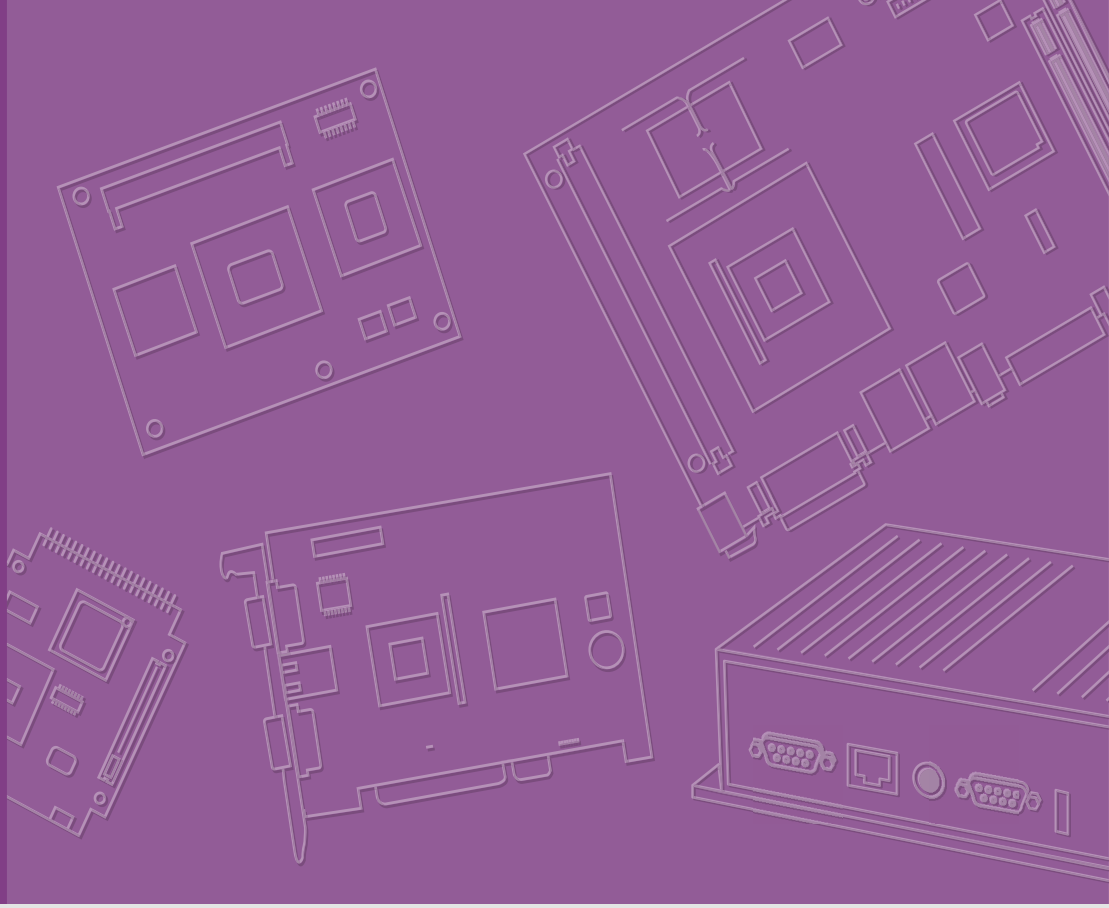

User Manual

EIS-S232

Fanless Embedded Box PC

ADVANTECH

Enabling an Intelligent Planet

Attention!

Please note:

This package contains a hard-copy user manual in Chinese for China CCC certification purposes. There is an English user manual included as a PDF file on the CD. Please disregard the Chinese hard copy user manual if the product is not to be sold and/or installed in China.

Part No. 2006S23210 Edition 1
Printed in China March 2024

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http://www.advantech.com/http://www.advantech.com/ePlatform/

For technical support and service, please visit our support website at: http://support.advantech.com.tw/support/

Product Warranty (2 years)

Advantech warrants the original purchaser that each 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 will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

If you believe your product to be 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 used, etc.) Note anything abnormal and list any onscreen 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 a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, 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 assistance.

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!*

Les avertissements indiquent des conditions qui, si elles ne sont pas observées, peuvent entraîner blessure!

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

"Batteries are at risk of exploding if incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type as recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions."
Des précautions sont incluses pour éviter les dommages matériels et les données pertes.

Il existe un risque d'explosion d'une nouvelle batterie si elle n'est pas correctement installée. N'essayez pas de recharger, d'ouvrir de force ou de chauffer la batterie. Remplacez la batterie uniquement par un type identique ou équivalent recommandé par le fabricant. Jetez les piles usagées conformément aux instructions du fabricant.

Note! *Notes provide additional optional information.*

Packing List

Before system installation, check that the items listed below are included and in good condition. If any item does not accord with the list, contact your dealer immediately.

- 1 x EIS-S232Unit
- 1 x User Manual (Simplified Chinese)
- 1 x China RoHS
- 1 x Desk mounting kit
- 1 x WISE-DeviceOn
- 1 x DeviceOn/iEdge
- 1 x McAfee Application Control Lite/Acronis Backup 11.7 for Windows PC

Default Packing List

Part Number	Description
-	EIS-S232 Unit
-	User Manual (Simplified Chinese)
36WSWPE2I001A1	DeviceOn/iEdge
36WSWPDOBD0211	McAfee Application Control Lite/Acronis Backup 11.7 for Windows PC

Optional Item for Default SKU

Part Number	Description
96PSA-A230W24P4-3	AC to DC adapter, DC 24V 230W, -20 ~ 60 °C
1702002600	Power cable 3-pin 183cm, USA type
1702002605	Power cable 3-pin 183cm, EU type
1702031801	Power cable 3-pin 183cm, UK type
1700000237	Power cable, 3-Pin 183cm, PSE type
AMK-A0035	2 x internal HDD bays kit (Max Height 15mm)

Ordering Information

Part No.	CPU	DDR4	Gbe	VGA	HDMI	Option 3rd display module	RS-232	RS-232/ 422/ 485	LAN	USB 3.2+3.0	MiniPCI e*	SI M	M.2	DC Input	Expansion
EIS-S232-U20STB1	Xeon W-1290TE	DDR4 2666 ECC 32GB	1TB SSD	2	1	1	2	4	2	8	1	1	1	12-36V_{DC}	PCI x 16 + 2 PCI
EIS-S232-01DSTB1	I7-10700E	Optional	Optional	2	1	1	2	4	2	8	1	1	1	12-36V_{DC}	PCI x 16 + 2 PCI
EIS-S232-01DS281	I3-10100E	Optional	Optional	2	1	1	2	4	2	8	1	1	1	12-36V_{DC}	PCI x 16 + 2 PCI

1. Expansion riser card maximum load: 30W.
2. Please return to the authorized dealer for any installation, replacement, repair, update or service.

Note! *CPU/Memory/Storage and operating system bundled by request.*

Safety Instructions

1. Read these safety instructions carefully.
2. Retain this user manual for future reference.
3. Disconnect the equipment from all power outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or spray detergents.
4. For pluggable equipment, the power outlet socket must be located 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. Protect the equipment from overheating. Do not cover the openings.
8. The power outlet sockets should have grounded connections.
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 it from the power source to avoid damage from transient overvoltage.
12. Never pour liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If any of the following occurs, have the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated 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 damage the components. The equipment should be kept 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: Batteries are at risk of exploding if incorrectly replaced. Replace only with the same or equivalent type as recommended by the manufacturer. Discard 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 areas.
21. DISCLAIMER: These instructions are provided according to IEC 704-1 standards. Advantech disclaims all responsibility for the accuracy of any statements contained herein.
22. Use a power cord connected to a socket-outlet with a grounded connection.

23. This product is intended to be supplied by a UL Listed power supply suitable for use at minimum Tma 60° C (140° F) whose output meets ES1 (or SELV) and output is rated: 12-36Vdc, 16-6.3A. Please contact Advantech for further information.
24. Never open the equipment. For safety reasons, the equipment should be opened by qualified service personnel only.
25. RESTRICTED ACCESS AREA: The equipment should only be installed in a Restricted Access Area.

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. La prise de courant doit avoir une connexion mise à la terre.
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. Au moyen d'un cordon d'alimentation connecté à une prise de courant avec mise à la terre.
23. Ce produit est destiné à être alimenté par un bloc d'alimentation homologué UL adapté à une utilisation à Tma 60 degrés C min. dont la sortie est conforme à ES1 (ou SELV) et dont la sortie est nominale: 12-36Vdc, 16- 6.3A, si besoin d'aide supplémentaire, veuillez contacter Advantech pour plus d'informations.
24. N'ouvrez jamais l'équipement. Pour des raisons de sécurité, l'équipement ne doit être ouvert que par du personnel de service qualifié (Par personne qualifiée).
25. ZONE D'ACCES RESTREINTE: L'équipement ne doit être installé que dans une zone d'accès restreint.

Contents

Chapter 1

General Introduction

This chapter details background information on the EIS-S232 series.

1.1 Introduction

Advantech's EIS-S232 is an intelligent, high-performance, fanless desktop system powered by 10th Gen. Intel® Core™ LGA1200 and Core i3/i5/i7 65W CPU processors. EIS-S232 supports a maximum 65W processor and broad temperature ranges (-20 ~ 60° C/-4 ~ 140° F). Additionally, it provides multiple I/O - 6 x COM, 2 x GbE, 4 x USB 3.2 (Gen2,10G), 2 x USB 3.0, 2 x Independent USB 3.0, 1 x miniPCIe (share with mSATA), 1 x M.2 (E key), 1 x SIM holder,1 x Line out,TPM2.0 (optional) and 2x 2.5" SATA III hard drive bays. (Up to 4 x 2.5" SATAIII HDD bays by optional AMK-A0035).

Rugged Multi-Functional Design

EIS-S232 adopts an advanced thermal design for its desktop processor solution. All models are fanless, and feature various quality features. These include wide operating temperatures (-20 ~ 60° C/-4 ~ 140° F), diverse expandability options, and structural strengthening. EIS-S232 supports diverse I/O interfaces — including 2x GbE, 2 x USB 3.2, 2 x USB 3.0, 2 x Independent USB 3.0, 2 x 2.5" HDD, 1 x miniPCIe, 1 x M.2 (E key), 4 x RS-232/422/485 and 2 x RS-232 COM ports.

Built-in Intelligent Management Tools-Advantech SUSI API and WISE-DeviceOn

Advantech SUSI API provides a valuable suite of programmable APIs such as multi-level watchdog, hardware monitoring, system restoration, and other user-friendly interfaces.

SUSI API is an intelligent self-management cross platform tool that monitors the system's status for problems and takes action in the event of abnormalities. SUSI API offers a boot up guarantee in critical, low-temperature environments so systems can automatically recover when voltages dip. SUSI API makes the entire system more reliable and intelligent. EIS-S232 also supports Advantech's own WISE-DeviceOn which provides easy remote management so users can monitor, configure, and control a large number of terminals to make maintenance and system recovery simpler.

1.2 Product Features

1.2.1 General

- **CPU:** Intel® 10th Gen. Xeon® W and Core™ i3/i5/i7/i9 processor LGA1200 desktop processor (up to 65W)
- **System Chipset:** Intel® W480E
- **BIOS:** AMI EFI 256Mbit
- **System Memory:** DDR4 2933Mhz up to 64GB
- **Watchdog Timer:** Single chip Watchdog 255-level interval timer, setup by software
- **I/O Interface:** 4 x RS232/422/485, 2 x RS232
- **USB:** 2 x USB 3.2, 2 x USB 3.0, 2 x Independent USB3.0
- **Audio:** High Definition Audio (HD), Line-out/Mic-in
- **Storage:** 2 x 2.5" HDD drive bays (15mm/0.59 in height) and 1 x mSATA(Up to 4 x 2.5" SATAIII HDD bays by optional AMK-A0035)
- **Expansion Interface:**
  - 1 x Full size MiniPCIe (support mSATA and 1 with SIM)
  - 1 x M.2 (E key for Wi-Fi, suggested installation at Advantech manufacturing)
  - Add-on Card Slot: 2x PCI + 1x PCIe x16
  - 1 x iDoor Module
- **TPM:** TPM2.0 (Optional)

1.2.2 Display

- **Controller:** According to customer-specified CPU selection
- **Resolution:**
  - VGA: supports 1920x1200 @ 60 Hz
  - HDMI: supports HDMI 1.4, 4096 x 2160 @ 30 Hz
- **Triple Display:**
  - VGA+HDMI (Default)
  - HDMI+HDMI (Support by TPN)
  - DP+VGA (Support by TPN)
  - DP+HDMI (Support by TPN)

1.2.3 Ethernet

- **Chipset:**
  - LAN1 Intel® i219LM
  - LAN2 Intel® i210IT
- **Speed:** 10/100/1000 Mbps

1.3 Chipset

1.3.1 Functional Specifications

1.3.1.1 Processor

- Processor Supports 10th Gen. Intel® LGA1200 processor (up to 65W)
- Memory Supports DDR4 2933 MHz up to 64GB
- 2 x 260-pin SODIMM socket type

1.3.1.2 Chipset

- **Internal Graphics Features:**
  - DirectX 12, OpenGL 4.5
  - VGA + HDMI
  - Intel® Display Power saving technology 6.0
- **Video Accelerator:**
  - HW accelerated Media Decode: H.265/HEVC, H.264/MPEG-4 AVC, MPEG-2, VC-1/WMV9, JPEG/MJPEG, VP8 and VP9
  - HW accelerated Media Encode:H. H.265/HEVC, H.264/MPEG-4 AVC, MPEG-2, JPEG/MJPEG and VP8

SATA Interface

- **Intel® H370 (Q370 supports by TPN) Chip Supports:**
  - Several optional selections of Serial ATA III
  - SATA data transfer rates of up to 6 Gb/s
  - Integrated AHCI controller
  - mSATA socket

USB Interface

- **Intel® W480E Chip Supports:**
  - 1 x XHCI Host Controller, supporting SuperSpeed USB 3.2 Gen1/Gen2
  - 1 x EHCI Host Controllers, supporting HighSpeed USB 2.0 ports
  - Wake-up from sleep states S3
  - Maximum 500mA for each USB port

Power Management

- **Intel® W480E Chip Supports:**
  - ACPI
  - ACPI-defined power states (processor driven C states)
  - ACPI Power Management Timer
  - SMI# generation

1.3.1.3 Others

- **Serial Ports:**
  - 6x serial ports
  - Supports IRQ Sharing among serial ports under Microsoft
- **Windows OS:**
  - COM1, COM2, COM3, COM4: RS-232/422/485
  - COM5, COM6: RS-232

Ethernet

- **LAN1 Intel i219LM, LAN2 Intel i210IT:**
  - Supports 10/100/1000 Mbps
  - LAN Connectors: Phone Jack RJ45 8P 90D (F)

Audio

- **Audio Codec: ALC888S-VD2-GR**
  - Compliant with HD Audio specifications
  - Supports 16/20/24-bit DAC and 16/20/24-bit ADC resolution
  - Supports: Speak-out, Mic-in
  - Audio Connectors: Ear Phone Jack * 1
- **Battery Backup:** 3V/210 mAh with WIRE x 1
- **TPM:** TPM 2.0

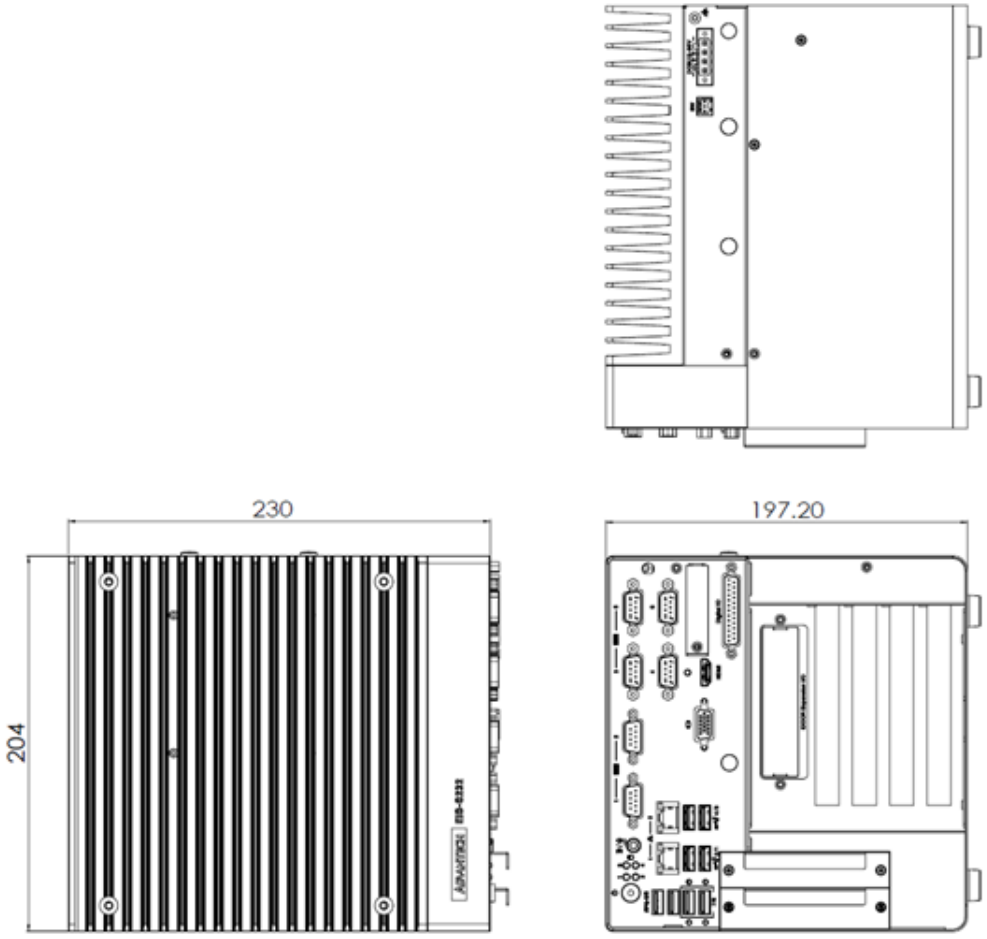
1.3.2 SUSI 4.0

- SUSI API
- DIO 16-bit programmable DIO
- Watchdog Timer Multi-level WDT (set by Advantech iManager)
- Programmable 1-255 sec/min
- Hardware Monitor CPU Temperature/input Current/input Voltage
- System Information Running HR/Boot record

1.4 Mechanical Specifications

1.4.1 Dimensions

197.2 x 204 x 230 mm (W x H x D)



1.4.2 Weight

- 6.215 kg

1.5 Power Requirements

1.5.1 System Power

- **Minimum Power Input:** 12 ~ 36 V_{DC}

1.6 Operating Environment Specifications

1.6.1 Operating Temperature

- **With extended peripherals:** -20 ~ 60° C (-4 ~ 140° F) 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 Safety

- UL, CB, CCC, BSMI

1.6.5 EMC

- CE/FCC Class B, CCC, BSMI

Chapter 2

Hardware Configuration

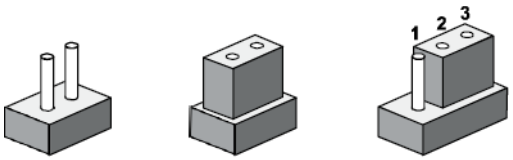
2.1 Introduction

The following sections show the internal jumper settings and the external connector pin assignments for different applications.

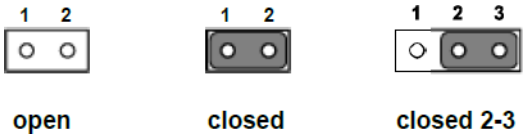
2.2 Jumpers

2.2.1 Jumper Description

You may configure EIS-S232 to match the needs of your application 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, you 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. In this case you would connect either pins 1 and 2, or 2 and 3.



The jumper settings are schematically depicted in this manual as follows.



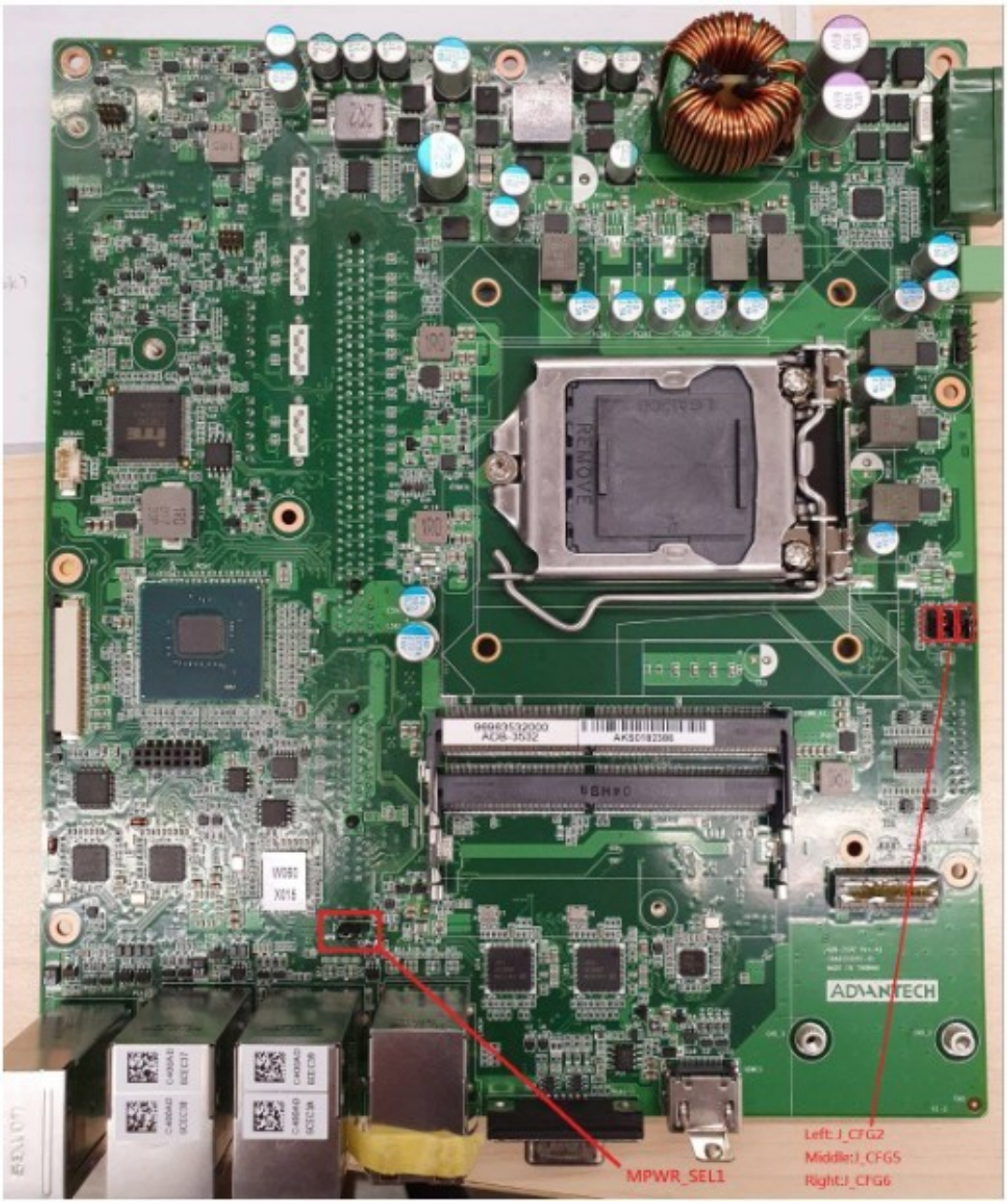
A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes. Generally, you simply need a standard cable to make most connections.

2.2.2 Jumper List

Table 2.1: Jumper List

J1	Auto Power On Setting (MB)
JCMOS1	Clear CMOS (MB)
MPWR_SEL1	MINI PCIE Power Setting (MB)
J_CFG2	PCIE X16 Lane Reversal Setting (MB)
J_CFG5	PCIE X16 Bifurcation Setting (MB)
J_CFG6	PCIE X16 Bifurcation Setting (MB)
J1(JSETCOM3_V1)	COM3 RI Power Setting (on AMO-I028)

2.2.3 Jumper Location



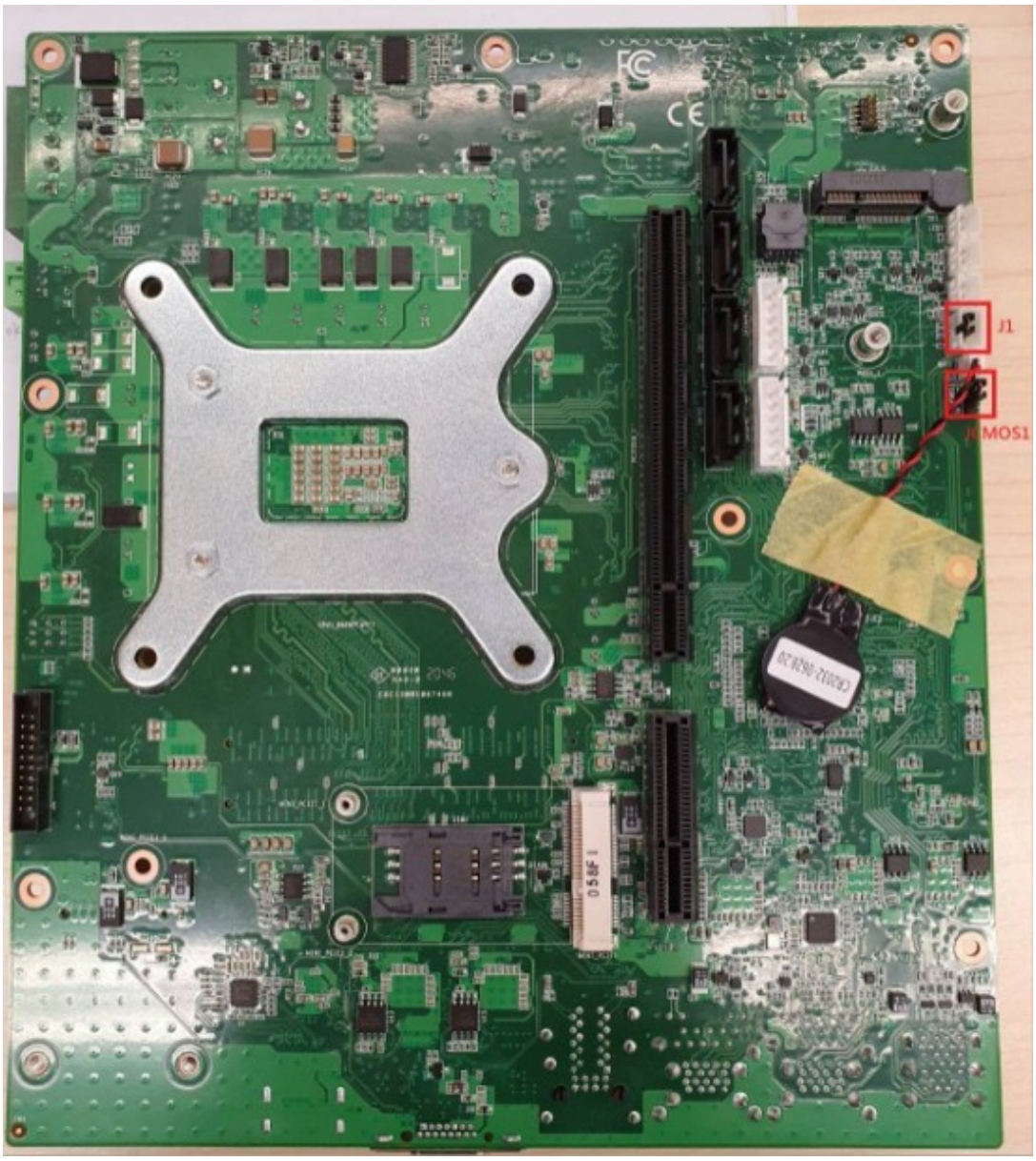


Figure 2.1 Jumper Layout

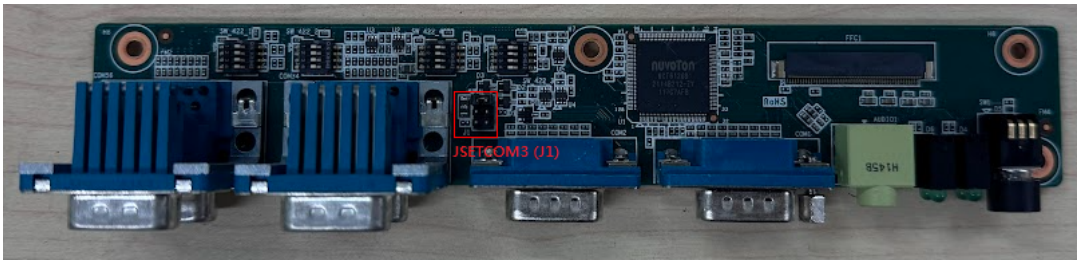
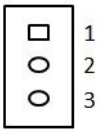


Figure 2.2 Jumper Layout

2.2.4 Jumper Settings

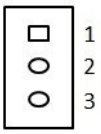
2.2.4.1 Auto Power On Setting for J1

Table 2.2: J1 Auto Power On Setting	
Part Number	1655303020
Footprint	WHL3V-2M
Description	WAFER BOX 3P 2.0mm 180D(M) DIP 2001-WS-3
Setting	Function
(1-2)	Auto Power On
(2-3)	Power Button for Power On (Default)



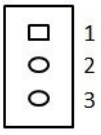
2.2.4.2 Clear CMOS Setting for JCMOS1

Table 2.3: JCMOS1 Clear CMOS Setting	
Part Number	1653003101
Footprint	HD_3x1P_79_D
Description	PIN HEADER 3x1P 2.0 mm 180D(M) DIP 2000-13 WS
Setting	Function
(1-2)	Normal Operation (Default)
(2-3)	Clear CMOS



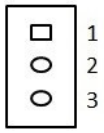
2.2.4.3 MINI PCIE Power Setting for MPWR_SEL1

Table 2.4: MPWR_SEL1 Power Setting	
Part Number	1653003101
Footprint	HD_3x1P_79_D
Description	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
Setting	Function
(1-2)	3.3V (Default)
(2-3)	3.8V for 5G module



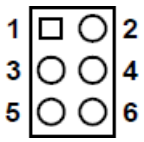
2.2.4.4 PCIE X16 Lane Reversal Setting for J_CFG2

Table 2.5: J_CFG2 PCIE X16 Lane Reversal Setting	
Part Number	1653003101
Footprint	HD_3x1P_79_D
Description	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
Setting	Function
(1-2)	0: Lane numbers reversed (Default)
(2-3)	1: Normal operations



2.2.4.5 COM3 RI Power Setting JSETCOM3 (J1) on AMO-I028 Card

Table 2.6: JSETCOM3 (J1) COM3 RI Power Setting	
JSETCOM3 (J1) COM3 RI Power Setting	
Part Number	1653003201
Footprint	HD_3x2P_79_D
Description	PIN HEADER 3x2P 2.0mm 180D(M) DIP 21N22050
Setting	Function
(1-2)	Normal (default)
(3-4)	+5V
(5-6)	+12V



2.3 Connectors

2.3.1 EIS-S232 External I/O Locations

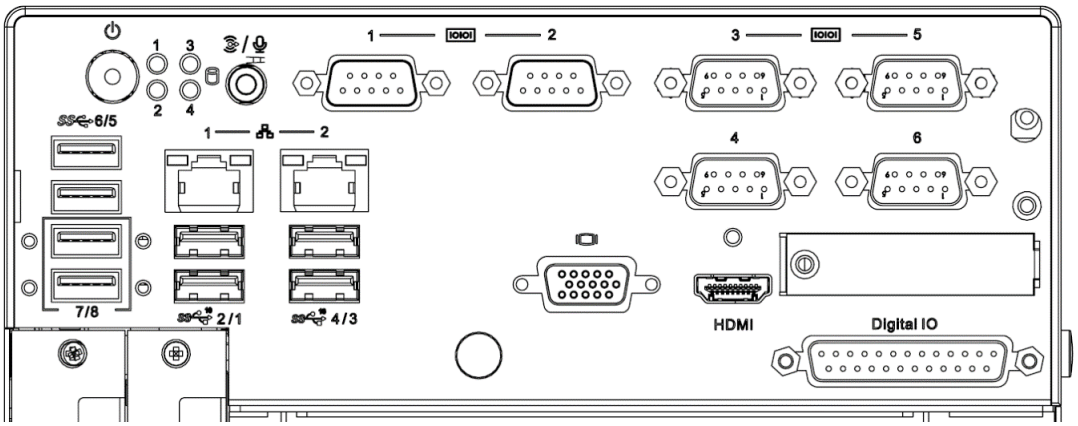


Figure 2.3 EIS-S232 Front and Rear I/O Connector Diagram

2.3.1.1 COM Connector

EIS-S232 provides up to 6 D-sub 9-pin connectors, which offers RS-232/422/485 serial communication interface ports. The default setting is RS-232, the mode RS-422/485 of EIS-S232 COM3/4/5/6 can be supported via the BIOS settings. COM1/2 supports RS-232.

- **COM3~COM6**

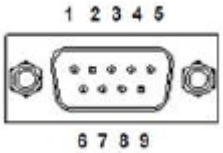


Figure 2.4 COM Connector

Table 2.7: COM Connector Pin Assignments

	RS-232	RS-422	RS-485
Pin	**Signal Name**	**Signal Name**	**Signal Name**
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

Note! *NC represents "No Connection".*

- **COM1~COM2**

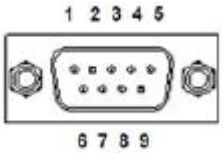


Table 2.8: COM Connector Pin Assignments

	RS-232
Pin	**Signal Name**
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

2.3.1.2 Ethernet Connector (LAN)

EIS-S232 is equipped with up to 2 x Ethernet controllers that are fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards. These Ethernet ports provides a standard RJ-45 jack connector with LED indicators on the front side to show its Active/Link status (Green LED) and Speed status (Green/Orange LED).

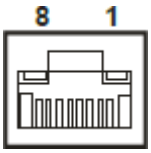


Figure 2.5 Ethernet Connector

Table 2.9: Ethernet Connector Pin Assignments

Pin	10/100/1000BaseT Signal Name
1	TX+
2	TX-
3	RX+
4	MDI2+
5	MDI2-
6	RX-
7	MDI3+
8	MDI3-

2.3.1.3 HDMI Connector

An integrated, 19-pin receptacle connector HDMI Type A Interface is provided. The HDMI link supports resolutions up to 3840 x 2160 @ 30 Hz.

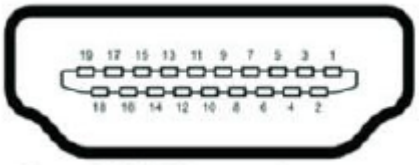


Figure 2.6 HDMI Receptacle Connector

Table 2.10: HDMI Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	TMDS Data 2+	2	TMDS Data 2 shield
3	TMDS Data 2-	4	TMDS Data 1+
5	TMDS Data 1 shield	6	TMDS Data 1-
7	TMDS Data 0+	8	TMDS Data 0 shield
9	TMDS Data 0-	10	TMDS clock+
11	TMDS clock shield	12	TMDS clock-
13	CEC	14	Reserved
15	SCL	16	SDA
17	DDC/CEC Ground	18	+5V
19	Hot Plug Detect		

2.3.1.4 VGA Connector

EIS-S232 provides an integrated 15-pin female VGA digital video interface, which supports up to 1920 x 1200 @ 60 Hz. Please refer to Table 2.6 for its pin assignments.

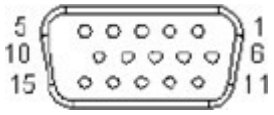


Figure 2.7 VGA Connector

Table 2.11: VGA Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	NC	10	GND
11	NC	12	DDAT
13	H-SYNC	14	V-SYNC
15	DCLK		

2.3.1.5 DIO Connector

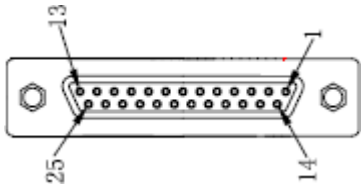


Figure 2.8 DIO Connector

Table 2.12: DIO Connector Pin Assignment

Pin	Signal Name	Pin	Signal Name
1	GND	14	GND
2	Port0 D0	15	Port1 D0
3	Port0 D1	16	Port1 D1
4	Port0 D2	17	Port1 D2
5	Port0 D3	18	Port1 D3
6	Port0 D4	19	Port1 D4
7	Port0 D5	20	Port1 D5
8	Port0 D6	21	Port1 D6
9	Port0 D7	22	Port1 D7
10	+5V	23	+5V
11	NC	24	NC
12	NC	25	NC
13	NC		

Note! NC represents “No Connection”.

2.3.1.6 Power On/Off Button

EIS-S232 has a Power On/Off button with LED indicators on the front side that show “On” (Green LED) and “Off/Suspend” statuses (Orange LED). The Power button supports dual functions: Soft Power -On/Off (Instant off or Delay 4 Seconds then off), and Suspend.

Figure 2.9 Power ON/OFF Button

2.3.1.7 Audio Connector

EIS-S232 features one phone jack connector that supports stereo Line Out or Mic In audio ports. The audio chip is controlled by ALC888 and compliant with the Azalea standards.

2.3.1.8 LED Indicators

There are four LEDs on the front panel that indicate the system's status: HDD LED is for HDD status.

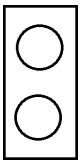


Figure 2.10 LED Indicators

2.3.1.9 USB3.2 Gen2 and Gen1

EIS-S232 supports 4 x USB 3.2 (Gen2,10G),2 x USB 3.2 (Gen1, 5G), and 2 x Independent USB 3.2 (Gen1, 5G) interfaces The USB interfaces complies with USB UHCI, Rev. 3.0 standards. Please refer to Table 2.5 for its pin assignments. USB 3.2 Gen1/2 connectors contain legacy pins to interface with USB 2.0 devices, and a new set of pins for USB 3.2 Gen1/2 connectivity.

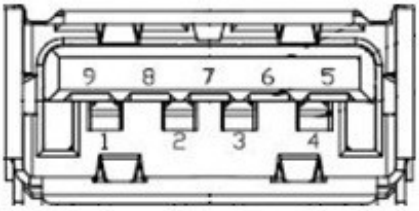


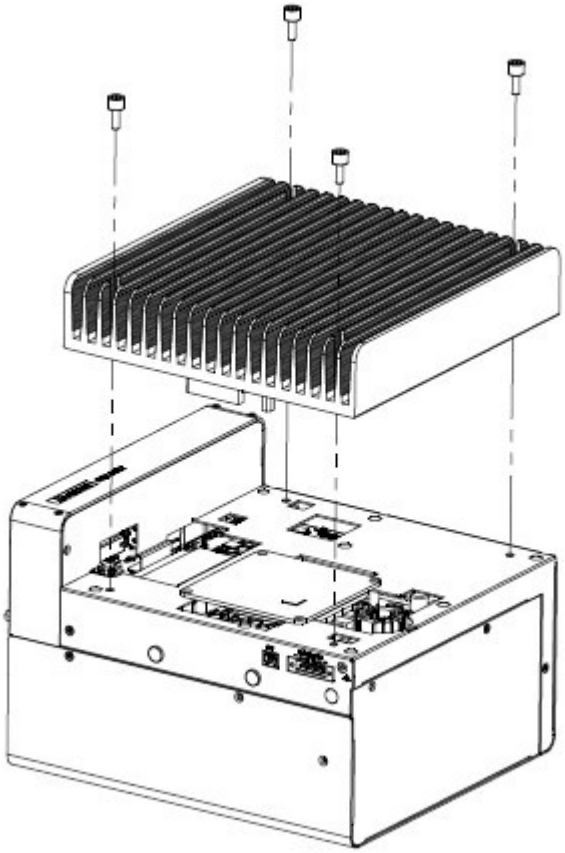
Figure 2.11 USB3.2 Gen1/2 Connector

Table 2.13: USB3.2 Gen1/2 Connector Pin Assignments

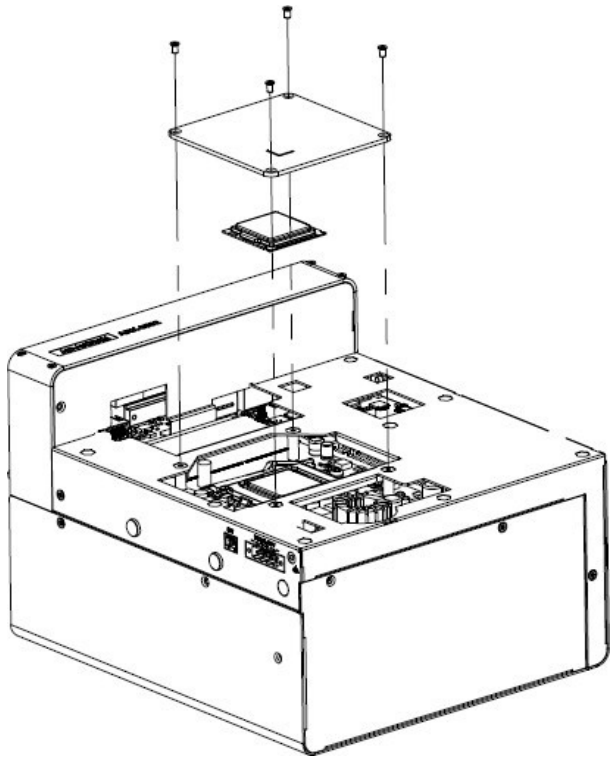
Pin	Signal Name	Pin	Signal Name
1	+5V	2	USB_data-
3	USB_data+	4	GND
5	SSRX-	6	SSRX+
7	GND	8	SSTX-
9	SSTX+		

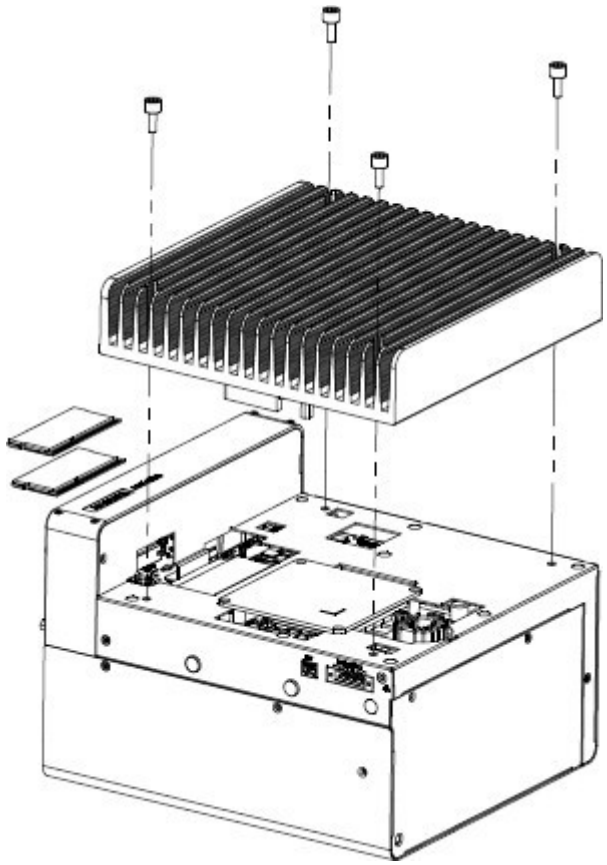
2.4 Installation

2.4.1 CPU/Memory Installation



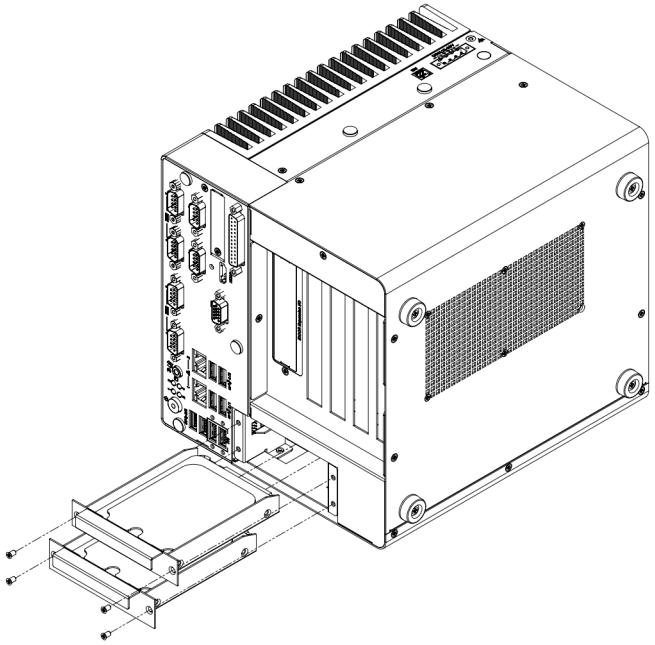
1. Unscrew the 4 screws on the top cover, and remove the top cover.





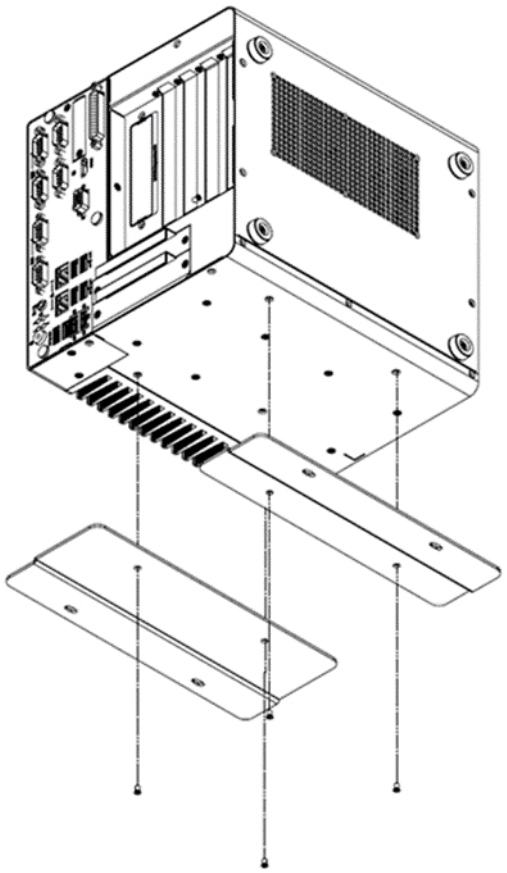
2. Install the CPU (LGA1151) and memory into the system.
3. Replace the top cover.

2.4.2 External HDD/SSD Installation



1. Unscrew 2 x screws on hard drive bay.
2. Install HDD/SSD with 4 x screws on the HDD/SSD tray.
3. Push back the hard drive bay into the system and use the same screws to affix.

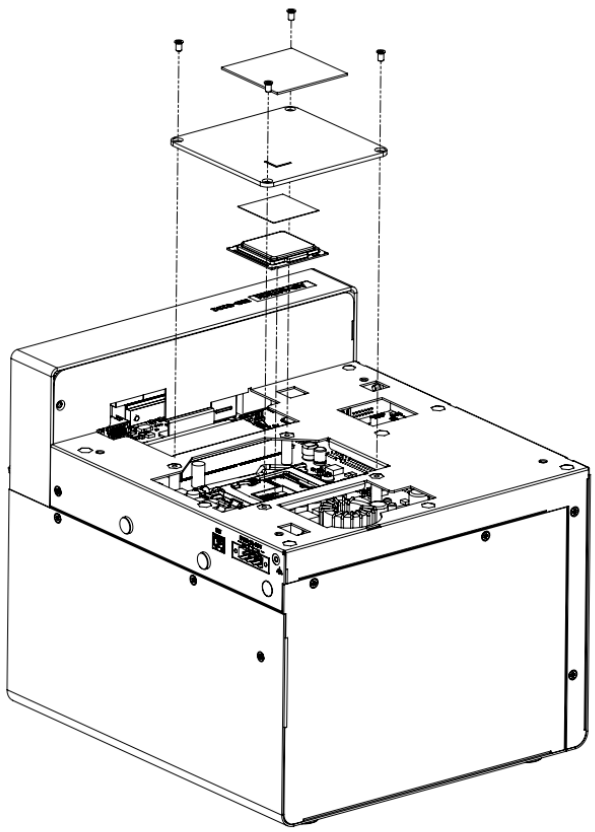
2.4.3 Mounting Kit Installation



1. Take out mounting kit and 4 screws (M4x6L) from the accessory box.
   Retirez le kit de montage et les 4 vis (M4x6L) de la boîte d'accessoires.
2. Screw one of the 2 screws (M4x6L) on left and right side and fix the system horizontally.
   Vissez chaque 2 vis (M4x6L) sur les côtés gauche et droit et fixez le système horizontalement.

2.4.4 Attaching the Thermal Pad

1. Take the thermal pad from the accessory box.
2. Paste the 30 x 30 x 0.2 mm (1.18 x 1.18 x 007 in) thermal pad to the CPU (as illustrated above).
3. Paste the 46 x 46 x 1 mm (1.8 x 1.8 x 03 in) piece to the Copper block (as illustrated below).

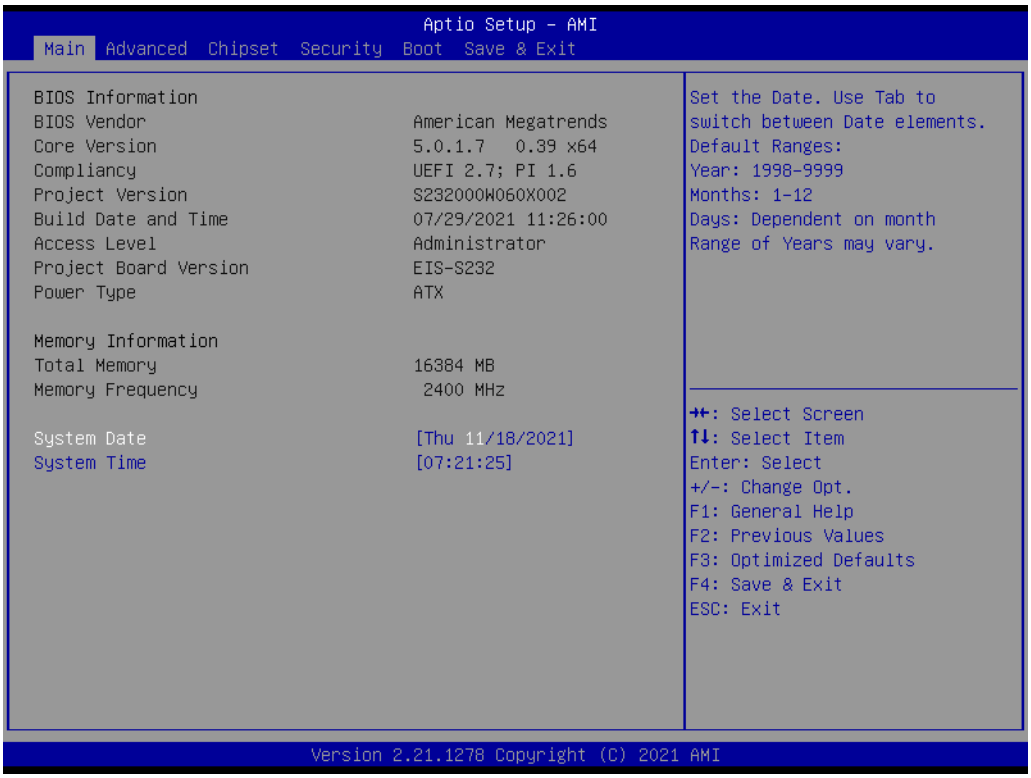


Chapter 3

BIOS Settings

3.1 Introduction

AMIBIOS has been integrated into motherboards for over two decades. With the AMIBIOS Setup program, users can modify BIOS settings and control various system features. This chapter describes the basic navigation of the EIS-S232 BIOS setup screens.



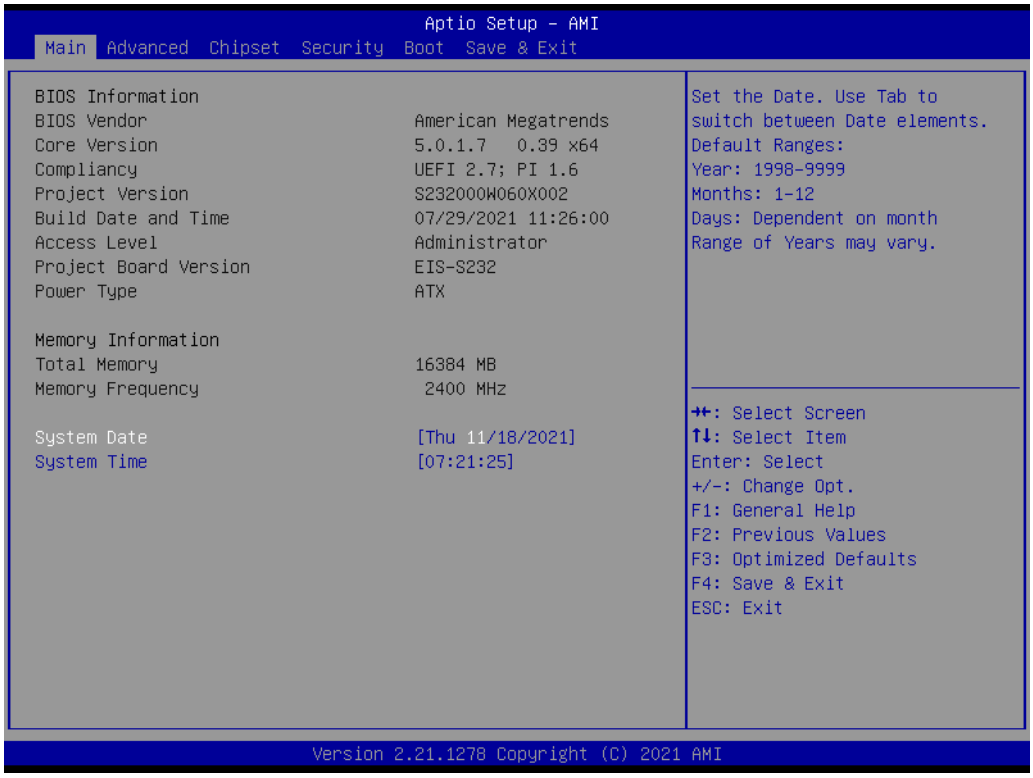
AMI's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This information is stored in flash ROM so it retains the Setup information when the power is turned off.

3.2 Entering the Setup

Turn on the computer and check for the patch code. If there is a number assigned to the patch code, it means that BIOS supports your CPU. If there is no number assigned to the patch code, please contact an Advantech application engineer to obtain an up-to-date patch code file. This will ensure that your CPU's system status is valid. After ensuring that you have a number assigned to the patch code, press <DEL> and you will immediately be allowed to enter Setup.

3.2.1 Main Setup

When users first enter the BIOS Setup Utility, they will enter the Main setup screen. Users can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

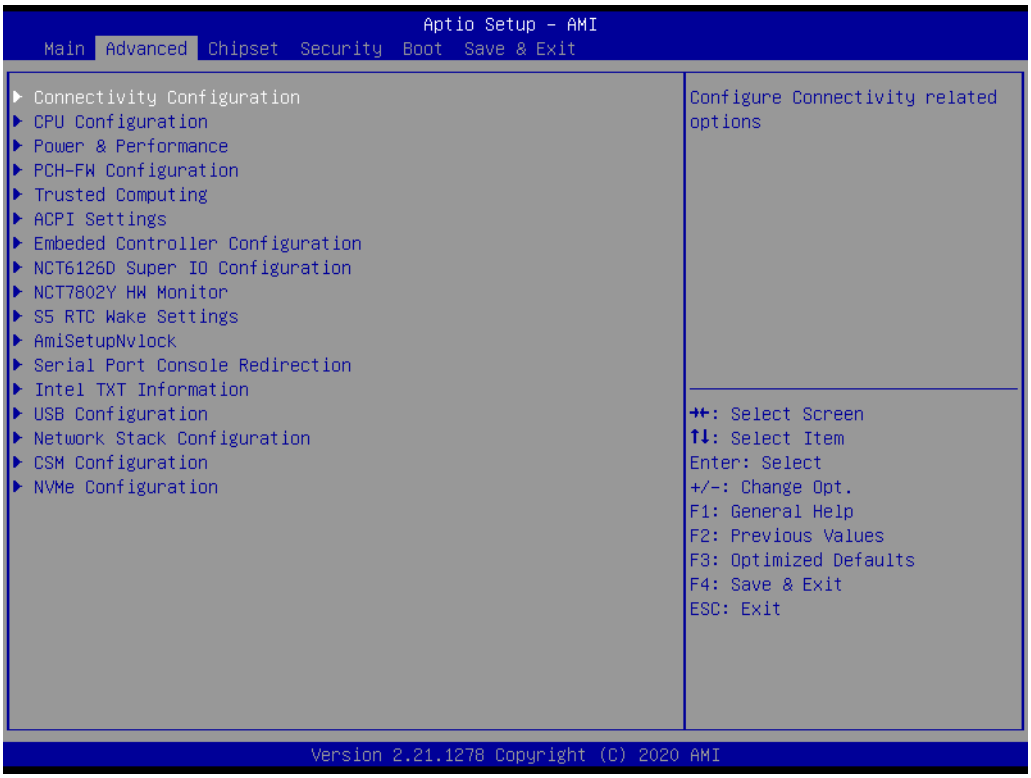
System time/System date

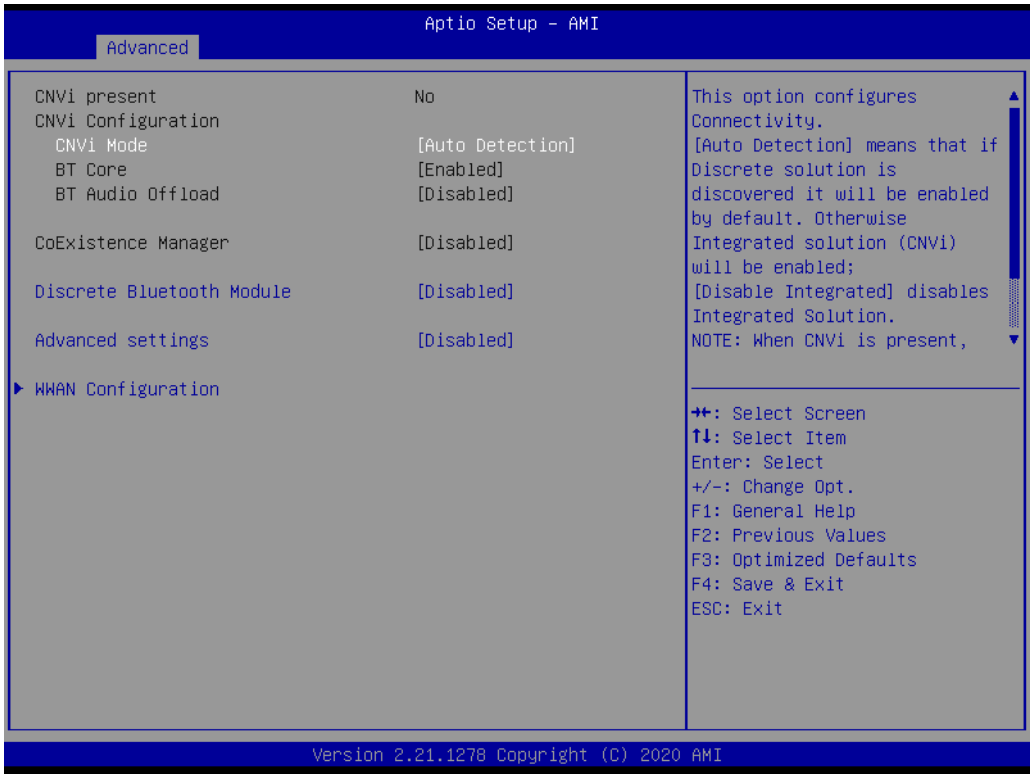
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the EIS-S232 setup screen to enter the Advanced BIOS Setup screen. Users can select any item in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. Users can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

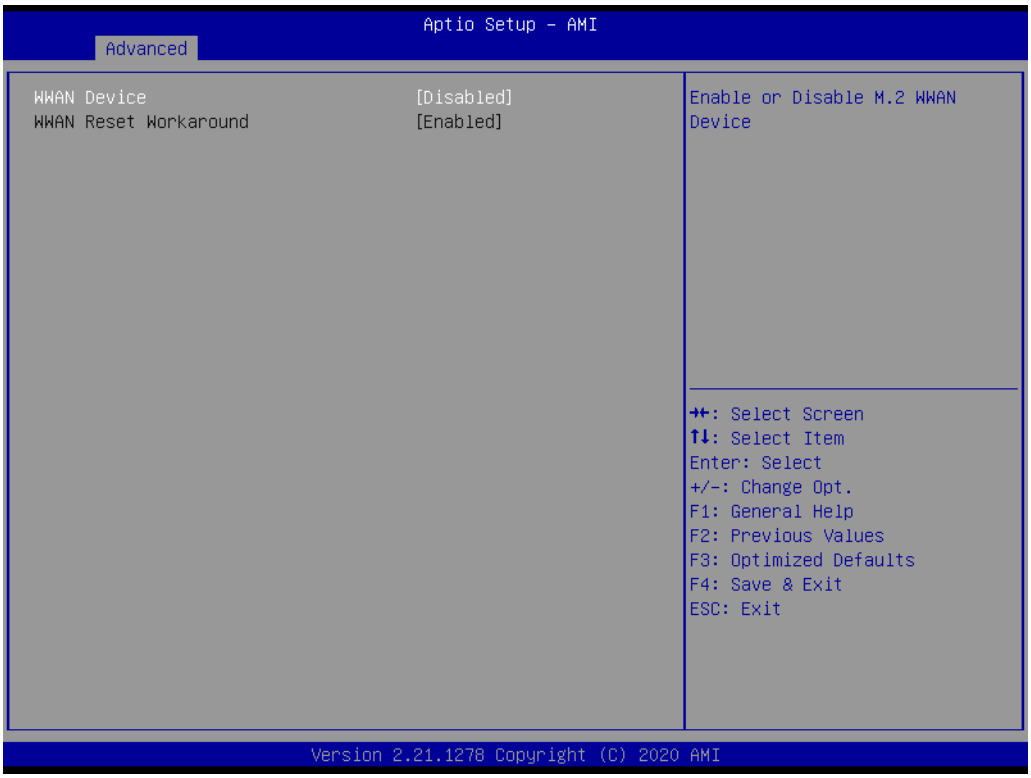
3.2.2.1 Connectivity Configuration





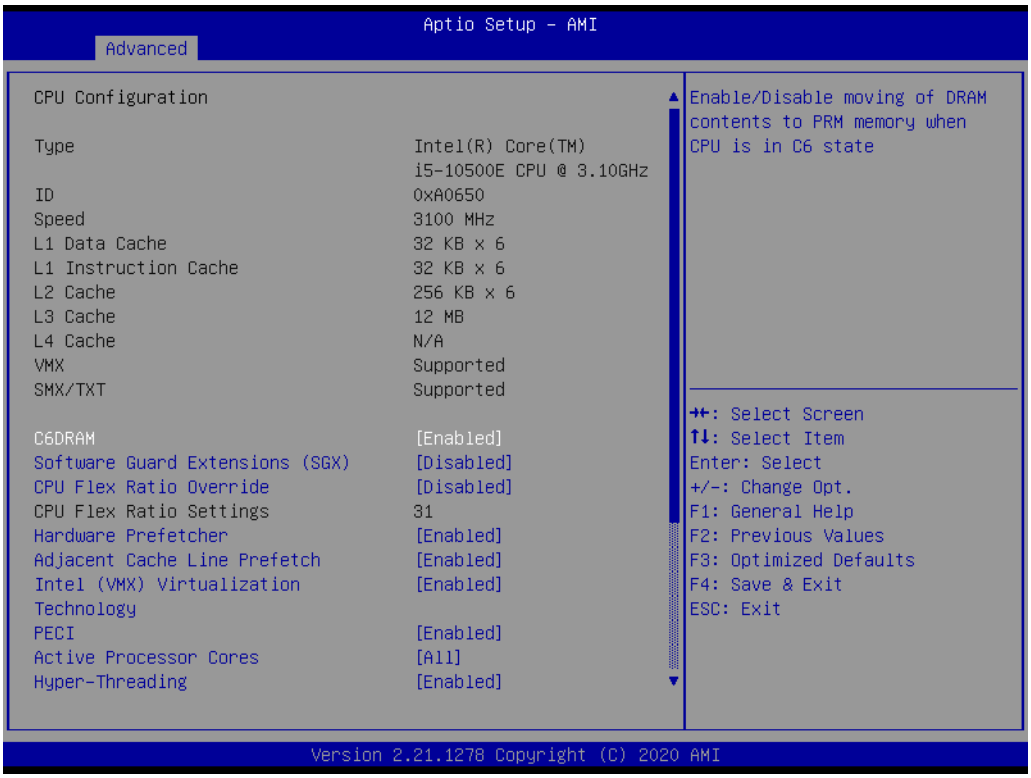
- **CNVi Mode**
  This option configures connectivity.
- **Discrete Bluetooth Module**
  Seriallo UART0 needs to be enabled to select BT module.
- **Advanced settings**
  Configure ACPI objects for wireless devices.

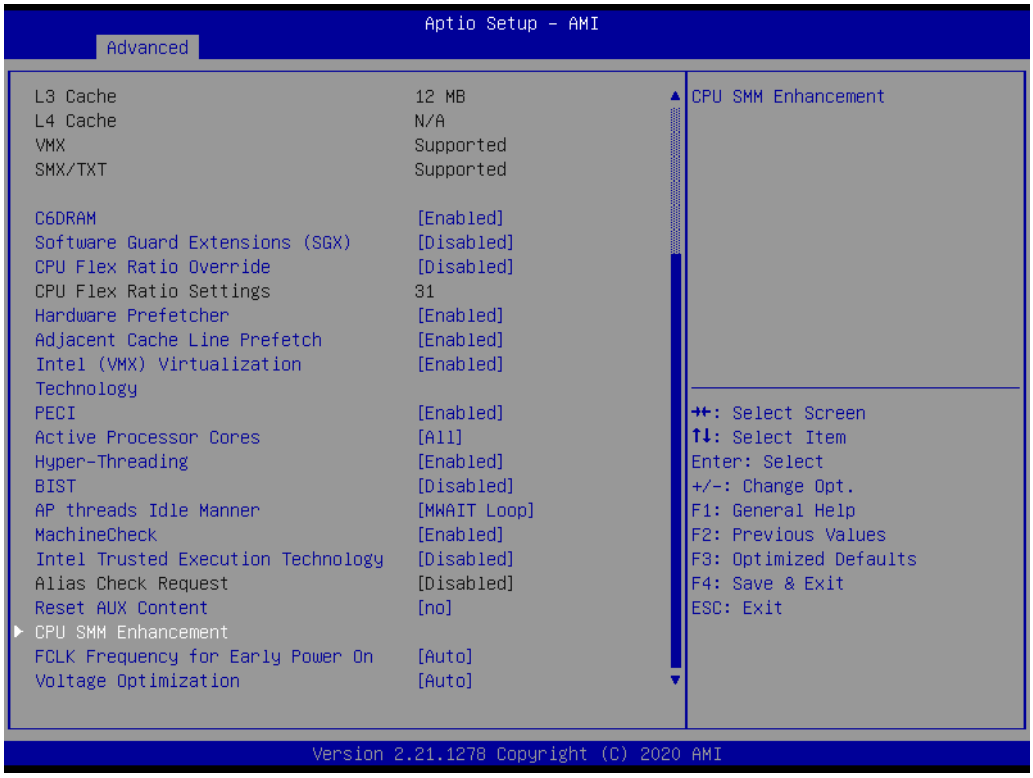
WWAN Configuration



- **WWAN Device**
  Enable or Disable M.2 WWAN Device.

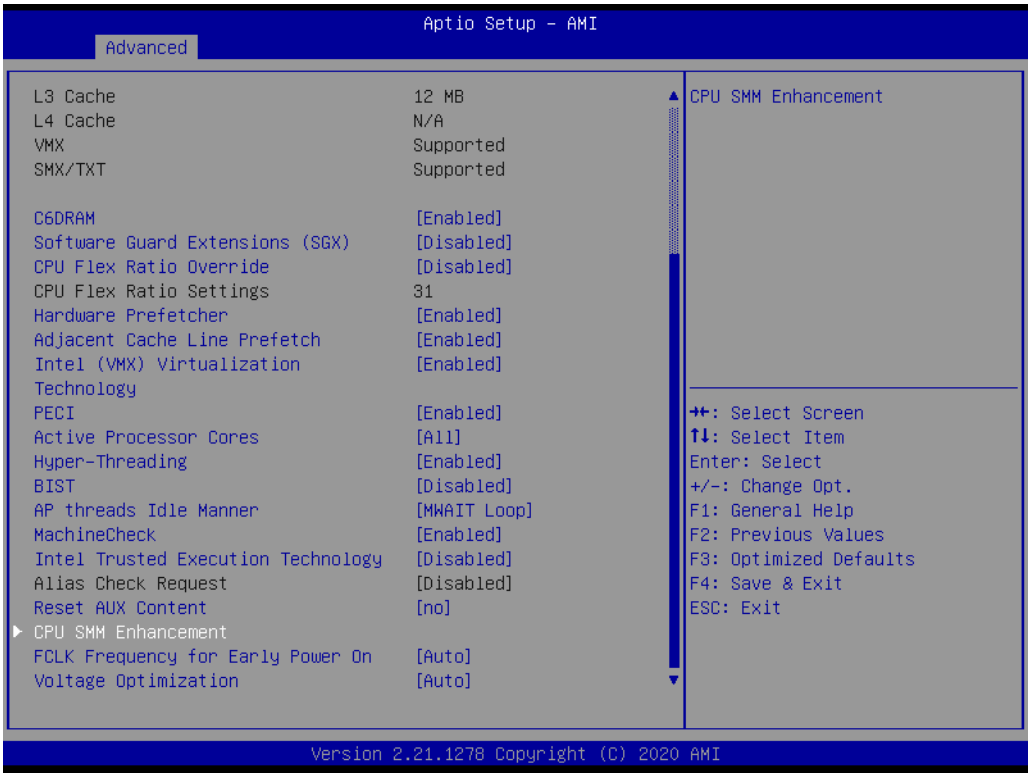
3.2.2.2 CPU Configuration

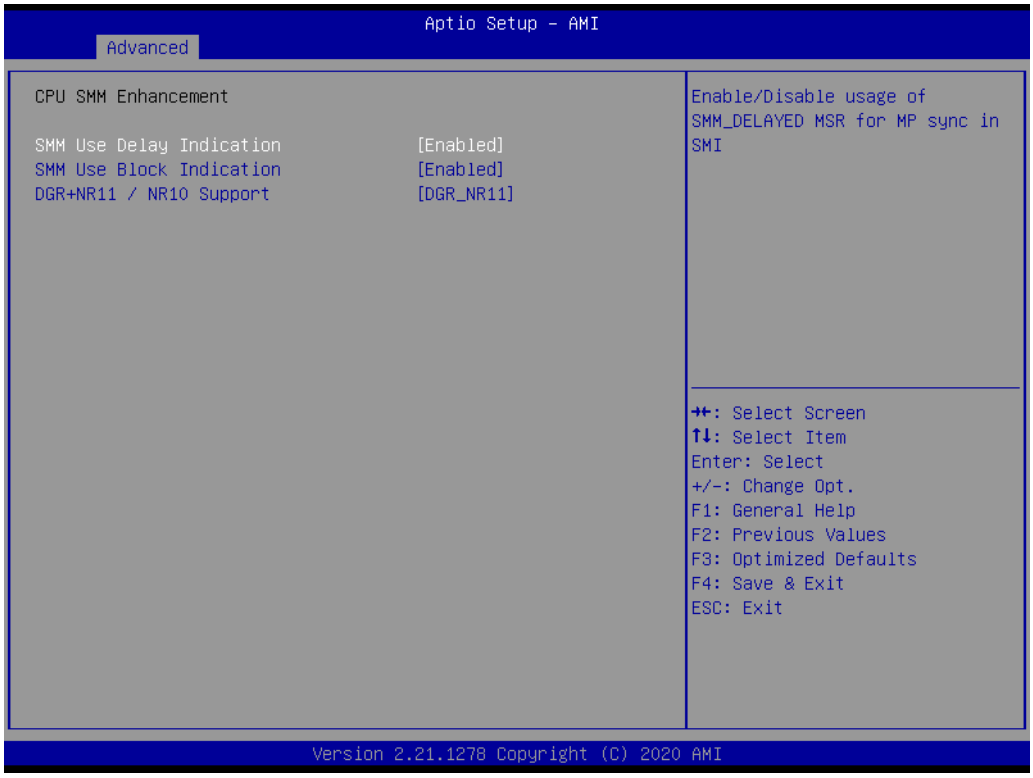




- **C6DRAM**
  Enable/disable moving of DRAM contents to PRM memory when CPU is in C6 state.
- **Software Guard Extensions (SGX)**
  Enable/disable Software Guard Extensions (SGX).
- **CPU Flex Ratio Override**
  Enable/disable CPU Flex Ratio programming.
- **CPU Flex Ratio Settings**
  This value must be between Max Efficiency Ratio (LFM) and Maximum non-turbo ratio set by Hardware (HFM).
- **Hardware Prefetcher**
  To turn on/off the MLC streamer prefetcher.
- **Adjacent Cache Line Prefetch**
  To turn on/off prefetching of adjacent cache lines.
- **Intel (VMX) Virtualization Technology**
  When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
- **PECI**
  Enable/disable PECI.
- **Active Processor Cores**
  Number of cores to enable in each processor package.
- **Hyper-Threading**
  Enable or Disable Hyper-Threading technology.
- **BIST**
  Enable/Disable BIST (Built-In Self Test) on reset
- **AP threads Idle Manner**
  AP threads Idle manner for waiting signal to run.
- **MachineCheck**
  Enable/disable Machine Check.

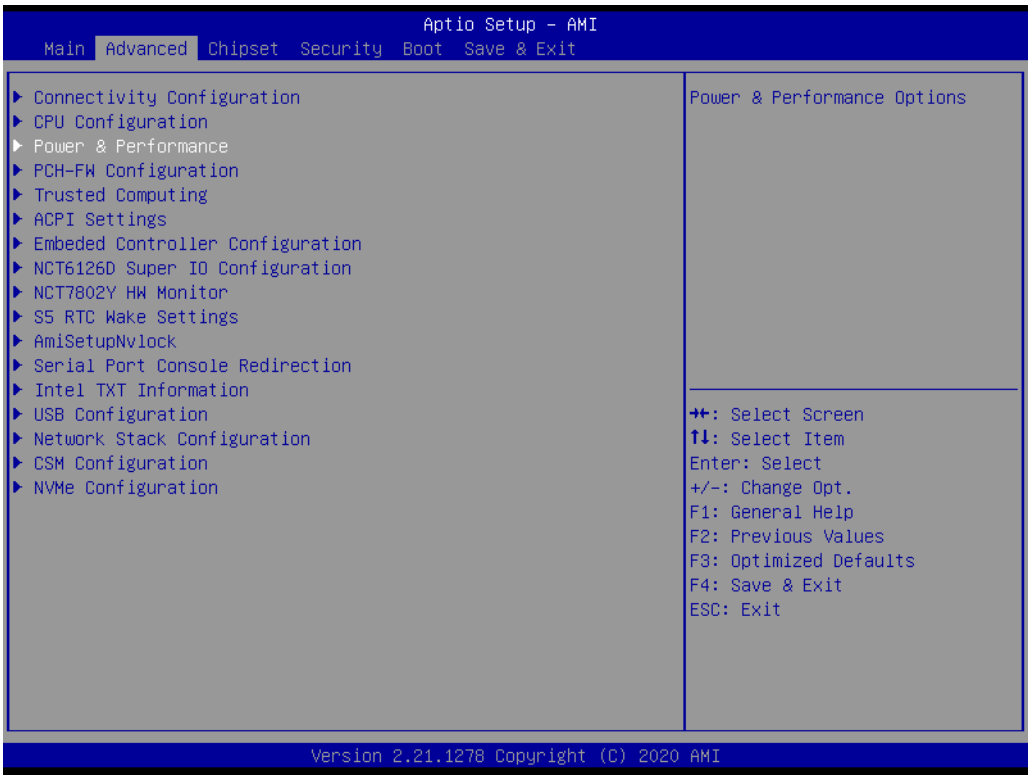
- **Intel Trusted Execution Technology**
  Enables utilization of additional hardware capabilities provided by Intel (R) Trusted Execution Technology.
- **Alias Check Request**
  Enables Txt Alias Checking capability.
- **Reset AUX Content**
  Reset TPM Aux content. Txt may not functional after AUX content gets reset.
- **FCLK Frequency for Early Power On**
  FCLK frequency can take values of 400MHz, 800MHz and 1GHz.(1GHz not supported for ULT/ULX SKUs)
- **Voltage Optimization**
  Auto: This option will honor the silicon default values.
  ENABLE - Mobile SKU's.
  DISABLE - Rest of all SKUs other than mobile.

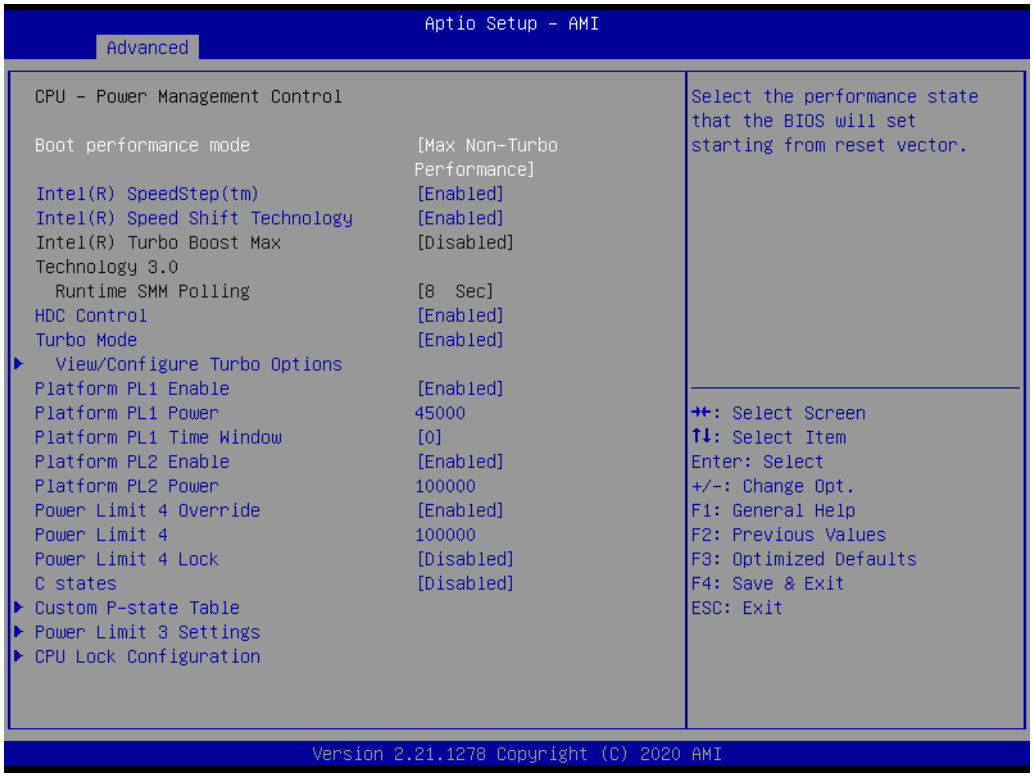




- **SMM Use Delay Indication**
  Enable/disable usage of SMM_DELAYED MSR for MP sync in SMI.
- **SMM Use Block Indication**
  Enable/disable usage of SMM_BLOCKED MSR for MP sync in SMI.
- **DGR+NR11/NR10 Support**
  Select DGR with Nifty Rock11 or Nifty Rock10 feature.

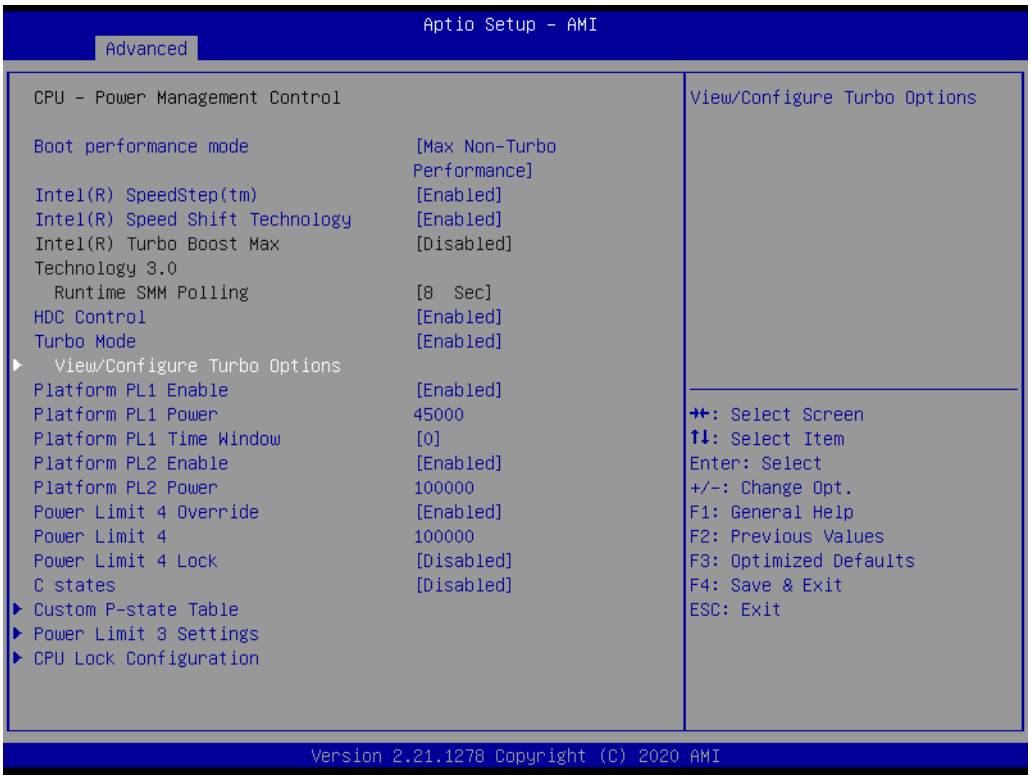
3.2.2.3 Power & Performance – CPU Power Management Control

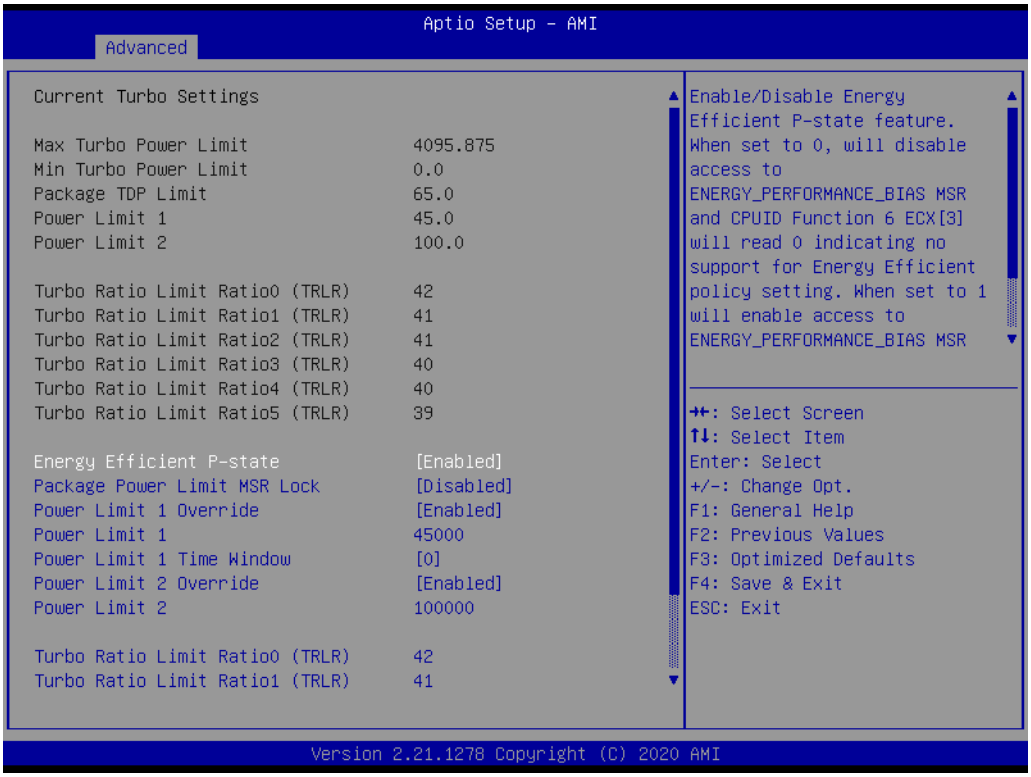


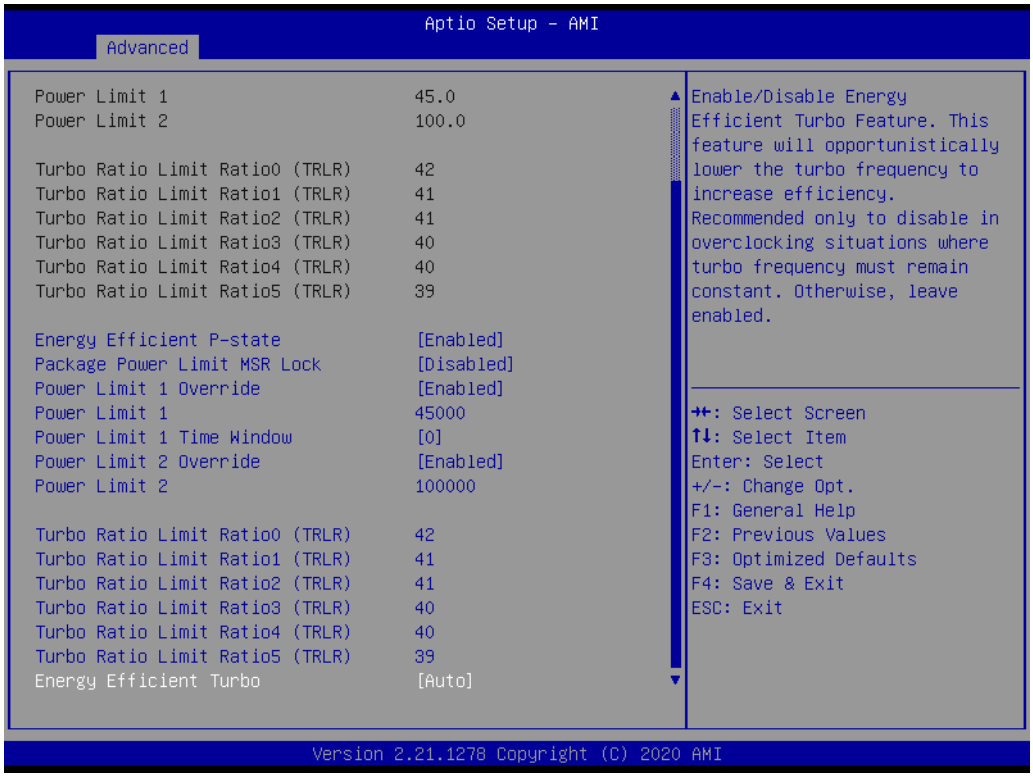


- **Boot Performance**
  Select the performance state that the BIOS will set before OS hand-off.
- **Intel® Speedstep™**
  Allows more than two frequency ranges to be supported.
- **Intel® Speed Shift Technology**
  Enable/disable Intel (R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
- **HDC Control**
  This option allows HDC configuration.
- **Turbo Mode**
  Enable/disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).
- **Platform PL1 Enable**
  Enable/disable platform power limit 1 programming.
- **Platform PL1 Power**
  Platform power limit 1 power in milliwatts.
- **Platform PL1 Time Window**
  Platform power limit 1 Time Window value in seconds.
- **Platform PL2 Enable**
  Enable/disable platform power limit 2 programming.
- **Platform PL2 Power**
  Platform power limit 2 power in milliwatts.
- **Power Limit 4 Override**
  Enable/disable power limit 4 override.
- **Power Limit 4**
  Power limit 4 in milliwatts.

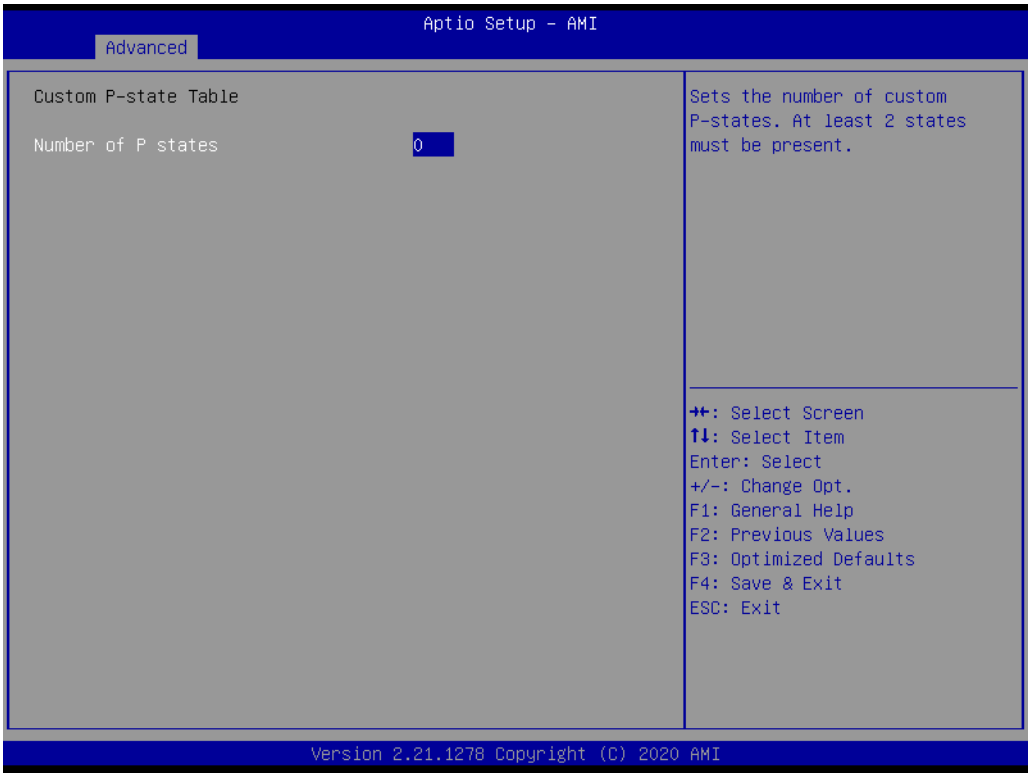
- **Power Limit 4 Lock**
  Power Limit 4 MSR 601h Lock. When enabled PL4 configurations are locked during OS. When disabled PL4 configuration can be changed during OS.
- **C states**
  Enable/disable CPU Power Management.



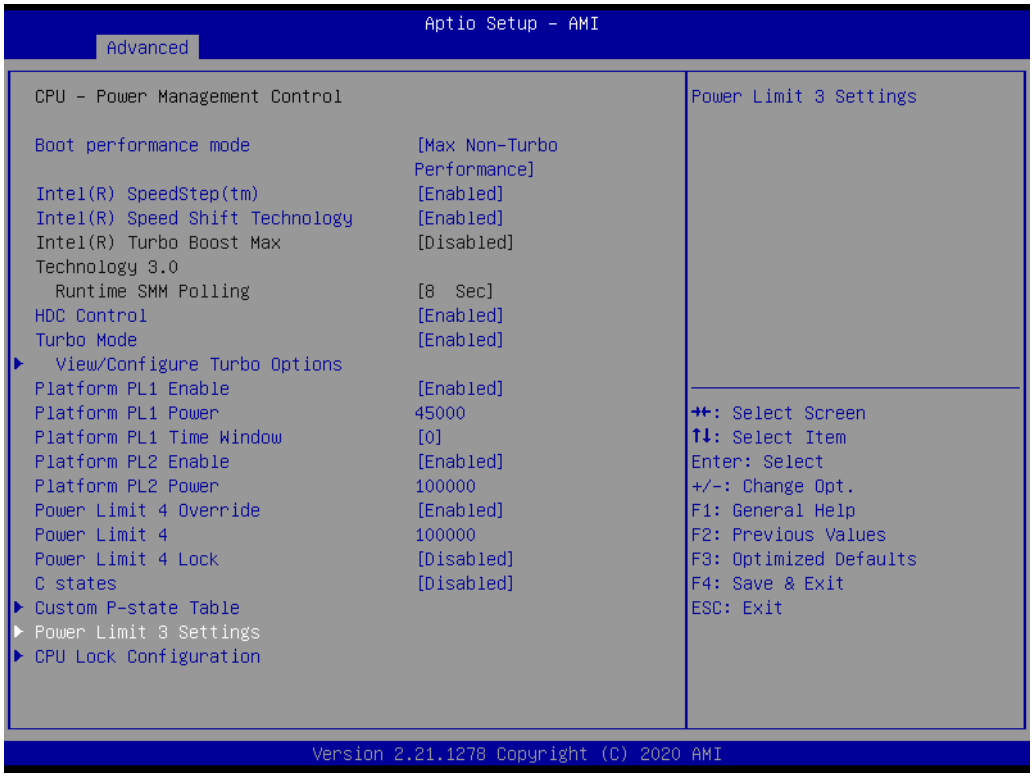




- **Energy Efficient P-state**
  Enable/disable Energy Efficient P-state feature.
- **Package Power Limit MSR Lock**
  Enable/disable locking of Package Power Limit settings.
- **Power Limit 1 Override**
  Enable/disable Power Limit 1 override.
- **Power Limit 1**
  Power Limit 1 in milliwatts.
- **Power Limit 1 Time Window**
  Power Limit 1 Time Window value in seconds.
- **Power Limit 2 Override**
  Enable/disable Power Limit 2 override.
- **Power Limit 2**
  Power Limit 2 value in milliwatts.
- **Turbo Ratio Limit Ratio0~5 (TRLR)-**
  Turbo Ratio Limit Ratio0~5 (TRLR) with range of (Max Non-Turbo Ratio - 255). Min = Max Non-Turbo Ratio. Max = fused turbo ratio, or 255 if CPU is unlocked for overclocking.
- **Energy Efficient Turbo**
  Enable/disable Energy Efficient Turbo feature. This feature will opportunistically lower the turbo frequency to increase efficiency.



- **Number of P states**
  Sets the number of custom P-states. At least 2 states must be present.


Aptio Setup – AMI
Advanced
CPU – Power Management Control
Boot performance mode [Max Non-Turbo Performance]
Intel(R) SpeedStep(tm) [Enabled]
Intel(R) Speed Shift Technology [Enabled]
Intel(R) Turbo Boost Max Technology 3.0 [Disabled]
Runtime SMM Polling [8 Sec]
HDC Control [Enabled]
Turbo Mode [Enabled]
View/Configure Turbo Options
Platform PL1 Enable [Enabled]
Platform PL1 Power 45000
Platform PL1 Time Window [0]
Platform PL2 Enable [Enabled]
Platform PL2 Power 100000
Power Limit 4 Override [Enabled]
Power Limit 4 100000
Power Limit 4 Lock [Disabled]
C states [Disabled]
Custom P-state Table
Power Limit 3 Settings
CPU Lock Configuration
Power Limit 3 Settings
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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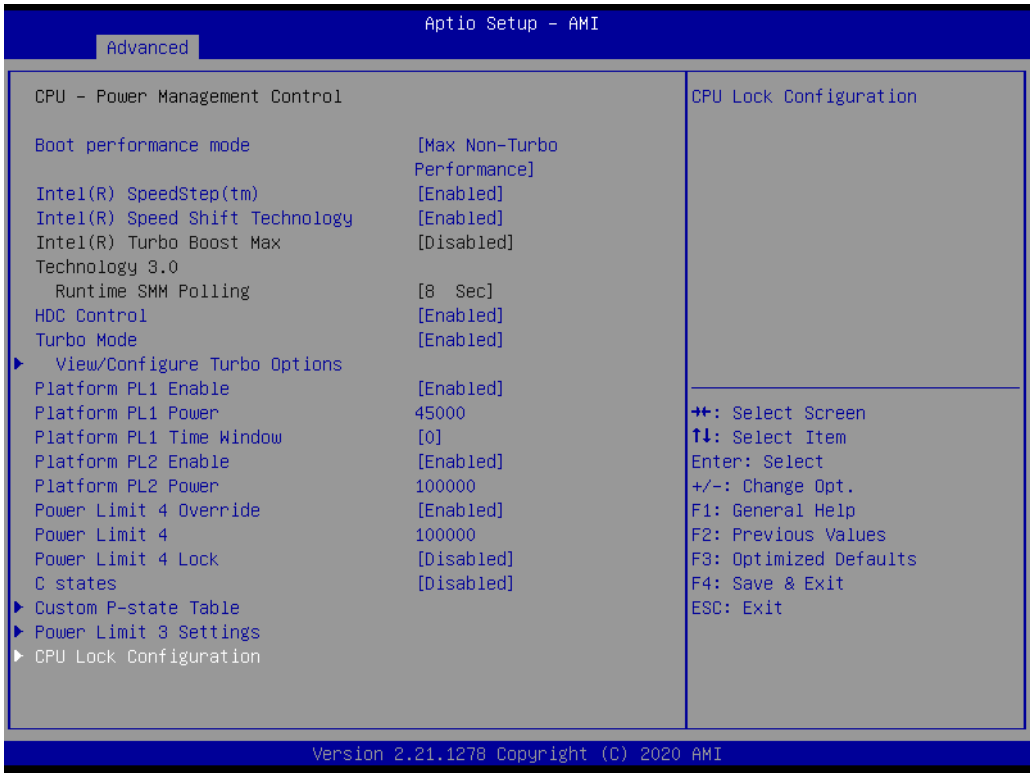
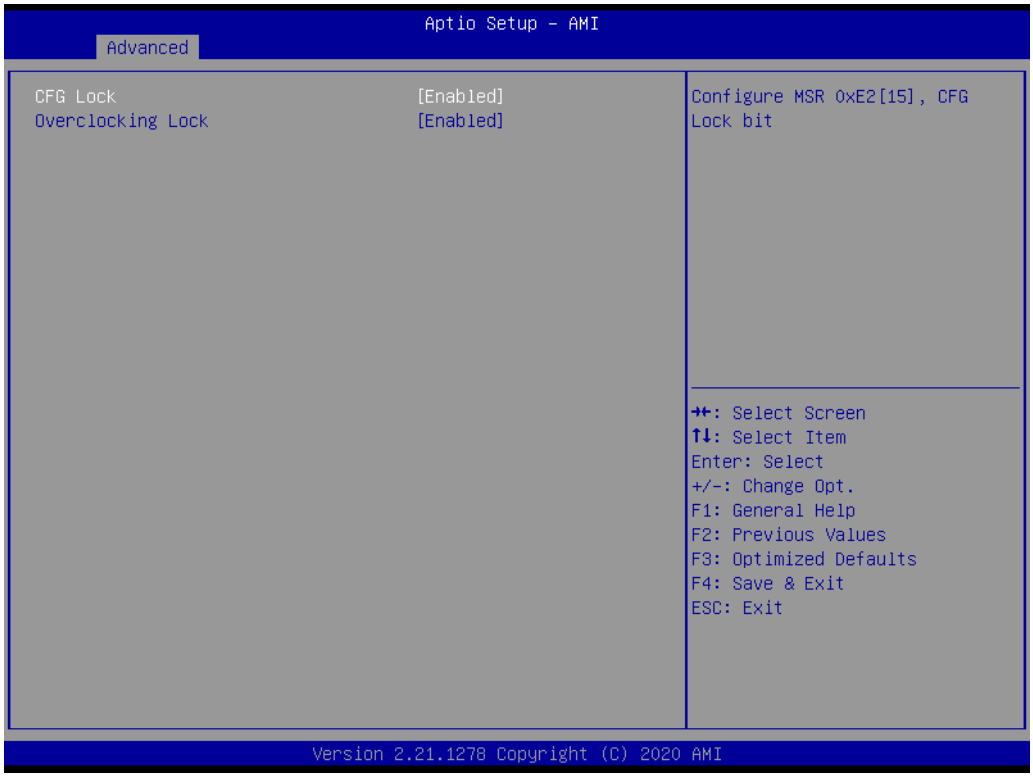
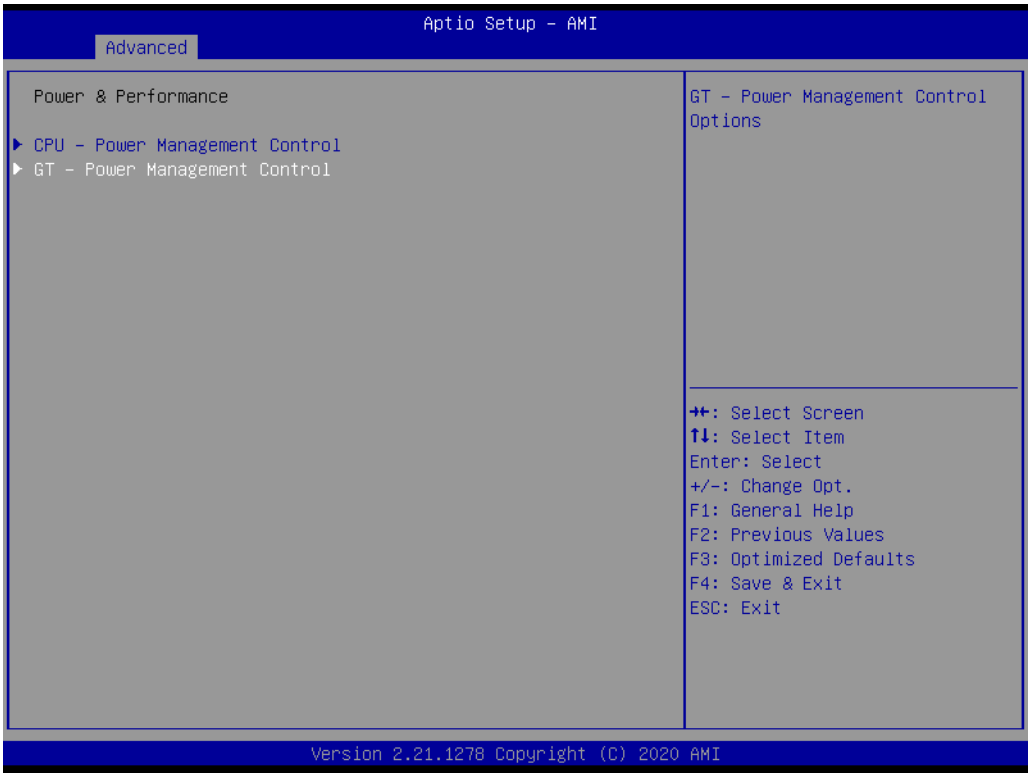
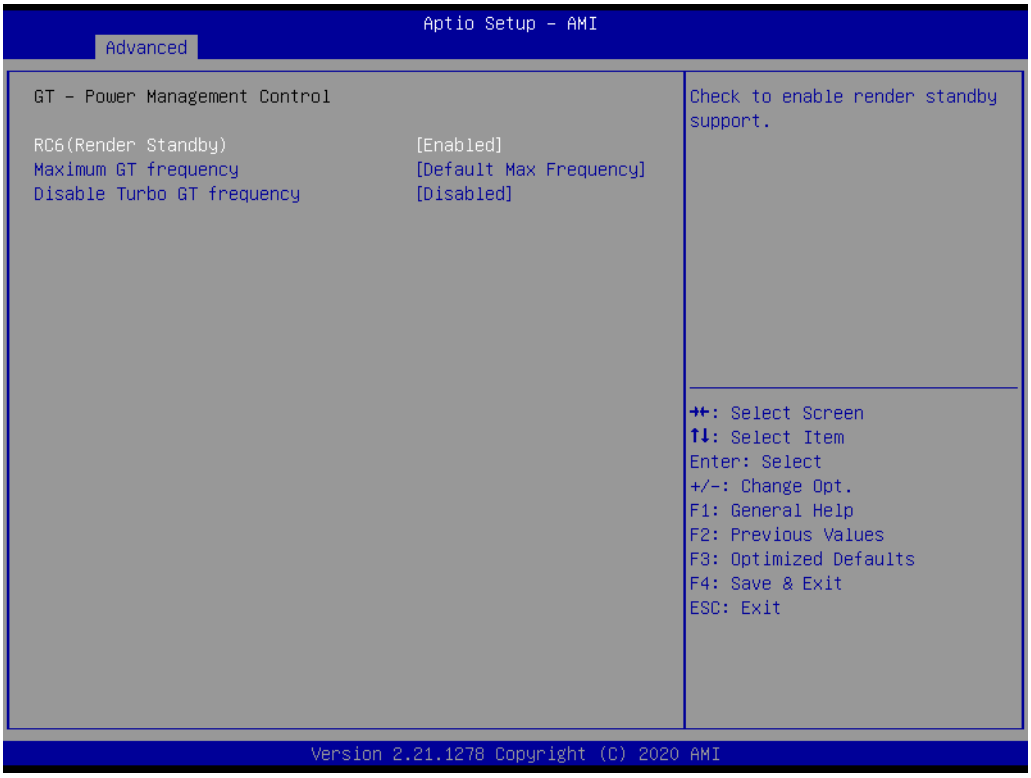
- **Power Limit 3 Override**
  Enable/disable power limit 3 override.
- **Power Limit 3**
  Power Limit 3 in milliwatts.
  Power Limit 3 time window.
  Power Limit 3 time window value in milli seconds.
- **Power Limit 3 Duty Cycle**
  Specify the duty cycle in percentage that the CPU is required to maintain over the configured time window. Range is 0-100.
- **Power Limit 3 Lock**
  Power Limit 3 MSR 615h Lock. When enabled PL3 configurations are locked during OS. When disabled PL3 configuration can be changed during OS.





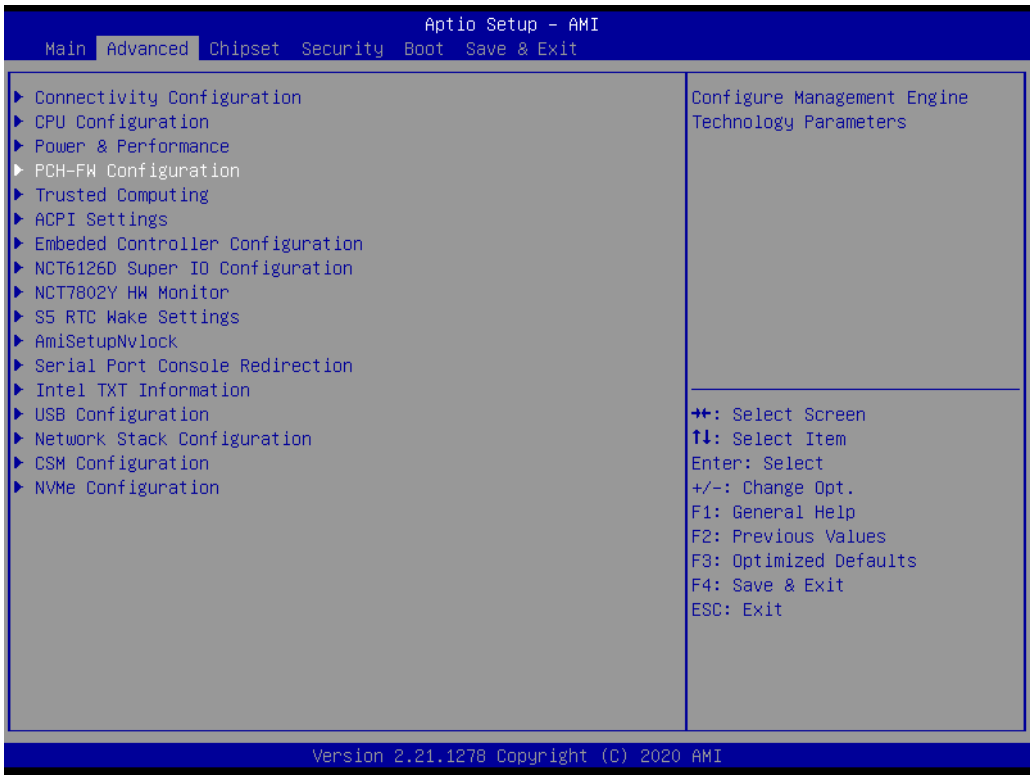
- **CFG Lock**
  Configure MSR 0xE2[15], CFG Lock bit.
- **Overclocking Lock**
  Enable/Disable Overclocking Lock (BIT 20) in FLEX_RATIO(194) MSR.

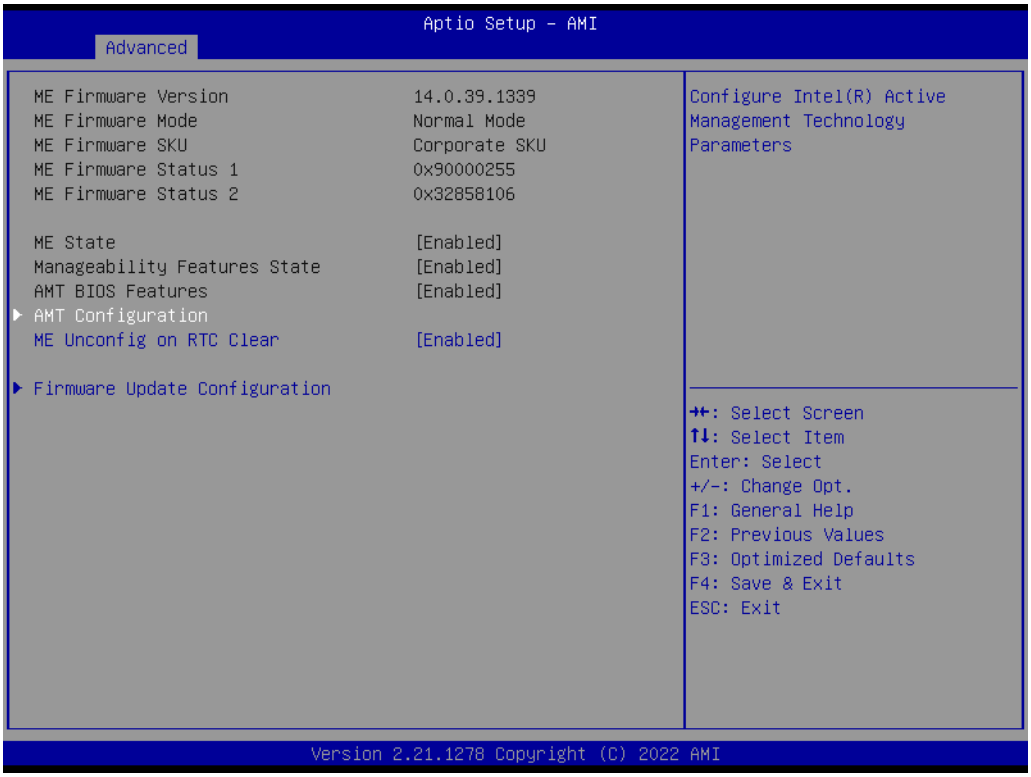




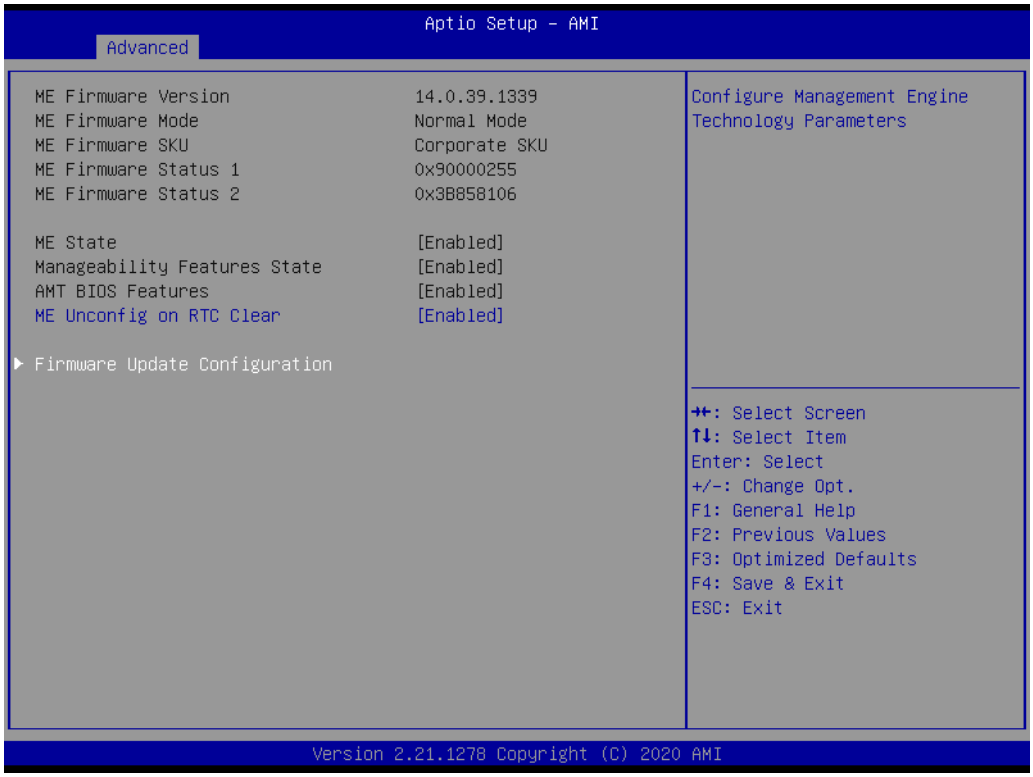
- **RC6 (Render Standby)**
  Check to enable render standby support.
- **Maximum GT frequency**
  Maximum GT frequency limited by the user.
- **Disable Turbo GT frequency**
  Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited.

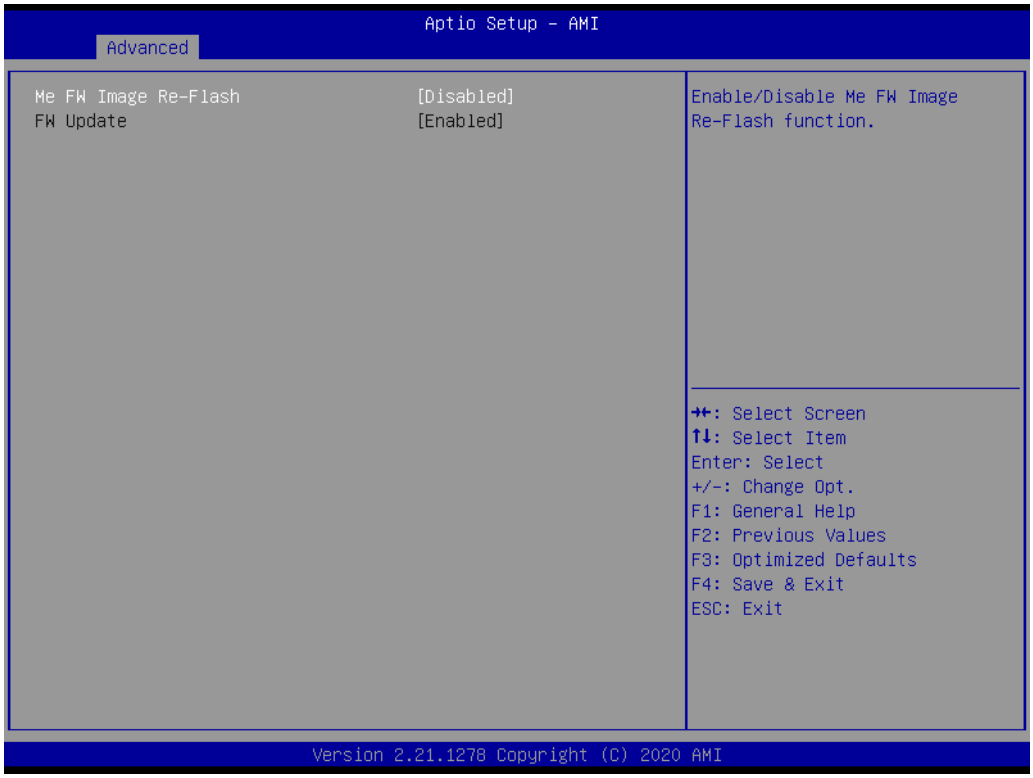
3.2.2.4 PCH-FW Configuration



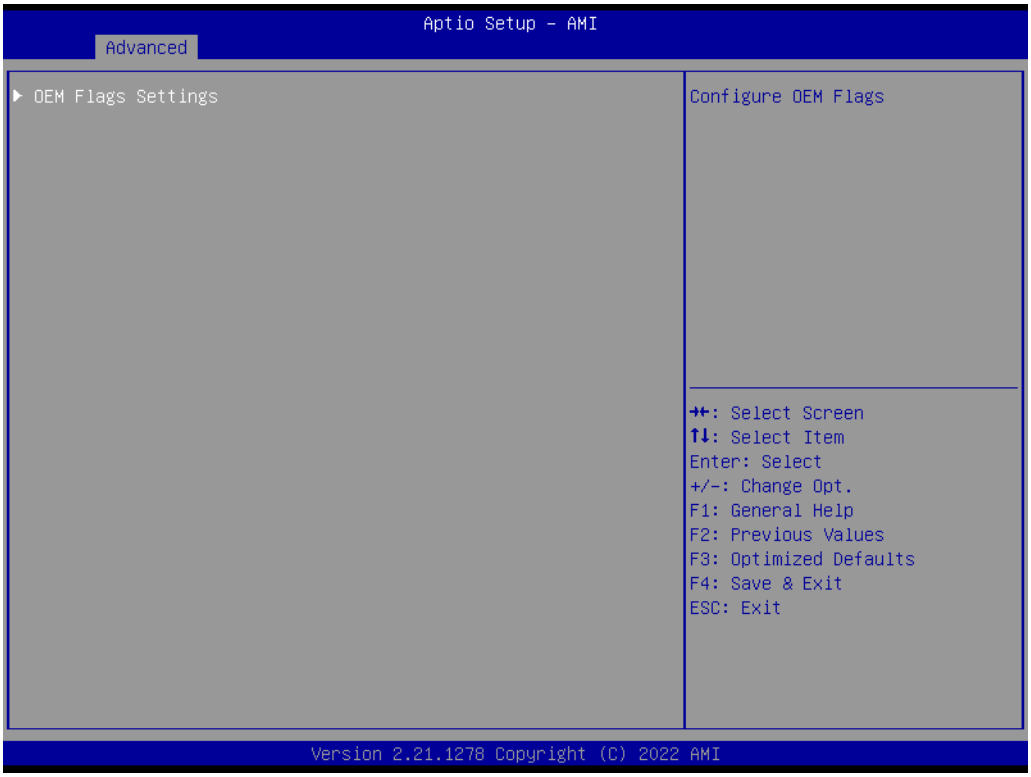


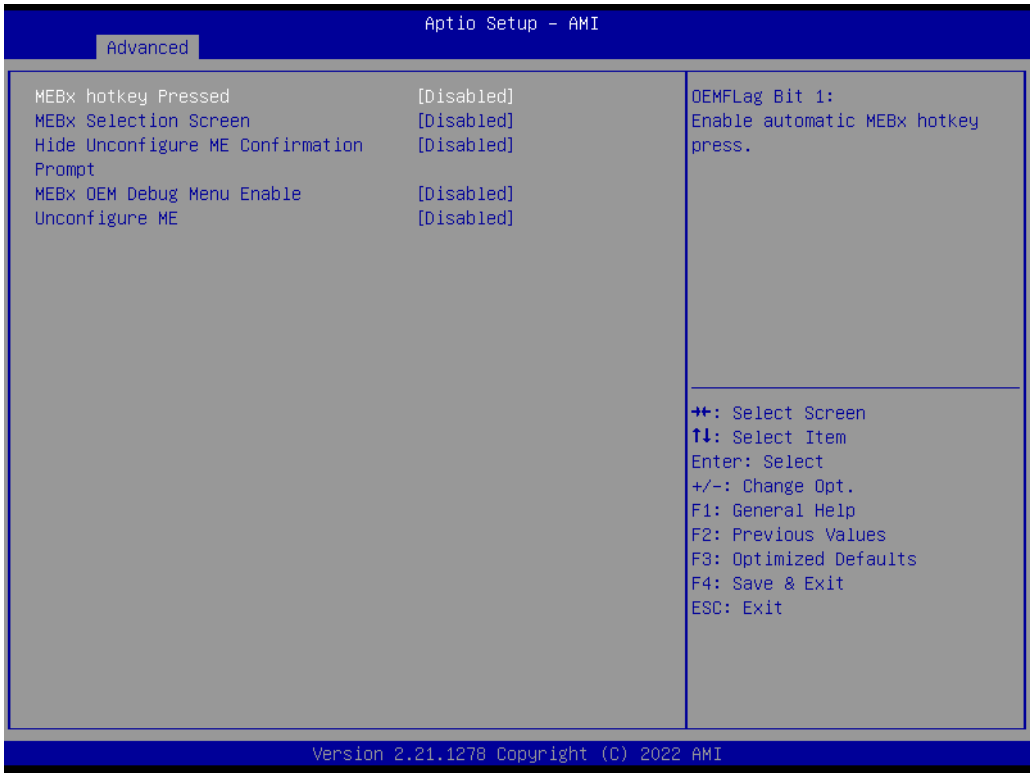
- **AMT Configuration**
  Configure Intel(R) Active Management Technology parameters.
- **ME State**
  When disabled ME will be put into ME temporarily disabled mode.
- **Manageability Features State**
  Enable/disable Intel (R) manageability features.
- **AMT BIOS Features**
  When disabled AMT BIOS 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.





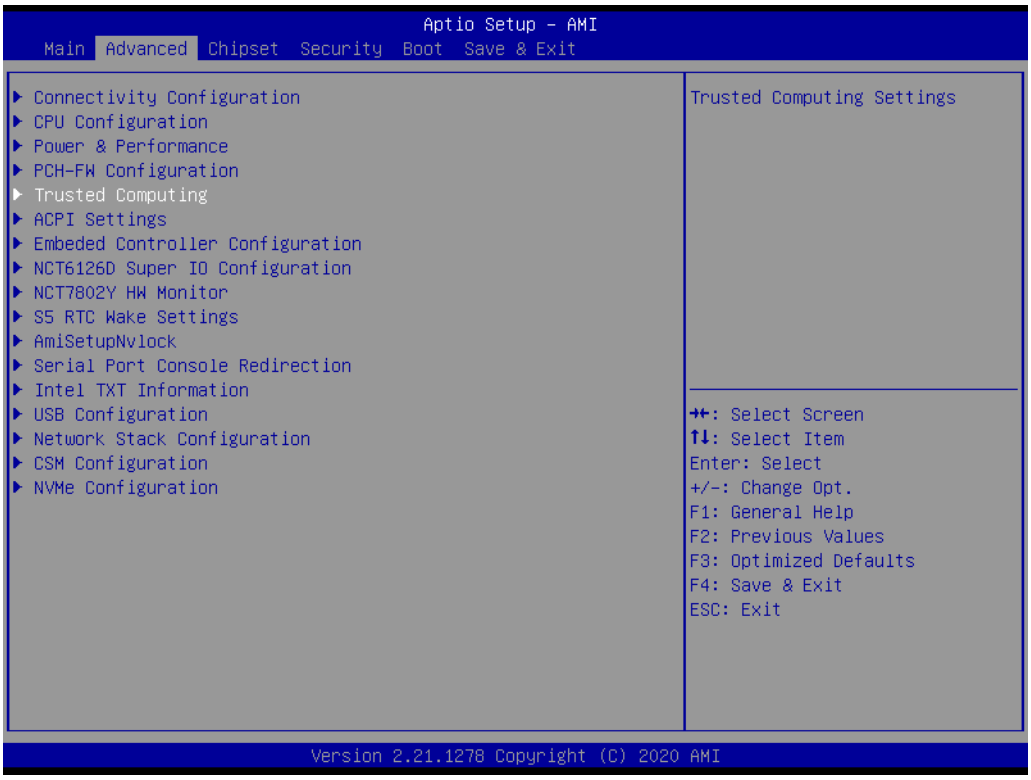
- **Me FW Image Re-Flash**
  Enable/Disable Me FW Image Re-Flash function.
- **FW Update**
  Enable/Disable ME FW Update function.

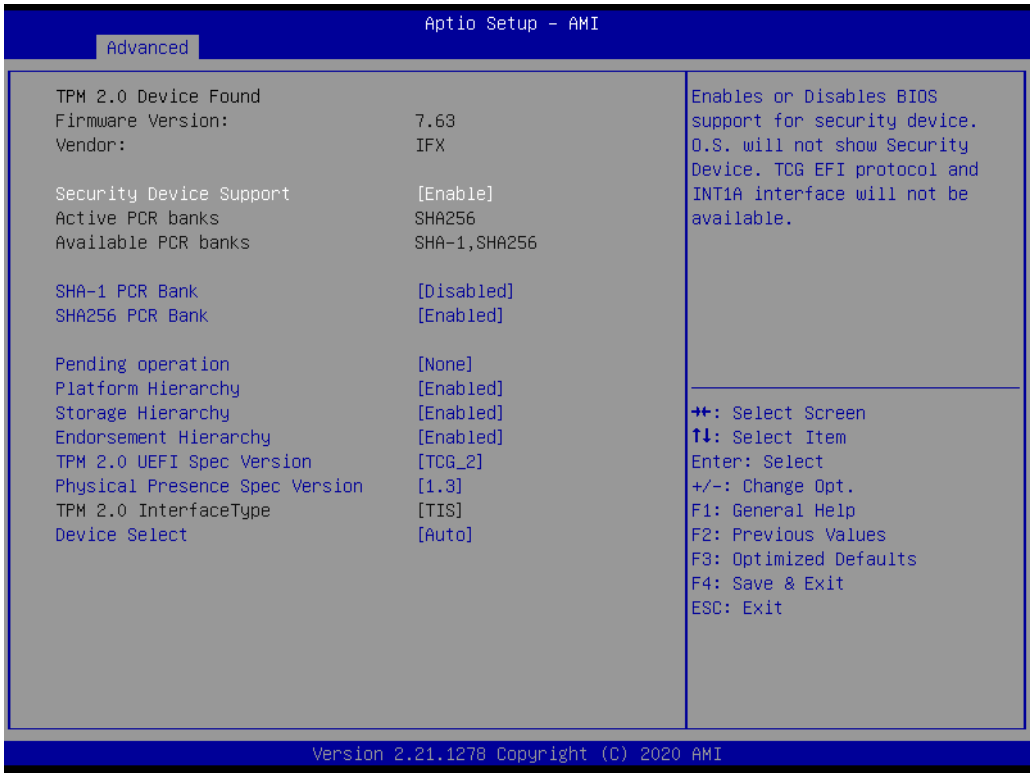

Aptio Setup – AMI
Advanced
OEM Flags Settings
Configure OEM Flags
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.21.1278 Copyright (C) 2022 AMI



- **OEM Flags Settings**
  Configure OEM Flags.
- **MEBx hotkey Pressed OEMFLag Bit 1**
  Enable automatic MEBx hotkey press.
- **MEBx Selection Screen: OEMFLag Bit 2**
  Enable MEBx selection screen with 2 options: Press 1 to enter ME Configuration Screens. Press 2 to initiate a remote connection. Note: Network Access must be activated from MEBx Setup for this screen to be displayed.
- **Hide Unconfigure ME Confirmation Prompt: OEMFlag Bit 6**
  Hide Unconfigure ME confirmation prompt when attempting ME unconfiguration.
- **MEBx OEM Debug Menu Enable: OEMFlag Bit 14**
  Enable OEM debug menu in MEBx.
- **Unconfigure ME: OEMFlag Bit 15**
  Unconfigure ME with resetting MEBx password to default.

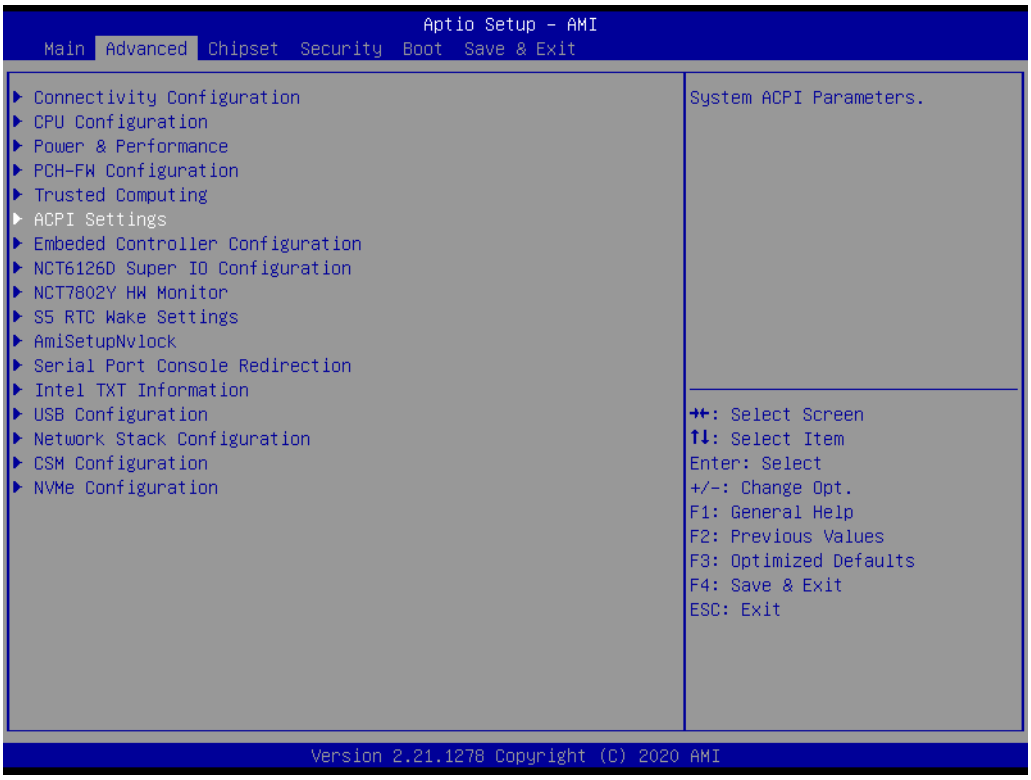
3.2.2.5 Trusted Computing

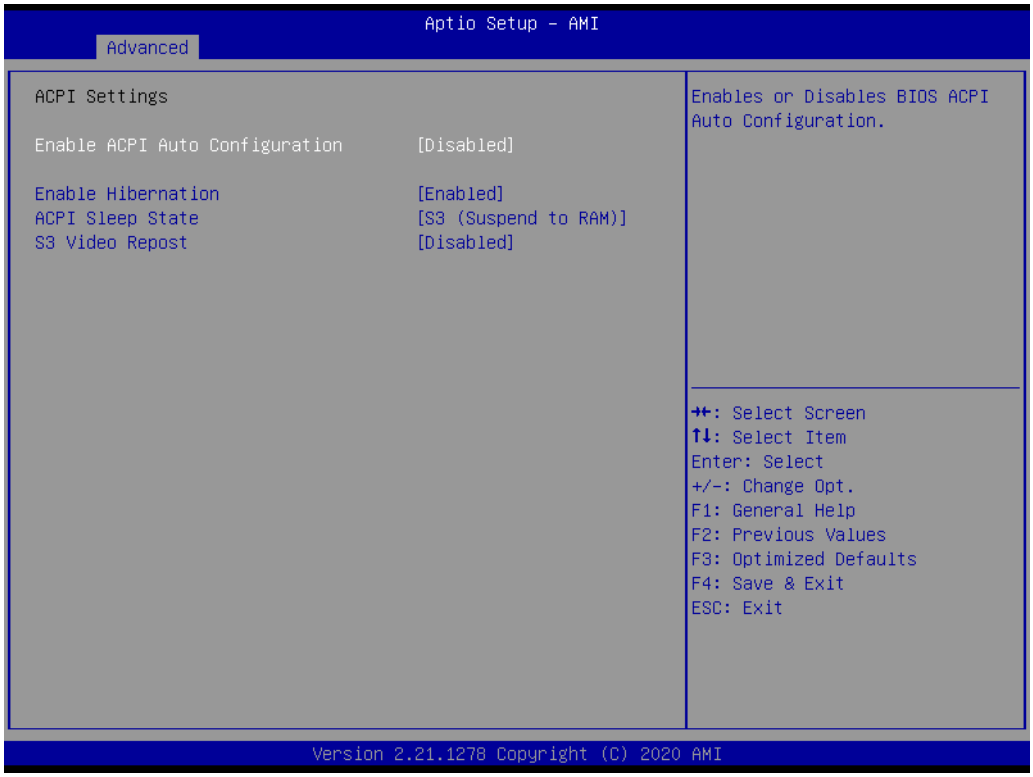




- **Security Device Support**
  Enable or disable BIOS support for security device.
- **SHA-1 PCR Bank**
  Enable or disable SHA-1 PCR bank.
- **SHA256 PCR Bank**
  Enable or Disable SHA256 PCR bank.
- **Pending Operation**
  Schedule an operation for the security device.
- **Platform Hierarchy**
  Enable or disable Platform Hierarchy.
- **Storage Hierarchy**
  Enable or disable Storage Hierarchy.
- **Endorsement Hierarchy**
  Enable or disable Endorsement Hierarchy.
- **TPM 2.0 InterfaceType**
  Select the TCG2 spec version support.
- **Physical Presence Spec Version**
  Tells OS to support PPI Spec Version 1.2 or 1.3.
- **TPM 2.0 InterfaceType**
  Select the communication interface to TPM 20 device.
- **Device Select**
  TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.

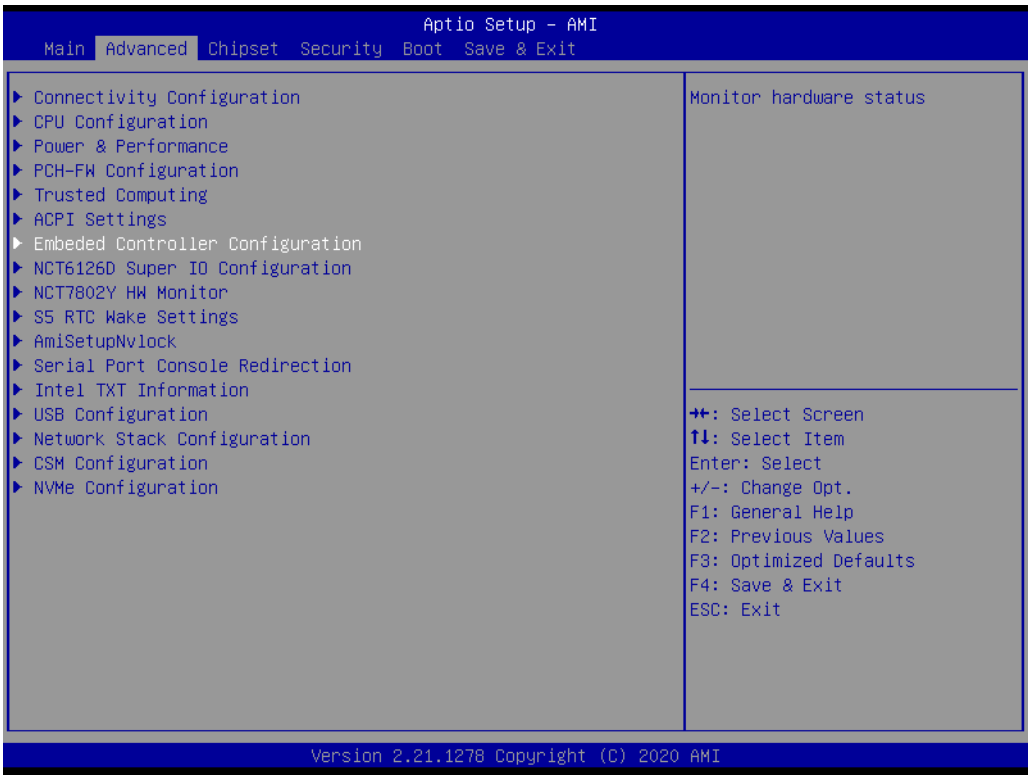
3.2.2.6 ACPI Settings

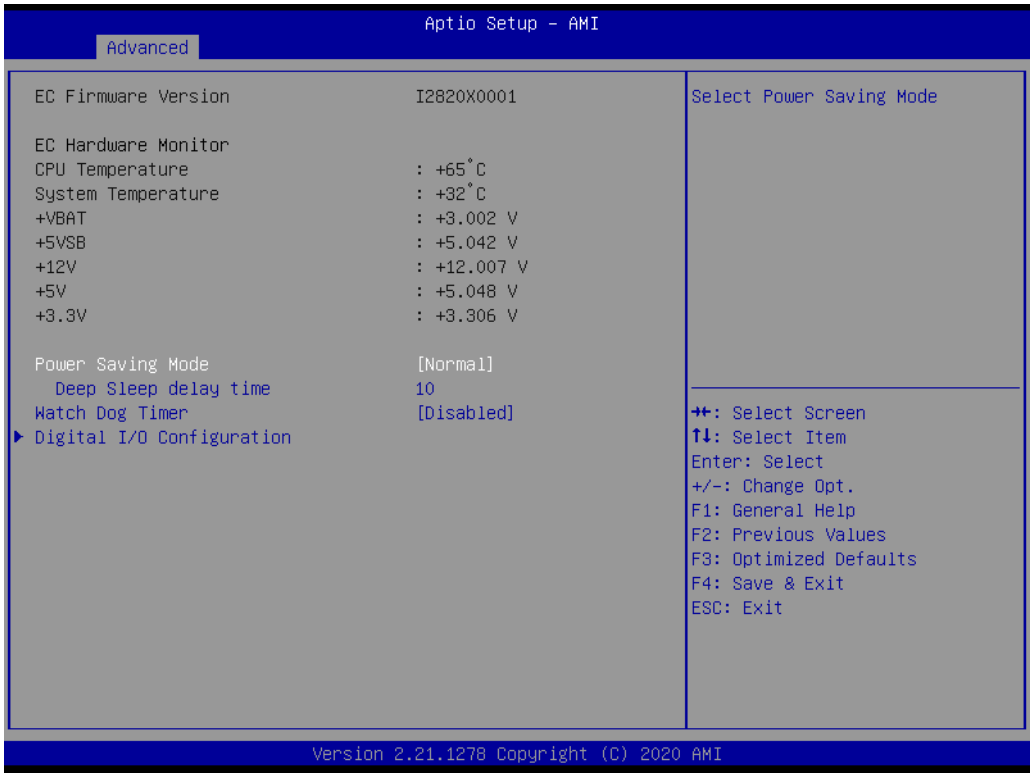




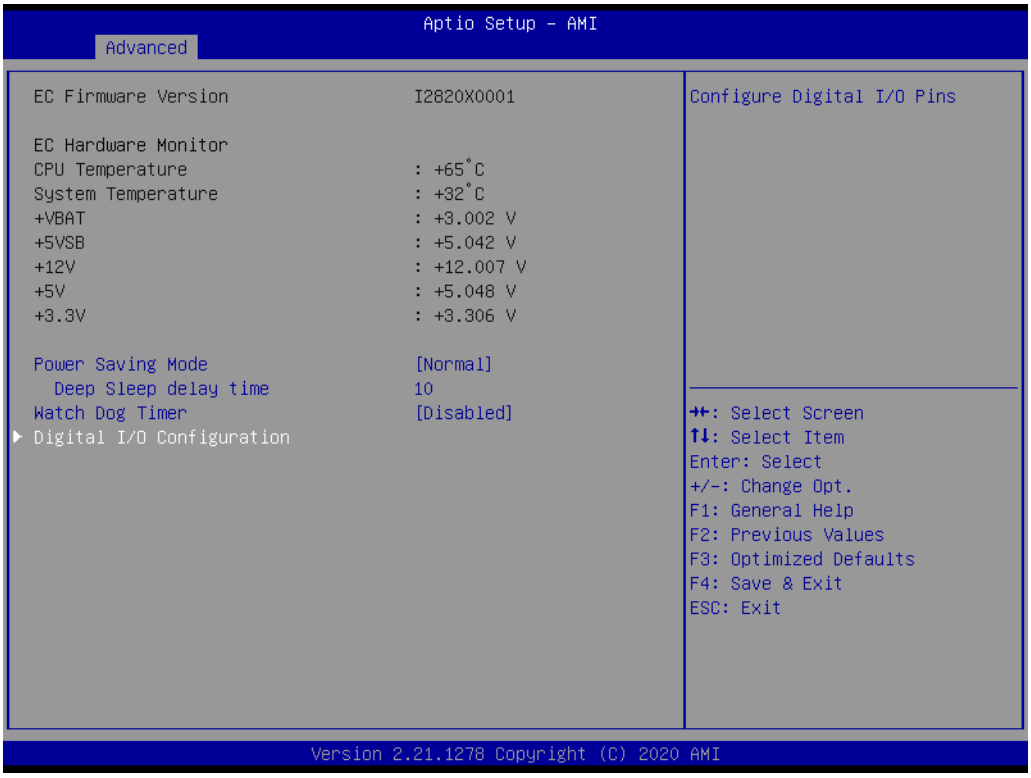
- **Enable ACPI Auto Configuration**
  Enables or disables BIOS ACPI Auto Configuration.
- **Enable Hibernation**
  Enable or disable system ability to hibernate (OS/S4 sleep state).
- **ACPI Sleep State**
  Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
- **S3 Video Repost**
  Enable or disable S3 Video Repost.

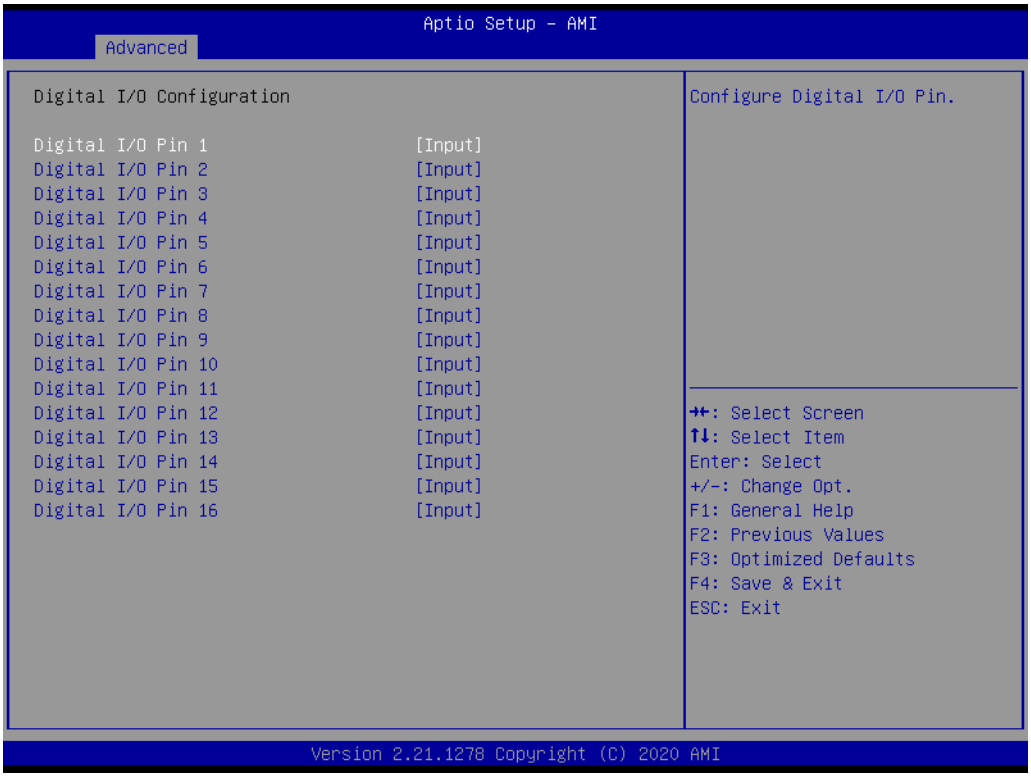
3.2.2.7 Embedded Controller Configuration





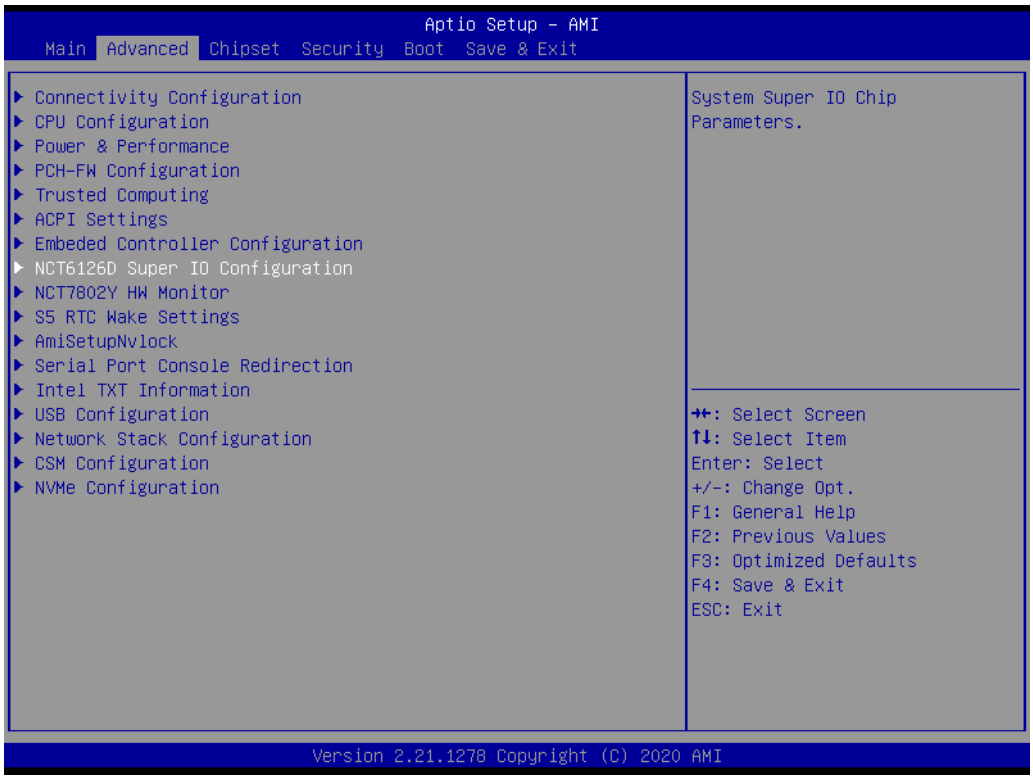
- **Power Saving Mode**
  Select Power Saving Mode.
- **Deep Sleep delay time**
  Set delay time for Deep Sleep mode.
- **Watch Dog Timer**
  Enabled or disabled Watch Dog Timer function. (Starts before OS boots and stops by itself).

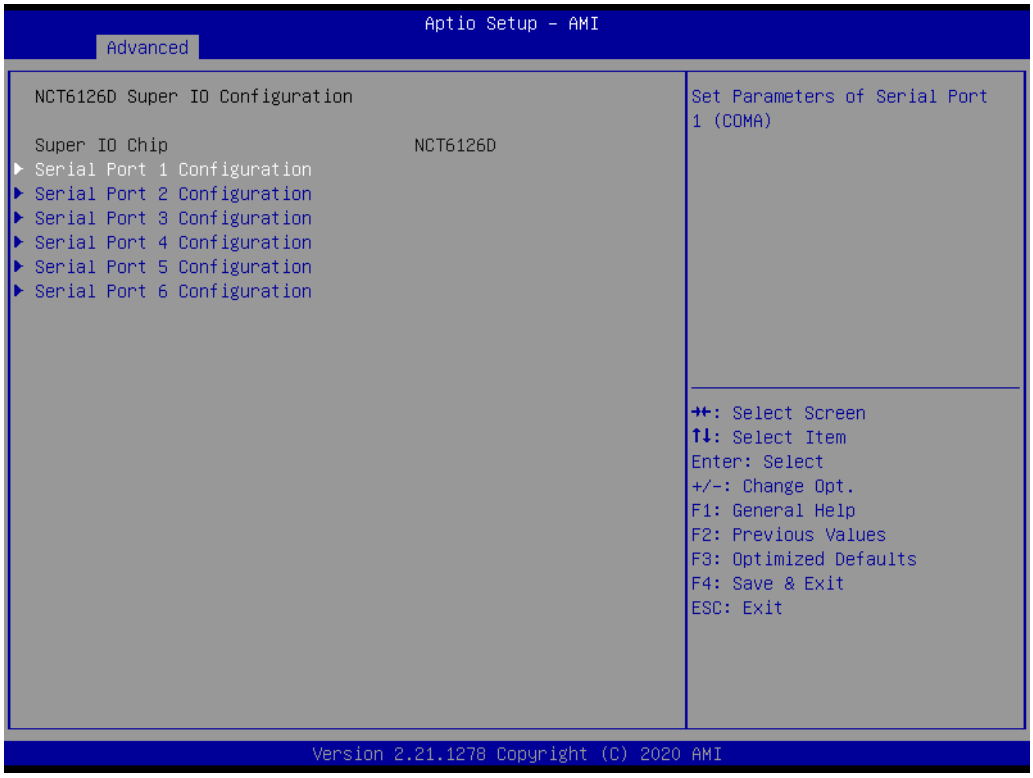


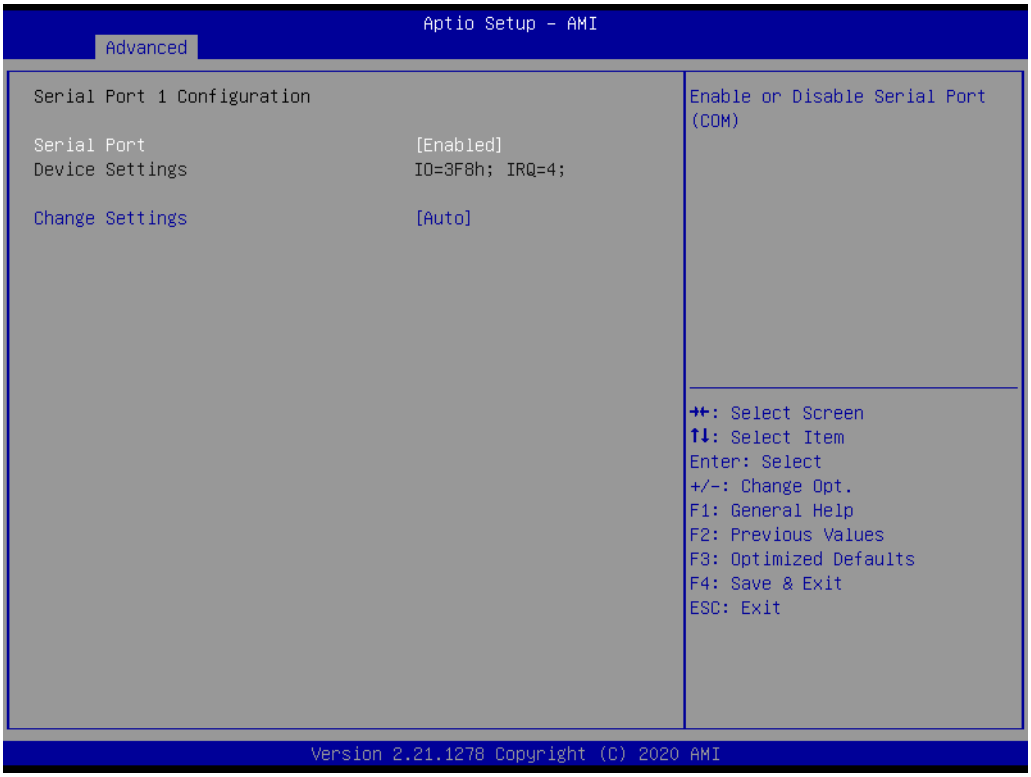


- **Digital I/O Pin 1~16**
  Configure Digital I/O Pin.

3.2.2.8 NCT61260 Super I/O Configuration

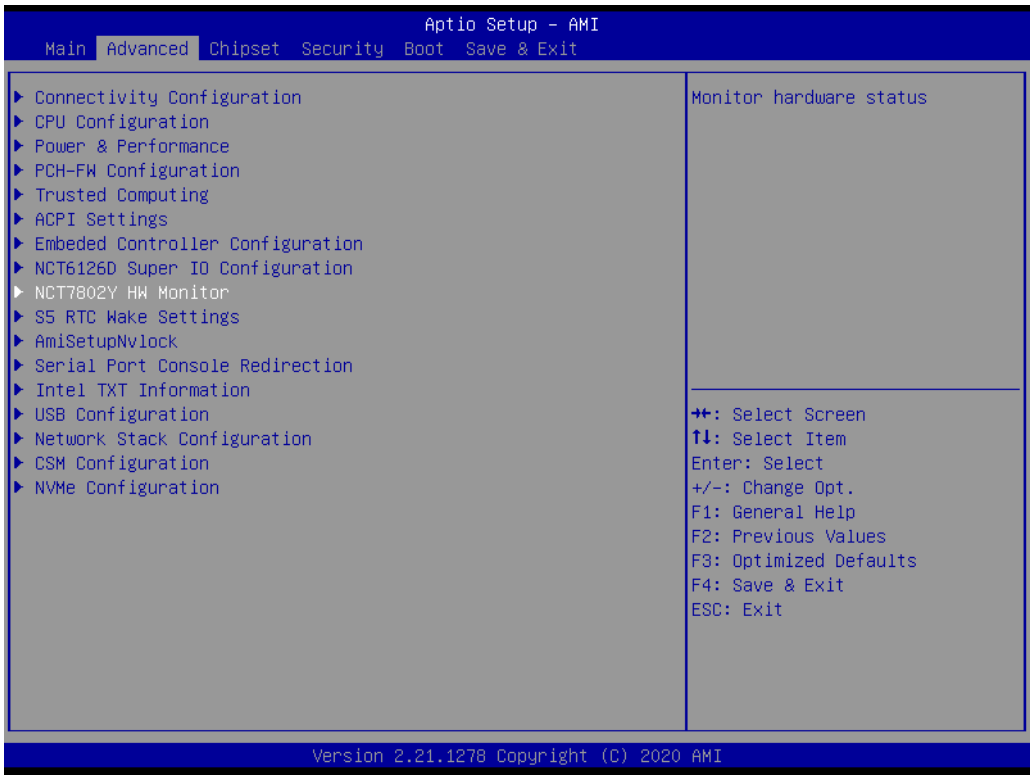


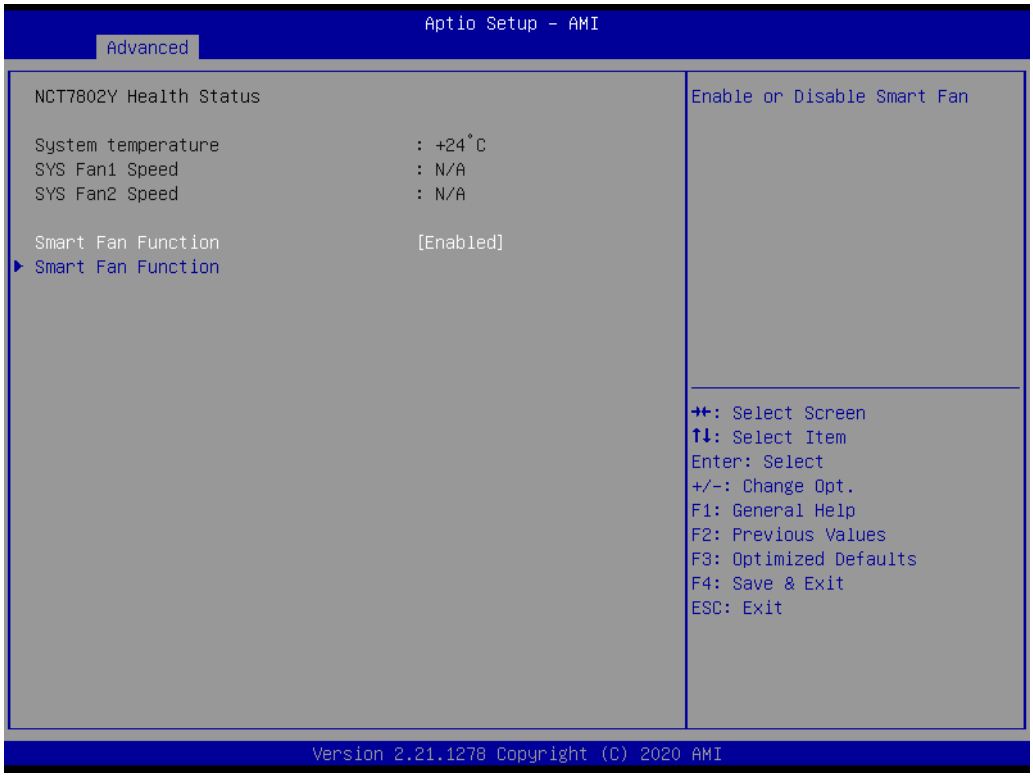


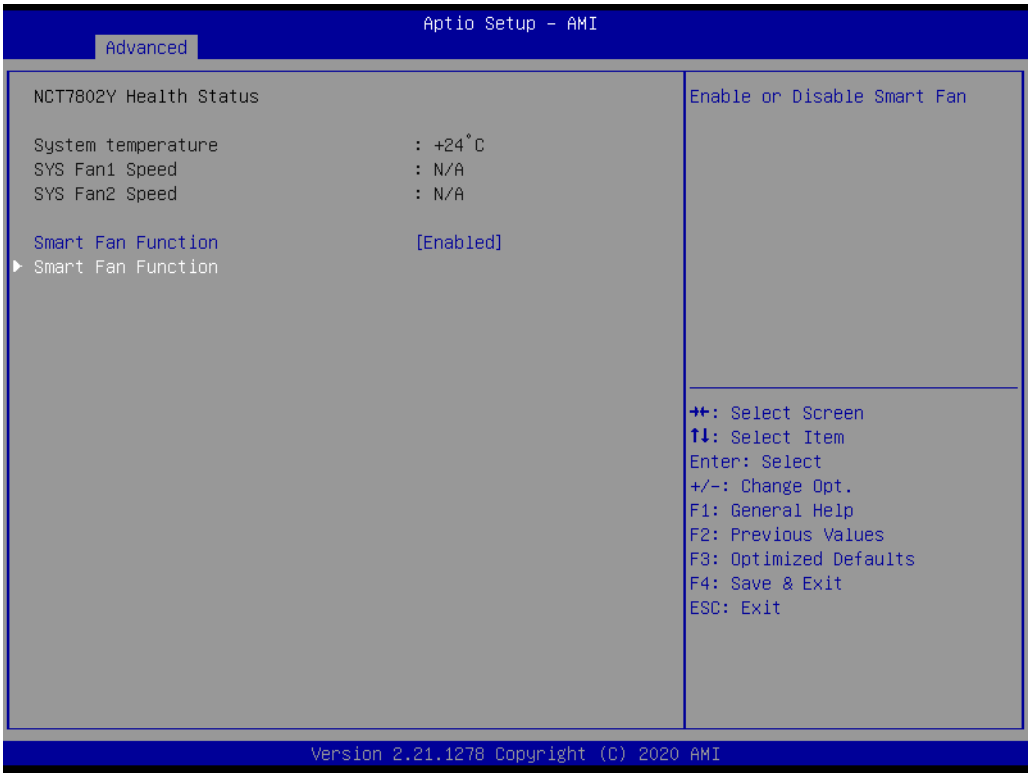


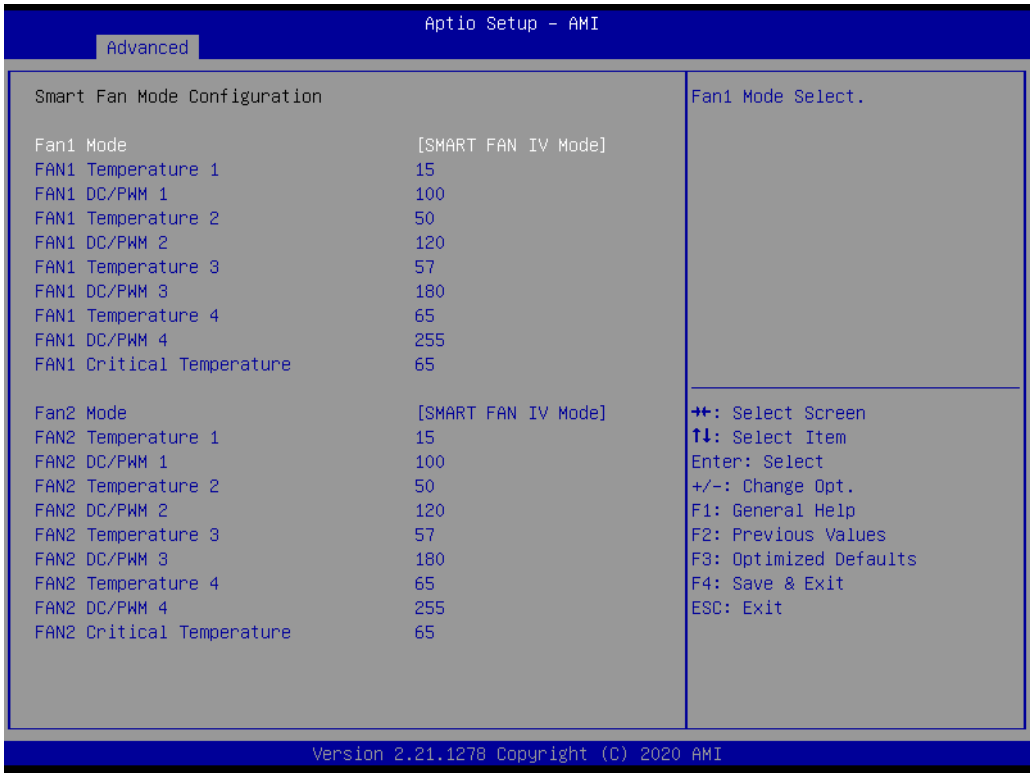
- **Serial Port**
  Enable or disable Serial Port.
- **Change Settings**
  Select an optimal settings for super IO device.
- **COM3~6 Mode**
  COM mode select.

3.2.2.9 NCT7802Y HW Monitor



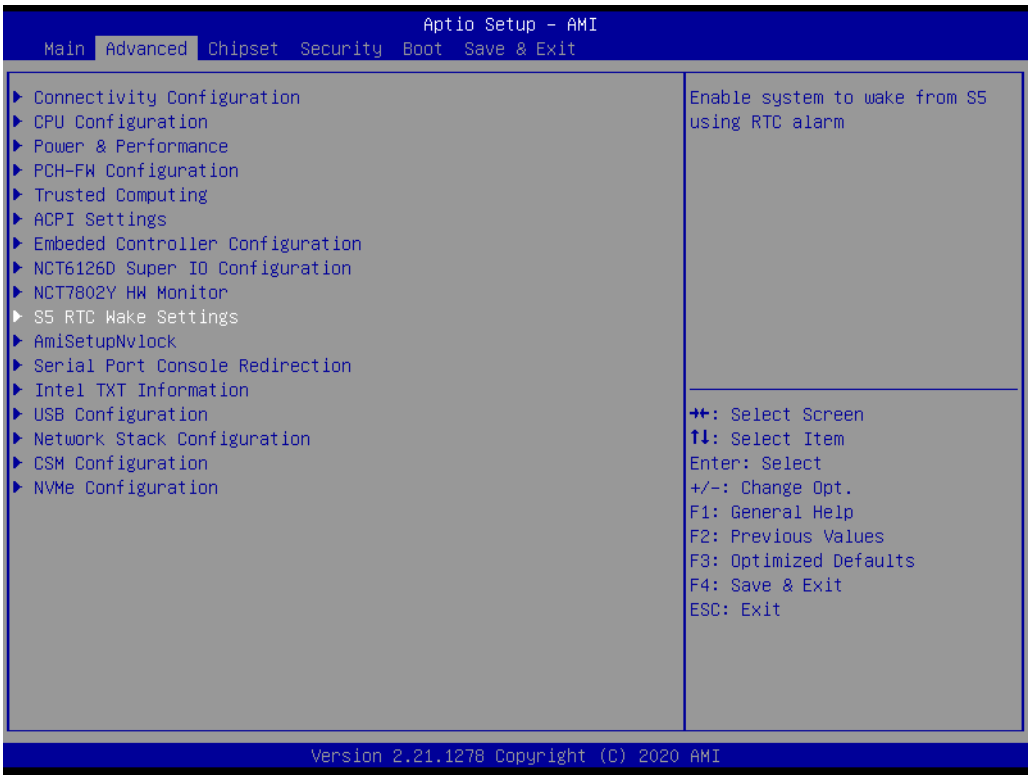



Aptio Setup – AMI
Advanced
NCT7802Y Health Status
System temperature : +24°C
SYS Fan1 Speed : N/A
SYS Fan2 Speed : N/A
Smart Fan Function [Enabled]
Smart Fan Function
Enable or Disable Smart Fan
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.21.1278 Copyright (C) 2020 AMI



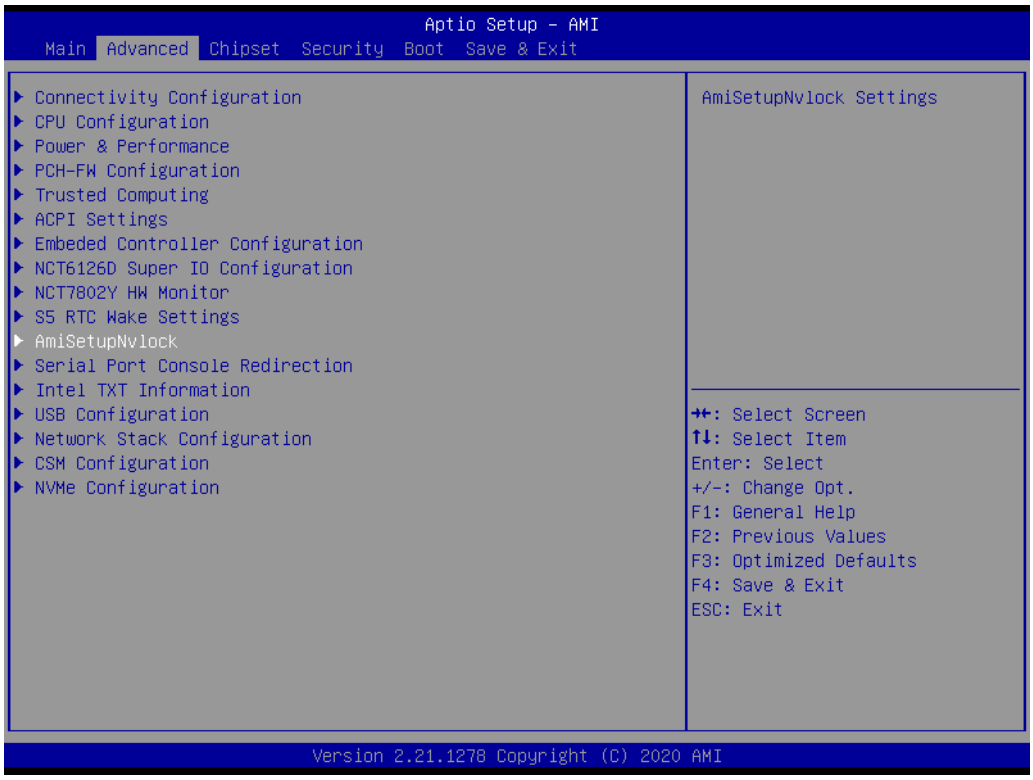
- **Smart Fan Function**
  Enable or disable Smart Fan.
- **Fan Mode**
  Fan Mode Select.
- **FAN Temperature 1**
  Input the system smart fan IV Temperature 1.
- **FAN DC/PWM 1**
  Input the system smart fan IV DC/PWM 1 Value.
- **FAN Temperature 2**
  Input the system smart fan IV Temperature 2.
- **FAN DC/PWM 2**
  Input the system smart fan IV DC/PWM 2 Value.
- **FAN Temperature 3**
  Input the system smart fan IV Temperature 3.
- **FAN DC/PWM 3**
  Input the system smart fan IV DC/PWM 3 Value.
- **FAN Temperature 4**
  Input the system smart fan IV Temperature 4.
- **FAN DC/PWM 4**
  Input the system smart fan IV DC/PWM 4 Value.
- **FAN Critical Temperature**
  Input the system smart IV Critical Temperature.

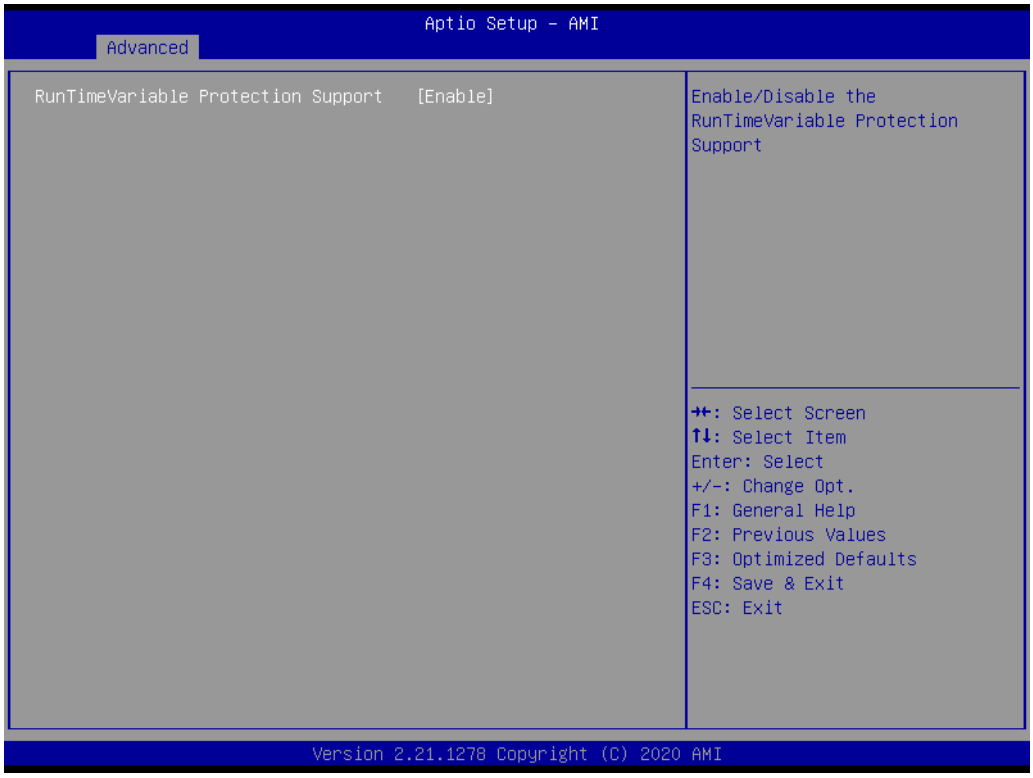
3.2.2.10 S5 RTC Wake Settings



- **Wake system from Sleep**
  Enable or disable system wake on alarm event.

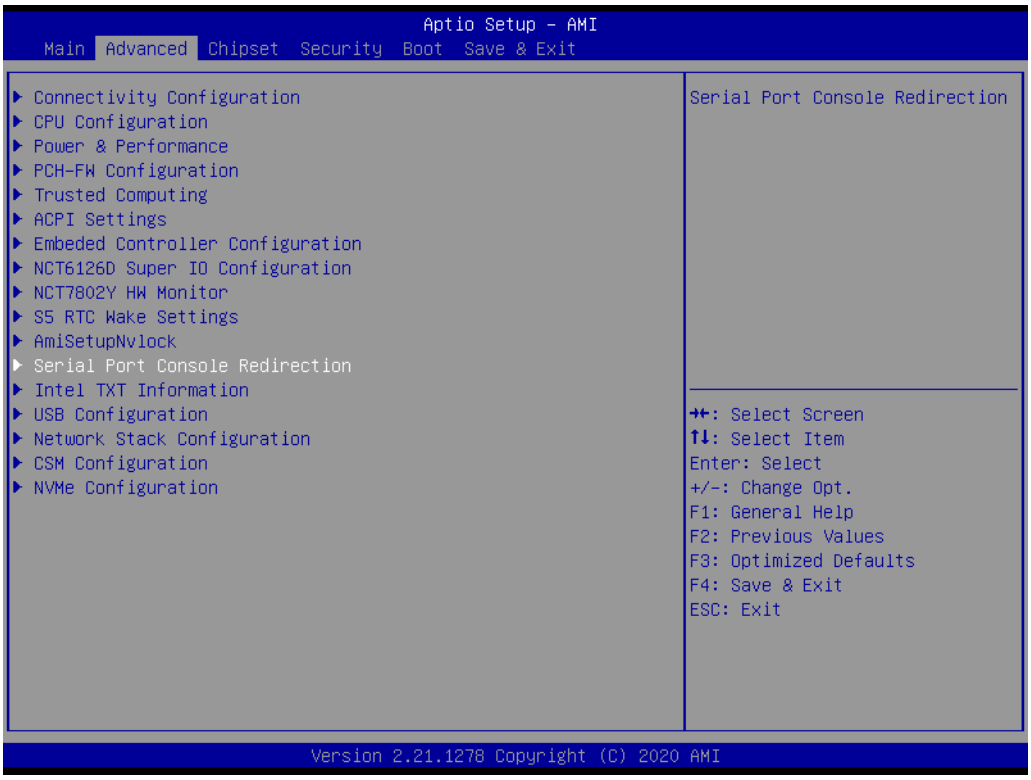
3.2.2.11 AmiSetupNvlock

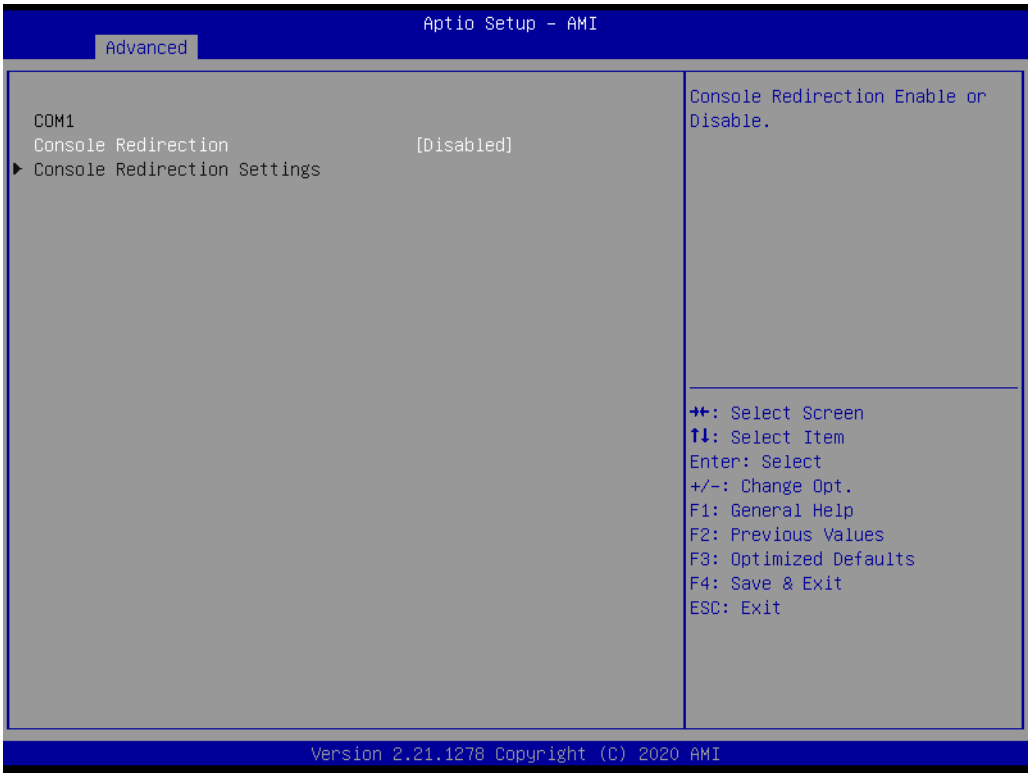




- **RunTimeVariable Protection Support**
  Enable/disable the RunTimeVariable Protection Support.

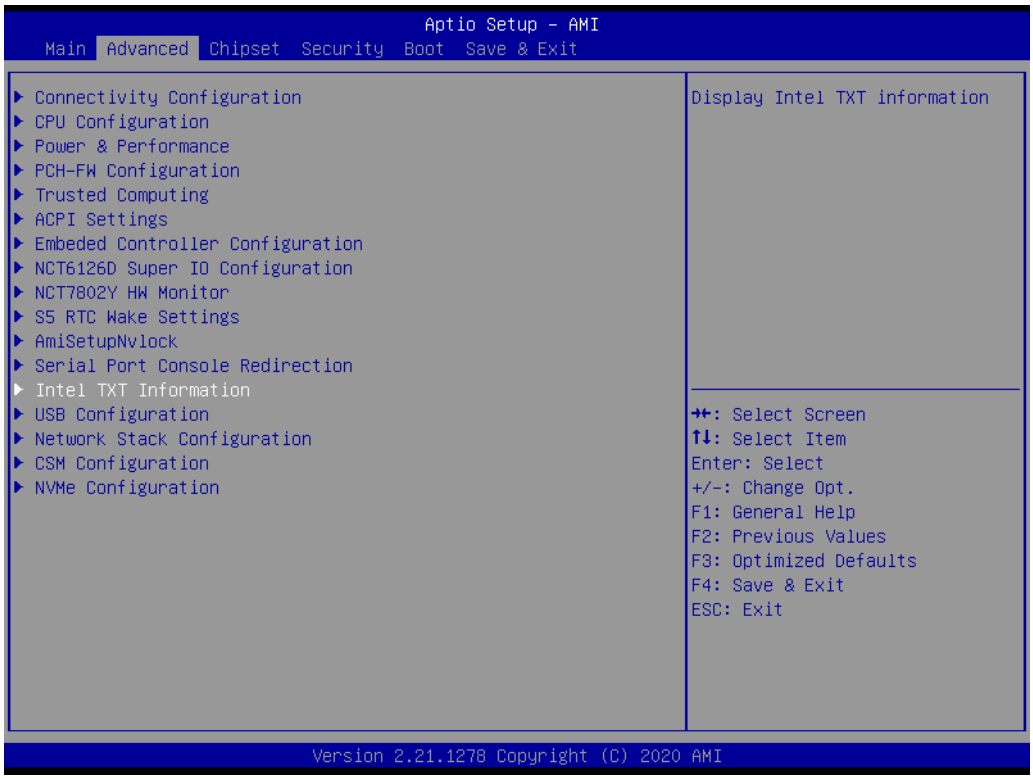
3.2.2.12 Serial Port Console Redirection

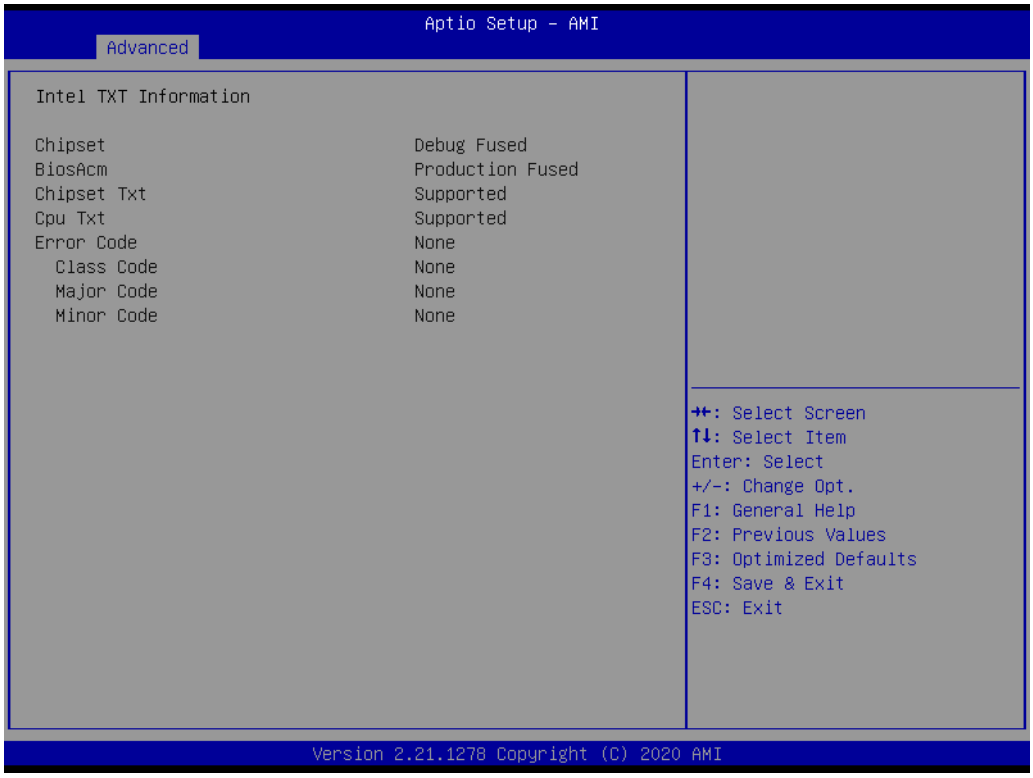




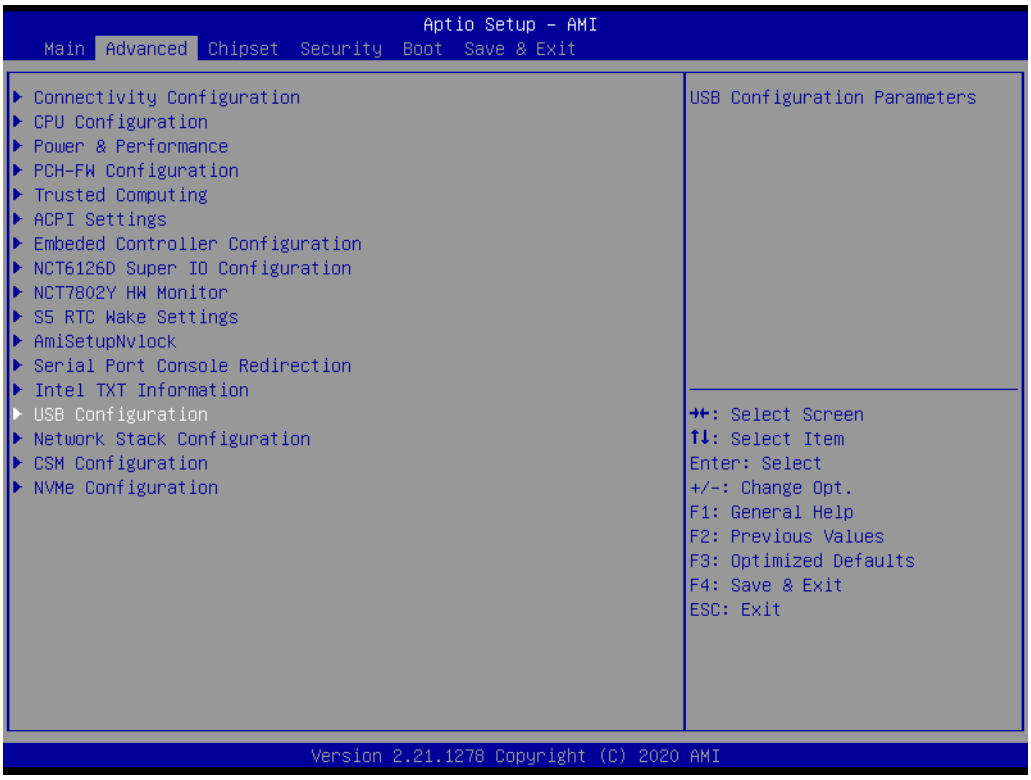
- **Console Redirection**
  Console Redirection enable or disable.

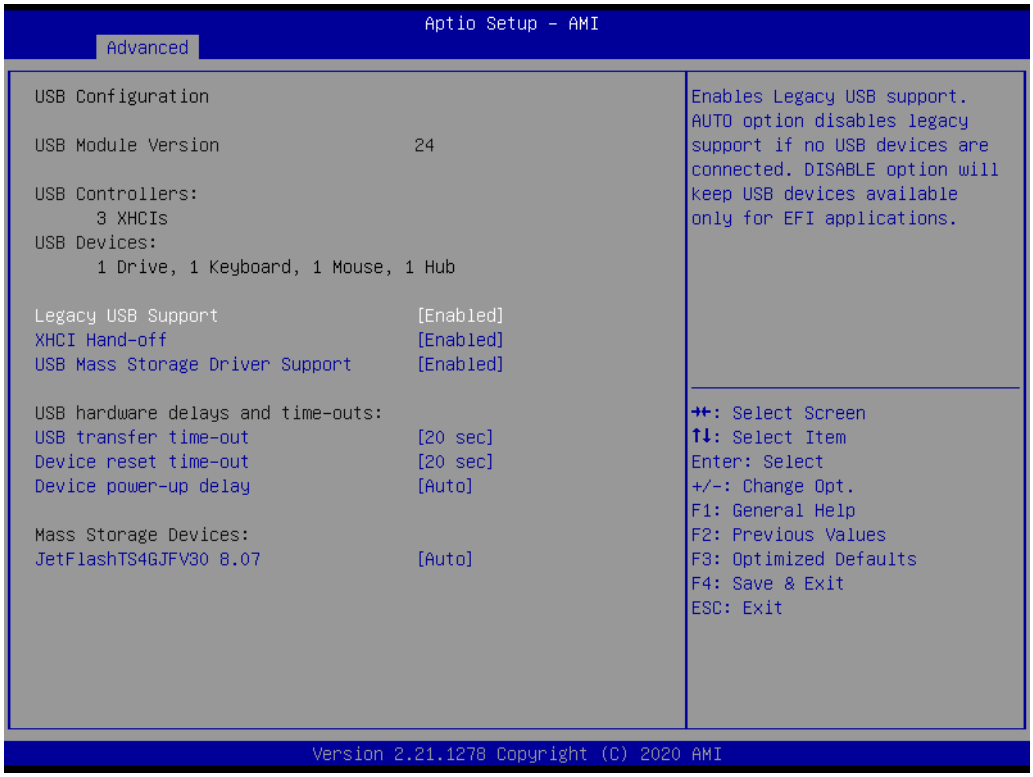
3.2.2.13 Intel TXT Information





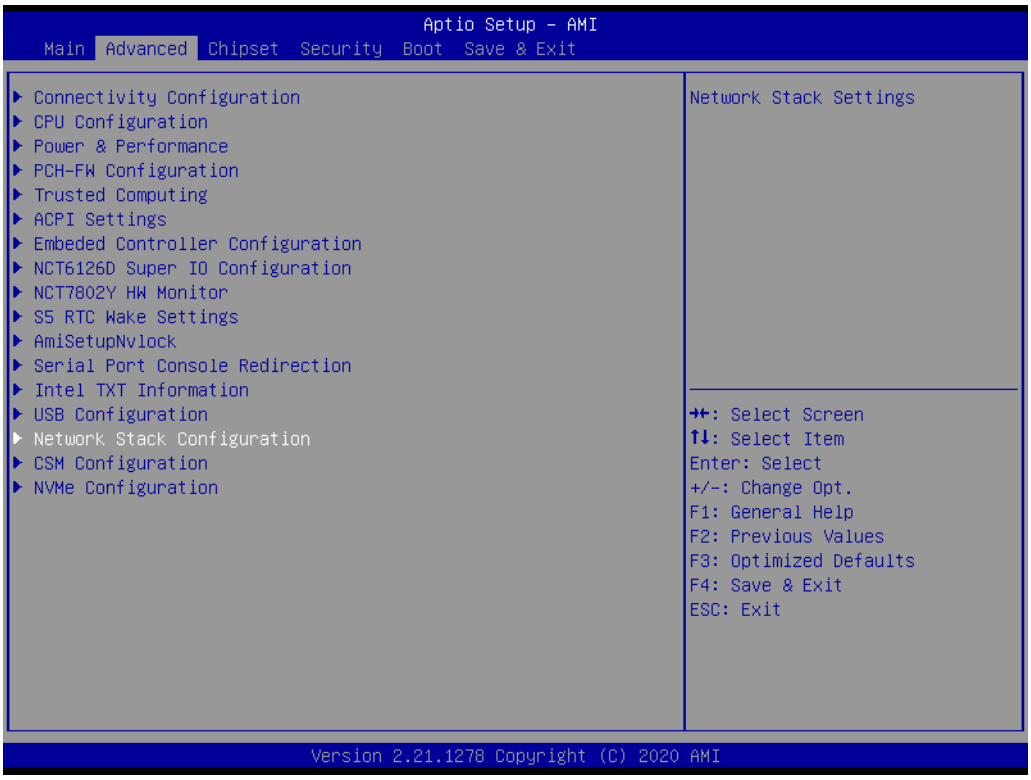
3.2.2.14 USB Configuration

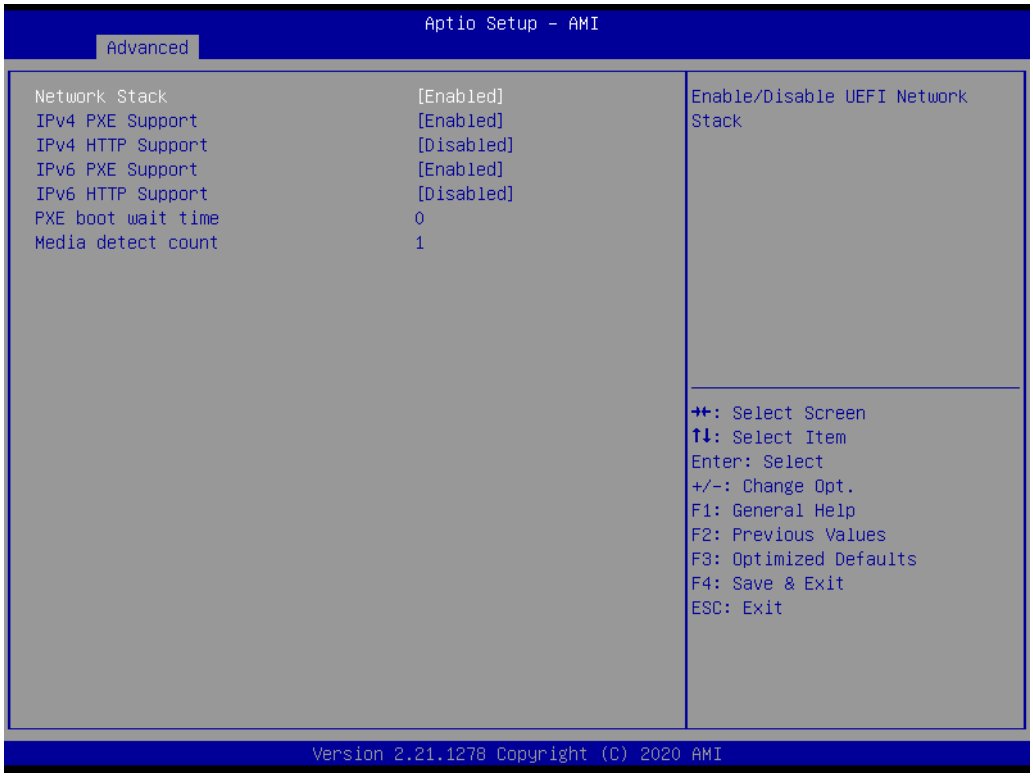




- **Legacy USB Support**
  Enables legacy USB support.
- **XHCI Hand-off-**
  This is a workaround for OS without XHCI hand-off support.
- **USB Mass Storage Device Configuration**
  Configure the USB Mass Storage Devices.
- **USB transfer time-out**
  The time-out value for control, bulk, and interrupt transfers.
- **Device reset time-out**
  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.

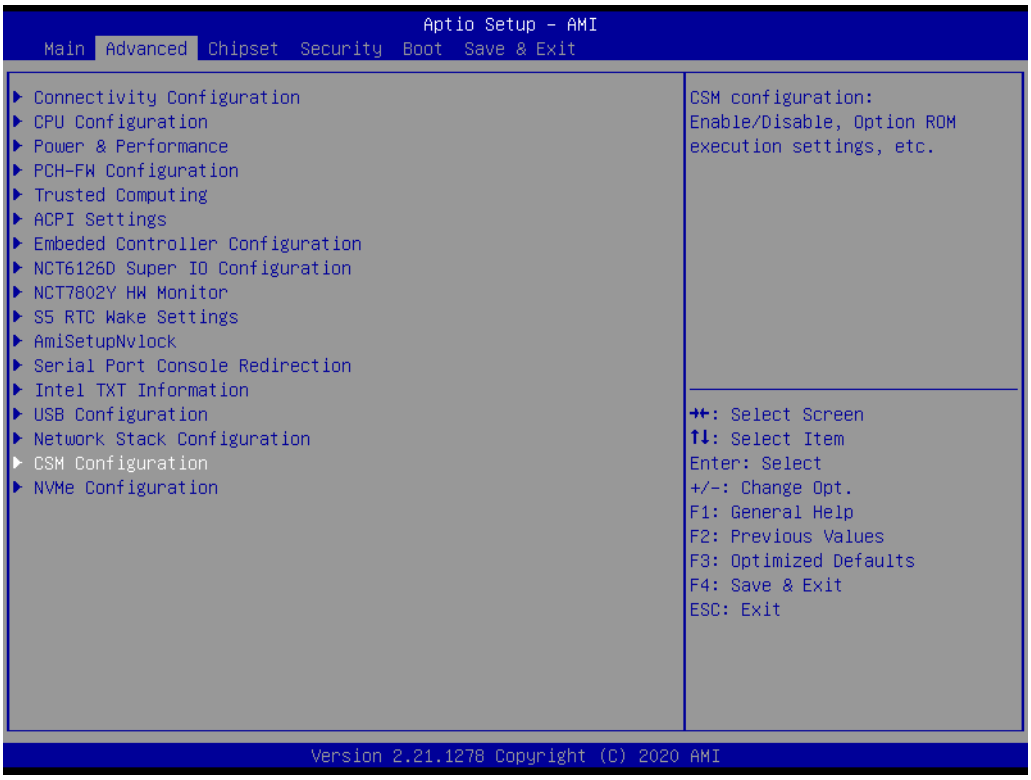
3.2.2.15 Network Stack Configuration

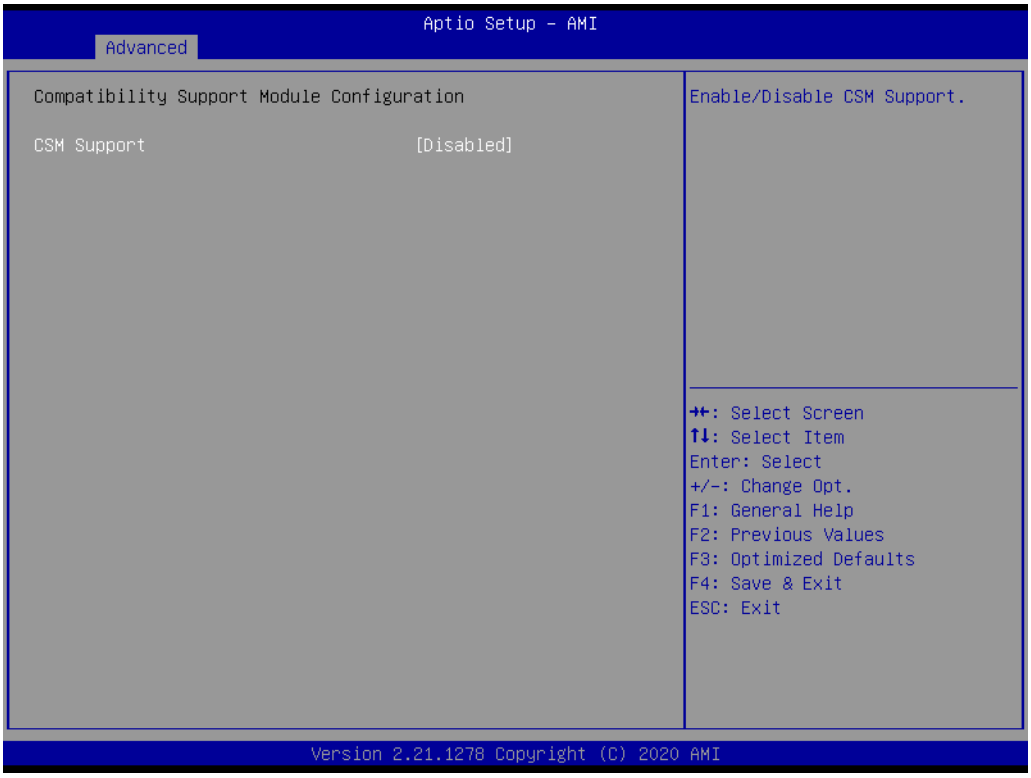




- **Network Stack**
  Enable/disable UEFI Network Stack.
- **IPv4 PXE Support**
  Enable/disable IPv4 PXE boot support.
- **IPv4 HTTP Support**
  Enable/disable IPv4 HTTP boot support.
- **IPv6 PXE Support**
  Enable/disable IPv6 PXE boot support.
- **IPv6 HTTP Support**
  Enable/disable IPv6 HTTP boot support.
- **PXE boot wait time**
  Wait time in seconds to press ESC key to abort the PXE boot.
- **Media detect count**
  Number of times the presence of media will be checked.

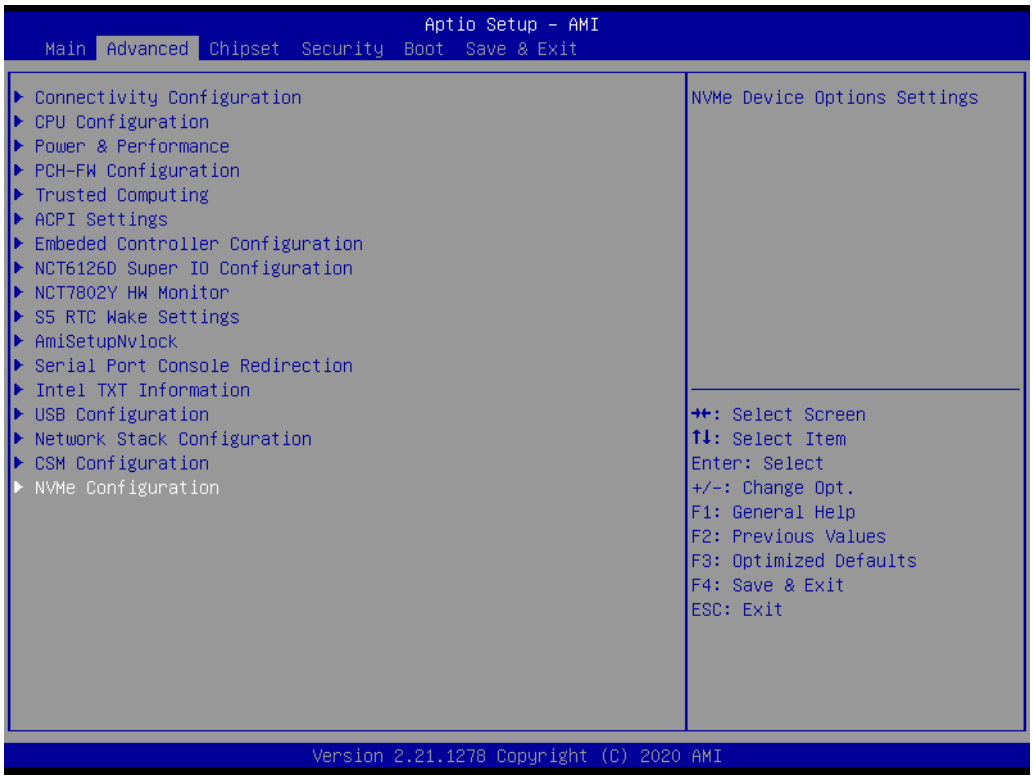
3.2.2.16 CSM Configuration

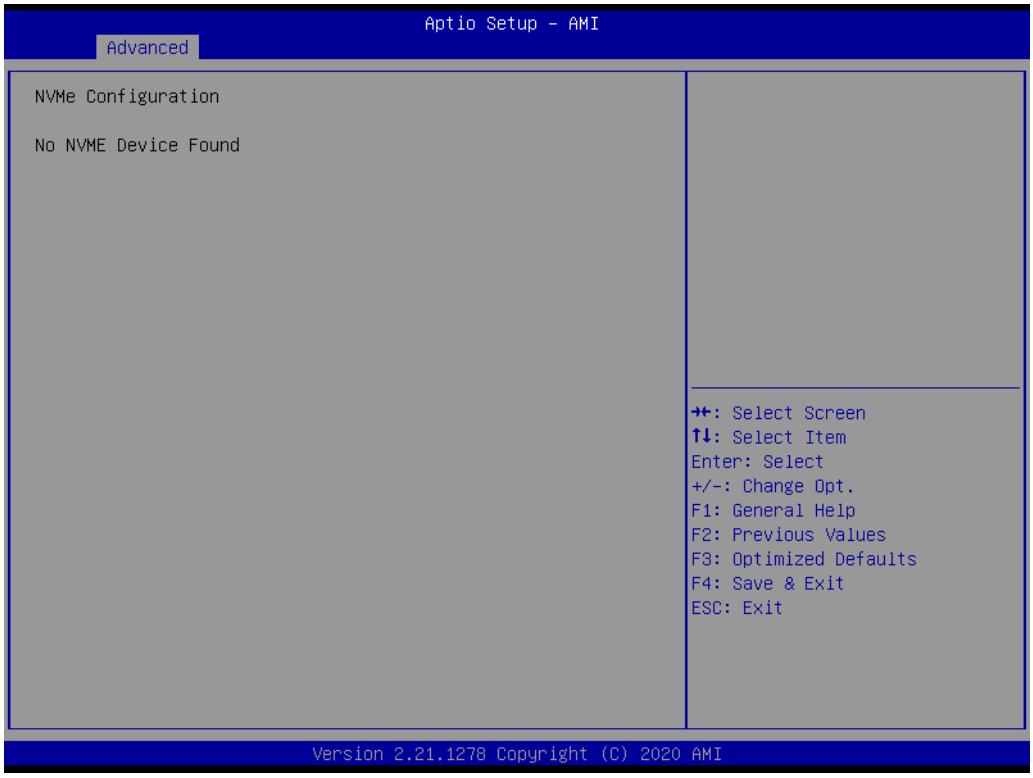




- **CSM Support**
  Enable/disable CSM Support.

3.2.2.17 NVMe Configuration



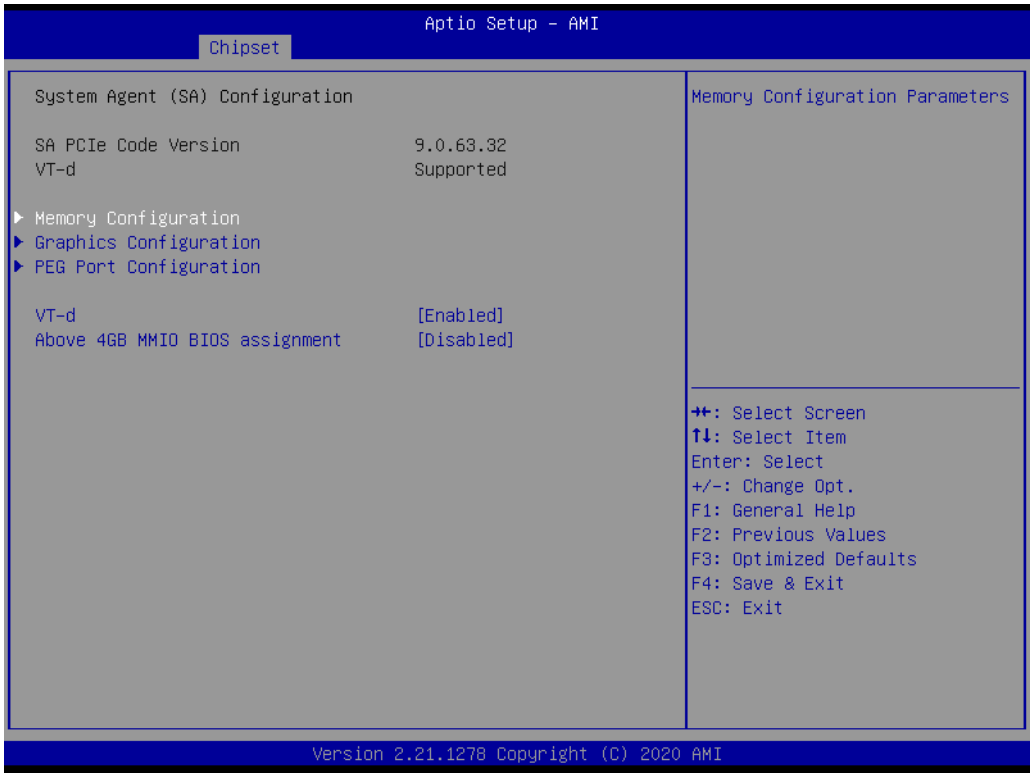


3.2.3 Chipset Configuration

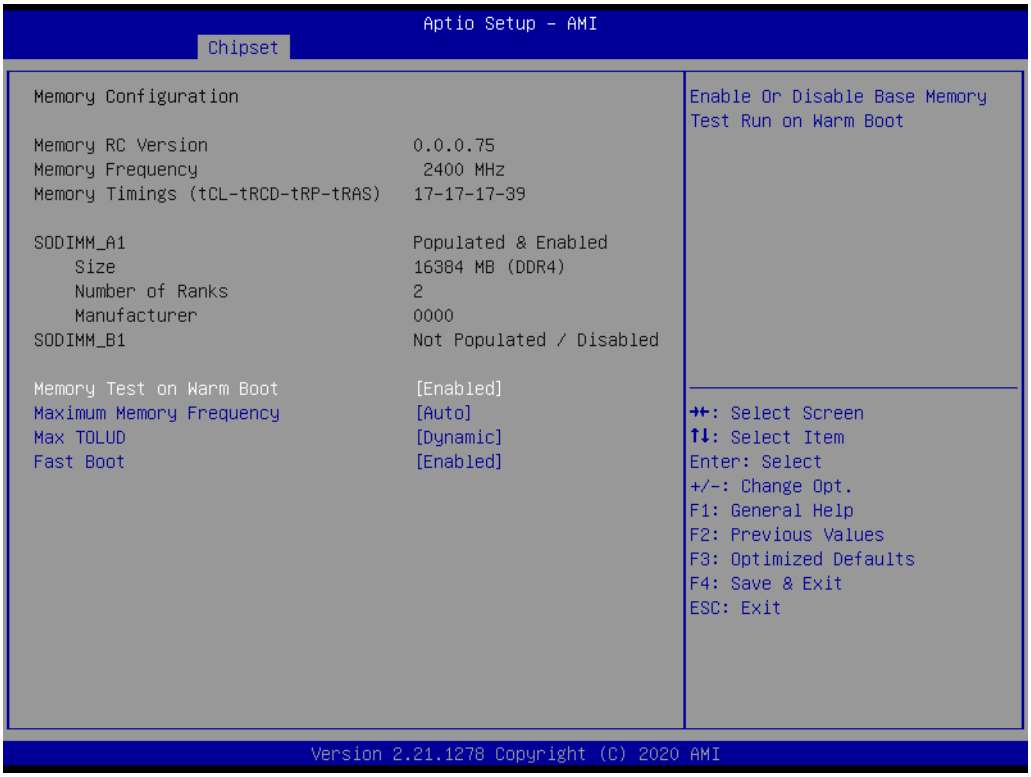
Select the Chipset tab from the EIS-S232 setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.

3.2.3.1 System Agent Configuration

Memory Configuration Options

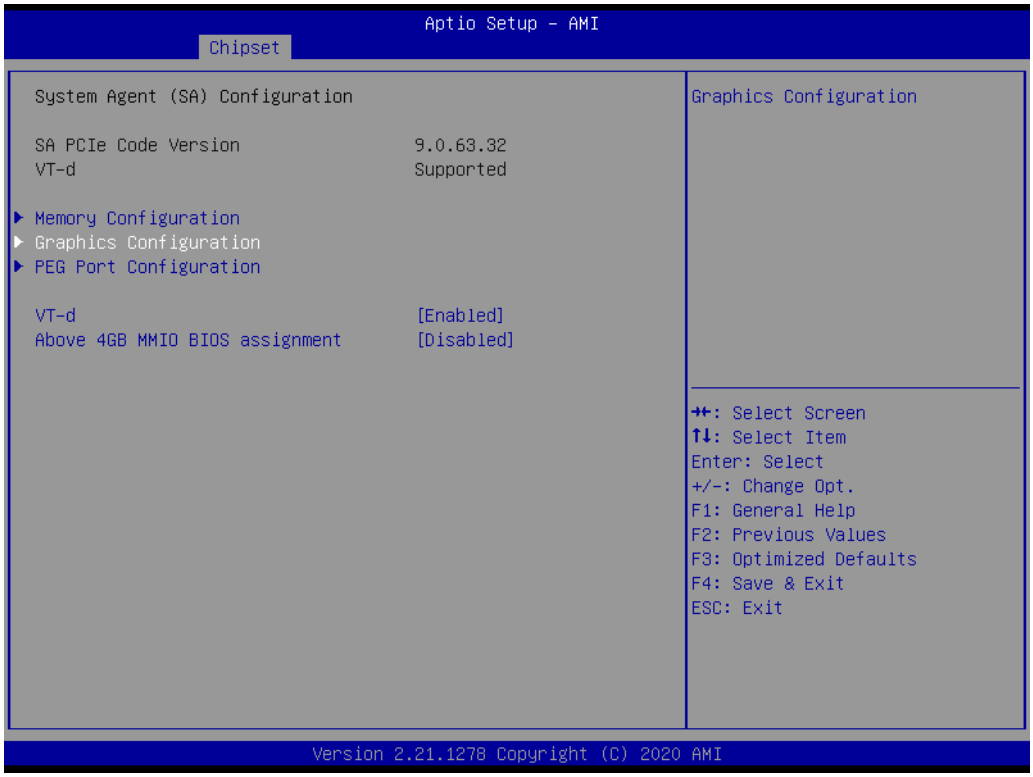


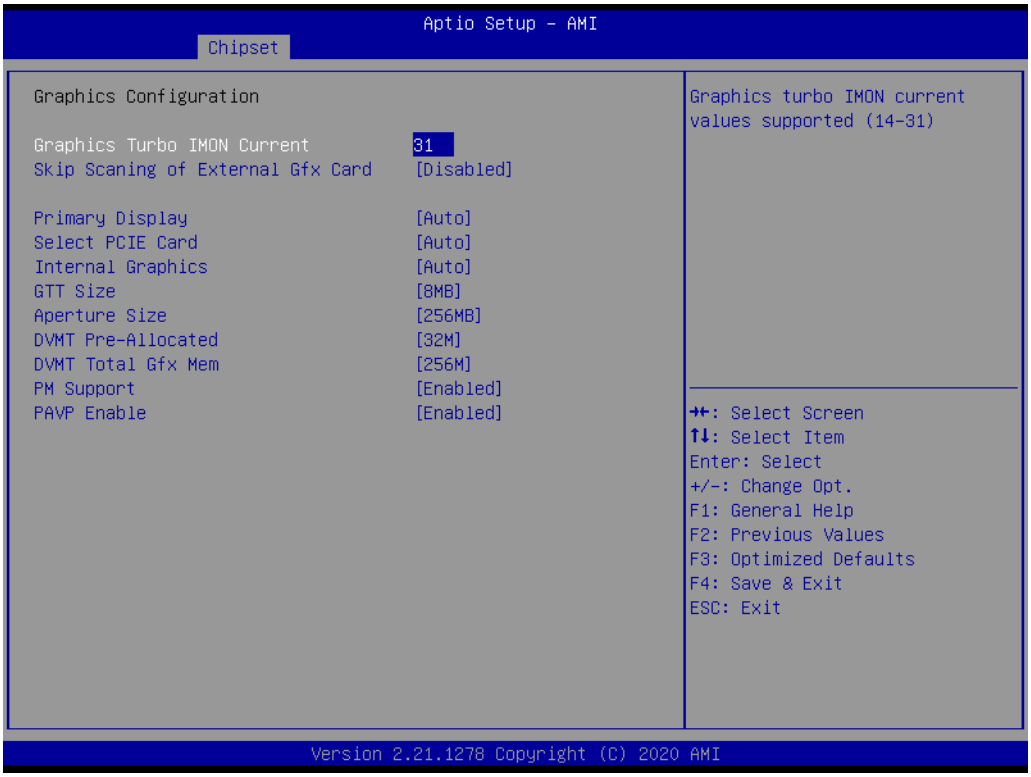
- **VT-d**
  VT-d capability.
- **Above 4GB MMIO BIOS assignment**
  Enable/disable above 4GB MemoryMappedIO BIOS assignment. This is enabled automatically when aperture size is set to 2048MB.



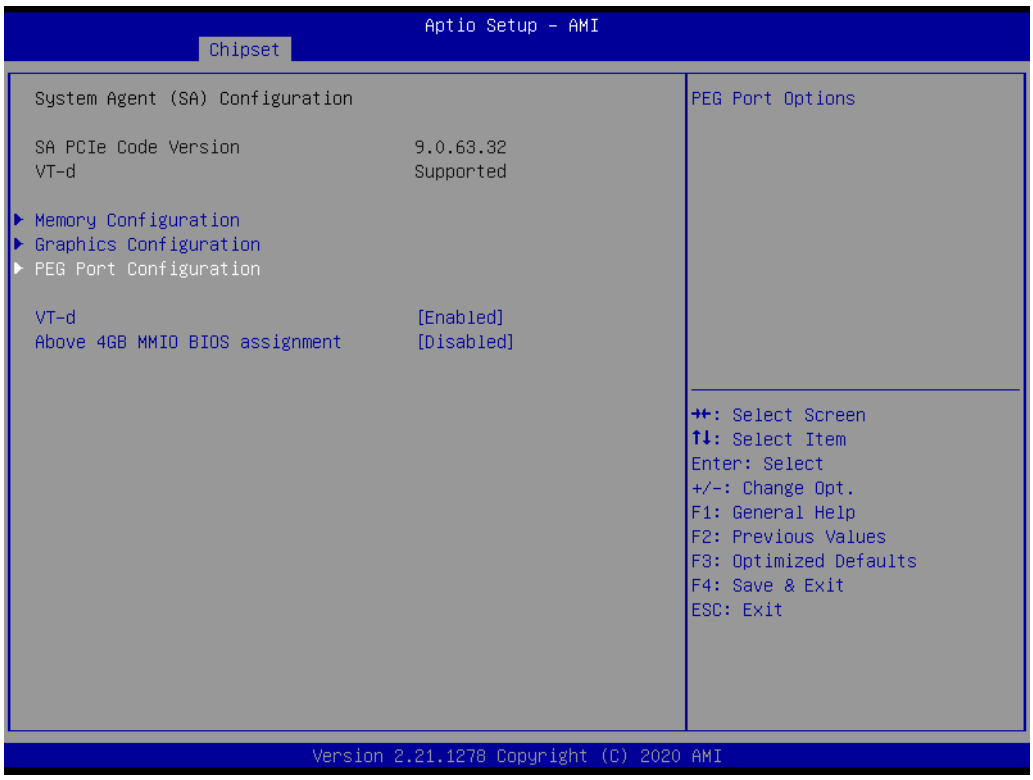
- **Memory Test on Warm Boot**
  Enable or disable base memory test run on warm boot.
- **Maximum Memory Frequency**
  Maximum Memory Frequency selections in Mhz.
- **Max TOLUD**
  Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.
- **Fast Boot**
  Enable/disable fast path through the MRC.

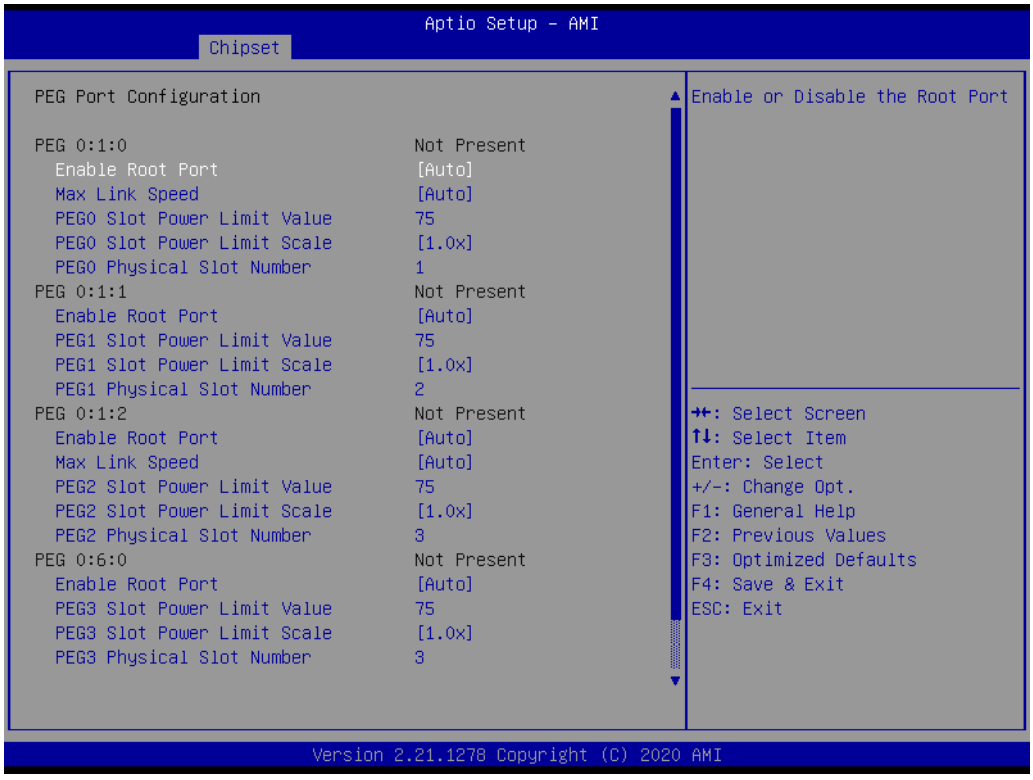
Graphics Configuration

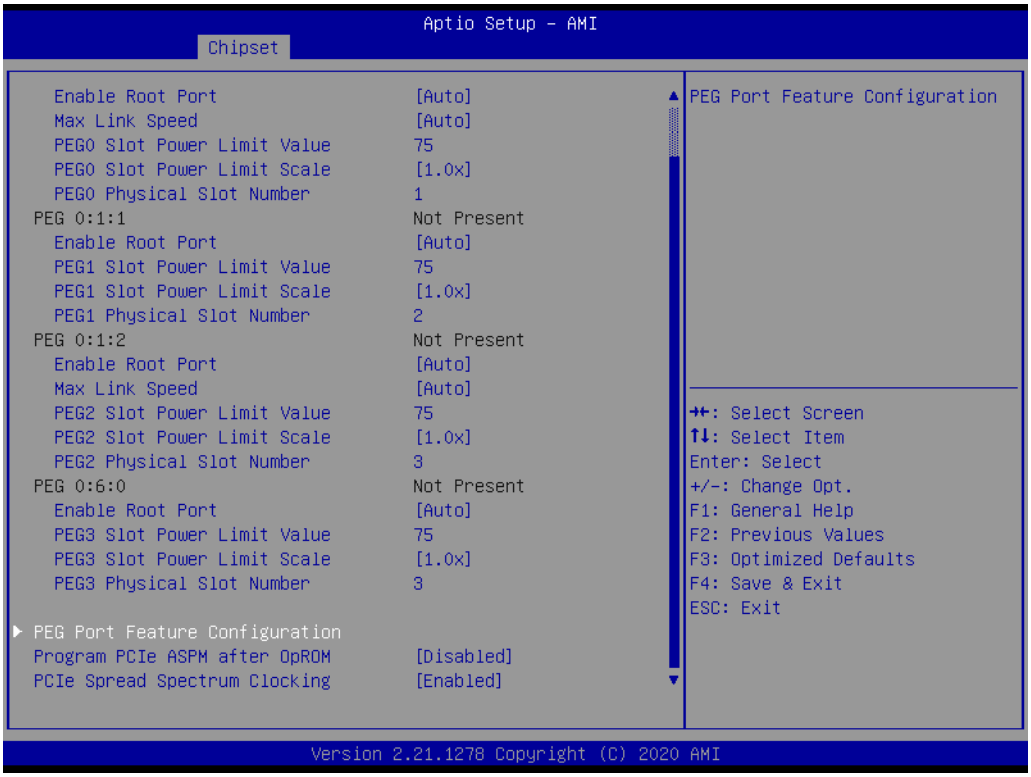




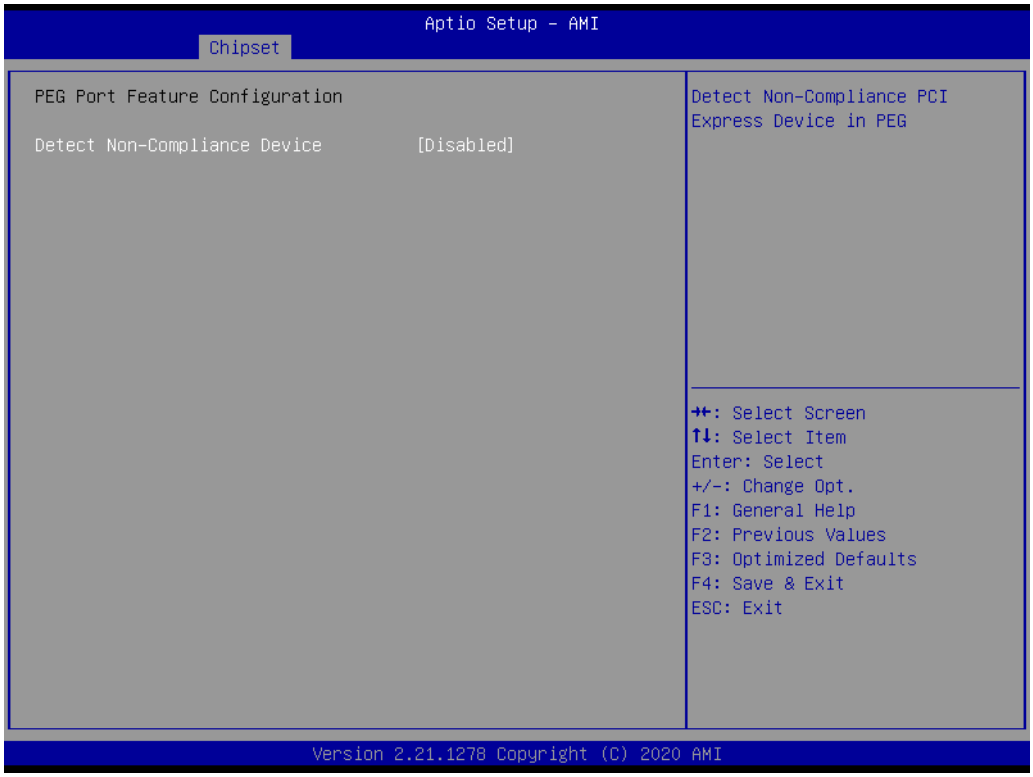
- **Graphics Turbo IMON Current**
  Graphics turbo IMON current values supported (14-31)
- **Skip Scanning of External Gfx Card**
  If enabled, it will not scan for external Gfx card on PEG and PCH PCIE ports.
- **Primary Display**
  Select which of IGFX/PEG/PCI graphics device should be primary display or select SG for switchable Gfx.
- **Select PCIE Card**
  Select the card used on the platform.
- **Internal Graphics**
  Keep IGFX enabled based on the setup options.
- **GTT Size**
  Select the GTT Size.
- **Aperture Size**
  Select the Aperture Size.
- **DVMT Pre-Allocated**
  Select DVMT 5.0 Pre-Allocated (fixed) graphics memory size used by the internal graphics device.
- **DVMT Total Gfx Mem**
  Select DVMT5.0 total graphic memory size used by the internal graphics device.
- **PM Support**
  Enable/disable PM support.
- **PAVP**
  Enable/disable PAVP.
- **PEG Port Configuration**


Aptio Setup – AMI
Chipset
System Agent (SA) Configuration
SA PCIe Code Version 9.0.63.32
VT-d Supported
Memory Configuration
Graphics Configuration
PEG Port Configuration
VT-d [Enabled]
Above 4GB MMIO BIOS assignment [Disabled]
PEG Port Options
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.21.1278 Copyright (C) 2020 AMI


Aptio Setup – AMI
Chipset
PEG Port Configuration
PEG 0:1:0 Not Present
Enable Root Port [Auto]
Max Link Speed [Auto]
PEG0 Slot Power Limit Value 75
PEG0 Slot Power Limit Scale [1.0x]
PEG0 Physical Slot Number 1
PEG 0:1:1 Not Present
Enable Root Port [Auto]
PEG1 Slot Power Limit Value 75
PEG1 Slot Power Limit Scale [1.0x]
PEG1 Physical Slot Number 2
PEG 0:1:2 Not Present
Enable Root Port [Auto]
Max Link Speed [Auto]
PEG2 Slot Power Limit Value 75
PEG2 Slot Power Limit Scale [1.0x]
PEG2 Physical Slot Number 3
PEG 0:6:0 Not Present
Enable Root Port [Auto]
PEG3 Slot Power Limit Value 75
PEG3 Slot Power Limit Scale [1.0x]
PEG3 Physical Slot Number 3
Enable or Disable the Root Port
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.21.1278 Copyright (C) 2020 AMI

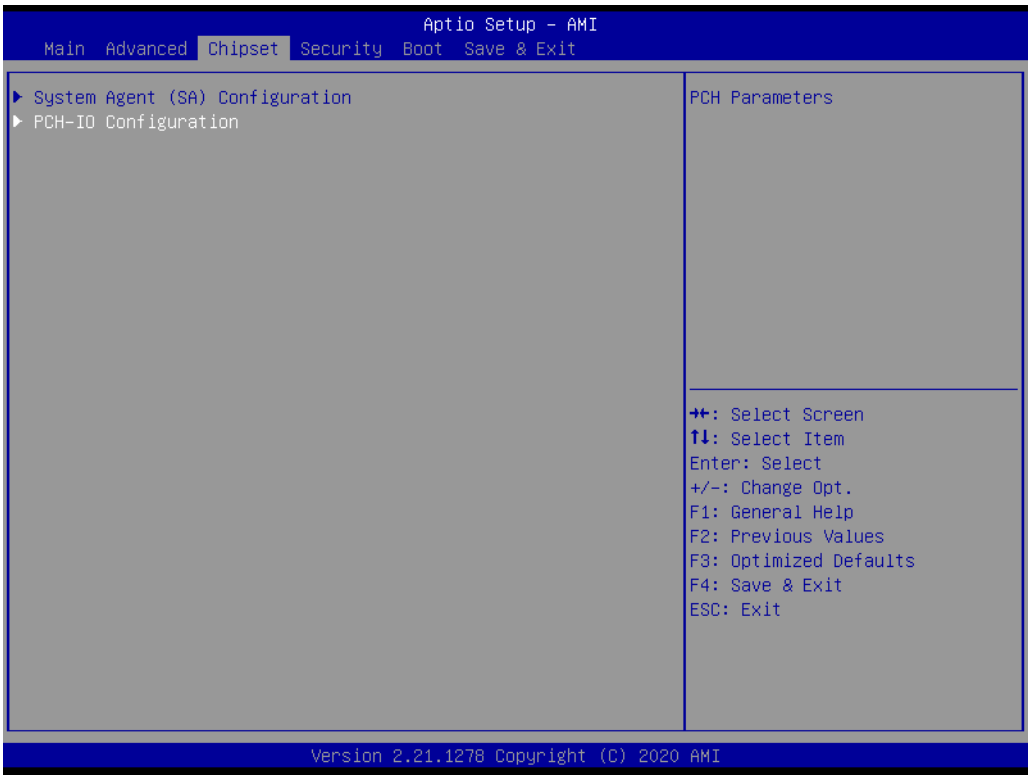


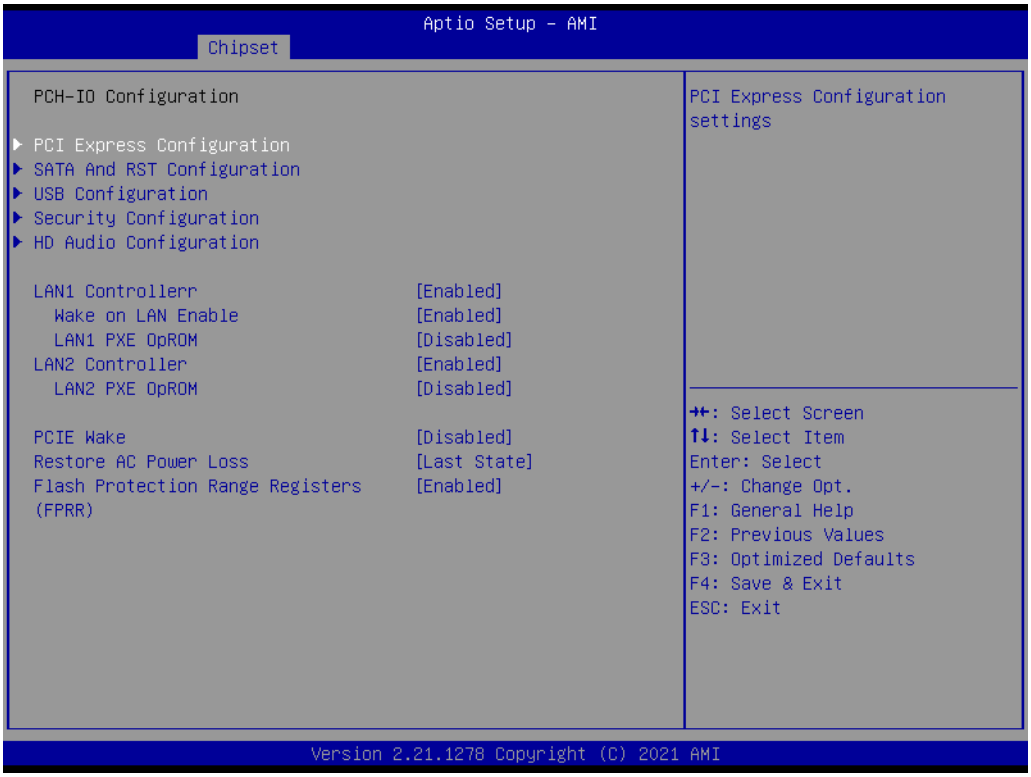
- **Enable Root Port**
  Enable or disable the Root Port.
- **Max Link Speed**
  Configure PEG Max Link Speed.
- **PEG Slot Power Limit Value**
  Sets the upper limit on power supplied by slot.
- **PEG Slot Power Limit Scale**
  Select the scale used for the Slot Power Limit Value.
- **PEG Physical Slot Number**
  Set the physical slot number attached to this port.
- **Program PCIe ASPM after OpROM**
  Enabled: PCIe ASPM will be programmed after OpROM.
- **PCIe Spread Spectrum Clocking**
  Allows disabling Spread Spectrum Clocking for compliance testing.



- **Detect Non-Compliance Device**
  Detect Non-Compliance PCI Express device in PEG.

3.2.3.2 PCH-IO Configuration

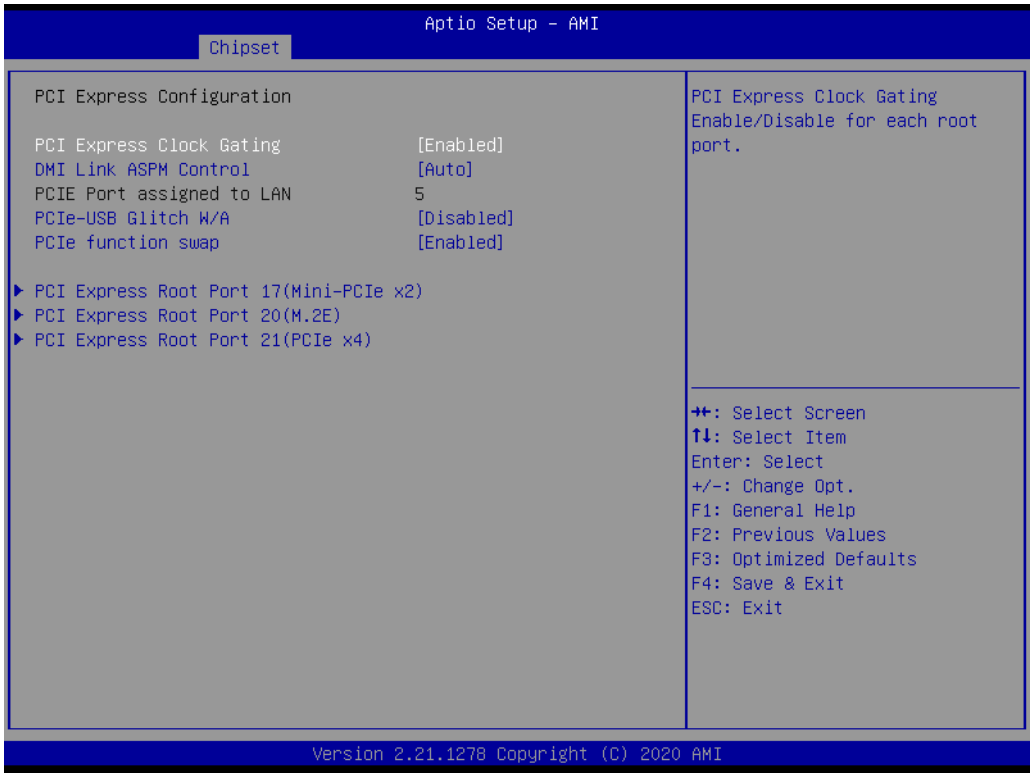




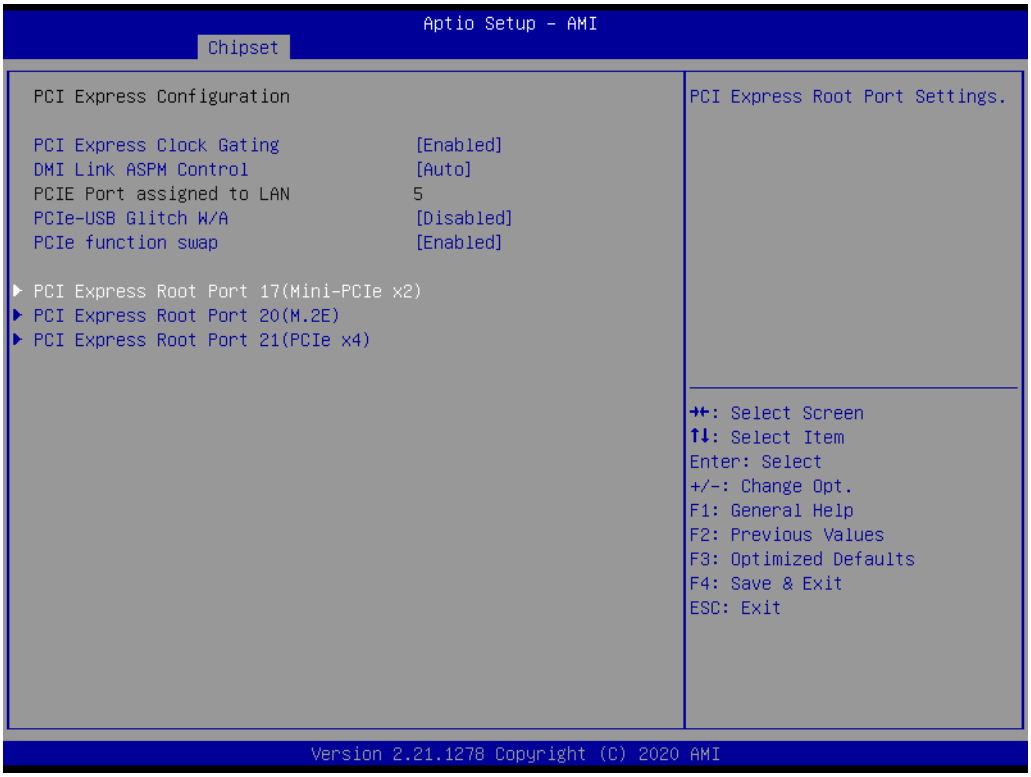
- **LAN1 Controller**
  Enable/disable onboard NIC.
- **Wake on LAN Enable**
  Enable/disable integrated LAN to wake the system.

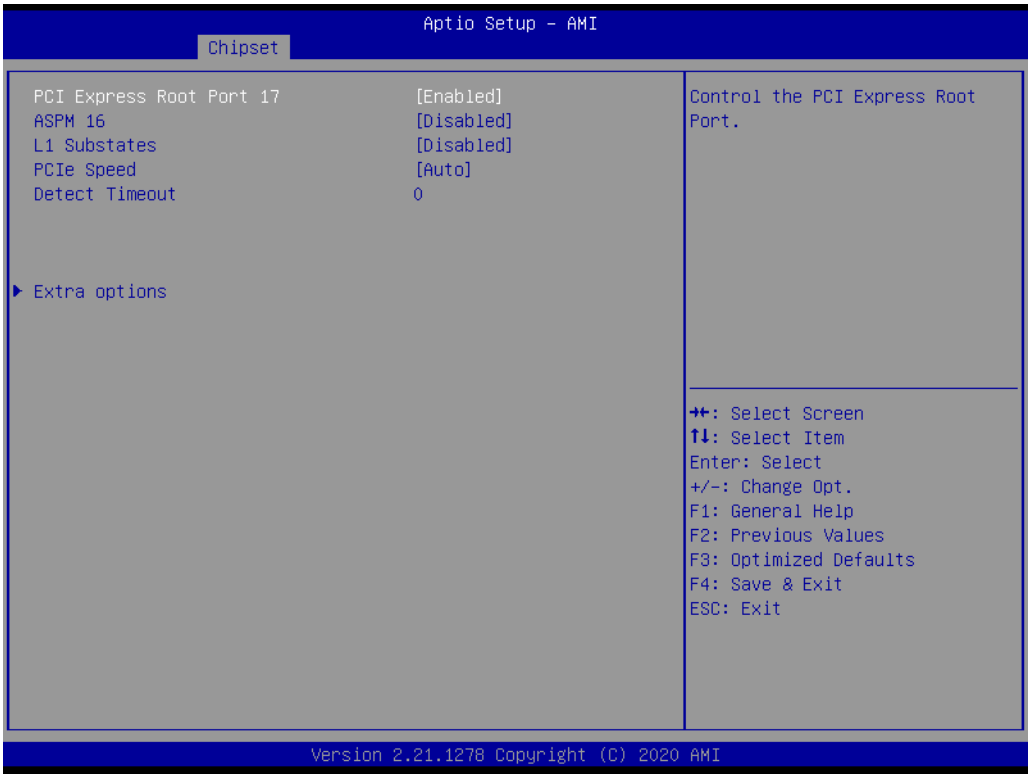
- **LAN1 PXE OpROM**
  Enable or disable boot option for LAN1 controller.
- **LAN2 Controller**
  Enable/Disable LAN2 controller.
- **LAN2 PXE OpROM**
  Enable or disable boot option for LAN2 controller.
- **PCIE Wake**
  Enable or disable PCIE to wake the system from S5.
- **Restore AC Power Loss**
  Specify last state to go to when power is re-applied after a power failure (G3 state).
- **Flash Protection Range Registers (FPRR)**
  Enable Flash Protection Range Registers.

PCI Express Configuration



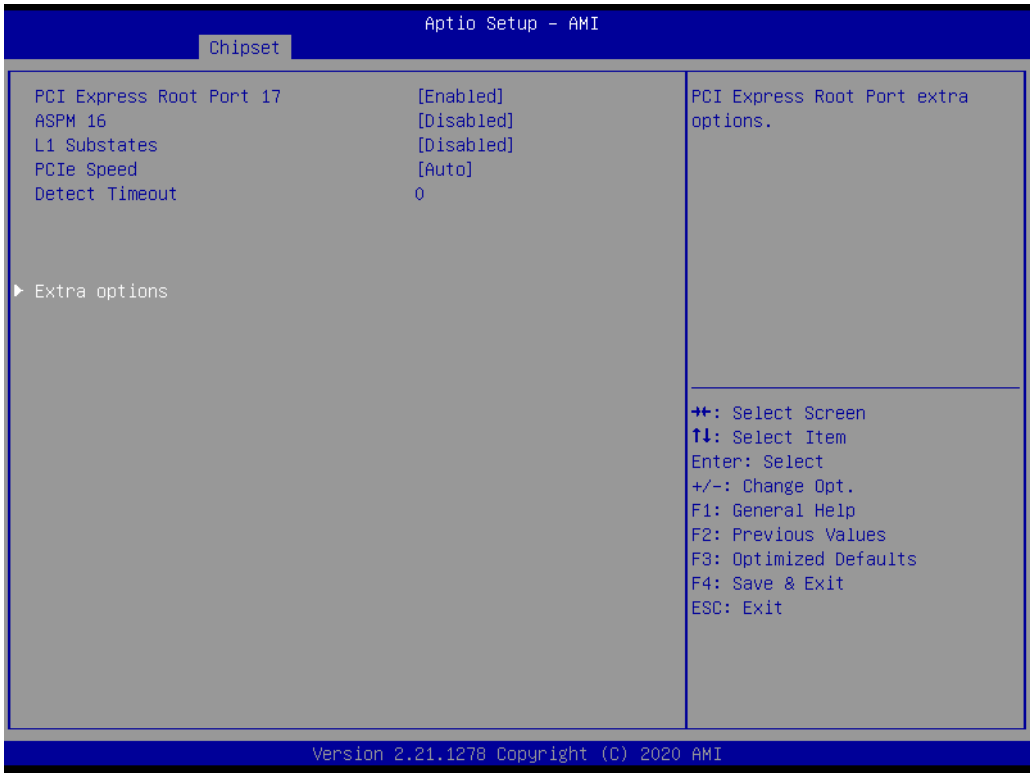
- **PCI Express Clock Gating**
  PCI Express Clock Gating enable/disable for each root port.
- **DMI Link ASPM Control**
  The control of Active State Power Management of the DMI Link.
- **PCIe-USB Glitch W/A**
  PCIe-USB Glitch W/A for bad USB device(s) connected behind PCIE/PEG port.
- **PCIe function swap**
  When disabled, prevents PCIE rootport function swap. If any function other than 0th is enabled, 0th will become visible.

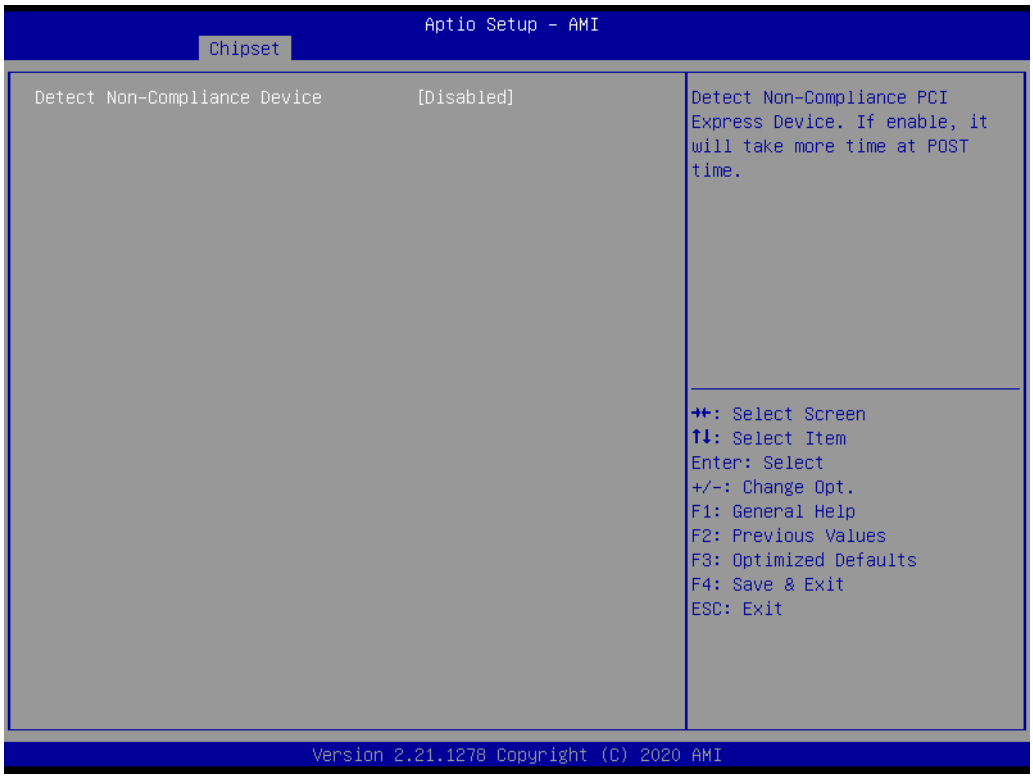




- **PCH-PCI Express Root**
  Port control the PCI Express Root Port.
- **ASPM-**
  Sets the ASPM Level.
- **L1 Substates**
  PCI Express L1 Substates settings.

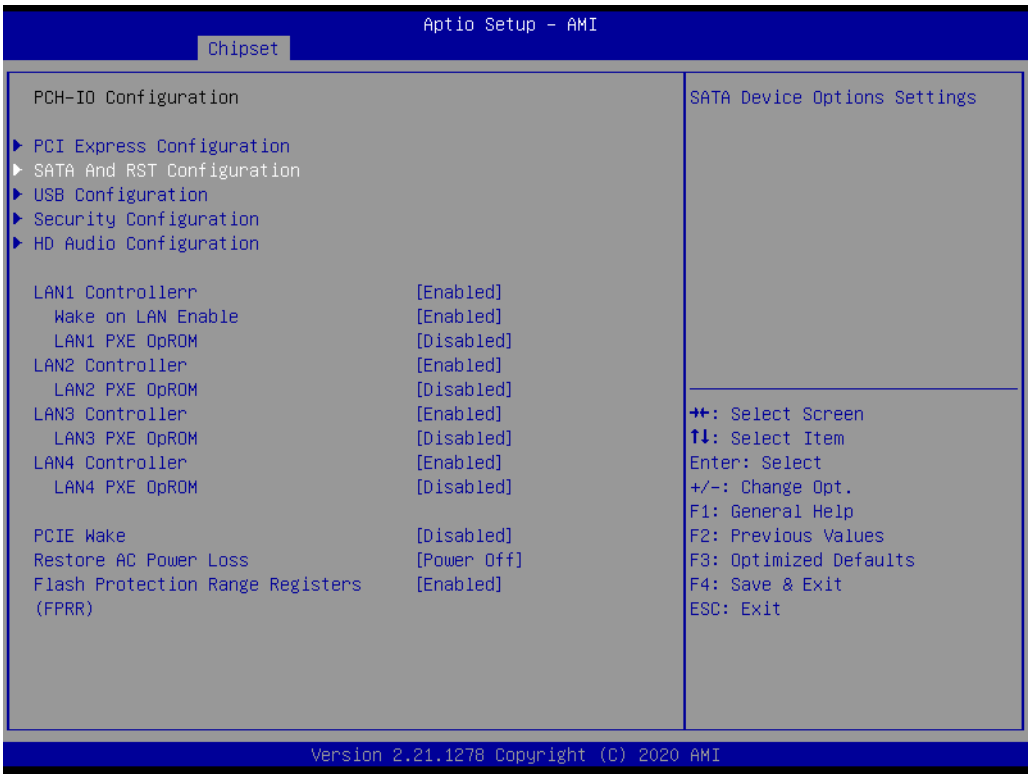
- **PCIe Speed-**
  Configure PCIe Speed.
- **Detect Timeout**
  The number of milliseconds reference code will wait for link to exit detection state for enabled ports before assuming there is no device and potentially disabling the port.

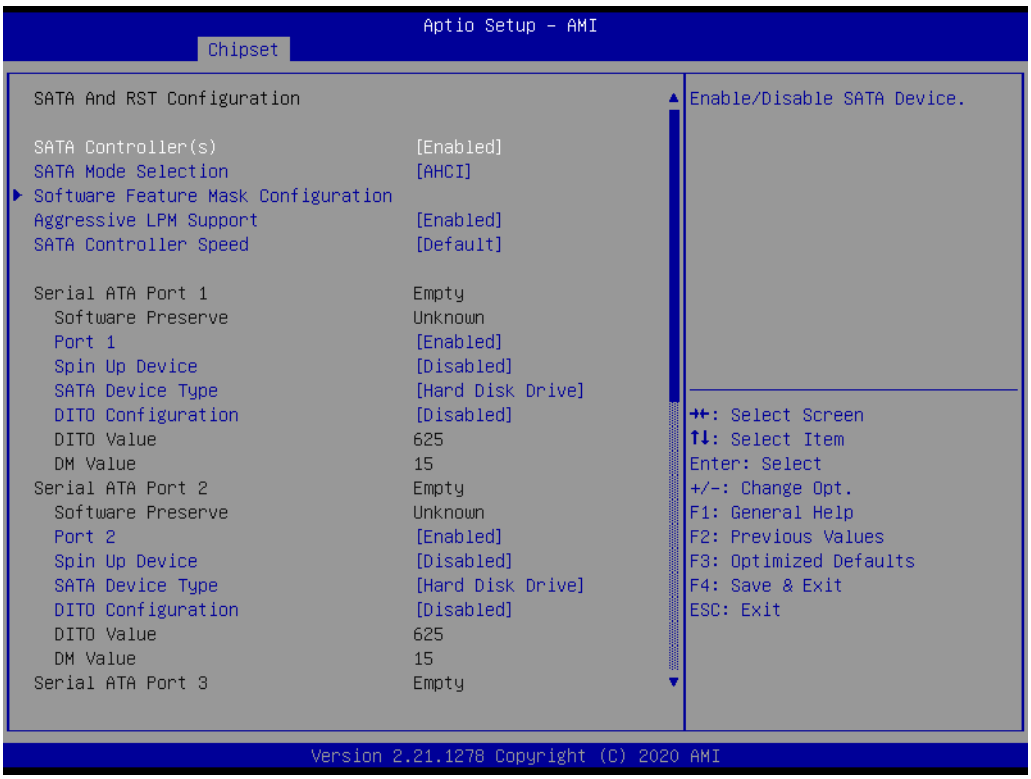


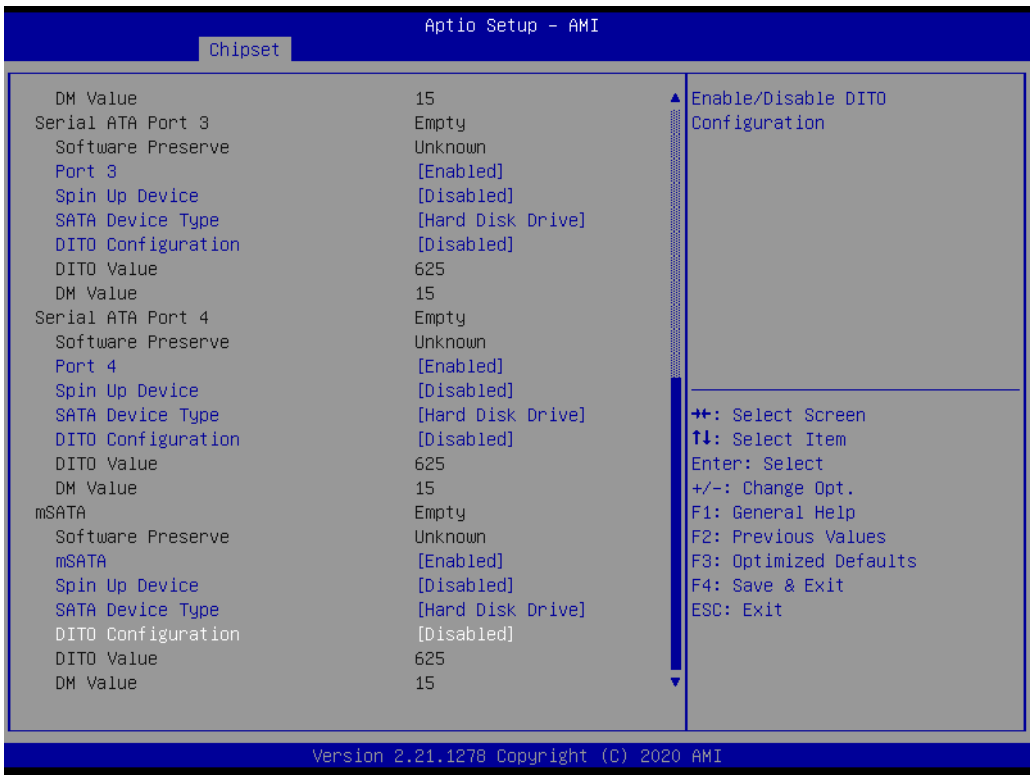


- **Detect Non-Compliance Device**
  Detects Non-Compliance PCI Express device. If enabled, it will take more time at POST time.

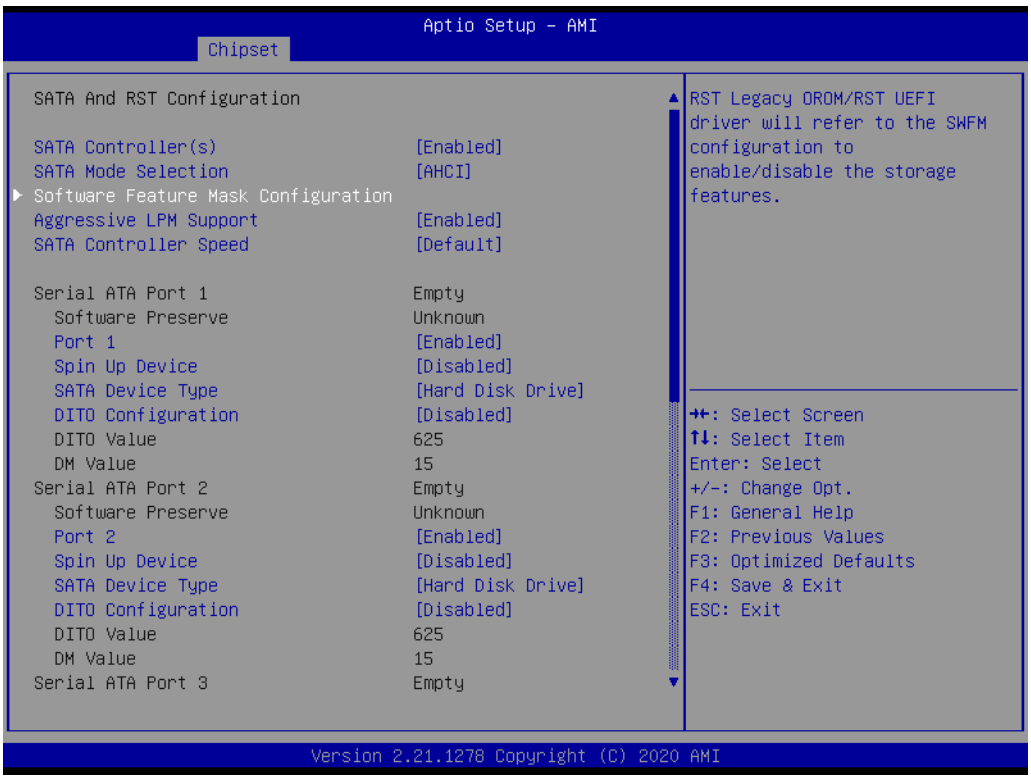
SATA and RST Configuration

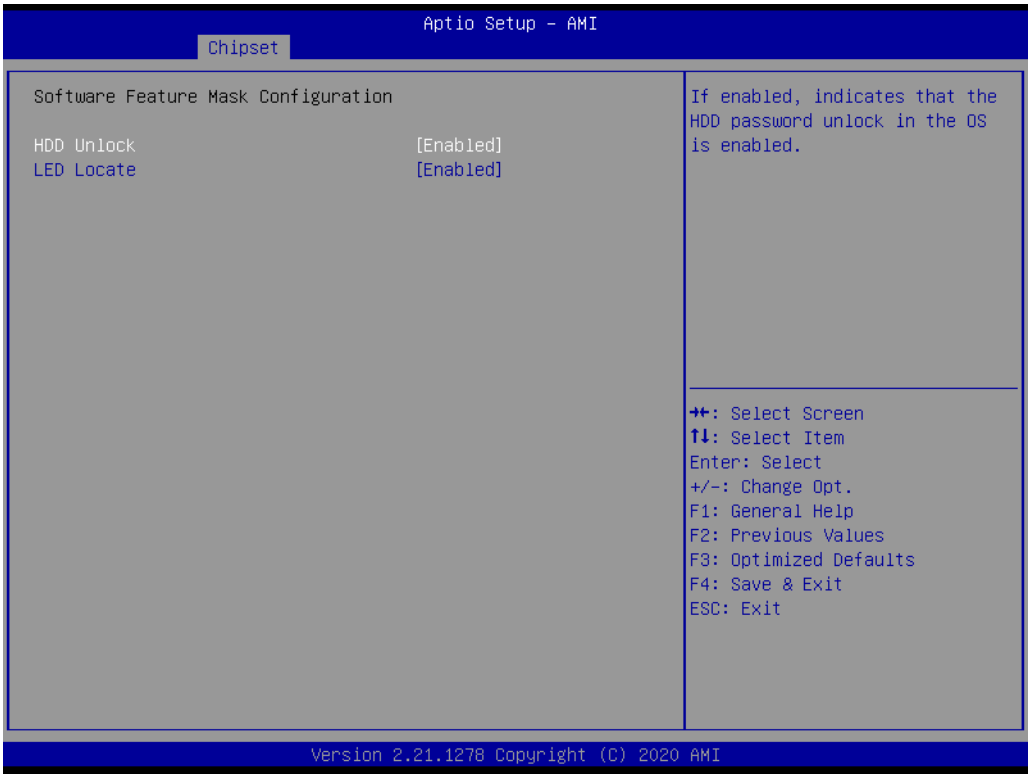






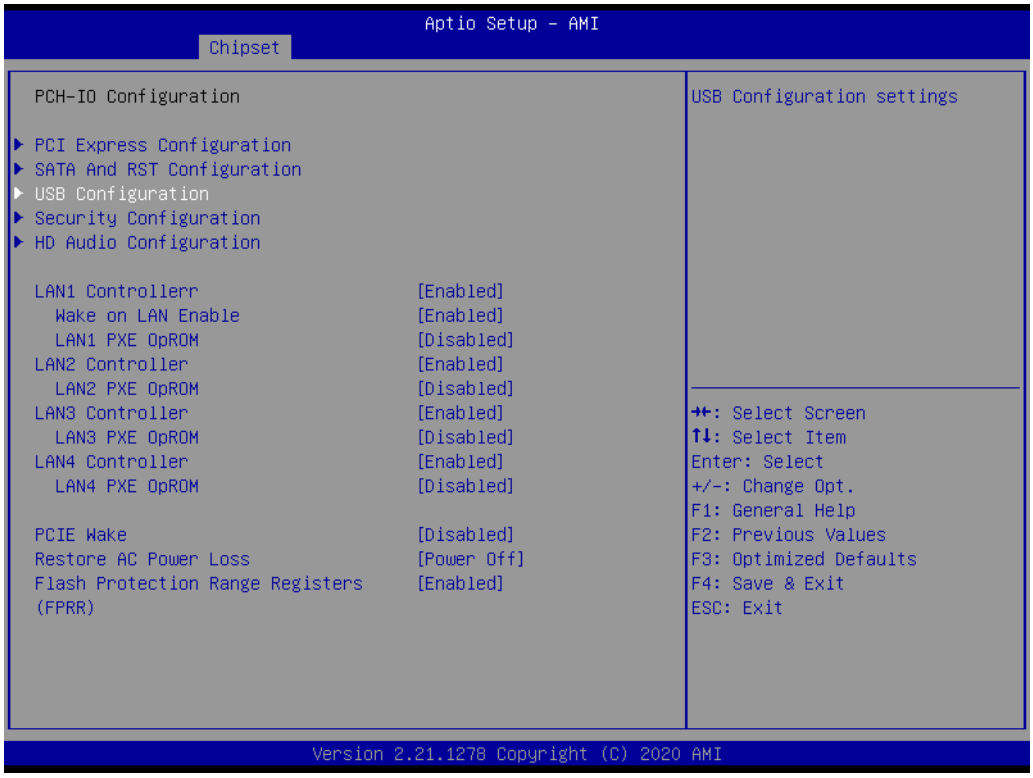
- **SATA Controller(s)**
  Enable/disable SATA device.
- **SATA Mode Selection**
  Determines how SATA controller(s) operate.
- **Aggressive LPM Support**
  Enabless PCH to aggressively enter link power state.
- **SATA Controller Speed-**
  Indicates the maximum speed the SATA controller can support.
- **Port 1~4/mSATA**
  Enable or disable SATA/mSATA Port.
- **Spin Up Device**
  If enabled for any ports, Staggered Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives will not spin up at boot.
- **SATA Device Type**
  Identifies if the SATA port is connected to a Solid State Drive or Hard Disk Drive.
- **DITO Configuration-**
  Enable/disable DITO configuration.

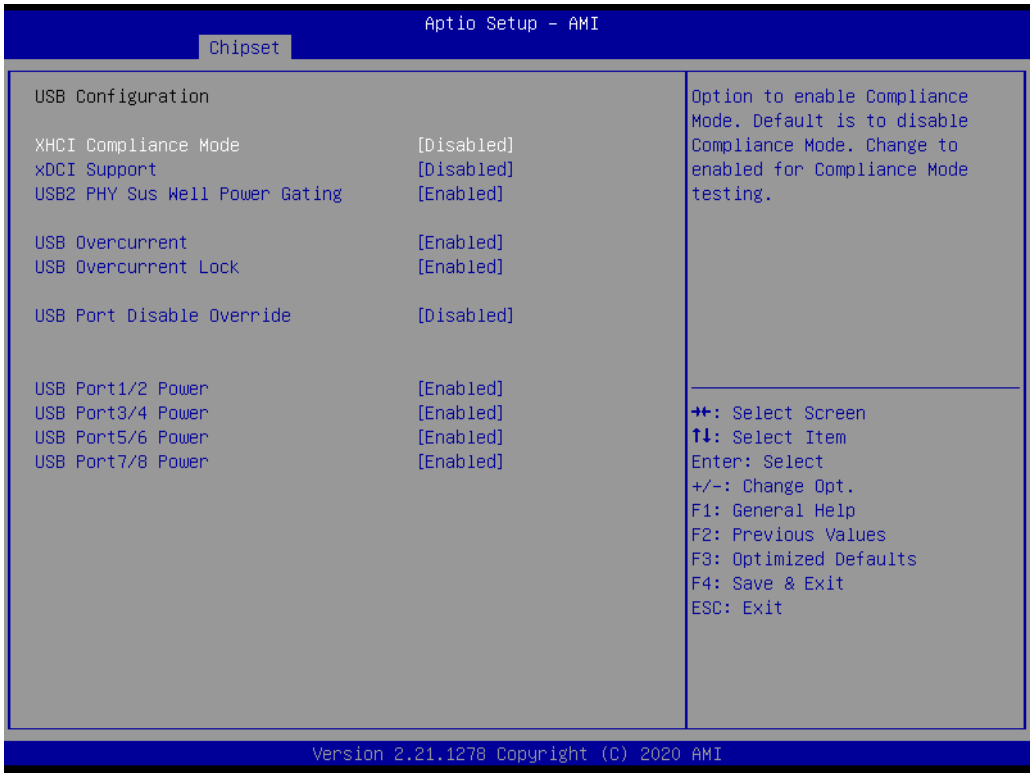




- **HDD Unlock**
  If enabled, indicates that the HDD password unlock in the OS is enabled.
- **LED Locate**
  If enabled, indicates that the LED/SGPIO hardware is attached and ping to locate feature is enabled on the OS.

USB Configuration

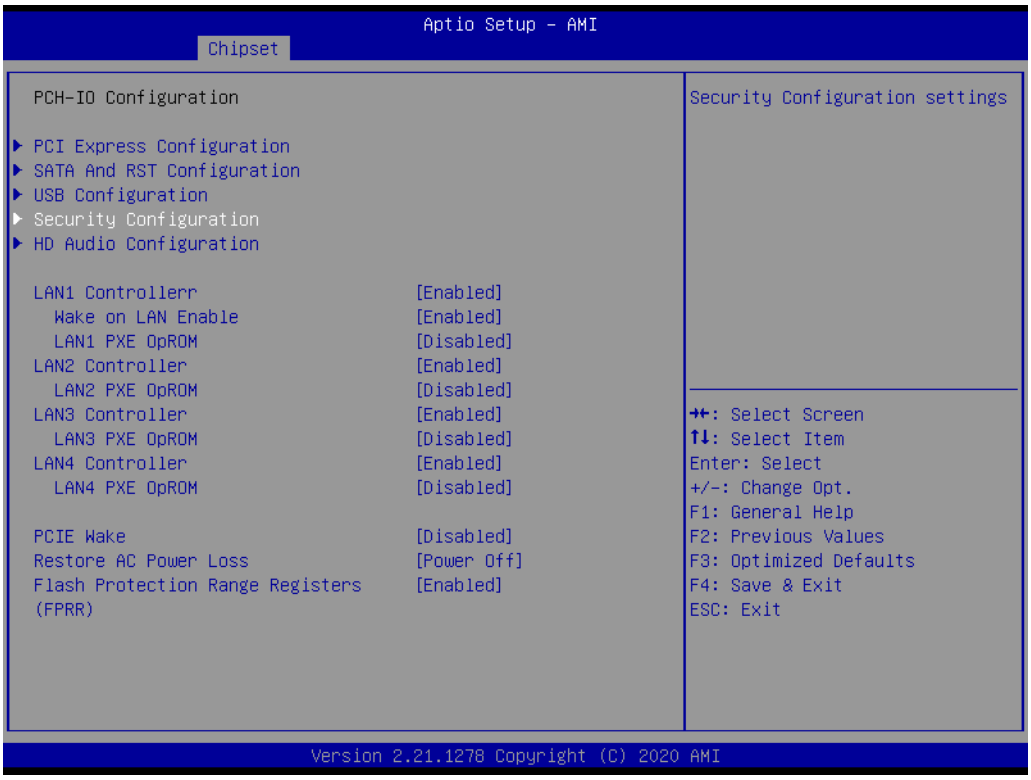


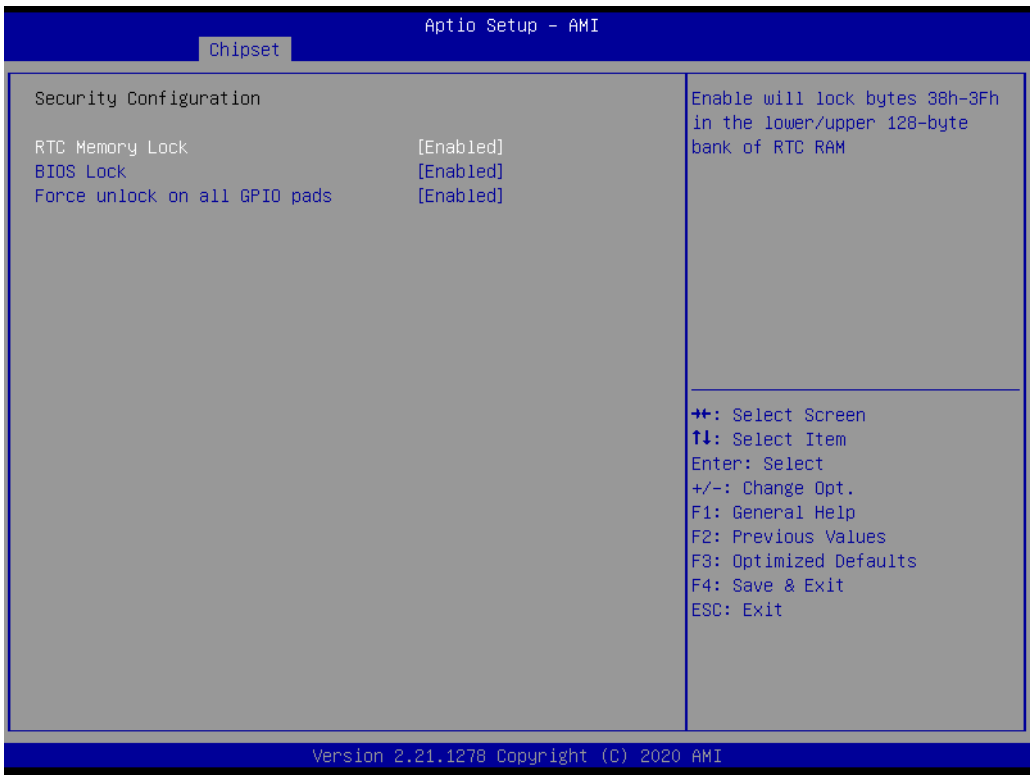


- **XHCI Compliance Mode**
  Option to enable Compliance Mode. Default is to disable Compliance Mode.
- **xDCI Support**
  Enable/disable xDCI (USB OTG device).

- **USB2 PHY Sus Well Power Gating**
  Enable to select SUS Well PG for USB2 PHY. This option has no effect on PCH-H.
- **USB Overcurrent**
  Select 'Disabled' for pin-based debug. If pin-based debug is enabled but USB overcurrent is not disabled, USB DbC does not work.
- **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.
- **USB Port Power**
  Enable/disable USB ports power in S4/S5.

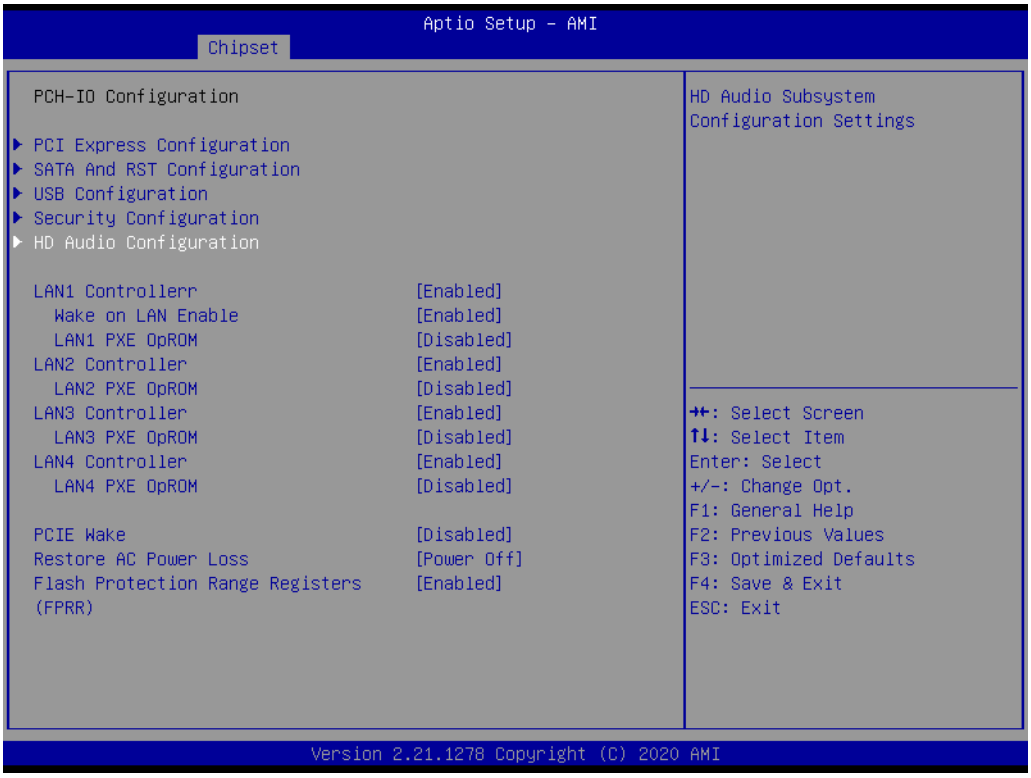
Security Configuration

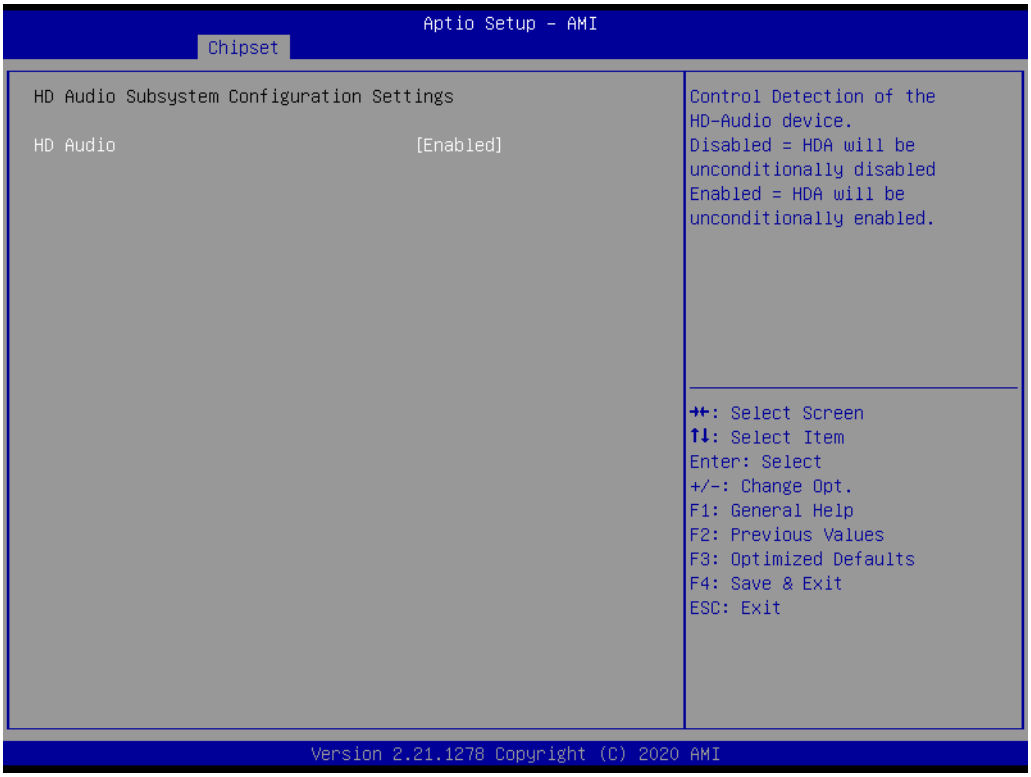




- **RTC Memory Lock**
  Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM.
- **BIOS Lock**
  Enable/disable the PCH BIOS Lock enable feature. Required to be enabled to ensure SMM protection of flash.
- **Force unlock on all GPIO pads**
  If enabled BIOS will force all GPIO pads to be in unlocked state.

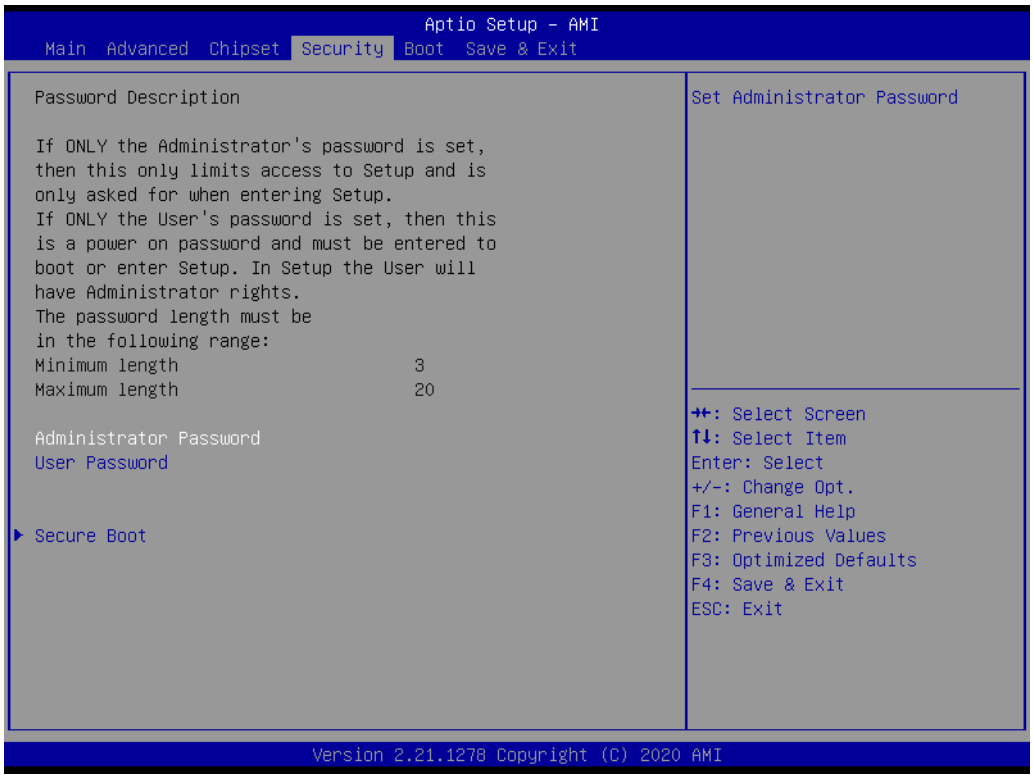
HD Audio Configuration



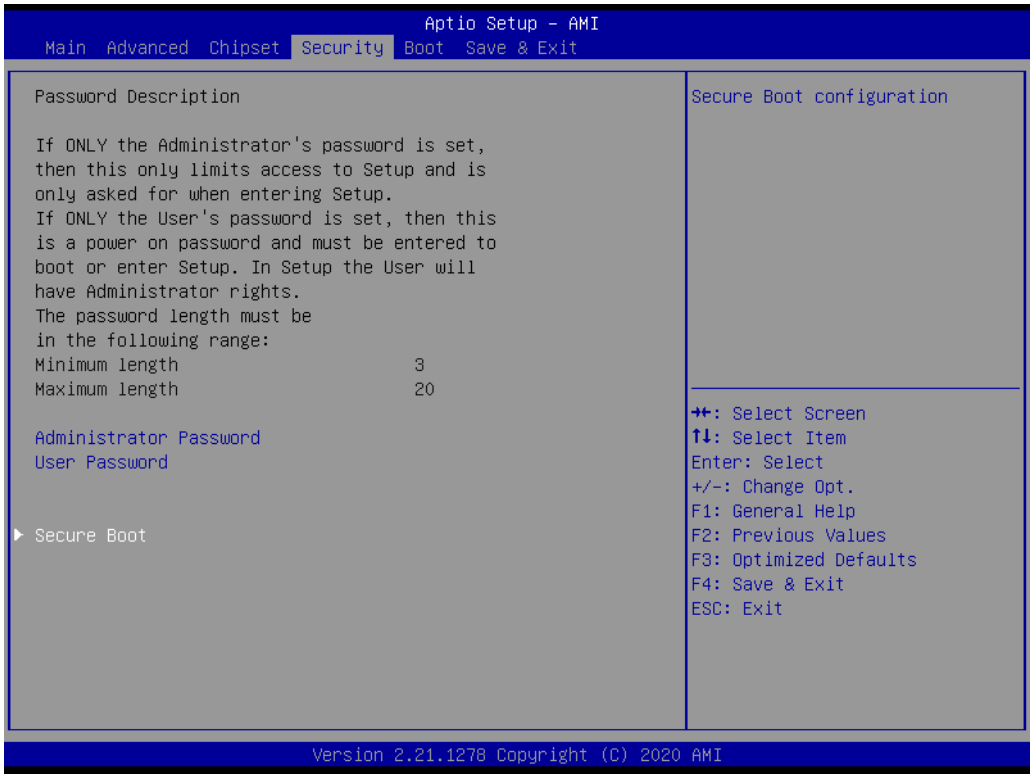


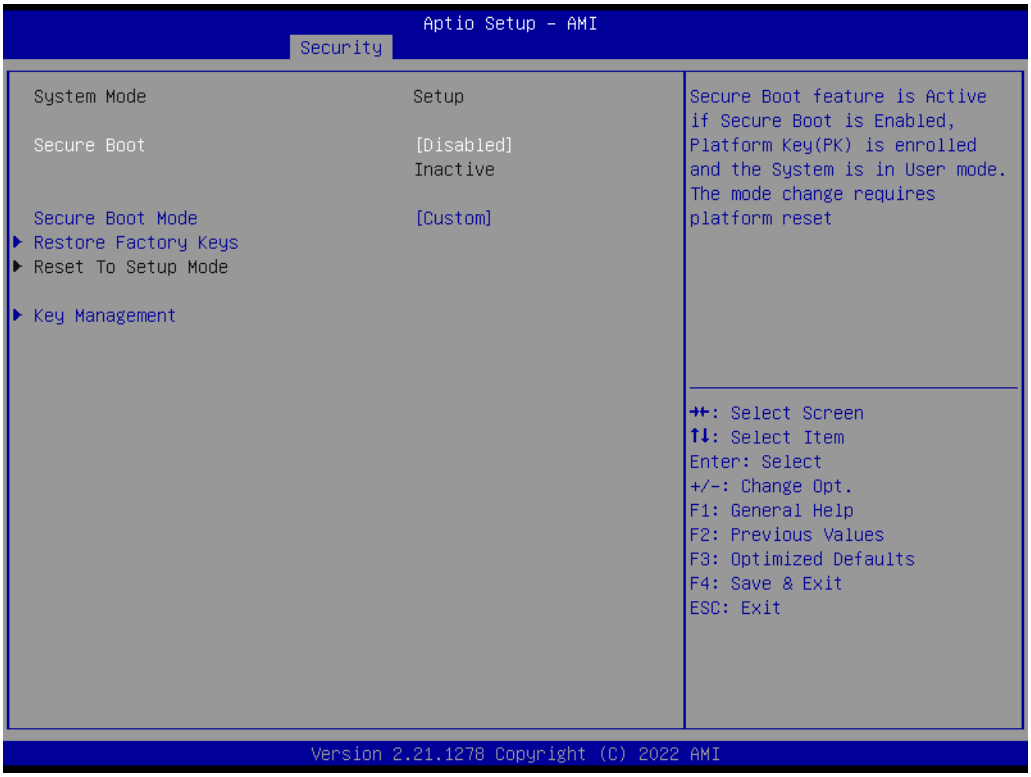
- **HD Audio**
  Controls detection of the HD-Audio device.

3.2.4 Security



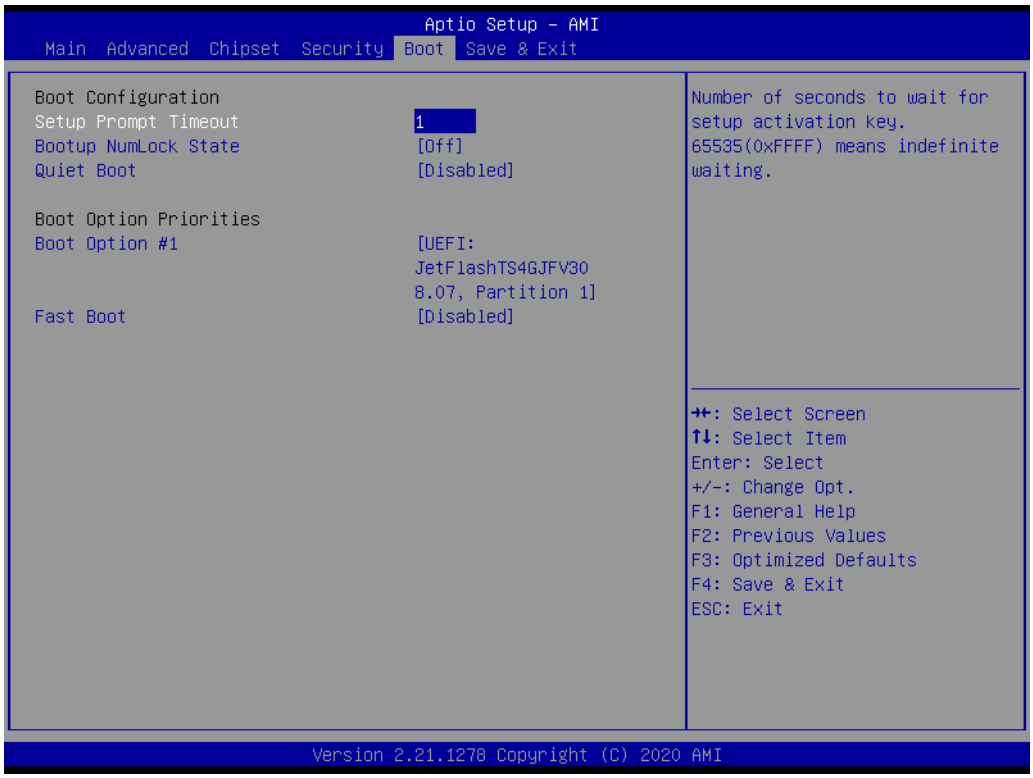
- **Administrator Password**
  Set Administrator Password.
- **User Password**
  Set User Password.





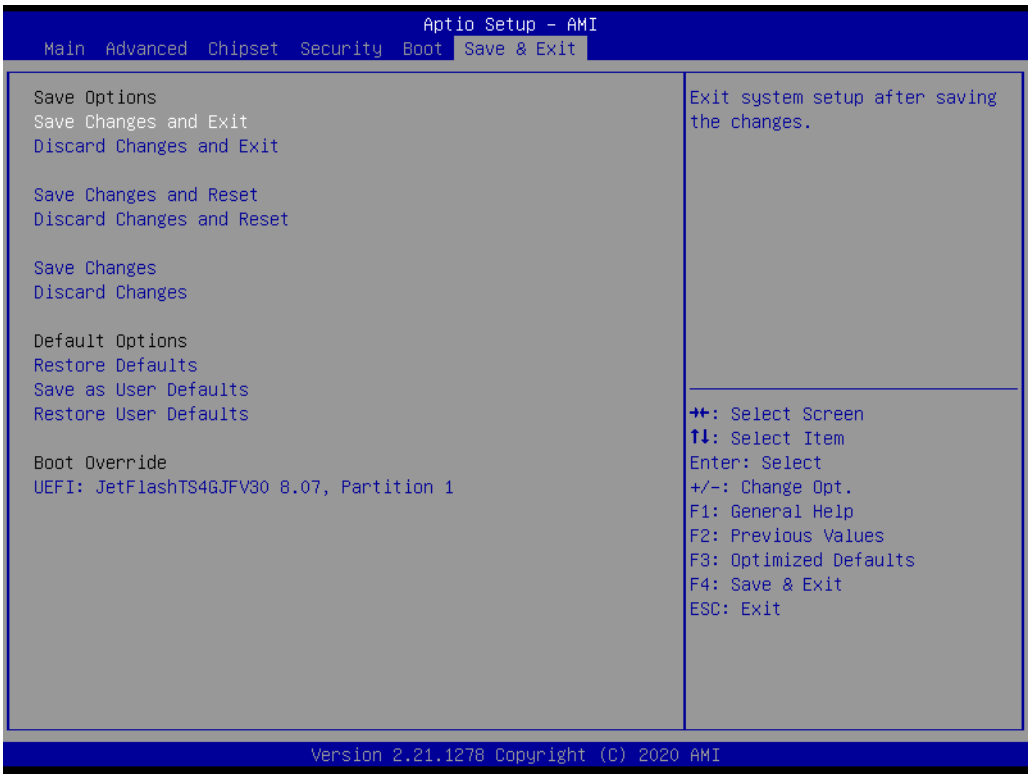
- **Secure Boot**
  Secure Boot feature is active if secure boot is enabled, Platform Key (PK) is enrolled and the system is in user mode. The mode change requires platform reset.
- **Secure Boot Mode**
  Secure Boot mode options: standard or custom.

3.2.5 Boot



- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
- **Bootup NumLock State**
  Select the keyboard NumLock state.
- **Quiet Boot**
  Enables or disables Quiet Boot option.
- **Fast Boot**
  Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

3.2.6 Save & Exit



- **Save 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

Watchdog Timer Sample Code

A.1 EC Watchdog Timer Sample Code

```
EC_Command_Port = 0x29Ah EC_Data_Port = 0x299h
Write EC HW ram = 0x89 Watch dog event flag = 0x57
Watchdog reset delay time = 0x5E Reset event = 0x04
Start WDT function = 0x28
================================================
.model small
.486p
.stack 256
.data
.code org 100h
.STARTup

mov dx, EC_Command_Port mov al,89h ; Write EC HW ram. out dx,al

mov dx, EC_Data_Port
mov al, 5Fh ; Watchdog reset delay time low byte (5Eh is high
byte) index, Timebase: 100ms
out dx,al

mov dx, EC_Data_Port
mov al, 64h ;Set 10 seconds delay time. out dx,al

mov dx, EC_Command_Port mov al,89h ; Write EC HW ram. out dx,al

mov dx, EC_Data_Port
mov al, 57h ; Watch dog event flag. out dx,al

mov dx, EC_Data_Port mov al, 04h ; Reset event. out dx,al

mov dx, EC_Command_Port
mov al,28h ; start WDT function. (Stop: 0x29, Reset: 0x2A) out
dx,al

.exit END
```

Appendix B

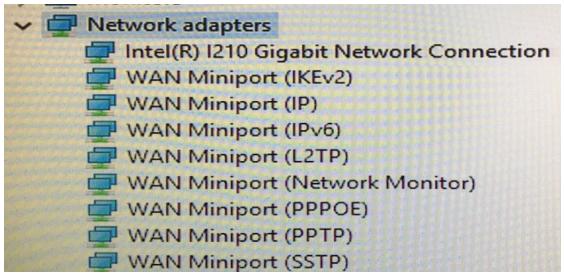
Fixing the LAN Order

B.1 Problem Statement

When installing Windows 10, the inbox driver will recognize I210 LAN chip and arrange it to the first order. After installing the LAN driver, the first LAN order will be I210. The second is I219.

This doesn't match the LAN sign on the device cabinet.

Before users install the LAN driver:



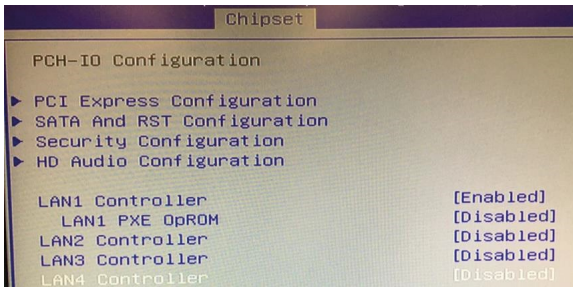
After installing the LAN driver, you will see I219 is set to Ethernet 2.

B.2 Addressing the LAN Order

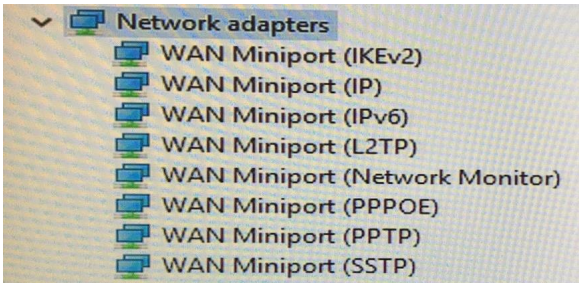
You have to disable LAN2 which is I210 LAN chip in the first BIOS screen.

Then install the Win 10 OS. After installing the LAN driver, the order will match the sign on the cabinet.

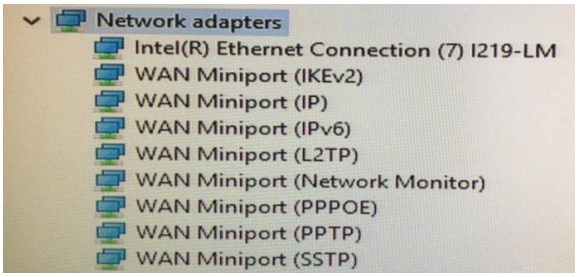
Disable the LAN2 controller in BIOS.(BIOS→Chipset→PCH-IO configuration 2 controller = Disabled).



Before installing the LAN driver, you won't see any LAN adapter.

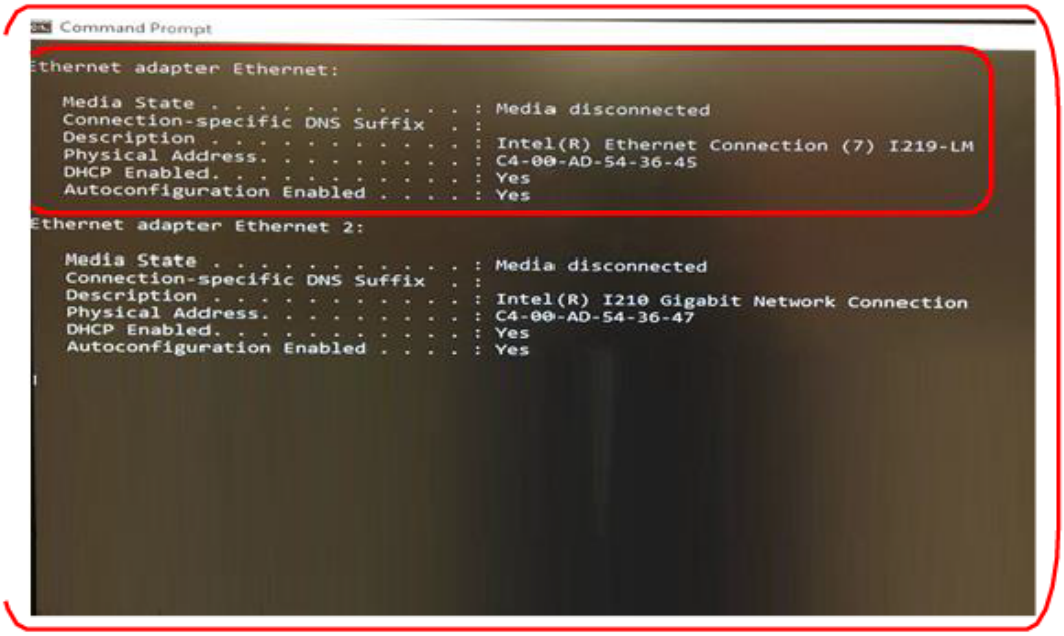


After installing the LAN driver, I219 will be recognized.



Enable LAN2 controller in BIOS.

Finally, enter the OS to make sure the LAN order matches the sign on the cabinet. I219 will become the first LAN order.



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