



Network Appliance Platforms

Hardware Platforms for Network Computing

NCA-1040 User Manual

Version: 1.3

Date of Release: 2022-06-27

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

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

Font Conventions

Example	Convention	Usage
<code>iptables -F</code>	Monospace, shaded	A command to be entered at a shell command-line
Setup page	Bold	A title of a dialog box or a page
<Enter>	Between a pair of inequality signs	A physical keyboard button
"Menu"	Between a pair of quotation marks	A menu option or a software button to be clicked
<i>Readme.txt</i>	In Italic	A filename or a file path
<u>IPMI User Guide</u>	Underlined	The name of another document or a chapter in this document

Icon Descriptions

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 use other available methods to get support from Lanner:

Submitting a Ticket

Visit the [Lanner Technical Support](#) page to fill in a support ticket to our technical support department.

Calling Us

Phone support is offered to our customers in the United States and Canada.

Toll-free customer service number: **+1 855-852-6637**

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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 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 the battery is replaced by an incorrect type.
- ▶ Dispose of used batteries according to the instructions.
- ▶ Installation should be conducted only by a trained electrician or only by an electrically trained person who knows all installation procedures 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 environment can result in an explosion or the leakage of flammable liquid or gas.
- ▶ A battery subjected to extremely low air pressure 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.
- ▶ Some USB devices may not be compatible with the system. If you encounter an error, please remove the USB device and restart the system.

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."



CAUTION: TO DISCONNECT POWER, REMOVE ALL POWER CORDS FROM UNIT.

注意：要断开电源，请将所有电源线从本机上拔下。

WARNING: Wenn Sie das Gerät zwecks Wartungsarbeiten vom Netz trennen müssen, müssen Sie beide Netzteile abnehmen.

ATTENTION: DÉBRANCHER LES TOUT CORDONS D'ALIMENTATION POUR DÉCONNECTER L'UNITÉ DU SECTEUR.

Electrical Safety Instructions

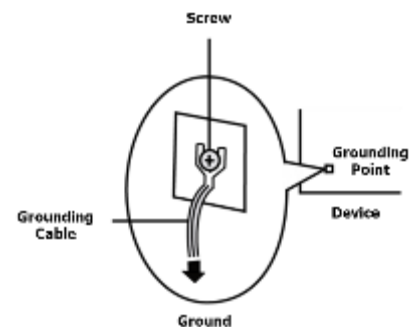
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect the ground wire after turning off the power. A ground wire (green-and-yellow) 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 DC Power Source

- ▶ Connect the grounding cable to the ground.
- ▶ The protection device for the DC power source must provide 30 A current.
- ▶ This protection device must be connected to the power source before DC power.



Procédure de mise à la terre pour source d'alimentation CC

- ▶ Branchez le câble de mise à la terre à la terre.
- ▶ L'appareil de protection pour la source d'alimentation CC doit fournir 30 A de courant.
- ▶ Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation CC.

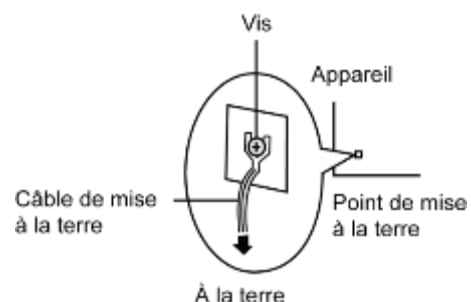


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CHAPTER 1: PRODUCT OVERVIEW

NCA-1040 is a compact desktop appliance empowered by Intel® Atom® x8460E / Intel® Pentium® N6415 (codenamed Elkhart lake) for deployment at edge environment, branch offices, and retail surroundings. Besides the low power consumption and decent processing capability, NCA-1040 also provides necessary I/O functionality for edge computing, multi-service gateways, VPN routers and CPE applications.

Package Content

Your package contains the following items:

- ▶ 1x NCA-1040 Network Security Platform
- ▶ 1x Power Adaptor
- ▶ 1x Power Cable
- ▶ 1x Console Cable



Ordering Information

SKU No.	Main Features
NCA-1040A	Compact Fanless Network Appliance with Intel® Atom x6413E (Elkhart Lake), 4x Gbe RJ45, 1x DDR4 SO-DIMM

Optional Accessories

Model	Description
5G Kit	Telit FN980 (sub 6), and Antenna Kit
LTE Kit	Sierra EM 7565, and Antenna Kit
Wi-Fi 6 Kit	Compexenl Q9882C, and Antenna Kit
PoE Kit	PoE+ Power Adapter Kit
FIPS Kit	FIPS Kit for NCA-1040
Rackmount Kit	1U Rackmount kit (long ear bracket with adapter holder, 2-sided design)
Wall Mount Kit	Wall Mount Kit for NCA-1040

System Specifications

Form Factor		Fanless Desktop
Platform	Processor Options	Intel® Atom x6413E (Elkhart Lake), 1.5GHz
	CPU TDP	9W;
	CPU Socket	Onboard
	CPU Cores	4
	Chipset	SoC
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR4 3200MT/s SO-DIMM
	Max. Capacity	32 GB
	Socket	1x 260pin SO-DIMM
Networking	Ethernet Ports	4x GbE RJ45 via Intel® i210AT
	Bypass	N/A
PoE+ Support	# of PoE+ (PSE) Ports	1
	Standard	IEEE 802.3at
	PoE+ Power Input	4-pin power connector with 65W PoE+ adapter
I/O Interface	Reset Button	1x Reset Button
	LED Indicators	Power/Status/Storage/M.2/Mini PCIe, refer to Appendix A
	Power Button	1x Power Button with LED
	Console Port	1x RJ45 (Default Baud rate : 115200) Console Port
	USB Port	1x USB 3.0 Port
	Display Port	1x Display Port (without Audio Function)
	Power Input	1x DC Jack with Lock
	Antenna Hole	2x Front Antenna holes; 2x Rear Antenna holes
Storage	Onboard Slots	1x M.2 (SATA) 2280 B-Key
Expansion	Mini-PCIe	1x Mini-PCIe (PCIe/USB2.0); 1x M.2 3042/3052 B-Key
	SIM Card Slot	2x Nano SIM
Miscellaneous	Watchdog	YES
	Internal RTC with Li Battery	YES
	TPM	N/A
Cooling	Processor	Passive CPU Heatsink
	System	Fanless (Default), 1x 5-pin Fan Connector (Optional)
Environmental Parameters	Temperature	0~40°C Operating, -20~70°C Non-Operating
	Humidity (RH)	5~90% Operating, 5~ 95% Non-Operating
System Dimensions	(WxDxH)	183 x 168 x 32 mm
	Weight	0.9 kg
Package Dimensions	(WxDxH)	TBC
	Weight	TBC
Power	Type/Watts	1x 12V 5A 60W Power Adapter
	Input	AC 100~240V @50~60 Hz
OS Support		Linux
Approvals and Compliance		RoHS, CE/FCC Class B (with PoE function will be Class A), UL, VCCI, UKCA

Front Panel



No.	Description	
F1	Antennas	2x SMA Antenna Holes
F2	Reset Button	1x Reset Button
F3	LED Indicators	Power/Status/Storage/M.2/Mini-PCle, refer to Appendix A
F4	Console Port	1x RJ45 Console Port
F5	USB Port	1x USB 3.0 Port

Rear Panel

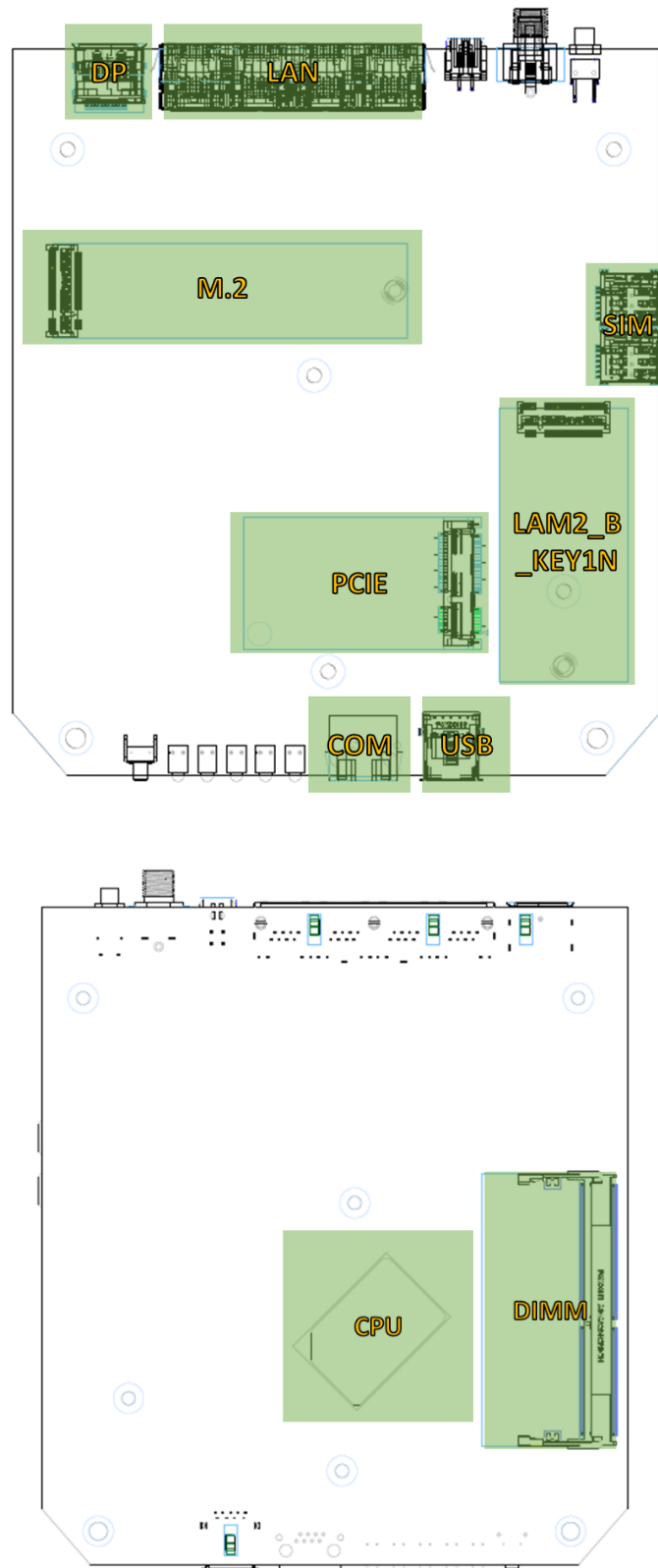


No.	Description	
R1	Antennas	2x SMA antenna holes
R2	Power Button	1x Power Button with LED
R3	Power Inlet	1x DC Jack with Lock
R4	PoE+ (PSE) Port	1x 4-pin 54V Input Port with Lock (ATX4P) for PoE+ (Optional)
R5	LAN Ports	4x RJ45 Ethernet Ports with LED
R6	Display Port	1x Display Port (without Audio Function)

CHAPTER 2: MOTHERBOARD INFORMATION

Jumpers and Connectors

The following displays the connectors and jumpers on the motherboard layout.

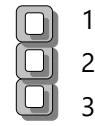


Jumper Setting and Connector Pin-out

The following references the pin assignments and internal connectors of NCA-1040.

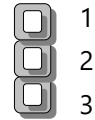
JCOMS1: RTC Reset

Pin	Description
1-2	Clear RTC_TEST
2-3	Clear RTC_RST



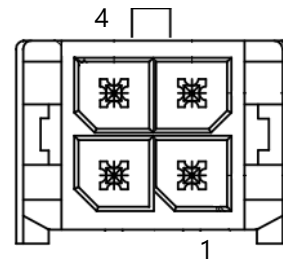
J8: Reset Option

Pin	Description
1-2	Hardware Reset
2-3 (Default)	Software Reset



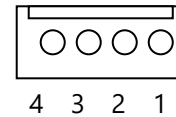
PW2: Power Supply Connector of PSE

Pin	Description
1	GND
2	GND
3	+P54V
4	+P54V



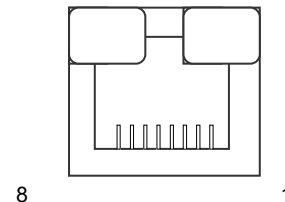
JPW1: SATA Power Connector 1x4 Pins 2.54mm

Pin	Description
1	+P12V_S
2	GND
3	GND
4	+P5V_S



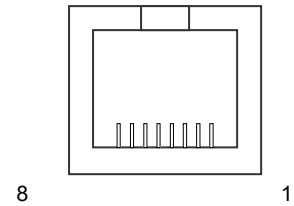
LAN1: 1x4 RJ45 w/o transformer

Pin	Description
1	MD0+
2	MD0-
3	MD1+
4	MD2+
5	MD2-
6	MD1-
7	MD3+
8	MD3-

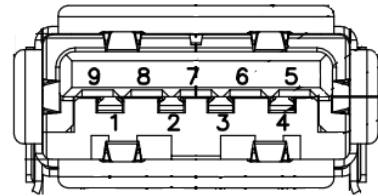


COM1: RJ45 Console

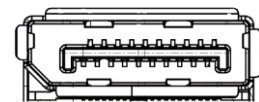
Pin	Description
1	Request to Send (RTS)
2	NC
3	Transmitted Data (TxD)
4	Signal Ground
5	Signal Ground
6	Received Data (RxD)
7	NC
8	Clear to Send (CTS)

**USB1: USB 3.0 single CONN**

Pin	Description
1	+P5V_USB1
2	USB20_N1
3	USB20_P1
4	GND
5	USB30_RXN0
6	USB30_RXP0
7	GND
8	USB30_TXN0
9	USB30_TXP0

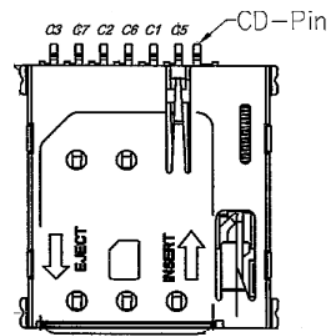
**DP1: Display Port 20P 0.6mm**

Pin	Description	Pin	Description
1	DP1_C_DATA0	11	GND
2	GND	12	DP1_C_DATAN3
3	DP1_C_DATAN0	13	DDI1_AUX_EN_P13
4	DP1_C_DATA0	14	CONFIG2
5	GND	15	DDI1_DDC_CLK_AUX_DP
6	DP1_C_DATAN1	16	GND
7	DP1_C_DATA0	17	DDI1_DDC_DAT_AUX_DN
8	GND	18	DP1_HPD
9	DP1_C_DATAN2	19	GND
10	DP1_C_DATA0	20	+P3V3_DP



SIM1/2: Nano SIM push-push

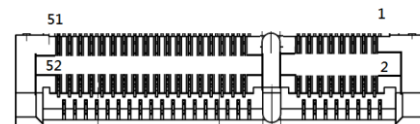
Pin	Description
1	UIMx_PWR
2	UIMx_RST#
3	UIMx_CLK
4	UIMx_DETECT
5	GND
6	NC
7	UIMx_DAT

**SATA1:180° SATA Connector**

Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

**PCIE1: MiniPCle Socket**

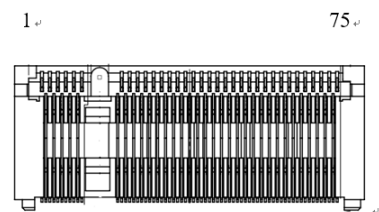
Pin	Description	Pin	Description
1	NC, PMC_WAKE#	27	GND
2	+P3V3_S	28	+P1V5_S
3	NC	29	GND
4	GND	30	NC, SMB_CLK
5	NC	31	PCIE_TXN
6	+P1V5_S	32	NC, SMB_DATA
7	PCIE_CLKREQ5#	33	PCIE_TXP
8	NC	34	GND
9	GND	35	GND
10	NC	36	USB20_N0
11	REFCLK-	37	GND
12	NC	38	USB20_P0
13	REFCLK+	39	+P3V3_S
14	NC	40	GND
15	GND	41	+P3V3_S
16	NC	42	NC
17	NC	43	GND



18	GND	44	LED_WLAN_N
19	NC	45	NC
20	PH, +P3V3_S	46	NC
21	GND	47	NC
22	MPCIE_RST#	48	+P1V5_S
23	PCIE_RXN	49	NC
24	+P3V3_S	50	GND
25	PCIE_RXP	51	NC
26	GND	52	+P3V3_S

M2_1: M.2 B-Key for Storage

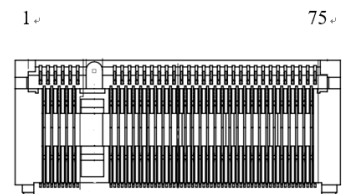
Pin	Description	Pin	Description
1	NC	2	+P3V3_S
3	GND	4	+P3V3_S
5	GND	6	NC
7	NC	8	NC
9	NC	10	NC
11	GND	12	B-KEY
13	B-KEY	14	B-KEY
15	B-KEY	16	B-KEY
17	B-KEY	18	B-KEY
19	B-KEY	20	NC
21	NC	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	NC	30	NC
31	NC	32	NC
33	GND	34	NC
35	NC	36	NC
37	NC	38	NC
39	GND	40	NC
41	SATA_C_RXP0	42	NC
43	SATA_C_RXN0	44	NC
45	GND	46	NC
47	SATA_C_TXN0	48	NC
49	SATA_C_TXP0	50	NC
51	GND	52	NC



53	NC	54	NC
55	NC	56	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	GND	70	+P3V3_S
71	GND	72	+P3V3_S
73	GND	74	+P3V3_S
75	NC		

M2_B_KEY1: M.2 B-Key for 4G/5G

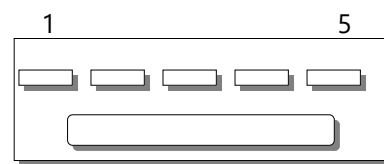
Pin	Description	Pin	Description
1	NC	2	+P3V3_A
3	GND	4	+P3V3_A
5	GND	6	PH, +P1V8_A
7	USB2_DP0	8	PH, +P3V3_A
9	USB2_DN0	10	LED_M2_WWAN_N
11	GND	12	B-KEY
13	B-KEY	14	B-KEY
15	B-KEY	16	B-KEY
17	B-KEY	18	B-KEY
19	B-KEY	20	PH, +P1V8_A
21	GND	22	PH, +P3V3_A
23	NC, WAKE_UP#	24	NC
25	DPR	26	PH, +P3V3_A
27	GND	28	NC
29	M2_USB30_TXN2	30	UIM1_RST#
31	M2_USB30_TXP2	32	UIM1_CLK
33	GND	34	UIM1_DAT
35	M2_USB30_RXN2	36	UIM1_PWR
37	M2_USB30_RXP2	38	NC
39	GND	40	UIM2_DETECT
41	M2_PCIE_RXN1	42	UIM2_DAT
43	M2_PCIE_RXP1	44	UIM2_CLK
45	GND	46	UIM2_RST#



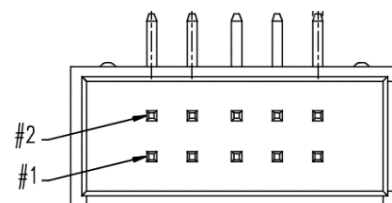
47	M2_PCIE_TXN1	48	UIM2_PWR
49	M2_PCIE_TXP1	50	NC, PCIE_B_RST#
51	GND	52	NC, M2_PCIE_CLKREQ1#
53	M2_PCIE_CLKN	54	NC, B_WAKE#
55	M2_PCIE_CLKP	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	UIM1_DETECT
67	NC, M2_RESET#	68	NC
69	GND	70	+P3V3_A
71	GND	72	+P3V3_A
73	GND	74	+P3V3_A
75	NC		

JFAN1: DIP 2.54mm 5-Pin Fan Connector

Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

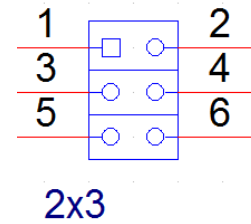
**JUSBDM1: DIP 2.54mm 2x5 Box Header R/A Type**

Pin	Description
1	+P5V_USB2
2	NC
3	USB20_L_N
4	NC
5	USB20_L_P
6	NC
7	GND
8	NC
9	NC,USB_R_WP
10	NC

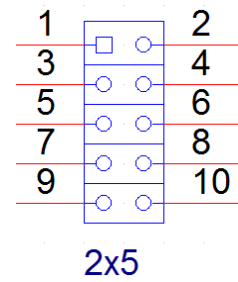


JDI01: DIP 2.0mm 2x3 Pin Header

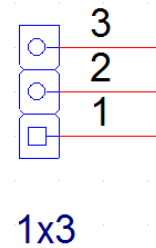
Pin	Description
1	DIO_GPI_1
2	DIO_GPO_1
3	DIO_GPI_2
4	DIO_GPO_2
5	GND
6	GND

**JSPI1: SMD 2.0mm 2x5 Pin Header**

Pin	Description	Pin	Description
1	SPI0_IO3_HOLD#	2	NC
3	SPI0_CS0_R#	4	V_3P3_SPI
5	SPI0_IO1_MISO_R	6	NC
7	NC	8	SPI0_CLK_R
9	GND	10	SPI0_IO0_MOSI_R

**J2: DIP 2.43mm 1x3 Pin Header for VCCIN debug**

Pin	Description
1	SMB_DATA_VR
2	SMB_CLK_VR
3	GND



CHAPTER 3: HARDWARE SETUP

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 and wear ESD protection gloves when handling the installation steps. Pls refer to the [Product Unboxing video](#) released by Lanner for reference.

Opening the Chassis

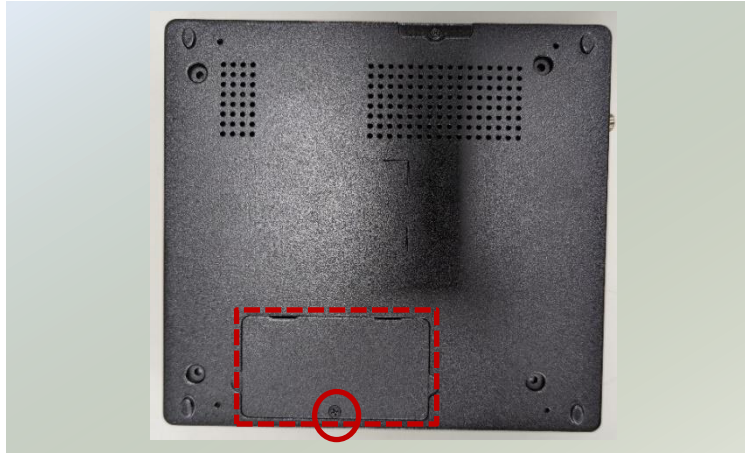
1. Power off the system and remove all power connections.
2. Turn the system upside down, with its bottom side facing up, and locate the four footing screws.
3. Remove the four (4) screws.
4. Turn the system right side up and gently lift the top chassis up.



Installing the System Memory

The motherboard supports a DIMM DDR4 3200MHz non-ECC up to 32GB, which is located on the bottom side of the motherboard. Please follow the steps below to install the DIMM memory module properly.

1. Power off the system.
2. Turn the system upside down, with its bottom side facing up.
3. Locate the DIMM socket cover.



4. Unscrew the one (1) screw securing the cover. And gently lift up the DIMM socket cover.



5. Align the notch of the DIMM card with the socket key in the pin slot.
6. Insert the DIMM card at 30 degrees into the socket until it is fully seated.



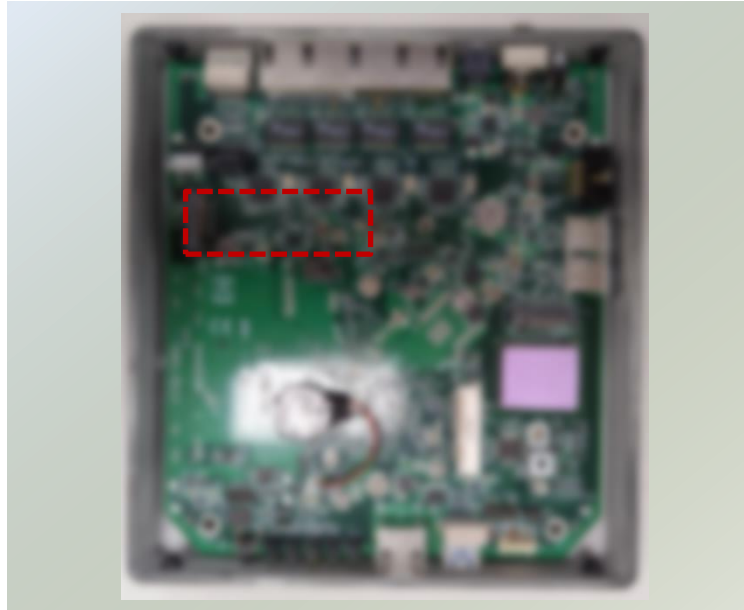
7. Push down on the module card until the slot latches catches and clicks into place.



Installing M.2 Memory Card (Optional)

The system supports one M.2 slot for additional data storage (SSD is recommended due to heat and vibration concerns). Please 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 M.2 memory card with the socket key in the pin slot.



4. Insert the M.2 memory card pins at 30 degrees into the socket until it is fully seated.

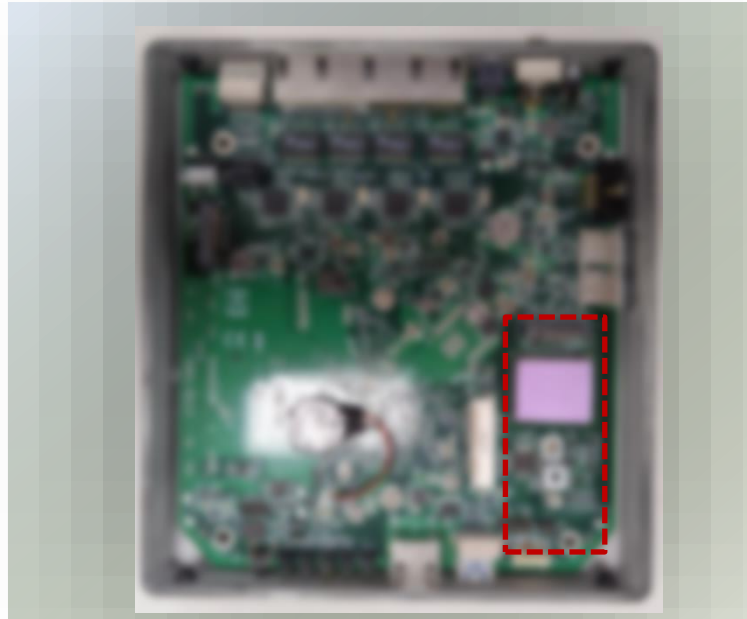


5. Push down on the module card and secure it with a screw.

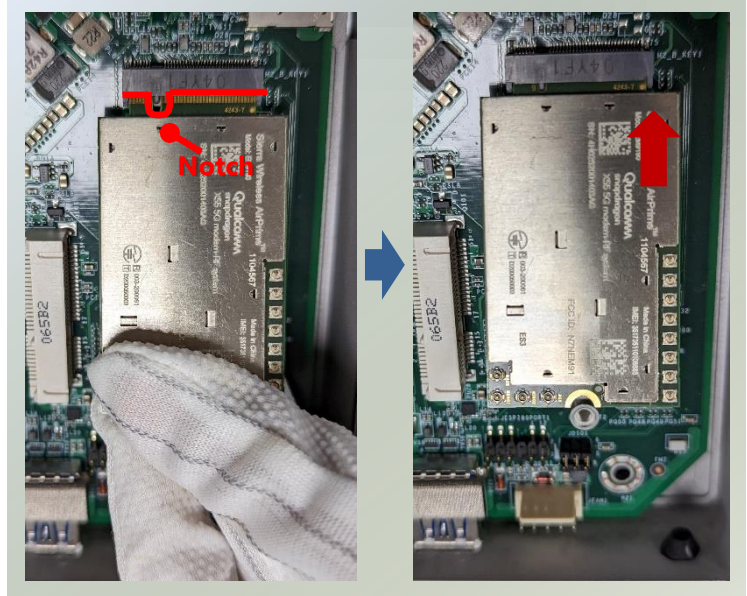
Installing LTE/5G Module Card (Optional)

The motherboard provides one M.2 slot for LTE/5G module card. Please follow the procedures for installation. LTE module requires two antennas, and 5G module requires four antennas.

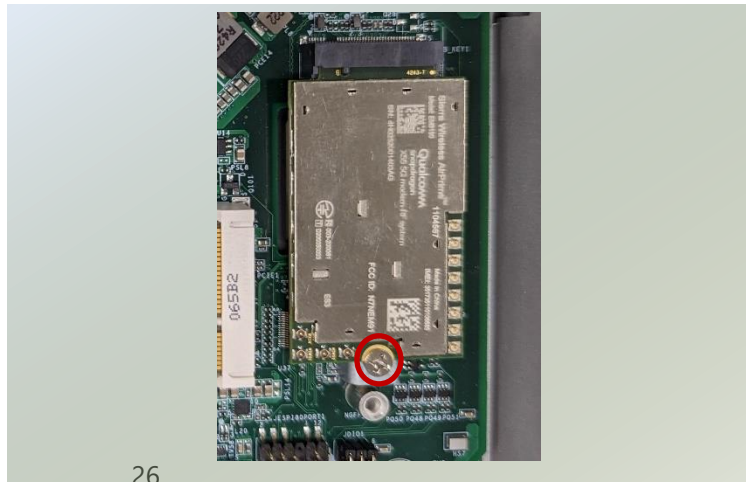
1. Power off the system and open the chassis cover.
2. Locate the M.2 slot on the motherboard.



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



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



Installing 5G Antennas

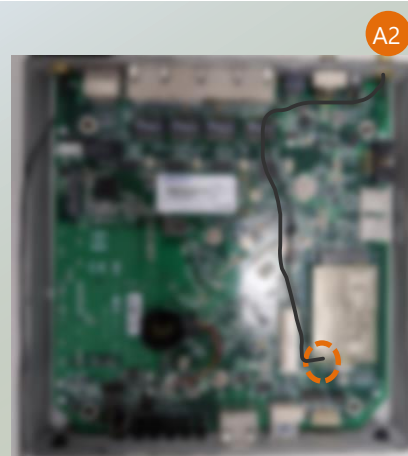
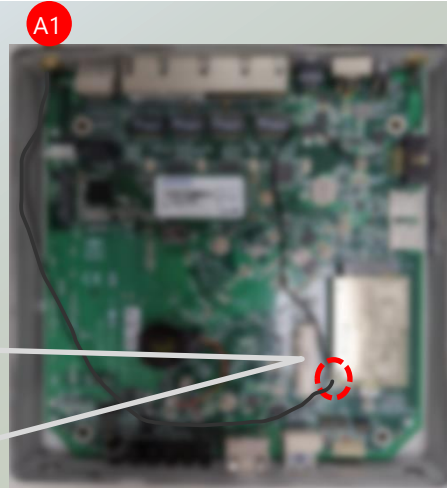
Front Panel



Rear Panel



1. Locate the four (4) antenna RF cables. Locate the four (4) IPEX connectors on the 5G module card.
2. Connect RF cables to the 5G module card.





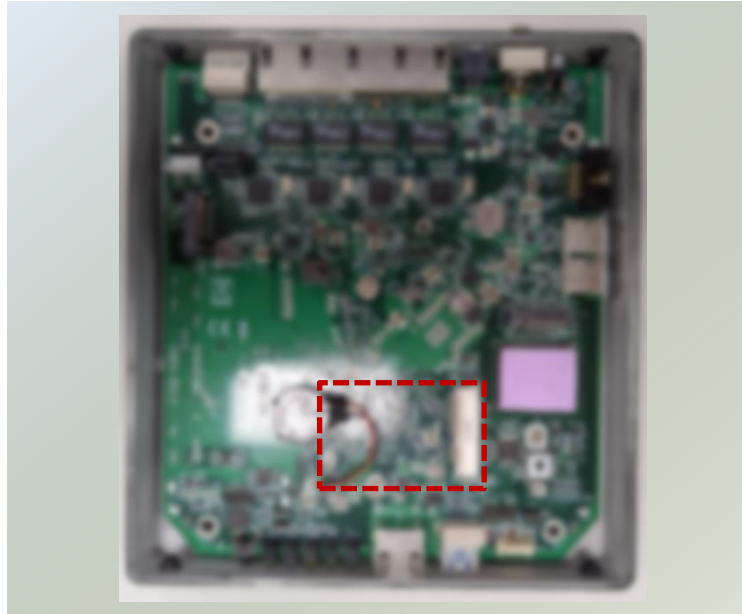
3. Screw on the four (4) antennas to the system.



Installing Wi-Fi Module Card (Optional)

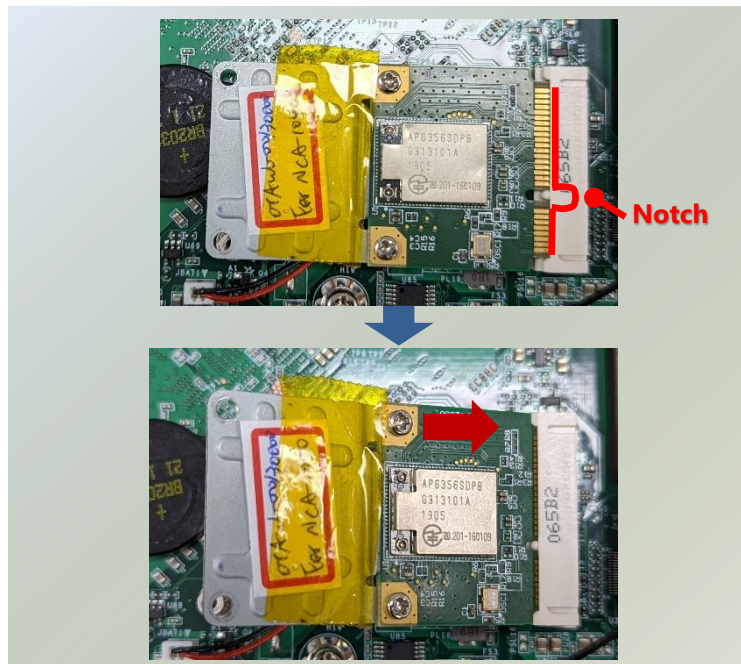
The system supports one mini-PCIe slot for a Wi-Fi or BT module card. Please follow the steps to install the Wi-Fi module card. Wi-Fi module requires two antennas.

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



3. Align the notch of the Wi-Fi module card with the socket key in the pin slot.

4. Insert the Wi-Fi module card pins at 30 degrees into the socket until it is fully seated.



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

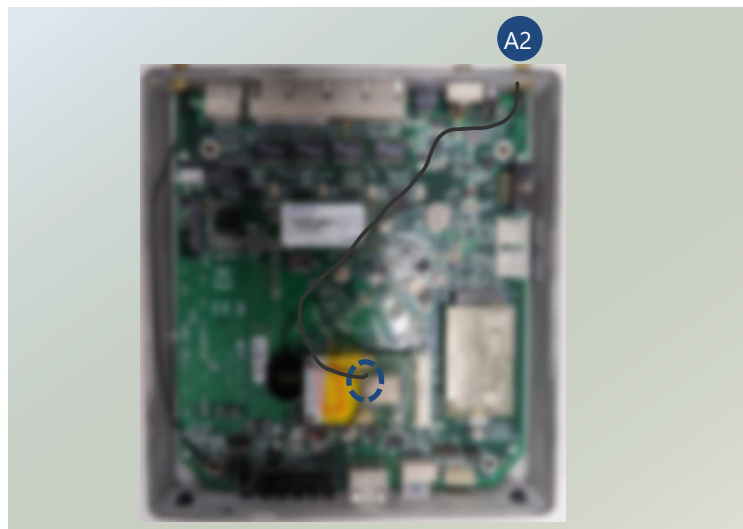
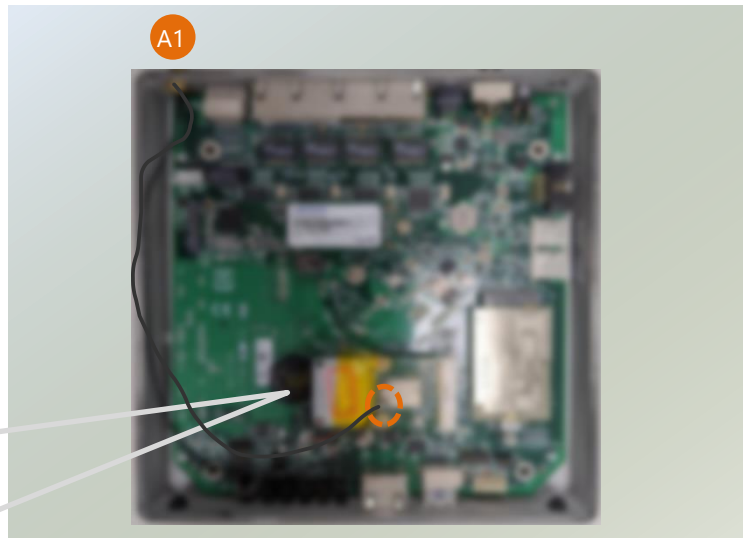


Installing Wi-Fi Antennas

Rear Panel



1. Locate the two (2) antenna RF cables. Locate the two (2) IPEX connectors on the Wi-Fi module card
2. Connect the RF cables to the Wi-Fi module card.



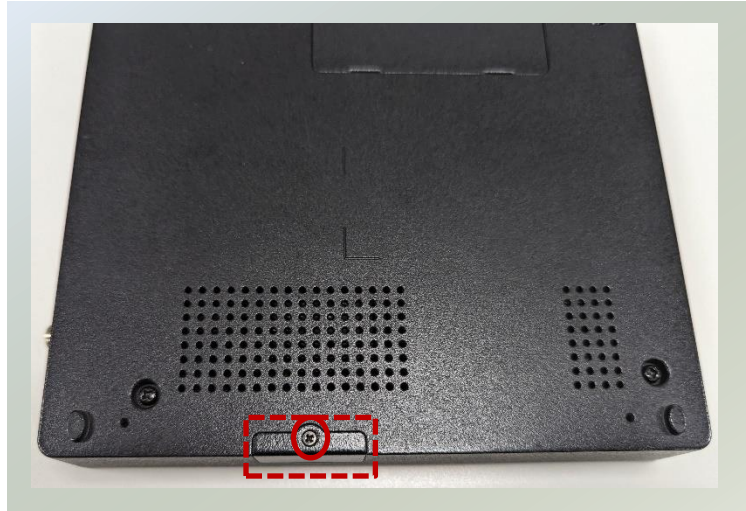
3. Screw on the two (2) antennas to the system.



Installing SIM card

The SIM slot on the bottom panel supports the LTE/5G module care (optional). Please follow the steps below for SIM card placement.

1. Power off the system.
2. Turn the system upside down, with its bottom side facing up.
3. Locate the SIM slot cover.



4. Unscrew the one (1) screw securing the cover. And gently remove the SIM slot cover.
5. Insert and push the nano-SIM card all the way in until it clicks into place.



6. To remove the SIM card, use your fingertips to push it once, to have the card automatically eject.
7. Place the slot door back and tighten the one (1) screw.

CHAPTER 4: BIOS SETUP

BIOS (Basic Input / Output System) is the program that controls the computer boot process.

Entering 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.

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

1. Boot up the system.
2. Pressing the **<Tab>** or **** 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



Note: The images in the following section are for reference only.

Main Page

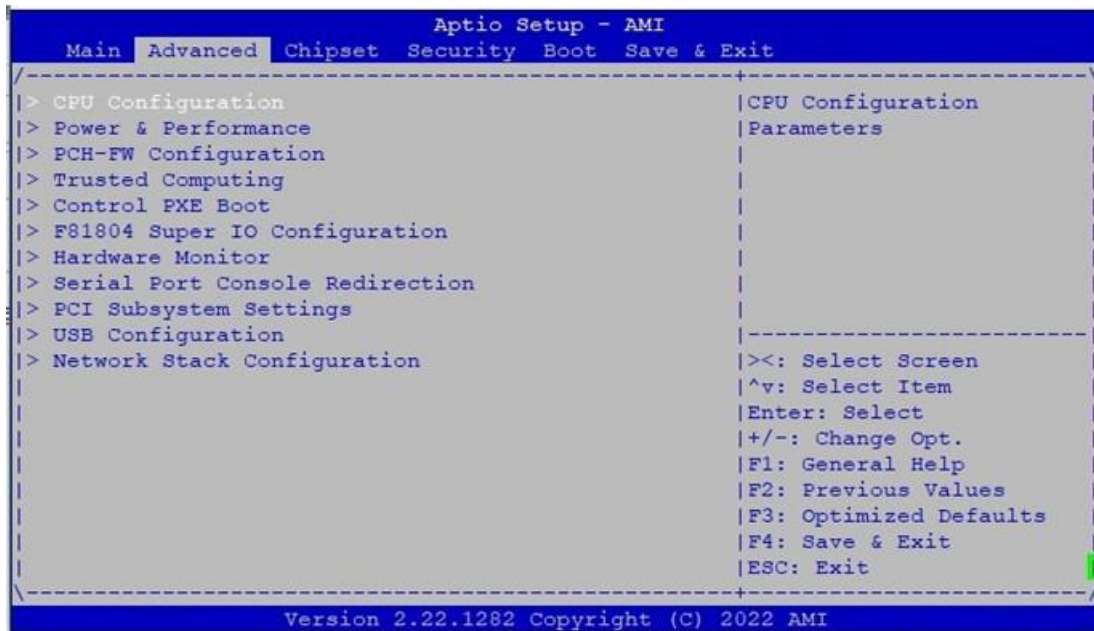
Setup main page contains BIOS information and project version information.



Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User
FSP Information	FSP version: Intel FSP binary version. RC version: Intel reference code version.
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

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



CPU Configuration



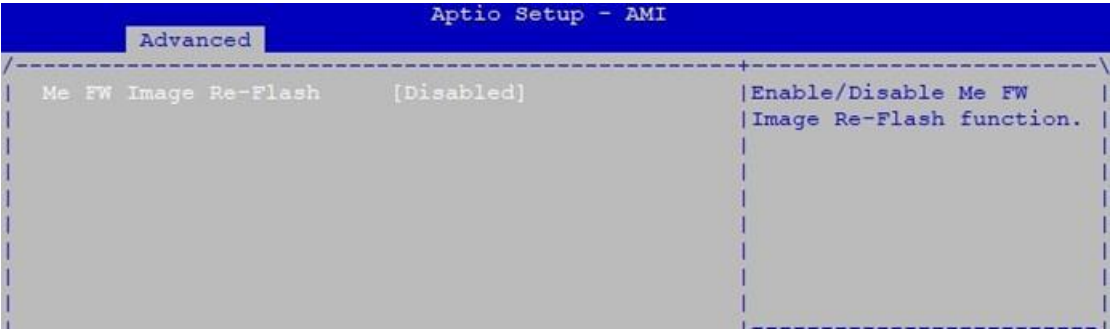
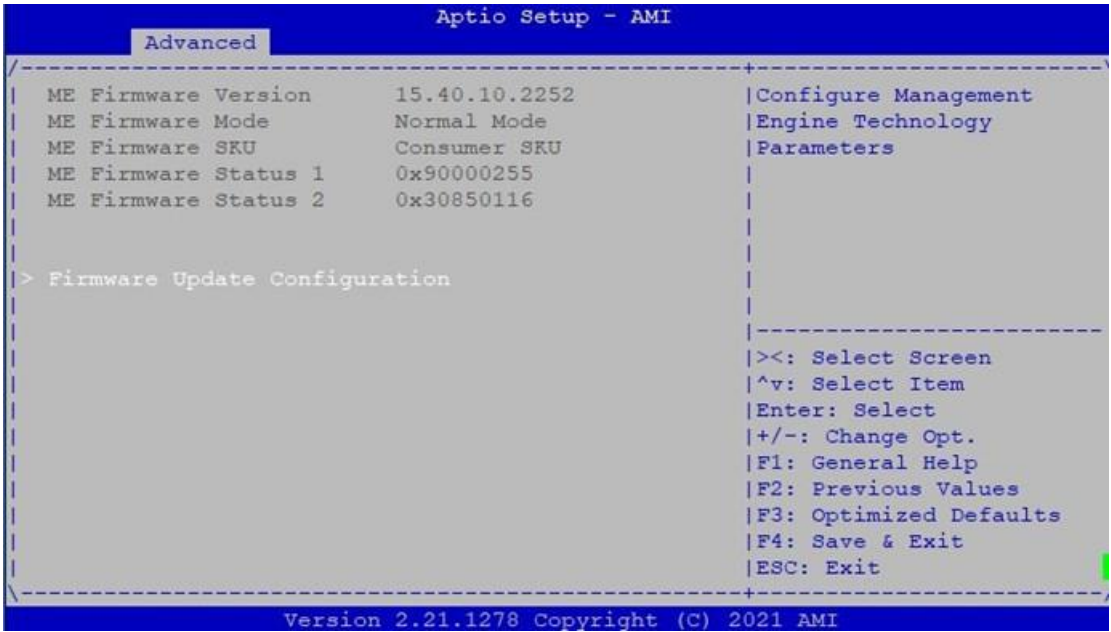
Feature	Options	Description
Hardware Prefetcher	Enabled Disabled	To turn ON/OFF the MLC streamer prefetcher
Adjacent Cache Line Prefetch	Enabled Disabled	To turn ON/OFF prefetching of adjacent cache lines.
Intel (VMX) Virtualization Technology	Enabled Disabled	Intel (VMX) Virtualization Technology
AES	Enabled Disabled	Enable/Disable AES (Advanced Encryption Standard)
MonitorMWait	Enabled Disabled	Enable/Disable MounitorMWait
AC Split Lock	Enabled Disabled	Enable/Disable AC Split Lock

Power & Performance



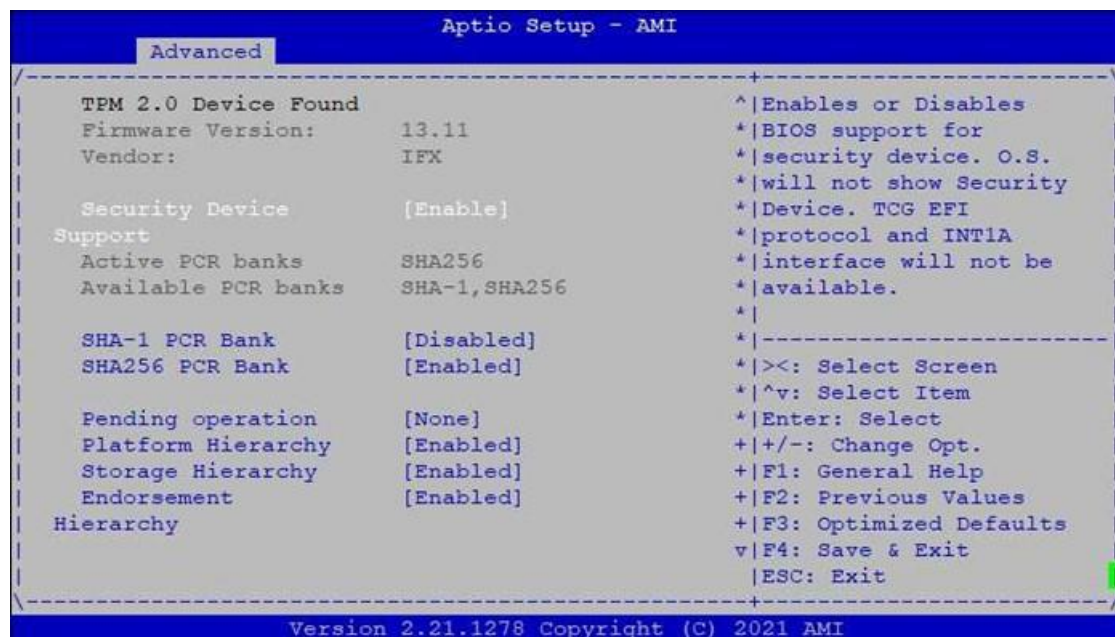
Feature	Options	Description
Boot Performance Mode	Max Battery Max Non-Turbo Performance Turbo Performance	Select the performance state that the BIOS will set starting from reset vector.
Intel® SpeedStep™	Enabled Disabled	Allows more than two frequency ranges to be supported.
RC6 (Render Standby)	Enabled Disabled	Check to enable render standby support.
Disable Turbo GT Frequency	Enabled Disabled	Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited.

PCH-FW Configuration



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

Trusted Computing

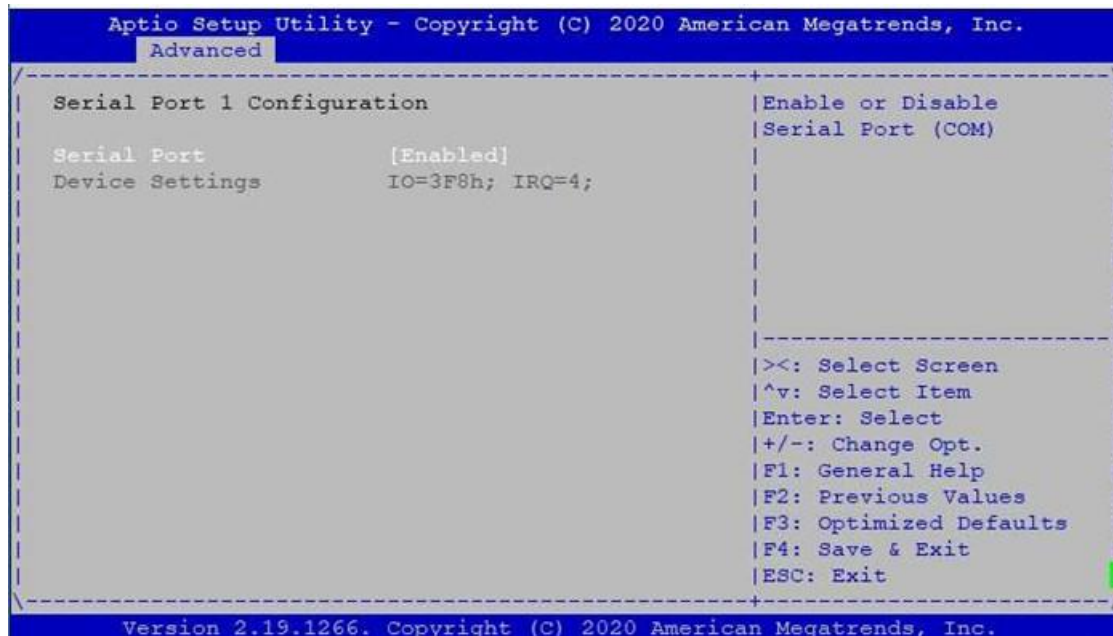
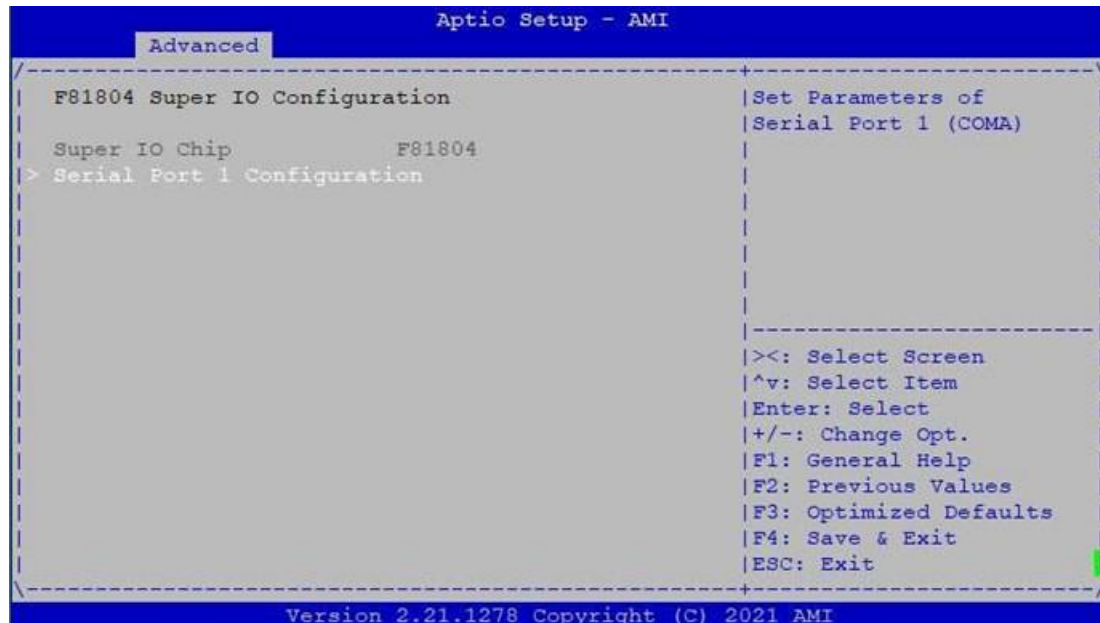


Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA-1 PCR Bank	Enabled Disabled	Enables or disables SHA-1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

Control PXE Boot

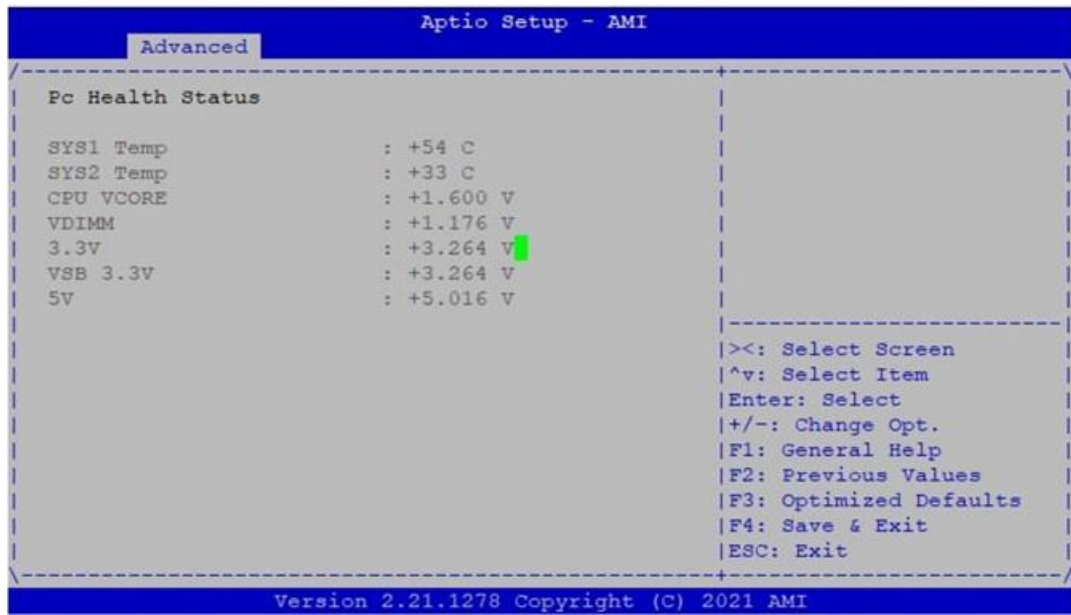
Feature	Options	Description
Control Legacy PXE Boot From	Disabled LAN1 LAN2 LAN3 LAN4	Control PXE Boot from which LAN.

Super IO Configuration



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

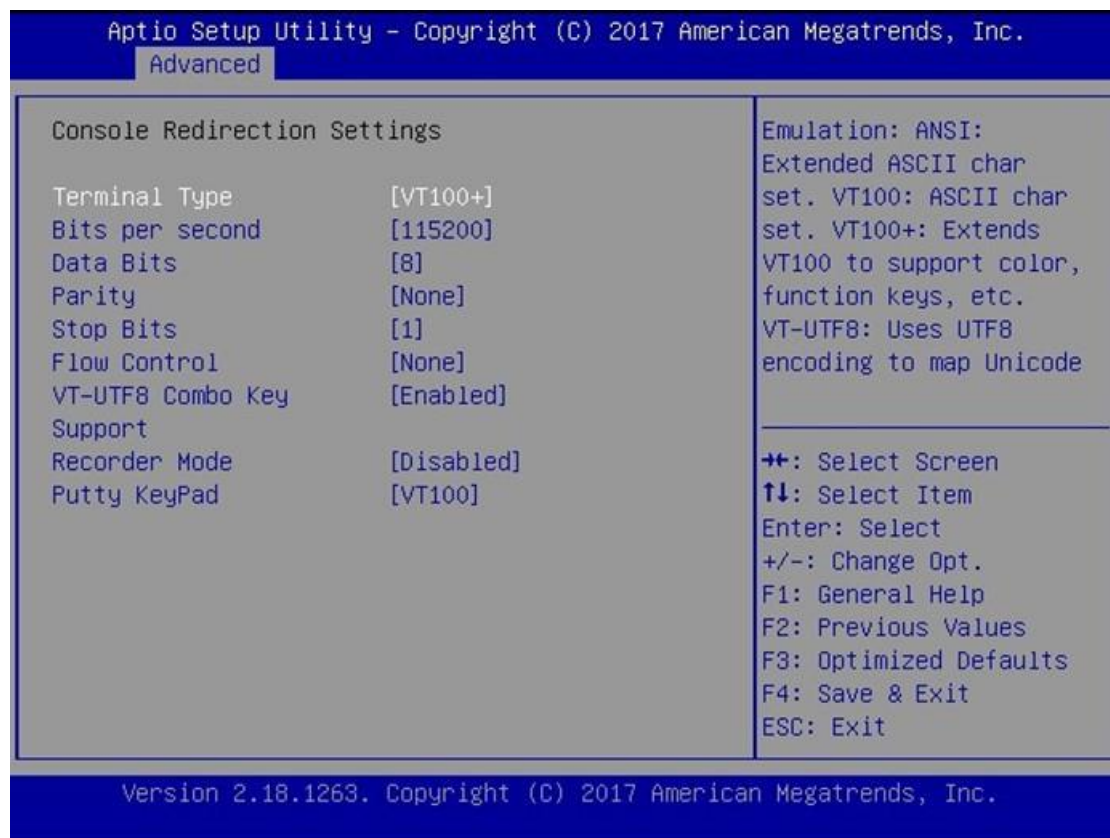
H/W Monitor



Serial Port Console Redirection

		
Feature	Options	Description
Console Redirection	Enabled Disabled	Enables or Disables Console Redirection

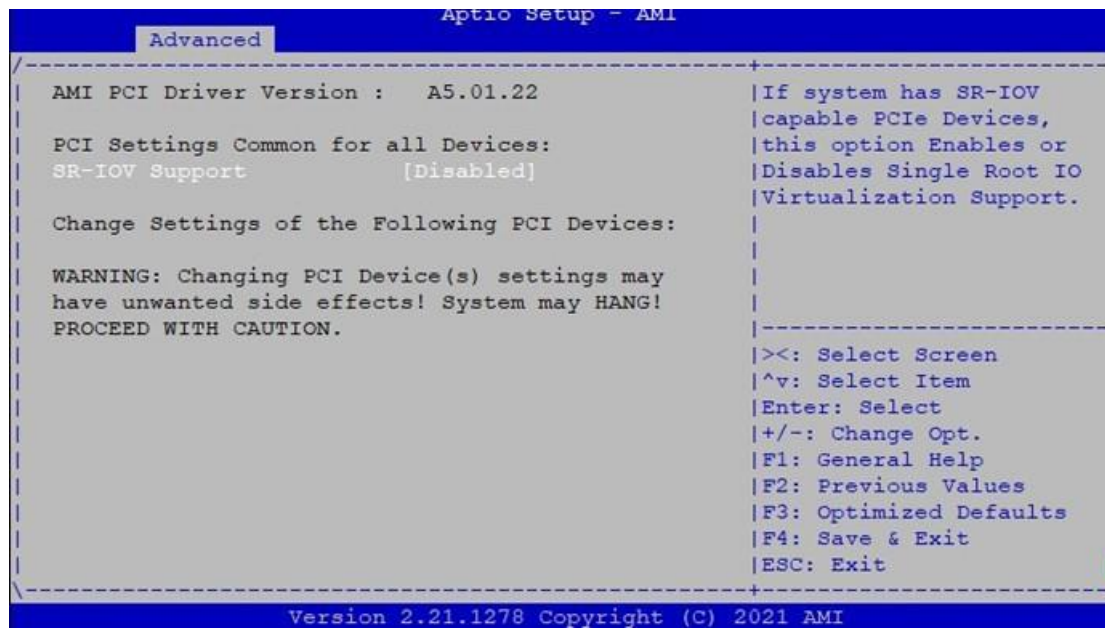
Console Redirection Settings



Feature	Options	Description
Terminal Type	VT100	VT100: ASCII char set
	VT100+	VT100+: Extends VT100 to support color, function keys, etc.
	VT-UTF8	VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes
	ANSI	
Bits per second	9600	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
	19200	
	38400	
	57600	
	115200	
Data Bits	7	Data Bits
	8	
Parity	None	A parity bit can be sent with the data bits to detect some transmission errors.
	Even	
	Odd	
	Mark	
	Space	
Stop Bits	1	Indicates the end of a serial data packet.
	2	

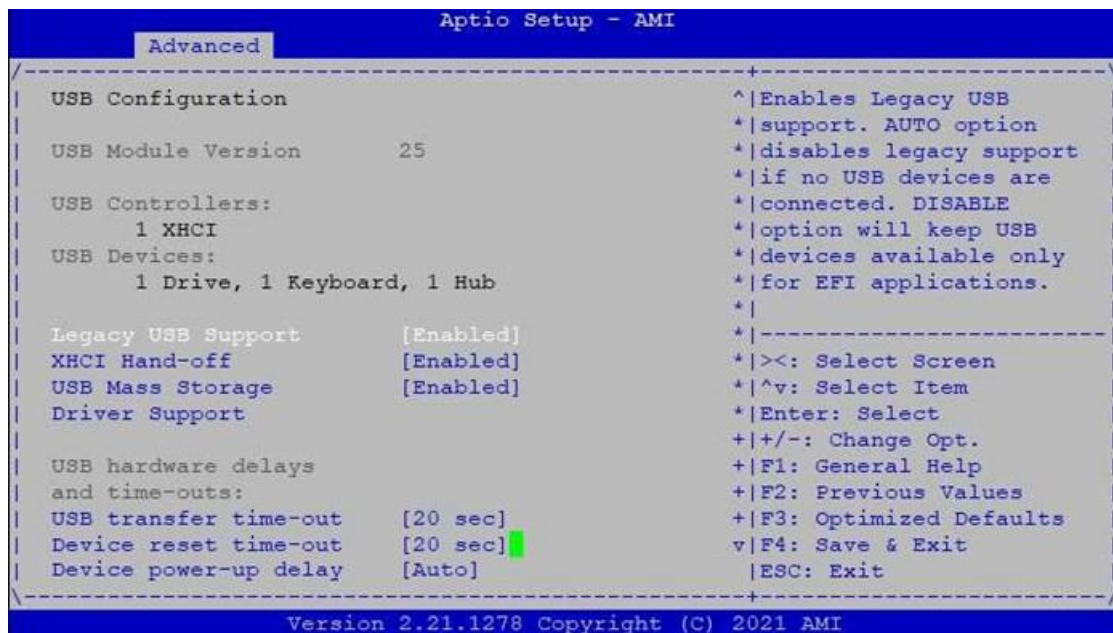
Flow Control	None Hardware RTS/CTS	Flow Control can prevent data loss from buffer overflow.
VT-UTF8 Combo Key Support	Disabled Enabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled, only text will be sent. This is to capture Terminal data
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution
Putty KeyPad	VT100 LINUX XTERM86 SCO ESCN VT400	Selects FunctionKey and Keypad on Putty

PCI Subsystem Settings



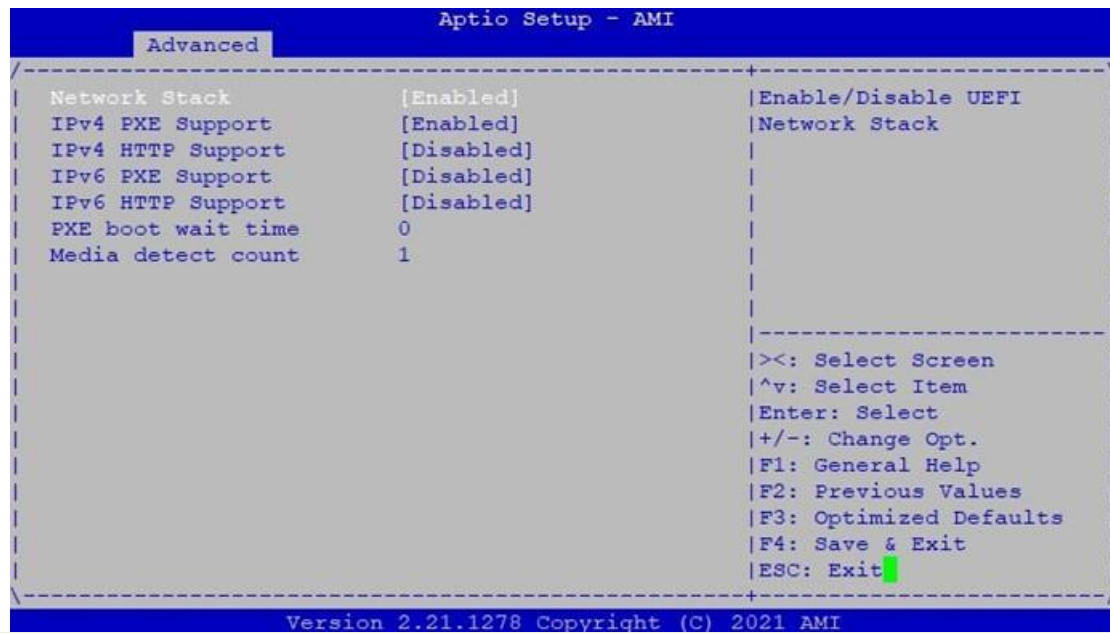
Feature	Options	Description
SR-IOV Support	Disabled Enabled	If the system has SR-IOV capable PCIe Devices, this option enables or disables Single Root IO Virtualization Support.

USB Configuration



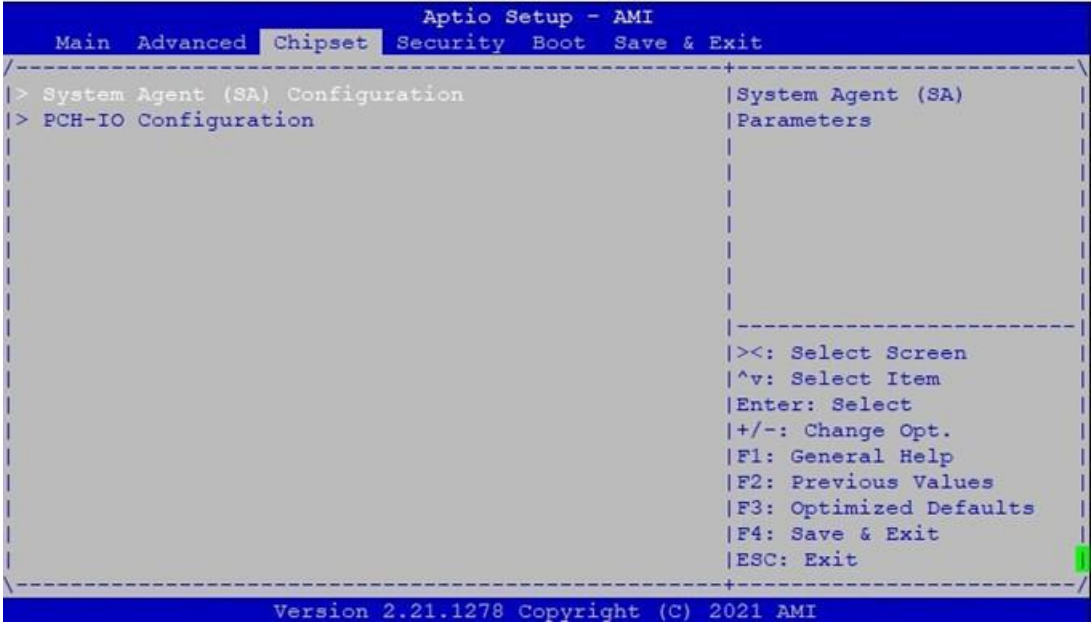
Feature	Options	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. Auto option disables legacy support if no USB devices are connected; Disabled option will keep USB devices available only for EFI applications
XHCI Hand-off	Enabled Disabled	This is a workaround for OSeS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	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 100ms, for a Hub port the delay is taken from Hub descriptor.

Network Stack Configuration

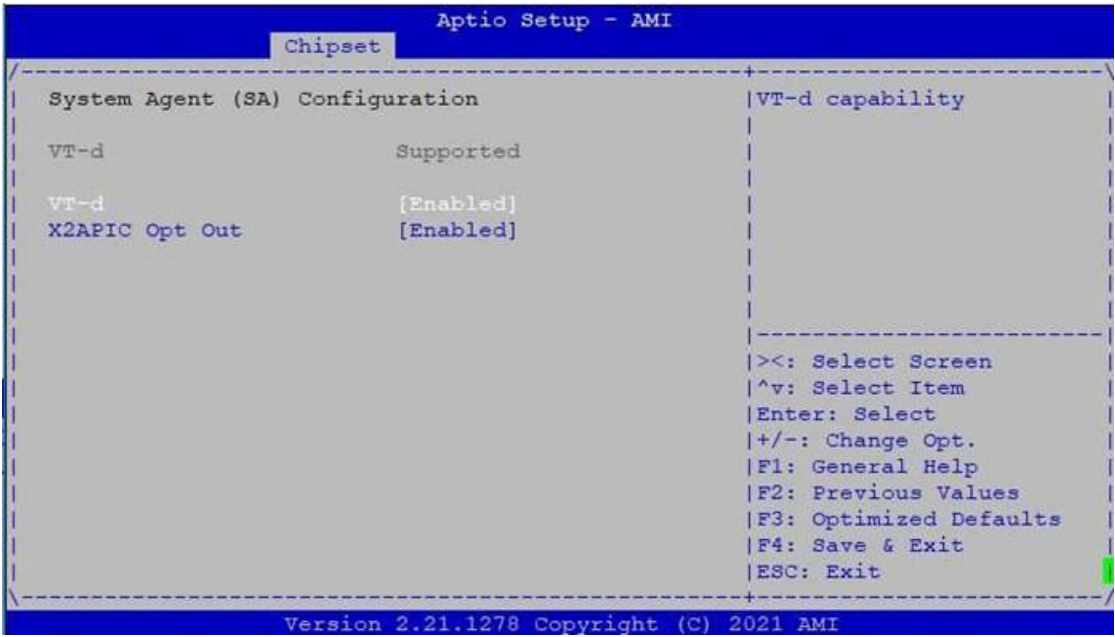


Feature	Options	Description
Network Stack	Disabled Enabled	Enables or disables UEFI Network Stack
IPv4 PXE Support	Disabled Enabled	Enables IPv4 PXE Boot Support. If IPv4 is disabled, PXE boot option will not be created.
IPv4 HTTP Support	Disabled Enabled	Enables IPv4 HTTP Boot Support. If IPv4 is disabled, 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.

Chipset

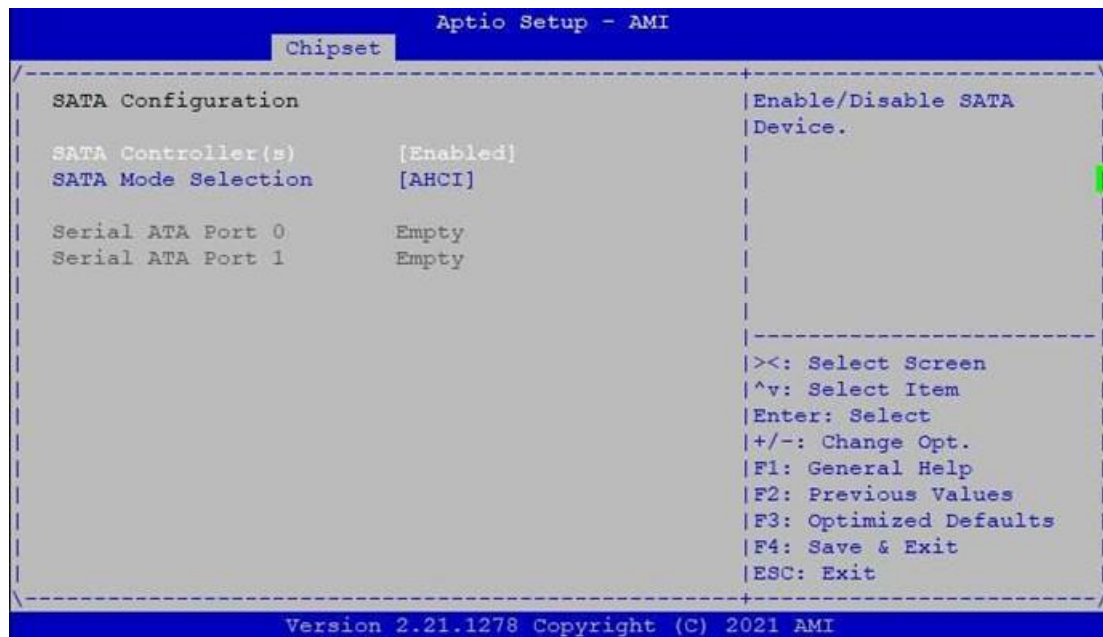


System Agent (SA) Configuration



Feature	Options	Description
VT-d	Disable	VT-d capability.
	Enable	Option to Enable/Disable VT-d.
X2APIC Opt Out	Disable	Enable/Disable X2APIC_OPT_OUT
	Enable	

PCH-IO Configuration



Feature	Options	Description
SATA Controller(s)	Disabled Enabled	Enables/Disables SATA controller
SATA Mode Selection	AHCI	SATA mode support.

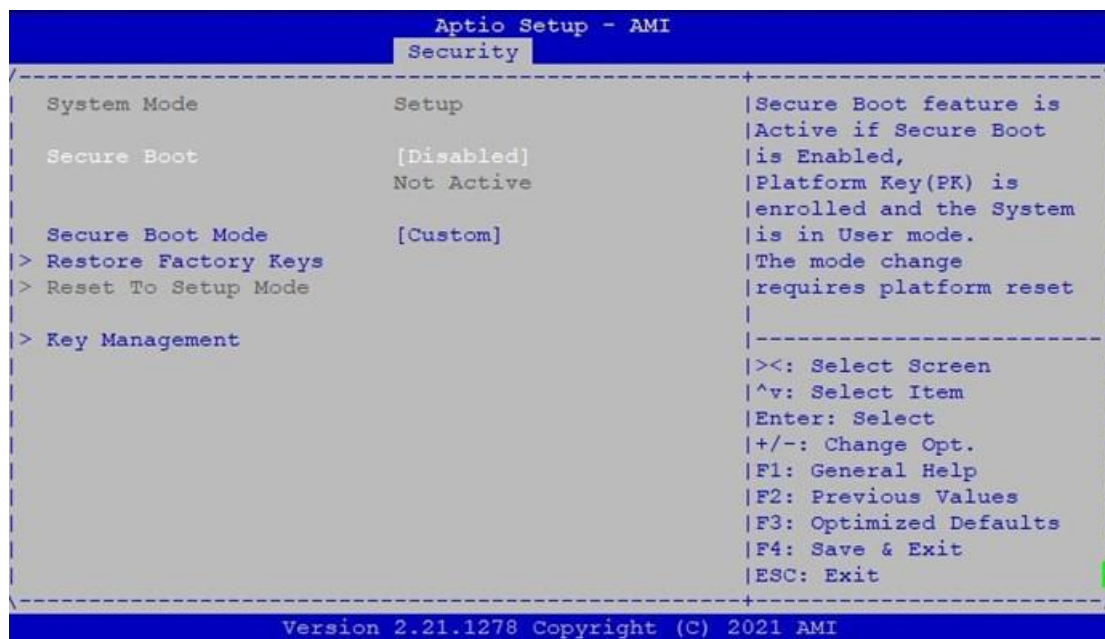
Security

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.



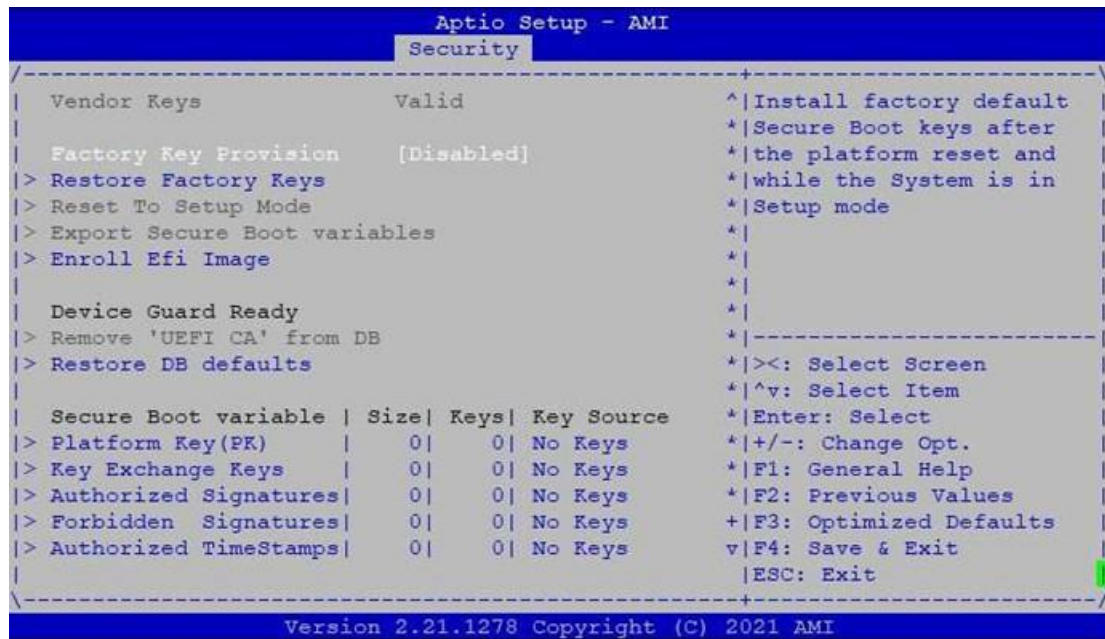
Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the 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	Customizable Secure Boot mode: In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

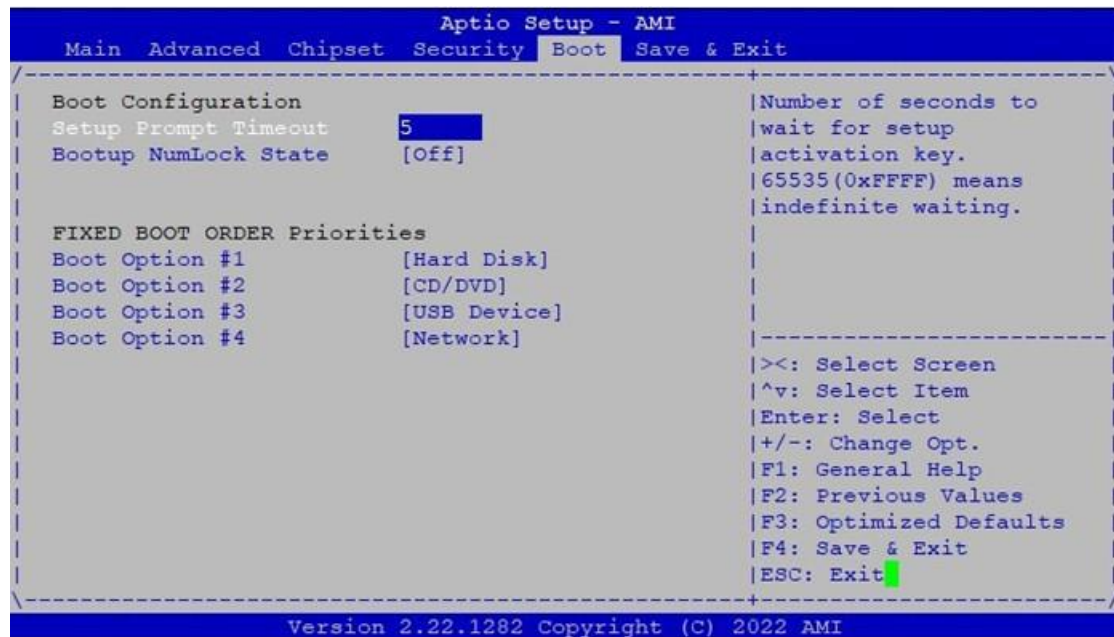
Key Management



Feature	Options	Description
Factory Key Provision	Disabled Enabled	Provision factory default keys on next re-boot only when System in Setup Mode.
Restore Factory Keys	None	Force System to User Mode. Configure NVRAM to contain OEM-defined factory default Secure Boot keys.
Enroll Efi Image	None	Allows the image to run in Secure Boot mode. Enroll SHA 256 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.

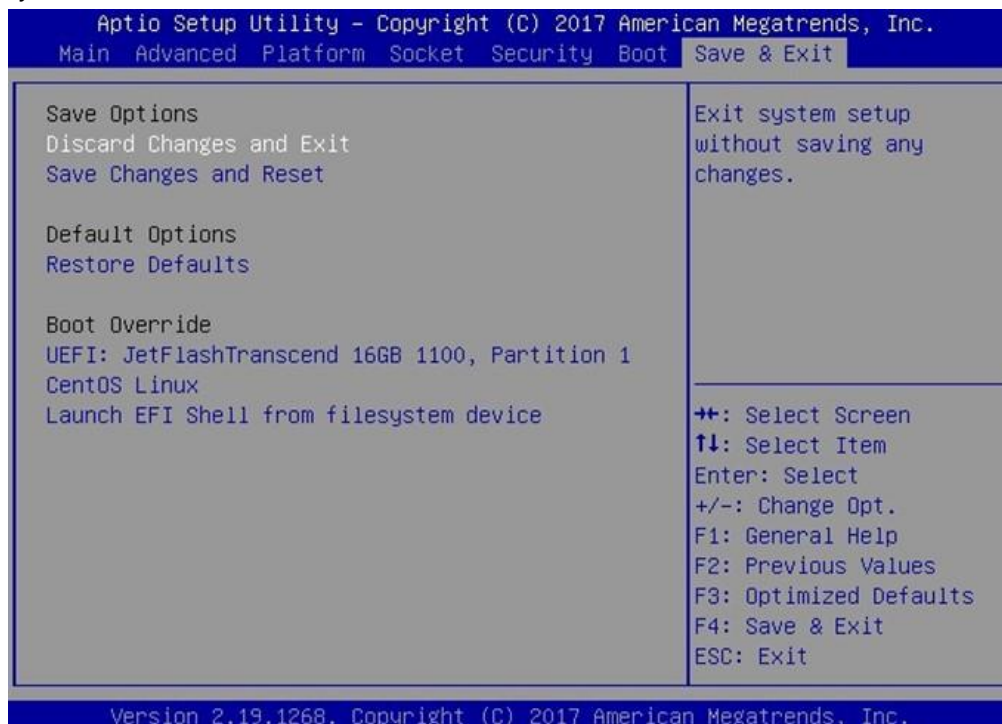


Feature	Options	Description
Setup Prompt Timeout	5	The number of seconds to wait for setup activation key. 65535 means indefinite waiting
Bootup NumLock State	ON OFF	Select the keyboard NumLock state

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

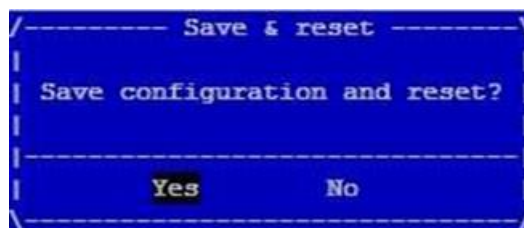
Save and Exit Menu

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.



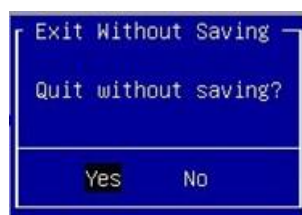
■ Save Changes and Rest

When Users have completed the system configuration changes, select this option to save the changes and exit 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 Exit”** option is selected. Select **“Yes”** to Save Changes and Exit Setup.



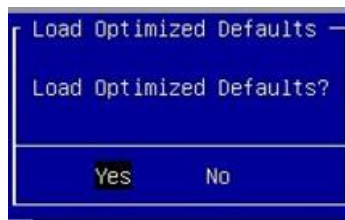
■ Discard Changes and Exit

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.



■ Restore Defaults

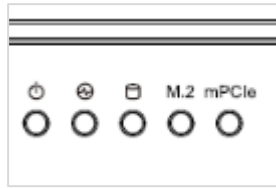
Restore default values for all setup options. Select **“Yes”** to load Optimized defaults.



Note: The items under Boot Override may not have the same image. It would depend on the devices connected to the system.

APPENDIX A: LED INDICATOR EXPLANATIONS

► Power / Status / Storage / M.2 / mPCIe LED



LED	COLOR	LED ACTION	DESCRIPTION
Power	Green	Steady	System is powered ON
	OFF	N/A	System is powered OFF
Status	Green	Steady	System is Active
	Red	Steady	System Error
	OFF	N/A	System is powered OFF
	Note: Status bi-color LED controlled by GPIO		
Storage	Yellow	Blinking	Storage (SATA/NVME) Active
	OFF	N/A	No Data Access
M.2	LED behavior will be determined by the inserted module card (optional)		
mPCIe	LED behavior will be determined by the inserted module card (optional)		

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 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, 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 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
03: CMOS Data Lost	09: Cache RMA Problem	15: PS2	21: Shut Down
04: FDC Fail	10: Memory Socket Bad	16: LAN	22: Panel Fail
05: HDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
06: Bad Slot	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)

Request Party

Confirmed By Supplier

Authorized Signature / Date

Authorized Signature / Date