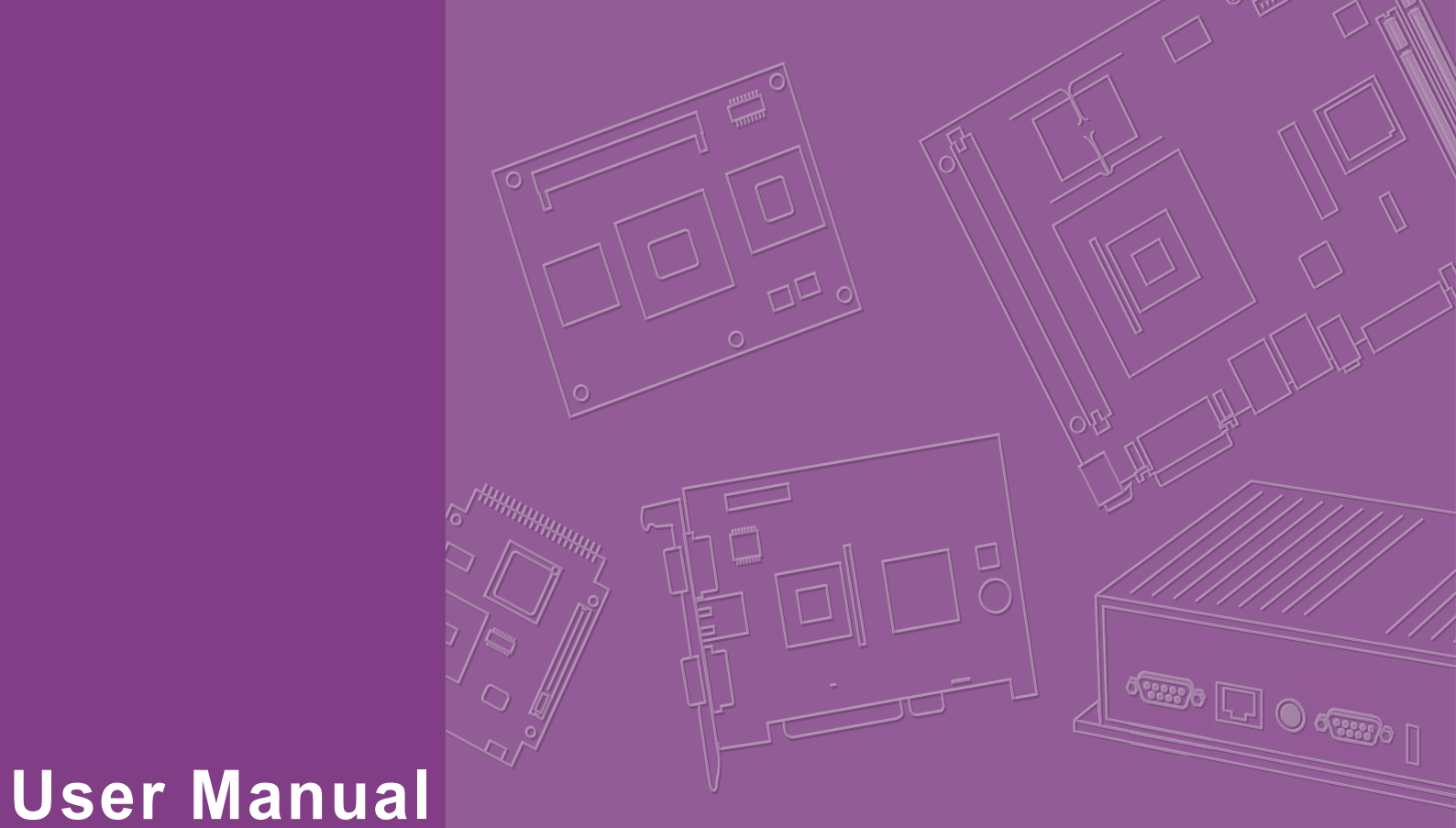




User Manual

EI-52

Fanless Edge Intelligence System

ADVANTECH

Enabling an Intelligent Planet

Attention!

This product contains a hard copy of the Chinese user manual for China CCC certification purposes. A PDF of the English user manual is included on the accompanying CD. Please disregard the hard copy Chinese user manual if the product is not sold and/or installed in China.

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Product Warranty (2 Years)

Advantech warrants the original purchaser that all of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products that have been repaired or altered by persons other than repair personnel authorized by Advantech, or products that have been subject to misuse, abuse, accident, or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced free of charge during the warranty period. For out-of-warranty repairs, customers are billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

If you believe that your product is defective, follow the steps outlined below.

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software, etc.) Note anything abnormal and list any on-screen messages displayed when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
5. Write the RMA number clearly on the outside of the package, and ship the package prepaid to your dealer.

Declaration of Conformity

FCC Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, 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, users are 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 your dealer or an experienced radio/TV technician for help

Technical Support and Assistance

1. Visit the Advantech website at www.advantech.com/support to obtain the latest product information.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before calling:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Warnings, Cautions, and Notes

Warning! *Warnings indicate conditions that if not observed can cause personal injury!*



Caution! *Cautions are included to help prevent hardware damage and data losses.*



Note! *Notes provide additional optional information.*



Safety Instructions

1. Read these safety instructions carefully.
2. Retain this user manual for future reference.
3. Disconnect the equipment from all AC outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or sprayed detergent.
4. For pluggable equipment, the power outlet should be near the equipment and easily accessible.
5. Protect the equipment from humidity.
6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
7. The openings on the enclosure are for air convection and protect the equipment from overheating. Do not cover the openings.
8. Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet.
9. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect the equipment from the power source to avoid damage from transient over-voltage.
12. Never pour liquid into an opening as this can cause fire or electrical shock.
13. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
14. If one of the following occurs, have the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment is malfunctioning or does not operate according to the user manual.
 - The equipment has been dropped and damaged.
 - The equipment shows obvious signs of breakage.
15. Do not leave the equipment in an environment with a storage temperature of below -40 °C (-40 °F) or above 85 °C (185 °F) as this may cause damage. The equipment should be stored in a controlled environment.
16. Any unverified component may cause unexpected damage. To ensure correct installation, always use the components (e.g., screws) provided in the accessory box.
17. CAUTION: The equipment is equipped with a battery-powered real-time clock circuit. There is a risk of explosion if a battery is incorrectly replaced. Replace only with same or equivalent type as recommended by the manufacturer. Discard all used batteries according to the manufacturer's instructions.
18. Always disconnect the power cord from the chassis before manually handling the hardware. Do not implement connections or configuration changes while the device is powered on. Sudden power surges may damage sensitive electronic components.
19. In accordance with IEC 704-1:1982 specifications, the sound pressure level at the operator's position does not exceed 70 dB (A).
20. The equipment should only be installed in a restricted access area.
21. DISCLAIMER: These instructions are provided according to IEC 704-1 specifications. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

22. This model is intended to be supplied by an UL-certified power supply (Adapter: FSP/ FSP060-DAAN2) suitable for use at TMA 60 °C (140 °F) min., and the output is rated 24 V_{DC}, 2.5A min., ES1. If you need further assistance, contact Advantech for additional information.

Consignes de Sécurité

1. Veuillez lire attentivement ces instructions de sécurité.
2. Veuillez conserver ce manuel de l'utilisateur pour référence ultérieure.
3. Veuillez débrancher cet équipement de la prise secteur avant le nettoyage. Utilisez un chiffon humide. Ne pas utiliser de détergent liquide ou pulvérisé pour le nettoyage. Utilisez une feuille ou un chiffon humide pour le nettoyage.
4. Pour les équipements enfichables, la prise de courant doit être à proximité de l'équipement et doit être facilement accessible.
5. S'il vous plaît garder cet équipement de l'humidité.
6. Posez cet équipement sur une surface fiable lors de l'installation. Une chute ou une chute pourrait causer des blessures.
7. Les ouvertures sur le boîtier sont destinées à la convection d'air, protégeant ainsi l'équipement de la surchauffe. **NE COUVREZ PAS LES OUVERTURES.**
8. Assurez-vous de la tension de la source d'alimentation lorsque vous connectez l'équipement à la prise secteur.
9. Placez le cordon d'alimentation de sorte que personne ne puisse marcher dessus. Ne placez rien sur le cordon d'alimentation.
10. Tous les avertissements et mises en garde sur l'équipement doivent être notés.
11. Si l'appareil n'est pas utilisé pendant une longue période, débranchez-le du secteur pour ne pas être endommagé par une surtension transitoire.
12. Ne jamais verser de liquide dans les ouvertures de ventilation; Cela pourrait provoquer un incendie ou un choc électrique.
13. N'ouvrez jamais l'équipement. Pour des raisons de sécurité, seul le personnel de maintenance qualifié doit ouvrir l'équipement.
14. Si l'une des situations suivantes se présente, faites vérifier le matériel par le personnel de service:
 - Le cordon d'alimentation ou la fiche est endommagé
 - Un liquide a pénétré dans l'appareil
 - L'équipement a été exposé à l'humidité
 - L'équipement ne fonctionne pas bien ou vous ne pouvez pas le faire fonctionner conformément au manuel d'utilisation
 - Equipment L'équipement est tombé et a été endommagé
 - Equipment L'équipement présente des signes évidents de rupture
15. Ne laissez pas cet équipement dans un environnement où la température de stockage peut être inférieure à -40 °C (-40 °F) ou supérieure à 85 °C (185 °F). Cela pourrait endommager l'équipement. L'équipement doit être dans un environnement contrôlé.
16. Tout composant non vérifié peut causer des dommages inattendus. Pour garantir une installation correcte, veuillez toujours utiliser les composants (ex. Vis) fournis avec la boîte d'accessoires.
17. **ATTENTION:** L'ordinateur est équipé d'un circuit d'horloge temps réel alimenté par batterie. Il y a un risque d'explosion si la batterie est remplacée de manière incorrecte. Remplacez uniquement avec le même type ou un type équivalent recommandé par le fabricant. Jetez les piles usagées conformément aux instructions du fabricant.

-
18. Débranchez toujours complètement le cordon d'alimentation de votre châssis lorsque vous utilisez du matériel. Ne faites pas de connexion quand l'appareil est sous tension. Les composants électroniques sensibles peuvent être endommagés par des surtensions soudaines.
 19. Niveau de pression acoustique au poste de l'opérateur selon la norme CEI 704-1: 1982 n'est pas supérieur à 70 dB (A).
 20. L'équipement ne doit être installé que dans une zone d'accès restreint.
 21. **AVERTISSEMENT:** Cet ensemble d'instructions est donné conformément à la norme CEI 704-1. Advantech décline toute responsabilité quant à l'exactitude des déclarations contenues dans ce.
 22. Ce modèle est destiné à être alimenté par une alimentation certifiée UL (adaptateur: FSP / FSP060-DAAN2), adaptée à une utilisation à 60 degrés Celsius. et la sortie est nominale 24Vcc, 2,5A min., ES1, si vous avez besoin d'une assistance supplémentaire, veuillez contacter Advantech pour plus.

Packing List

Before installation, check that the following items were included with the product:

- 1 x EI-52 unit
- 1 x Power adapter (DC 19V, 90W)
- 1 x Registration and 2-year warranty card
- 1 x China RoHS
- 1 x WISE-DeviceOn and Edge X brief card
- 1 x Simplified Chinese user manual

Ordering Information

Model Number	Description
EI-52-S6A1	Intel Core i5-1145G7E, w/ 16GB DDR4 RAM, 64GB SATA Slim SSD built-in
EI-52-S2A1	Intel Core i3-1115G4E, w/ 8GB DDR4 RAM, 64GB SATA Slim SSD built-in
EI-52-U0A1	Intel Celeron 6305E, w/ 8GB DDR4 Memory, 64GB SATA Slim SSD built-in

Optional Accessories

Part Number	Description
1700001524	Power Cable 3-pin 180cm, USA type
170203183C	Power Cable 3-pin 180cm, Europe type
170203180A	Power Cable 3-pin 180cm, UK type
1700008921	Power Cable 3-pin PSE Mark 183cm
AMK-A0038	VEGA-330 and thermal kit for EI-52 (including VEGA-330 module and thermal solution)
AMK-A0039	Thermal solution and Antenna for EI-52+AIW-355 5G module. (AIW-355 module is not included in AMK-A0039 and need to be ordered separately.)
AMK-A0040	VESA and DIN-Rail Mounting kit for EI-52
AMO-I026A	MiniPCle to M.2, support M.2 Key B USB signal module (for using AIW-355 5G module on EI-52)

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Chapter 1

General Introduction

This chapter gives background information on the EI-52 series

1.1 Introduction

EI-52 is an edge intelligence system with Intel 11th generation Core i5/Celeron processor. The built in Intel 12th Iris Xe graphics and Vector Neural Network Instructions (VNNI) offers high graphic performance and AI inference acceleration. EI-52 supports Advantech WISE-DeviceOn and Edge X data acquisition API, which can fulfill diverse data acquisition demand in various applications, such as self-service kiosk, smart city and factory automation.

Intel 11th Gen. High Performance Processors

EI-52 is with high performance Intel 11th generation Core i5/Celeron processor. The built-in Intel 12th Iris Xe graphic chipset and vector neural network instructions (VNNI) offers powerful graphic computing performance and AI inference acceleration through Intel OpenVINO toolkit.

HDMI+DP Dual Display & Compact-size with Multiple I/Os

EI-52 is fanless design, built-in DDR4 memory and SATA Slim SSD, and supports -10 ~ 50°C operating temperature. The system dimensions is 156 x 112 x 60 mm compact size but with multiple I/Os, including 2 x RS-232/422/485, 2 x GbE, 6 x USB and support M.2 2280 M key and full-size mini PCIe expansions.

Advantech WISE-DeviceOn, Edge X Data Acquisition API integrated

EI-52 integrates with Advantech WISE-DeviceOn and Edge X data acquisition API for edge to cloud data acquisition applications. With WISE-DeviceOn, users can easily monitor device status in real time with graphic user interface and enhance device security. On the other hand, Edge X API empowers users to collect data from edge sensors to cloud, including various public cloud platforms such as Azure, AWS and Alibaba cloud. Users can also do 2nd development with Edge X SDK for their own applications.

1.2 Product Features

1.2.1 General

- **CPU:**
 - Intel Core i5-1145G7E
 - Intel Core i3-1115G4E
 - Intel Celeron 6305E
- **BIOS:** AMI 256 Mbit Flash BIOS
- **System Memory:**
 - i5 SKU: Built-in 1 x 16GB DDR4 260 pin SO-DIMM (-20~ 85 °C)
 - i3 & Celeron SKU: Built-in 1 x 8GB DDR4 260 pin SO-DIMM (-20~ 85 °C)
- **Serial Port:** 2 x RS-232/422/485 with auto flow control
- **USB:** 4x USB 3.0, 2x USB 2.0
- **Audio:** High-definition (HD) audio, Line Out, Mic In
- **Storage:** 1 x SATA Slim 64G SSD Built-in
- **Expansion Interface:**
 - 1x M.2 2280 M key
 - 1x Full-size Mini PCIe

1.2.2 Display

- **Controller:** Intel 12th Gen. graphic chipset
- **Resolution:**
 - 1x HDMI 2.0b, supports up to 4096x2304@60Hz
 - 1x DP 1.4a, supports up to 7680x4320@60Hz
- **Dual Display:** HDMI + DP

1.2.3 Ethernet

- **Chipset:**
 - LAN1 Intel® i219
 - LAN2 Intel® i210
- **Speed:** 10/100/1000 Mbps
- **Interface:** 2 x RJ45
- **Standard:** Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3x, IEEE 802.3y, IEEE 802.ab.

If it is necessary for the LAN order recognized by OS and the LAN order printed on I/O plate to be exactly the same, please do not order EI-52 207 OS image. To make the LAN order be the same for OS and physical connector printed on I/O plate, please follow the instructions in Appendix "Fixing the LAN order" section.

1.3 Chipset

1.3.1 Functional Specifications

1.3.1.1 Processor

Processor	- Intel Core i5-1145G7E - Intel Core i3-1115G4E - Intel Celeron 6305E
Memory	- i5 SKU: Built-in 1 x 16GB DDR4 260 pin SO-DIMM (-20~ 85 °C) - i3 & Celeron SKU: Built-in 1 x 8GB DDR4 260 pin SO-DIMM (-20~ 85°C)

1.3.1.2 Chipset

Internal Graphics Features	Direct X 12.1, OpenGL 4.6 Display Ports HDMI 2.0b + DP 1.4a
Video Accelerator	H/W accelerated video decoding Video decoder: Support H.265/HEVC, H.264/AVC, VP9, SCC Video Encoder: Support H.265/HEVC, H.264/AVC, VP9, SCC
SATA Interface	Supports several optional sections of Serial ATA II: Extensions to Serial ATA 1.0 specification, Revision 1.0 Supports SATA transfers to 300 Mbytes/sec.
USB Interface	USB host interface with support for 4x USB 3.0 and 2x USB 2.0 ports All ports are High-Speed, Full-Speed, and Low-Speed capable Supports legacy keyboard/mouse software
BIOS	AMI 256 Mbit Flash BIOS

1.3.1.3 Others

Serial Ports	■ 2 x RS-232/422/485, supports auto-flow control
Ethernet	LAN1 Intel i219, LAN2 Intel i210 ■ Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3x, IEEE 802.3y, and IEEE 802.ab ■ Supports 10/100/1000 Mbps. LAN Connectors: Phone Jack RJ45 8P 90D(F)
Audio	Audio Codec: Realtek ALC888S: ■ Compliant with HD audio specifications ■ Supports 16/20/24-bit DAC and 16/20/24-bit ADC resolution ■ Supports Line Out and Mic In audio Connectors: 1 x Earphone jack
Battery	■ 1 x 3V/210 mAh battery with wire

1.4 Mechanical Specifications

1.4.1 System Dimensions

156 x 112 x 60 mm

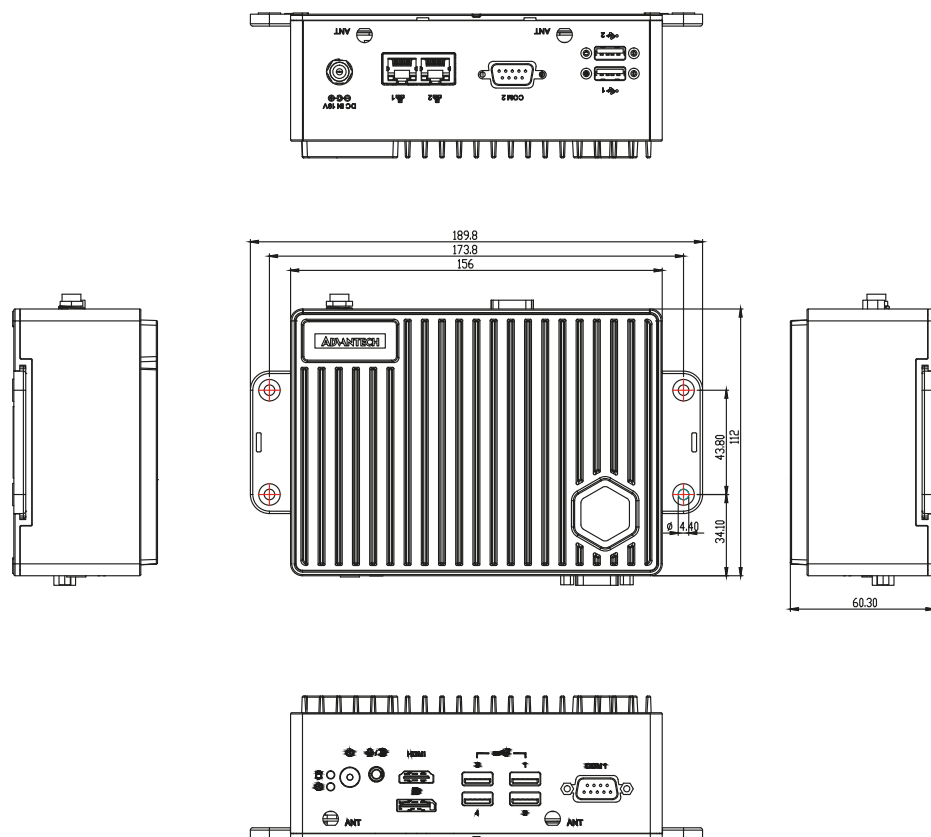


Figure 1.1 EI-52 Mechanical Dimensions

1.4.2 Weight

0.94 Kg

1.5 Power Requirements

1.5.1 System Power

- **Power Input:** DC In 19V

1.5.2 RTC Battery

- **Lithium:** 3 V/210 mAH

1.6 Environmental Specifications

1.6.1 Operating Temperature

- -10 ~ 50 °C, with 0.7m/s air flow

1.6.2 Relative Humidity

- 95% @ 40 °C (104 °F) (non-condensing)

1.6.3 Storage Temperature

- -40 ~ 85 °C (-40 ~ 185 °F)

1.6.4 Vibration Tolerance

- When the system is equipped with an SSD/mSATA: 3 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr/axis, (x, y, z) 3 axes

1.6.5 Shock Tolerance

- When the system is equipped with an SSD/mSATA: 30 G, IEC 60068-2-27, half sine, 11 ms duration

1.6.6 Safety Certification

- UL, CB, CCC, BSMI

1.6.7 EMC Certification

- CE, FCC, CCC, BSMI

Chapter 2

Hardware Installation

This chapter details instructions for installing EI-52 hardware and external I/O

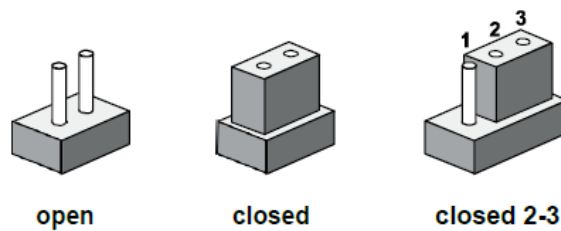
2.1 Introduction

The following sections demonstrate the internal jumper settings and the external connector pin assignments.

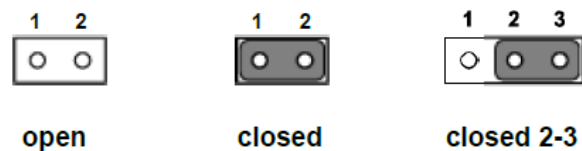
2.2 Jumpers

2.2.1 Jumper Description

EI-52 can be configured to satisfy specific application requirements by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To close a jumper, connect the pins with the clip. To open a jumper, remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. For these jumpers, connect either pins 1 and 2, or 2 and 3.



The jumper settings are schematically diagramed in this manual as follows:



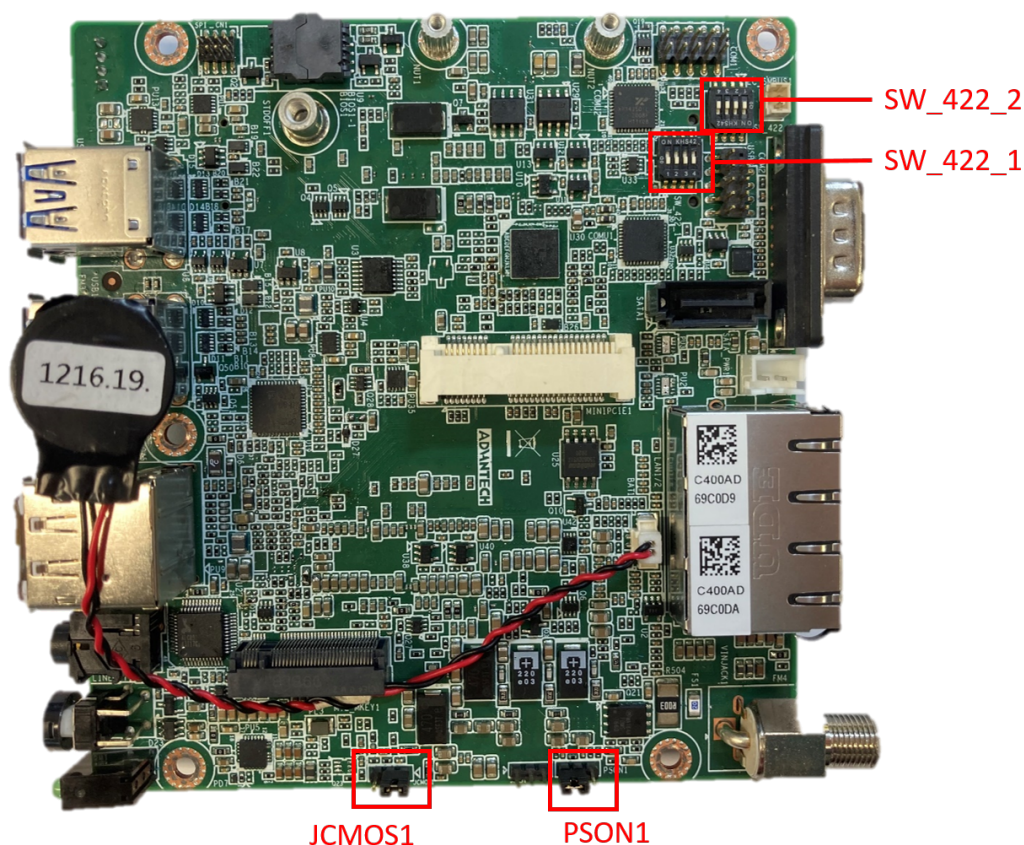
A pair of needle-nose pliers may be necessary when working with jumpers. Users with concerns regarding the ideal hardware configuration for your application should contact your local distributor or sales representative before making any changes. Usually, only a standard cable is required to make most connections.

2.2.2 Jumper List

Table 2.1: Jumper Settings

Location	Function
JCMOS1	Clear CMOS
PSON1	Auto Power On Setting
SW_422_1	RS485/RS422 Fail Safe Enabled/Disabled
SW_422_2	RS485/RS422 Fail Safe

2.2.3 Jumper Location



2.2.4 Jumper Settings

Table 2.2: JCOMS1 Clear CMOS

Part Number	1653003101
Description	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
Default Setting	(1-2)
Jumper Setting	(2-3): Clear CMOS

Table 2.3: PSON1 Auto Power On Setting

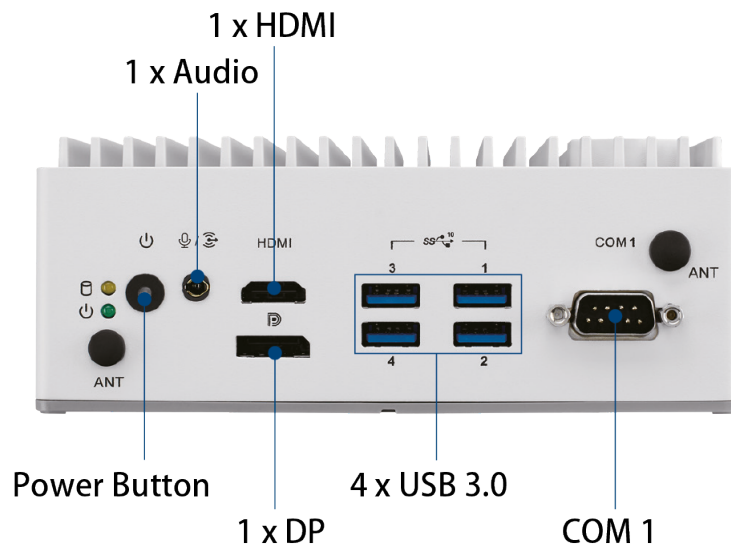
Part Number	1653003101
Description	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
Default Setting	(2-3): ATX mode
Jumper Setting	(1-2): AT mode

SW_422_2 RS485	RS422 Fail Safe Off	
Part Number	1600000402	
Description	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS	
Jumper Setting	(1-8) OFF: RS485	RS422 Fail Safe Off
Jumper Setting	(2-7) OFF: RS485	RS422 Fail Safe Off
Jumper Setting	(3-6) OFF: RS485	RS422 Fail Safe Off
Jumper Setting	(4-5) OFF: RS485	RS422 Fail Safe Off

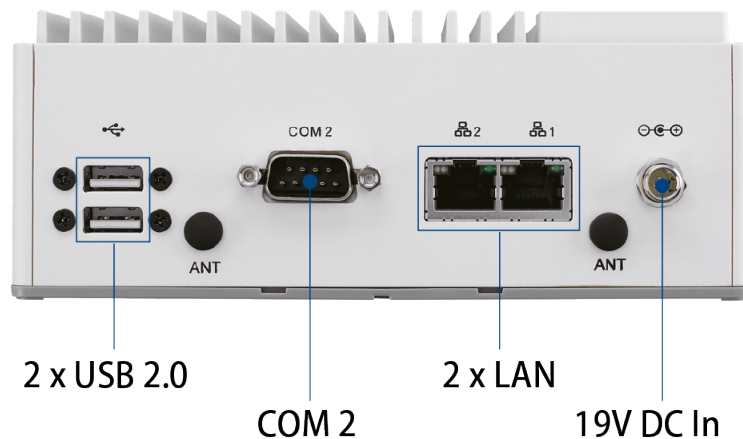
SW_422_1 RS485	RS422 Fail Safe Enabled	Disabled
Part Number	1600000402	
Description	DIP SW SMD 8P SPST P=1.27mm W=5.4mm KHS42E	
Jumper Setting	(1-8) OFF: RS485/RS422 Fail Safe Enabled	Disabled
Jumper Setting	(2-7) OFF: RS485/RS422 Fail Safe Enabled	Disabled
Jumper Setting	(3-6) OFF: RS485/RS422 Fail Safe Enabled	Disabled
Jumper Setting	(4-5) OFF: RS485/RS422 Fail Safe Enabled	Disabled

2.3 System I/O

Front View



Rear View



2.4 External I/O

2.4.1 Power On/Off Button

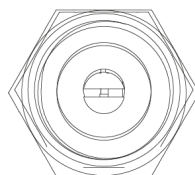
EI-52 features a Power On/Off button with an LED indicators on the top side that show On status (Green LED)



Figure 2.1 Power On/Off Button

2.4.2 Power Input Connector

The power input connector supports DC in 19V.



2.4.3 Ethernet Connector (LAN)

EI-52 is equipped with one Intel® i219 and one Intel® i210 Ethernet controllers that are fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards and connected to LAN1 and LAN2. The Ethernet port provides a standard RJ45 jack connector with LED indicators on the front side to show its Active/Link status (Green LED) and Speed status (Yellow LED).

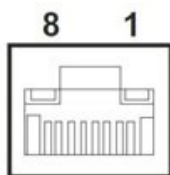


Figure 2.2 Ethernet Connector (LAN)

Table 2.4: Ethernet Connector (LAN) Pin Definition

Pin	10/100/1000 Mbps Signal Name
1	BI_DA+(GHz)
2	BI_DA-(GHz)
3	BI_DB+(GHz)
4	BI_DC+(GHz)
5	BI_DC-(GHz)
6	BI_DB-(GHz)
7	BI_DD+(GHz)
8	BI_DD-(GHz)
H3	GND
H4	GND

2.4.4 USB 3.0 Connector

EI-52 supports four USB 3.0 interfaces, which support Plug-and-Play functionality and hot swapping for up to 127 external devices. The USB interfaces comply with USB UHCI, Rev. 3.0.

USB 3.0 connectors contain legacy pins to interface to USB 2.0 devices and a new set of pins for USB 3.0 connectivity.

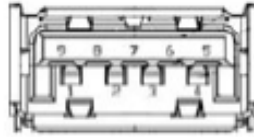


Figure 2.3 USB Connector

Table 2.5: USB Connector Pin Definition

Pin	Signal Name
1	+5V
2	D-_0
3	D+_0
4	GND
5	USB0_SSRX-
6	USB0_SSRX+
7	GND
8	USB0_SSTX-
9	USB0_SSTX+

2.4.5 Audio Connector

EI-52 features one phone jack connectors that support stereo Line Out and Mic In audio ports. The audio chip is controlled by ALC888S and compliant with the Azalea standard.



Figure 2.4 Audio Connector

Table 2.6: Audio Connector Pin Definition

Pin	Signal Name
1	Mic In
2	Line Out

2.4.6 COM Connector

EI-52 provides two 9-pin D-sub connector, which supports RS232/422/485 serial communication interface ports. The default setting is RS-232, if you want to use RS-422/485, you can use the BIOS manual to change settings.

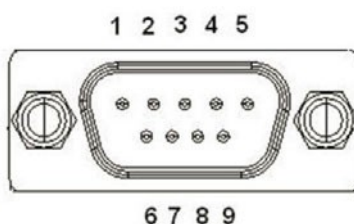


Figure 2.5 COM Connector

Table 2.7: COM Connector Pin Definition

Pin	RS-232	RS-422	RS-485
1	DCD	Tx-	DATA-
2	RxD	Tx+	DATA+
3	TxD	Rx+	NC
4	DTR	Rx-	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

NC represents "No Connection".

2.4.7 DP Connector

EI-52 offers one DP interface. The DP interface supports resolution up to 7680x4320.

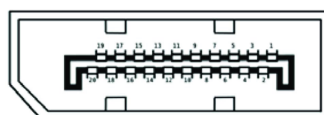


Table 2.8: DP Connector Pin Definition

Pin	Signal Name	Pin	Signal Name
1	ML_Lane 0 (p)	2	GND
2	ML_Lane 0 (n)	4	ML_Lane 1 (p)
5	GND	6	ML_Lane 1 (n)
7	ML_Lane 2 (p)	8	GND
9	ML_Lane 2 (n)	10	ML_Lane 3 (p)
11	GND	12	ML_Lane 3 (n)
13	GND	14	GND
15	AUX CH (p)	16	GND
17	AUX CH (n)	18	Hot Plug
19	GND	20	DP_PWR

Please notice that the DP cable in use should meet DP standard. If using DP cable which does not meet the standard, the cable may cause electricity leakage.

2.4.8 HDMI Connector

EI-52 offers two integrated 19-pin receptacle connector HDMI 2.0b interfaces. The HDMI link supports resolutions up to 4096 x 2304 @ 60 Hz.

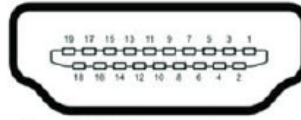


Figure 2.6 HDMI Connector

Table 2.9: HDMI Connector Pin Definition

Pin	Signal Name
1	HDMI_TX2+
2	GND
3	HDMI_TX2-
4	HDMI_TX1+
5	GND
6	HDMI_TX1-
7	HDMI_TX0+
8	GND
9	HDMI_TX0-
10	HDMI_CLK+
11	GND
12	HDMI_CLK-
13	NC
14	NC
15	HDMI_DCLK
16	HDMI_DDAT
17	GND
18	+V5_HDMI-HPD
19	DDP0_HPDP

NC represents "No Connection".

2.4.9 Antenna Socket

EI-52 reserves four antenna sockets for installing wireless/LTE device antennas. Each antenna socket is labeled "ANT" for easy identification.

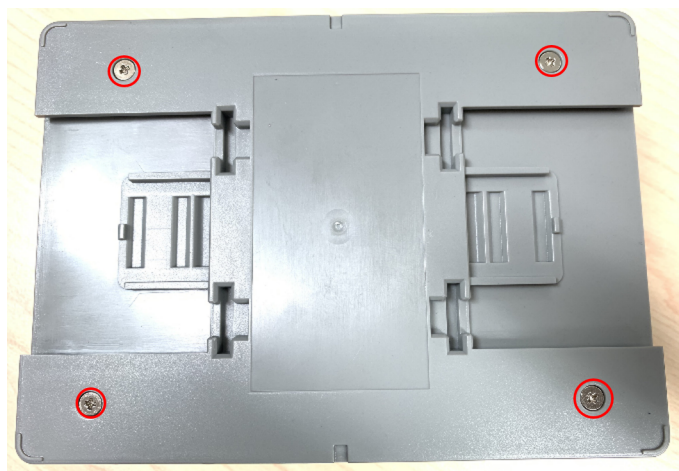


Figure 2.7 Antenna Socket

2.5 Installation

2.5.1 M.2 Installation

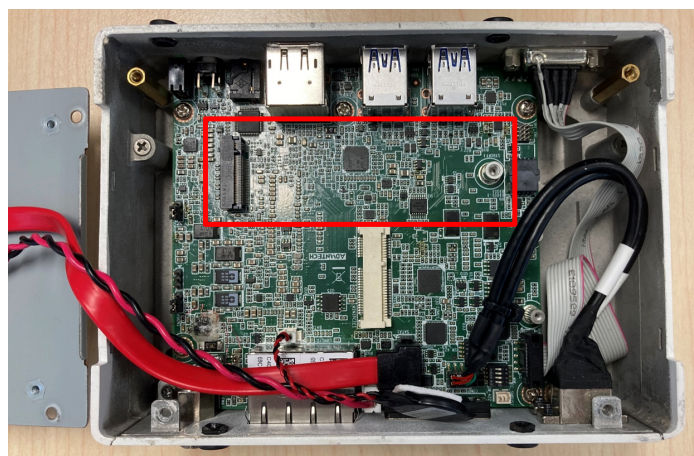
1. Loosen the 4 screws affixing screws and remove the bottom cover.



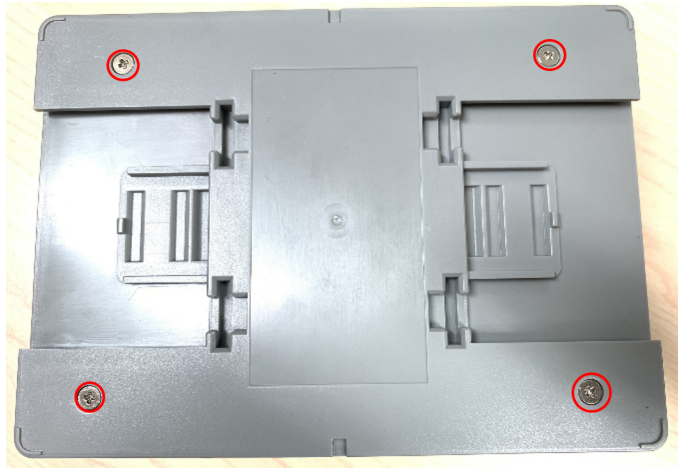
2. Loosen the 4 screws and remove the mechanical plate for storage.



3. Install the M.2 2280 M key module.

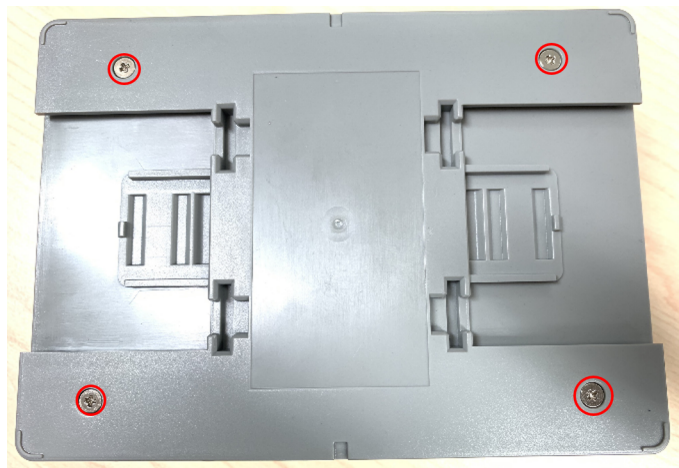


4. Reinstall the mechanical plate for storage and bottom cover and secure it with screws (each 4x screws).



2.5.2 Mini PCIe Installation

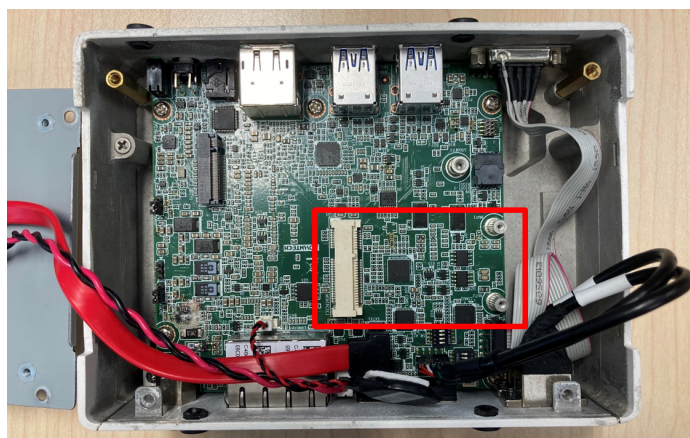
1. Loosen the 4 screws affixing screws and remove the bottom cover.



2. Loosen the 4 screws and remove the mechanical plate for storage.

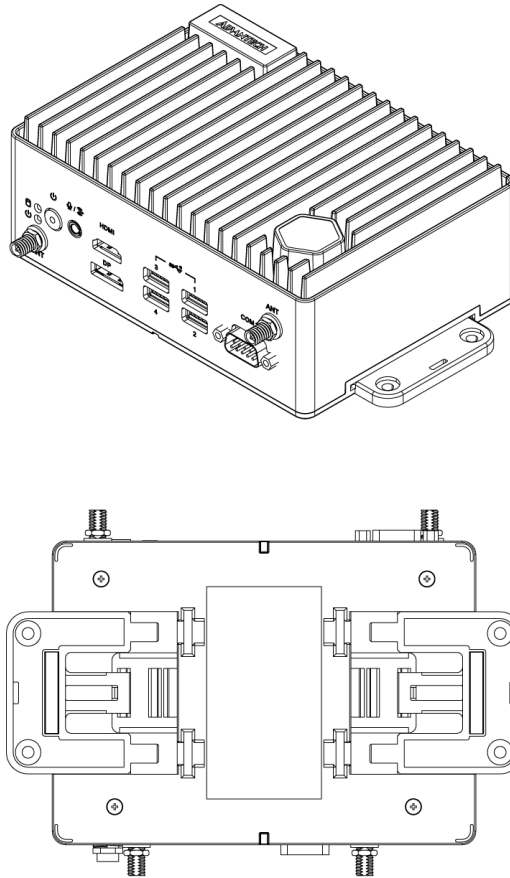


3. Install full-size mini PCIe module.



2.5.3 EI-52 Wall Mount

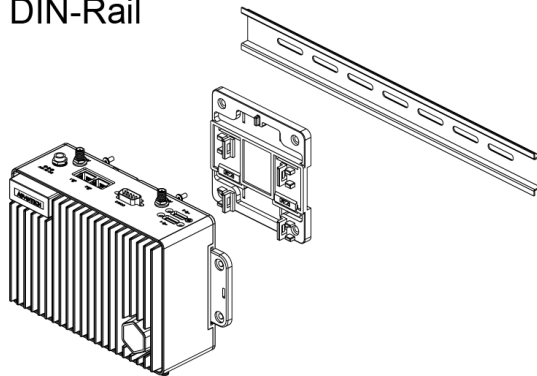
EI-52 default supports wall mount with the two wings on the bottom cover.



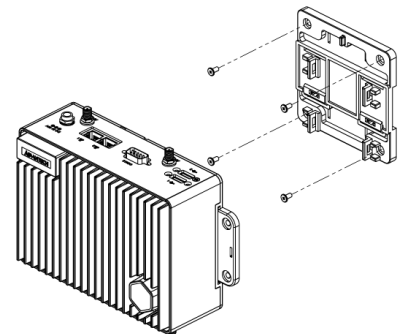
2.5.4 EI-52 DIN-Rail and VESA Mount (Optional AMK-A0040)

EI-52 default supports optional DIN-Rail and VESA mount with optional AMK-A0040 mounting kit.

DIN-Rail

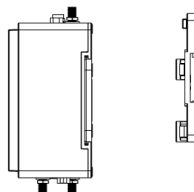


VESA

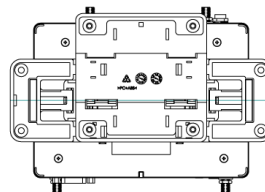


Assemble DIN-Rail/VESA Mounting bracket with EI-52:

Step 1



Step 2



Chapter 3

BIOS Settings

This chapter details the BIOS configuration instructions

3.1 Introduction

The AMI BIOS ROM has a built-in setup program - the BIOS Setup Utility - that allows users to modify the basic system configuration. All configuration data is stored in battery-backed CMOS to ensure the setup information is retained when the power is turned off.

This chapter describes the basic navigation of the EI-52 BIOS setup screens

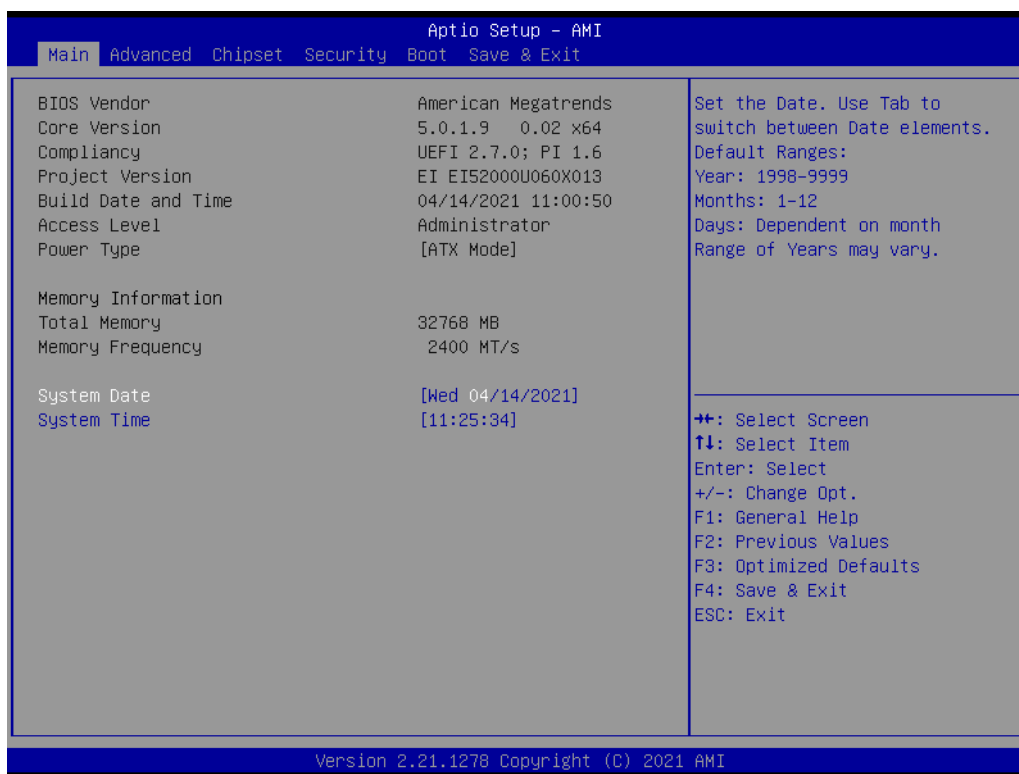


3.2 Entering BIOS Setup

Turn on the computer and then press <F2> or to enter the BIOS Setup menu.

3.2.1 Main Setup

Upon accessing the BIOS Setup Utility, users are presented with the Main setup page. Users can always return to the Main setup page by selecting the Main tab. The Main BIOS Setup page is shown below.



The Main BIOS setup page has two main frames. The left frame displays all the items accessible on the Main page. Items that are grayed out cannot be configured, whereas items presented in blue text can be configured. The right frame displays the key legend.

Located above the key legend is an area reserved for a text message. When an item is selected in the left frame, the item is presented in white text and often accompanied by a text message.

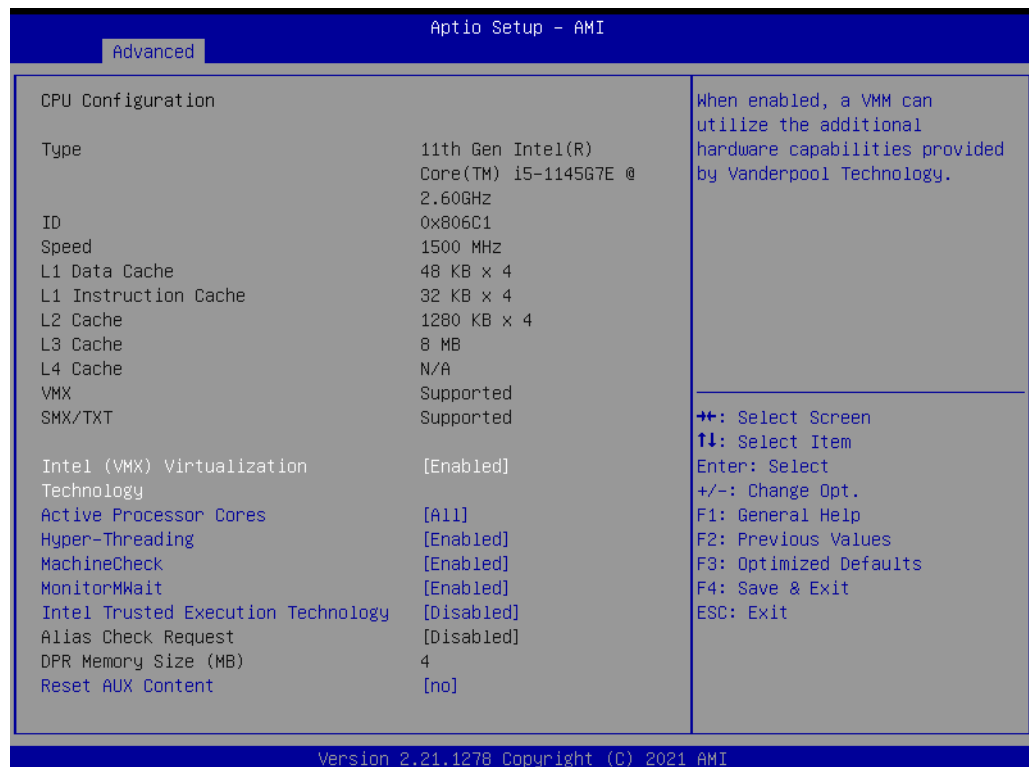
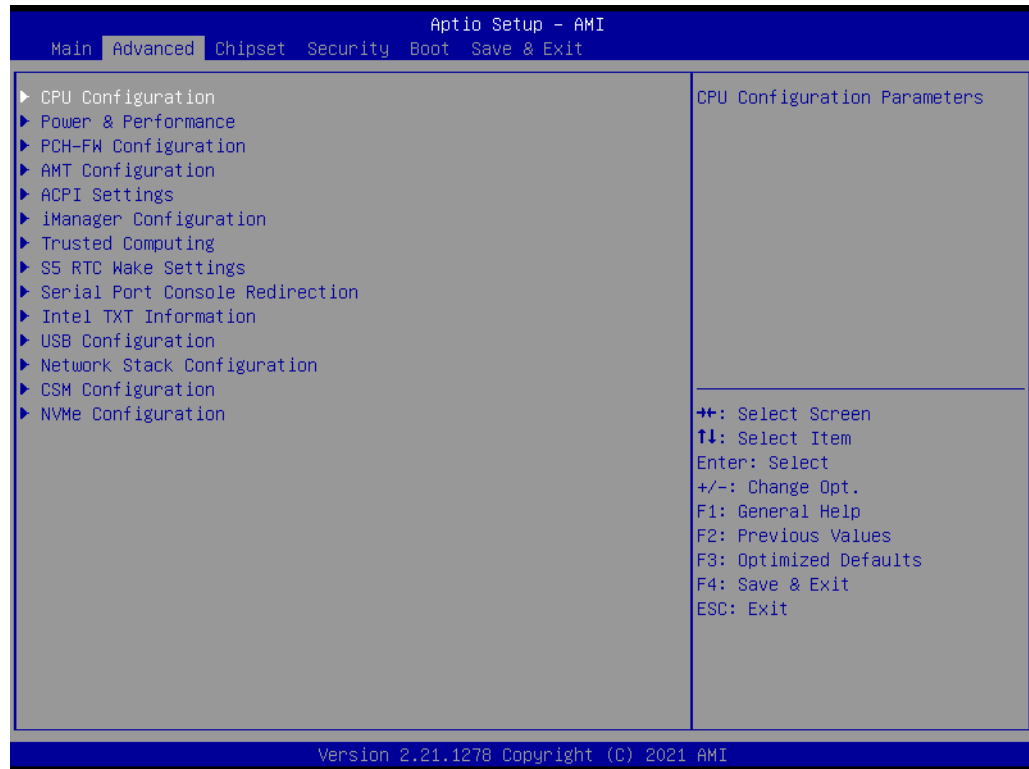
■ System Time/System Date

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values via the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format, and the time must be entered in HH:MM:SS format.

3.2.2 Advanced BIOS Setup

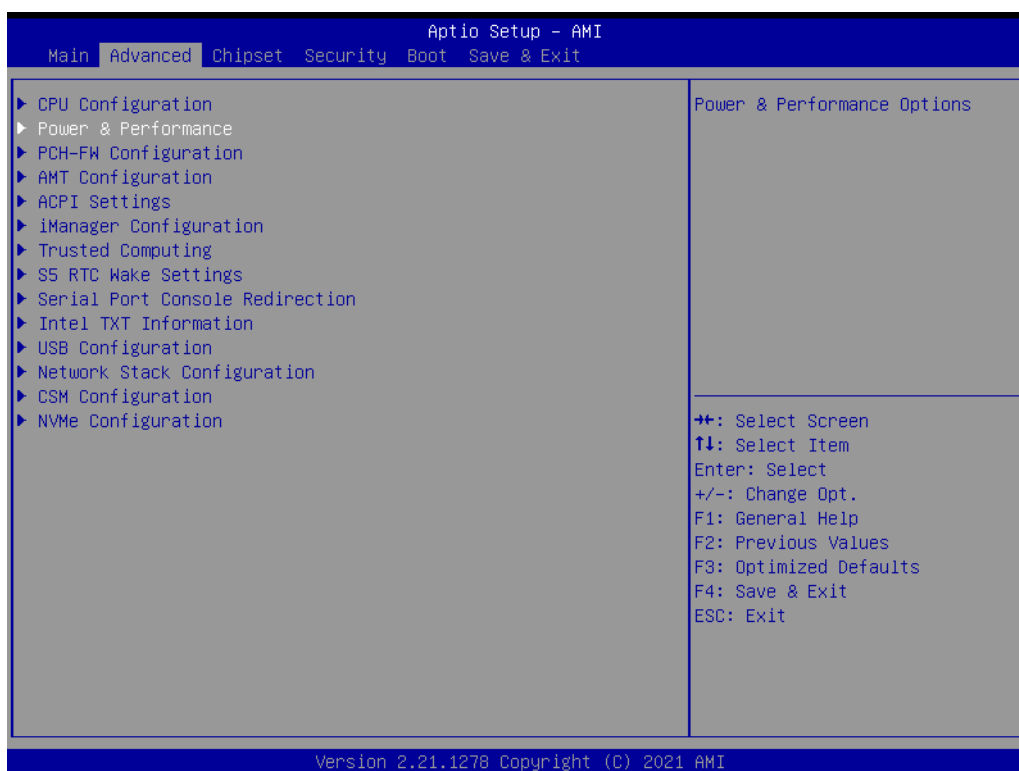
Select the Advanced tab from the BIOS Setup Utility to enter the Advanced BIOS Setup page. Select any of the items in the left frame of the screen, such as CPU Configuration, to access the sub menu for that item. The options for any of the Advanced BIOS Setup items can be displayed by highlighting the item using the <Arrow> keys.

3.2.2.1 CPU Configuration



- **Intel (VMX) Virtualization Technology**
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
- **Active Processor Cores**
Number of cores to enable in each processor package.
- **Hyper-Threading**
Enable or Disable Hyper-Threading Technology.
- **MachineCheck**
Enable/Disable Machine Check.
- **MonitorMWait**
Enable/Disable MonitorMWait.
- **Intel Trusted Execution Technology**
Enables utilization of additional hardware capabilities provided by Intel (R) Trusted Execution Technology. Changes require a full power cycle to take effect.
- **Alias Check Request**
Enables Txt Alias Checking capability. Changes require full Txt capability before it will take effect. It is a one time only change, next reboot will be reset.
- **DPR Memory Size (MB)**
Reserve DPR memory size (0-255) MB
- **Reset AUX Content**
Reset TPM Aux content. Txt may not functional after AUX content gets reset.

3.2.2.2 Power & Performance





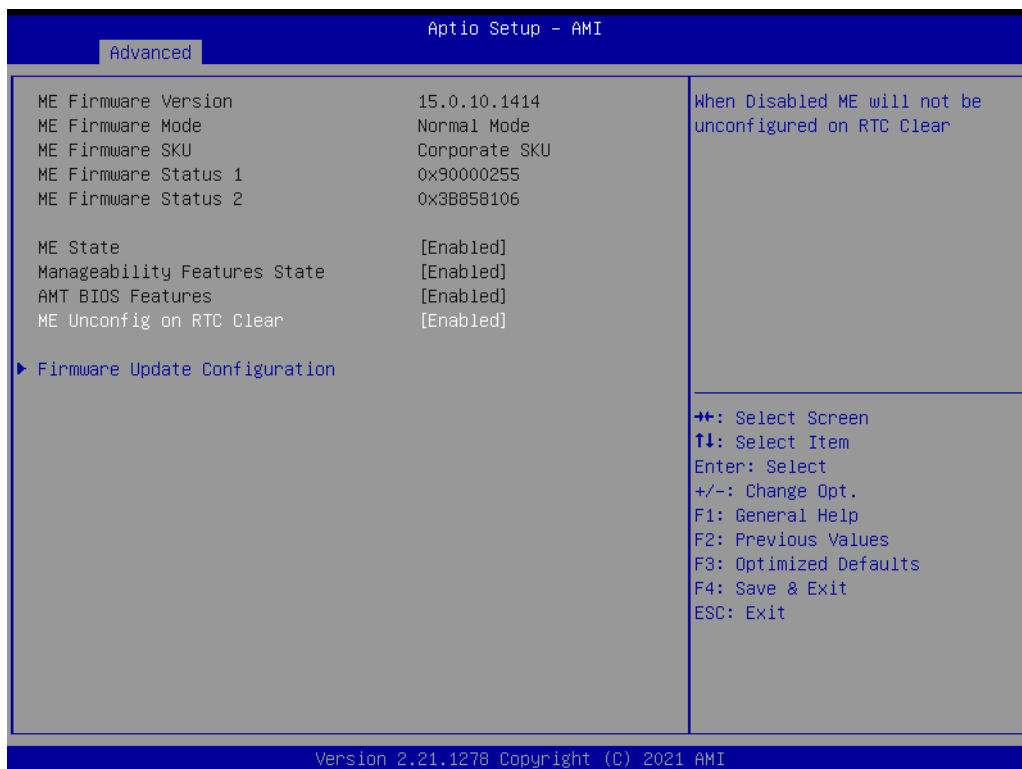
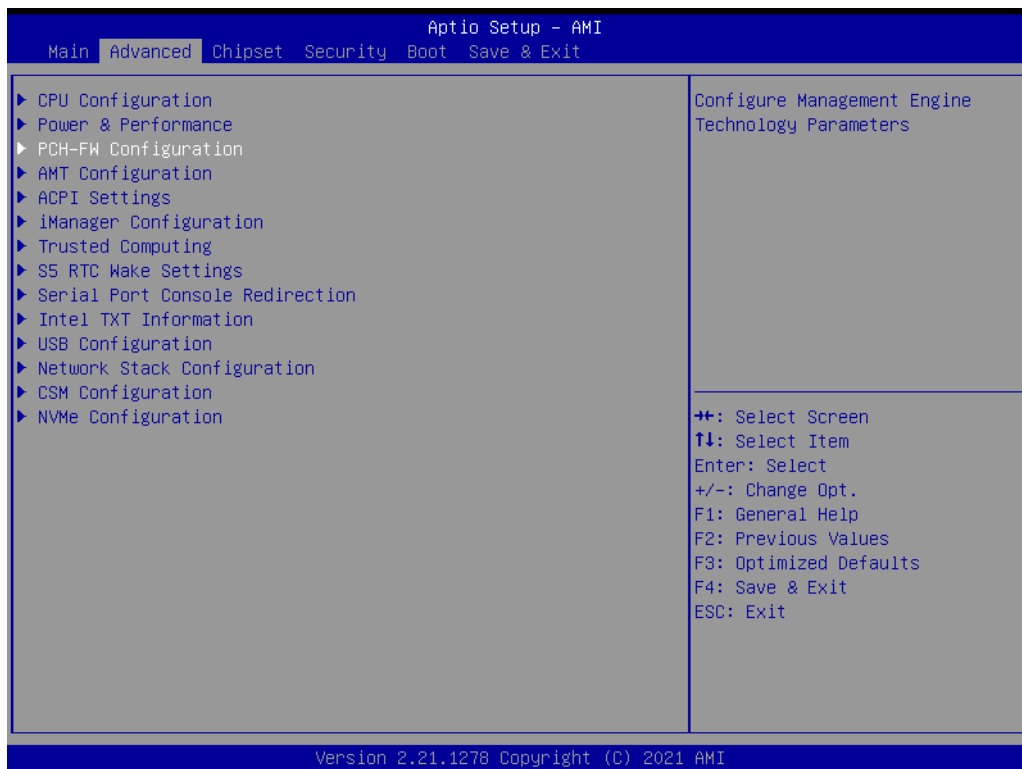
CPU - Power Management Control

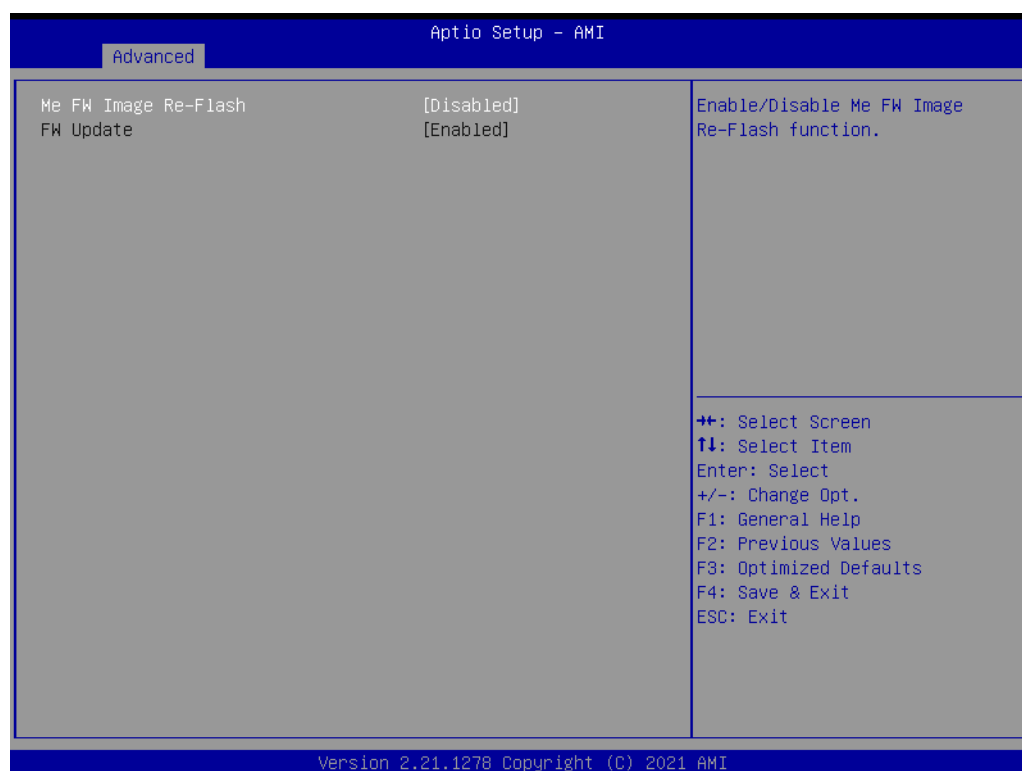
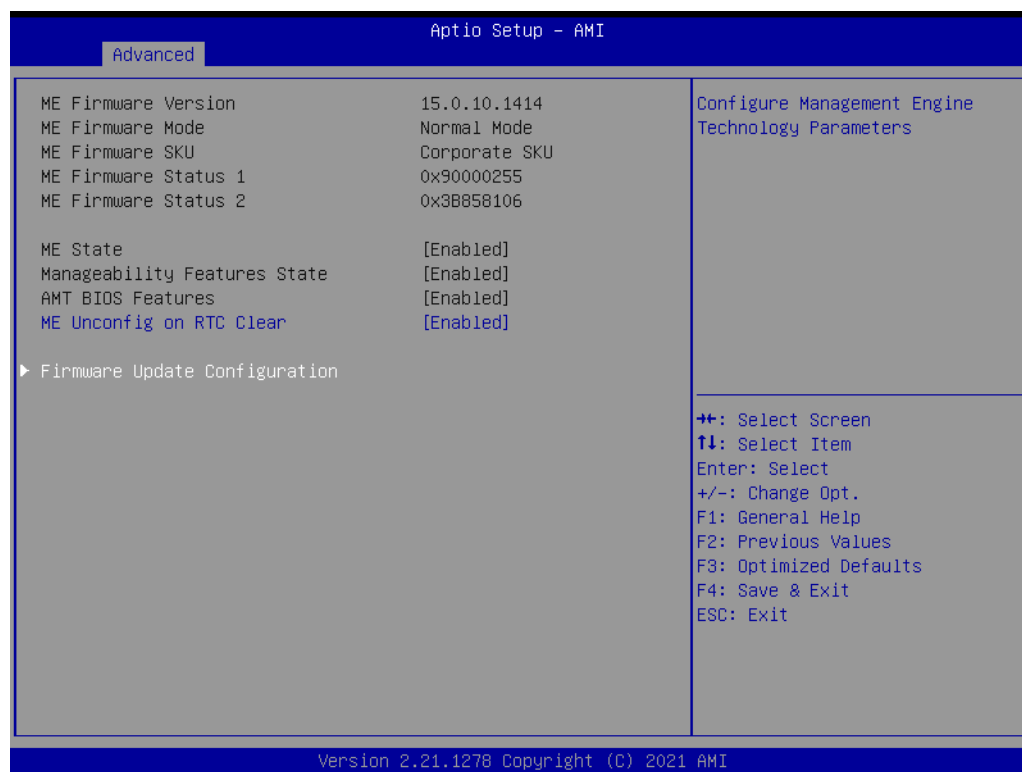
- **Boot performance mode**
Select the performance state that the BIOS will set starting from reset vector.
- **Intel(R) SpeedStep(tm)**
Allows more than two frequency ranges to be supported.
- **Turbo Mode**
Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.
- **C state**
Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

GT - Power Management Control

- **RC6(Render Standby)**
Check to enable render standby support.
- **Maximum GT frequency**
Maximum GT frequency limited by the user.
- **Disable Turbo GT frequency**
Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited

3.2.2.3 PCH-FW Configuration





- **ME State**
When Disabled ME will be put into ME Temporarily Disabled Mode.
- **Manageability Features State**
Enable/Disable Intel(R) Manageability features.

- **AMT BIOS Features**

When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup.

- **ME Unconfig on RTC Clear**

When Disabled ME will not be unconfigured on RTC Clear

Firmware Update Configuration

- **Me FW Image Re-Flash**

Enable/Disable Me FW Image Re-Flash function.

- **FW Update**

Enable/Disable ME FW Update function.

OEM Flags Settings

- **MEBx hotkey Pressed**

Enable automatic MEBx hotkey press.

- **MEBx Selection Screen**

Enable MEBx selection screen with 2 options : Press 1 to enter ME Configuration Screens. Press 2 to initiate a remote connection.

- **Hide Unconfigure ME Confirmation Prompt**

Hide Unconfigure ME confirmation prompt when attempting ME unconfiguration.

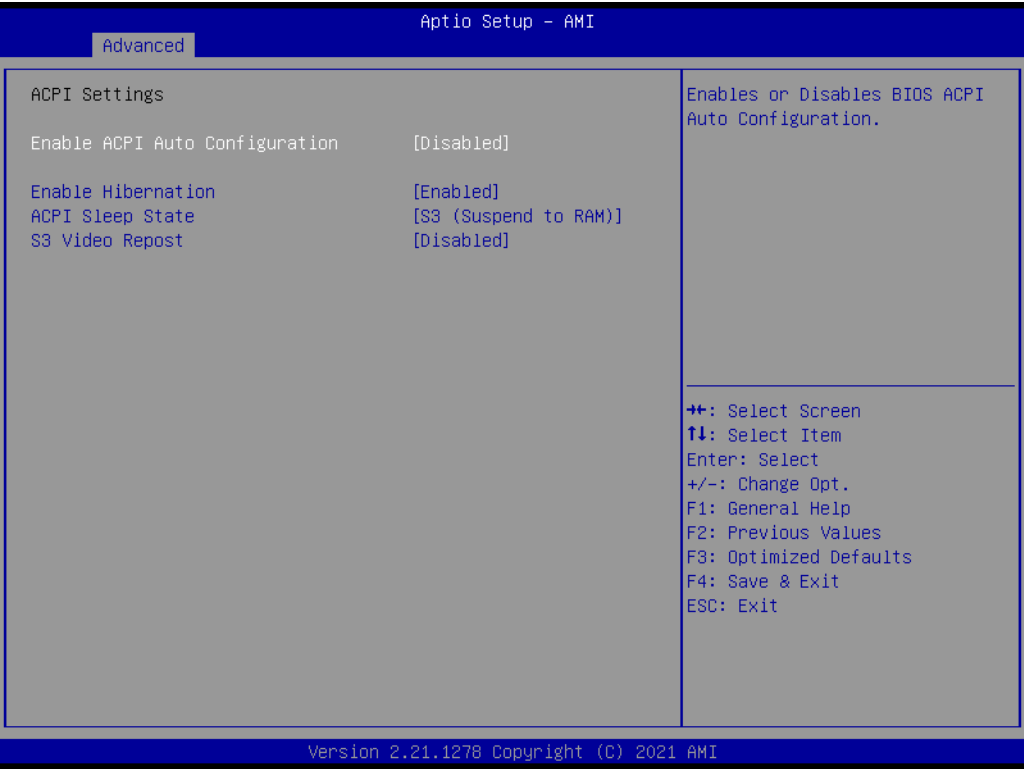
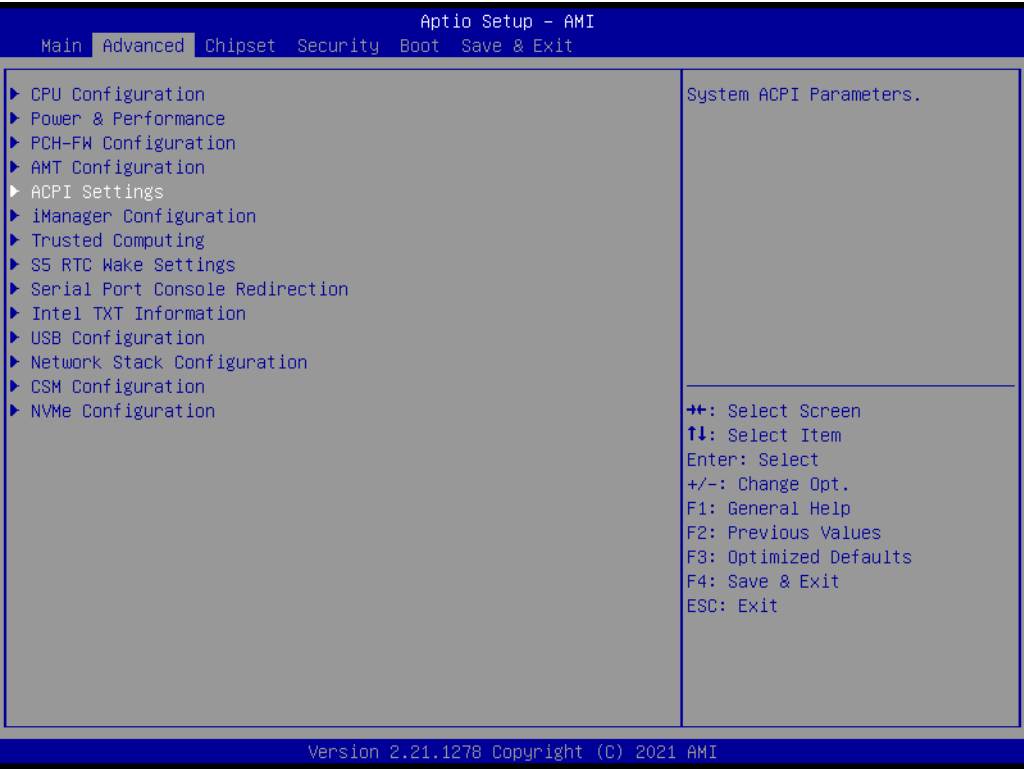
- **MEBx OEM Debug Menu Enable**

Enable OEM debug menu in MEBx.

- **Unconfigure ME**

Unconfigure ME with resetting MEBx password to default.

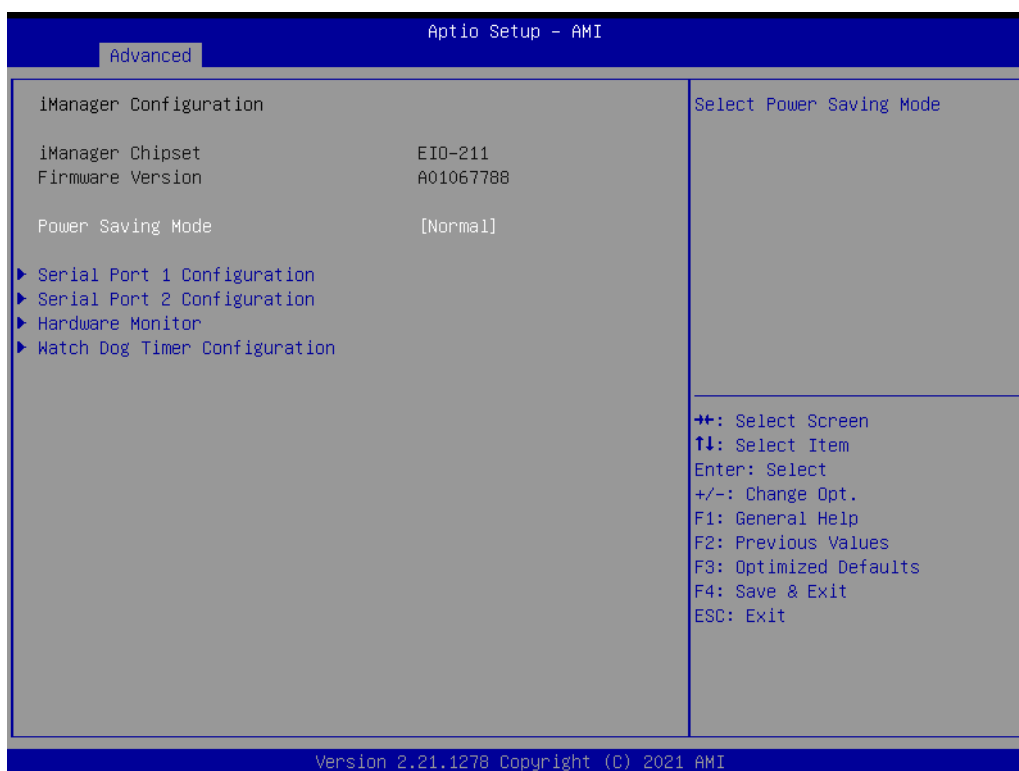
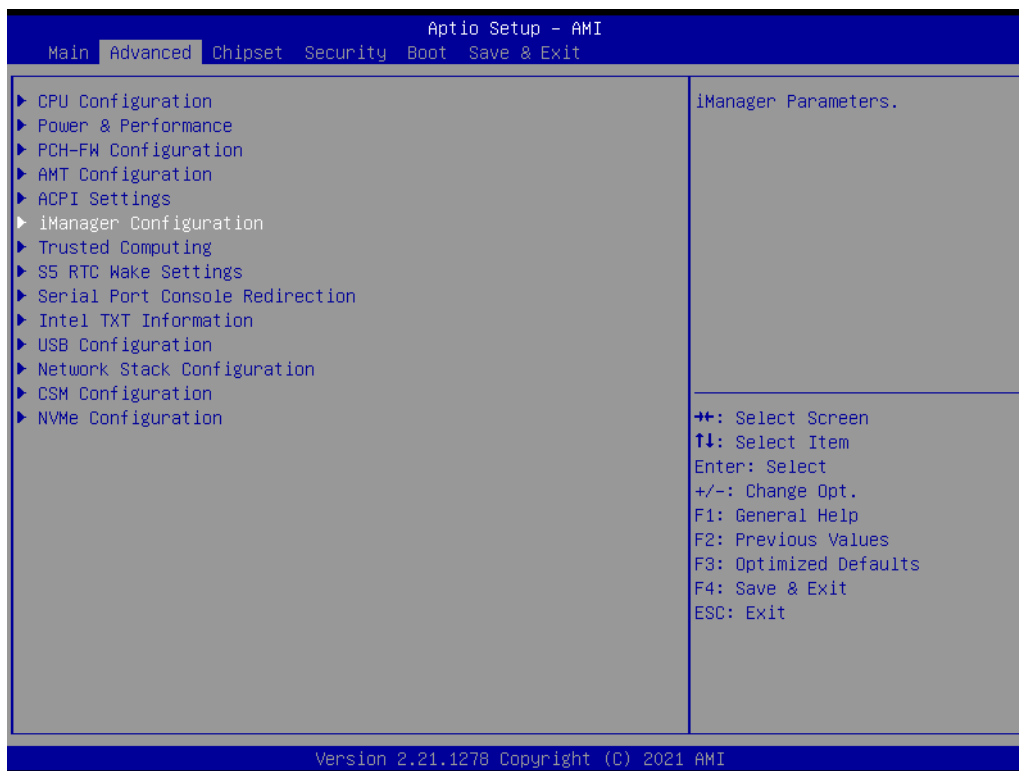
3.2.2.4 ACPI Settings



- **Enable ACPI Auto Configuration**
Enables or Disables BIOS ACPI Auto Configuration.
- **Enable Hibernation**
Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.

- **ACPI Sleep State**
Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
- **S3 Video Repost**
Enable or Disable S3 Video Repost.

3.2.2.5 iManager Configuration



-
- **Power Saving Mode**
Select Power Saving Mode.

Serial Port 1 Configuration

- **Serial Port**
Enable or Disable serial port.
- **Change Settings**
Select an optimal settings for Super IO device.
- **COM1 Mode**
COM1 mode select.

Serial Port 2 Configuration

- **Serial Port**
Enable or Disable serial port.
- **Change Settings**
Select an optimal settings for Super IO device.
- **COM2 Mode**
COM2 mode select.

Hardware Monitor

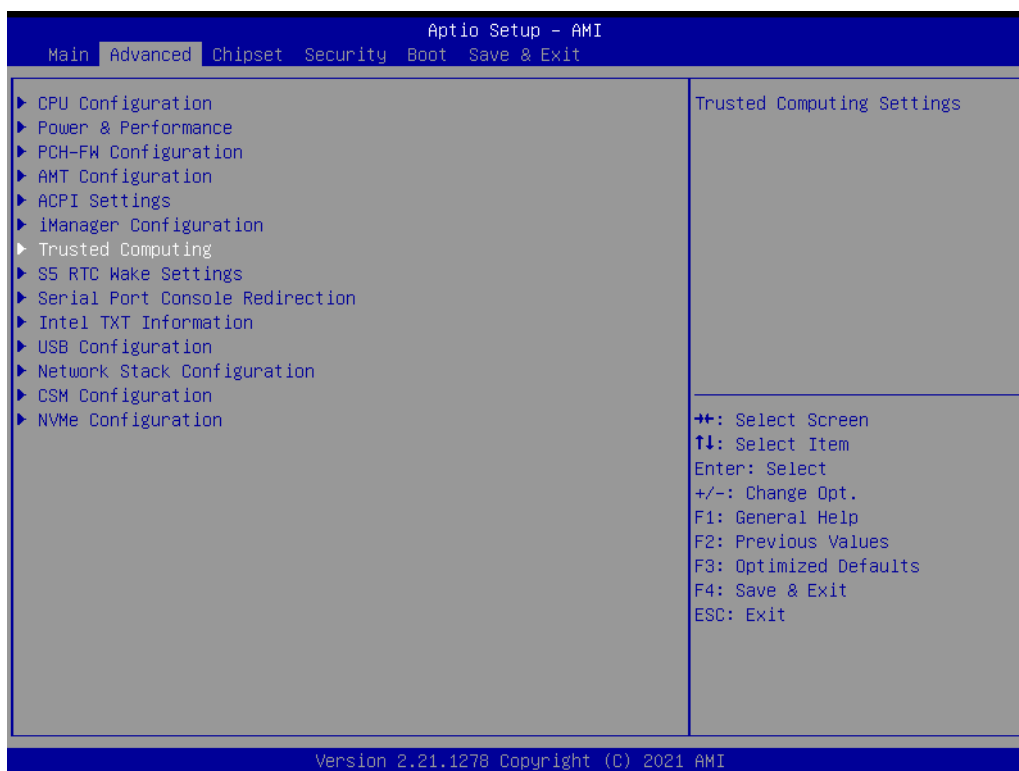
Provide hardware monitor information

Watch Dog Timer Configuration

- **Watch Dog Timer**
Enabled or Disabled

Watch Dog Timer function (Start before boot to OS and must stop by self)

3.2.2.6 Trusted Computing



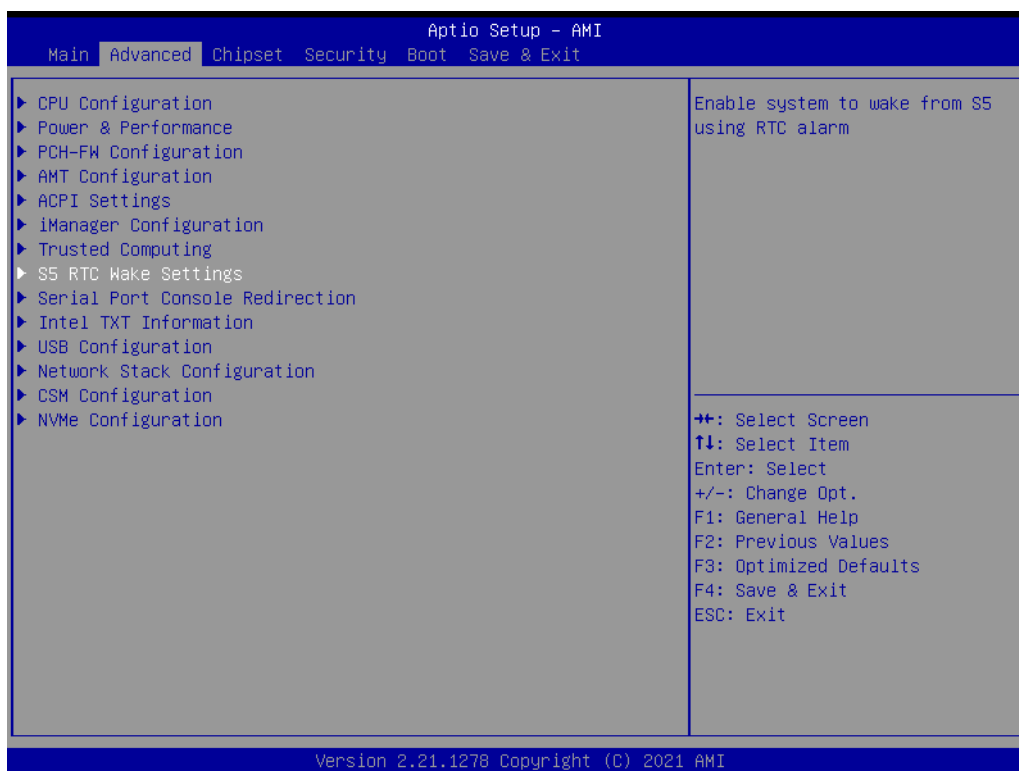
- **Security Device Support**
Enables or Disables BIOS support for security device.
- **SHA-1 PCR Bank**
Enable or Disable SHA-1 PCR Bank.

-
- **SHA256 PCR Bank**
Enable or Disable SHA256 PCR Bank.
 - **Pending operation**
Schedule an Operation for the security device.

3.2.2.7 S5 RTC Wake Settings

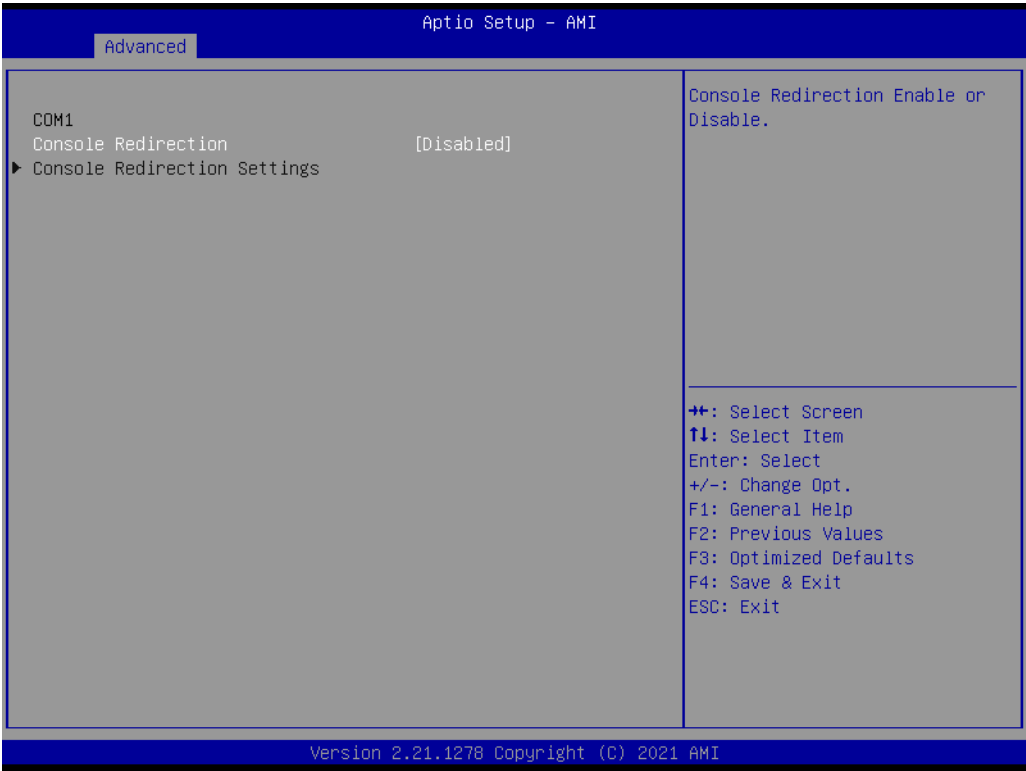
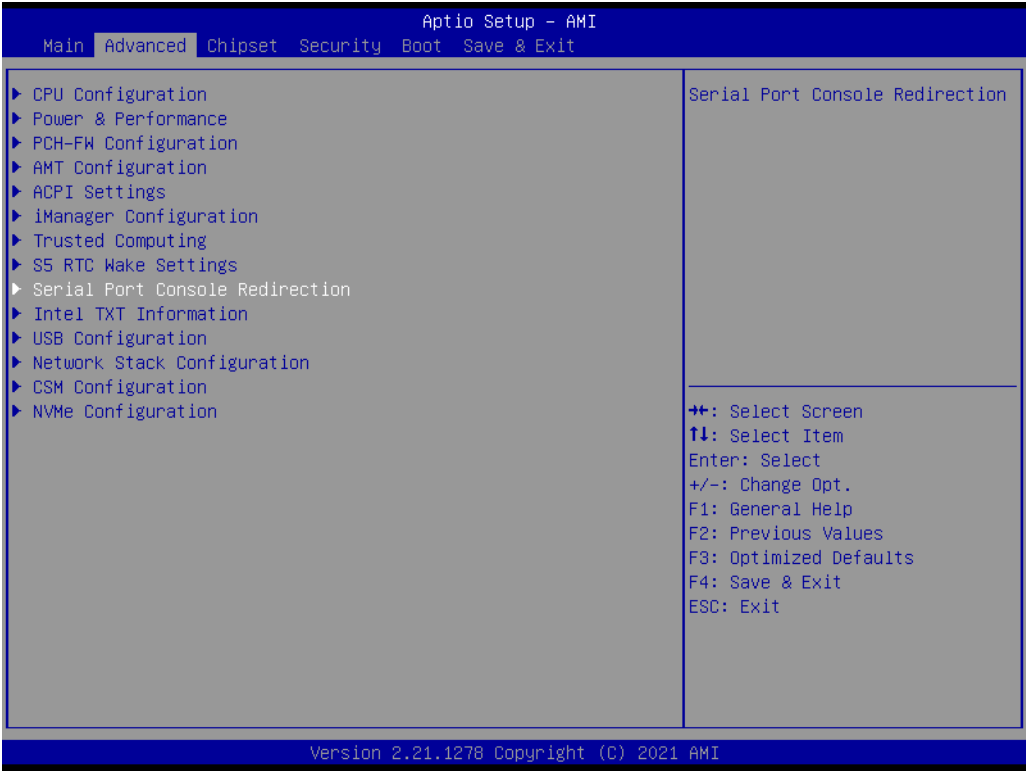
■ Wake System from S5

Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified

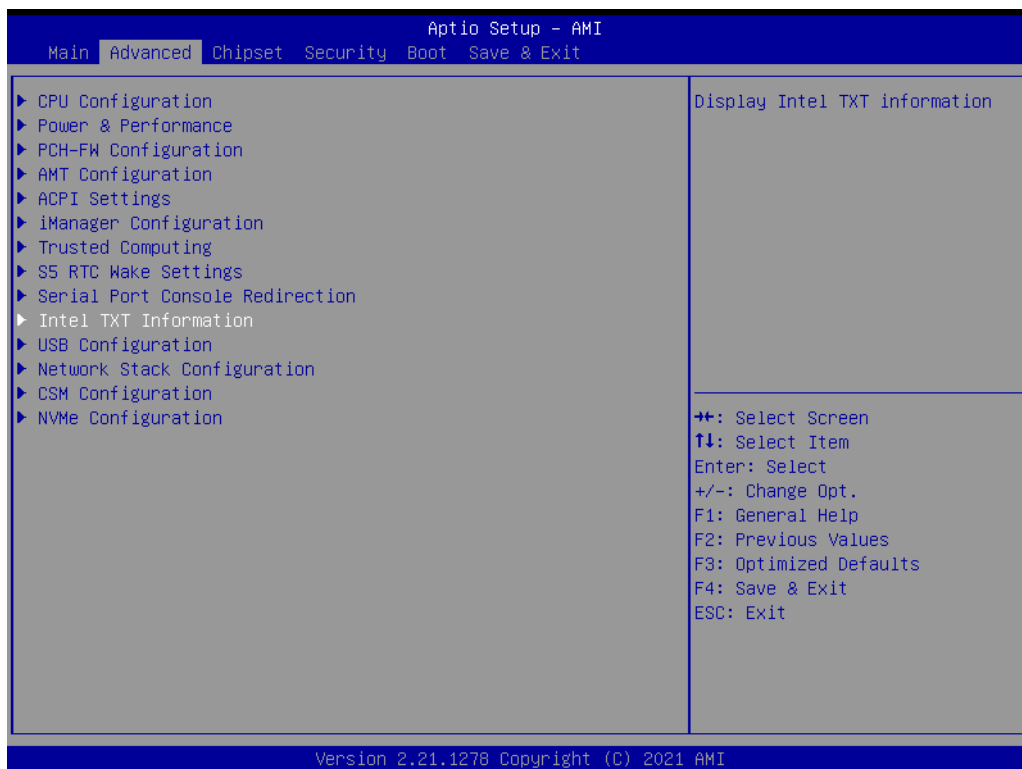


3.2.2.8 Serial Port Console Redirection

- **Console Redirection**
Console Redirection Enable or Disable.

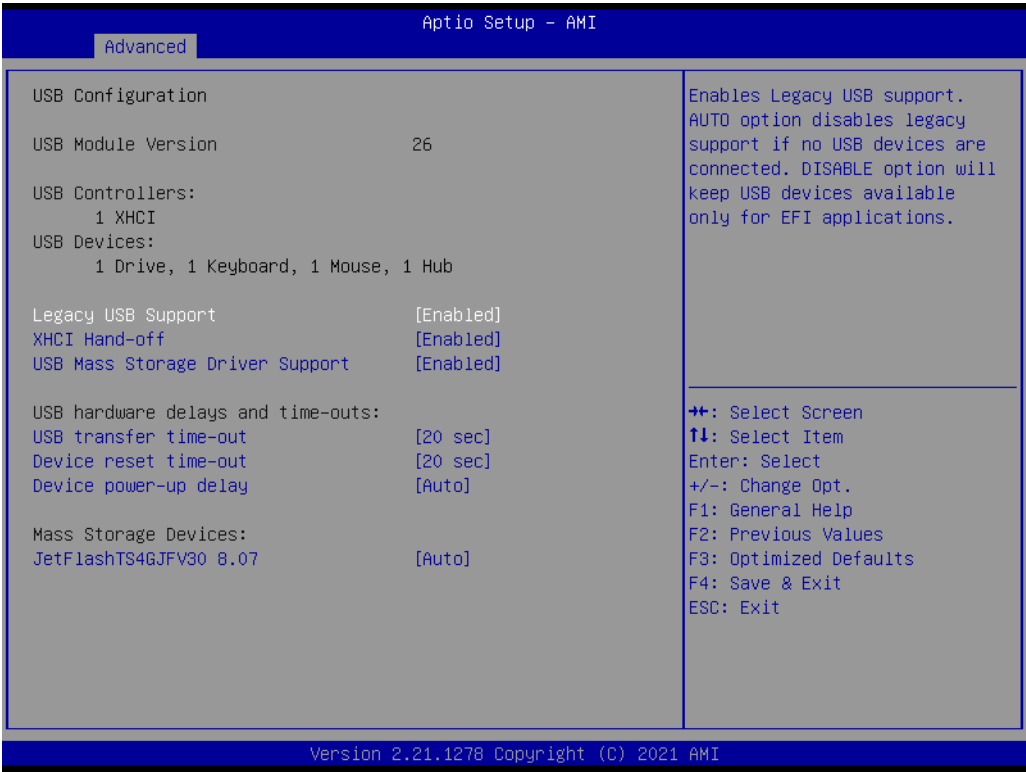
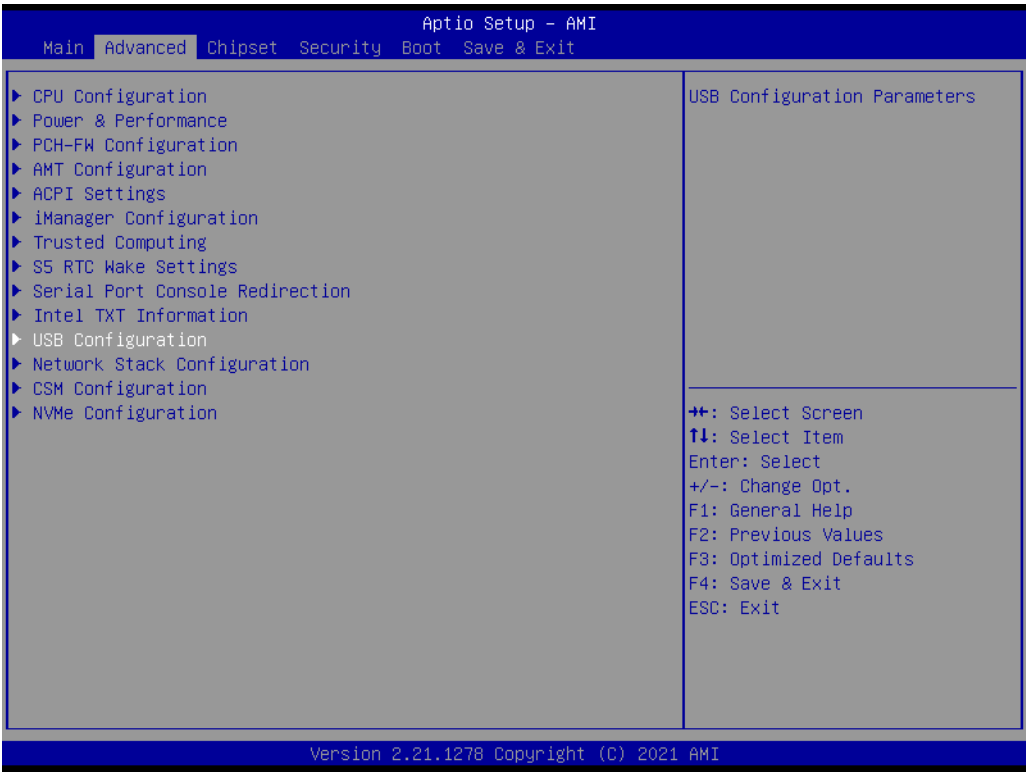


3.2.2.9 Intel TXT Information



Provide Intel TXT information.

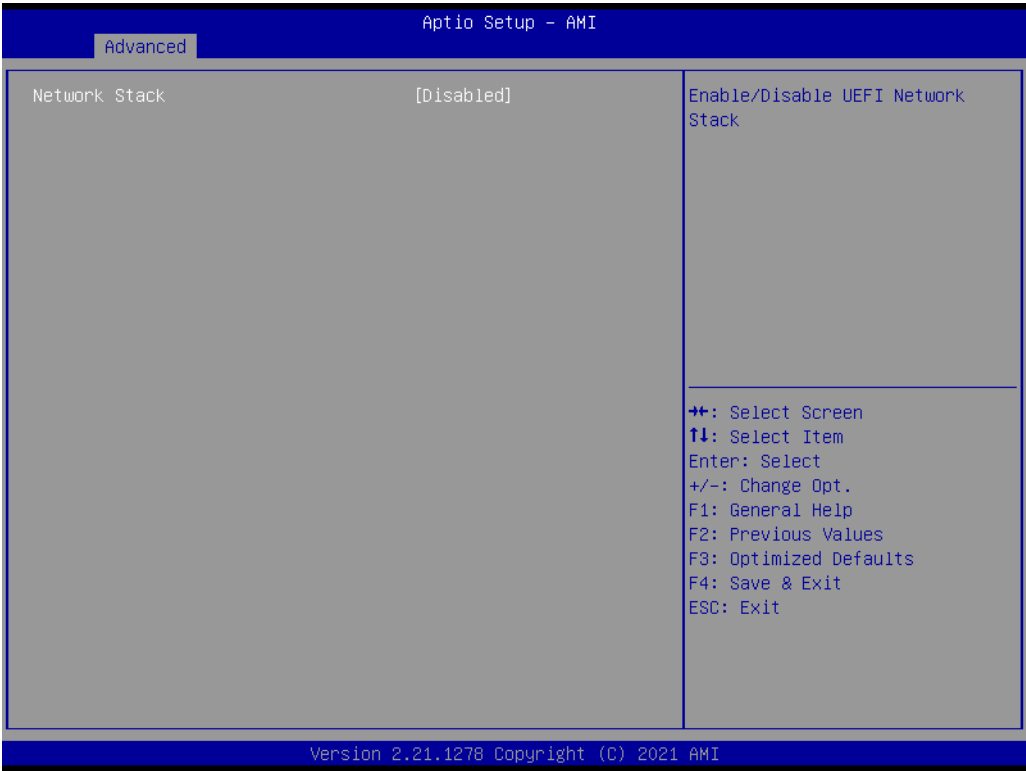
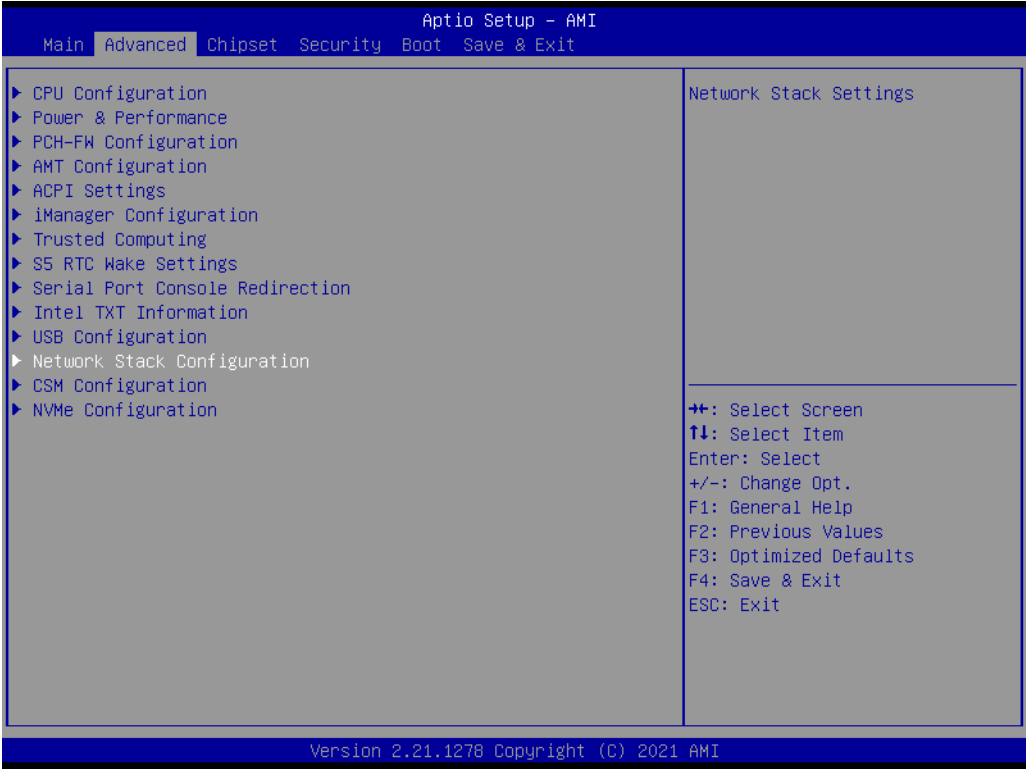
3.2.2.10 USB Configuration



- **Legacy USB Support**
Enables Legacy USB support.
- **XHCI Hand-Off**
This is a workaround for OSeS without XHCI hand-off support.
USB Mass Storage Driver Support: Enable/Disable USB Mass Storage Driver Support.

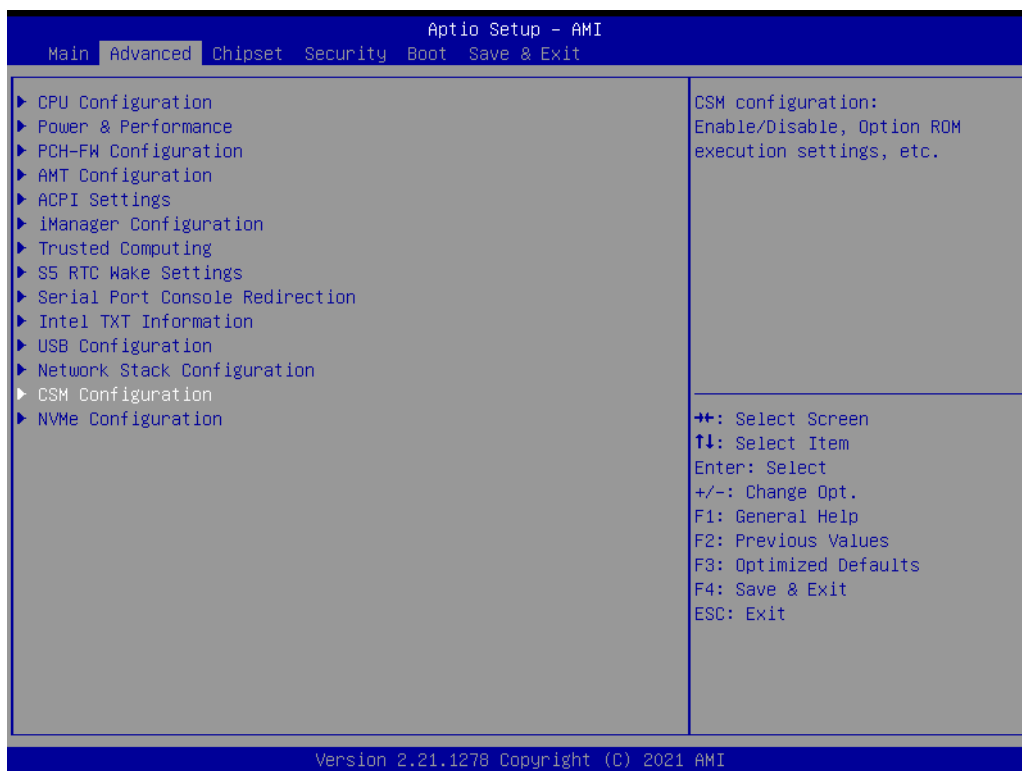
- **USB transfer time-out**
The time-out value for Control, Bulk, and Interrupt transfers.
- **Device Reset Timeout**
USB mass storage device Start Unit command time-out.
- **Device Power-Up Delay**
Maximum time the device will take before it properly reports itself to the Host Controller.

3.2.2.11 Network Stack Configuration



- **Network Stack**
Enable/Disable UEFI network stack.

3.2.2.12 CSM Configuration



- **CSM Support**
Enable/Disable CSM support.

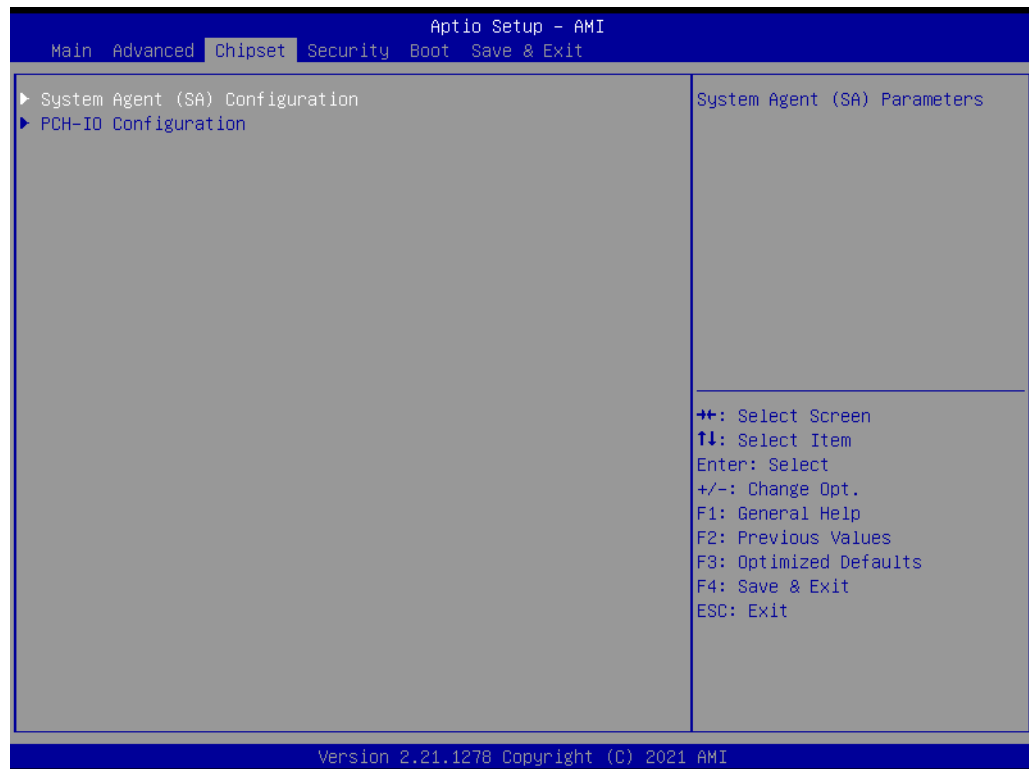
3.2.3 Chipset Configuration

3.2.3.1 System Agent (SA) Configuration

Memory Configuration

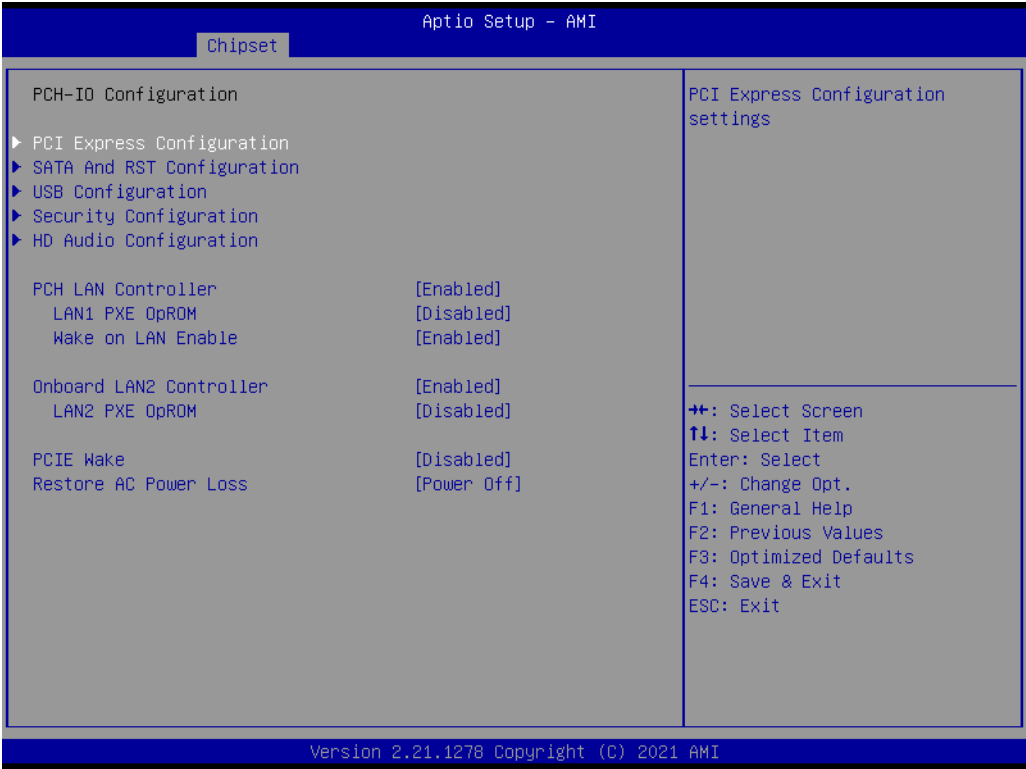
Display memory information.

- **VT-d**
VT-d capability.
- **Above 4GB MMIO BIOS assignment**
Enable/Disable above 4GB MemoryMappedIO BIOS assignment. This is enabled automatically when Aperture Size is set to 2048MB.





3.2.3.2 PCH-IO Configuration



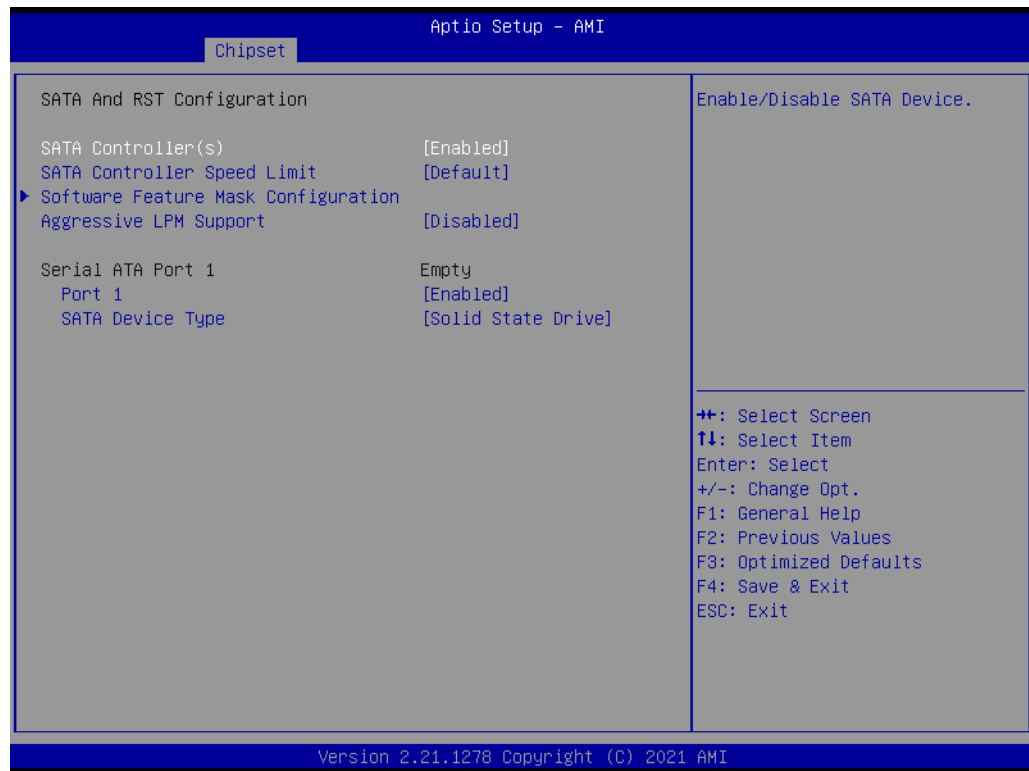


PCI Express Configuration

■ M.2 E Key

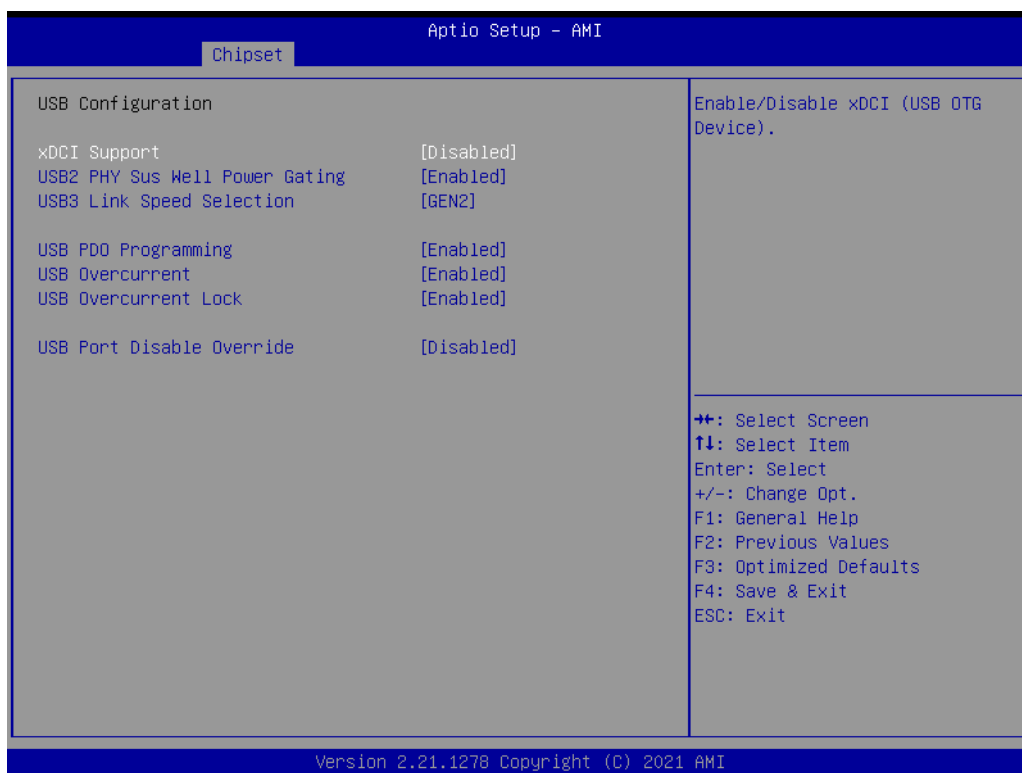
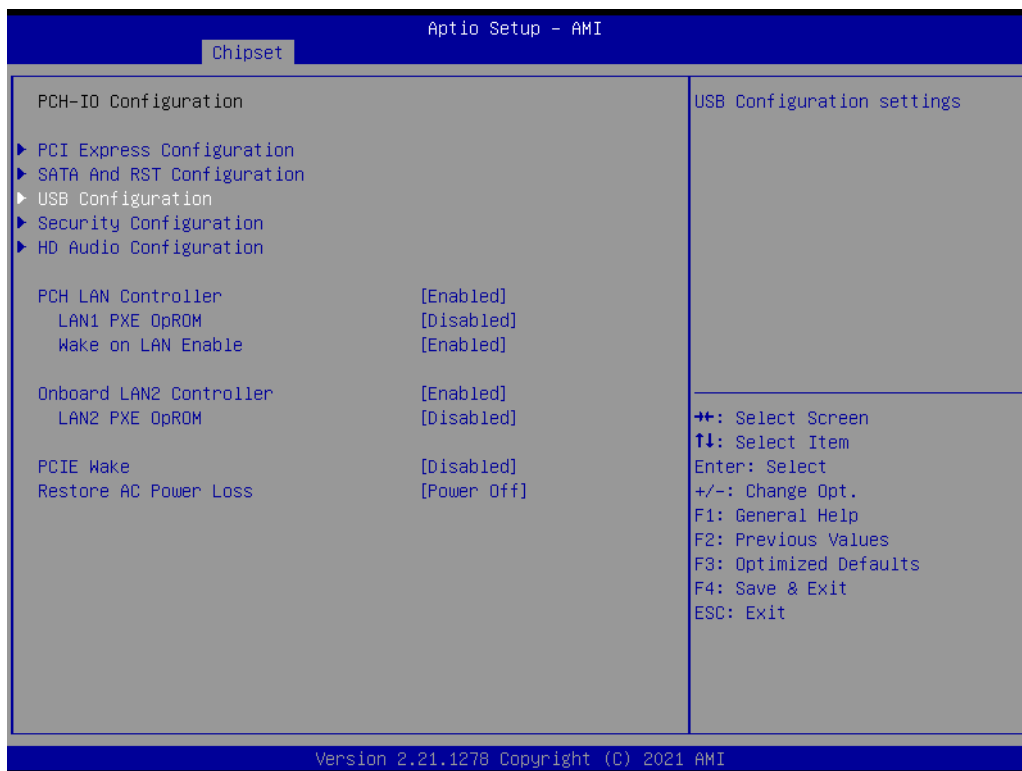
Select to enable or disable M.2 E Key.





SATA And RST Configuration

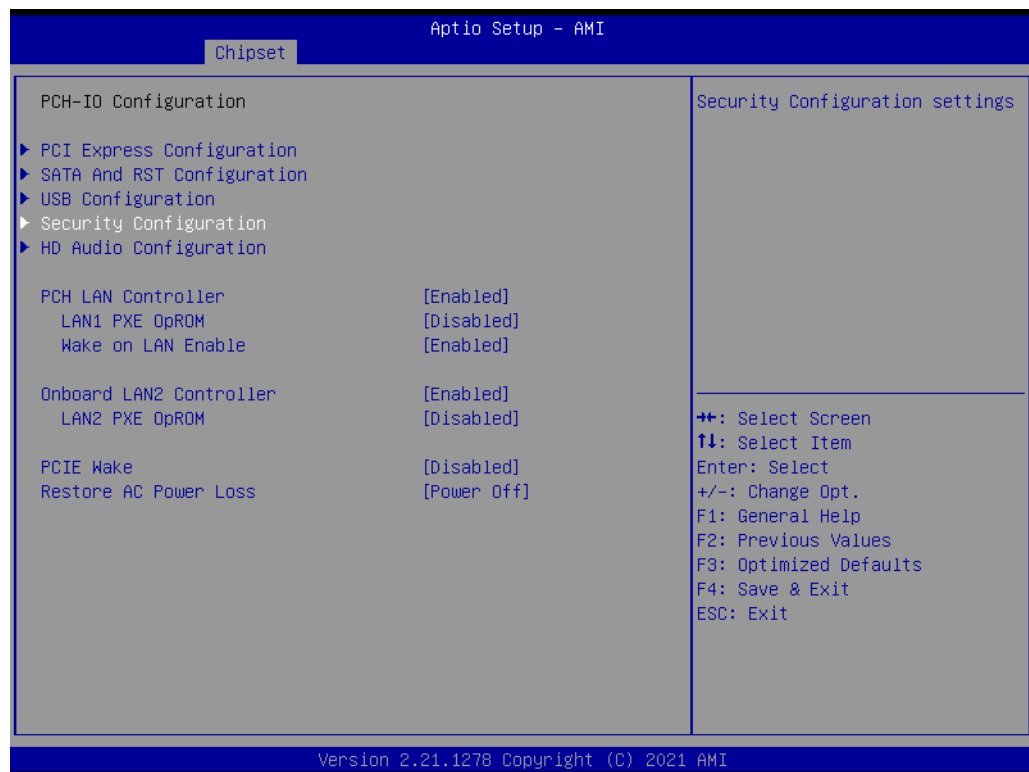
- **SATA Controller(s)**
Enable/Disable SATA Device.
- **SATA Controller Speed Limit**
Indicates the maximum speed the SATA controller can support.
- **HDD Unlock**
If enabled, indicates that the HDD password unlock in the OS is enabled.
- **LED Locate**
If enabled, indicates that the LED/SGPIO hardware is attached and ping to locate feature is enabled on the OS.
- **Aggressive LPM Support**
Enable PCH to aggressively enter link power state.
- **Port 1**
Enable or disable SATA port.
- **SATA Device Type**
Identify the SATA port is connected to Solid State Drive or Hard Disk Drive



USB Configuration

- **xDCI Support**
Enable/Disable xDCI (USB OTG Device).
- **USB2 PHY Sus Well Power Gating**
Select 'Enabled' to enable SUS Well PG for USB2 PHY.

- **USB3 Link Speed Selection**
This option is to select USB3 Link Speed GEN1 or GEN2
- **USB PDO Programming**
Select 'Enabled' if Port Disable Override functionality is used.
- **USB Overcurrent**
Select 'Disabled' for pin-based debug.
- **USB Overcurrent Lock**
Select 'Enabled' if Overcurrent functionality is used. Enabling this will make xHCI controller consume the Overcurrent mapping data.
- **USB Port Disable Override**
Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller.





Security Configuration

■ RTC Memory Lock

Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM.

■ BIOS Lock

Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.





HD Audio Configuration

■ HD Audio

Control Detection of the HD-Audio device.

PCH LAN Controller

Enable/Disable onboard NIC.

LAN1 PXE OpROM

Enable or disable boot option for LAN1 Controller.

Wake on LAN Enable

Enable/Disable integrated LAN to wake the system.

Onboard LAN2 Controller

Select to Enable or Disable Onboard LAN2 Controller.

LAN2 PXE OpROM

Enable or disable boot option for LAN2 Controller.

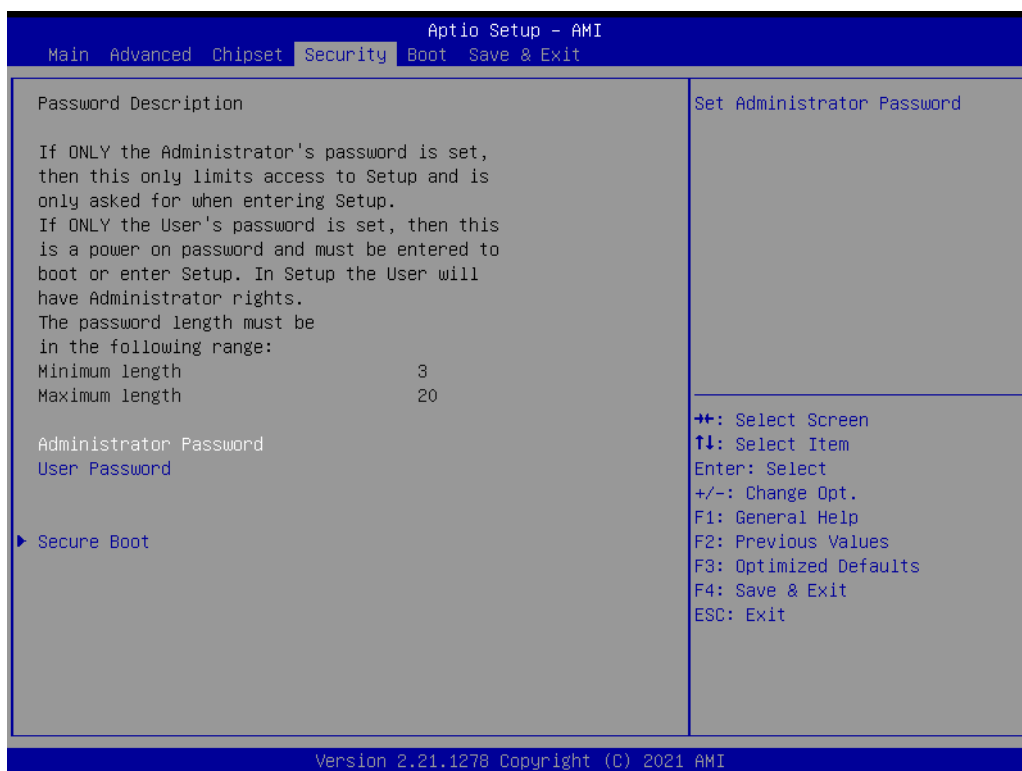
PCIe Wake

Enable or disable PCIe to wake the system from S5.

Restore AC Power Loss

Specify what state to go to when power is re-applied after a power failure (G3 state)

3.2.4 Security



Security

- **Administrator Password**
Set Administrator Password.
- **User Password**
Set User Password.

Secure Boot

■ Secure Boot

Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset.

■ Secure Boot Mode

Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

3.2.5 Boot



Boot

■ Setup Prompt Timeout

Number of seconds to wait for setup activation key.

■ Bootup NumLock State

Select the keyboard NumLock state.

■ Quiet Boot

Enables or disables Quiet Boot option.

3.2.6 Save & Exit



- **Changes and Exit**
Exit system setup after saving the changes.
- **Discard Changes and Exit**
Exit system setup without saving any changes.
- **Save Changes and Reset**
Reset the system after saving the changes.
- **Discard Changes and Reset**
Reset system setup without saving any changes.
- **Save Changes**
Save Changes done so far to any of the setup options.
- **Discard Changes**
Discard Changes done so far to any of the setup options.
- **Restore Defaults**
Restore/Load Default values for all the setup options.
- **Save as User Defaults**
Save the changes done so far as User Defaults.
- **Restore User Defaults**
Restore the User Defaults to all the setup options.

Appendix **A**

LAN Order Change Method

A.1 Problem Statement

If it is necessary for the LAN order recognized by OS matches the LAN order of printing on I/O plate to be exactly the same, please do not order EI-52 207 OS image. To make the LAN order be the same, users need to order Windows 10 license key, install Windows 10 via iso file and follow the instructions in below “Addressing the LAN order” section.

The phenomenon that LAN order recognized by OS does not match the LAN order of printing on I/O plate is because:

When installing Windows 10, the inbox driver will recognize I210 LAN chip and arrange it to the first order. Therefore, after users install the I219 LAN driver manually, the I219 will be recognized by OS as LAN 2, and LAN 1 is I210. However, this order does not match the LAN label printed on EI-52 I/O plate, which LAN 1 is I219, and LAN 2 is I210, as below figure shown.

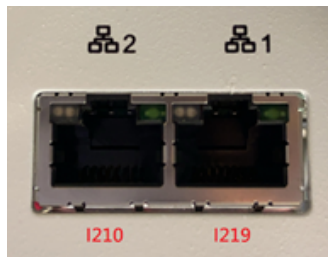


Figure A.1 The physical connector label is LAN 1 for I219, and LAN 2 for I210.

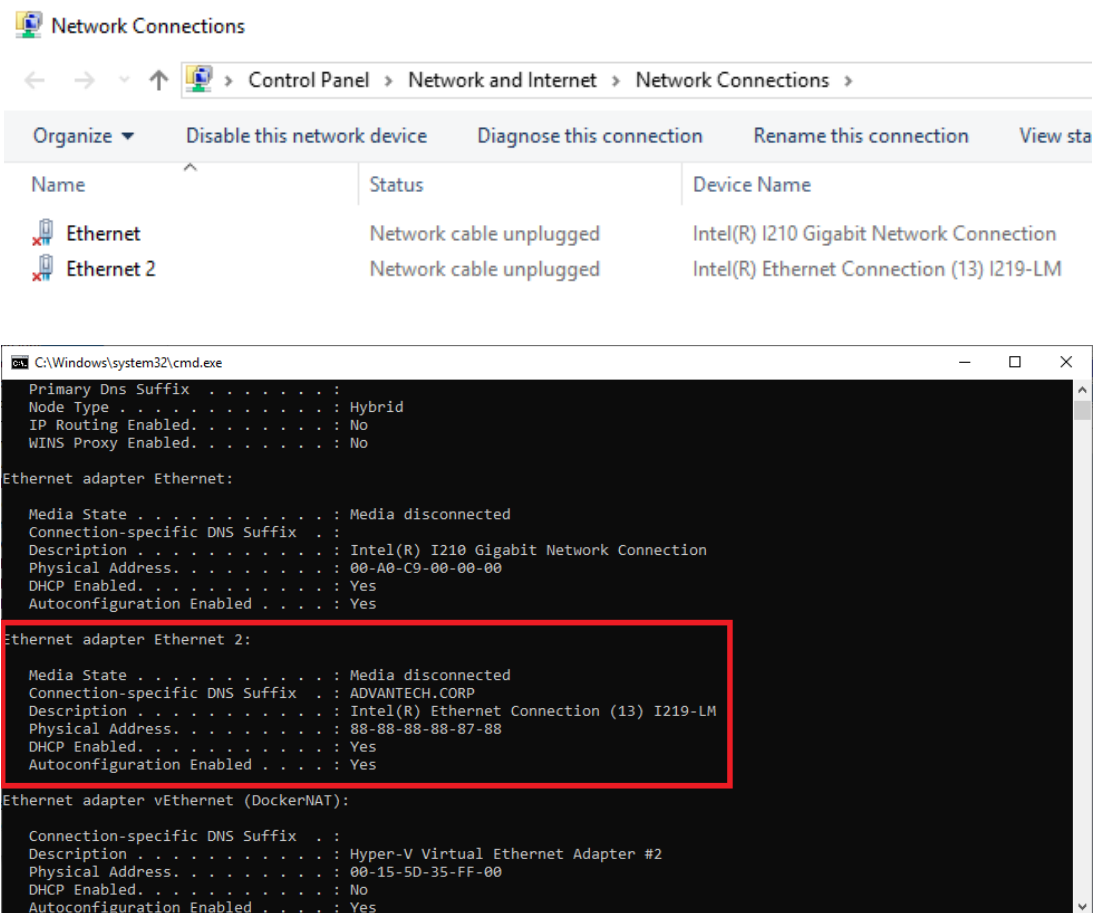


Figure A.2 After users install I219 LAN driver manually, I219 is set to Ethernet 2 (LAN 2), which does not match the order in Figure 1.

A.2 Addressing the LAN Order

To fix the LAN order mismatch phenomenon, users have to:

1. Disable LAN2 in BIOS BEFORE installing Windows 10 via iso file, as Figure 3 shown.
2. Install Windows 10 via iso file, and activate by the purchased license key.
3. Install I219 LAN driver.
4. Reboot, enter BIOS and enable LAN2 controller. Save and exit BIOS.
5. Confirm in OS whether the LAN order recognized by OS matches that of the physical connector printing on I/O plate.

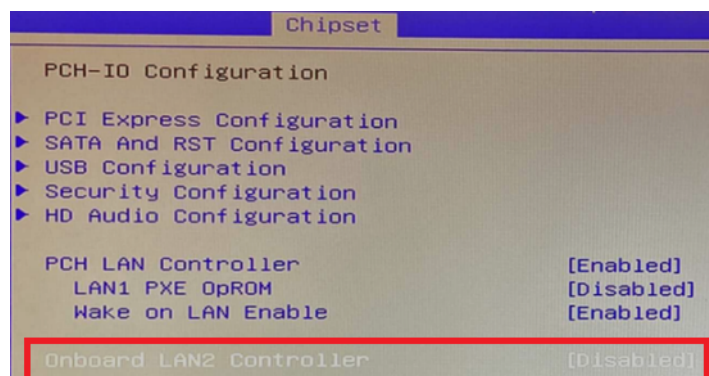


Figure A.3 Disable the LAN 2 controller in BIOS (BIOS → Chipset → PCH-IO Configuration → Onboard LAN2 controller → [Disabled]).

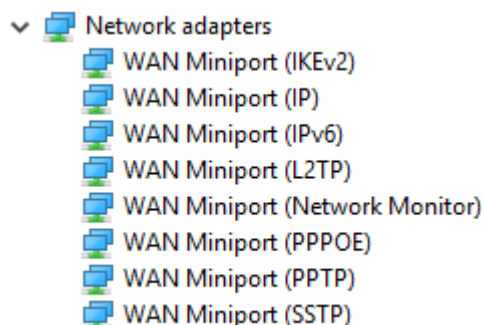


Figure A.4 Before installing I219 LAN driver, there is no any LAN adapter shown in device manager.

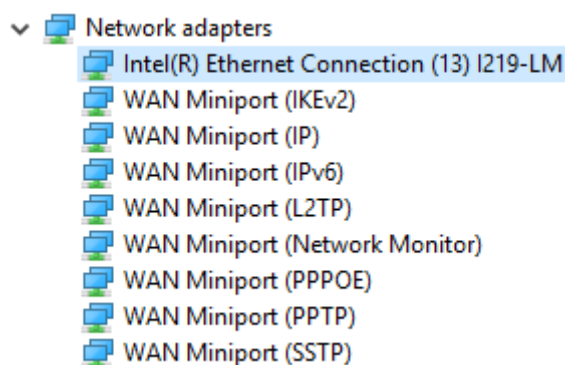


Figure A.5 After installing I219 LAN driver, I219 will be recognized and shown in device manager.

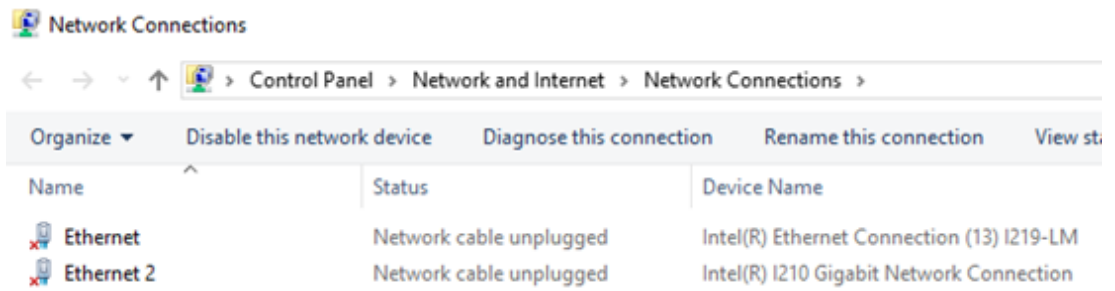


Figure A.6 Users should see that LAN 1 is I219, and LAN 2 is I210 in OS, which matches the printing on I/O plate as shown in Figure 1.



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