (Default)

(2-3) = Clear CMOS

PIN	Description
1	CLEAR_MOS_CONN
2	+VDDBT
3	GND

SEL1: Reset Button Select

(1-2) = SW Reset (Default)

(2-3) = HW Reset

PIN	Description
1	RST_SW_N
2	SYSRST_BTN_N_R
3	OOB_RST_N_D_MB

JTAG1: OOB Module Connector

Description	PIN		Description
OOB_SCL	1	2	GND
OOB_SDA	3	4	OOB_SYS_RST_N
OOB_DIO	5	6	OOB_PWR_BTN_N
OOB_RESET_N_R	7	8	OOB3V3_SB

CN5501: CAN Module Connector

Description	PIN		Description
NC	2	1	CAN2_BATT_24V
NC	4	3	CAN2_DO
GND_CAN	6	5	GND_CAN
CAN2_J1708_P	8	7	NC
CAN2_J1708_N	10	9	ISO_SIO_SIN3
CAN2_J1939_P	12	11	ISO_SIO_SOUT3
CAN2_J1939_N	14	13	+P5V_CAN

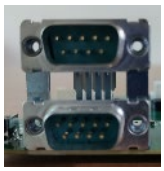
CN4: CAN Module Connector

Description	PIN		Description
NC	2	1	CAN1_BATT_24V
NC	4	3	CAN1_DO
GND_CAN	6	5	GND_CAN
CAN1_J1708_P	8	7	NC
CAN1_J1708_N	10	9	ISO_SIO_SIN2
CAN1_J1939_P	12	11	ISO_SIO_SOUT2
CAN1_J1939_N	14	13	+P5V_CAN

CAN1: DB9 Connector for CAN OUT

PIN	1		2		3		4		5
Description	CAN1_J1708_R_N		GND_CAN		CAN1_J1939_R_P		NC		CAN1_J1939_R_N
PIN		6		7		8		9	
Description		CAN1_J1708_R_N		CAN1_J1708_R_P		CAN1_J1708_R_P		CAN1_BATT_24V	

PIN	1		2		3		4		5
Description	CAN2_J1708_R_N		GND_CAN		CAN2_J1939_R_P		NC		CAN2_J1939_R_N
PIN		6		7		8		9	
Description		CAN2_J1708_R_N		CAN2_J1708_R_P		CAN2_J1708_R_P		CAN2_BATT_24V	



JBAT1: RTC Battery

PIN	Description
1	+VBAT_CON
2	GND

JIG3301/JIG3302: Ignition Signal from IEK-PBR570

PIN	Description
1	IGNITION1_CONN (JIG3301) / IGNITION2_CONN (JIG3302)
2	GND

J3401: 5G Module Setting

Jumper Setting VS 5G Module should follow the table.

V = Install Jumper

X = NC

Latch	EM9291	EM9191	Others
(1-2)	X	V	X
(3-4)	X	V	X
(5-6)	V	X	X

Description	PIN		Description
M2B1_P22_VBUS_SENSE	1	2	M2B1_P22_VBUS_SENSE_PU
M2B1_P20_PCIE_DIS	3	4	M2B1_P20_PCIE_DIS_PU
M2B1_OPT_VCC	5	6	+P3V3_M2B1

J3501: 5G Module Setting

Jumper Setting VS 5G Module should follow the table.

V = Install Jumper

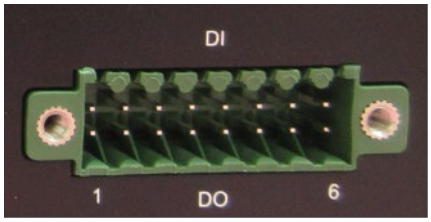
X = NC

Latch	EM9291	EM9191	Others
(1-2)	X	V	X
(3-4)	X	V	X
(5-6)	V	X	X

Description	PIN		Description
M2B2_P22_VBUS_SENSE	1	2	M2B2_P22_VBUS_SENSE_PU
M2B2_P20_PCIE_DIS	3	4	M2B2_P20_PCIE_DIS_PU
M2B2_OPT_VCC	5	6	+P3V3_M2B2

CN3 (DIO)

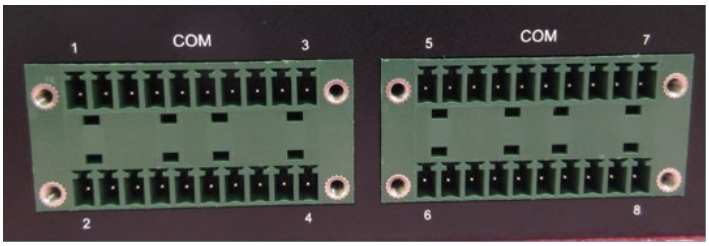
Description	DI_COM	DI1	DI2	DI3	DI4	DI5	DI6	GND_DIO
PIN	1	3	5	7	9	11	13	15
	2	4	6	8	10	12	14	16
Description	GND_DIO	DO1	DO2	DO3	DO4	DO5	DO6	GND_DIO



CN1/CN2 (COM Port)

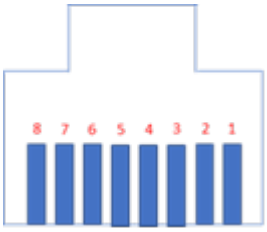
Port	COM1					COM3				
Pin	1	2	3	4	5	6	7	8	9	10
RS-232	GND	TX	RX			GND	TX	RX		
RS-422	GND	RX+	RX-	TX-	TX+	GND	RX+	RX-	TX-	TX+
RS-485 Full	GND	RX+	RX-	TX-	TX+	GND	RX+	RX-	TX-	TX+
RS-485 Half	GND			D-	D+	GND			D-	D+
Port	COM2					COM4				
Pin	11	12	13	14	15	16	17	18	19	20
RS-232	GND	TX	RX			GND	TX	RX		
RS-422	GND	RX+	RX-	TX-	TX+	GND	RX+	RX-	TX-	TX+
RS-485 Full	GND	RX+	RX-	TX-	TX+	GND	RX+	RX-	TX-	TX+
RS-485 Half	GND			D-	D+	GND			D-	D+

Port	COM5					COM7				
Pin	1	2	3	4	5	6	7	8	9	10
RS-232	GND	TX	RX			GND	TX	RX		
RS-422	GND	RX+	RX-	TX-	TX+	GND	RX+	RX-	TX-	TX+
RS-485 Full	GND	RX+	RX-	TX-	TX+	GND	RX+	RX-	TX-	TX+
RS-485 Half	GND			D-	D+	GND			D-	D+
Port	COM6					COM8				
Pin	11	12	13	14	15	16	17	18	19	20
RS-232	GND	TX	RX			GND	TX	RX		
RS-422	GND	RX+	RX-	TX-	TX+	GND	RX+	RX-	TX-	TX+
RS-485 Full	GND	RX+	RX-	TX-	TX+	GND	RX+	RX-	TX-	TX+
RS-485 Half	GND			D-	D+	GND			D-	D+



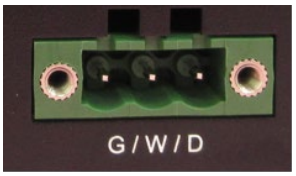
Console

PIN	Description
1	RTS
2	NC
3	TX
4	GND
5	GND
6	RX
7	NC
8	CTS



GPS

G	W	D
GND	SPEED	FORWARD

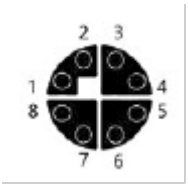


Power Input: M12 K-coded

PIN	Description
1	GND
2	DC_IN
3	GND
4	IGN
5 (PE)	Chassis_GND

LAN Port: M12 X-coded

PIN	Signals	PIN	Signals
1	LANx*_MX0P	2	LANx*_MX0N
3	LANx*_MX1P	4	LANx*_MX1N
5	LANx*_MX3P	6	LANx*_MX3N
7	LANx*_MX2N	8	LANx*_MX2P



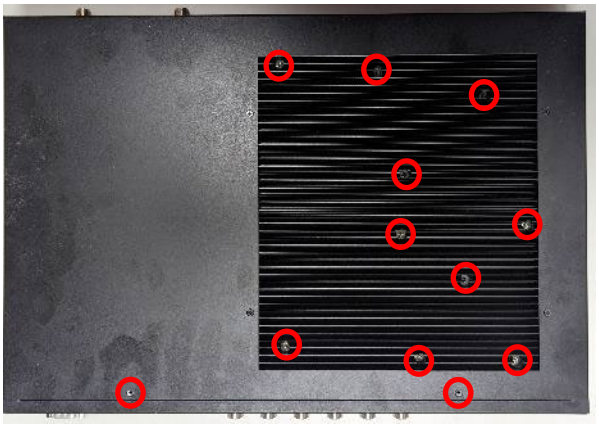
CHAPTER 2: HARDWARE SETUP

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

Open the Chassis

1. Power off the system. Loosen and remove the 12 screws on the top side, the two (2) screws on the rear panel, and the two (2) screws on right side and left side.

Top Side



Rear Panel

Left Side

Right Side

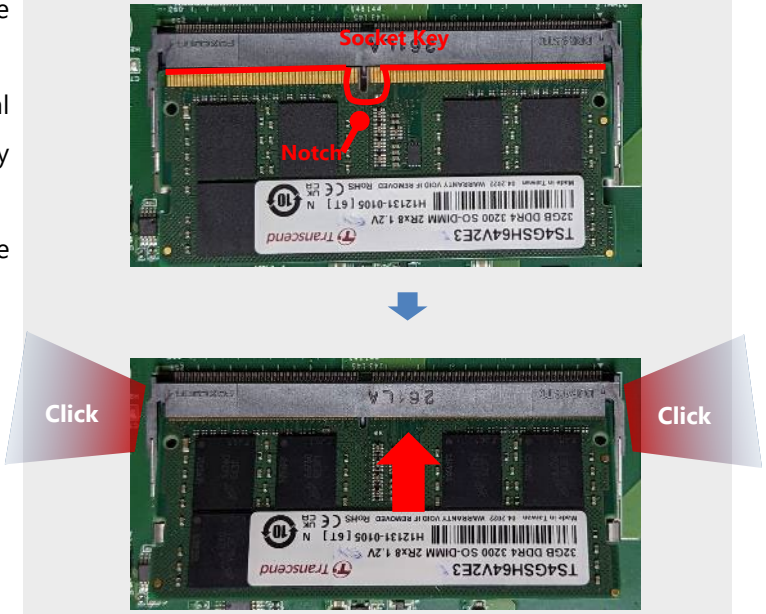
2. Lift the chassis cover up to remove.

Installing System Memory

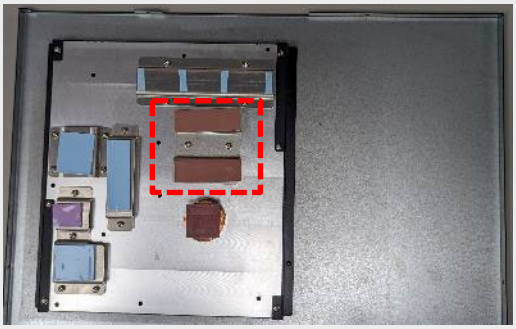
The motherboard supports two (2) memory slots, please follow the steps for installation

1. Power off the system and open the chassis cover.
2. Locate the memory slots on the motherboard.

3. Align the notches of the DIMM module with the socket key in the pin slot.
4. 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.
5. Repeat if one more DIMM module is to be placed.



6. Next, thermal pad placement. Remove the protective film on the thermal pads (included in the accessory pack) and gently place on the bottom of the top chassis.

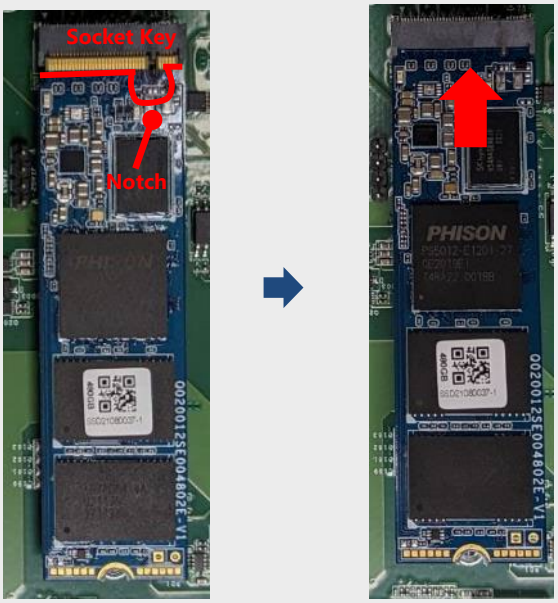


Installing SATA Storage Module (Optional)

The system supports one M.2 SATA slot for storage expansion. Follow the procedures below for installing a SATA storage module card.

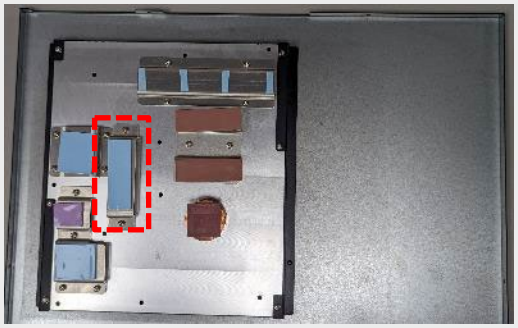
1. Power off the system and open the chassis cover. 2. Locate the SATA module socket on the motherboard.

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



5. Push down on the storage card and secure it with one (1) screw.

6. Next, thermal pad placement. Remove the protective film on the thermal pads (included in the accessory pack) and gently place on the bottom of the top chassis.

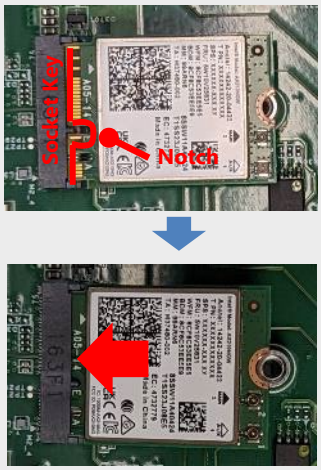


Installing the Wi-Fi Module (SKU A Only, Optional)

The motherboard provides one M.2 E-Key slots for 5G module cards. A Wi-Fi module requires two (2) antennas. Follow the steps for installation.

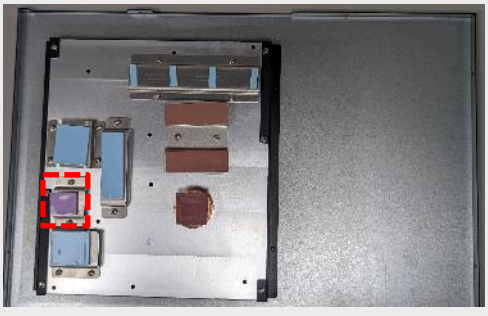
1. Power off the system, and open the chassis cover.
2. Locate the M.2 slot on the motherboard.

3. Align the notch of the 5G module card with the socket key in the slot.
4. Insert at 30 degrees into the socket until it is fully seated in the connector.



5. Push down on the 5G module card and secure it with one (1) screw.

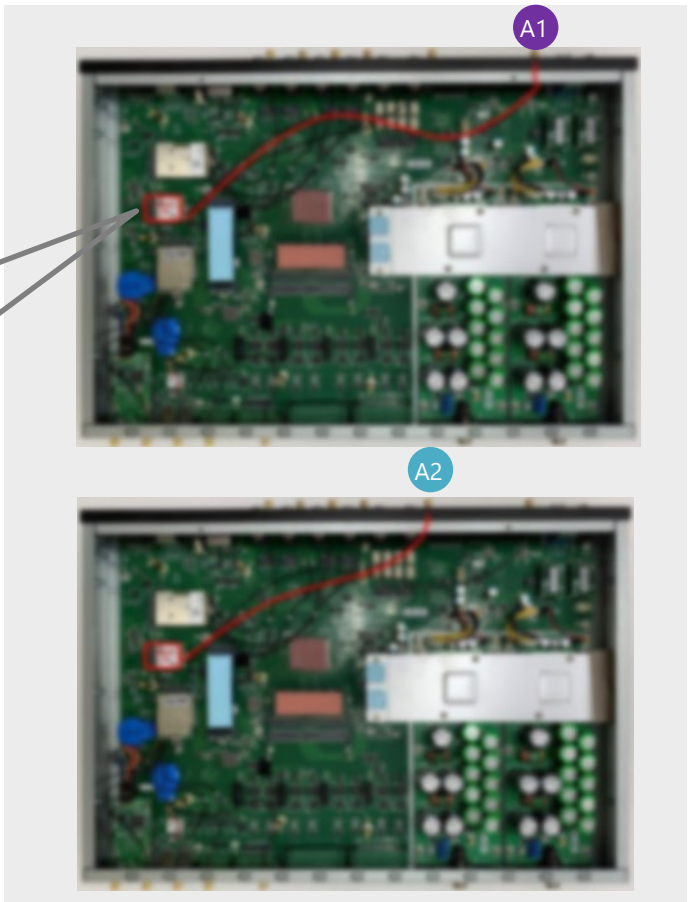
6. Next, thermal pad placement. Remove the protective film on the thermal pads (included in the accessory pack) and gently place on the bottom of the top chassis.



Installing 5G Antennas

Front Panel

1. Locate the two antenna RF cables and IPEX connectors on the 5G module card.
2. Connect RF cables to the 5G module card IPEX connector.

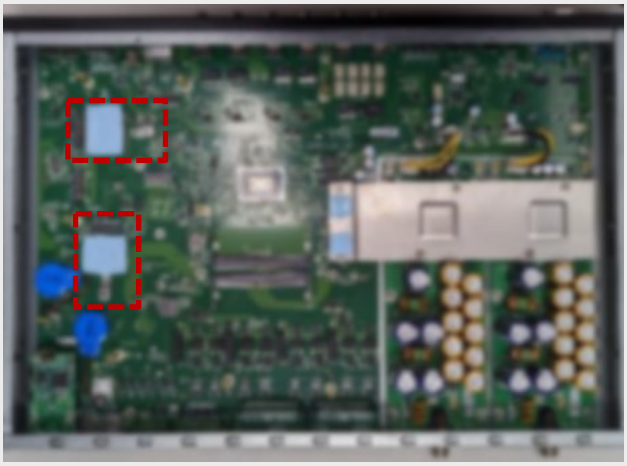


4. Screw on the two (2) antennas to the system.

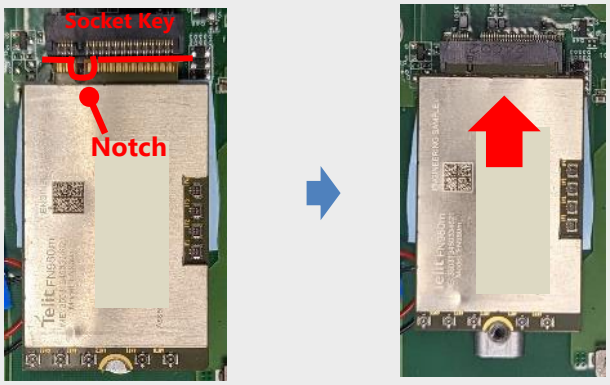
Installing the M.2 5G Module (SKU A Only, Optional)

The motherboard provides two (2) M.2 B-Key slots for 5G module cards. Each 5G module requires four (4) antennas. Follow the steps for installation.

1. Power off the system, and open the chassis cover.
2. Locate the two (2) M.2 slots on the motherboard.

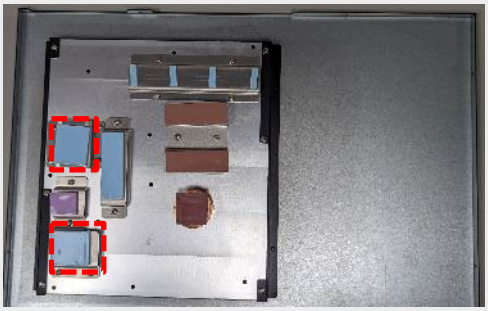


3. Align the notch of the 5G module card with the socket key in the slot.
4. Insert at 30 degrees into the socket until it is fully seated in the connector.



5. Push down on the 5G module card and secure it with one (1) screw.
6. Repeat if inserting a 2nd 5G module card.

7. Next, thermal pad placement. Remove the protective film on the thermal pads (included in the accessory pack) and gently place on the bottom of the top chassis.

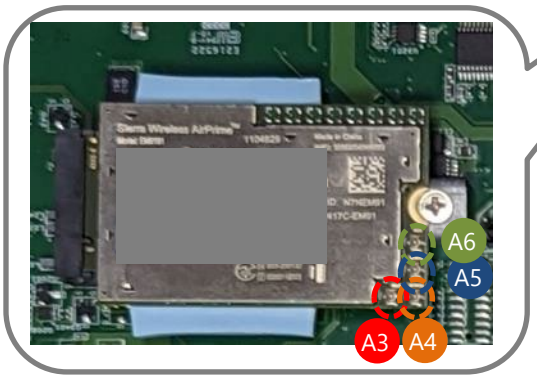


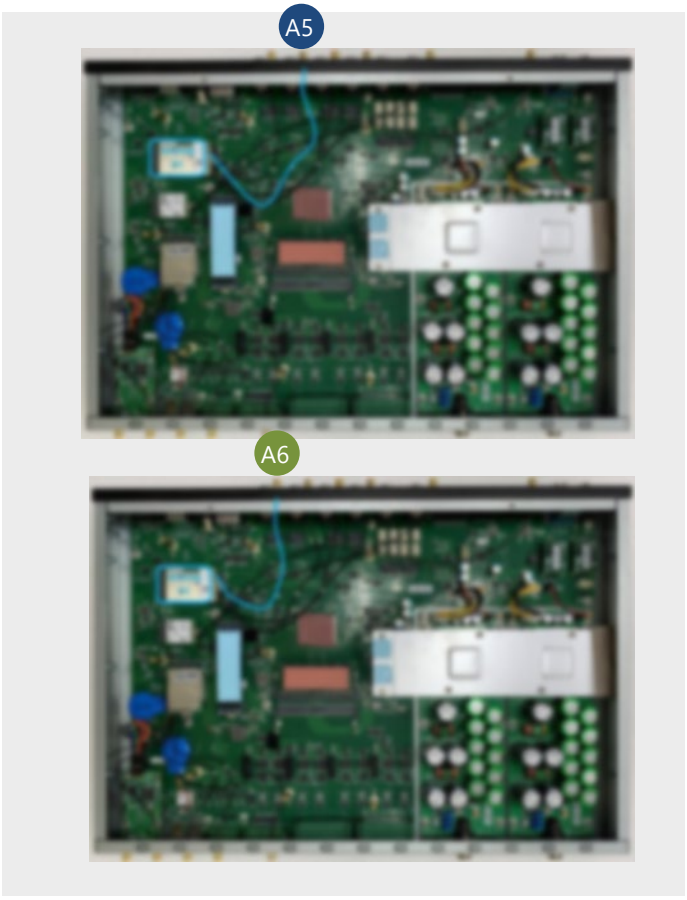
Installing 5G Antennas

Front Panel

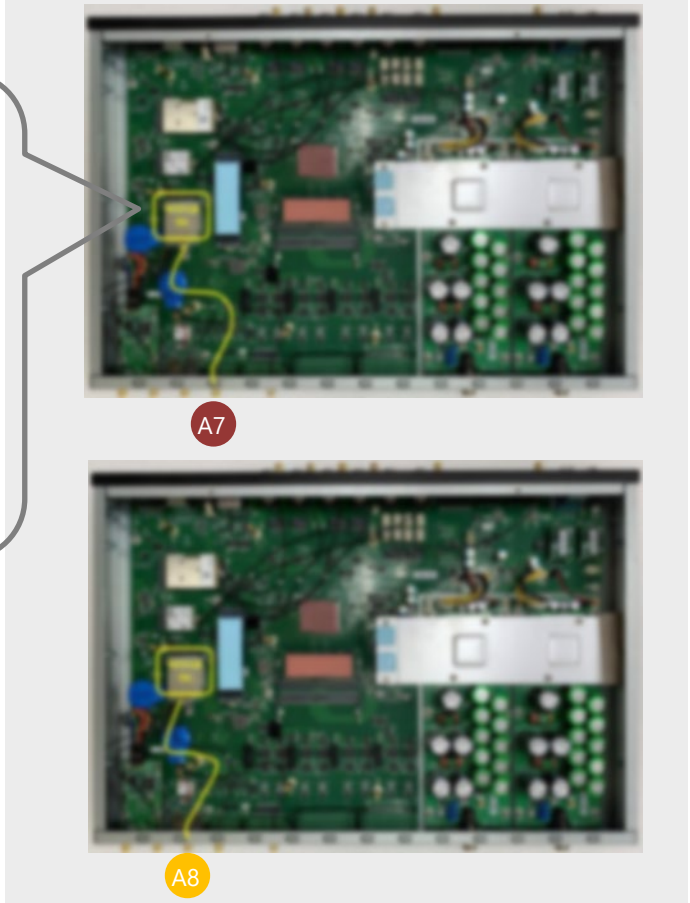
Rear Panel

1. Locate the two antenna RF cables and IPEX connectors on the 5G module card.
2. Connect RF cables to the 5G module card IPEX connector.

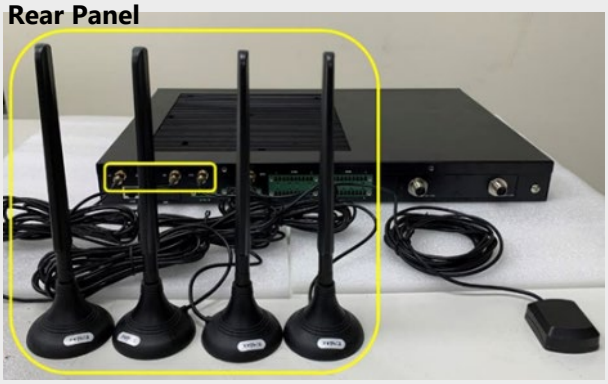




3. Repeat for the second 5G module card.



4. Screw on the eight (8) antennas (4 for each module) to the system.



Installing SIM Card

1. Locate the SIM Card cover on the rear panel. And loosen the screw to remove the cover.

2. Insert and push the SIM card, gold contacts facing downwards, all the way in until it clicks into place.

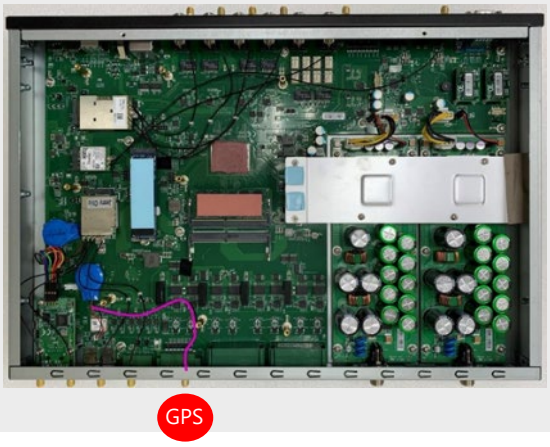
3. To remove the card, push it once, to have the card automatically eject.
4. Place the cover back and secure with the original one (1) screw.

Installing GPS Antenna

On the rear panel, there is an antenna hole for GPS GNSS (GPS, Galileo, GLONASS, BeiDou) support.

1. Locate the antenna hole on the rear panel, and locate the IPEX connector on the motherboard.

1. Connect antenna RF cables to the IPEX connector.



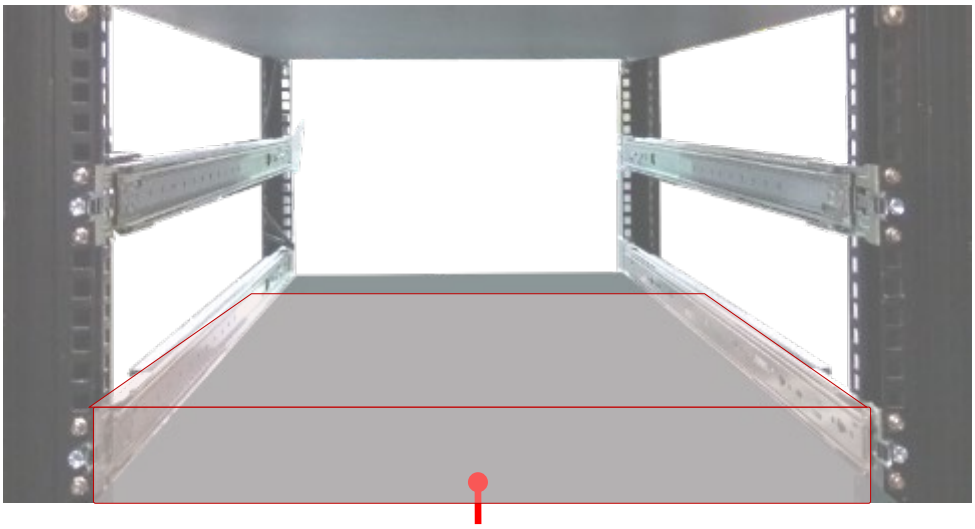
2. Screw on the antenna to the system.

Rack Mounting

There are two methods for installing this system into a rack:

- With **Mounting Ear Brackets** only

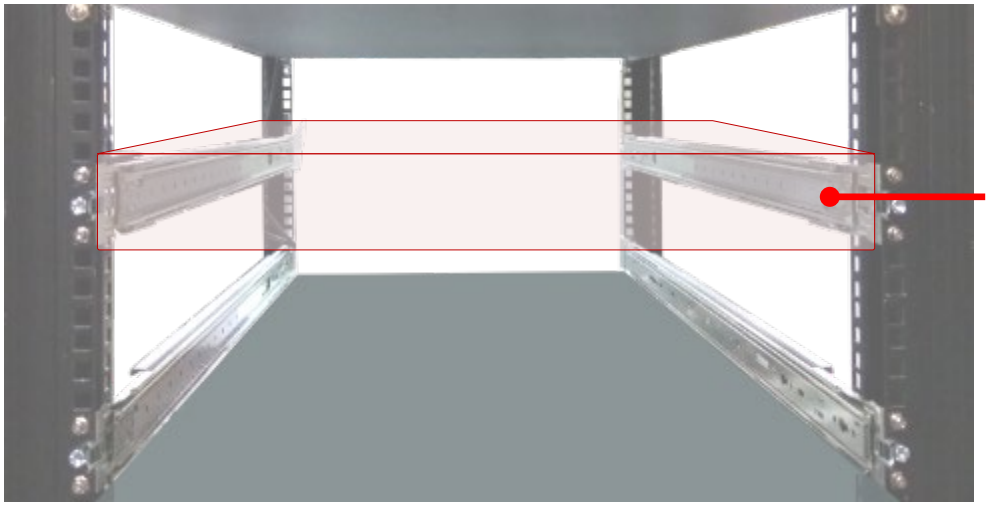
This method is quick and easy by fixing this system to the front posts of the rack, but it also makes servicing the system more difficult. Please note that the use of these brackets must go with a rack shelf or slide rails to prevent the chassis from falling over, for the bracket assembly alone cannot provide sufficient support to the chassis.



The system shall be installed on the rack along with a shelf or slide rails, for the “Mounting Ears" are meant to secure the system, not to support it.

- With **Slide Rail Kit + Mounting Ear Brackets**

This method is rather complicated, but the slidable rails allow you to access the system easily while securing it in the rack solidly.



The Slide Rail Kit can secure the system while providing sufficient weight support for the device.

Installing the System Using Mounting Ear Brackets Only

1. Check the accessory pack for the following items:
   - 1x Screw Pack
   - 2x Ear Brackets

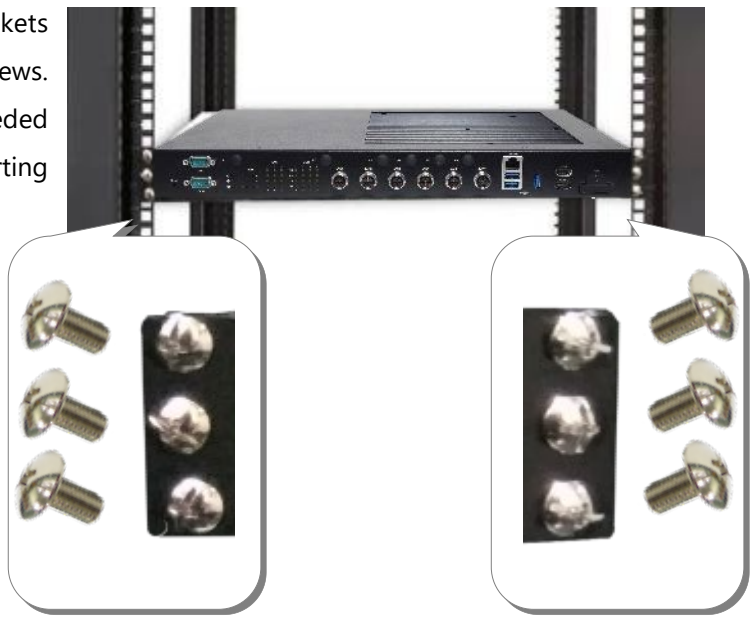
Screw Pack

Ear Brackets

2. Align the bracket to the side of the chassis and make sure the screw-holes are matched, and then secure the bracket onto the chassis with three provided screws.

3. Repeat Step 2 to attach the bracket to the other side of the chassis.

4. Install the chassis into the rack with the brackets fixed onto the posts using the provided screws. The actual approach you adopt and the needed parts for assembly will depend on the supporting accessory (shelf or rail kit) you use.



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Installing the System Using the Slide Rail Kit (with Mounting Ear Brackets)

1. Check the package contents of the Slide Rail Kit. The kit shall include the following items:

   - 1x pack of M4X4L screws (for securing the Rail Brackets on the system)
   - 1x pack of 7.1 Round Hole screws (for securing the system on the rail posts)
   - 2x Slide Rails

M4X4L Screws

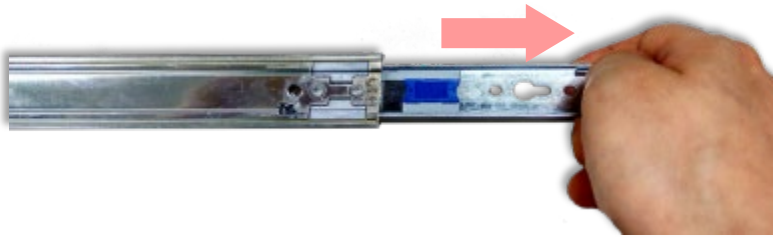
7.1 Round Hole Screws

Slide Rails

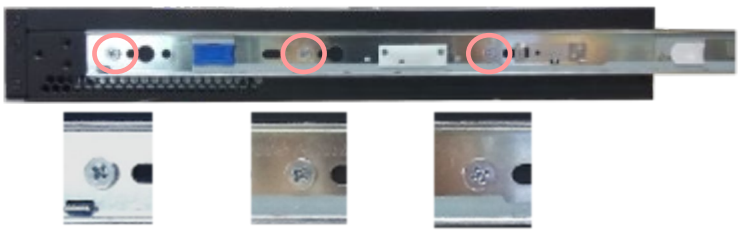
A rail consists of the following parts:

2. Unpack a slide rail and slide the Inner Rail all the way to the end.

3. Stretch the Rail Bracket to the fullest.
4. Remove the Rail Bracket from the Inner Rail by pushing the Release Tab on the bracket outwards while sliding it out.



5. Align the bracket to the side of the chassis and make sure the screw-holes are matched, and then secure the bracket onto the chassis with three provided M4X4L screws.

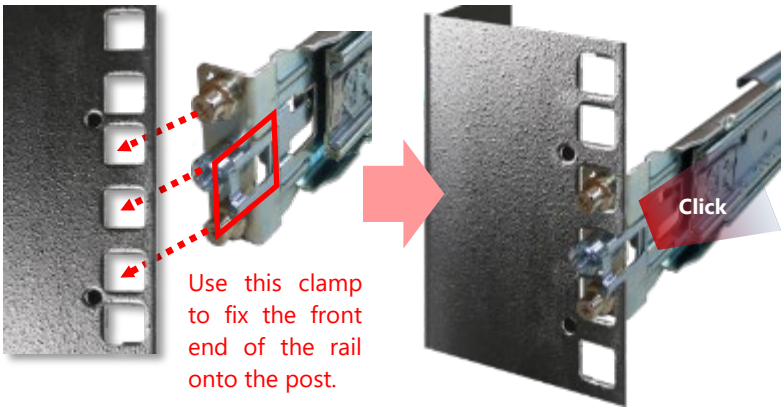


Align the screws with the holes indicated on the brackets and the screw holes on the side of the chassis.

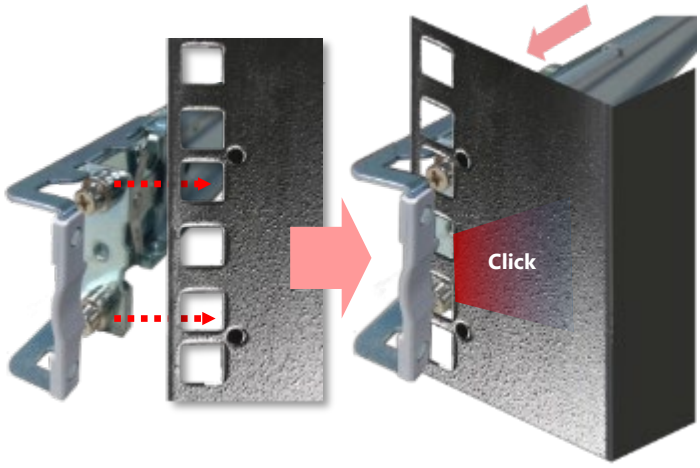
6. Repeat Steps 2~5 to attach the bracket to the other side of the chassis.
7. Follow the instructions in Installing the System Using Mounting Ear Brackets Only to attach the Mounting Ear Brackets.

Now, you shall install the slide rail assemblies onto the rack.

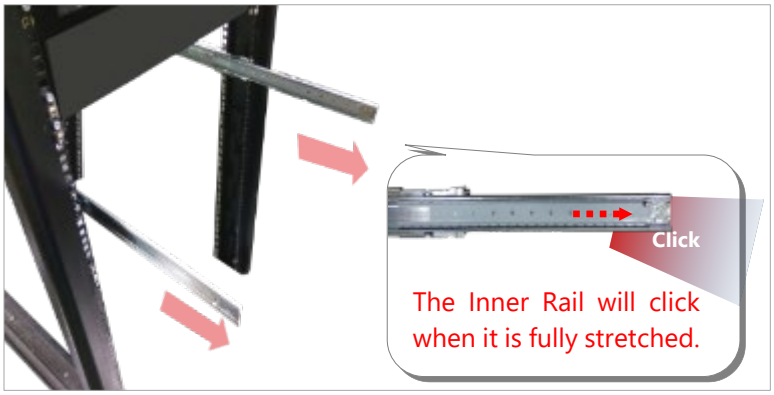
8. This slide rail kit does NOT require screw-fixing. Simply aim at three available screw holes on the rack front and snap the rail front into the rack post as shown in the image. You should hear a "click" sound once it is firmly attached.



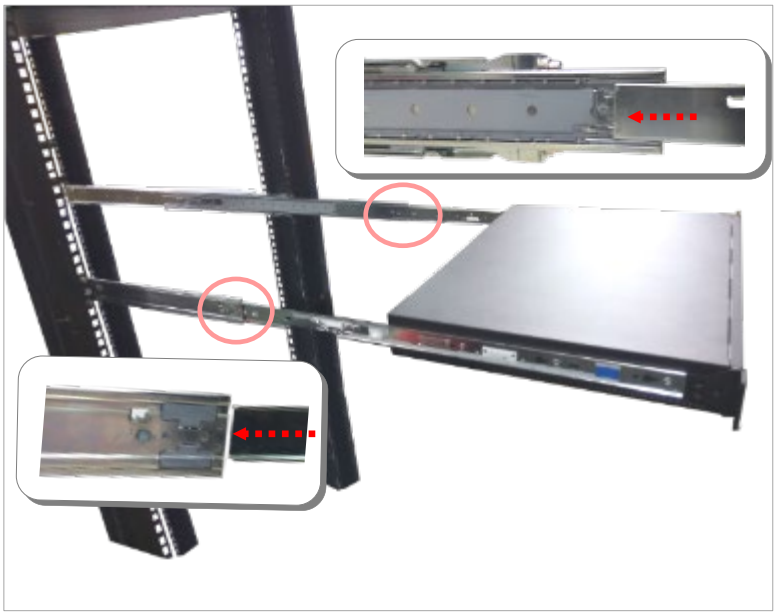
9. For the rear rack installation, slide the rail to aim and engage the bolts on the rail's rear end with the two available holes on the post, and the rail assembly will click into place.



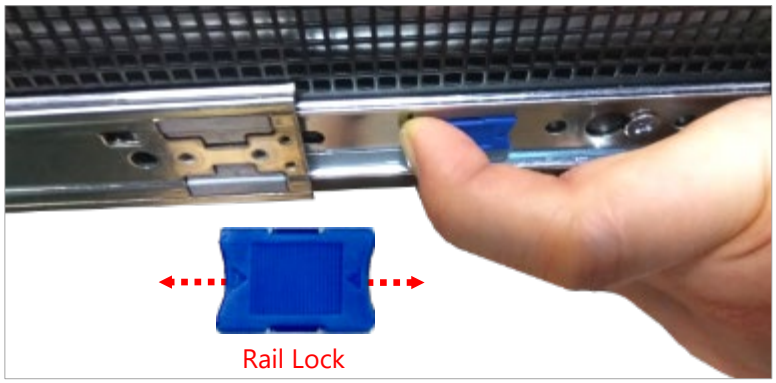
10. Stretch both of the Inner Rails out to their fullest extent. You will hear a click sound when they are fully stretched and locked.



11. Hold the system with its front facing you, lift the chassis and gently engage the brackets on the system while aligning them with the Inner Rails as shown in the image, and then push the system into the cabinet.

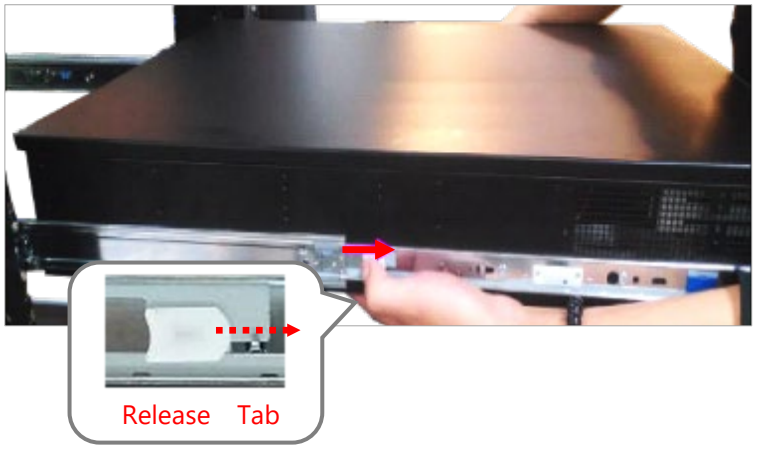


12. While pushing in the system, also push and hold the Rail Lock tab on both brackets.



Push the system all the way in until it stops.

To remove the system from the rack, gently pull it outwards, towards you, while pushing the Release Tab on both sides of the brackets.



CHAPTER 3: SOFTWARE SETUP

BIOS Setup

BIOS is a firmware embedded on an exclusive chip on the system's motherboard. Lanner's BIOS firmware offering including market-proven technologies such as Secure Boot and Intel Boot Guard technology deliver solid commitments for the shield protection against malware, uncertified sequences, and other named cyber threats.

Main Page Setup

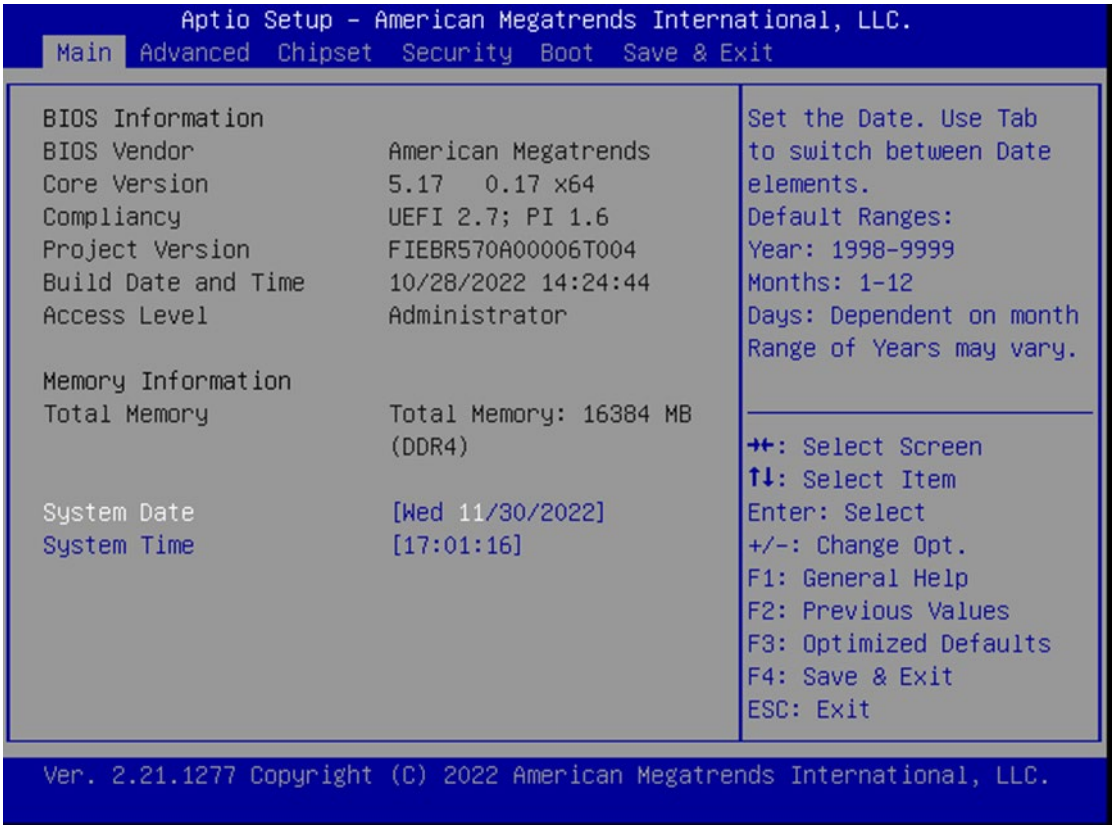
To enter the BIOS setup utility, simply follow the steps below:

1. Boot up the system.
2. Pressing the **<Tab>** or **<Del>** key immediately allows you to enter the Setup utility, and 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

Main Page

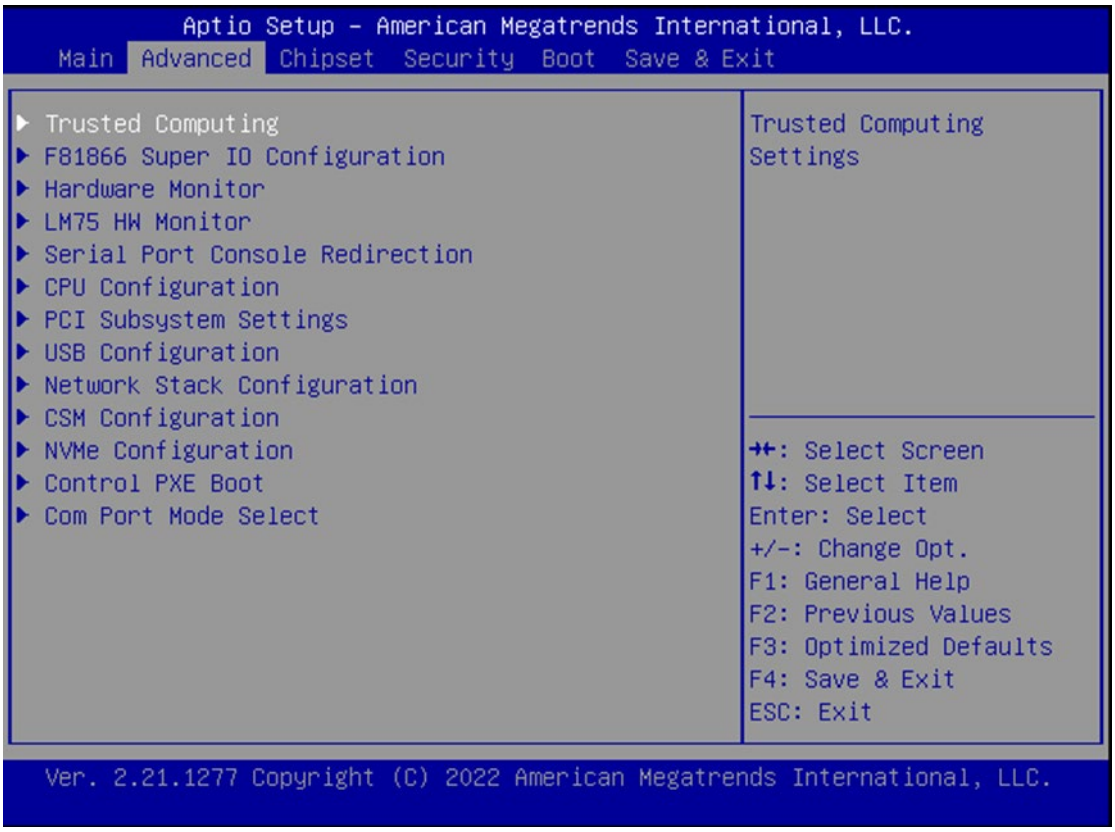
Setup main page contains BIOS information and project version information.



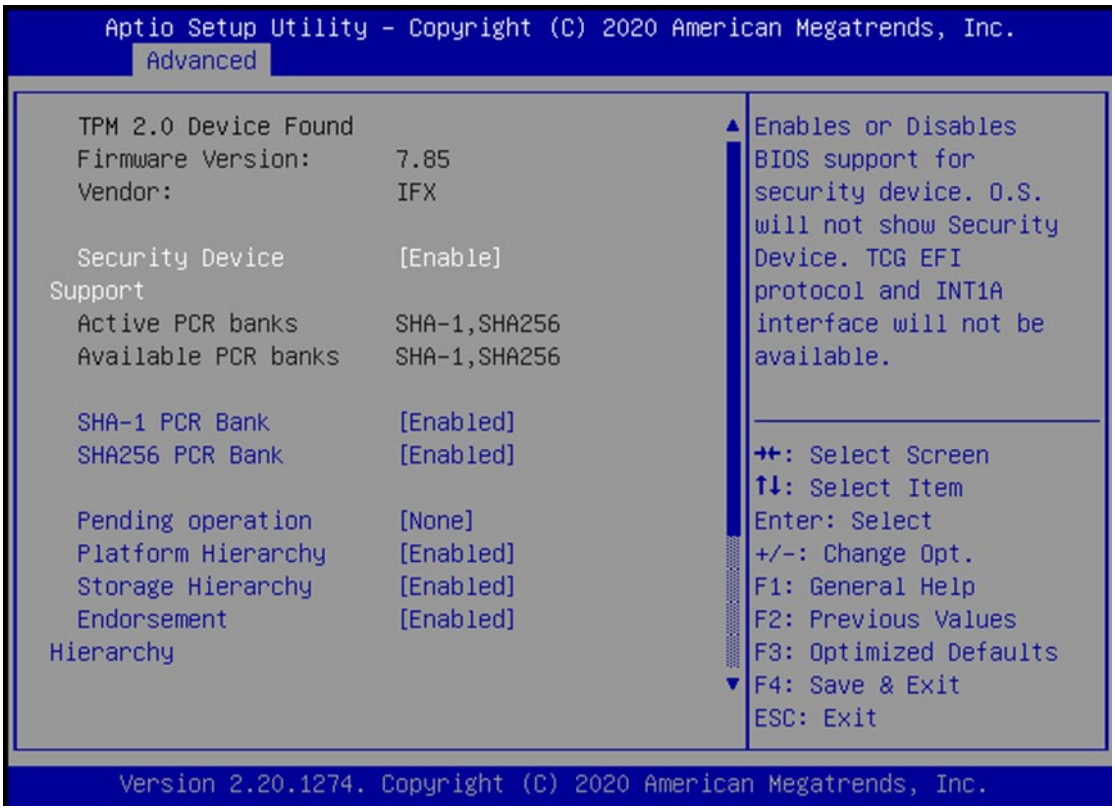
Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User
System Date	To set the Date, use **<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.

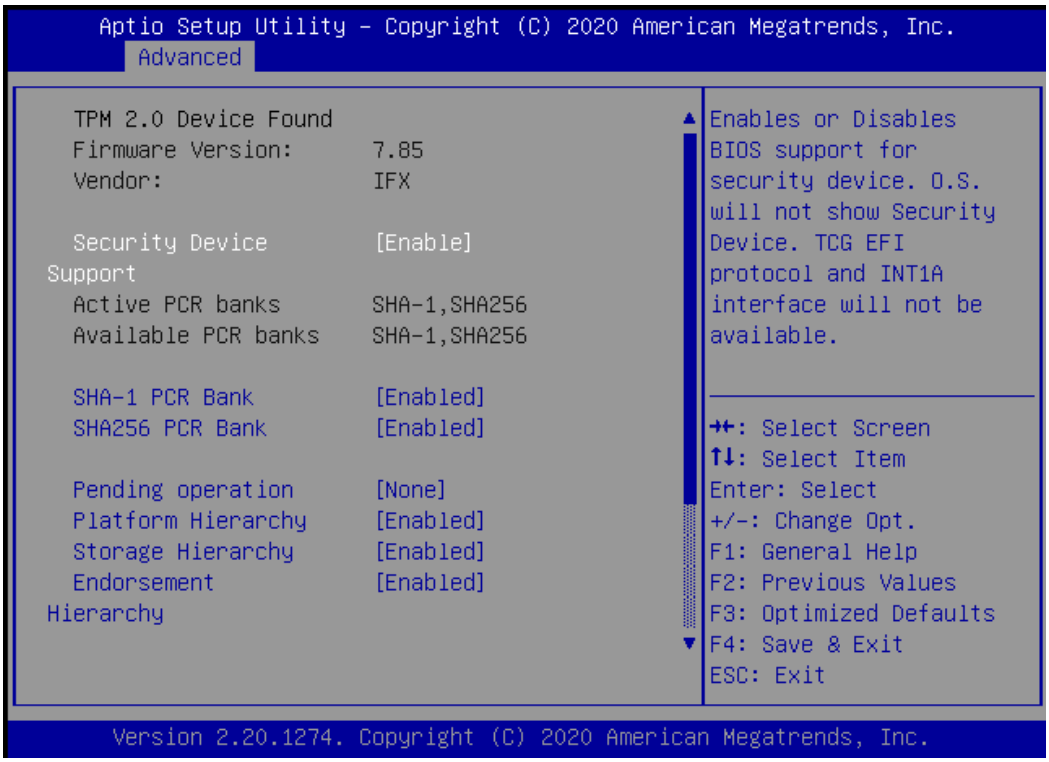


Trusted Computing



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.

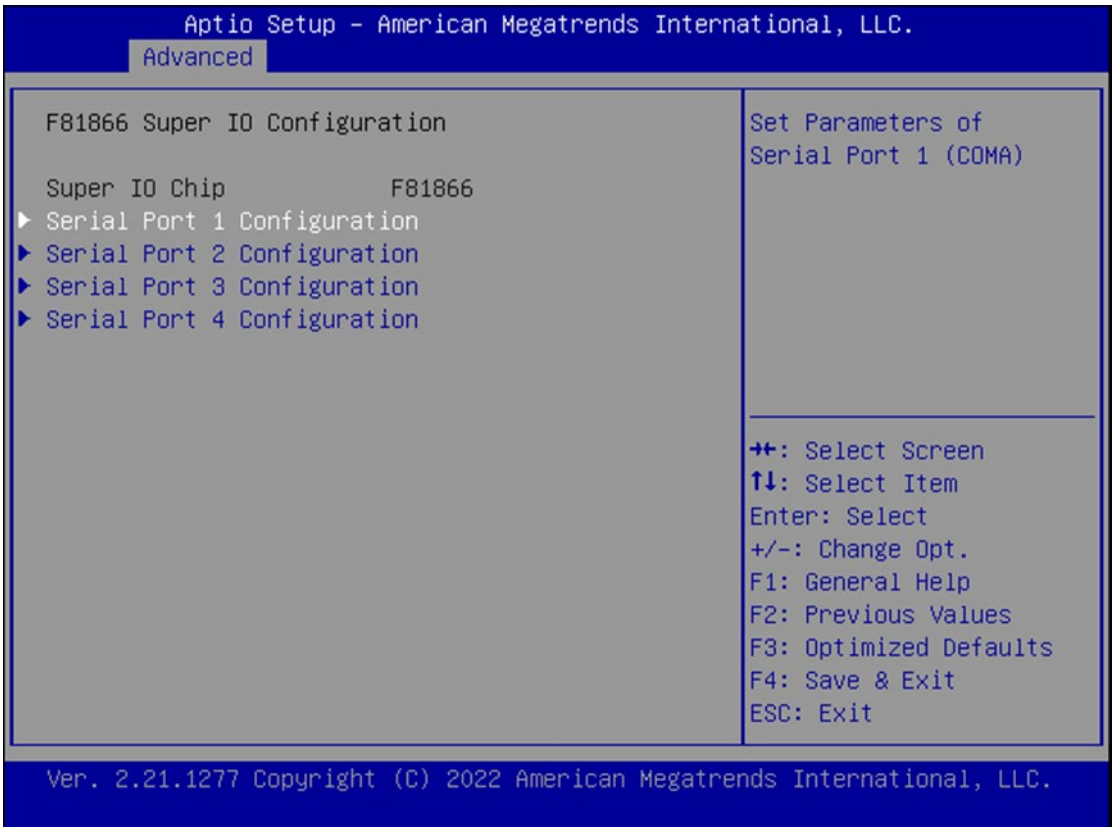
Trusted Computing (TPM 2.0)



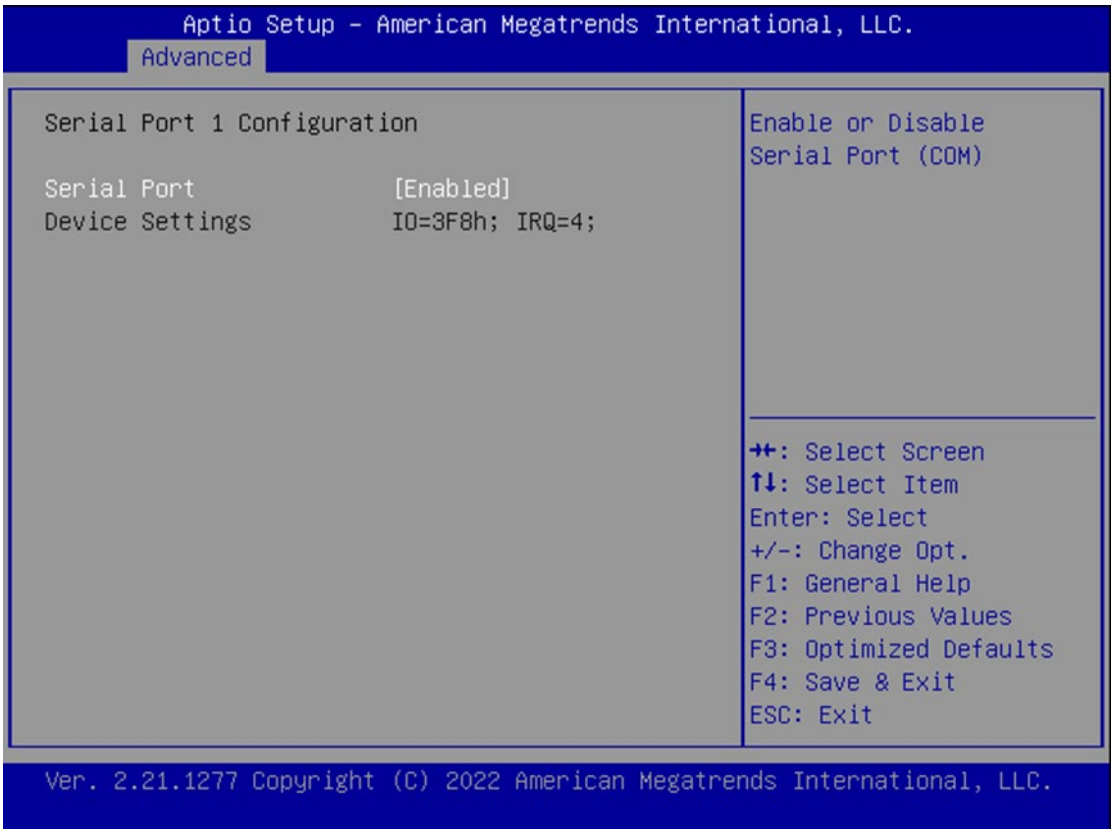
Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA-1 PCR Bank	Enabled Disabled	Enables or disables SHA-1 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	1.2	Select to tell OS to support PPI Spec Version 1.2 or 1.3.

Spec Version	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.

F81866 Super IO Configuration

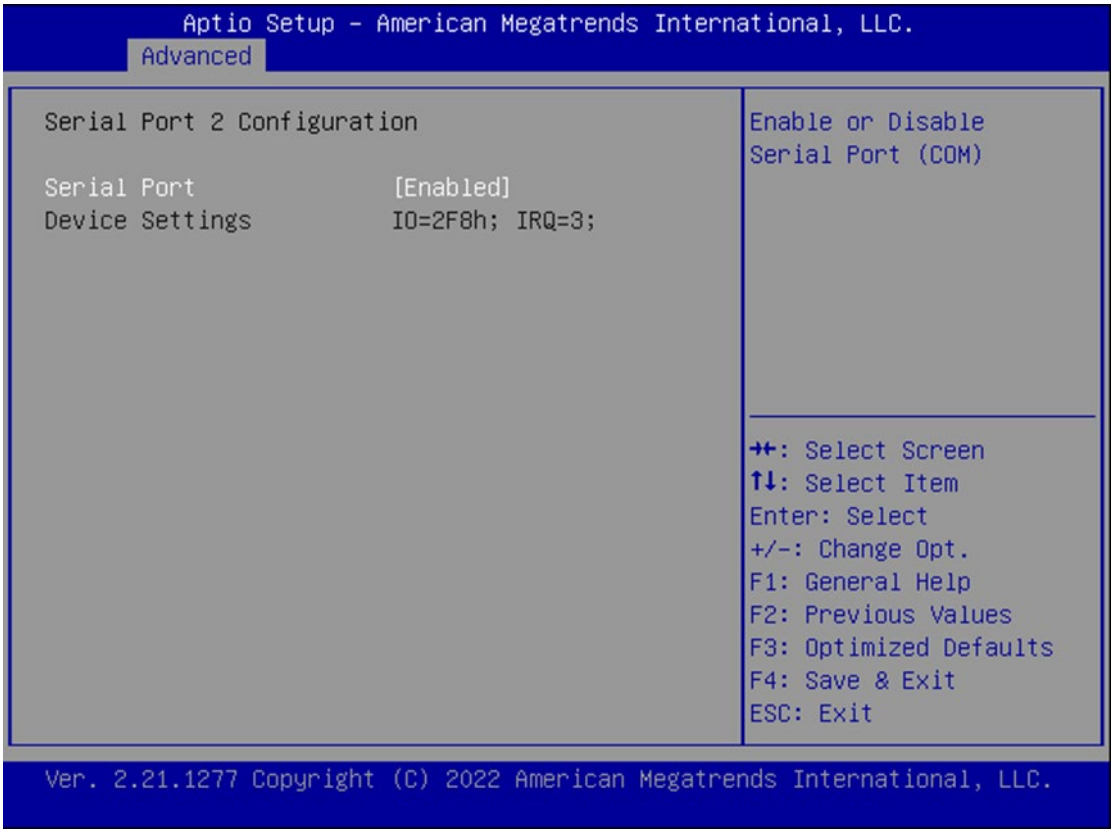


Serial Port 1 Configuration



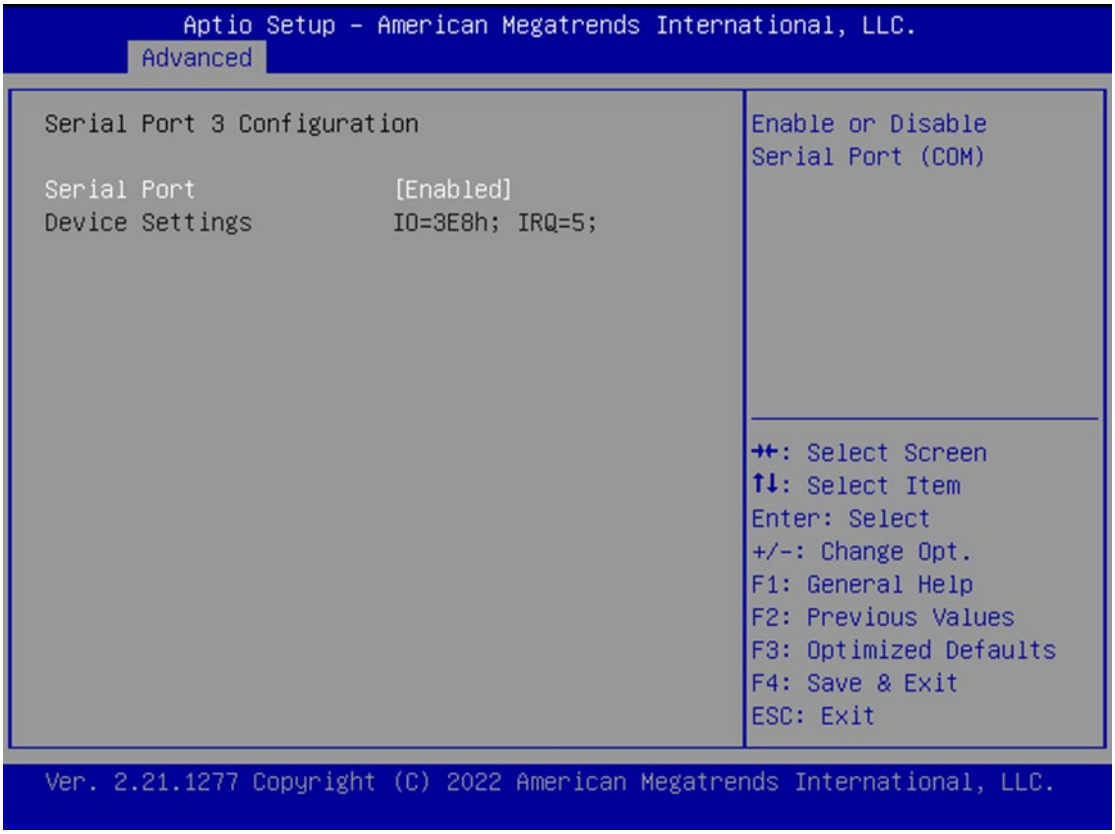
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 1.
Device Settings	NA	IO=3F8h; IRQ = 4

Serial Port 2 Configuration



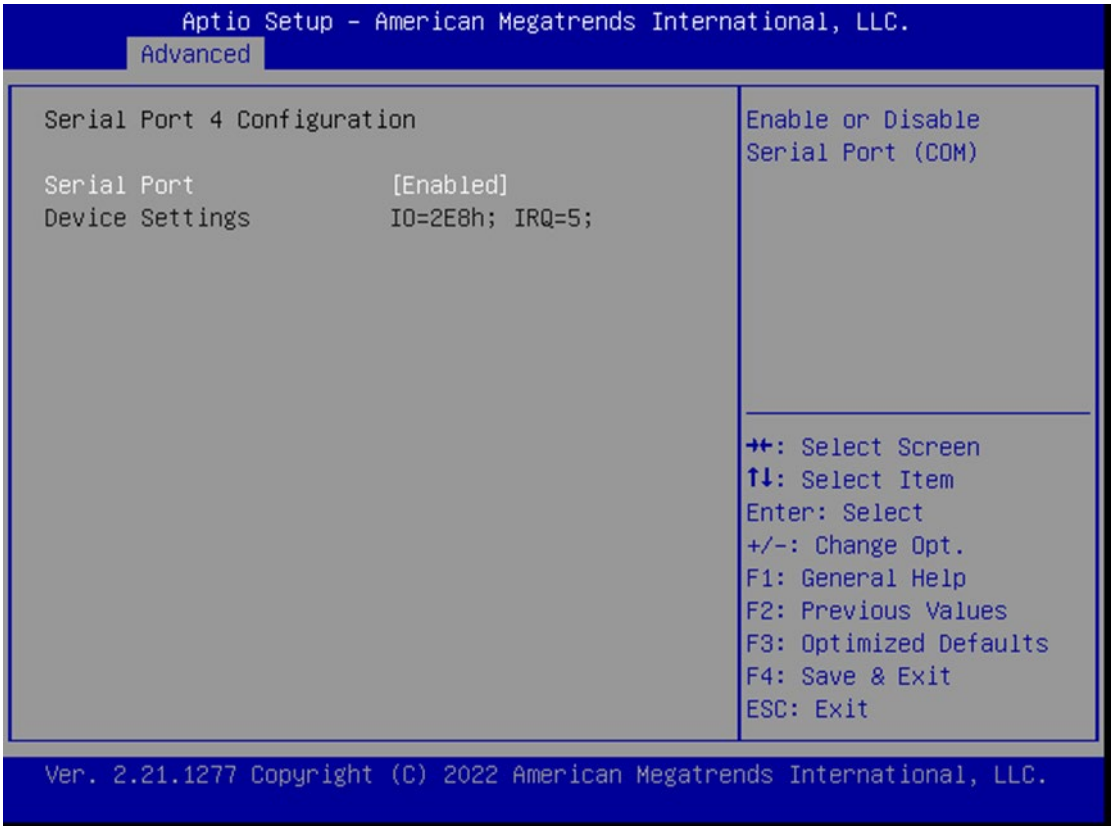
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 2.
Device Settings	NA	IO=2F8h; IRQ = 3

Serial Port 3 Configuration



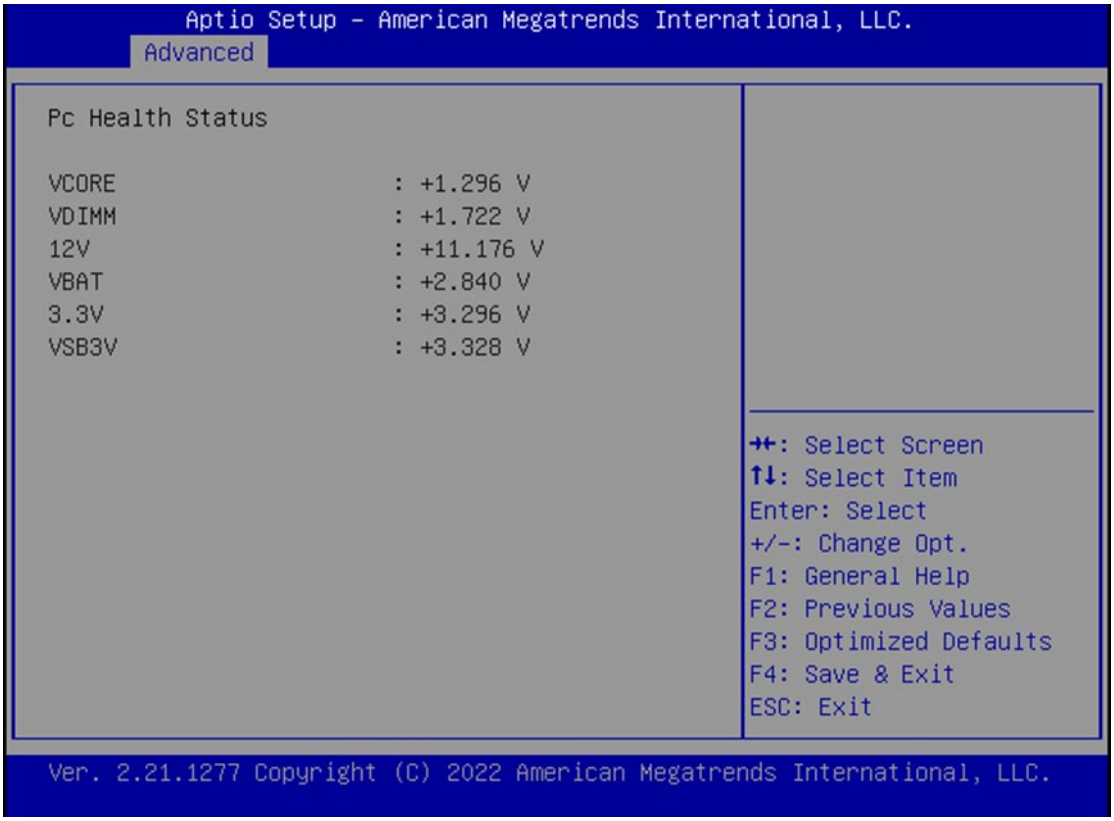
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 3.
Device Settings	NA	IO=3E8h; IRQ = 5

Serial Port 4 Configuration

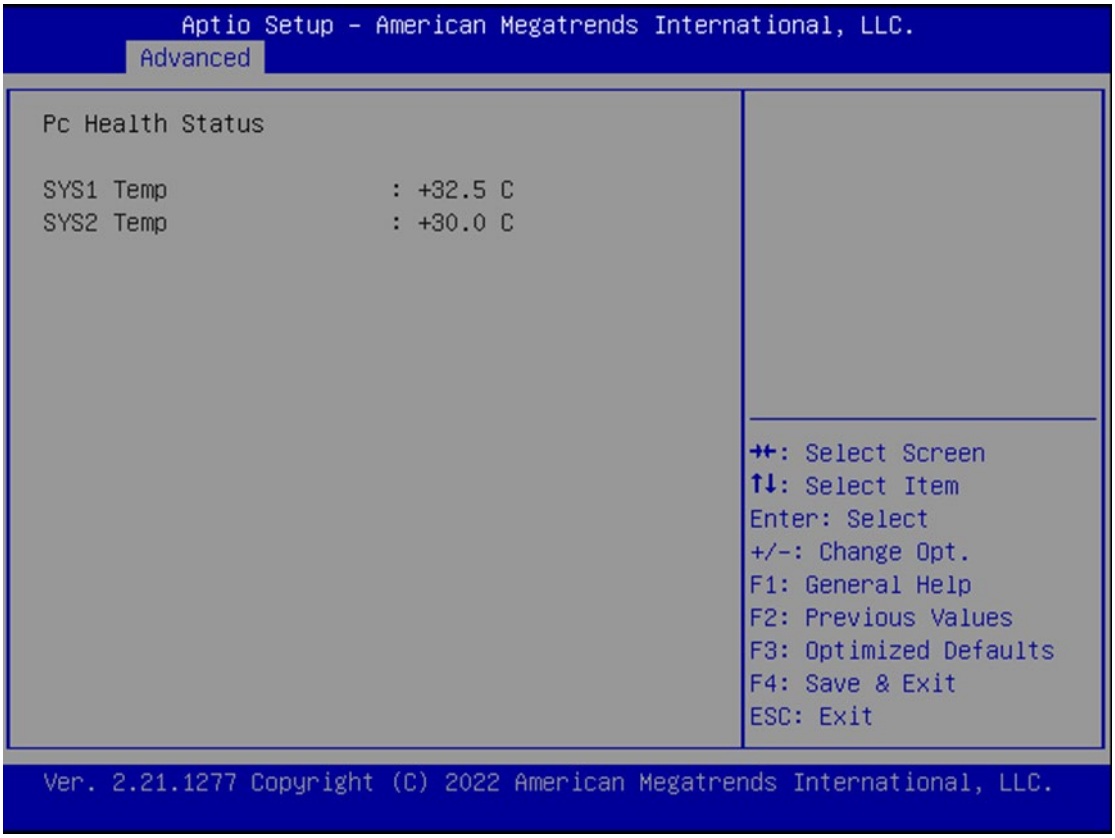


Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 4.
Device Settings	NA	IO=2E8h; IRQ = 5

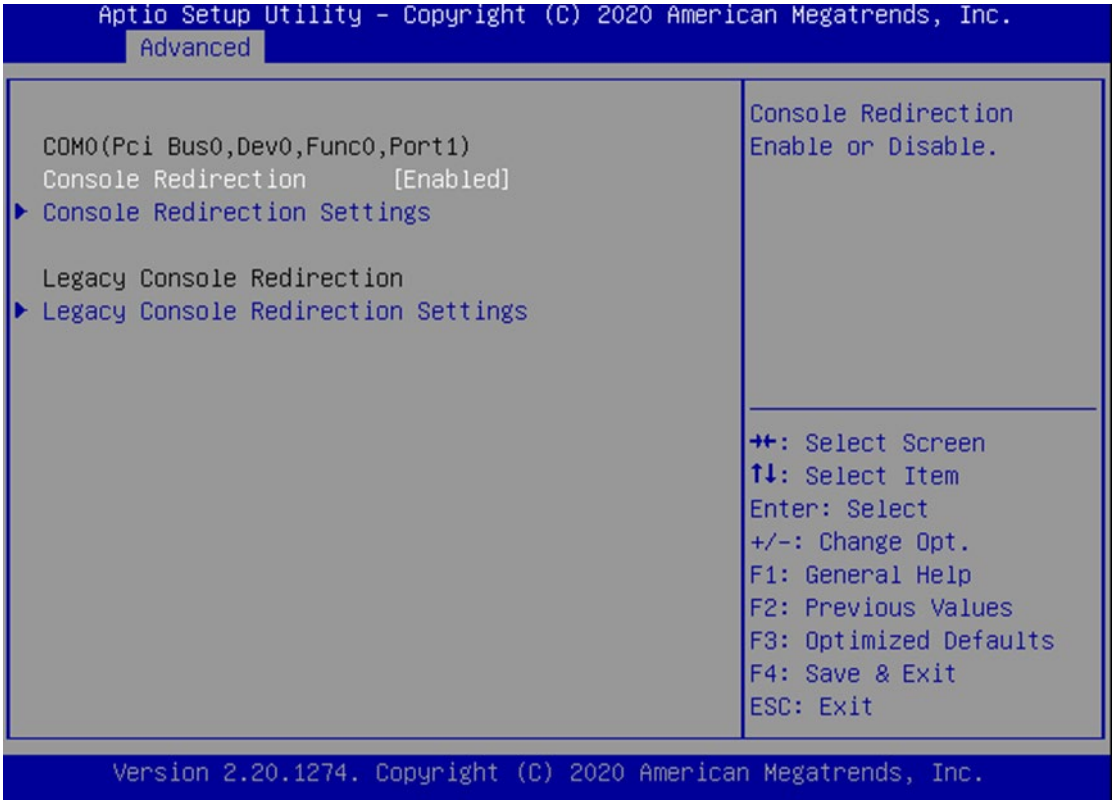
■ Hardware Monitor



■ LM75 Hardware Monitor

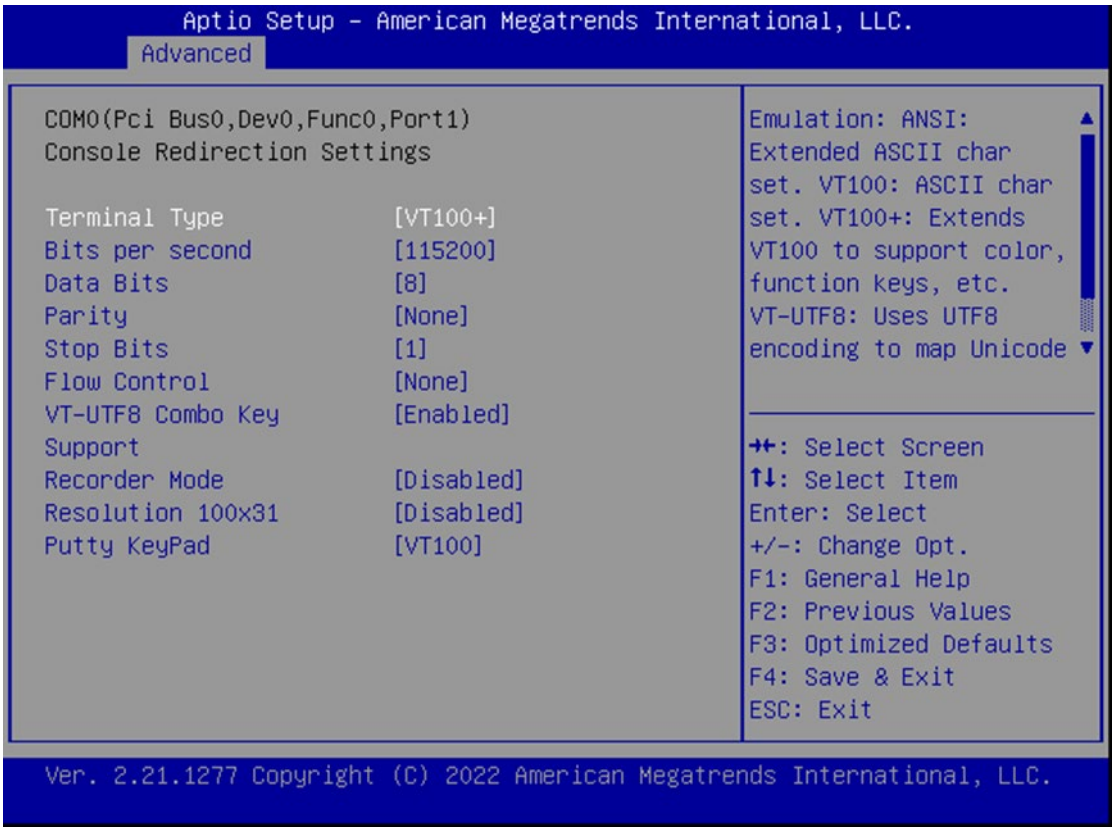


■ Serial Port Console Redirection



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

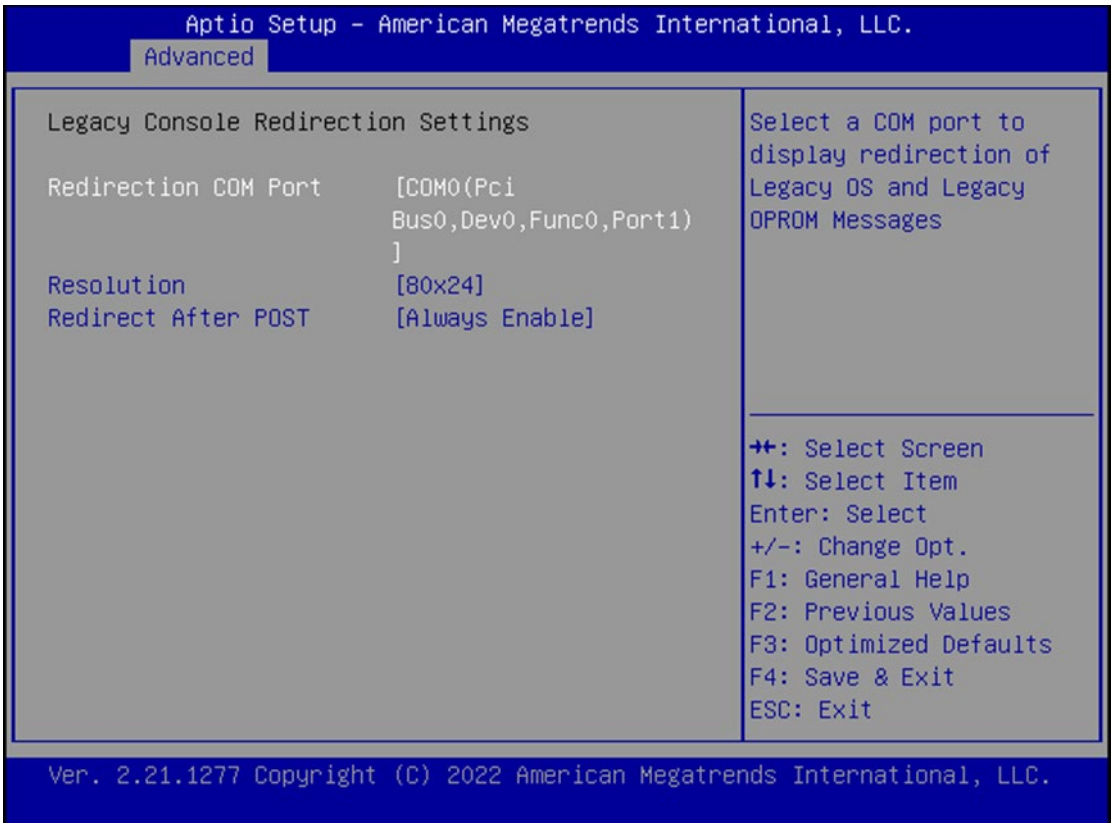
Console Redirection Setting



Feature	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	**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	Indicates the end of a serial data packet.

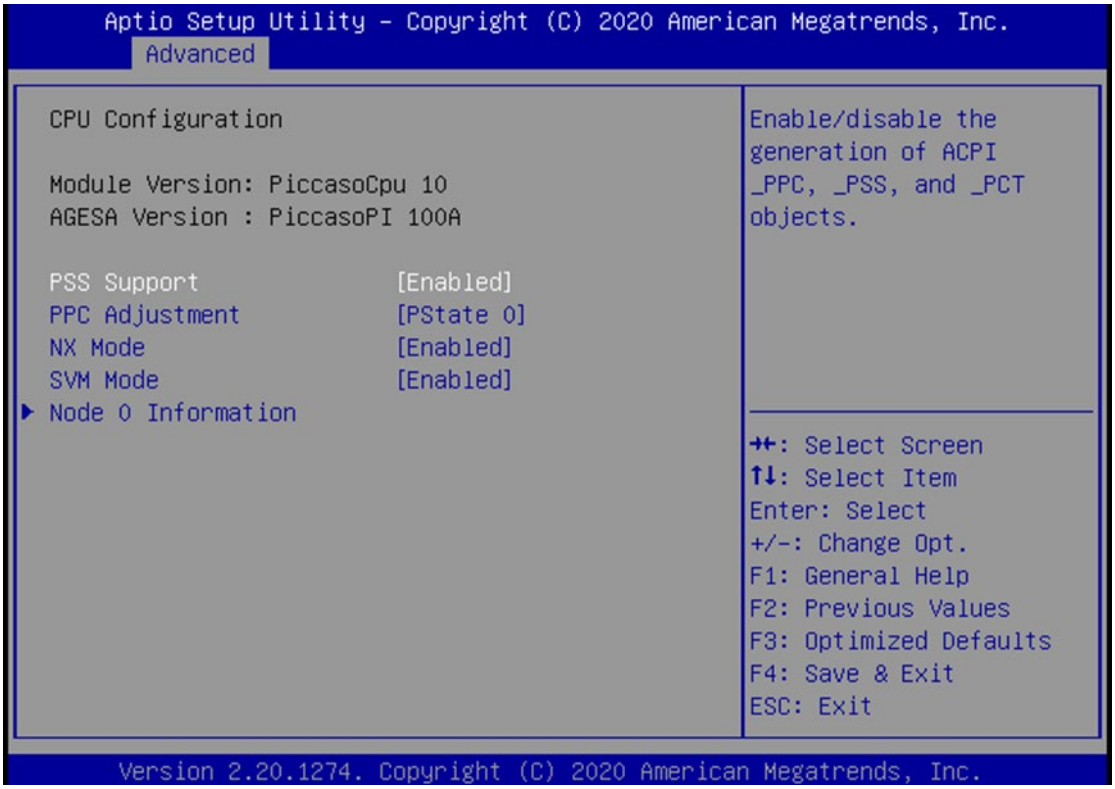
Flow Control	None Hardware RTS/CTS	Flow Control can prevent data loss from buffer overflow.
VT-UTF8 Combo Key Support	Disabled Enabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled, only text will be sent. This is to capture Terminal 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.

Legacy Console Redirection Settings



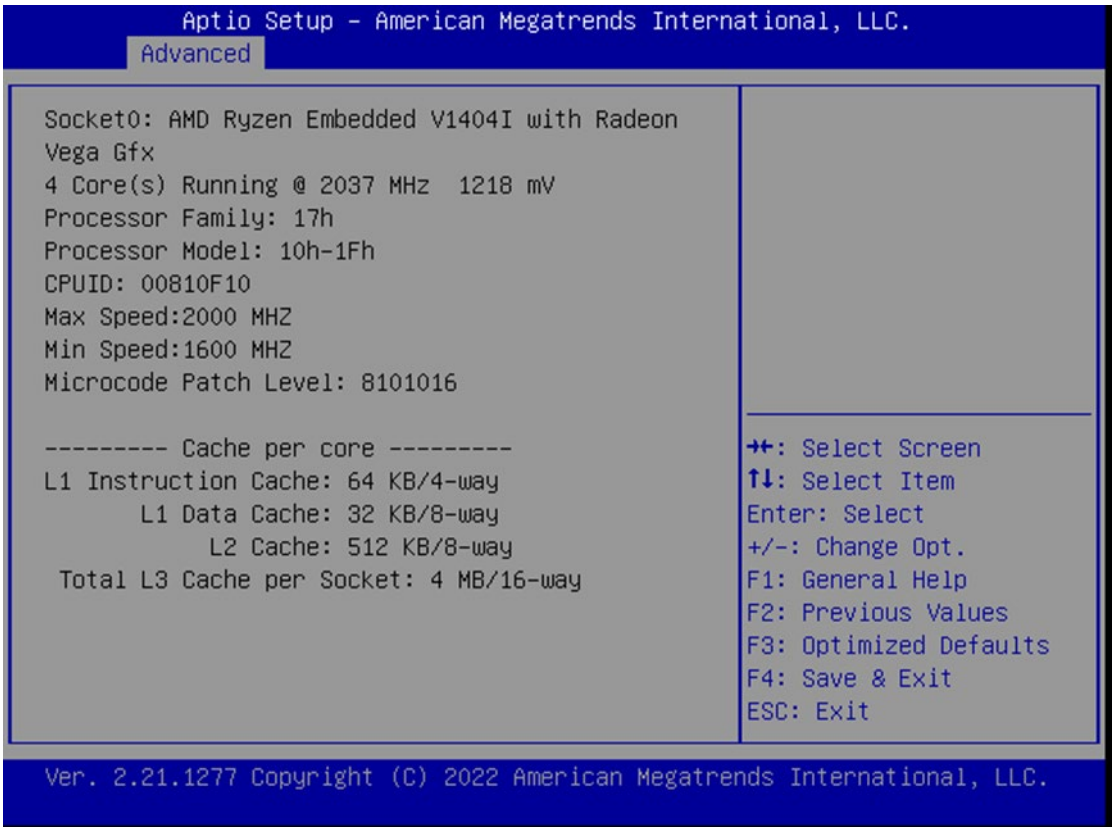
Feature	Options	Description
Legacy Serial Redirection Port	COM0	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages
Legacy OS Redirection Resolution	80x24 80x25	On Legacy OS, the Number of Rows and Columns supported redirection.
Redirection After BIOS POST	Always Enabled BootLoader	When **Bootloader** is selected, 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

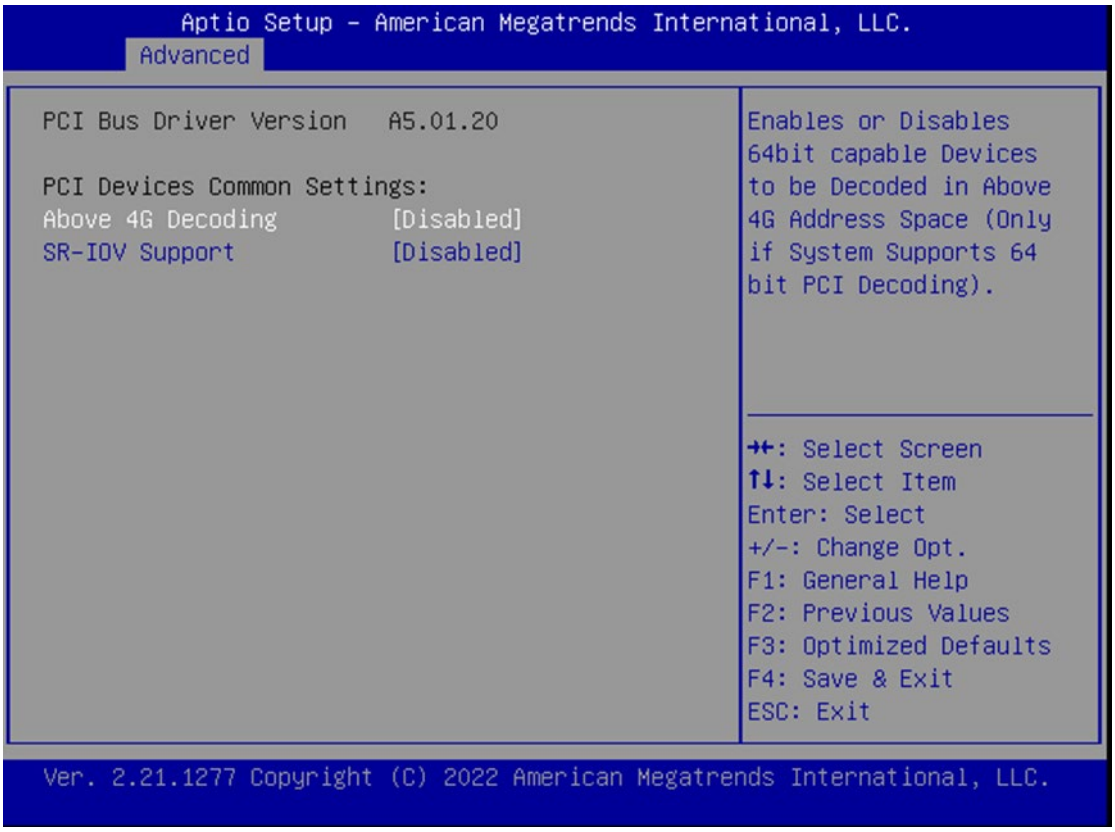


Feature	Options	Description
PSS Support	Enabled Disabled	Enable/disable the generation of ACPI _PPC, _PSS, and _PCT objects.
PPC Adjustment	PState 0 PState 1 PState 2	Provide to adjust _PPC object.
NX Mode	Enabled Disabled	Enable/disable No-execute page protection Function.
SVM Mode	Enabled Disabled	Enable/disable CPU Virtualization.

Node 0 Information

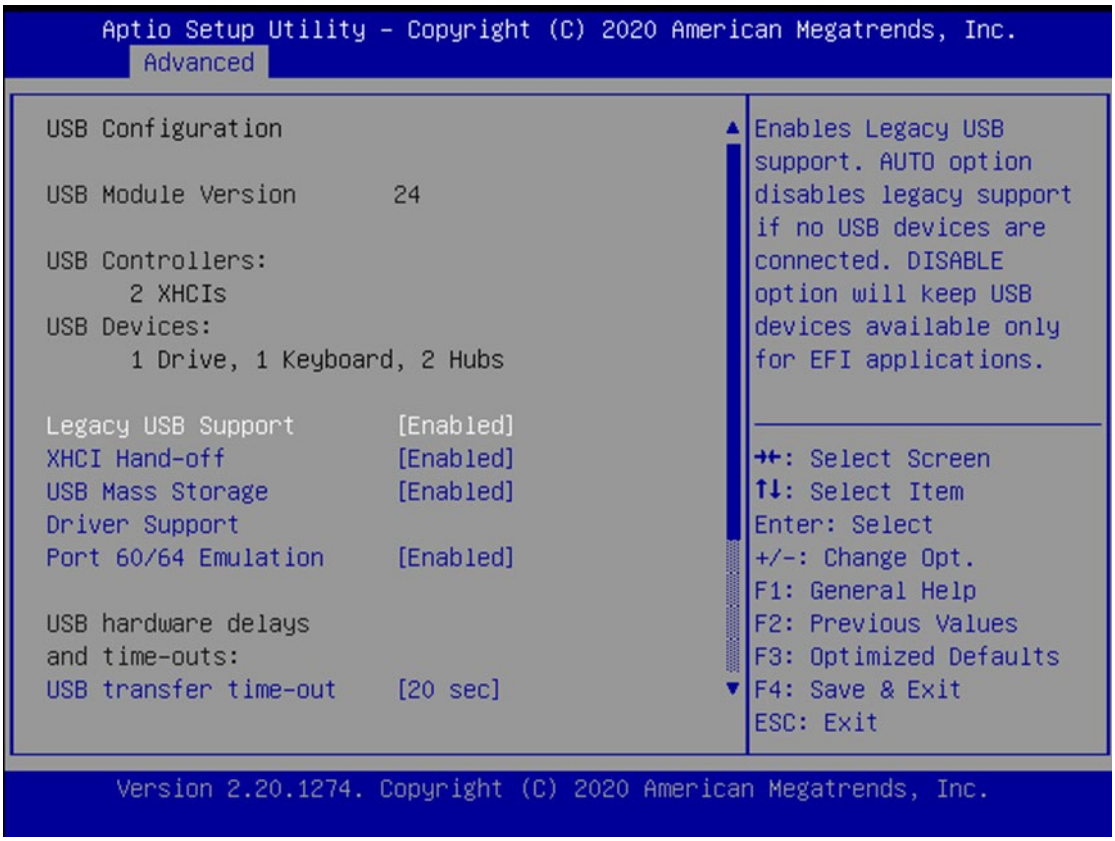


■ PCI Subsystem Settings



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

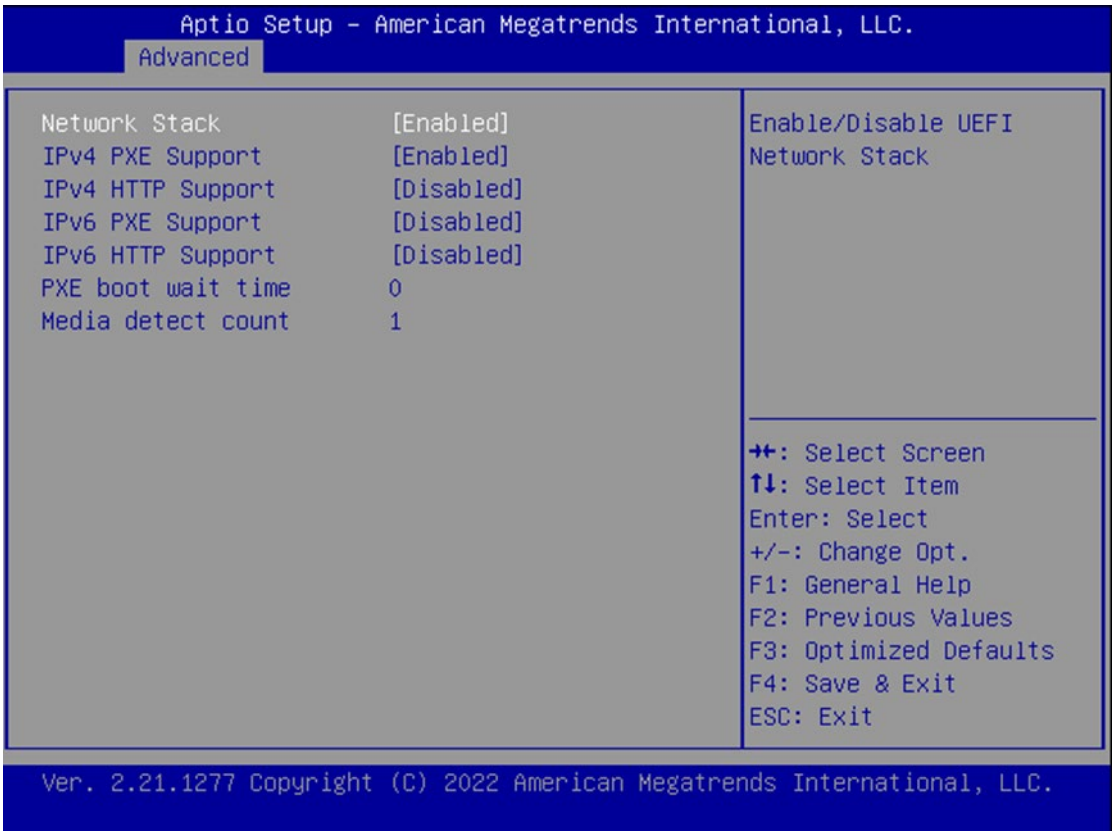
■ USB Configuration



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	Enabled Disabled	Enables or disables USB Mass Storage Driver Support.
Port 60/64 Emulation	Enabled Disabled	Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec	The time-out value for Control, Bulk, and Interrupt transfers
Device reset	1 sec	USB mass storage device Start Unit command time-out

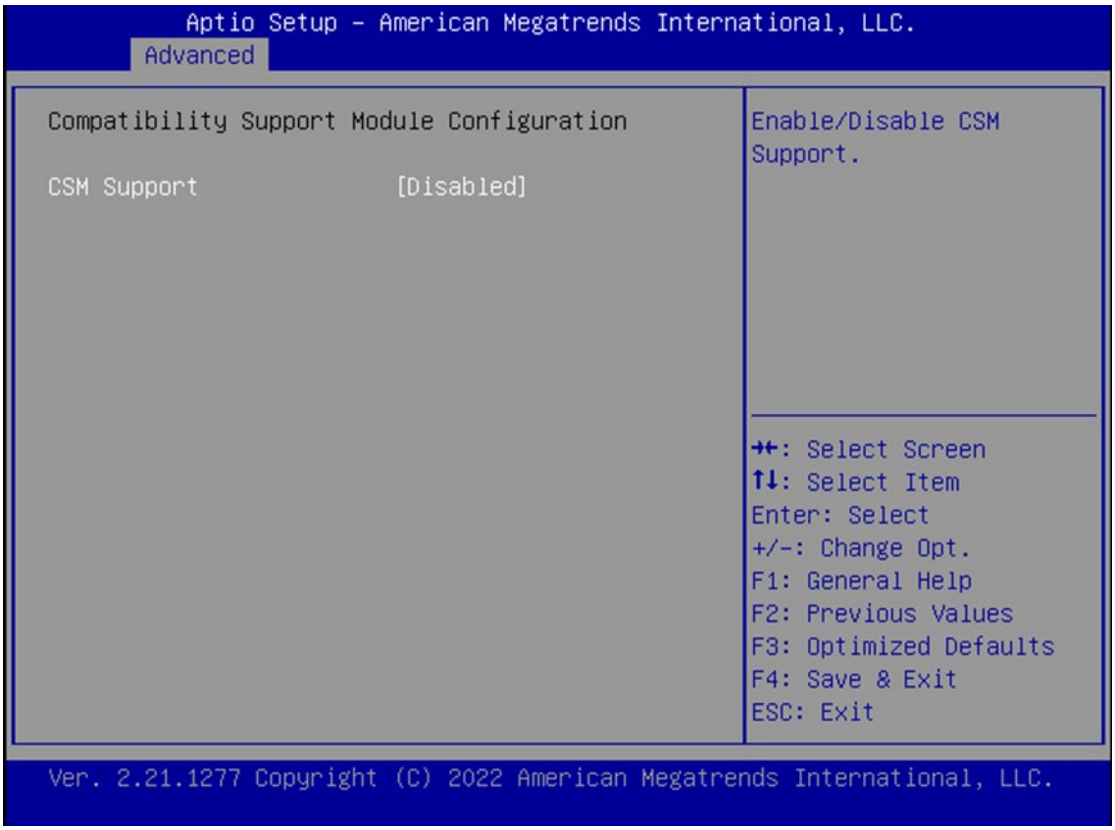
time-out	5 sec 10 sec 20 sec	
Device power-up delay	Auto Manual	Maximum time the device will take before it properly reports itself to the Host Controller. **Auto** uses default value: for a Root port, it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

■ Network Stack Configuration



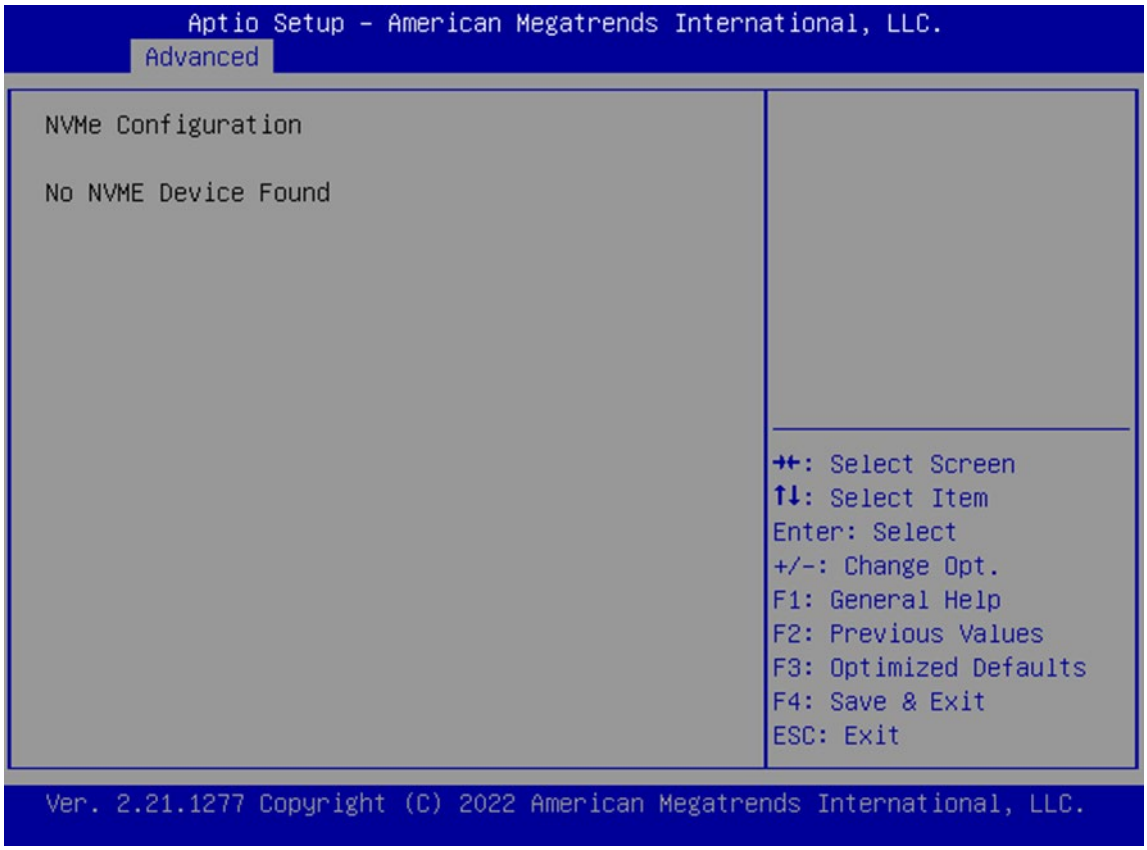
Feature	Options	Description
Network Stack	Disabled Enabled	Enables or disables UEFI Network Stack
Ipv4 PXE Support	Disabled Enabled	Enables Ipv4 PXE Boot Support. If IPV4 is disabled, PXE boot option will not be created.
Ipv4 HTTP Support	Disabled Enabled	Enables Ipv4 HTTP Boot Support. If IPV4 is disabled, HTTP boot option will not be created.
Ipv6 PXE Support	Disabled Enabled	Enables Ipv6 PXE Boot Support. If IPV6 is disabled, PXE boot option will not be created.
Ipv6 HTTP Support	Disabled Enabled	Enables Ipv6 HTTP Boot Support. If IPV6 is disabled, HTTP boot option will not be created.
PXE boot wait time	0	Wait time to press **<ESC>** key to abort the PXE boot
Media detect count	1	Number of times the presence of media will be checked

■ CSM Configuration

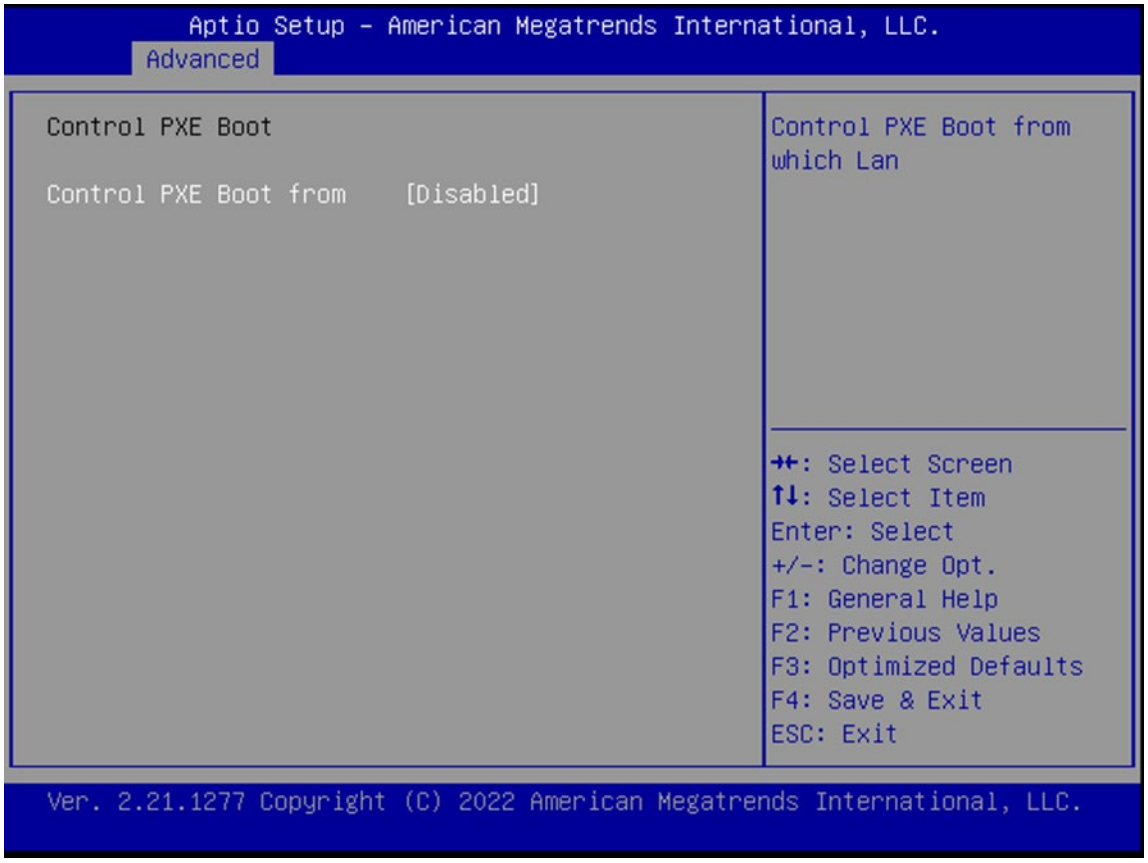


Feature	Options	Description
CSM Support	Disabled Enabled	Enables or disables CSM Support
Network	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM
Storage	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy Storage OpROM
Video	Do Not Launch UEFI Legacy	Controls 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

■ NVMe Configuration

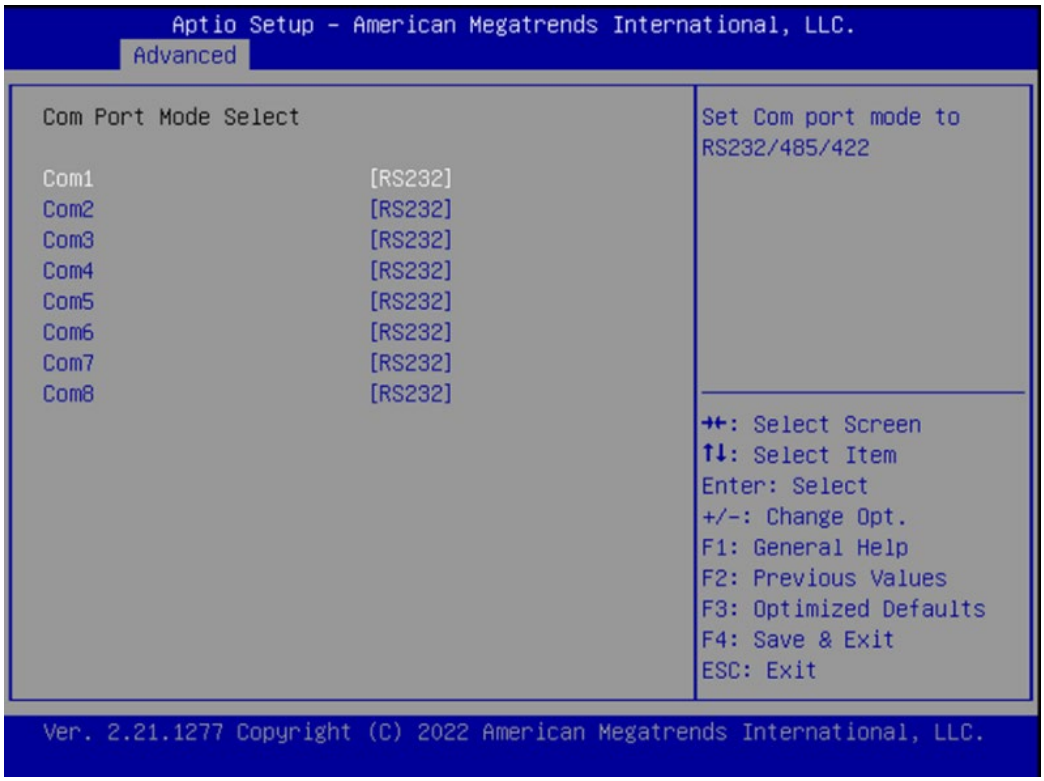

Aptio Setup – American Megatrends International, LLC.
Advanced
NVMe Configuration
No NVME Device Found
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Ver. 2.21.1277 Copyright (C) 2022 American Megatrends International, LLC.

■ Control PXE Boot



Feature	Options	Description
Control PXE Boot from	Disabled Lan1 Lan2 Lan3 Lan4	Control PXE Boot from which Lan

■ Com Port Mode Select

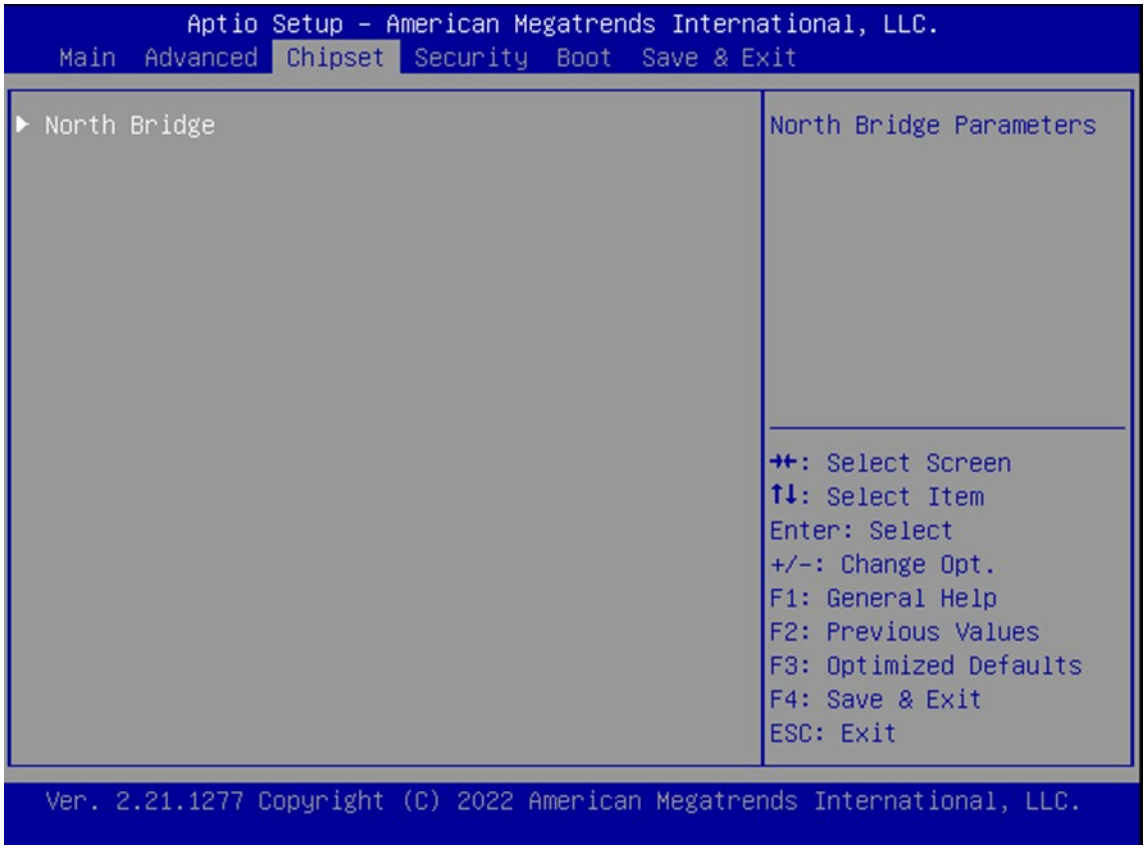


Feature	Options	Description
Com1	Loop Back RS485 RS232 RS422	Set Com port mode to RS232/485/422
Com2	Loop Back RS485 RS232 RS422	Set Com port mode to RS232/485/422
Com3	Loop Back RS485 RS232 RS422	Set Com port mode to RS232/485/422
Com4	Loop Back RS485 RS232 RS422	Set Com port mode to RS232/485/422
Com5	Loop Back RS485 RS232 RS422	Set Com port mode to RS232/485/422

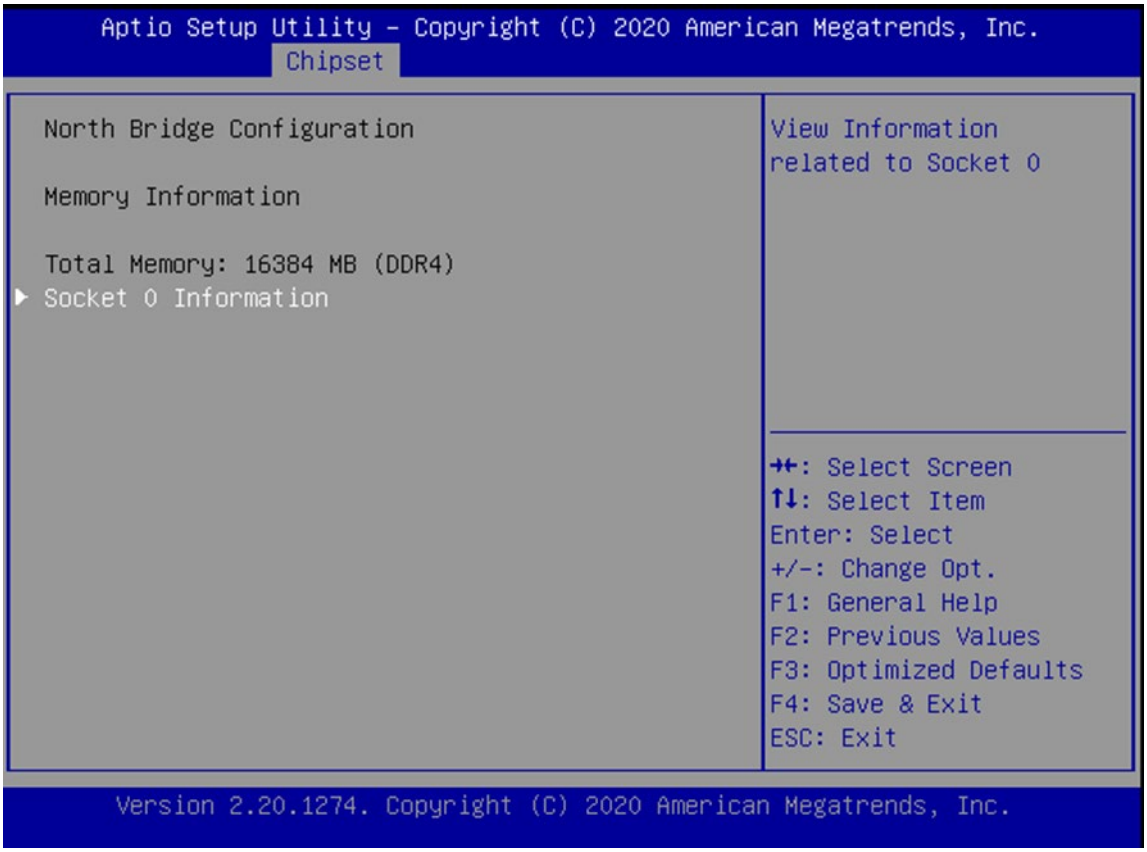
Com6	Loop Back RS485 RS232 RS422	Set Com port mode to RS232/485/422
Com7	Loop Back RS485 RS232 RS422	Set Com port mode to RS232/485/422
Com8	Loop Back RS485 RS232 RS422	Set Com port mode to RS232/485/422

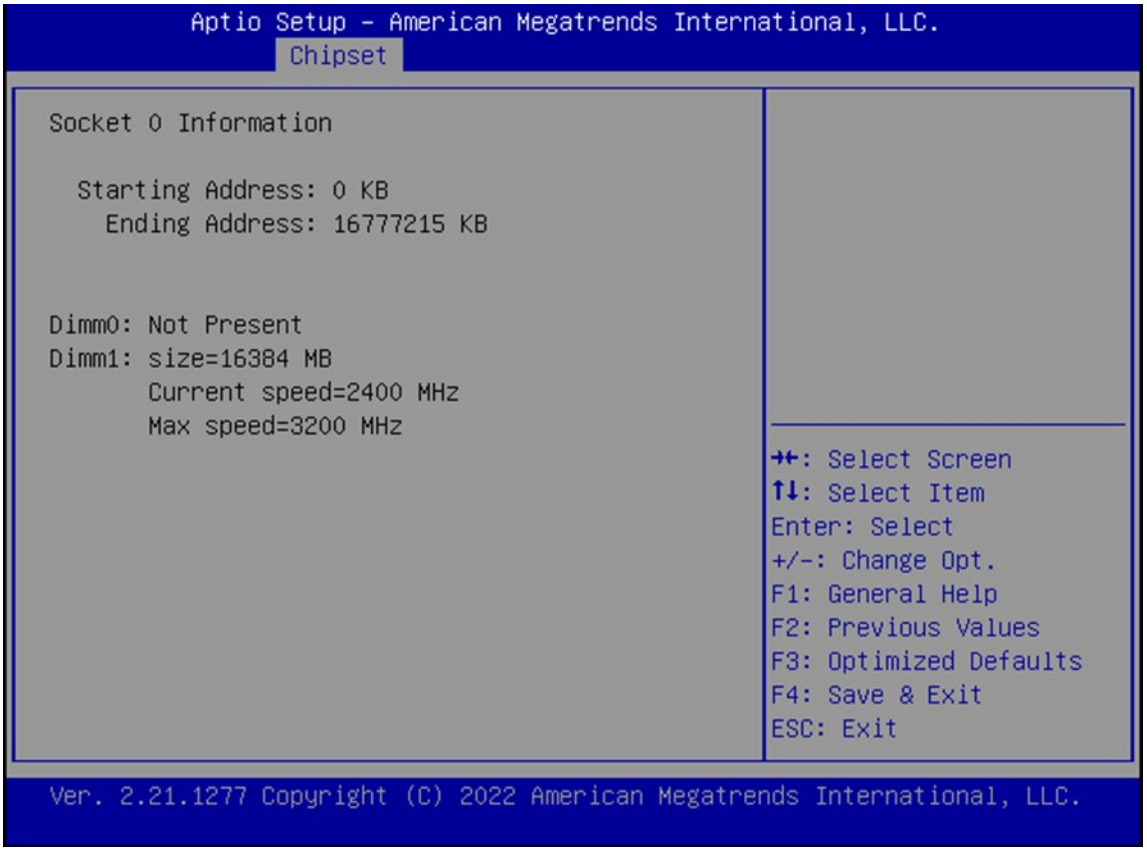
Chipset

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



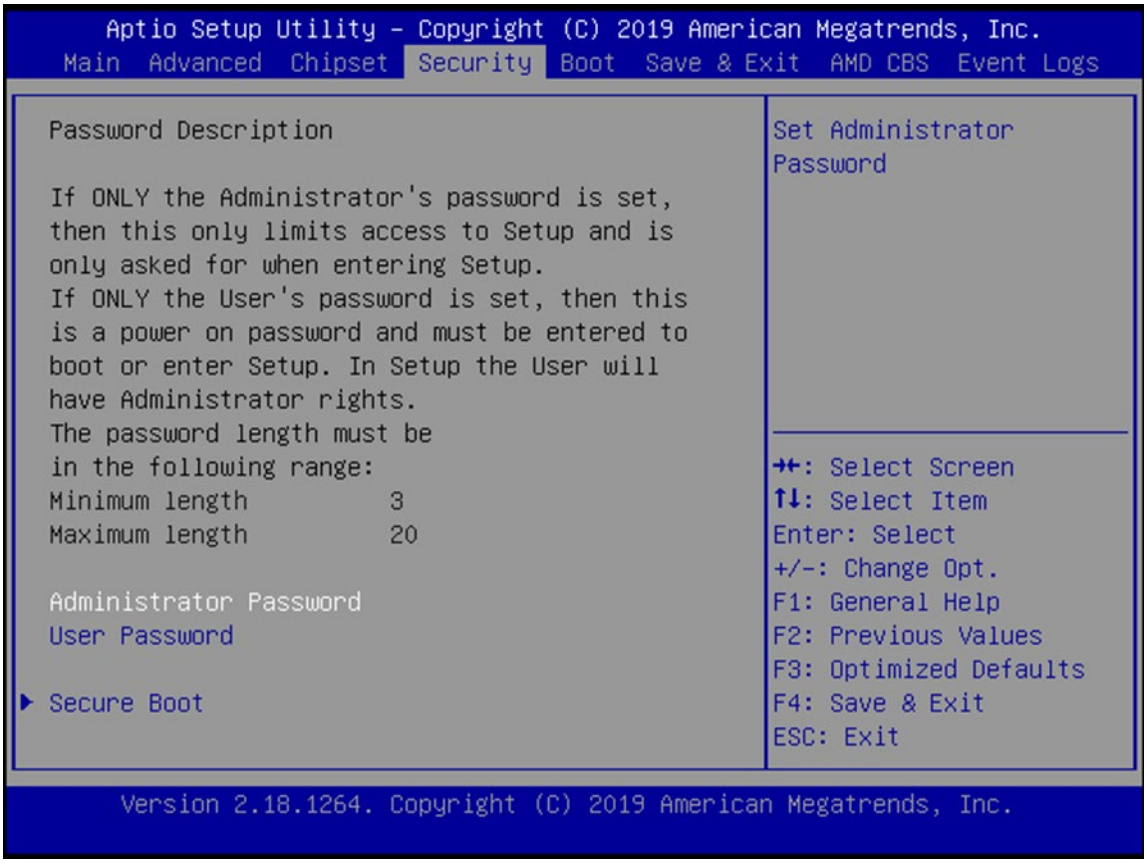
■ North Bridge





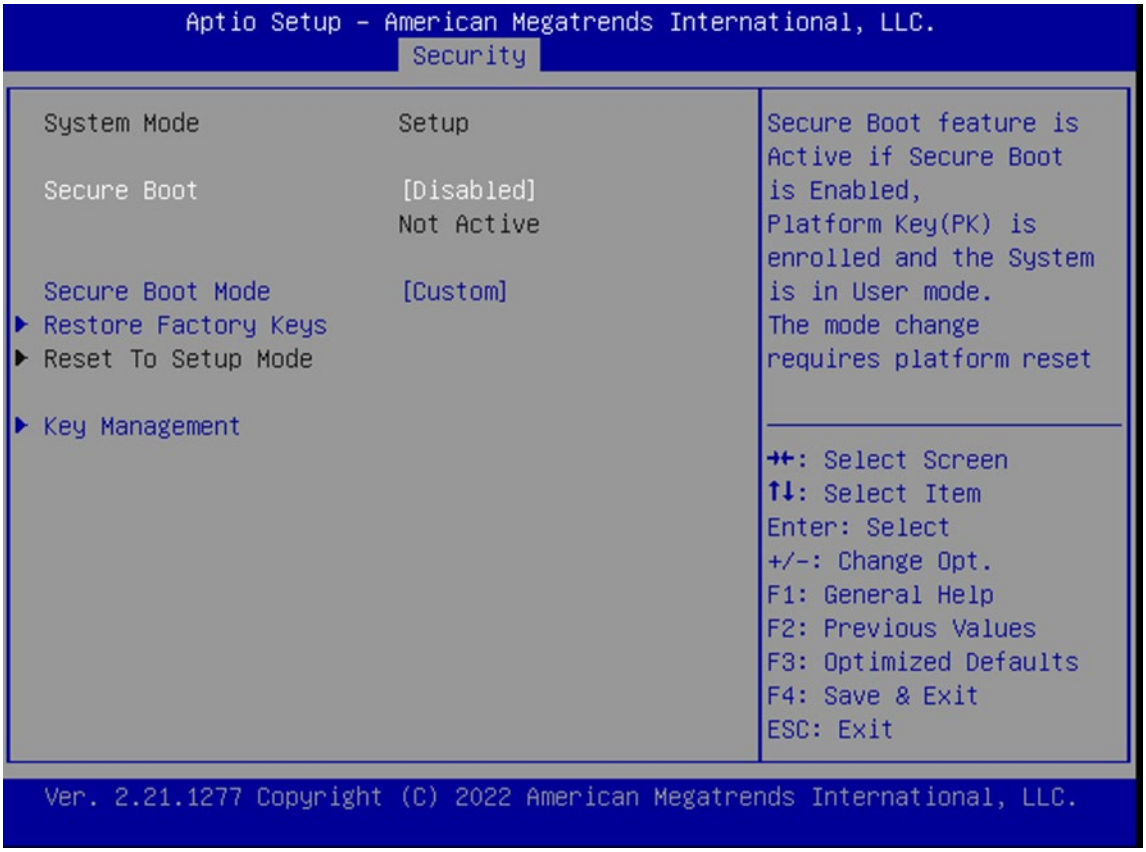
Security

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.



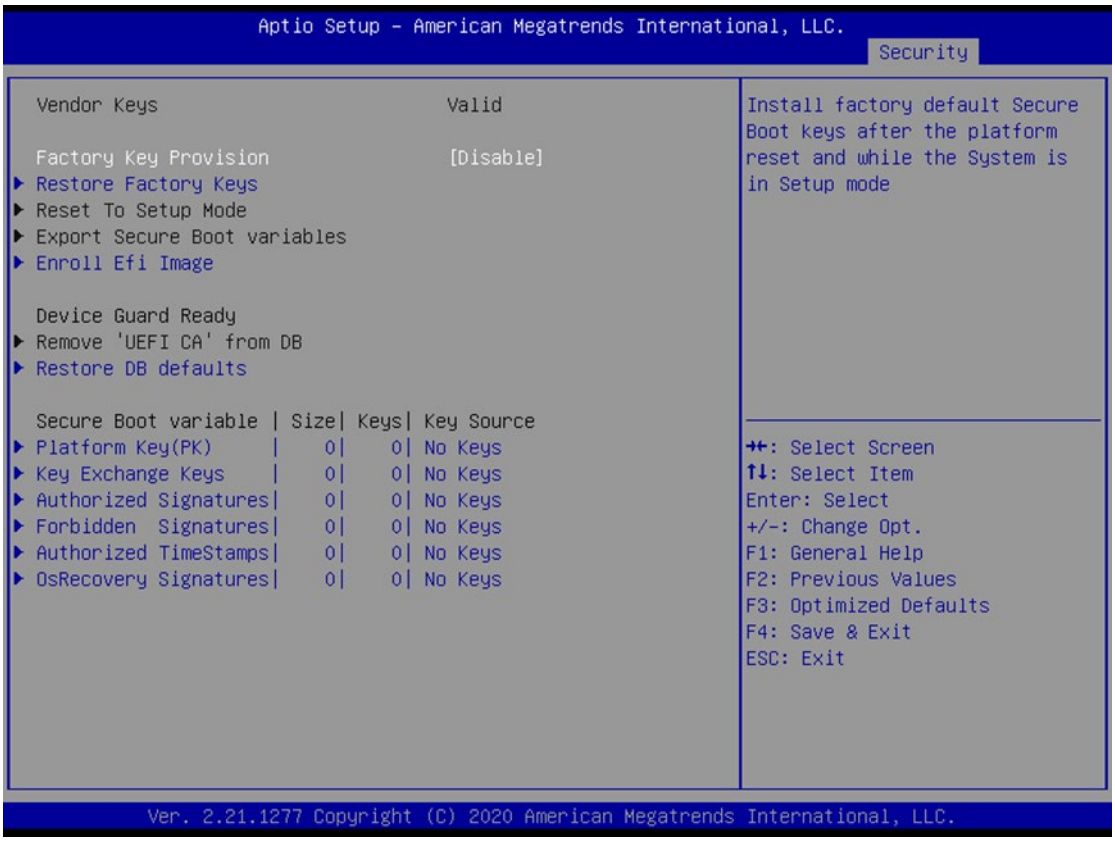
Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the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

■ Secure Boot



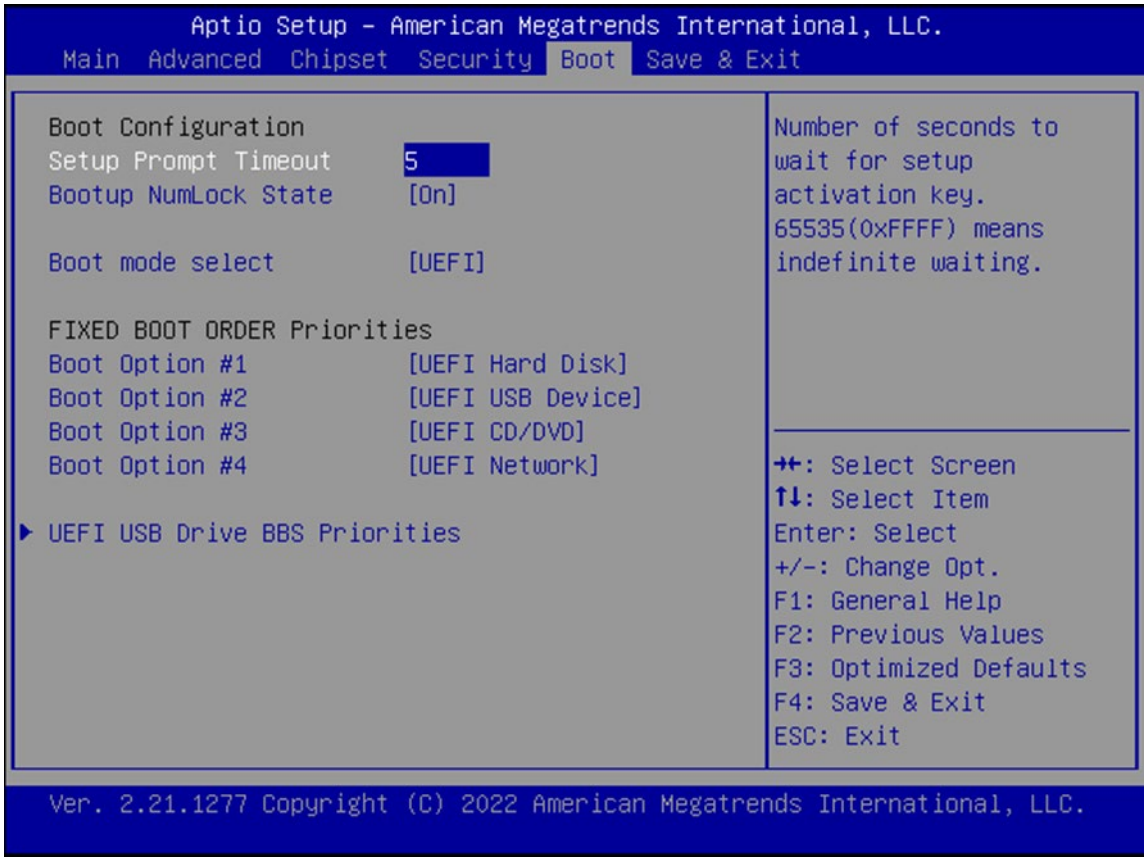
Feature	Options	Description
Secure Boot	Disabled Enabled	Secure Boot is activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.
Secure Boot Mode	Standard Custom	Secure Boot mode selector: In **Custom** mode, Secure Boot Variables can be configured without authentication

Key Management



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.

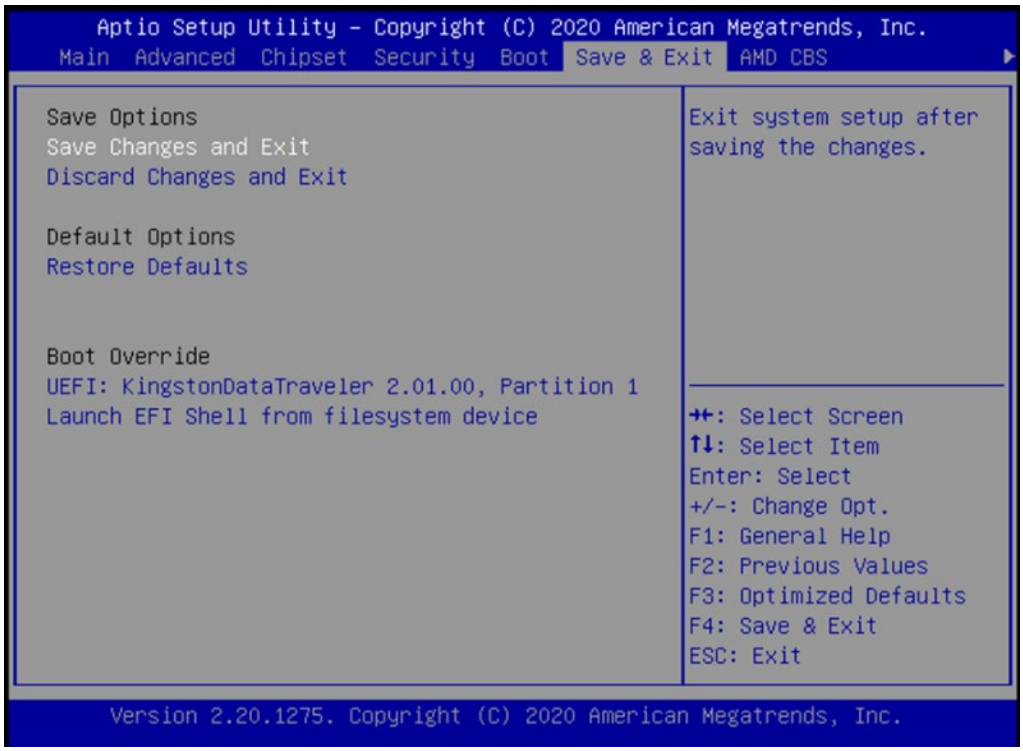


Feature	Options	Description
Setup Prompt Timeout	5	The number of seconds to wait for setup activation key. 65535 means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.
Boot mode select	LEGACY UEFI DUAL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

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

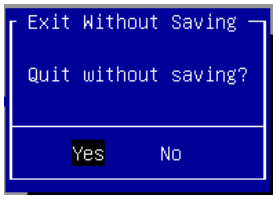
Save and Exit Menu

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.



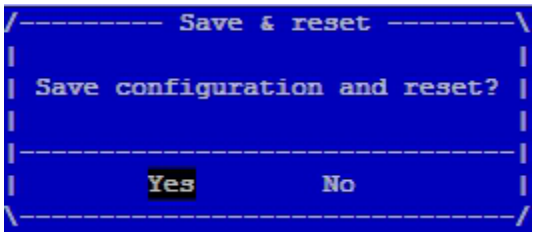
■ Discard Changes and Exit

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.



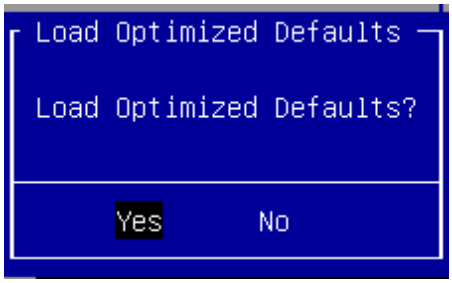
■ Save Changes and Reset

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**

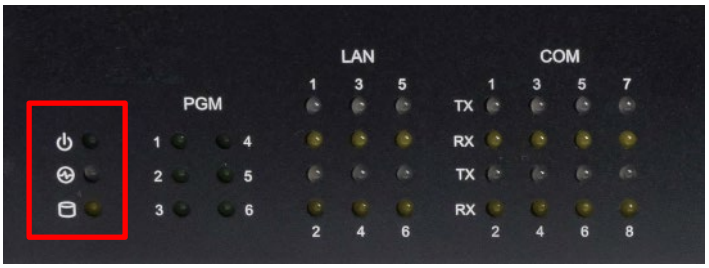
Restore default values for all setup options. Select "**Yes"** to load Optimized defaults.



Note: The items under Boot Override may not be the same image as above, as the image will depend on the actual devices connected to the system.

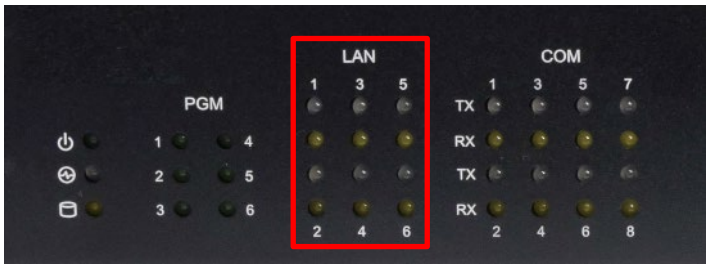
APPENDIX A: LED INDICATOR EXPLANATIONS

▸ System Power / Status / HDD Activity



LED	COLOR ON LCM	COLOR ON BOARD	LED ACTION	DESCRIPTION
POWER	**Green**	**Green**	Steady	When system power on
	Off	Off	N/A	No power on
STATUS	**Green**	**Red**	Steady	control by GPIO
	Off	Off	N/A	control by GPIO (Default) or No power on
HDD	**Yellow**	**Yellow**	**Blinking**	Blinking indicates HDD activity Include SATA / NVME
	Off	Off	N/A	No data access or No power on

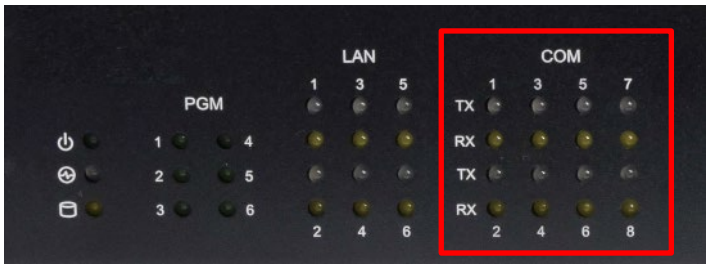
▸ RJ45 LAN LED (LED1~ LED6)



Speed	Green (Link/Active)	Green/Yellow (Speed)
100M	ON / Blinking (Data Access)	OFF
1G	ON / Blinking (Data Access)	ON (Yellow)
2.5G	ON / Blinking (Data Access)	ON (**Green**)

1. When cable is plugged-in and network is linked. Both LED lights will be bright. The behavior is as defined.
2. Without the Cable plug-in, the LED should be OFF.
3. If LAN Driver controls the LED, the behavior will follow the Driver.

▸ COM LED



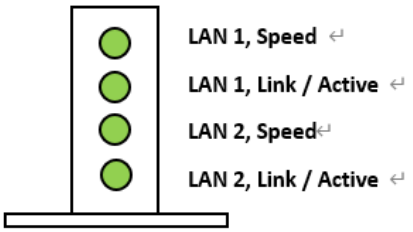
RX Activity	
Data Transmitting	Solid **Yellow**
No Data Activity	OFF

TX Activity	
Data Transmitting	Solid **Green**
No Data Activity	OFF

- **LAN Bypass LED Define and Default Configuration**

Define Bypass LED

When the bypass is Enable, the LED will be blinking per 2 seconds. The color is **Green**.



LAN Port	LAN1 Speed	LAN1 Link/Active	LAN2 Speed	LAN2 Link/Active
M12	Bllink (per 2 sec) (**Green**)	OFF	OFF	Blink (per 2 sec) (**Green**)

Bypass Default Configuration:

Item	Power ON	Run Time	Power OFF
Bypass (Default)	Disable	Disable	Enable
Remove the Power Cord	Return to default status		
System Reboot	Maintain current conditions & status		

APPENDIX B: TERMS AND CONDITIONS

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of 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 reverse engineering of the product
   - Operation outside of the environmental specifications for the product.

RMA Service

Requesting an RMA#

1. To obtain an RMA number, simply 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 describe failure details) ☐ Testing Purpose
Company:	Contact Person:
Phone No.	Purchased Date:
Fax No.:	Apply Date:
Return Shipping Address: _____	
Shipping by: ◻ Air Freight ◻ Sea ◻ Express:_____	◻ Others:_____

Item	GP	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

***Problem Code:**

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

Requested by

Authorized Signature / Date

Confirmed by supplier

Authorized Signature / Date