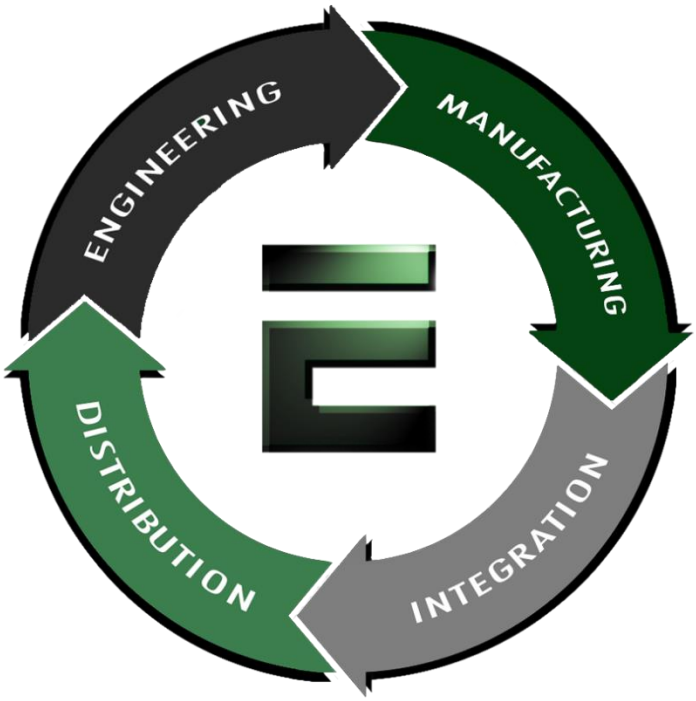
Our Products Make Your Product Better®

Click here to: learn more about EMAC's products and services and how they can help your project

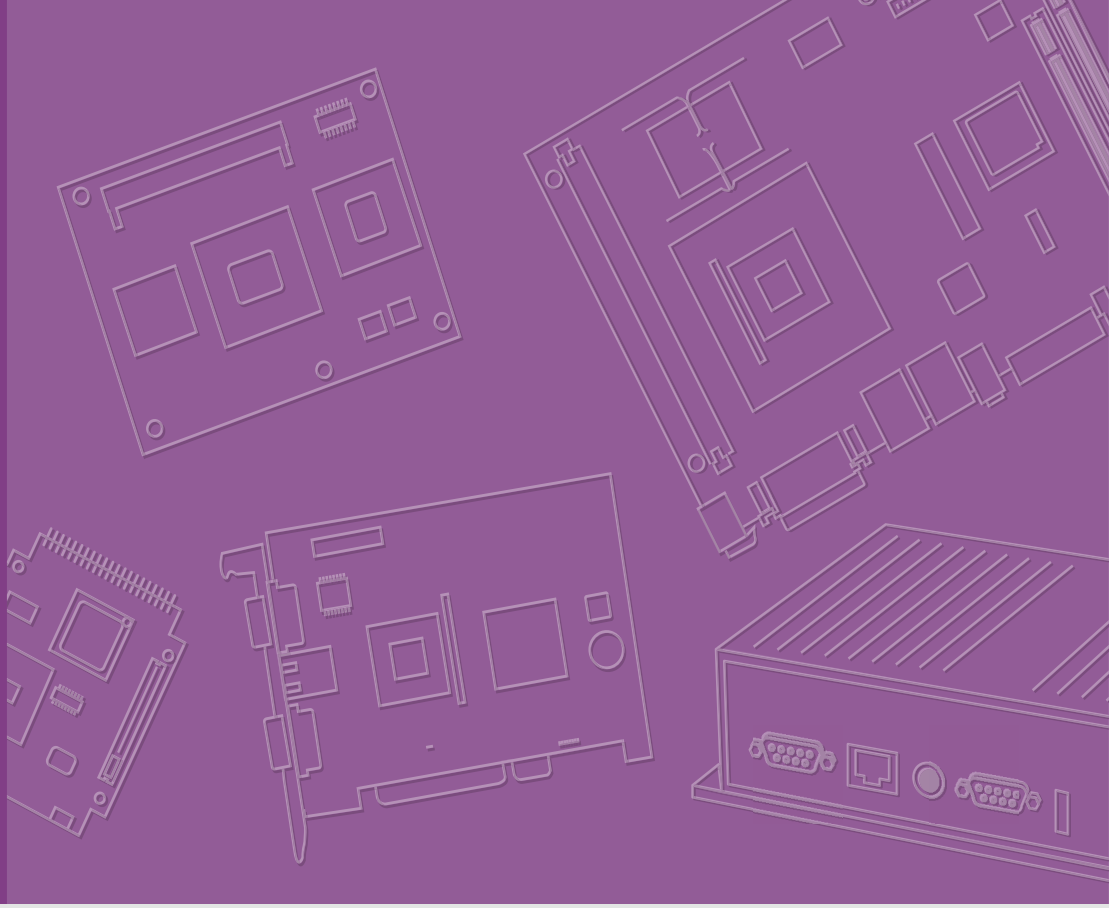


Authorized Distributor, Integrator and Value-Added Reseller

Manual and Datasheets available at: ftp.emacinc.com

For purchase information please contact info@emacinc.com

For Technical Support Services please submit a ticket at www.emacinc.com/support/



User Manual

EPC-S202

Fanless Embedded PC

ADVANTECH

Enabling an Intelligent Planet

Attention!

Please note:

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

Copyright

The documentation and the software included with this product are copyrighted 2020 by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice.

No part of this manual may be reproduced, copied, translated, or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. Information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of the rights of third parties, which may result from its use.

Acknowledgments

Award is a trademark of Award Software International, Inc.

VIA is a trademark of VIA Technologies, Inc.

IBM, PC/AT, PS/2 and VGA are trademarks of International Business Machines Corporation.

Intel® and Pentium® are trademarks of Intel Corporation.

Microsoft Windows® is a registered trademark of Microsoft Corp.

RTL is a trademark of Realtek Semi-Conductor Co., Ltd.

ESS is a trademark of ESS Technology, Inc.

UMC is a trademark of United Microelectronics Corporation.

SMI is a trademark of Silicon Motion, Inc.

Creative is a trademark of Creative Technology Ltd.

CHRONTEL is a trademark of Chrontel Inc.

All other product names or trademarks are properties of their respective owners.

For more information about this and other Advantech products, please visit our website at:

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/

Part No. 2006S20200 Edition 1

Printed in China September 2020

Product Warranty (2 years)

Advantech warrants to you, 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 which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which 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 of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

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 you get 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 an return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

FCC Class B

Note: 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 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, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
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 you call:
   - 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, which if not observed, can cause personal injury!*

Caution! *Cautions are included to help you avoid damaging hardware or losing data.*

There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! *Notes provide optional additional information.*

Warning! *Les avertissements indiquent des conditions qui, si elles ne sont pas respectées, peuvent provoquer des blessures!*

Caution! *Des précautions sont incluses pour vous aider à éviter d'endommager le matériel ou de perdre des données.*

Il y a un risque d'explosion d'une nouvelle batterie si elle n'est pas installée correctement. 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! *Les notes fournissent des informations supplémentaires facultatives.*

Packing List

Before installation, please ensure the following items have been shipped:

- 1 x EPC-S202 unit
- 1 x China RoHS

Ordering Information

Model Number	Description
EPC-S202E-U0A1	Intel E3950 2.0GHz EPC, 12VDC, VGA, DIO, 2 COM port
EPC-S202E-S8A1	Intel E3930 1.8GHz EPC, 12VDC, VGA, DIO, 2 COM port

*Optional Accessories

For EPC-S202

Part Number	Description
96PSA-A60W12P2-3	DC power 12 V/5 A 60 W, 0 ~ 40 °C (32 ~ 104 °F), w/ Phoneix type power connector
1702002600-01	Power cable 3-pin 183 cm (72 in), USA type
1700018704	Power cable 3-pin 180 cm (70 in), UK type
1702002605	Power cable 3-pin 183 cm (72 in), Europe type
1700000237-01	Power cable 3-pin 183 cm (72 in), PSE type
EWM-W195M201E	WiFi/BT module: 802.11 a/b/g/n/ac, Atheros QCA6174A-5, 2T2R, with BT4.2 (-40 ~ 85 °C/-40 ~ 185 °F)
1750008717-01	External Antenna, Dipole Ant. D.B 2.4/5G Wi-Fi 3dBi
1750008799-01	Cable Ant.SMA/F-R-BH MFH4/113 L:170 mm (6.69 in)

*Optional: Not included by default.

Safety Instructions

1. Please read these safety instructions carefully.
2. Please keep this User's Manual for later reference.
3. Please disconnect this equipment from AC outlet before cleaning. Use a damp cloth. Don't use liquid or sprayed detergent for cleaning. Clean with a moist sheet of cloth.
4. For pluggable equipment, the socket-outlet should be near the equipment and easily accessible.
5. Please keep this equipment away from humidity.
6. Install this equipment on a reliable surface. A drop or fall could cause injury or damage the device.
7. The openings on the enclosure are for air convection and protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Check the voltage of the power outlet when connecting the equipment to a power supply.
9. Connect the power cord to a socket-outlet with a grounded connection.
10. Place the power cord in such a way that people cannot step on it. Do not place anything over the power cord.
11. All cautions and warnings on the equipment should be observed.
12. If the equipment is not in use for a long period of time, disconnect the equipment from the power to avoid damage caused by transient over-voltage.
13. Never pour any liquid into ventilation openings; this could cause a fire or electrical shock.
14. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
15. Before any internal installation procedures are carried out on the system, make sure the system is turned off and has cooled down for 15 minutes. Failing to do so before opening can cause permanent damage to the system and serious or fatal injury to the user.
16. If one of the following situations arises, get 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 does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage or damage.
17. Do not leave this equipment in an environment where the storage temperature may go below -40 °C (-40 °F) or above 85 °C (185 °F). This could damage the equipment. the equipment should be in a controlled environment.
18. Caution: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer, discard used batteries according to the manufacturer's instructions.
    - Risk of explosion if the battery is replaced by an incorrect type.
    - Replacement of a BATTERY with an incorrect type that can defeat a SAFEGUARD (for example, in the case of some lithium BATTERY types).
    - Disposal of a BATTERY into fire or a hot oven, or mechanically crushing or cutting of a BATTERY, that can result in an EXPLOSION.

- Leaving a BATTERY in an extremely high temperature surrounding environment that can result in an EXPLOSION or the leakage of flammable liquid or gas.
- A BATTERY subjected to extremely low air pressure that may result in an EXPLOSION or the leakage of flammable liquid or gas.

19. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).
20. RESTRICTED ACCESS AREA: The equipment should only be installed in a Restricted Access Areas.
21. This equipment is not suitable for use in locations where children are likely to be present.
22. Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.
23. DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Instructions de sécurité

1. Veuillez lire attentivement ces instructions de sécurité.
2. Veuillez conserver ce manuel de l'utilisateur pour toute référence ultérieure.
3. Veuillez déconnecter cet équipement de la prise secteur avant le nettoyage, utilisez un chiffon humide, n'utilisez pas de détergent liquide ou pulvérisé pour le nettoyage, utilisez une feuille d'humidité ou un chiffon pour le nettoyer.
4. Pour les équipements enfichables, la prise de courant doit se trouver à proximité de l'équipement et doit être facilement accessible.
5. Veuillez garder cet équipement de l'humidité.
6. Posez cet équipement sur une surface fiable lorsqu'il est installé.
7. Les ouvertures de l'enceinte sont destinées à la convection de l'air et protègent finalement l'équipement contre la surchauffe.
8. Assurez-vous de la tension de la source d'alimentation lorsque vous connectez l'équipement à la prise secteur.
9. Assurez-vous de connecter le cordon d'alimentation à une prise de courant avec connexion à la terre.
10. Placez le cordon d'alimentation de manière à ce que les personnes ne puissent pas marcher dessus. Ne placez rien sur le cordon d'alimentation.
11. Toutes les précautions et tous les avertissements sur l'équipement doivent être notés.
12. Si l'appareil n'est pas utilisé pendant une longue période, débranchez-le du secteur pour éviter d'être endommagé par une surtension transitoire.
13. Ne jamais verser de liquide dans les ouvertures de ventilation, cela pourrait provoquer un incendie ou un choc électrique.
14. N'ouvrez jamais l'appareil.Pour des raisons de sécurité, seul le personnel de maintenance qualifié doit ouvrir l'équipement.
15. Avant d'effectuer toute procédure d'installation interne sur le système, assurez-vous que le système est éteint et refroidi pendant 15 minutes, sans quoi le système risque d'être endommagé de manière permanente et de provoquer des blessures graves ou mortelles. L'utilisateur.
16. Si l'une des situations suivantes se présente, faites vérifier l'équipement par le personnel de service:
    - Le cordon d'alimentation ou la fiche est endommagé.
    - Le liquide a pénétré dans l'équipement.

- Equipment L'équipement a été exposé à l'humidité.
- Equipment L'équipement ne fonctionne pas bien ou vous ne pouvez pas le faire fonctionner conformément au manuel de l'utilisateur.
- Equipment L'équipement est tombé et est endommagé.
- Equipment L'équipement présente des signes évidents de rupture.

17. Ne laissez pas cet appareil dans un environnement où la température de stockage peut être inférieure à -40 °C (-40 °F) ou supérieure à 85 °C (185 °F), ce qui pourrait endommager l'équipement. Environnement contrôlé.
18. Attention: Danger d'explosion si la batterie n'est pas remplacée correctement Remplacez uniquement par un type identique ou équivalent recommandé par le fabricant, jetez les piles usagées conformément aux instructions du fabricant.
    - Risque d'explosion si la batterie est remplacée par un type incorrect.
    - Remplacement d'une BATTERIE par un type incorrect pouvant neutraliser un SAFEGUARD (par exemple dans le cas de certains types de BATTERIE au lithium).
    - La mise au rebut d'une BATTERIE au feu ou dans un four chaud, ou le broyage ou la découpe mécanique d'une BATTERIE, pouvant entra?ner une EXPLOSION.
    - Laisser une BATTERIE dans un environnement extrêmement chaud pouvant entraîner une EXPLOSION ou une fuite de liquide ou de gaz inflammable.
    - Une BATTERIE </ RTI> est une pression d'air extrêmement basse qui peut provoquer une EXPLOSION ou une fuite de liquide ou de gaz inflammable.
19. Le niveau de pression acoustique au poste de conduite conformément à la norme CEI 704-1: 1982 ne dépasse pas 70 dB (A).
20. ZONE D'ACCÈS RESTREINTE: L'équipement ne doit être installé que dans une zone d'accès restreint.
21. Cet équipement ne peut pas être utilisé dans des endroits où des enfants sont susceptibles d'être présents.
22. Convient à une installation dans des salles informatiques conformément à l'article 645 du Code national de l'électricité et à la norme NFPA 75.
23. AVIS DE NON-RESPONSABILITÉ: Cet ensemble d'instructions est conforme à la norme CEI 704-1. Advantech décline toute responsabilité concernant l'exactitude des déclarations contenues dans ce document.

Contents

Chapter 1 General Introduction 1

1.1 Introduction 2
1.2 Product Features.....2
1.2.1 General 2
1.2.2 Display 2
1.2.3 Ethernet 2
1.3 Chipset.....3
1.3.1 Functional Specification 3
1.3.2 WISE-PaaS/DeviceOn 3
1.4 Mechanical Specifications.....4
1.4.1 EPC-S202 Dimensions 4
Figure 1.1 EPC-S202 Mechanical Dimensions Diagram 4
1.4.2 Weight.....4
1.5 Power Requirements.....4
1.5.1 System Power.....4
1.5.2 RTC Battery 4
1.6 Environment Specifications.....5
1.6.1 Operating Temperature.....5
1.6.2 Relative Humidity 5
1.6.3 Storage Temperature.....5
1.6.4 Vibration during Operation 5
1.6.5 Shock during Operation 5
1.6.6 Safety.....5
1.6.7 EMC.....5

Chapter 2 H/W Installation.....7

2.1 Introduction 8
2.2 I/O Introduction.....8
Figure 2.1 EPC-S202 Front View 8
Figure 2.2 EPC-S202 Rear View 8
2.3 EPC-S202 External I/O 9
2.3.1 Power On/Off Button.....9
Figure 2.3 Power On/Off Button 9
2.3.2 Power Input Connector 9
Figure 2.4 Power Input Connector.....9
2.3.3 Ethernet Connector (LAN1 & LAN2).....9
Figure 2.5 Ethernet Connector (LAN) 9
Table 2.1: Ethernet Connector (LAN) Pin Definition.....9
2.3.4 USB 3.0 Connector.....10
Figure 2.6 USB Connector.....10
Table 2.2: USB Connector Pin Definition 10
2.3.5 Audio Connector 10
Figure 2.7 Audio Connector.....10
Table 2.3: Audio Connector Pin Definition.....10
2.3.6 COM Connector 11
Figure 2.8 COM Connector.....11
Table 2.4: COM Connector Pin Definition 11
2.3.7 HDMI Connector 12
Figure 2.9 HDMI Connector.....12
Table 2.5: HDMI Connector Pin Definition.....12
2.3.8 Power LED Indicators 13
Figure 2.10Power LED Indicators.....13
2.3.9 Antenna Hole 13

Figure 2.11Antenna Hole 13
2.3.10 Digital In-put/Output (DIO1 & DIO2) Connector 13
Figure 2.12DIO Connector Pin Definition 13
Table 2.6: DIO Connector Pin Definition 13
2.4 Installation 14
2.4.1 Installation (Bottom case) 14
Figure 2.13Loosen the Screws and Open the Bottom 14

Chapter 3 BIOS Settings 15

3.1 Entering Setup 17
3.1.1 Main Setup 17
3.1.2 Advanced BIOS Features Setup 18
3.1.3 Chipset Configuration 29
3.1.4 Security 39
3.1.5 Boot 40
3.1.6 Save & Exit 41

Appendix A Watchdog Timer Sample Code 43

A.1 Watchdog Timer Sample Code 44

Appendix B SUSI API Introduction 47

B.1 SUSI API Introduction 48
B.1.1 The Watchdog API 48
B.1.2 The Hardware Monitor API 48

Chapter 1

General Introduction

This chapter details background information on the EPC-S202 series.

1.1 Introduction

EPC-S202 is a small, palm-sized, fanless embedded system that supports Din rail/ wall/desk mounting. EPC-S202 features front I/O to ease DIN rail assembly and mounting. Rear I/O ports facilitate expansion and upgrade with extension modules on demand. EPC-S202 is a semi-industrial expandable system easily installed in machine cabinets. This system is designed for limited space machine equipment applications in factory automation, equipment integration, and kiosks.

Easy & Simple Design

EPC-S202 is powered by an Intel® Atom™ E3950/E3930 to deliver high performance with low power consumption. EPC-S202 supports up to 2x COM port, 2x USB 3.0, 2x GbE LAN, one M.2 E key, mSATA/mPCIe, and on-board 4 GB LPDDR4 memory and 32 GB eMMC storage for rugged environments.

EPC-S202 passes several worldwide certifications — including CE/FCC, VCCI, and eventually CB, UL, CCC, and BSMI.

Built in Intelligent Management Tools - WISE-PaaS/DeviceOn

Advantech WISE-PaaS/DeviceOn provides a valuable suite of programmable APIs such as multi-level watchdog, hardware monitor, system restore, and other user-friendly interfaces. WISE-PaaS/DeviceOn makes the whole system more reliable and intelligent. EPC-S202 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® Atom™ E3950, 2.0 GHz
  - Intel® Atom™ E3930, 1.80 GHz
- **BIOS:** AMI UEFI 64 Mbit
- **System Memory:** On-board 4GB LPDDR4, 2400MT/s
- **Storage:** 32 GB eMMC
- **Watchdog Timer:** 65536 level, 0~65535 sec
- **COM Port:** 2x RS-232/422/485
- **USB:** 2x USB 3.0
- **Audio:** High Definition Audio (HD), Line-out, Line-in
- **Expansion Interface:**
  - 1x M.2 E-key 2230 (PCIe x 1, USB 2.0)
  - 1x Full-size mPCIe (Optional to mSATA)

1.2.2 Display

- **Controller:** Intel® SoC E3900 series
- **Resolution:** HDMI1.4b: up to 3840 x 2160 at 30 Hz

1.2.3 Ethernet

- **Controller:**
  - LAN1: Intel i210IT
  - LAN2: Intel i210IT

- **Speed:** 10/100/1000 Mbps
- **Connector:** 2 x RJ45
- **Standard:** Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3z, IEEE 802.ab

1.3 Chipset

1.3.1 Functional Specification

1.3.1.1 Processor

Processor	■ Intel® Atom™ E3950/Intel® Atom™ E3930 ■ Frequency – E3950: 2.00 GHz – E3930: 1.80 GHz ■ L2 cache: 2 MB
Memory	■ On-board 4 GB LPDDR4-2400MT/s, up to 8 GB
Storage	■ 32 GB eMMC, up to 64 GB

1.3.1.2 Chipset

Serial ports	■ 2x RS-232/422/485 ■ Supports auto-flow control. COM connector: D-SUB CON. 9P
Internal Graphics Features	■ 3D: DX12, OGL 4.4 ■ HDMI
Video accelerator	■ H/W accelerated video decode ■ HW Decode: HEVC/H.265, H.264, MVC, VP8, VP9, MPEG2, VC-1, WMV9 ■ HW Encode: HEVC/H.265, H.264, MVC, VP8
USB interface	■ 2x USB 3.0 ■ Transmission speed up to 5 Gbps
BIOS	■ UEFI 64 Mbit

1.3.1.3 Others

Ethernet	■ Controller: Intel® i210IT ■ Supports 10/100/1000 Mbps ■ Connectors: 2x RJ45
Audio	■ High Definition Audio (HD) ALC-888S codec ■ Connectors: Line-in/Line-out
Battery backup	■ BATTERY 3V/210 mAh with WIRE x 1

1.3.2 WISE-PaaS/DeviceOn

Sequence control	Supported
Watchdog timer	65536 level, 0~65535 sec
Hardware monitor	CPU temperature / input current / input voltage
Power saving	Deep sleep S5 mode
System information	Running HR / boot record

1.4 Mechanical Specifications

1.4.1 EPC-S202 Dimensions

139 x 100 x 44 mm (5.47 x 3.93 x 1.73 in) Unit: mm [Inch]

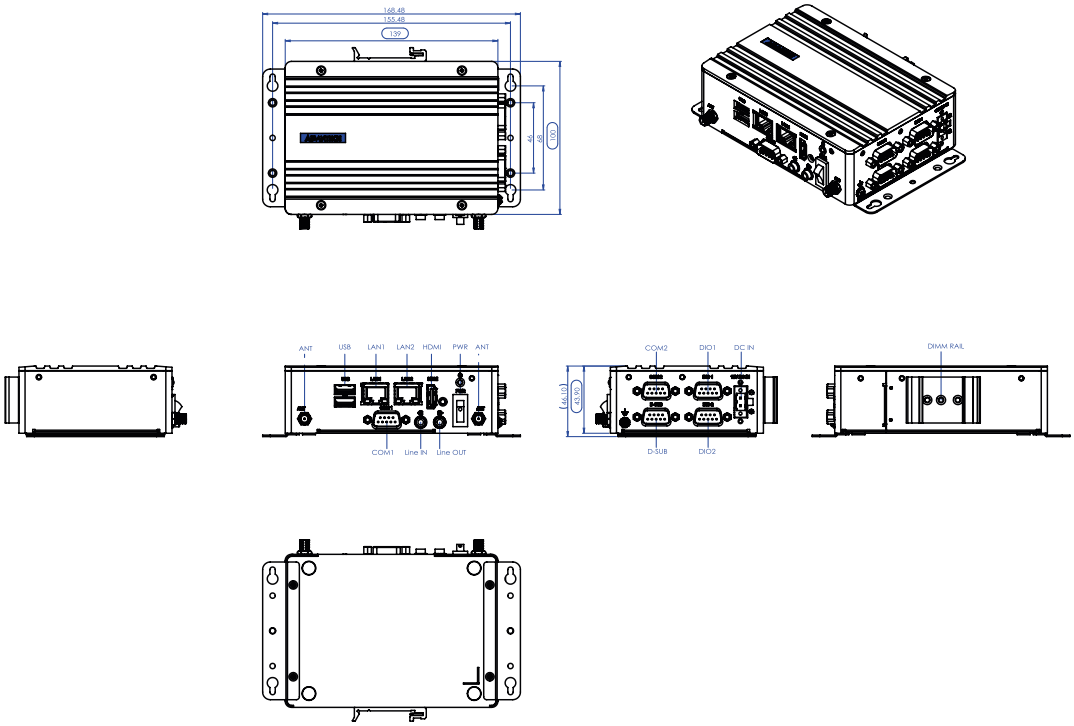


Figure 1.1 EPC-S202 Mechanical Dimensions Diagram

1.4.2 Weight

0.6 kg (1.32 lb)

1.5 Power Requirements

1.5.1 System Power

- **Minimum power input:** DC 12 V, 5 A

1.5.2 RTC Battery

- Lithium 3 V/210 mAH

1.6 Environment Specifications

1.6.1 Operating Temperature

- -20 ~ 60 °C (-4 ~ 140 °F), with air flow, speed=0.7 m/sec

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 during Operation

- Desk/Wall Mount/ DIN Rail: 3 Grms, IEC 60068-2-64, random vibration, 5 ~ 500 Hz, 1 hr/axis

1.6.5 Shock during Operation

- 30G, IEC60068-2-27, half sine, 11 m duration

1.6.6 Safety

- UL, CB, CCC, BSMI

1.6.7 EMC

- CE, FCC, CCC, BSMI, VCCI

Chapter 2

H/W Installation

This chapter details external I/O and EPC-S202 hardware installation.

2.1 Introduction

The following sections demonstrate the installation and the external connector pin assignments for different applications.

2.2 I/O Introduction

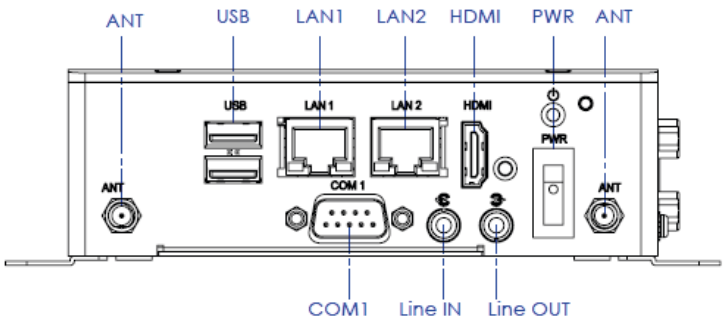


Figure 2.1 EPC-S202 Front View

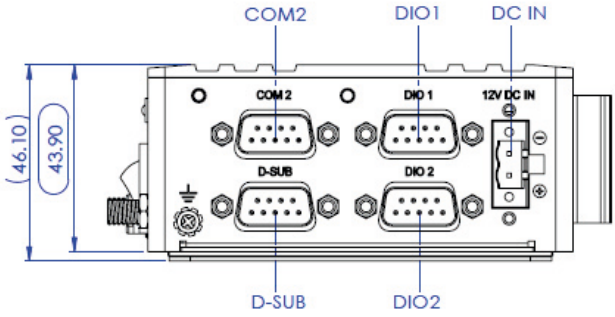


Figure 2.2 EPC-S202 Rear View

2.3 EPC-S202 External I/O

2.3.1 Power On/Off Button

EPC-S202 has a Power On/Off switch button on the front side that show On status (I) and Off/Suspend status (O).

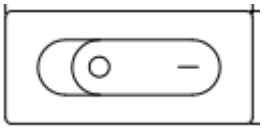


Figure 2.3 Power On/Off Button

2.3.2 Power Input Connector

EPC-S202 is designed with a phoenix connector and 12 DC input. (-) stands for GND; (+) stands for +12 V.

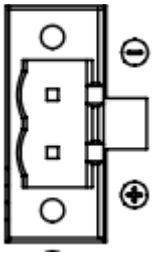


Figure 2.4 Power Input Connector

2.3.3 Ethernet Connector (LAN1 & LAN2)

EPC-S202 is equipped with two Ethernet controllers that are fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards. LAN1 and LAN2 are all equipped with i210 Ethernet controllers. The Ethernet port 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 (Yellow LED).

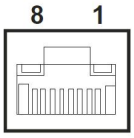


Figure 2.5 Ethernet Connector (LAN)

Table 2.1: 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)

2.3.4 USB 3.0 Connector

EPC-S202 supports two USB interfaces, which deliver Plug & Play and hot swapping capabilites for up to 127 external devices. The USB interface complies with USB UHCI, Rev. 3.0.

Please refer to Table. 2.2 for its pin assignments. 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 (both sets reside in the same connector).

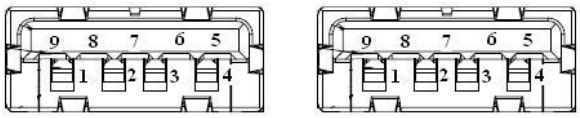


Figure 2.6 USB Connector

Table 2.2: USB Connector Pin Definition

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

2.3.5 Audio Connector

EPC-S202 supports stereo audio ports by two phone jack connectors: Line-out/Line-in. The audio chip is controlled by ALC888S and is compliant with Azalea standards.

Figure 2.7 Audio Connector

Table 2.3: Audio Connector Pin Definition

Pin	Signal Name
1	Line-out
2	Line-in

2.3.6 COM Connector

EPC-S202 provides two serial ports in D-sub 9-pin connectors. COM1/COM2 is for RS232/422/485 functionality. It provides connections for serial devices or a communication network.

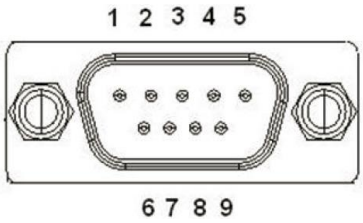


Figure 2.8 COM Connector

Table 2.4: COM Connector Pin Definition

	RS-232	RS-422	RS-485
Pin	**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

NC represents “No Connection”.

2.3.7 HDMI Connector

EPC-S202 supports a HDMI port. This is a 19-pin receptacle connector HDMI 1.4b interface. This HDMI link supports resolutions of up to 3840 x 2160 @ 30 Hz.

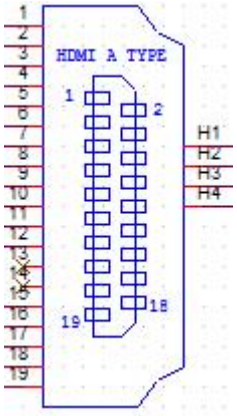


Figure 2.9 HDMI Connector

Table 2.5: 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_HPD

NC represents “No Connection”.

2.3.8 Power LED Indicators

EPC-S202 provides one front panel LED that indicates power statuses.

Figure 2.10 Power LED Indicators

2.3.9 Antenna Hole

EPC-S202 reserves two antenna holes for wireless antenna installation. Each antenna hole is marked “ANT” for easy recognition.

Figure 2.11 Antenna Hole

2.3.10 Digital Input/Output (DIO1 & DIO2) Connector

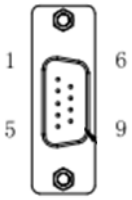


Figure 2.12 DIO Connector Pin Definition

Table 2.6: DIO Connector Pin Definition

Pin	Signal Name
1	GPIO0
2	GPIO1
3	GPIO2
4	GPIO3
5	GPIO4
6	GPIO5
7	GPIO6
8	GPIO7
9	GND

2.4 Installation

2.4.1 Installation (Bottom case)

1. Loosen the screws and open the bottom of the case.

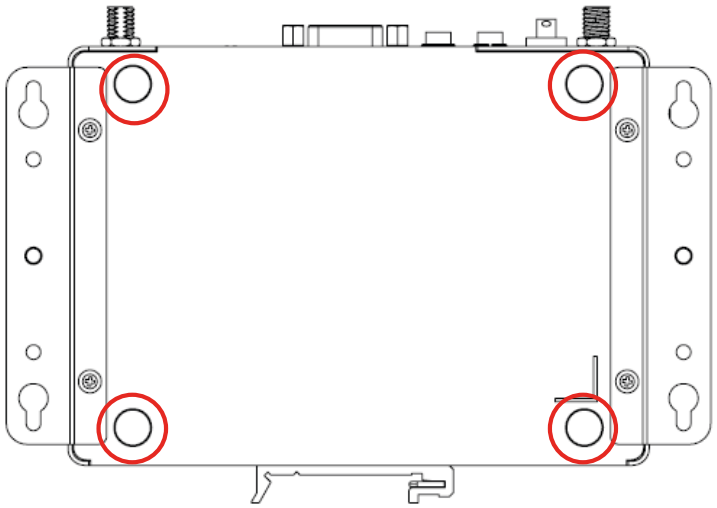
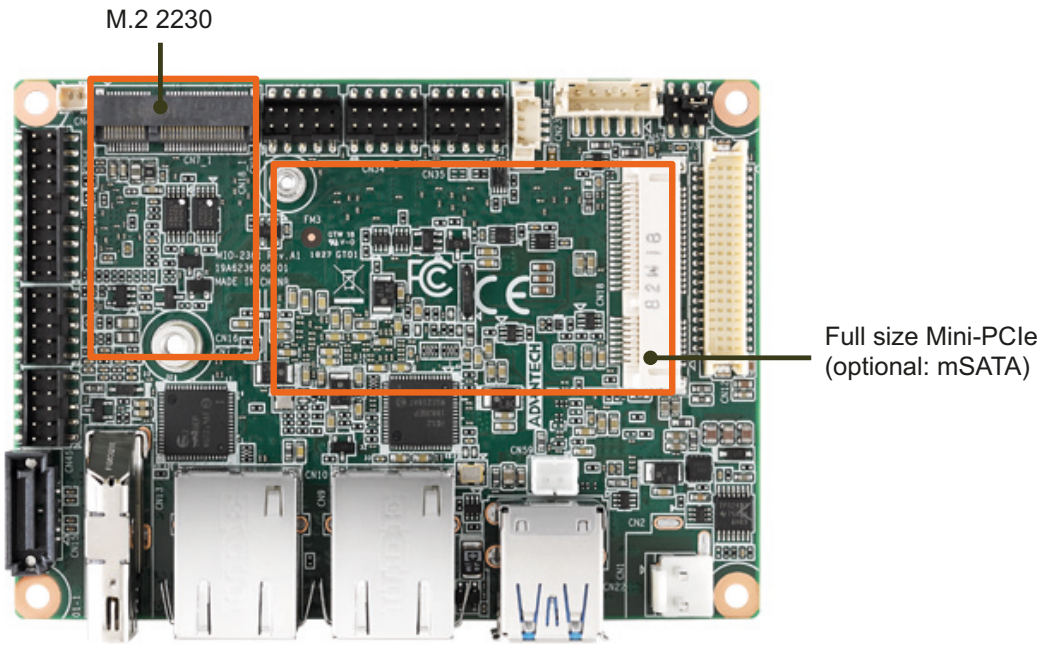


Figure 2.13 Loosen the Screws and Open the Bottom

2. Install M.2 or miniPCIe module. We suggest installing a miniPCIe module in CTOS. (M.2 2230 and miniPCIe/mSATA module are not included.)



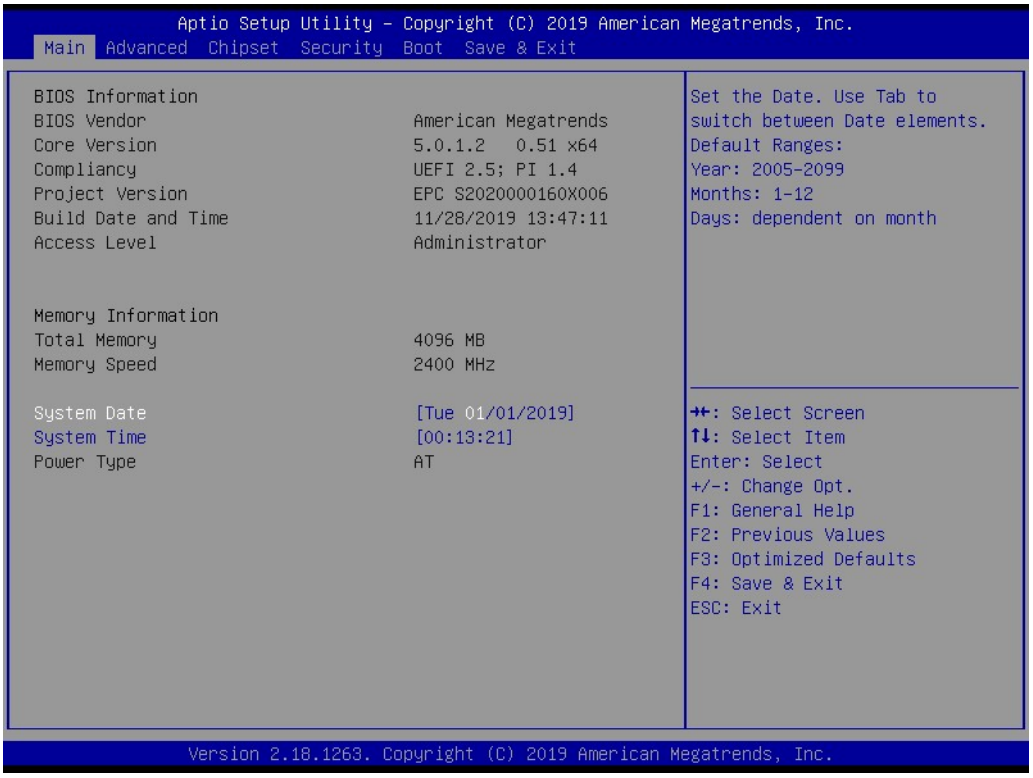
3. Replace the bottom cover and secure it with the four screws.

1. Desserrez les vis et ouvrez le bas du boîtier.
2. Installez le module M.2 ou miniPCIe.
3. Remettez le couvercle du boîtier inférieur et fixez-le avec les quatre vis.

Chapter 3

BIOS Settings

AMIBIOS has been integrated into motherboards for decades. With the AMIBIOS Setup program, you can modify BIOS settings and control various system features. This chapter describes the basic navigation of the EPC-S202 BIOS setup screens.



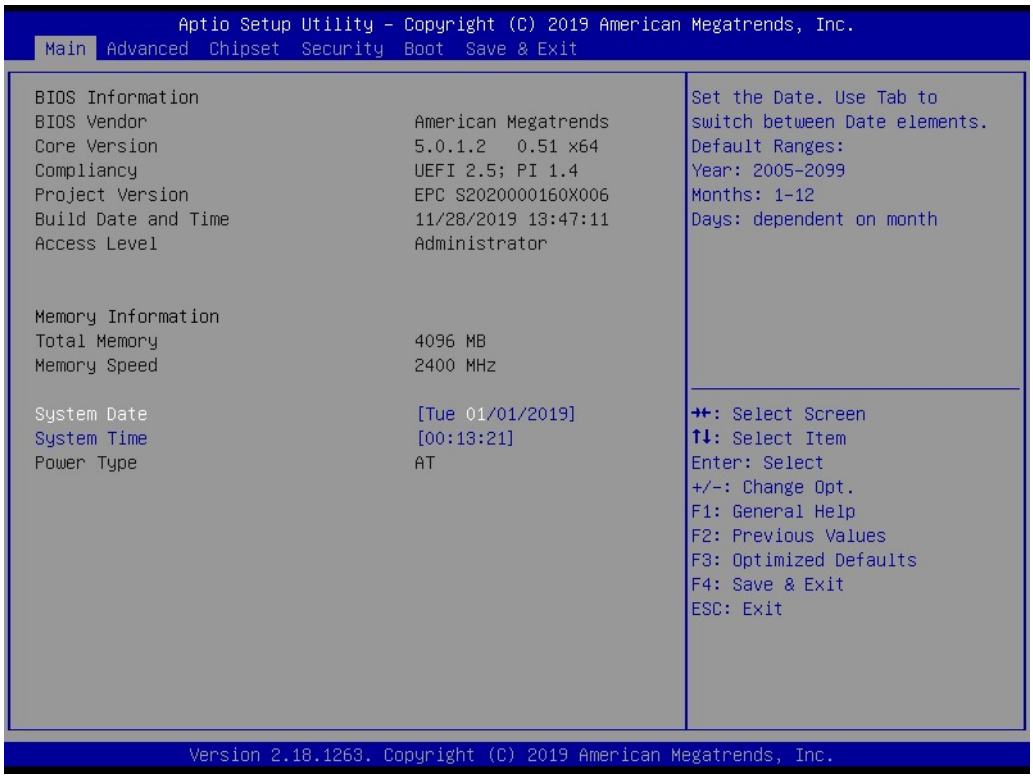
AMI BIOS ROM has a built-in Setup program that allows users to modify basic system configurations. This information is stored in battery-backed CMOS so it retains the Setup information when the power is turned off.

3.1 Entering Setup

Turn on the computer and check for the patch code. If there is a number assigned to the patch code, it means that the 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.

3.1.1 Main Setup

When you first enter the BIOS Setup Utility, you will encounter the Main setup screen. You 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.

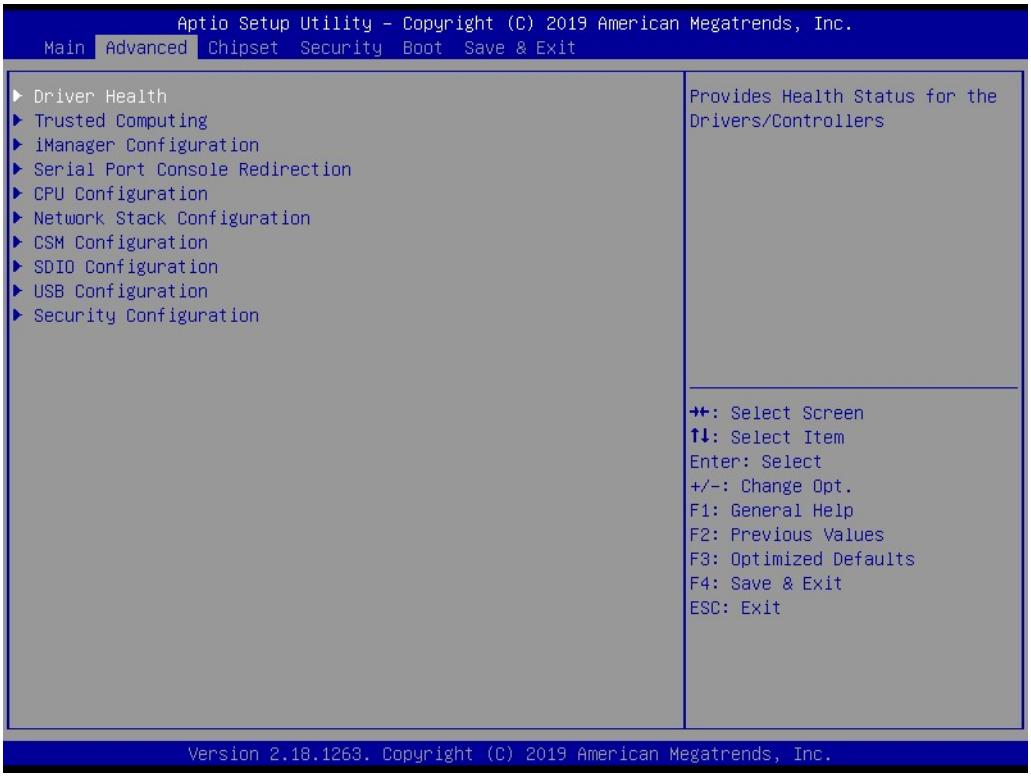
System time / System date

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.

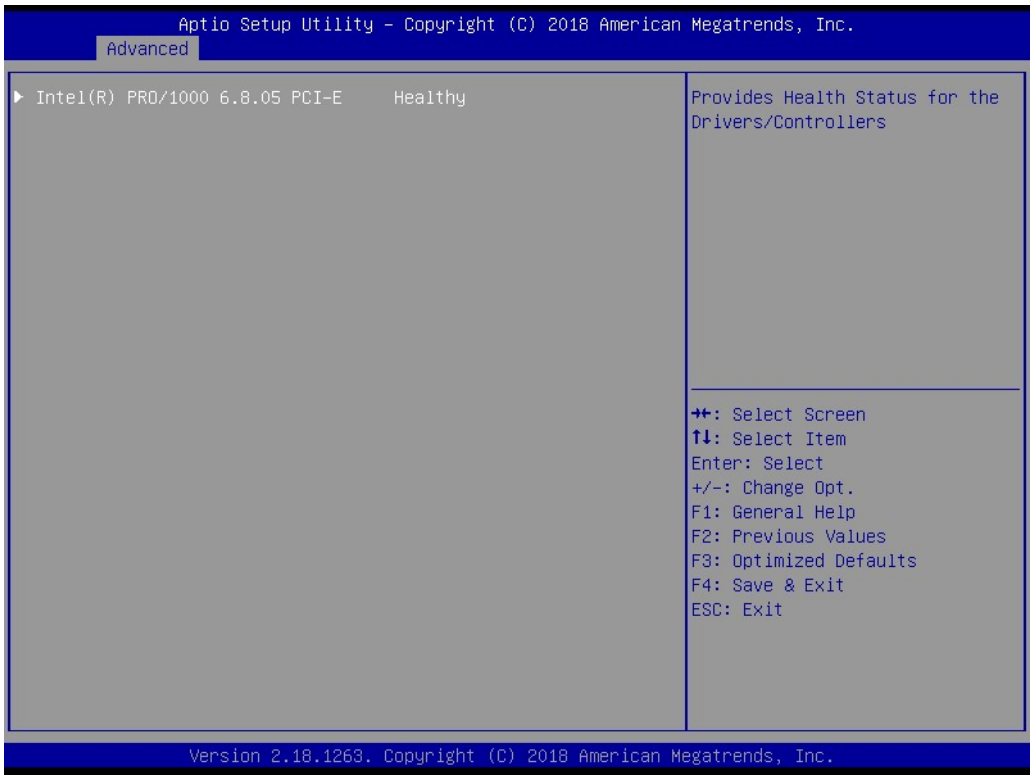
Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.1.2 Advanced BIOS Features Setup

Select the Advanced tab from the EPC-S202 setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. You 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 is shown below. The sub menus are described on the following pages.

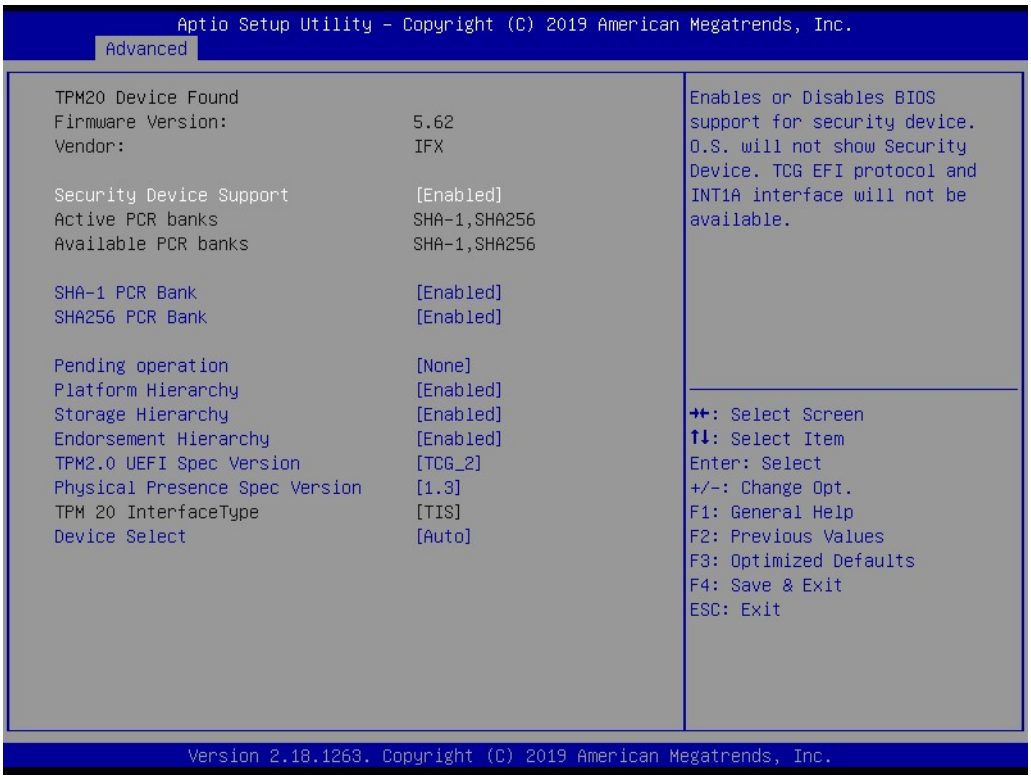


3.1.2.1 Driver Health



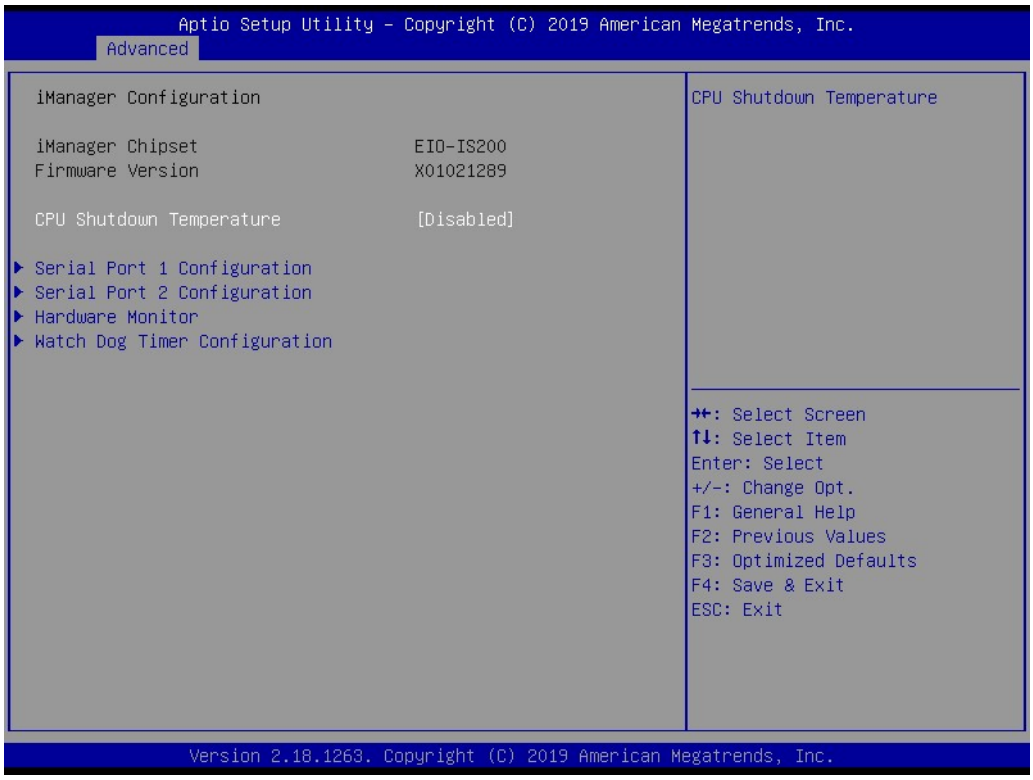
Provide Health Status for the Drivers/Controllers.

3.1.2.2 Trusted Computing



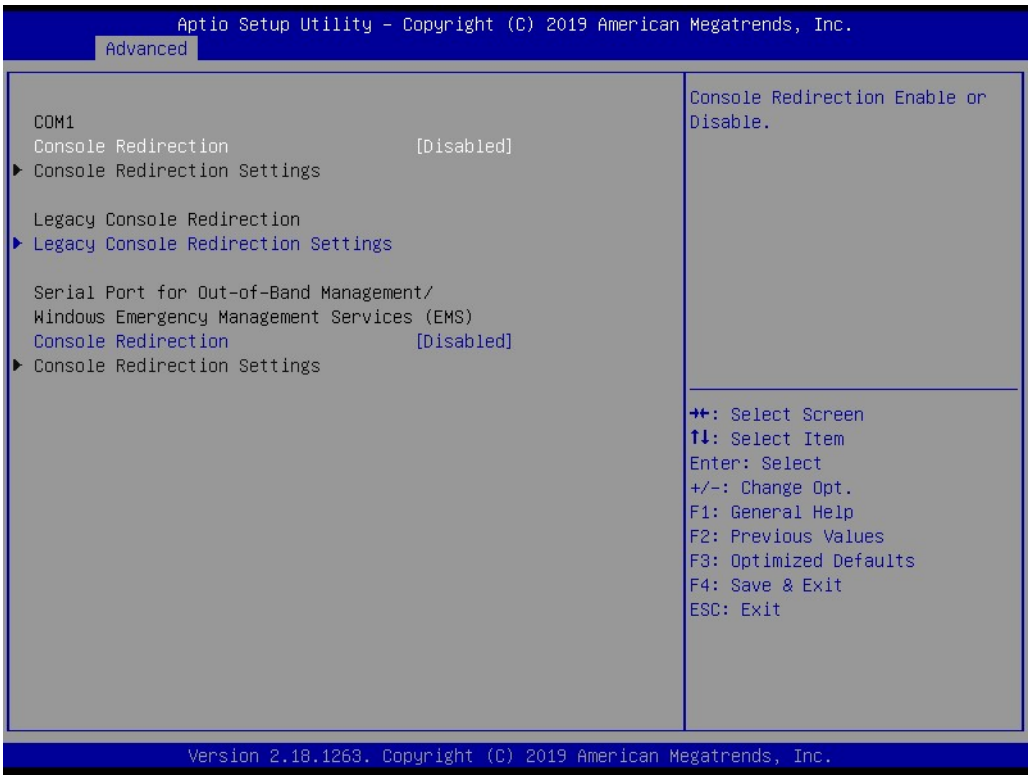
- **Security Device Support**
  Enable or Disable BIOS support for security device.
- **SHA-1 PCR Bank**
  Enable or Disable SHA-1 PCR Bank.
- **SHA256 PCR Bank**
  Enable or Disable SHA256 PCR Bank.
- **Pending operation**
  Schedule an Operation for the Security Device.
- **Platform Hierarchy**
  Enable or Disable Platform Hierarchy.
- **Storage Hierarchy**
  Enable or Disable Storage Hierarchy.
- **Endorsement Hierarchy**
  Enable or Disable Endorsement Hierarchy.
- **TPM 2.0 UEFI Spec Version**
  Select the TCG2 Spec Version Support.
- **Physical Presence Spec Version**
  Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3.
- **Device Select**
  TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices.

3.1.2.3 iManager Configuration



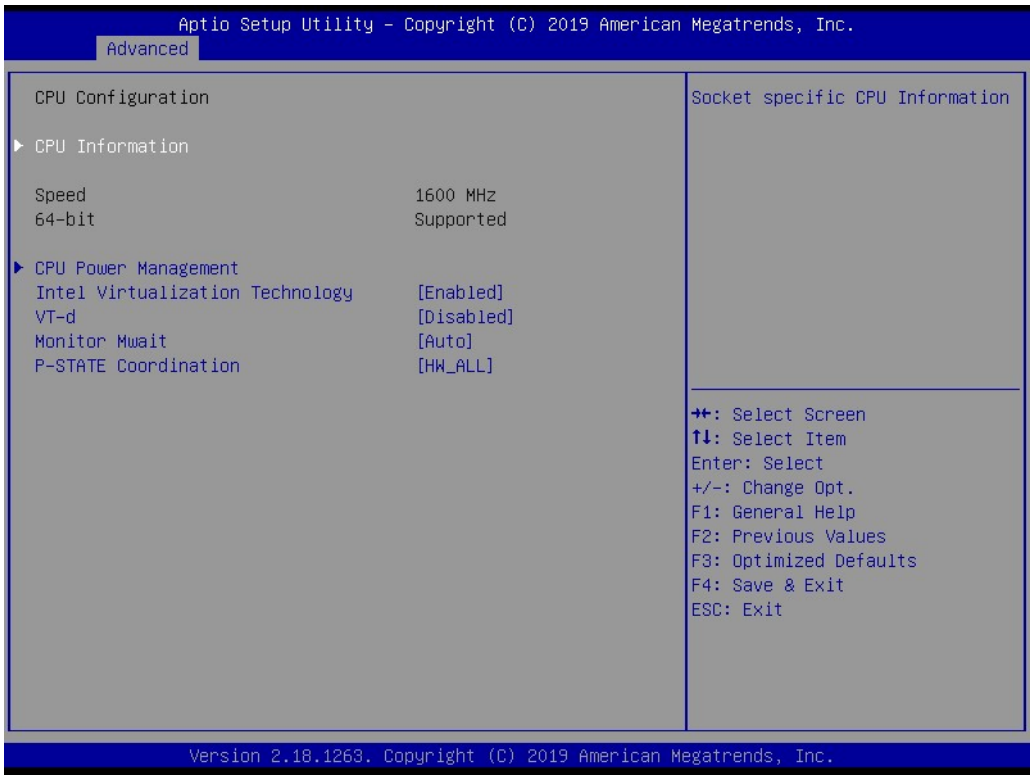
- **CPU Shutdown Temperature**
  CPU Shutdown Temperature settings.
- **Serial Port 1 Configuration**
  Set Parameters of Serial Port 1 (COMA).
- **Serial Port 2 Configuration**
  Set Parameters of Serial Port 2 (COMB).
- **Hardware Monitor**
  Monitor hardware status.
- **Watch Dog Timer Configuration**
  Watch Dog Timer Configuration Page.

3.1.2.4 Serial Port Console Redirection



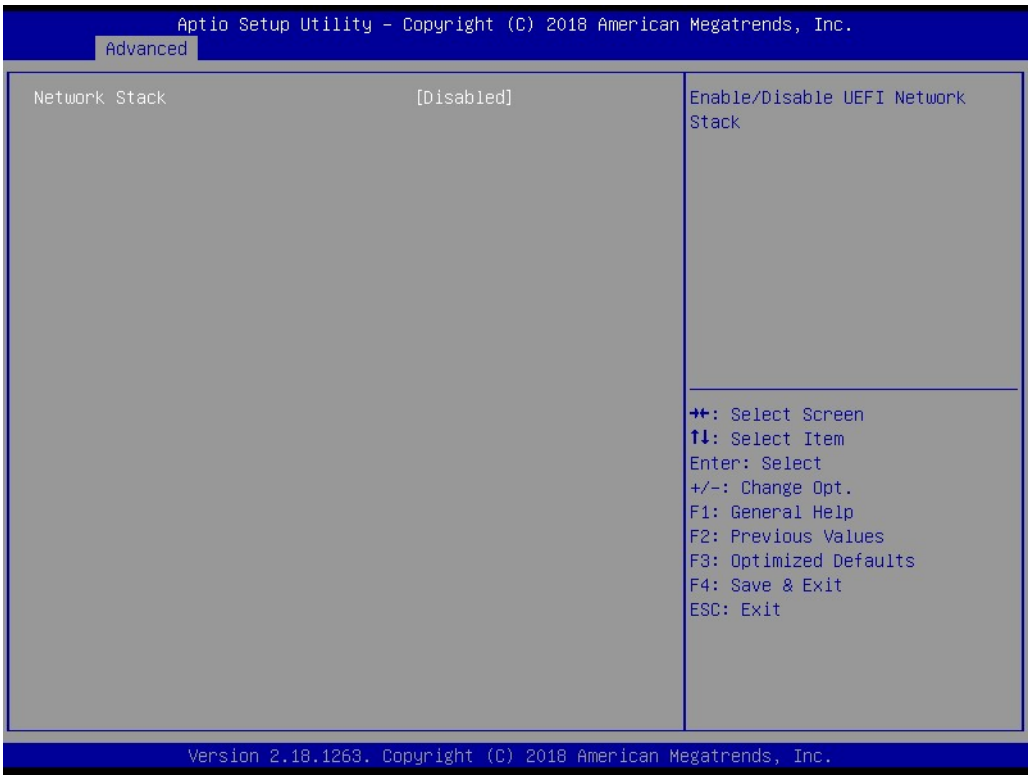
- **Console Redirection**
  This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).
- **Console Redirection**
  This item allows users to configure console redirection detail settings.

3.1.2.5 CPU Configuration



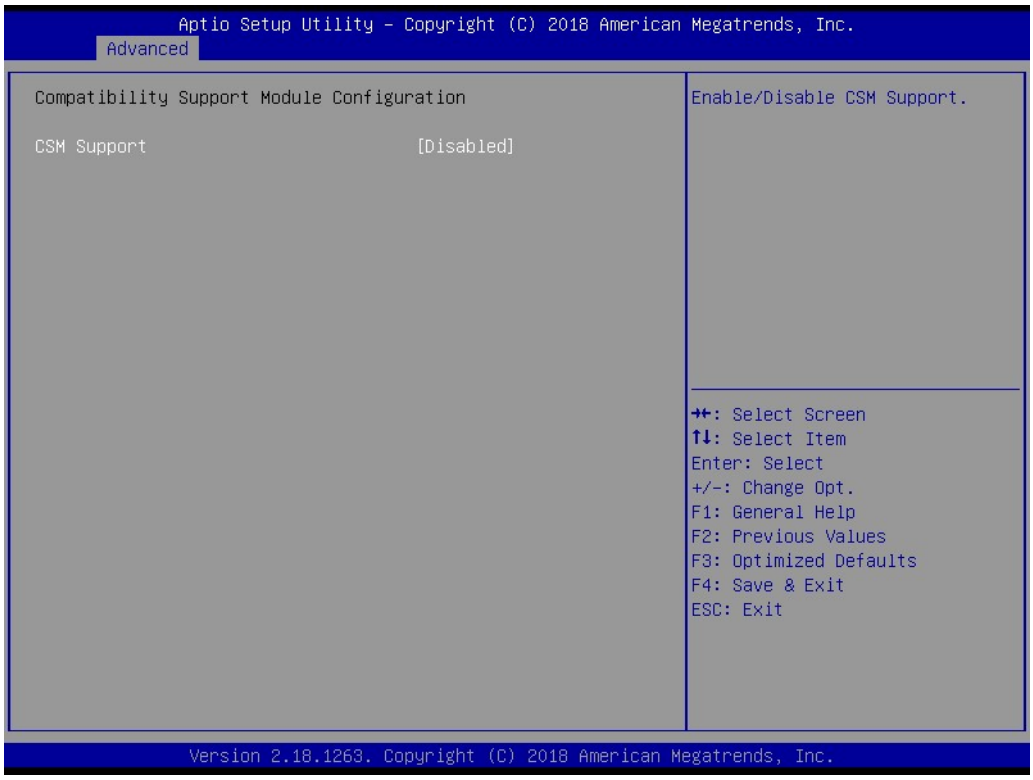
- **Intel Virtualization Technology**
  When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
- **VT-d**
  Enable/Disable CPU VT-d.
- **Monitor Mwait**
  Enable/Disable Monitor Mwait.
- **P-STATE Coordination**
  Change P-STATE Coordination type.

3.1.2.6 Network Stack Configuration



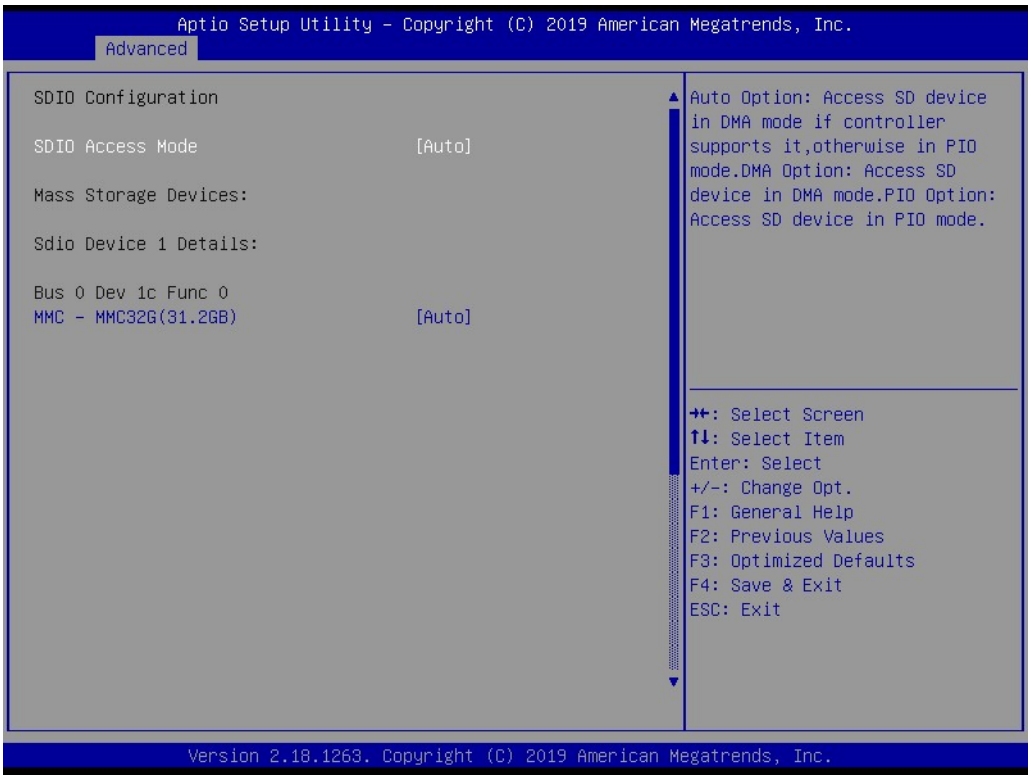
- **Network Stack**
  Enable/Disable UEFI Network Stack.

3.1.2.7 CSM Configuration



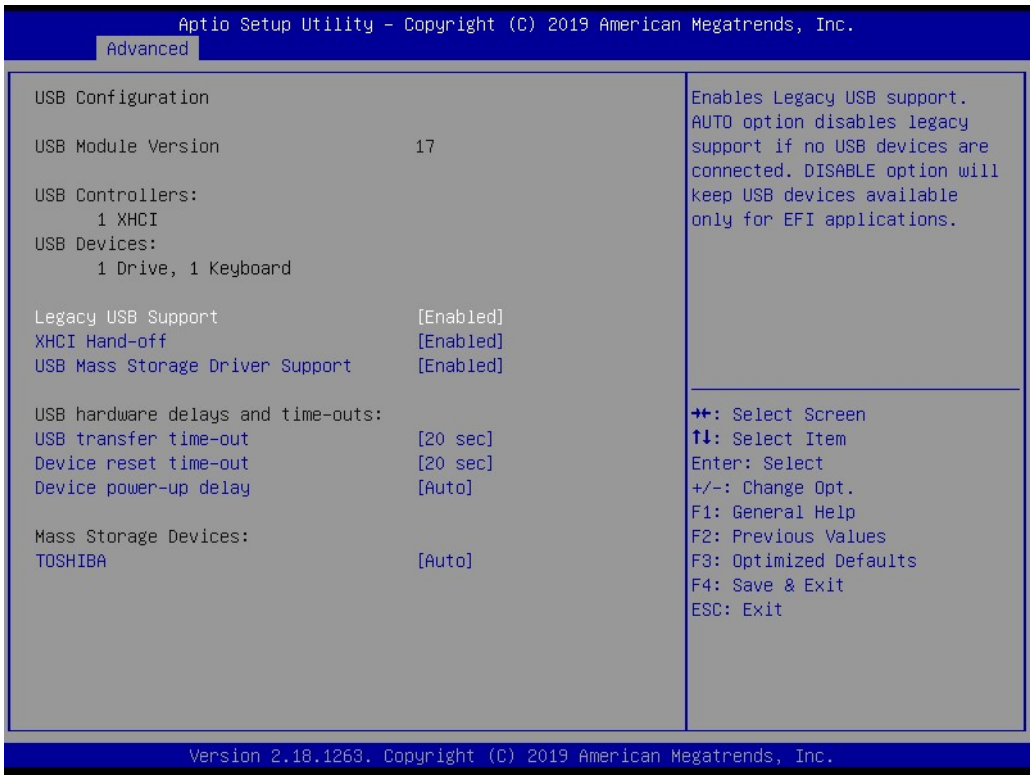
- **CSM Support**
  Enable/Disable CSM Support.
- **GateA20 Active**
  UPON REQUEST - GA20 can be disabled using BIOS services. ALWAYS – do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
- **INT19 Trap Response**
  BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot.
- **Boot option filter**
  This option controls Legacy/UEFI ROMs priority.
- **Network**
  Controls the execution of UEFI and Legacy PXE OpROM.
- **Storage**
  Controls the execution of UEFI and Legacy Storage OpROM.
- **Video**
  Controls the execution of UEFI and Legacy Video OpROM.
- **Other PCI devices**
  Determines OpROM execution policy for devices other than Network, Storage, or Video.

3.1.2.8 SDIO Configuration



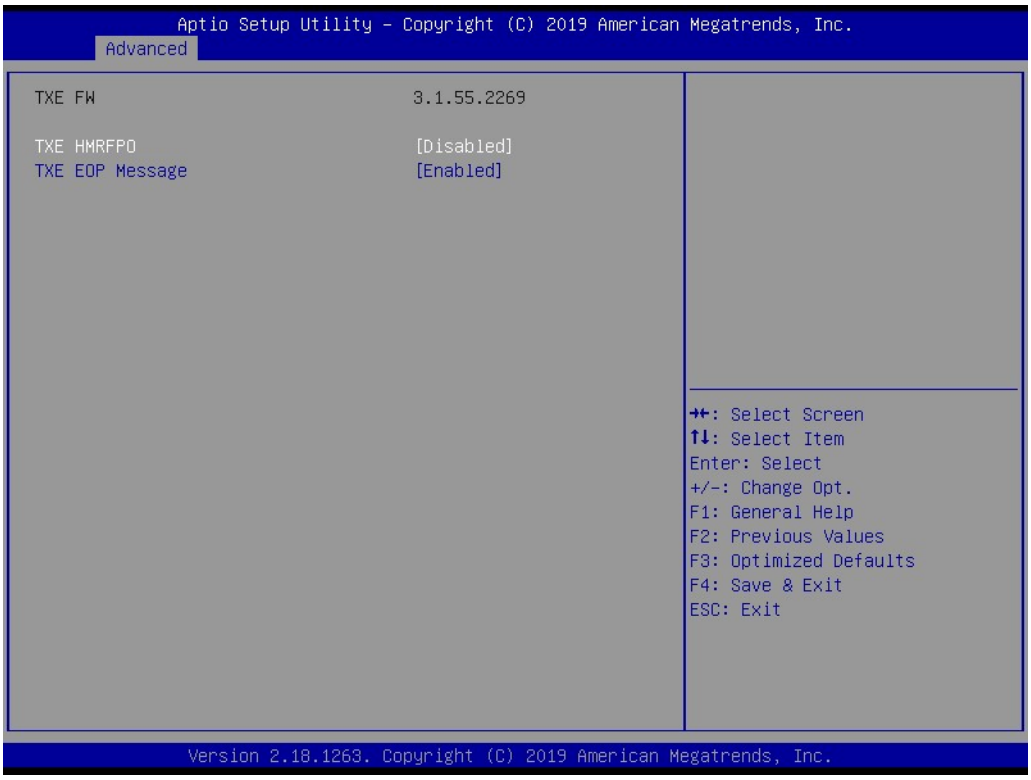
- **SDIO Access Mode**
  Select SDIO device operating mode to DMA or PIO mode.

3.1.2.9 USB Configuration



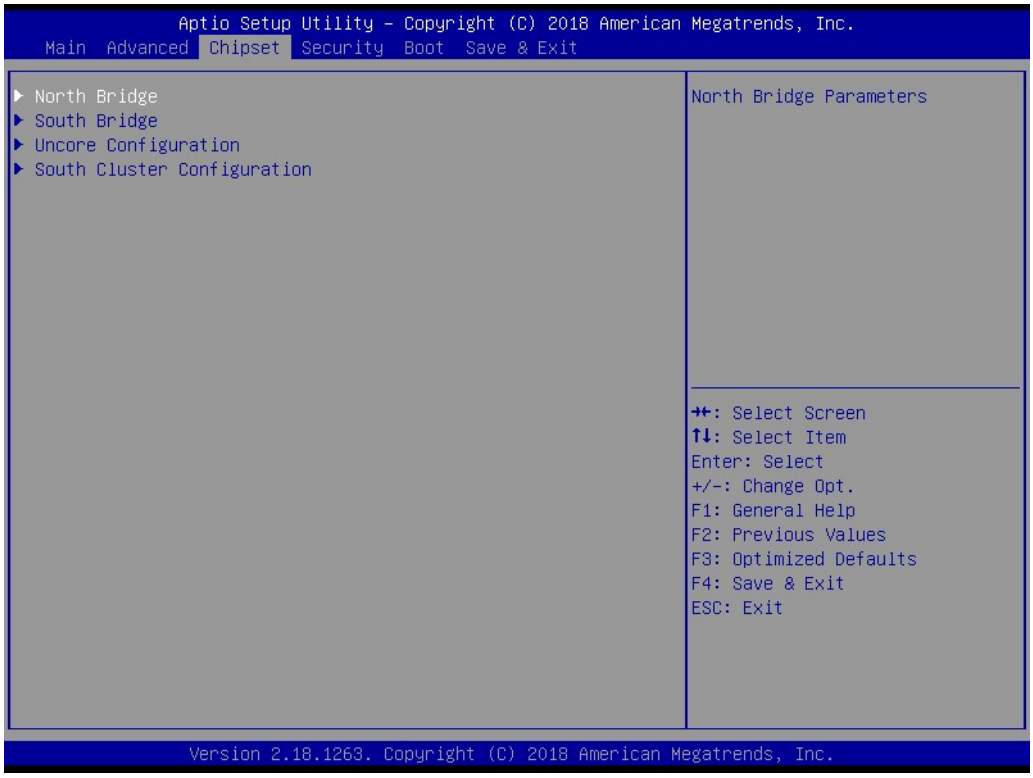
- **Legacy USB Support**
  Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
- **XHCI Hand-off**
  This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
- **USB Mass Storage Driver Support**
  Enable/Disable USB Mass Storage Driver Support.
- **USB transfer time-out**
  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. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

3.1.2.10 Security Configuration



- **TXE HMRFPO Disable**
- **TXE EOP Message**
  Send EOP Message Before Enter OS.

3.1.3 Chipset Configuration

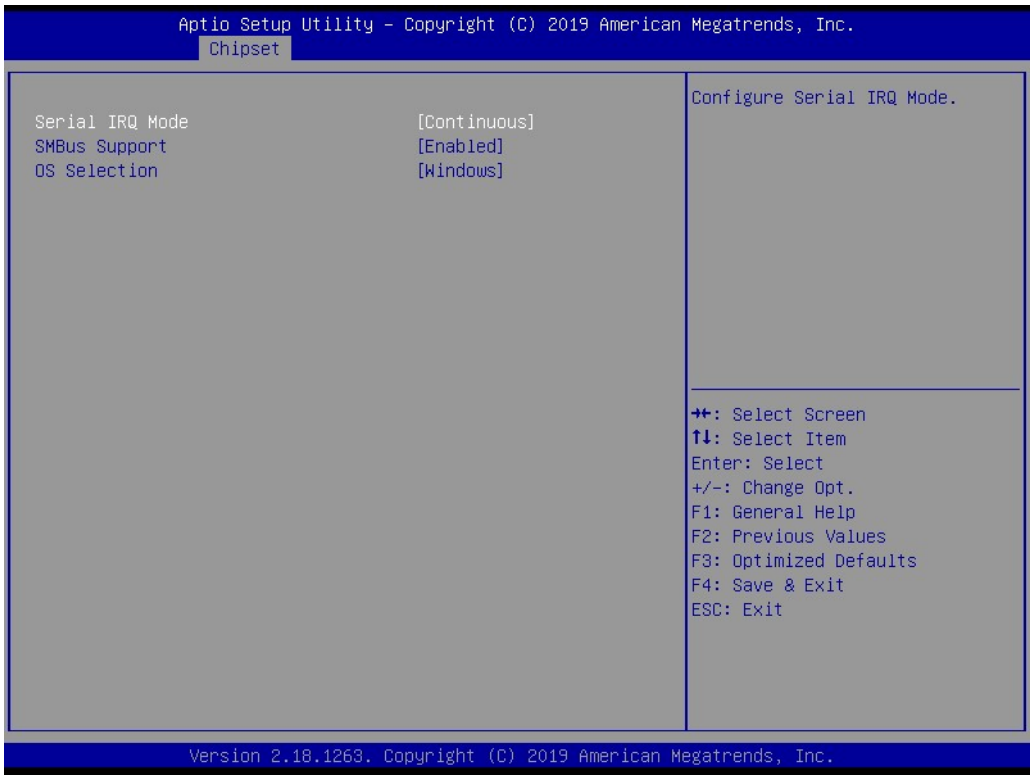


- **North Bridge**
  Details for North Bridge items.
- **South Bridge**
  Details for South Bridge items.
- **Uncore Configuration**
  Details for Uncore Configuration.
- **South Cluster Configuration**
  Details for South Cluster Configuration.

3.1.3.1 North Bridge

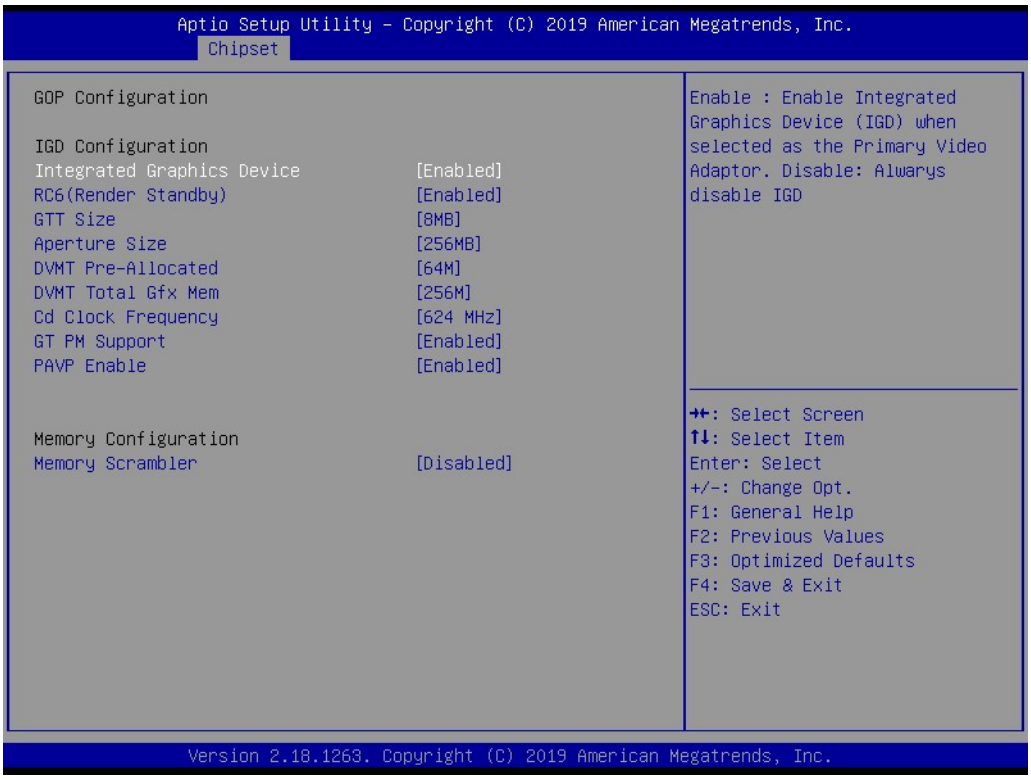
- **Max TOLUD**
  Maximum Value of TOLUD.

3.1.3.2 South Bridge



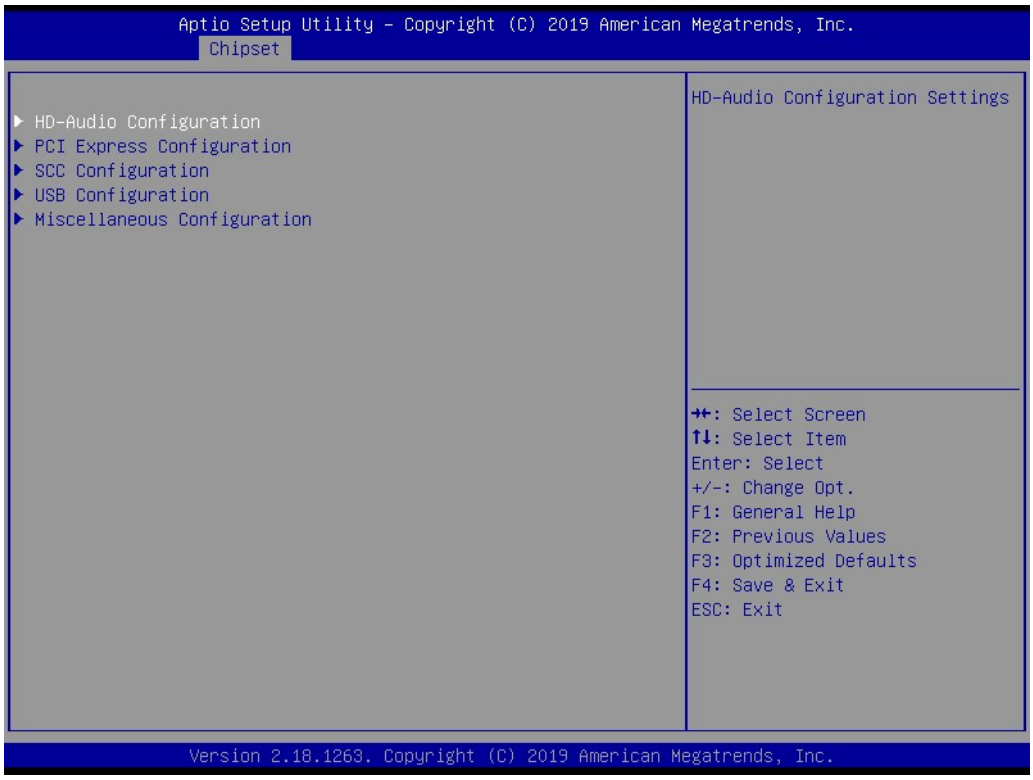
- **Serial IRQ Mode**
  Configure Serial IRQ Mode.
- **SMBus Support**
  Enable/Disable SMBus Support.
- **OS Selection**
  Select the target OS.

3.1.3.3 Uncore Configuration



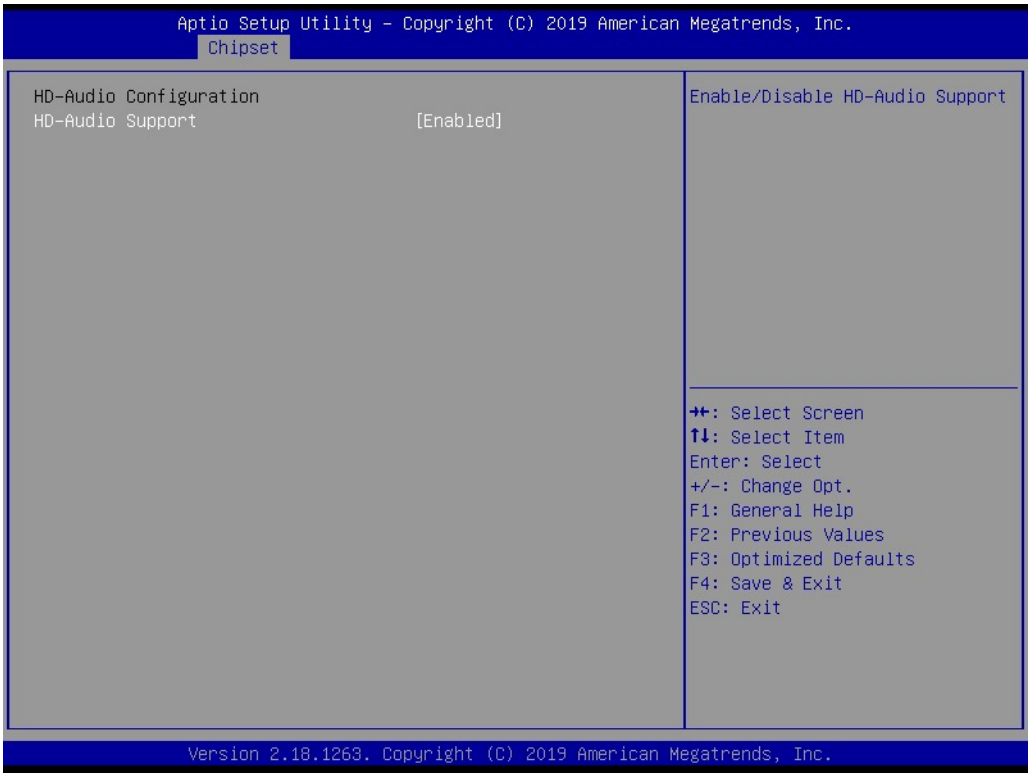
- **Integrated Graphics Device**
  Enable: Enable Integrated Graphics Device (IGD) when selected as the Primary Video Adapter. Disable: Always disable IGD.
- **RC6 Render Standby)**
  Check to Enable render standby support.
- **GTT Size**
  Select the GTT Size.
- **Aperture Size**
  Select the Aperture 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 DVMT 5.0 Total Graphic Memory size used by the Internal Graphics Device.
- **Cd Clock Frequency**
  Select the highest Cd Clock frequency supported by the platform.
- **GT PM Support**
  Enable/Disable GT PM Support.
- **PAVP Enable**
  Enable/Disable PAVP.
- **Memory Scrambler**
  Enable/Disable Memory Scrambler support.

3.1.3.4 South Cluster Configuration



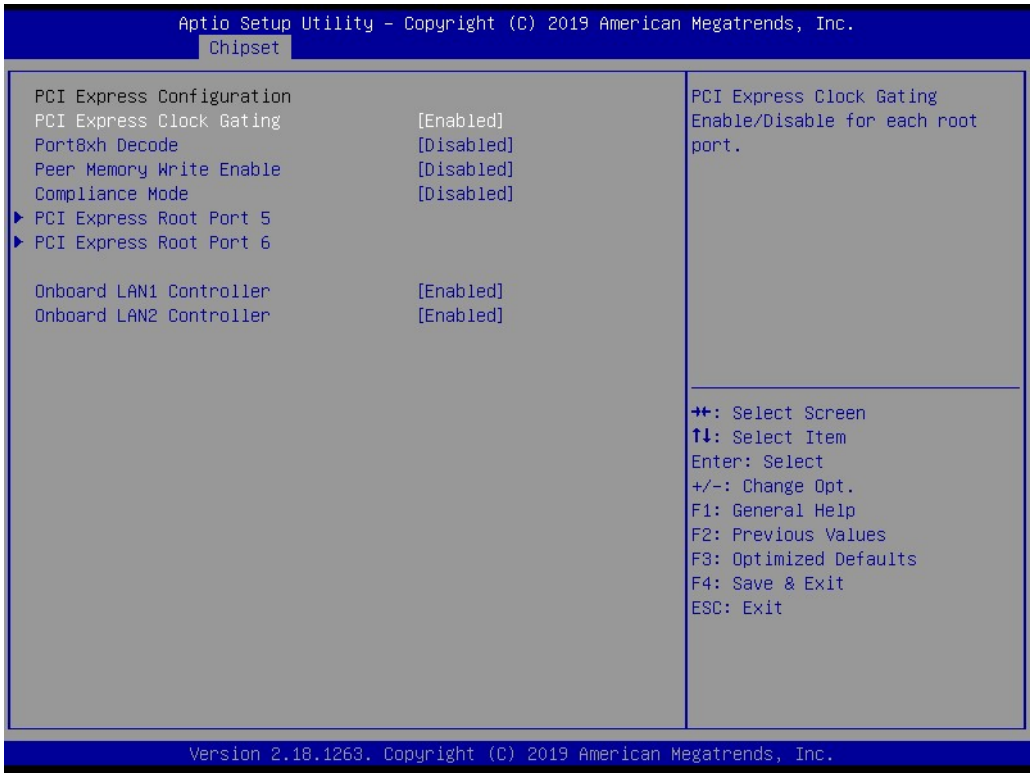
- **HD-Audio Configuration**
  HD-Audio Configuration Settings.
- **PCI Express Configuration**
  PCI Express Configuration Settings.
- **SCC Configuration**
  SCC Configuration Settings.
- **USB Configuration**
  USB Configuration Settings.
- **Miscellaneous Configuration**
  Enable/Disable Misc. Features.

HD-Audio Configuration



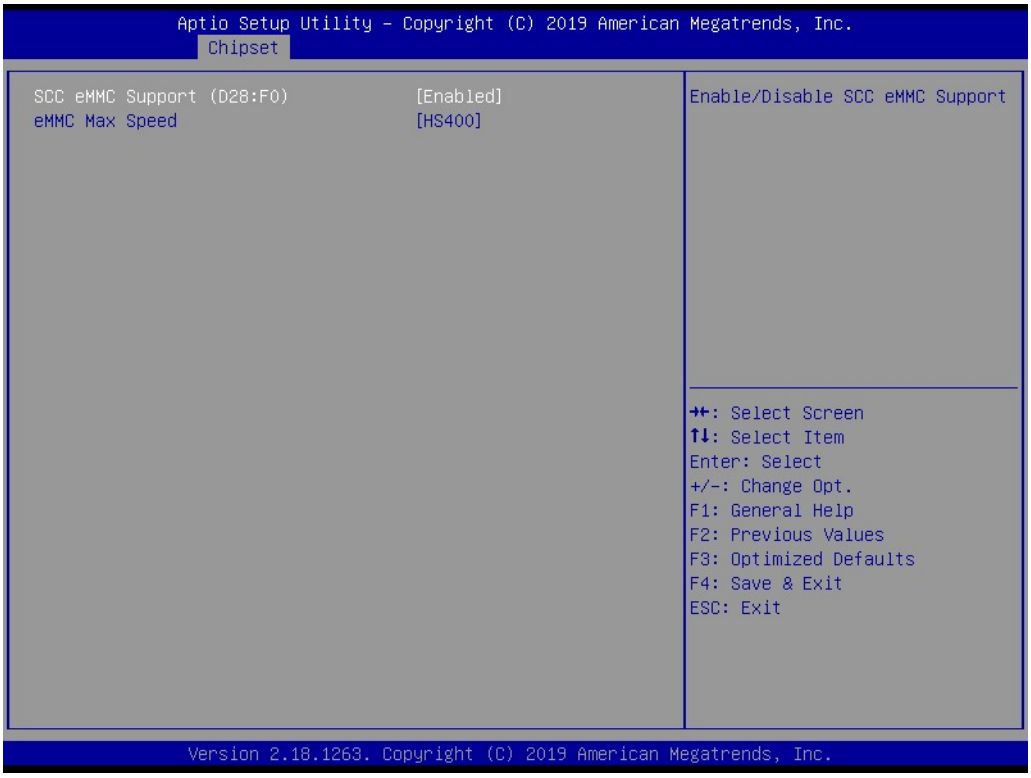
- **HD-Audio Support**
  Enable/Disable HD-Audio Support.

PCI Express Configuration



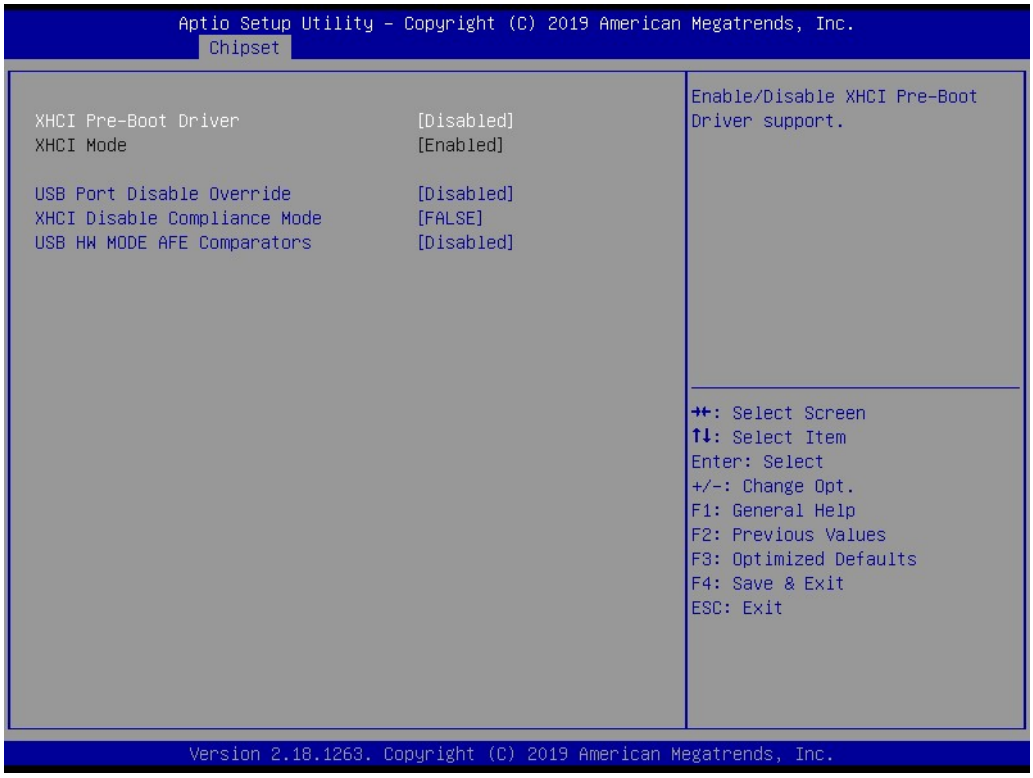
- **PCI Express Clock Gating**
  PCI Express Clock Gating Enable/Disable.
- **Peer Memory Write Enable**
  Peer Memory Write Enable/Disable.
- **Compliance Mode**
  Compliance Mode Enable/Disable.
- **PCI Express Root Port 5 / 6**
  Control the PCI Express Root Port.
- **Onboard LAN1/LAN2 Controller**
  Select to Enable or Disable Onboard LAN1/LAN2 Controller.
- **LAN Option ROM**
  Enabled / Disabled Onboard LAN's PXE option ROM.

SCC Configuration



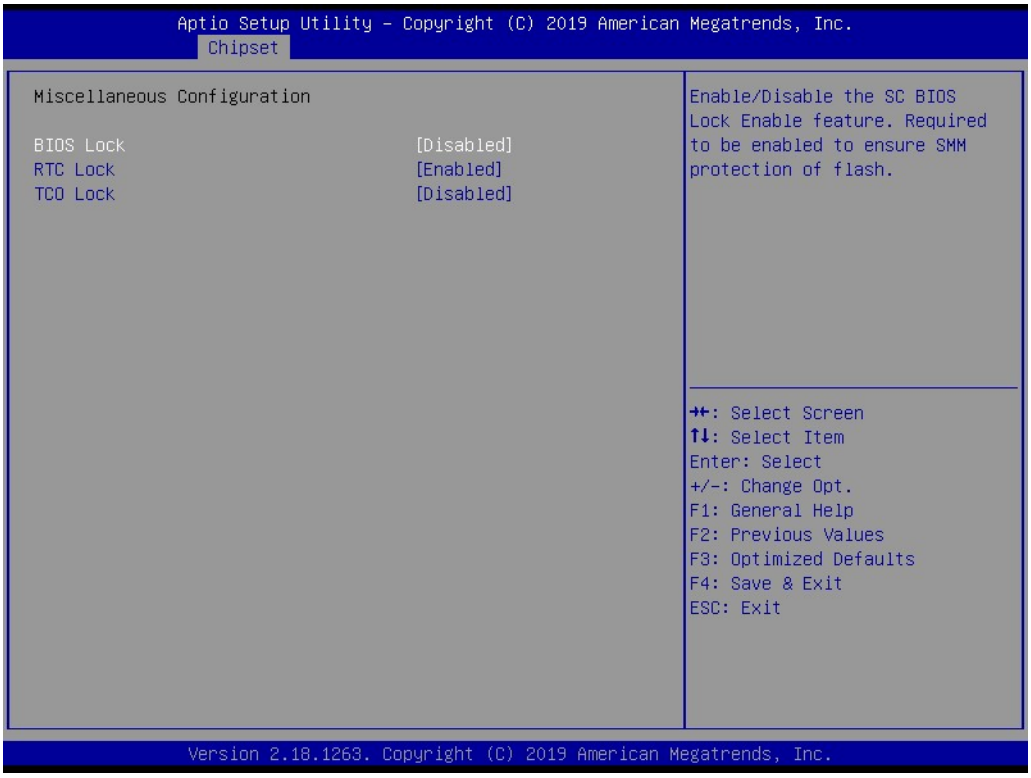
- **SCC eMMC Support (D28:F0)**
  Enable/Disable SCC eMMC Support.
- **eMMC Max Speed**
  Select the eMMC max Speed allowed.

USB Configuration



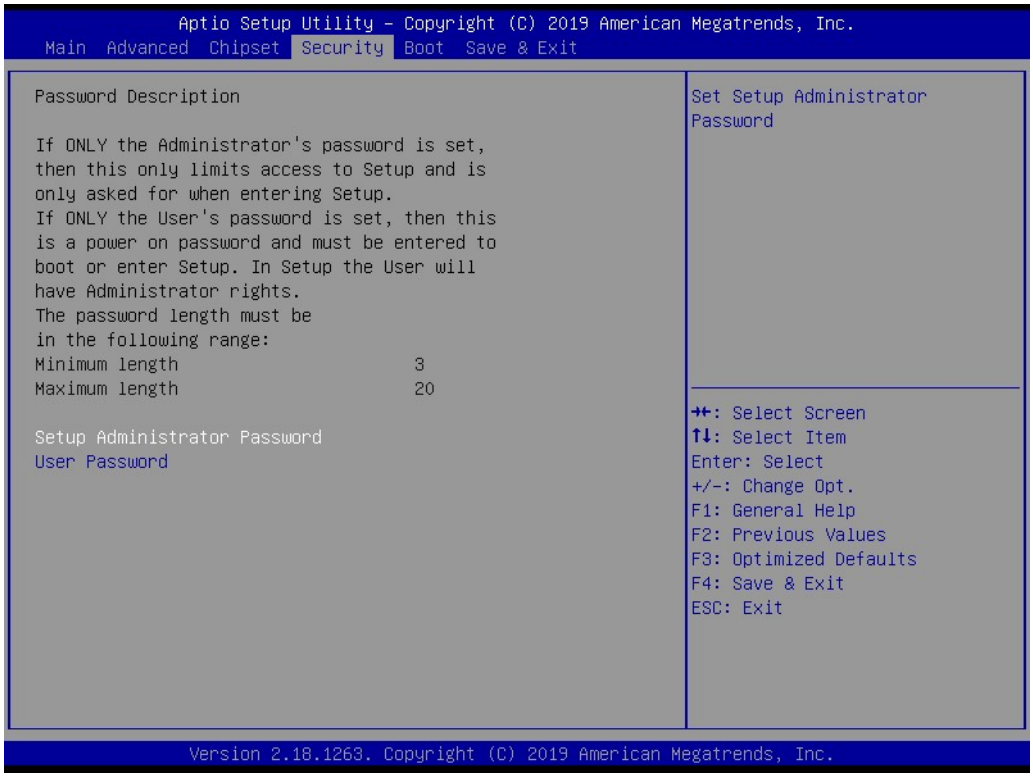
- **XHCI Pre-Boot Driver**
  Enable/Disable XHCI Pre-Boot Driver Support.
- **USB Port Disable Override**
  Selectively Enable/Disable corresponding USB port from reporting a Device Connection to the controller.
- **XHCI Disable Compliance Mode**
  Options to disable XHCI Link Compliance Mode.
- **USB HW MODE AFE Comparators**
  Enable/Disable USB HW MODE AFE Comparators.

Miscellaneous Configuration



- **BIOS Lock**
  Enable/Disable the BIOS Lock Enable feature.
- **RTC Lock**
  Enable or disable bytes 38h-3Fh in the upper and lower 128-byte bank of RTC RAM lockdown.
- **TCO SMI Lock**
  Enable TCO and Lock Down TCO.

3.1.4 Security

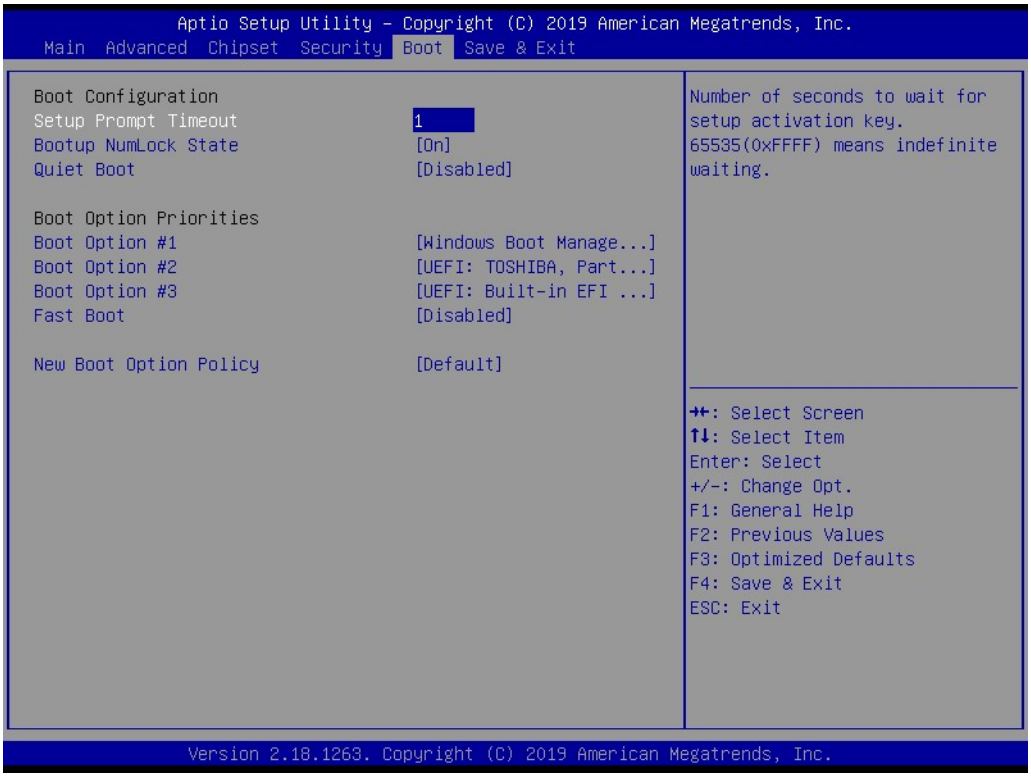


Select Security Setup from the EPC-S202 Setup main BIOS setup menu. All Security Setup options, such as password protection and virus protection are described in this section. To access the sub menu for the following items, select the item and press <Enter>:

Change Administrator / User Password

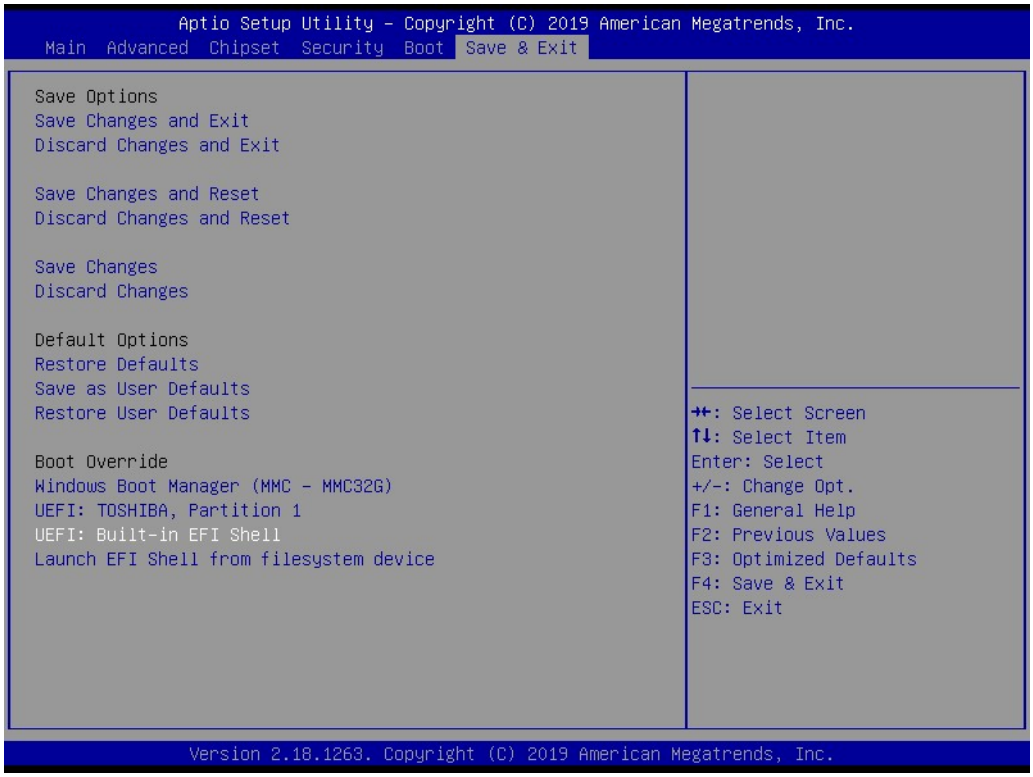
Select this option and press <ENTER> to access the sub menu, and then type in the password.

3.1.5 Boot



- **Setup Prompt Timeout**
  Number of seconds that the firmware will wait before initiating the original default boot selection. A value of 0 indicates that the default boot selection is to be initiated immediately on boot. A value of 65535(0xFFFF) indicates that firmware will wait for user input before booting. This means the default boot selection is not automatically started by the firmware.
- **Bootup NumLock State**
  Select the keyboard NumLock state.
- **Quiet Boot**
  Enables or Disables Quiet Boot option.
- **Boot Option #1**
  Sets the system boot order.
- **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.
- **New Boot Option Policy**
  Controls the placement of newly detected UEFI boot options.

3.1.6 Save & Exit



- **Save Changes and Exit**
  This item allows you to exit system setup after saving changes.
- **Discard Changes and Exit**
  This item allows you to exit system setup without saving any changes.
- **Save Changes and Reset**
  This item allows you to reset the system after saving changes.
- **Discard Changes and Reset**
  This item allows you to rest system setup without saving changes.
- **Save Changes**
  This item allows you to save changes made to any of the options so far.
- **Discard Changes**
  This item allows you to discard changes done to any of the options so far.
- **Restore Defaults**
  This item allows you to restore/load default values for all options.
- **Save as User Defaults**
  This item allows you to save the changes done so far as user defaults.
- **Restore User Defaults**
  This item allows you to restore the user defaults to all the options.
- **Boot Override**
  Boot device select can override your boot priority.

Appendix A

Watchdog Timer Sample Code

A.1 Watchdog Timer Sample Code

Watchdog function:

The SCH3114 Runtime base I/O address is A00h.
Setting WatchDog time value location at offset 66h.
If set value “0”, it is mean disable WatchDog function.

```
Superio_GPIO_Port = A00h
mov dx,Superio_GPIO_Port + 66h
mov al,00h
out dx,al
.model small
.486p
.stack 256
.data
SCH3114_IO EQU A00h
.code
org 100h
.STARTup
;=====================================================
;47H
;enable WDT function bit [0]=0Ch
;=====================================================
mov dx,SCH3114_IO + 47h
mov al,0Ch
out dx,al
;=====================================================
;65H
;bit [1:0]=Reserved
;bit [6:2]Reserve=00000
;bit [7] WDT time-out Value Units Select
;Minutes=0 (default) Seconds=1
;=====================================================
mov dx,SCH3114_IO + 65h;
mov al,080h
out dx,al
;=====================================================
;66H
;WDT timer time-out value
;bit[7:0]=0~255
;=====================================================
mov dx,SCH3114_IO + 66h
mov al,01h
out dx,al
;=====================================================
;bit[0] status bit R/W
;WD timeout occurred =1;WD timer counting = 0
;=====================================================
mov dx,SCH3114_IO + 68h
```

```
mov al,01h
out dx,al
.exit
END
```

Appendix B

SUSI API Introduction

B.1 SUSI API Introduction

To make hardware easier and more convenient to access for programmers, Advantech has released a suite of Application Programming Interfaces (API) in the form of a program library. This program library is called Secured and Unified Smart Interface or SUSI.

SUSI provides a uniform API for application programmers to access the hardware functions in different Operating Systems and on different Advantech hardware platforms.

Application programmers can invoke the functions exported by SUSI instead of calling the drivers directly. The benefit of using SUSI is portability. The same set of APIs is defined for different Advantech hardware platforms. Also, the same API set is implemented in different Operating Systems. This user's manual describes some sample programs and the API in SUSI. The hardware functions currently supported by SUSI can be grouped into a few categories including Watchdog and Hardware Monitor. Each category of API in SUSI is briefly described below.

B.1.1 The Watchdog API

A watchdog timer (abbreviated as WDT) is a hardware device that triggers an action, e.g. rebooting the system, if the system does not reset the timer within a specific period of time. The WDT API in SUSI provides developers with functions such as starting the timer, resetting the timer, and setting the timeout value if the hardware requires customized timeout values.

B.1.2 The Hardware Monitor API

The hardware monitor (abbreviated as HWM) is a system health supervision capability achieved by placing certain I/O chips along with sensors for inspecting the target of interests for certain condition indexes, such as temperature and voltage etc.

However, due to the inaccuracy among many commercially available hardware monitoring chips, Advantech has developed a unique scheme for hardware monitoring - achieved by using a dedicated micro-processor with algorithms specifically designed for providing accurate, real-time, and reliable data content; helping protect your system in a more reliable manner.

ADVANTECH

Enabling an Intelligent Planet

www.advantech.com

Please verify specifications before quoting. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.

No part of this publication may be reproduced in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission from the publisher.

All brand and product names are trademarks or registered trademarks of their respective companies.

© Advantech Co., Ltd. 2020