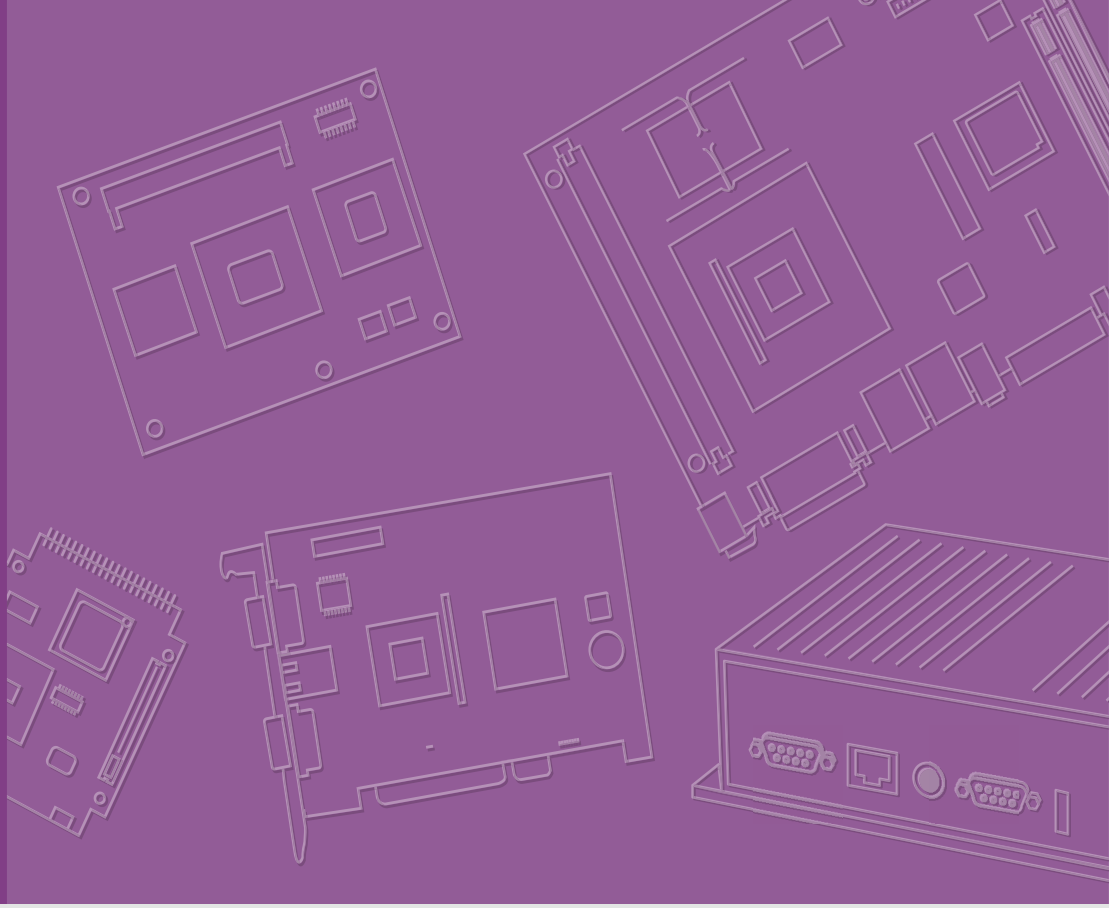


User Manual

TS-207

Fanless Embedded Computer with IP65-Rated Enclosure

ADVANTECH

Enabling an Intelligent Planet

Attention!

This package contains a hard-copy user manual in Chinese for China CCC certification purpOS, Please download the latest English user manual and drivers on website: https://www.advantech.tw/products/1-flnuyz/TS-207/mod_fbd3dc60-12e1-41f6-978b-d74bdd128da4

Please disregard the printed Chinese copy of the user manual if the product is not to be sold and/or installed in China.

甲類警語： 警告使用者：這是甲類資訊產品，在居住的環境中使用時， 可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當對策。

Copyright

The documentation and the software included with this product are copyrighted 2023 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. The 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 that may result from its use.

Acknowledgments

Intel and Pentium are trademarks of Intel® Corporation.

Microsoft Windows and MS-DOS are registered trademarks of Microsoft® Corp.

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

Product Warranty (3 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.

Part No. 2006020700 Edition 1

Printed in Taiwan July 2023

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This type of cable is available from Advantech. Please contact your local supplier for ordering information.

Test conditions for passing also include the equipment being operated within an industrial enclosure. In order to protect the product from damage caused by electrostatic discharge (ESD) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

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:

1. Reorient or relocate the receiving antenna
2. Increase the separation between the equipment and receiver
3. Connect the equipment to an outlet on a circuit different from that to which the receiver is connected
4. 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

Option Information

Part Number	Description
N/A*	Boot style hood kits for waterproof (2 x USB, 2 x HDMI, 2 x DB9)
SQR-SD4E16G3K2MNEB	Ultra Grade 260-Pin SODIMM DDR4-3200 16GB, operating temperature -40 ~ 125 °C
AIW-212 HU-001	Industrial GPS NEO-M9N, GPS/BeiDou/Galileo/ GLONASS, half sized mini-PCIe module, operating temperature -40 ~ 85 °C
96PSA-A120W24T2-3	Power adapter A/D 100-240V 120W 24V C14 CORD
1702002600	Power cable 3-pin 180 cm, USA type
1702002605-02	Power cable 3-pin 183 cm, Europe type
1700018704	Power cable 3-pin 183 cm, UK type
1700033565-01	Power adapter cable M12 to 6-PIN terminal block for power adapter

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 respectées, peuvent provoquer des blessures!

Caution! *Cautions are included to help prevent hardware damage and data losses.*
Des précautions sont incluses pour vous aider à éviter d'endommager le matériel ou de perdre des données.

Note! *Notes provide additional optional information.*

Document Feedback

To assist us with improving this manual, we welcome all comments and constructive criticism. Please send all feedback in writing to support@advantech.com.

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 TS-207 unit

Ordering Information

Part Number	Description
TS-207-V2DNA1	Celeron 6305E 8GB DRAM 12/24V for In-Vehicle, 0 - 60 °C
TS-207-V5DAA1	i5-1145GRE 8GB DRAM 12/24V for In-Vehicle, -40 - 70 °C
N/A*	Celeron 6305E 8GB DRAM 12/24V for In-Vehicle, PoE, 0 - 60 °C
N/A*	i5-1145GRE 8GB DRAM 12/24V for In-Vehicle, PoE, -40 - 70 °C
N/A*	Celeron 6305E 8GB DRAM 24V for Railway, PoE, 0 -60 °C
N/A*	i5-1145GRE 8GB DRAM 24V for Railway, PoE, -40 - 70 °C

* Product based support. Please contact sales for detailed information.

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. Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet.
9. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long period of time, disconnect it from the power source to avoid damage from transient over voltage.
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. 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.
16. ATTENTION: L'ordinateur est muni d'un circuit en temps reél de l'horloge alimentée par betterie. Il ya un danger d'explosion si la pile est replacée de façon incorrecte. Remplacez uniquement par un type identique ou équivalent recom-

mandé par le fabricant. Jetez les piles usagées selon les instructions du fabricant.

17. CAUTION: Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges.
18. CAUTION: Always ground yourself to remove any static charge before touching the motherboard, backplane, or add-on cards. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.
19. CAUTION: Any unverified component could cause unexpected damage. To ensure the correct installation, please always use the components (ex. screws) provided with the accessory box.
20. ATTENTION: Tout composant non vérifiée pourrait causer des dommages inattendu. Pour garantir une installation correcte, s'il vous plaît utilisez toujours les composants(vis ex.) fournies avec la boîte d'accessories.

Consignes de sécurité

1. Lisez attentivement ces instructions de sécurité.
2. Conservez ce manuel d'utilisation pour référence ultérieure.
3. Débranchez cet équipement de toute prise secteur avant de le nettoyer. Utilisez un chiffon humide. N'utilisez pas de détergents liquides ou en spray pour le nettoyage.
4. Pour les équipements enfichables, la prise de courant doit être située près de l'équipement et doit être facilement accessible.
5. Gardez cet équipement à l'abri de l'humidité.
6. Placez cet équipement sur une surface fiable pendant l'installation. Le laisser tomber ou le laisser tomber peut provoquer des dommages.
7. Les ouvertures du boîtier sont destinées à la convection d'air. Protégez l'équipement contre la surchauffe. NE COUVREZ PAS LES OUVERTURES.
8. Assurez-vous que la tension de la source d'alimentation est correcte avant de connecter l'équipement à la prise de courant. Le câble de la source d'alimentation doit être blindé.
9. Positionnez le cordon d'alimentation de sorte que personne ne puisse marcher dessus. Ne placez rien sur le cordon d'alimentation. La tension et le courant nominal du cordon doivent être supérieurs à la tension et au courant indiqués sur le produit.
10. Toutes les précautions et avertissements sur l'équipement doivent être notés.
11. Si l'équipement n'est pas utilisé pendant une longue période, débranchez-le de la source d'alimentation pour éviter tout dommage par surtension transitoire.
12. Ne versez jamais de liquide dans une ouverture. Cela peut provoquer un incendie ou un choc électrique.
13. N'ouvrez jamais l'équipement. Pour des raisons de sécurité, l'équipement ne doit être ouvert que par un technicien qualifié.
14. 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.
    - Du liquide a pénétré dans l'équipement.
    - L'équipement a été exposé à l'humidité.

- L'équipement ne fonctionne pas bien, ou vous ne pouvez pas le faire fonctionner selon le manuel de l'utilisateur.
- L'équipement est tombé et a été endommagé.
- L'équipement présente des signes évidents de rupture.

15. ATTENTION: L'ordinateur est fourni avec un circuit d'horloge en temps réel alimenté par batterie. Il y a un risque 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.
16. ATTENTION: L'ordinateur est muni d'un circuit en temps réel de l'horloge alimentée par betterie. Il y a un danger d'explosion si la pile est replacée de façon incorrecte. Remplacez uniquement par un type identique ou équivalent recommandé par le fabricant. Jetez les piles usagées selon les instructions du fabricant.
17. ATTENTION: débranchez toujours complètement le cordon d'alimentation de votre châssis lorsque vous travaillez avec le matériel. N'établissez pas de connexions lorsque l'appareil est sous tension. Les composants électroniques sensibles peuvent être endommagés par des surtensions soudaines.
18. ATTENTION: mettez-vous toujours à la terre pour éliminer toute charge statique avant de toucher la carte mère, le fond de panier ou les cartes d'extension. Les appareils électroniques modernes sont très sensibles aux charges électriques statiques. Par mesure de sécurité, utilisez en tout temps un bracelet antistatique. Placez tous les composants électroniques sur une surface dissipant l'électricité statique ou dans un sac blindé antistatique lorsqu'ils ne sont pas dans le châssis.
19. ATTENTION: Tout composant non vérifié peut provoquer des dommages inattendus. Pour garantir une installation correcte, veuillez toujours utiliser les composants (ex. Vis) fournis avec la boîte d'accessoires.
20. ATTENTION: Tout composant non vérifié qui pourrait causer des dommages inattendus. Pour garantir une installation correcte, s'il vous plaît utiliser toujours les composants (vis ex.) Fournis avec la boîte d'accessoires.

Contents

Chapter 1

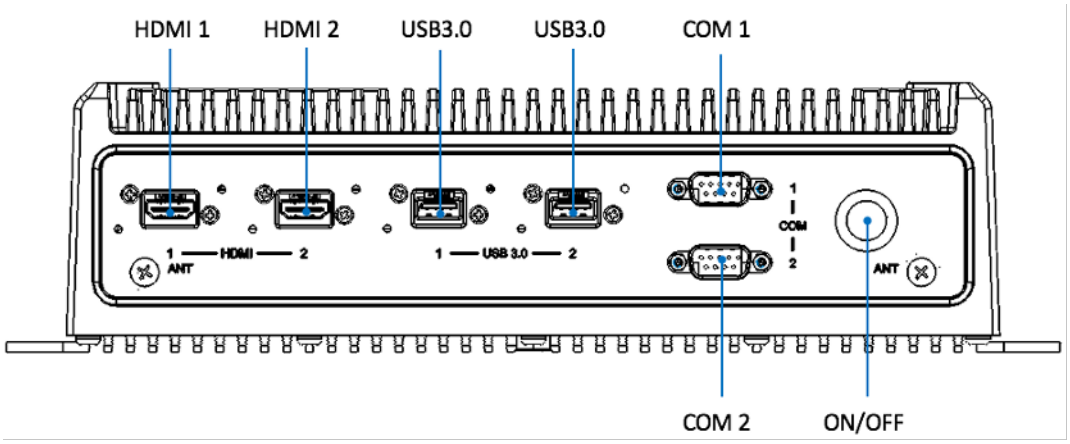
General Introduction

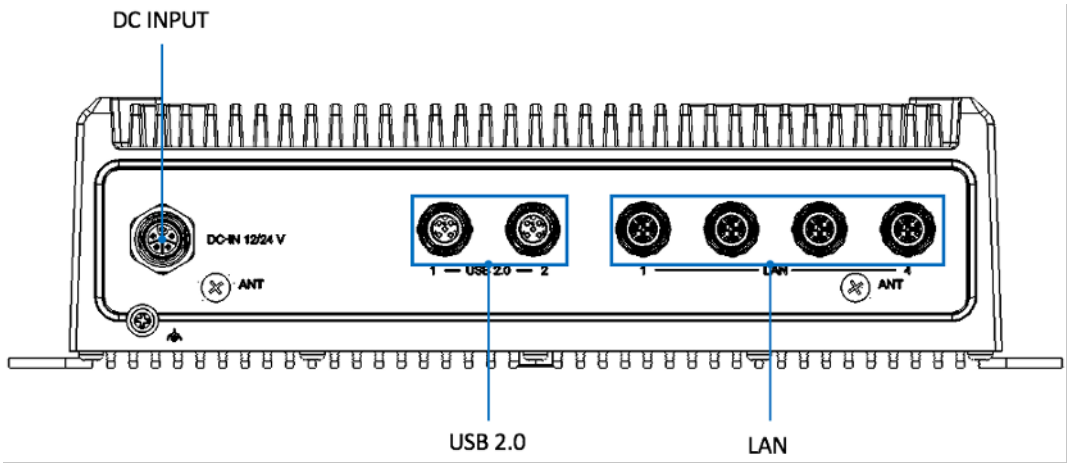
This chapter details background information for the TS-207 series.

1.1 Introduction

Advantech's TS-207 series are fanless embedded computers powered by the 11th Gen Intel® Core™/Celeron® processors that leverage 14nm process technology for transportation applications in outdoor environments. These solutions feature extended operating temperatures (-40-70 °C), an IP65 enclosure rating, and isolated I/O ports that provide high reliability and durability for outdoor applications. TS-207 supports DDR4 3200MT/s with 1.2V power design, up to 16GB memory down, and 32GB SO-DIMM. This solution also integrates 11th Gen. Intel® Core™ processors Iris® Xe Graphics to empower up to 2 x independent 4K displays and further provides support 4 x IEEE802.3af PoE ports with a maximum power output of 60W for IP camera surveillance applications. In addition, this series features Advantech's iManager (SUSI4) software. This software meets embedded application requirements by providing a multi-level watchdog timer, voltage & temperature monitoring, thermal protection, and mitigation via processor throttling and embedded storage for customized information. When combined with Advantech WISE-DeviceOn, it can remotely monitor and control devices.

TS-207 I/O Overview





1.2 Features

- 11th Gen. Intel® Core U-Series i5-1145GRE/ Celeron 6305E Processors
- Fanless Operation Temperature up to -40-70 °C
- Support 4 Ports Gigabit Power over Ethernet
- Lockable Connectors with IP65 Protection
- Intelligent Vehicle Power Ignition
- 12/24 V DC Input for In-vehicle and 24V DC for Railway
- E-Mark & EN50155 Certification and MIL-STD810H Compliance
- Remote Management Advantech WISE-DeviceOn

1.3 Specifications

- **CPU:**
  - Intel Core™ i5-1145GRE 2.6 / 4.1 GHz
  - Intel® Celeron® 6305E 1.8 GHz
- **GPU:**
  - Intel® Iris® Xe Graphics 1.30 / 1.25 GHz
  - 2 x HDMI 2.0b with 4Kx2K support at 48-60Hz/24bpp
- **Graphic output:**
  - HW Encode: Supports AVC, MPEG-2, HEVC, and VP9.
  - HW Decode: Supports Direct3D* 9 Video API (DXVA2), Direct3D 12 Video API, Intel Media SDK, MFT (Media Foundation Transform) filters, Intel VA API
  - **BIOS:**
  - AMI EFI 256 Mbit
- **System memory:**
  - 1 x SO-DIMM socket up to 32GB, DDR4 Dual-channel 3,200 MT/S
  - Onboard 8GB (for Intel i5 CPU skue only)
- **Storage:**
  - mSATA: 1 x full size mSATA storage (leverage mPCIe slot)
  - Onboard NVMe SSD up to 32 GB (support by project)
- **Serial Ports:**
  - 2 x DB-9. Isolated RS-232/422/485 ports with auto flow control
- **USB 3.0 Interface:** 2 x M12 circular with USB 3.0/2.0 support
- **Ethernet: PoE LAN**
  - 4 x M12 circular with Ethernet 10/100/1000 Mbps speed support (max.60W. Follow IEEE802.3af)
- **Expansion slot:**
  - 1 x full-size mini PCIe slot (with PCIe or USB3.0, 2.0)
  - 1 x full-size mini PCIe/mSATA slot (with PCIe Gen1/ USB3.0/USB 3.0 & 2.0 & SATA)
  - 1 x M.2 2230 E Key (with PCIe Gen 1, USB 2.0 signals)
- **Watchdog timer:** 255-level timer interval, setup by software
- **Audio:**
  - Main system: 1 x Pin header, Line-in, Line out, Mic-in (support by project)

- **Power Requirement:**
  - Power type: ATX/AT
  - Input voltage: In-Vehicle: +12/24V DC or Railway: +24V DC
  - Vehicle Power Ignition: Selectable boot-up & shut-down voltage, on/off delay time
  - Isolation: 1.5 KV Isolated
- **Dimensions: (W x H x D):** 316 x 81 x 230 mm (with wall-mounting)
- **Mounting:** Desk/Wall-mounting or Din-Rail/VESA mounting (support by project)
- **Enclosure:** Black aluminum housing
- **Operating temperature:**
  - With extended temperature peripherals: -40 ~ 70 °C with 0.7m/s air flow
  - With standard temperature peripherals: 0 ~ 60 °C with 0.7m/s air flow
- **Storage temperature:** -40 ~ 85 °C (-40 ~ 185 °F)
- **Relative humidity:** 95% @ 40 °C (non-condensing)
- **IP Rating:** IP65 water & dust proof
- **Certifications:**
  - EMC: CE/FCC Class B
  - Safety: 12V and 24V DC: E-Mark (E13)
    Additional for 24V DC: EN50155, EN45545
  - In-Vehicle Power: ISO7637-2 Lev.4
  - Vibration & shock: MIL-STD-810H method 814.8 (Category 4. Trucks and trailer)

1.4 Dimensions

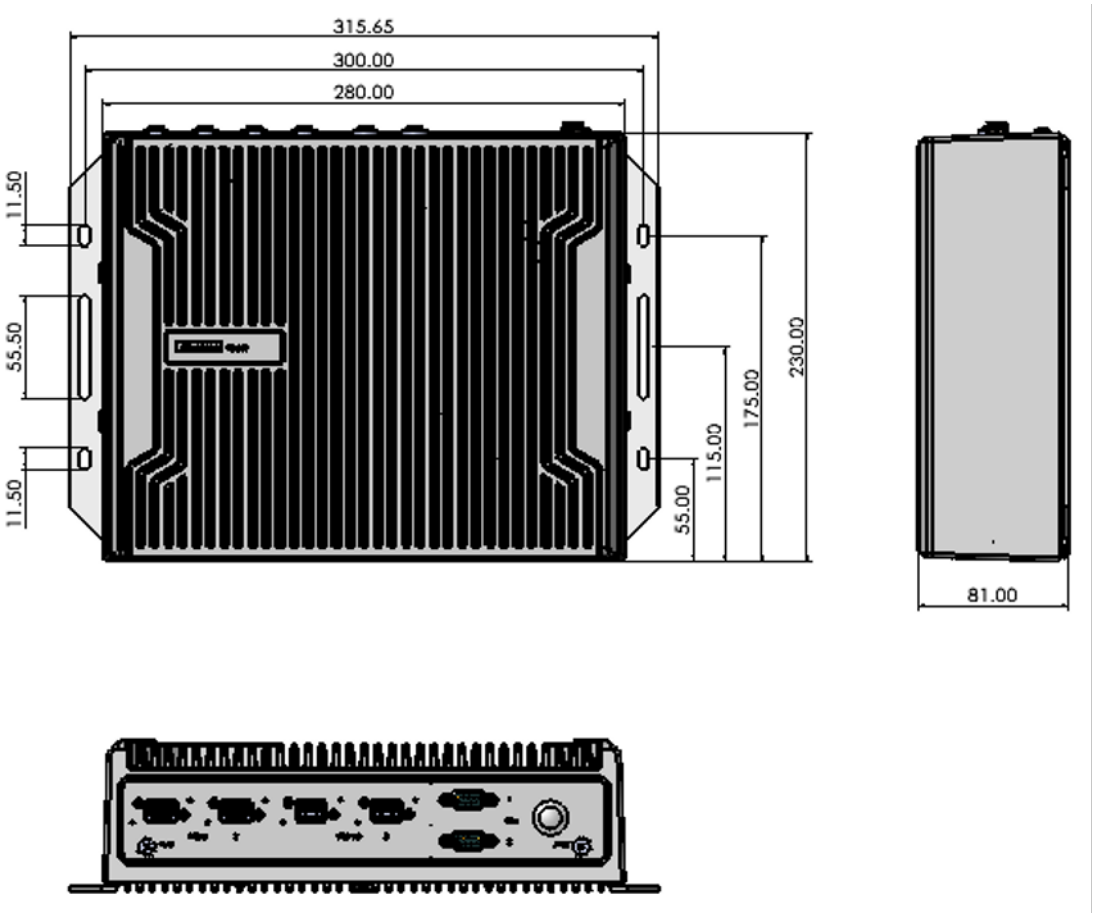


Figure 1.1 TS-207 Dimensions

Chapter 2

Hardware Installation

This chapter introduces the installation of TS-207 hardware.

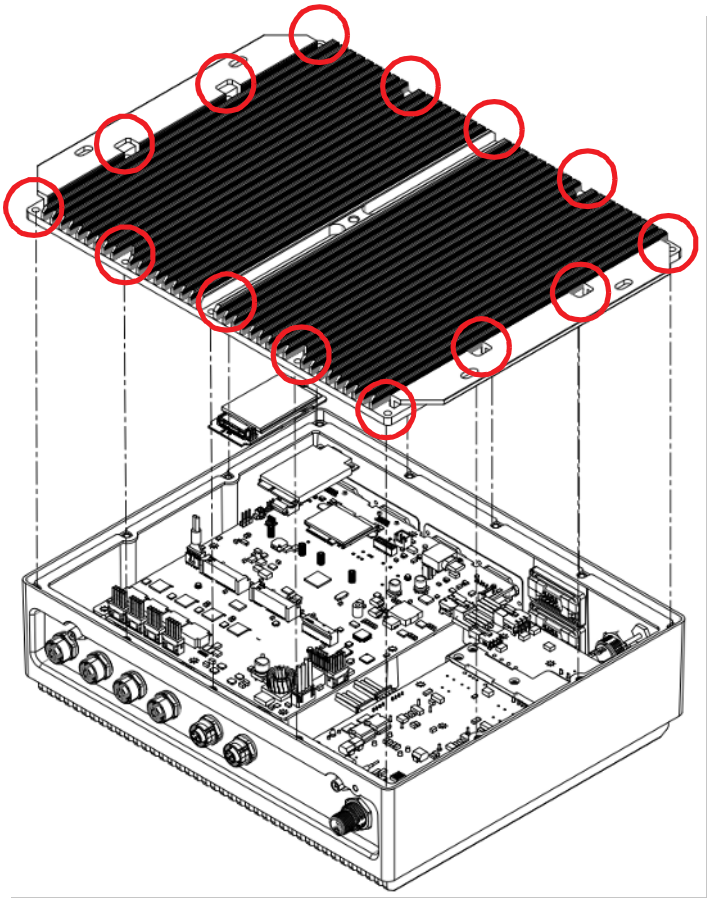
2.1 Overview of Hardware Installation & Upgrading

Warning! *Do not remove the aluminum covers until verifying that no power is flowing within the computer. Power must be switched off and the power cord must be unplugged. Take care in order to avoid injury or damage to the equipment.*

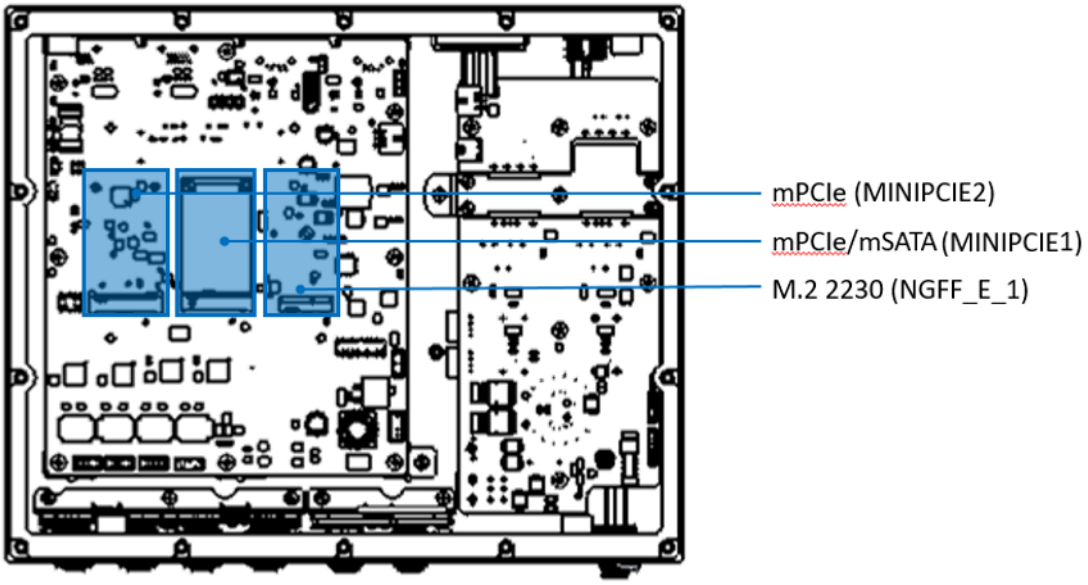
2.2 Expansions (mPCIe, mSATA, and M.2 2230)

Please contact Advantech sales if you want to install or upgrade the hardware in order to ensure product quality and IP-rated protection.

Remove 14 screws in total to install accessories on the button side of the board and please use a torque screwdriver to lock the 14 screws with torque value 8.0±0.5 kgf-cm after installing.

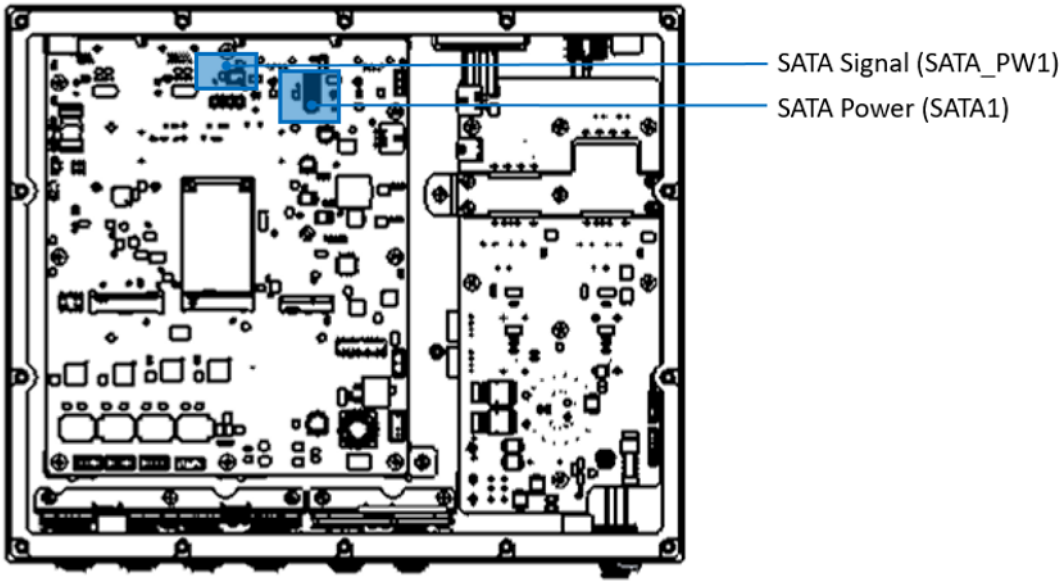


Install accessories on the button side of the board.



2.3 SATA and Power

Please check that SATA cable, power cable, and 2.5” HDD mounting kit are ready before set up. If any item does not accord with the table, please contact your dealer immediately.



2.4 Installing Memory

Please contact Advantech if you want to expand your memory capacity.

2.5 Installing Audio

This project requires customized enclosure and support based on specific needs. Please contact Advantech to inquire further about our project-based support services.

Chapter 3

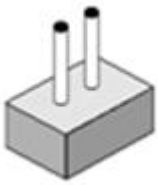
Jumper and Switch Settings

This chapter explains how to set up TS-207 Series hardware, including instructions on setting jumpers and connecting peripherals, and how to set switches and read indicators.

Be sure to read all the safety precautions before beginning the installation procedure.

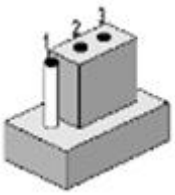
3.1 Setting Jumpers and Switches

It is possible to configure the In-Vehicle Computing Box to match the needs of the application by resetting the jumpers. A jumper is the simplest kind of electrical switch. It consists of two metal pins and a small metal clip, often protected by a plastic cover that slides over the pins to connect them. To “close” a jumper, connect the pins with the clip. To “open” a jumper, remove the clip. Sometimes a jumper has three pins, labeled 1, 2, and 3. In this case, connect either pins 1 and 2, or pins 2 and 3.



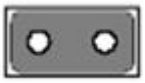
Open

Closed

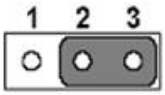


Closed 2-3

Open



Closed



Closed 2-3

A pair of needle-nose pliers may be helpful when working with jumpers. If there are any doubts about the best hardware configuration for the application, contact the local distributor or sales representative before making any changes.

An arrow is used on the motherboard to indicate the first pin of each jumper.

3.1.1 Location of Jumpers, Connectors, and Switches

Reserved for user setup.

Jumpers	Description
CMOS1	Clear CMOS
J1 (Power board)	Power input mode. Powered by power adapter or in-vehicle power
SW1 (Power board)	Power ignition control switch

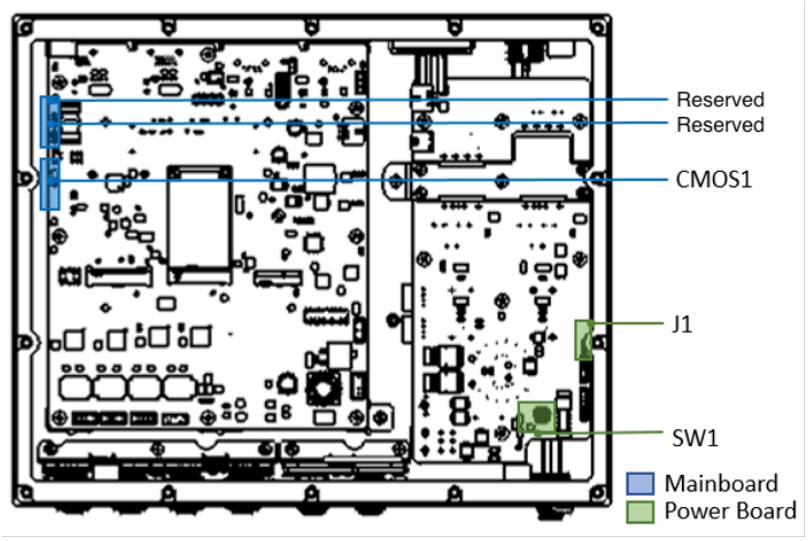
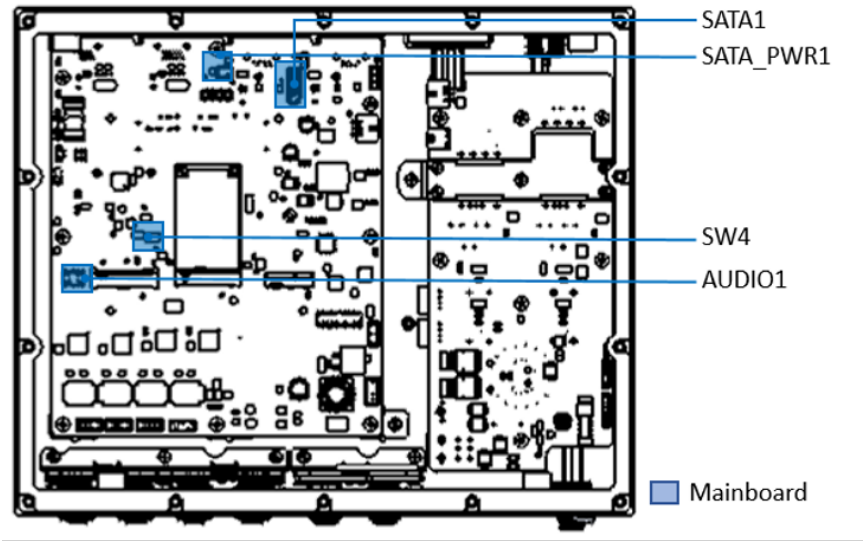


Figure 3.1 Top View of Jumpers and Switches

Reserved for user setup.

Connector	Description
SATA1	SATA connector
SATA_PW1	SATA power Connector
SW4	Power settings for miniPCIe2
AUDIO1	Audio connector



Reserved for system installation and debugging.

Connector	Description
SW1	Power switch with power LED
CN6	SMBus and UART (Reserved for power board)
DCIN_12V1	DC input
CN4 (Power Board)	Reset button
CN1 (Power Board)	SMBus & System ON/OFF control
CN2 (Power Board)	Power button

Figure 3.2 Top View of Reserved Connectors

3.2 Jumper Settings

3.2.1 Main Board

3.2.1.1 Clear CMOS (CMOS1)

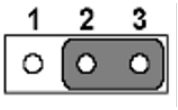


Table 3.1: Clear CMOS (CMOS1)	
Setting	**Function**
1-2	Normal (default)
2-3	Clear CMOS

3.2.2 Power Board

3.2.2.1 Power Input Mode (J1)

TS-207 provides two power input modes. One is V for in-vehicle and P is for power adapter.

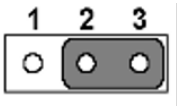


Table 3.2: Power Input Mode	
Setting	**Function**
1-2	V mode (In-vehicle mode, default)
2-3	P mode (power adapter)

3.3 Connector Settings

3.3.1 Main Board

3.3.1.1 SATA Connector (SATA1)

Table 3.3: SATA Connector			
Pin	**Signal Name**	**Pin**	**Signal Name**
1	GND	2	SATA0_TX+
3	SATA0_TX-	4	GND
5	SATA0_RX-	6	SATA0_RX
7	GND		

3.3.1.2 SATA Power Connector (SATA_PWR1)

Table 3.4: SATA power Connector			
Pin	**Signal Name**	**Pin**	**Signal Name**
1	+5V	2	GND

3.3.1.3 Audio Connector (AUDIO1)

Table 3.5: Audio Connector			
Pin	**Signal Name**	**Pin**	**Signal Name**
1	LINEOR	2	LINE1R
3	GND	4	GND
5	LINEOL	6	LINE1L
7	GND	8	GND
9	MIC1R	10	MIC1L

3.4 Switch Settings

3.4.1 Main Board

3.4.1.1 Power Settings for miniPCIe2 (SW4)

Table 3.6: Power Settings for MiniPCIe2	
Setting	**Function**
ON	Standard MiniPCIe (default)
OFF	Support ME909s

3.4.2 Power Board

3.4.2.1 Power Ignition Control Switch (SW1)

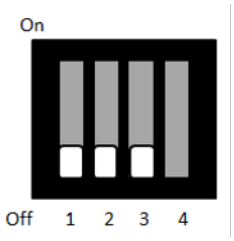
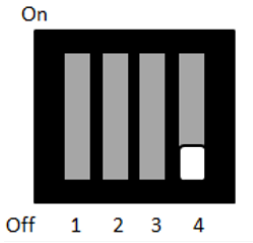


Table 3.7: Power Ignition

Setting			Function		
1	2	3	Ignition ON Timer	Ignition OFF Delay Timer	Ignition OFF Delay Timer (H/W shutdown)
OFF	OFF	OFF	7 (default)	30 (default)	180 (default)
ON	OFF	OFF	10	40	180
OFF	ON	OFF	10	60	180
OFF	ON	ON	30	60	180
OFF	OFF	ON	60	120	180
ON	OFF	ON	120	180	180
OFF	ON	ON	180	240	180
ON	ON	ON	7	0	180

3.4.2.2 Power Ignition SW/HW Setting (SW1_4)



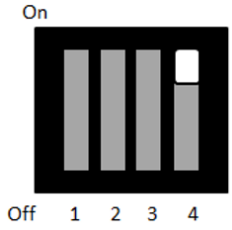


Table 3.8: Power Ignition SW/HW Setting Selection

Setting	Function
Off*	Power Ignition SW settings
On	Power Ignition HW settings (default)

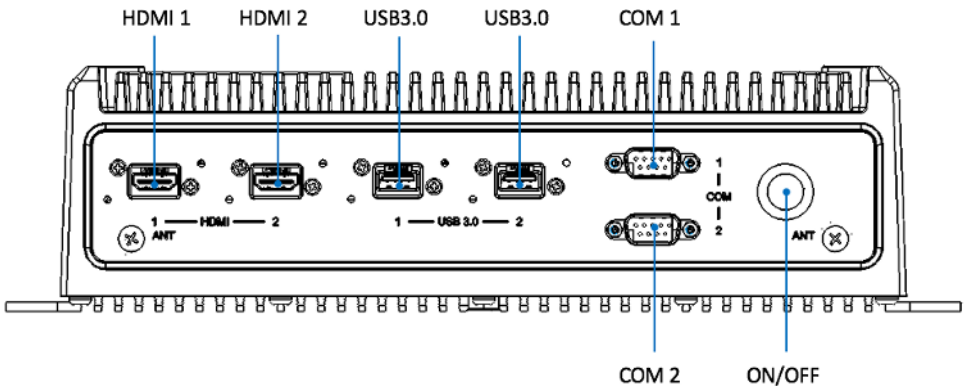
Chapter 4

Pin Assignments

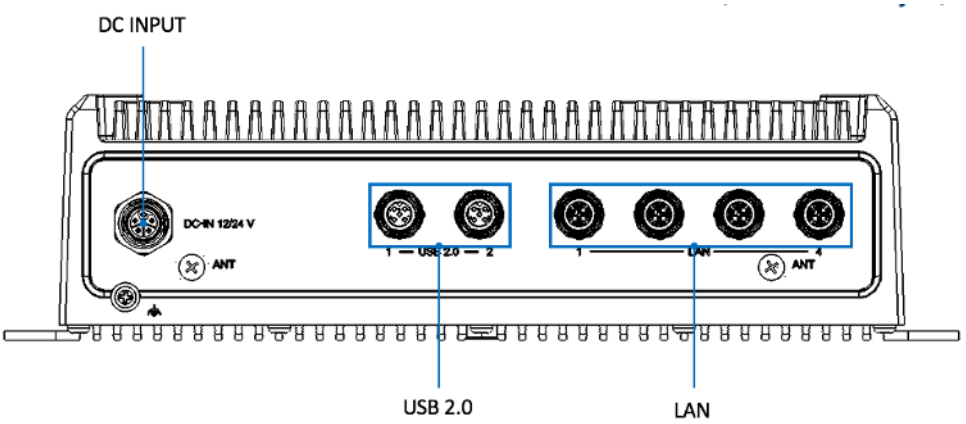
This chapter details Pin Assignments for the TS-207 Series.

4.1 I/O Connectors

4.1.1 Front I/O View



4.1.2 Rear I/O View



4.2 I/O Pin Definition

4.2.1 Power Input Connector

TS-207 comes with 4-pin M12 A-code power input connector for 12/24 V DC Input for in-vehicle, or 24V DC input for railway applications.

Table 4.1: Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	+V12	2	+V12
3	GND	4	GND

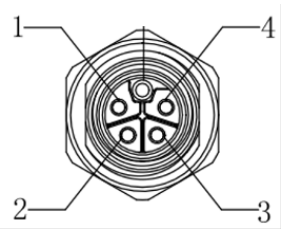


Figure 4.1 Power Input Connector

4.2.2 Power On/Off Button

TS-207 comes with a power ON/OFF button that supports dual function of soft power ON/OFF (instant off or 4-second delay), and suspend power functions. There are two LEDs for indicating system status: LED green is for power ON status; and LED red is for power OFF status.

Figure 4.2 Power ON/OFF Button

4.2.3 HDMI Connector

TS-207 provides 2 x HDMI ports with resolution that can support up to 4K x 2K at 48-60 Hz / 24bpp.

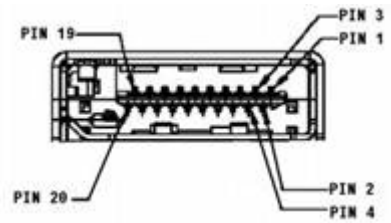


Figure 4.3 HDMI Connector

Table 4.2: HDMI/Display Port Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	TMDS_Data2+/DP_Data0+	2	GND
3	TMDS_Data2−/DP_Data0-	4	TMDS_Data1+/DP_Data1+
5	GND	6	TMDS_Data1−/DP_Data1-
7	TMDS_Data0+/DP_Data2+	8	GND
9	TMDS_Data0-/DP_Data2-	10	TMDS_Clock+/DP_Data3+
11	GND	12	TMDS_Clock−/DP_Data3-
13	NC	14	NC
15	SCL/AUX_CH+	16	SDA/GND
17	DDC GND/AUX_CH-	18	+5V/Hot plug detect
19	Hot plug detect/Return	20	DP_PWR

4.2.4 USB Connector

TS-207 provides up to 4 x USB interface connectors. 2 x USB type A 3.0 which provides plug & play capabilities, and 2 x M12 X-code circular connectors with USB 2.0 support.

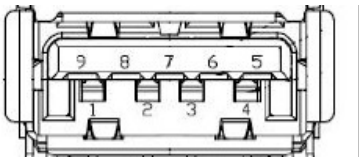


Figure 4.4 USB 3.0 Connector

Table 4.3: USB 3.0 Connector Pin Assignment

Pin	Signal Name	Pin	Signal Name
1	+5V	2	D-
3	D+	4	GND
5	SSRX-	6	SSRX+
7	GND	8	SSTX-
9	SSTX+	10	+5V
11	D-	12	D+
13	GND		

Table 4.4: USB 2.0 Connector Pin Assignment

Pin	Signal Name	Pin	Signal Name
1	+5V	2	GND
3	Data+	4	Data-

Figure 4.5 USB 2.0 with M12 Connector

4.2.5 Ethernet Connector

TS-207 provides 4 x 10/100/1000 bps with M12 X-code circular connector. In addition, it also supports up to 4 x ports PoE (project-based support).

- 4 x ports full-load, IEEE802.3af Class 2 (7 Watt)
- 2 x ports full-load, IEEE802.3af Class 3 (15.4 Watt)

Figure 4.6 Ethernet Connector

Table 4.5: Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	LAN_M0+	2	LAN_M1+
3	LAN_M3+	4	LAN_M2+
5	LAN_M0-	6	LAN_M1-
7	LAN_M3-	8	LAN_M2-

4.2.6 COM Connector

TS-207 provides 2 x D-sub 9-pin connectors, which offers 2 x RS-232/422/485 serial communication ports with 3 KV isolation and auto flow control. The setting of protocol can be configured via the BIOS settings.

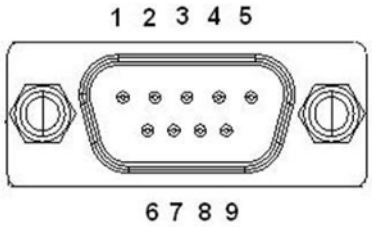


Figure 4.7 COM Port Connector

Table 4.6: 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

Chapter 5

BIOS Settings

BIOS Configuration data setup

5.1 Introduction

AMIBIOS has been integrated into many motherboards for over a decade. With the AMIBIOS Setup program, you can modify BIOS settings and control the various system features. This chapter describes the basic navigation of the TS-207 BIOS setup screens.

Figure 5.1 Setup Program Initial Screen

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

5.2 Entering Setup

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

5.2.1 Main Setup

When you first enter the BIOS Setup Utility, you will enter 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.

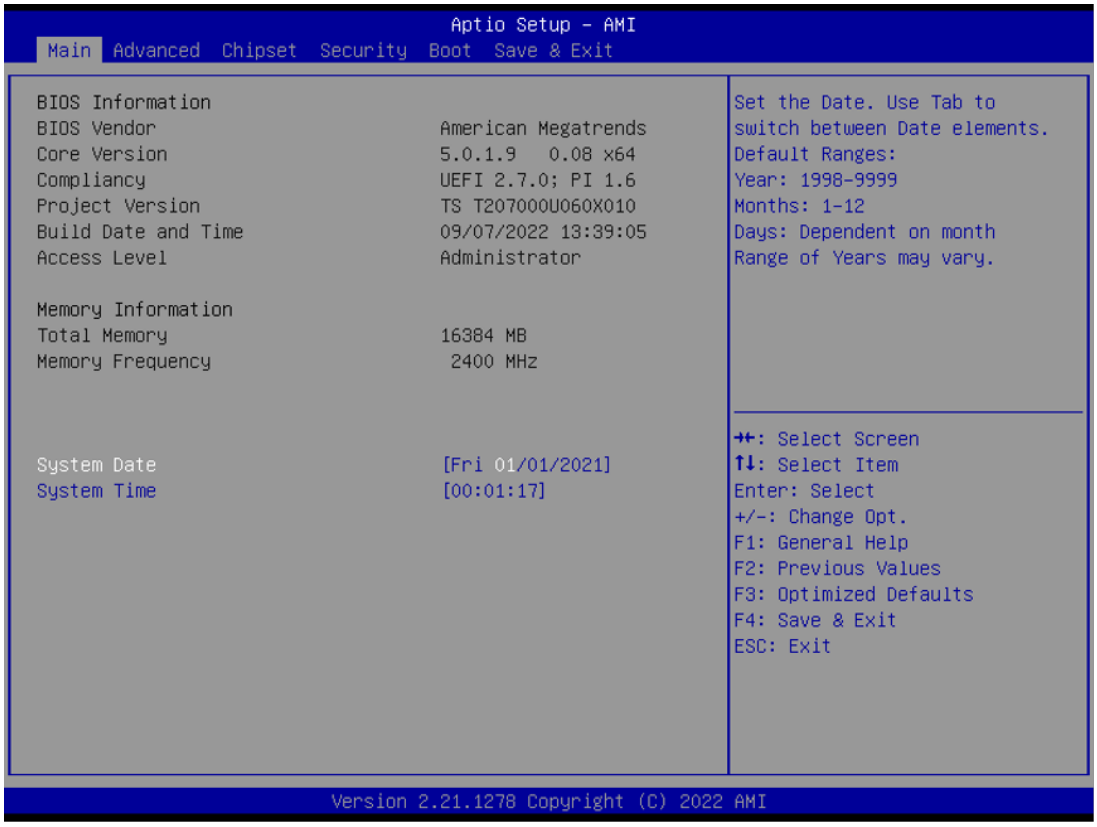


Figure 5.2 Main Setup Screen

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.

5.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the TS-207 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 are shown below. The sub menus are described on the following pages.

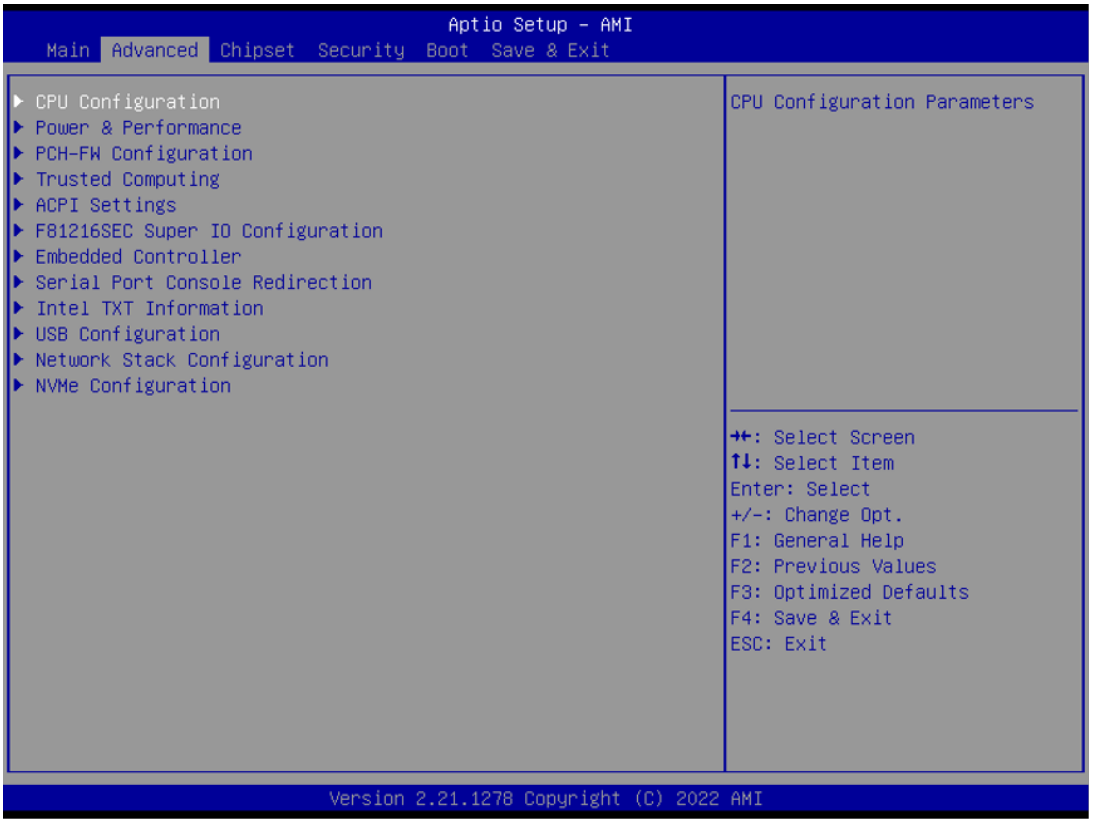


Figure 5.3 Advanced BIOS Features Setup Screen

5.2.2.1 ACPI Settings

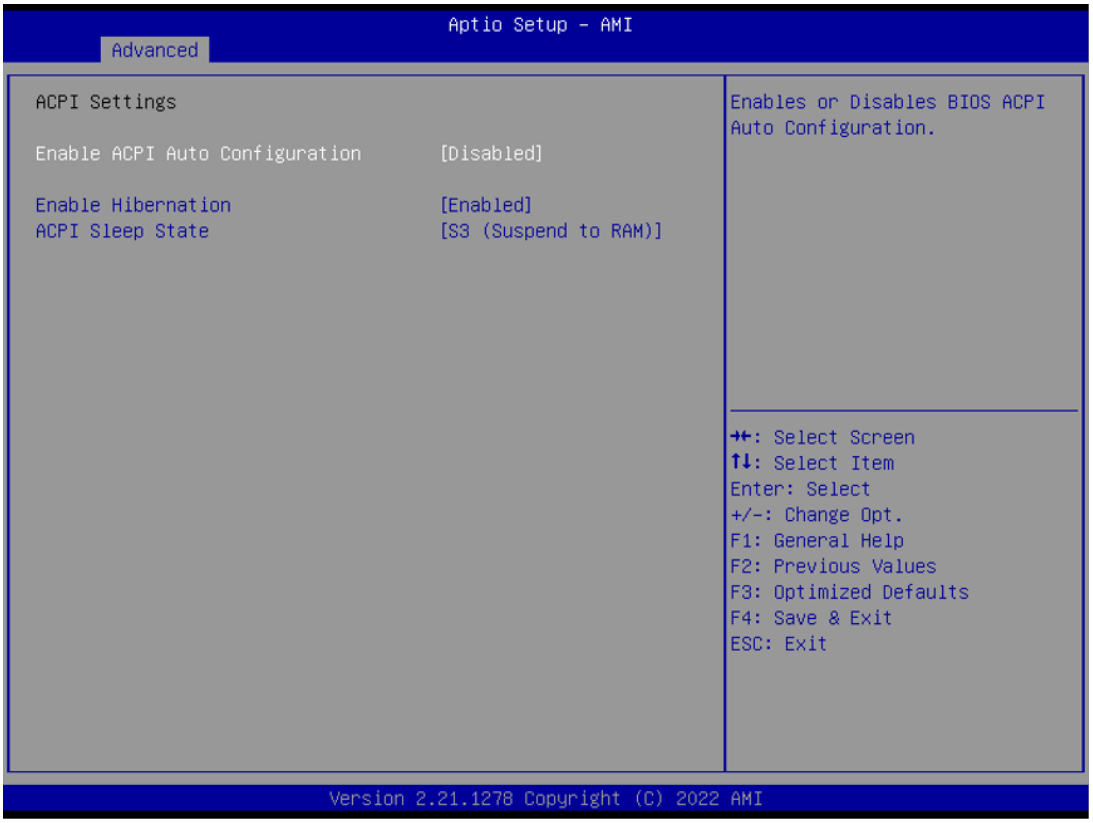
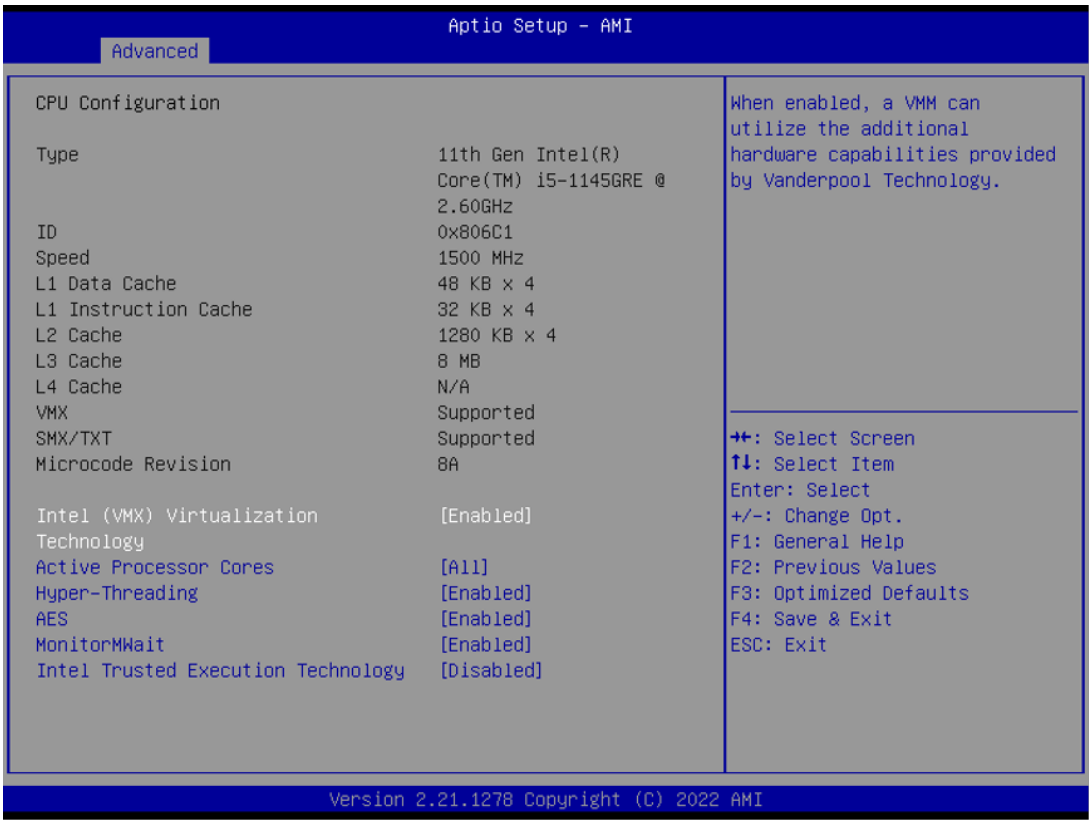


Figure 5.4 ACPI Settings

- **Enable ACPI Auto Configuration**
  Enables or Disables BIOS auto configuration.
- **Enable Hibernation**
  Enables or Disables 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.

5.2.2.2 CPU Configuration



- **Intel(VMX)VirtualizationTechnology**
  Enables or Disables VMX configuration
- **ActiveProcessorCore**
  Number of cores to enable in each processor package
- **Hyper-Threading**
  Enables or Disables Hyper-Threading configuration
- **AES**
  Enables or Disables AES configuration
- **MonitorMWait**
  Enables or Disables MonitorMWait configuration
- **IntelTrustedExecution Technology**
  Enables or Disables IntelTrustedExecution configuration

5.2.2.3 Power & Performance

Figure 5.5 Power & Performance

- **CPU- Power Management Control**
- **GT- Power Management Control**

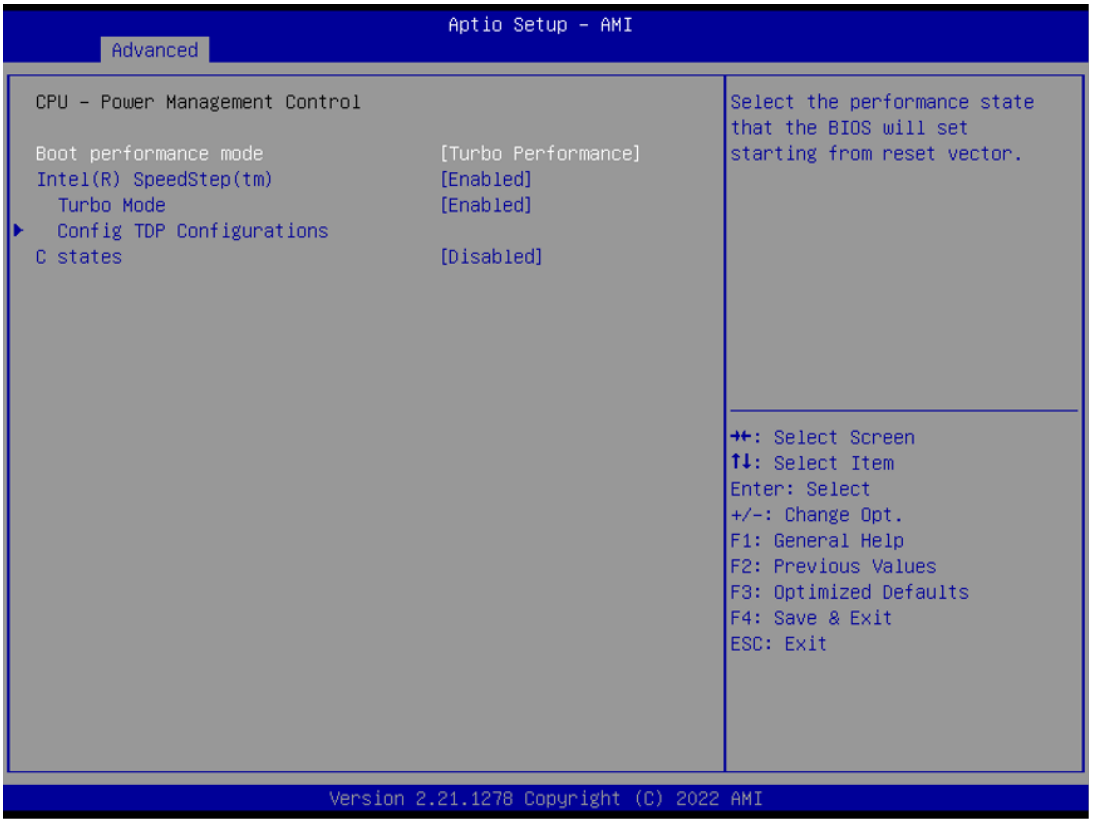


Figure 5.6 CPU- Power Management Control

- Boot performance mode
  Max Battery, Max Non-Turbo Performance, Turbo Performance
- Intel® SpeedStep™
  Enable/Disable
- Turbo Mode
  Enable/Disable
- Config TDP Configurations
- C states
  Enable/Disable
- Configurable TDP Boot Mode
  Nominal/Up/Down/Deactivate TDP selection

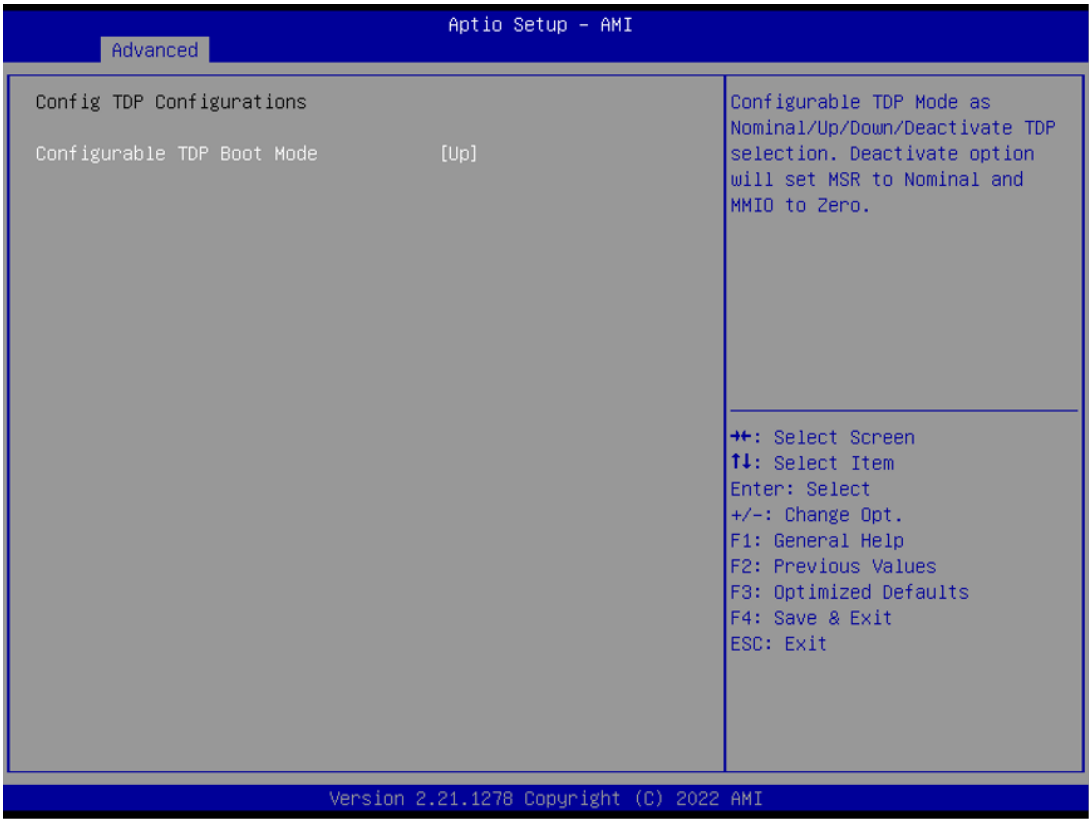


Figure 5.7 Configurable TDP Boot Mode

- **GT- Power Management Control**
  Disable/Enable

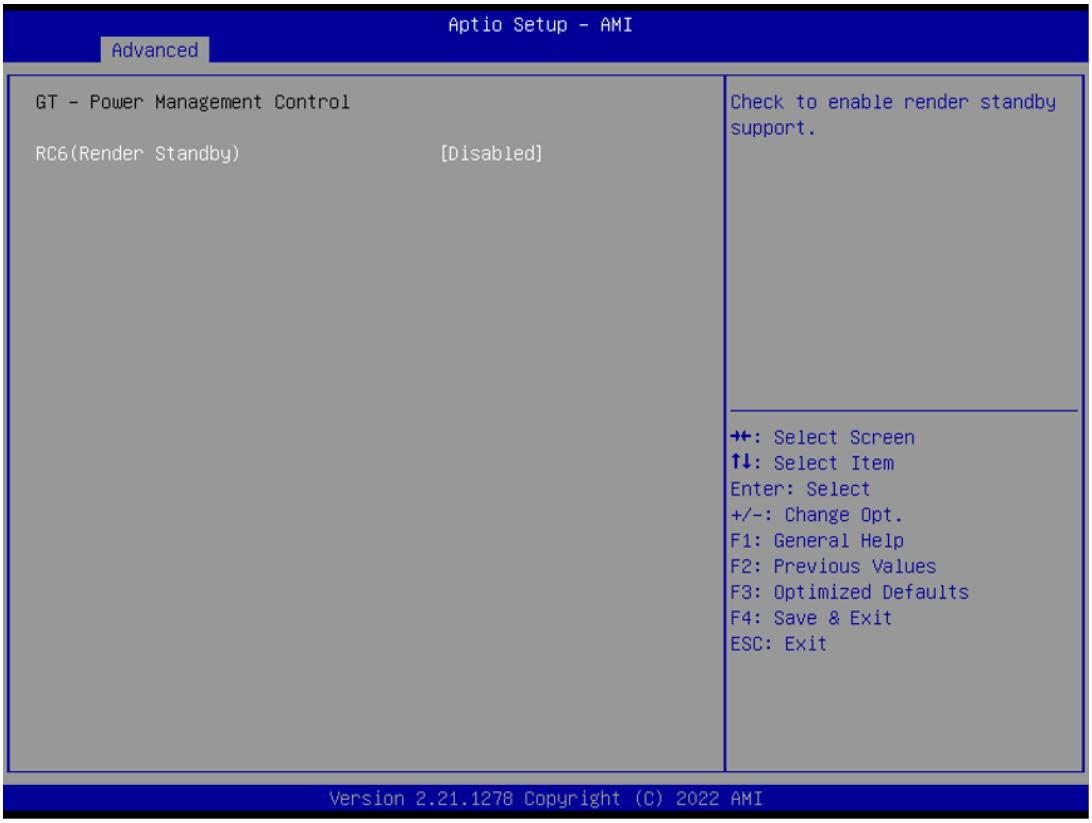


Figure 5.8 GT- Power Management Control

– RC6 (Render Standby)
  Check to enable render standby support.

5.2.2.4 PCH-FW Configuration

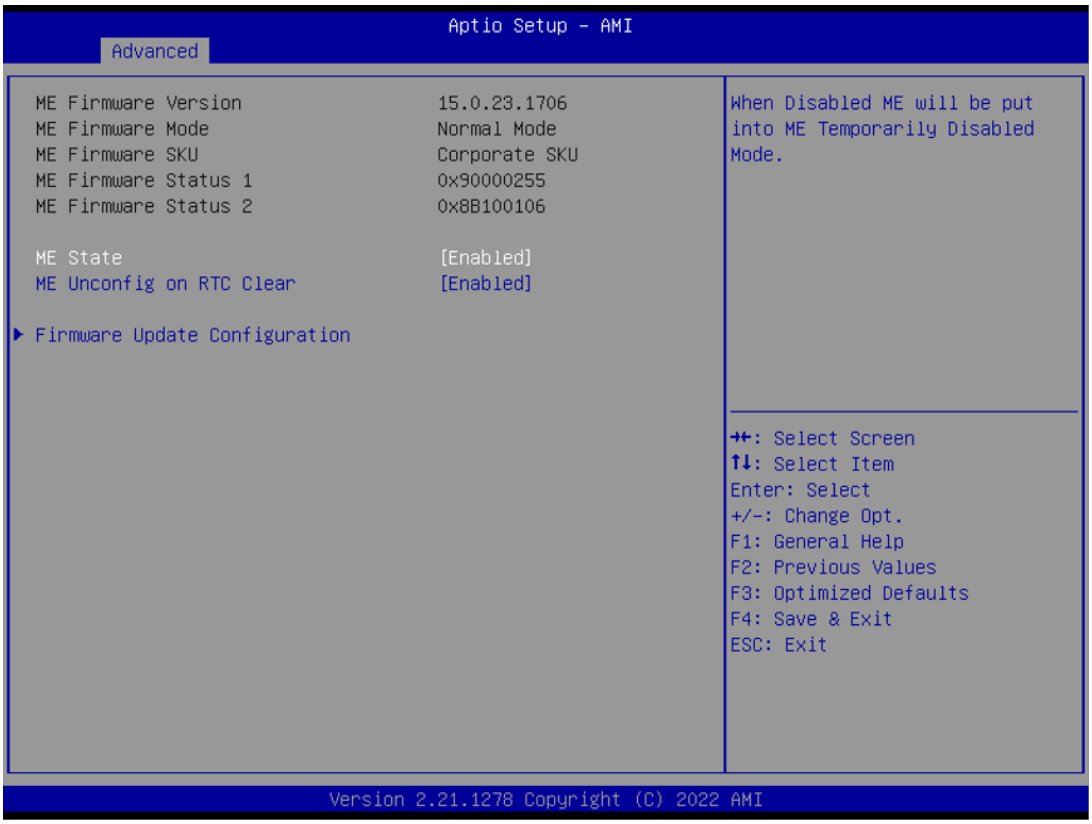


Figure 5.9 PCH-FW Configuration

- **ME Firmware**
  - Version
  - Mode
  - SKU
  - Status 1
  - Status 2
- **ME State**
  Disable/Enable
- **ME Unconfig on RTC Clear**
  Disable/Enable
- **Firmware Update Configuration**
  - Me FW Image Re-Flash
    Disable/Enable

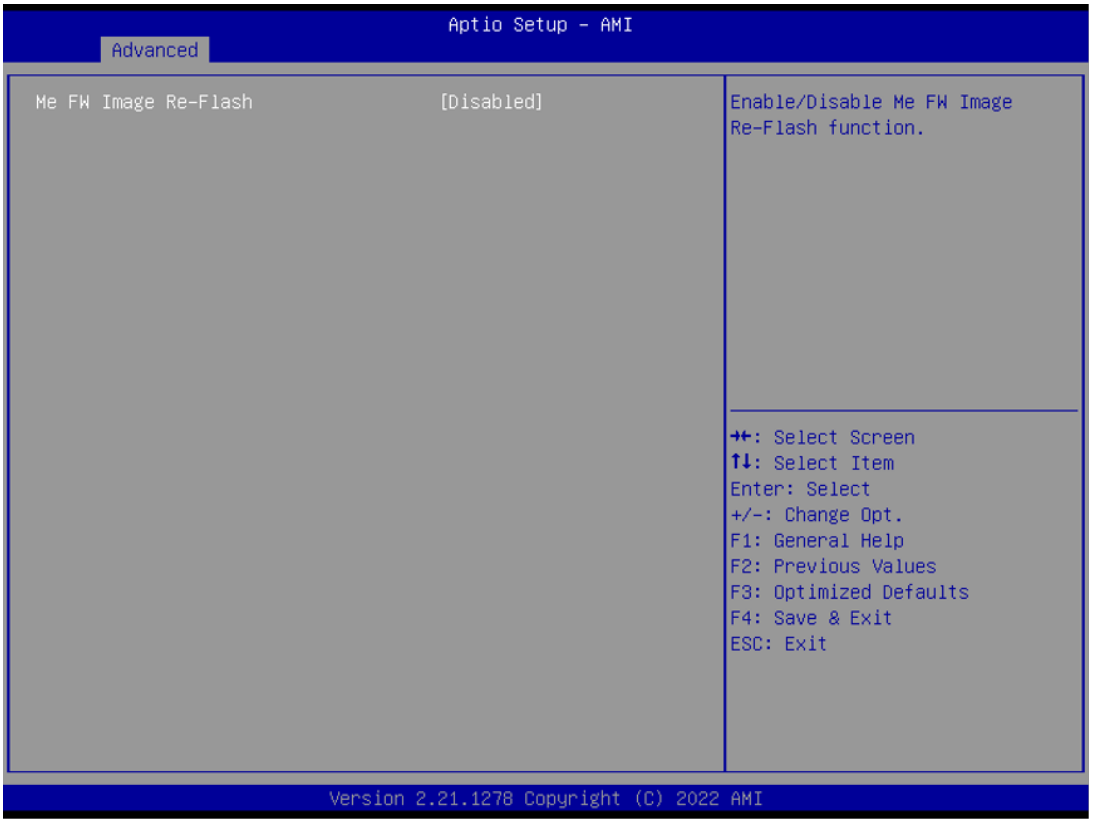


Figure 5.10 Firmware Update Configuration

5.2.2.5 Trusted Computing

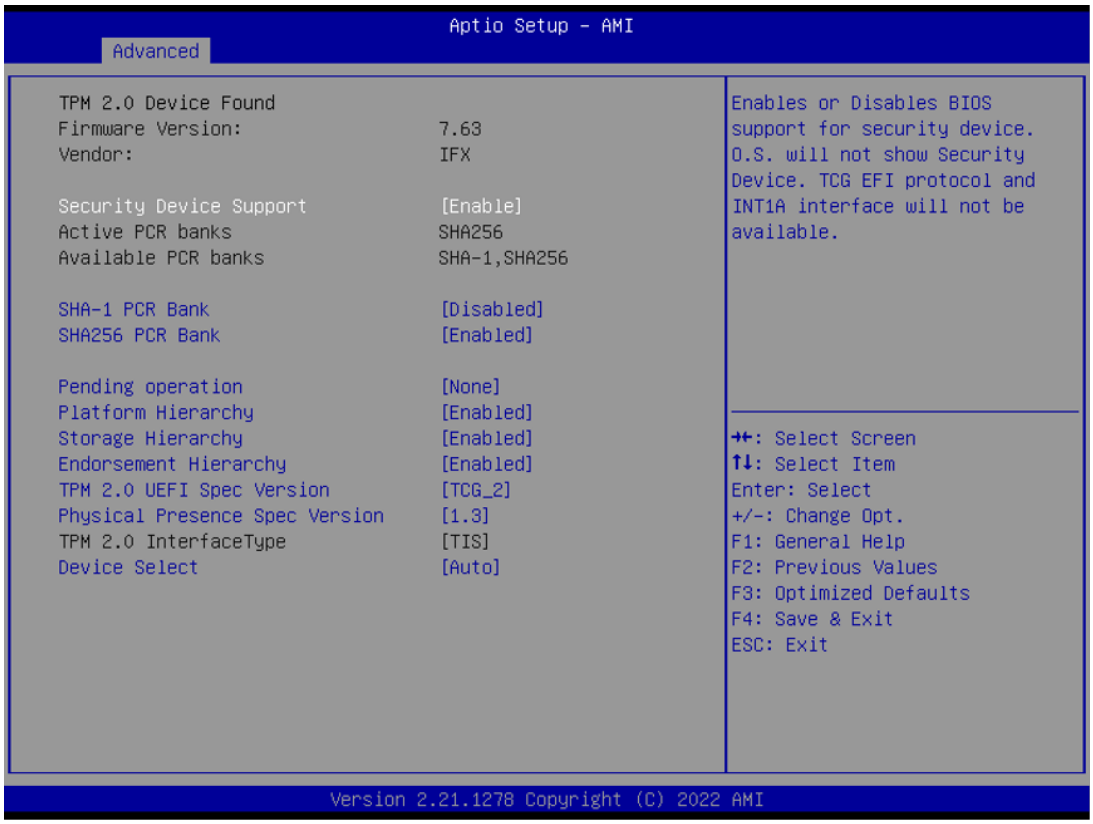


Figure 5.11 Trusted Computing

- **Security Device Support**
  Disable/Enable
- **SHA-1 PCR Bank**
  Disable/Enable
- **SHA256 PCR Bank**
  Disable/Enable
- **Pending operation**
  None/TPM Clear
- **Platform Hierarchy**
  Disable/Enable
- **Storage Hierarchy**
  Disable/Enable
- **Endorsement Hierarchy**
  Disable/Enable
- **TPM 2.0 VEFI Spec Version**
  TCG_1_2/TCG_2
- **Physical Presence Spec Version**
  1.2/1.3
- **TPM 2.0 InterfaceType**
  CRB/TIS
- **Device Select**
  Auto/Enable/Disable

5.2.2.6 ACPI Settings

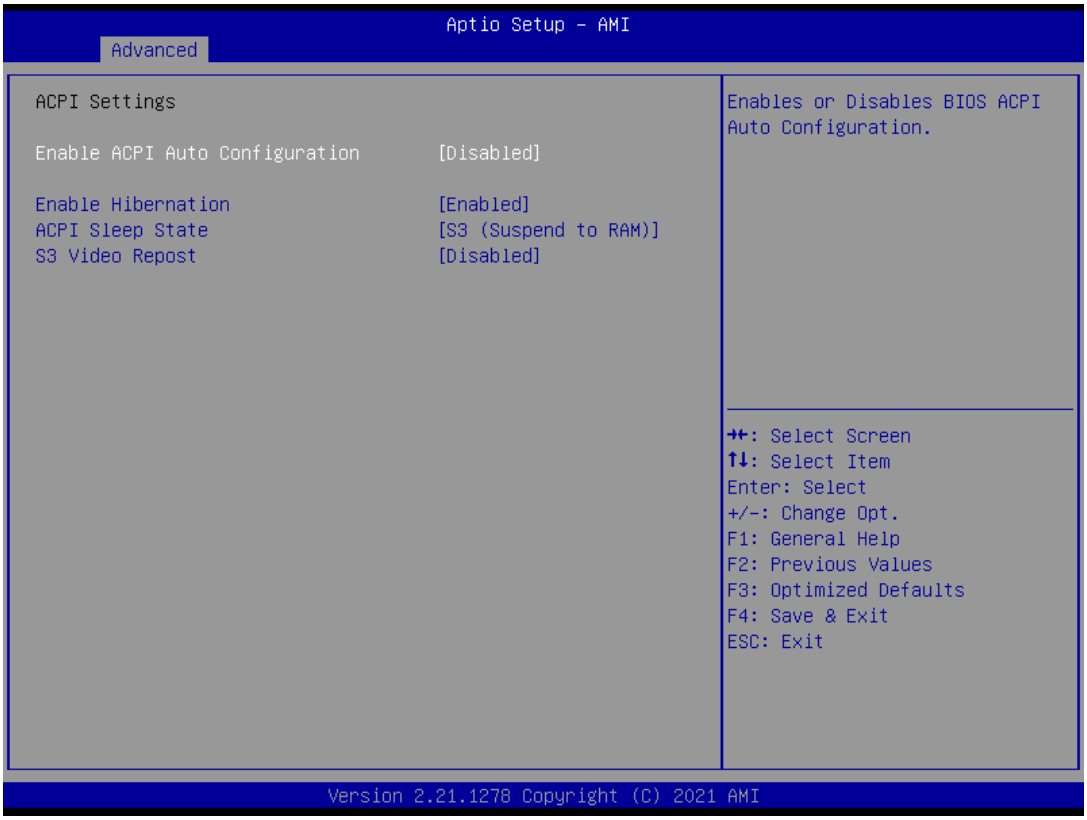


Figure 5.12 ACPI Settings

- **Enable ACPI Auto Configuration**
  Disable/Enable
- **Enable Hibernation**
  Disable/Enable
- **ACPI Sleep State**
  Suspend Disabled/S3 (Suspend to RAM)
- **S3 Video Repost**
  Disable/Enable

5.2.2.7 Embedded Controller

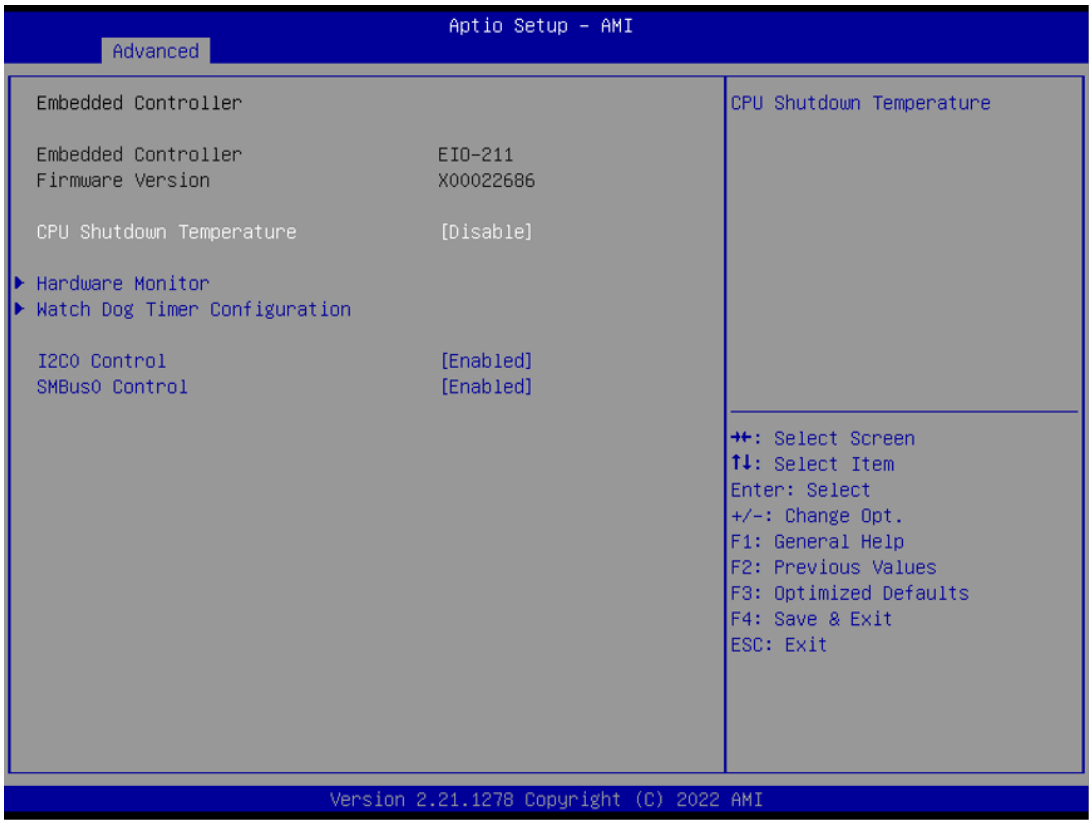


Figure 5.13 Embedded Controller

- **CPU Shutdown Temperature**
  Disable/Enable
- **Hardware Monitor**
- **Watch Dog Timer Configuration**
- **I2C0 Control**
  Disable/Enable
- **Smbus0 Control**
  Disable/Enable

Hardware Monitor

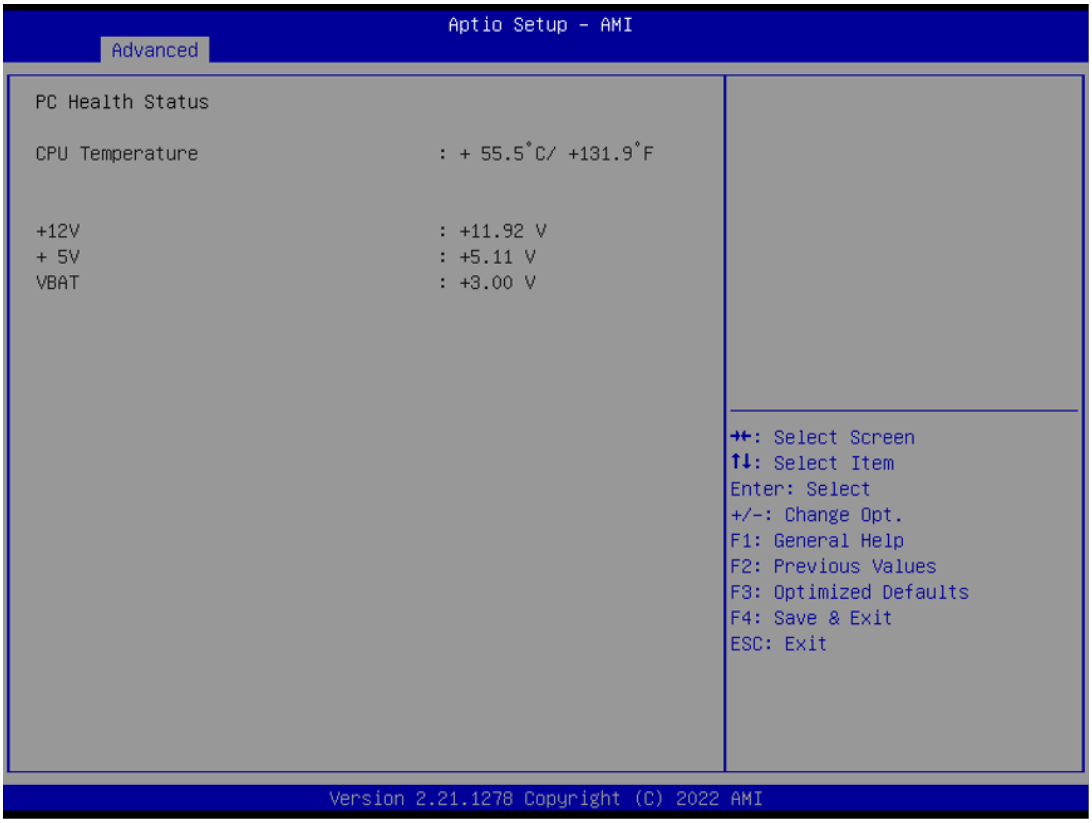


Figure 5.14 PC Health Status

Serial Port 1 & 2 Configuration

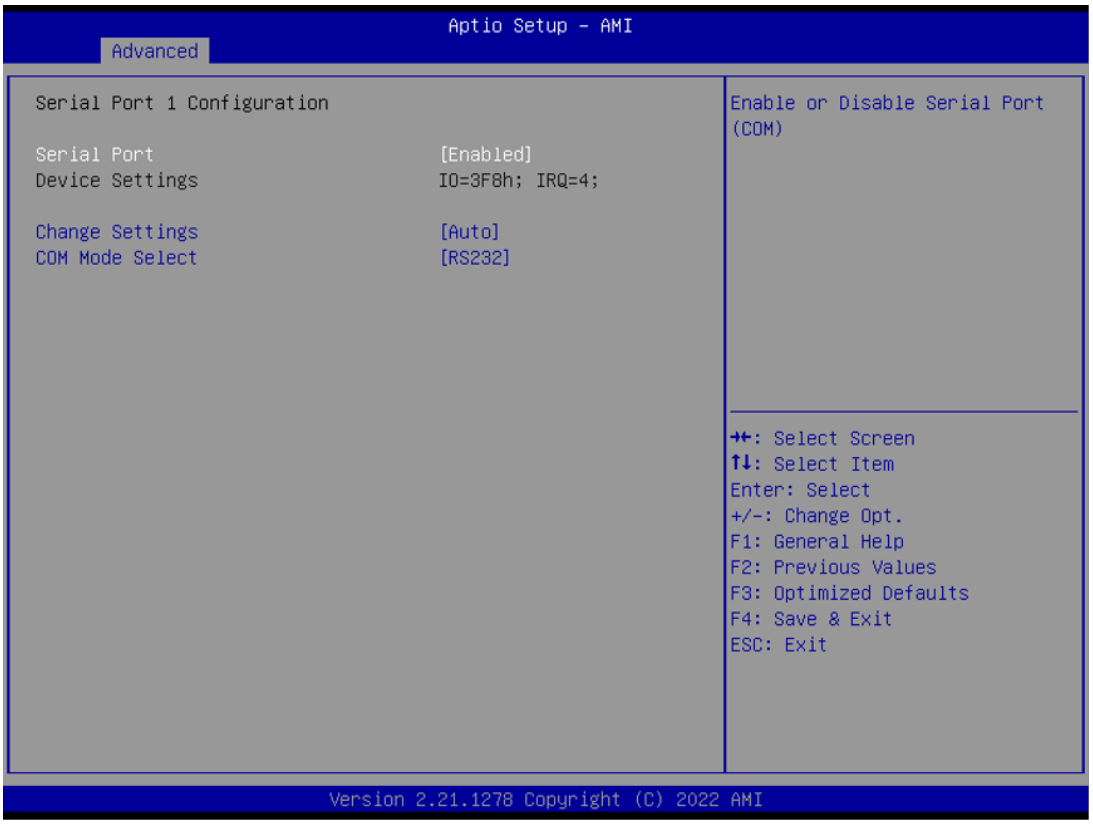


Figure 5.15 Serial Port 2 Configurations

– Serial Port

– Change Settings
– COM Mode Select

5.2.2.8 Serial Port Console Redirection

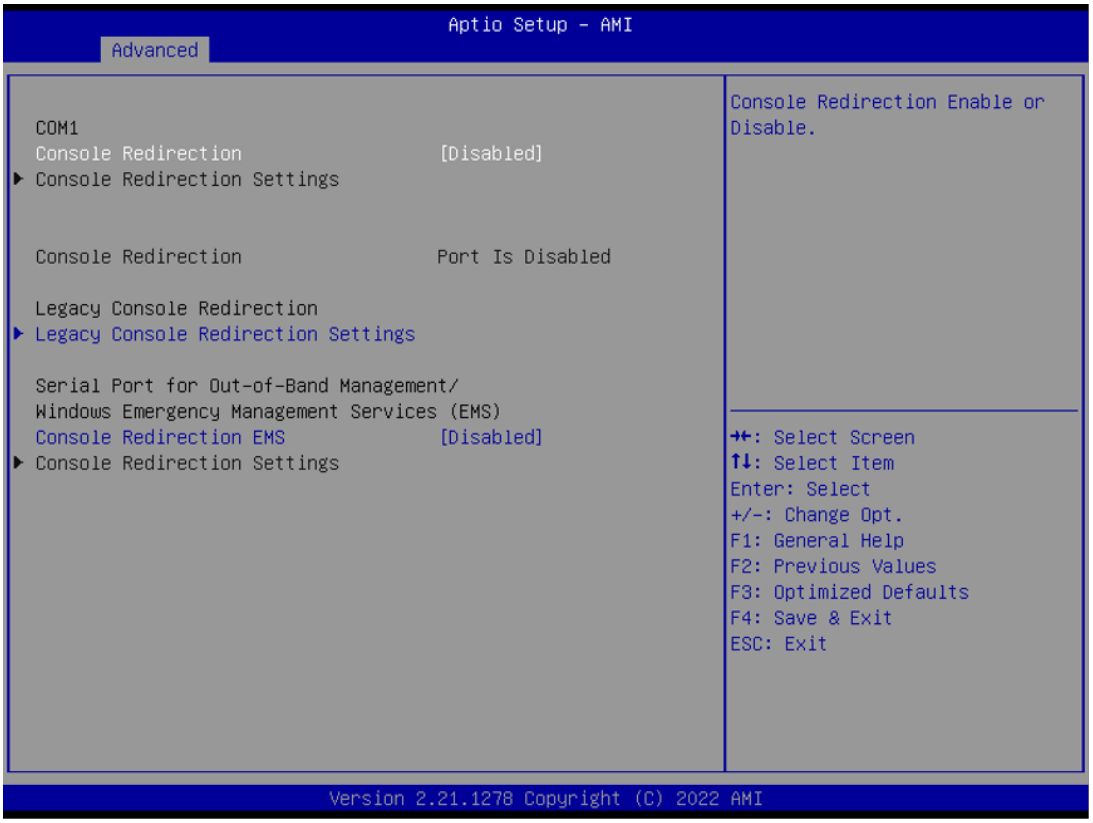


Figure 5.16 Serial Port Console Redirection

- **COM1 Console Redirection**
  Disable/Enable
- **Legacy Console Redirection Settings**
- **Console Redirection EMS**
  Disable/Enable

5.2.2.9 USB Configuration

Figure 5.17 USB Configuration

- **Legacy USB Support**
  Disable/Enable
- **XHCI Hand-off**
  Disable/Enable
- **USB Mass Storage Driver Support**
  Disable/Enable
- **USB transfer time-out**
  1 sec/5 sec/10 sec/20 sec
- **Device reset time-out**
  10 sec/20 sec/30 sec/40 sec
- **Device power-up delay**
  Manual/Audo
- **UFD 2.0 Silicon-Power16GPMAP**
  Manual/Audo

5.2.2.10 NVMe Configuration

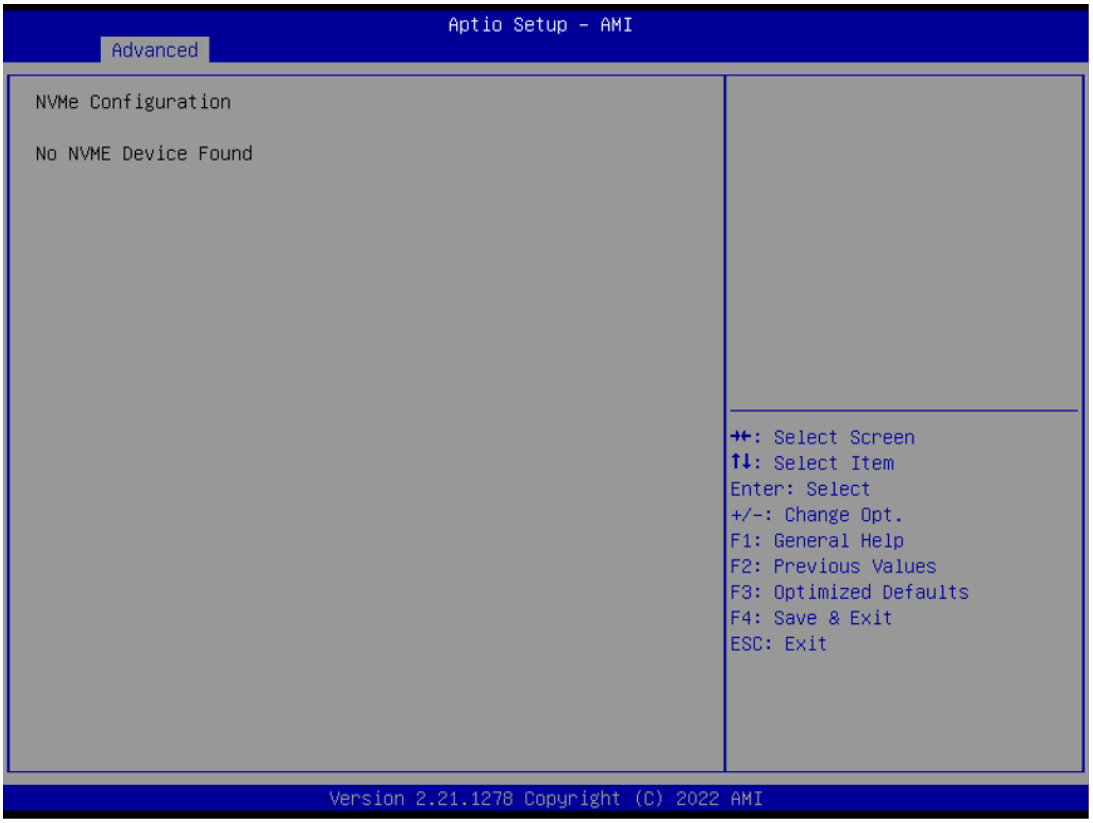


Figure 5.18 NVMe Configuration

5.2.2.11 Network Stack Configuration

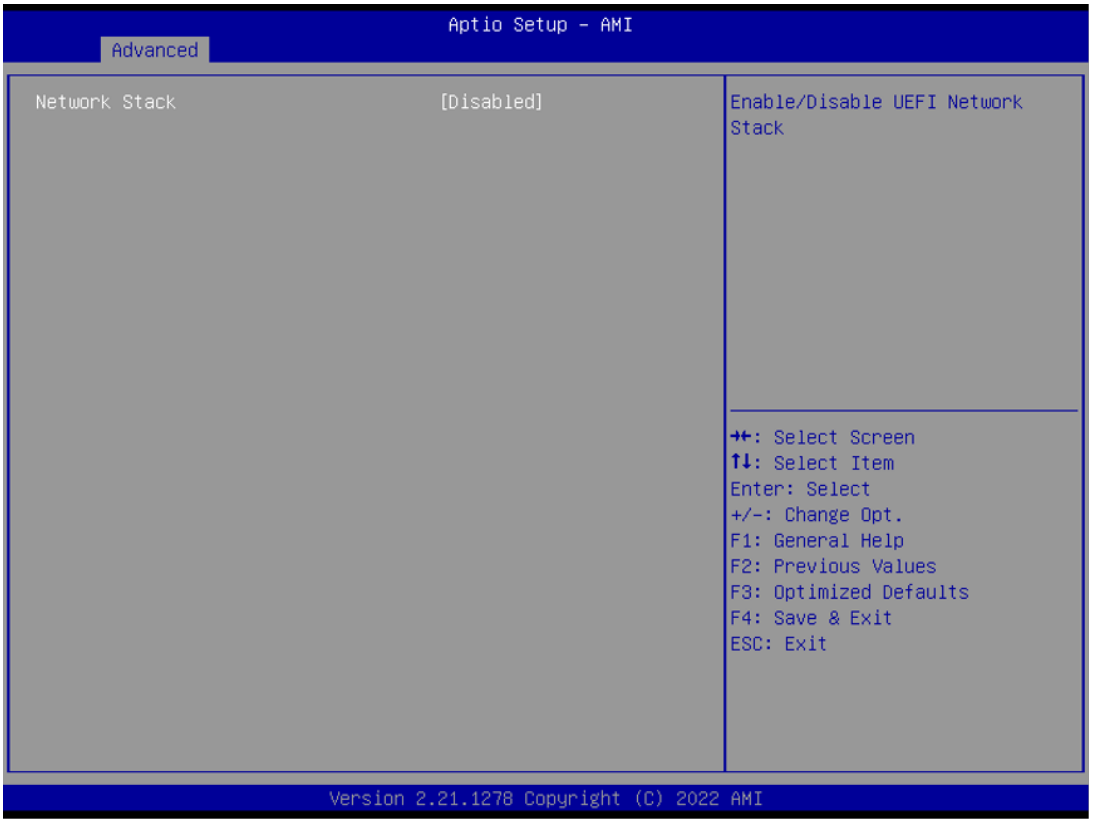


Figure 5.19 Network Stack Configuration

- **Network Stack**
  Disable/Enable

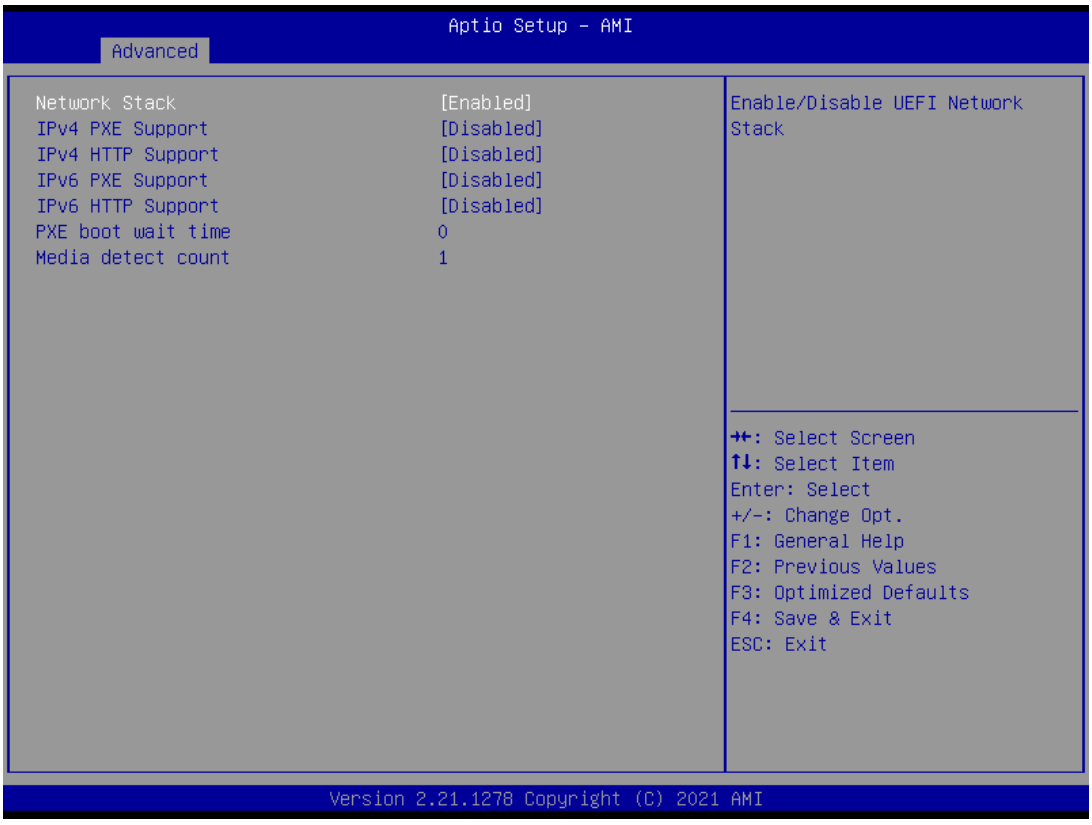


Figure 5.20 Network Stack Configuration Settings

- **Network Stack**
  Disable/Enable
- **IPv4 PXE Support**
  Disable/Enable
- **IPv4 HTTP Support**
  Disable/Enable
- **IPV6 PXE Support**
  Disable/Enable
- **IPv6 HTTP Support**
  Disable/Enable

5.2.3 Chipset Settings

Select the chipset tab from the 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.

Figure 5.21 Chipset Setup

- **System Agent (SA) Configuration**
- **PCH-IO Configuration**

5.2.3.1 System Agent (SA) Configuration

Figure 5.22 System Agent (SA) Configuration

- **Memory Configuration**
- **VT-d**
  Disable/Enable
- **Above 4GB MMIO BIOS assignment**
  Disable/Enable

Memory Configuration

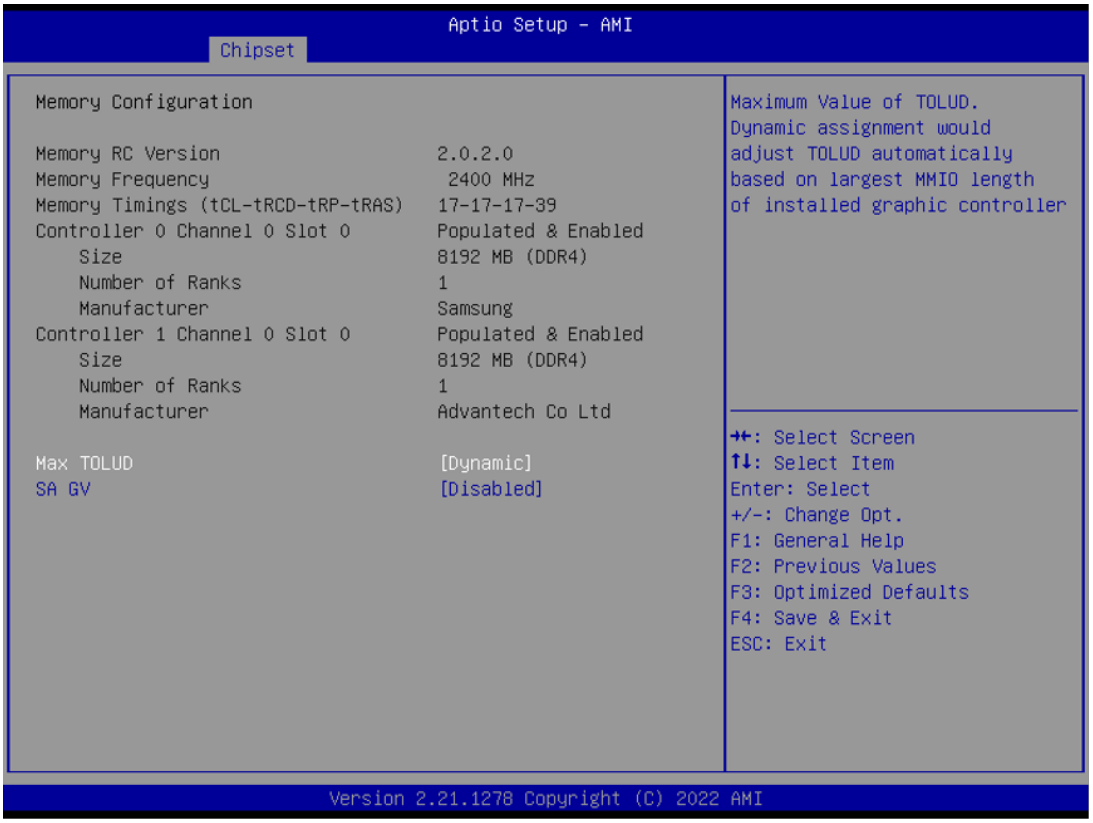


Figure 5.23 Memory Configuration

- **Max TOLUD**
  Dynamic/1 GB/1.25 GB/1.5 GB/1.75 GB/2GB/2.25 GB/2.5GB/2.75 GB/3GB/ 13.25 GB/13.5GB
- **SA GV**
  Disable/Enable

5.2.3.2 PCH-IO Configuration

Figure 5.24 PCH-IO Configuration

- **PCI Express Configuration**
- **SATA Configuration**
- **USB Configuration**
- **Security Configuration**
- **HD Audio Configuration**
- **LAN1 Controller**
  Disable/Enable
- **LAN1 PXE OpROM**
  Disable/Enable
- **LAN2 Controller**
  Disable/Enable
- **LAN2 PXE OpROM**
  Disable/Enable
- **LAN3 Controller**
  Disable/Enable
- **LAN3 PXE OpROM**
  Disable/Enable
- **LAN4 Controller**
  Disable/Enable
- **LAN4 PXE OpROM**
  Disable/Enable
- **Restore AC Power Loss**
  Power off
- **Pcie Ref P11 SSC**
  Auto

- **SPD Write Disable**
  TRUE/FALSE
- **PCIE Wake**
  Disable/Enable

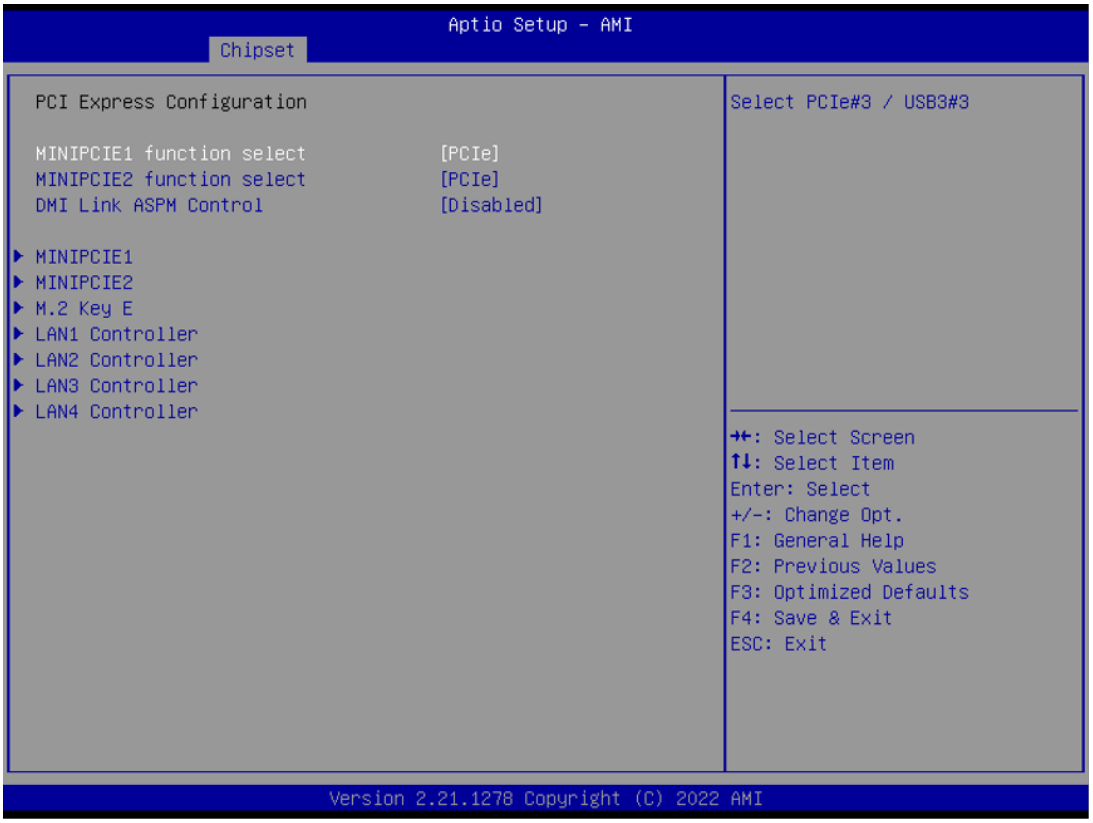


Figure 5.25 PCI Express Configuration

- **MINIPCIE1 function select**
  PCIe/ USB
- **MINIPCIE2 function select**
  PCIe/ USB
- **DMI LINK ASPM Control**
  Disable/Enable
- **MINIPCIE1**
- **MINIPCIE2**
- **M.2 Key E**
- **LAN1 Controller**
- **LAN2 Controller**
- **LAN3 Controller**
- **LAN4 Controller**

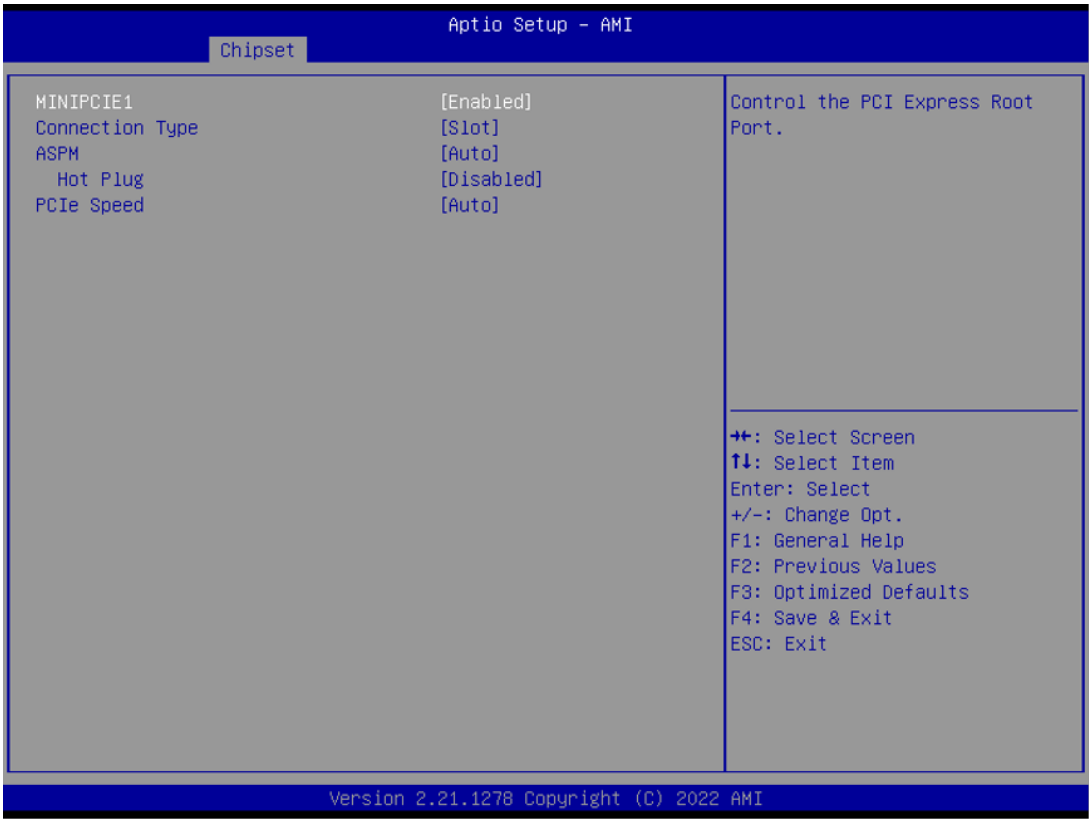


Figure 5.26 MINIPCIE1 and MINIPCIE2 Configuration

- **MINIPCIE1**
  Disable/Enable
- **Connection Type**
  Buit-in/ Slot
- **ASPM**
  - Hot Plug
  - Disable
- **PCIe Speed**
  Auto/Gen1/Gen2/Gen3

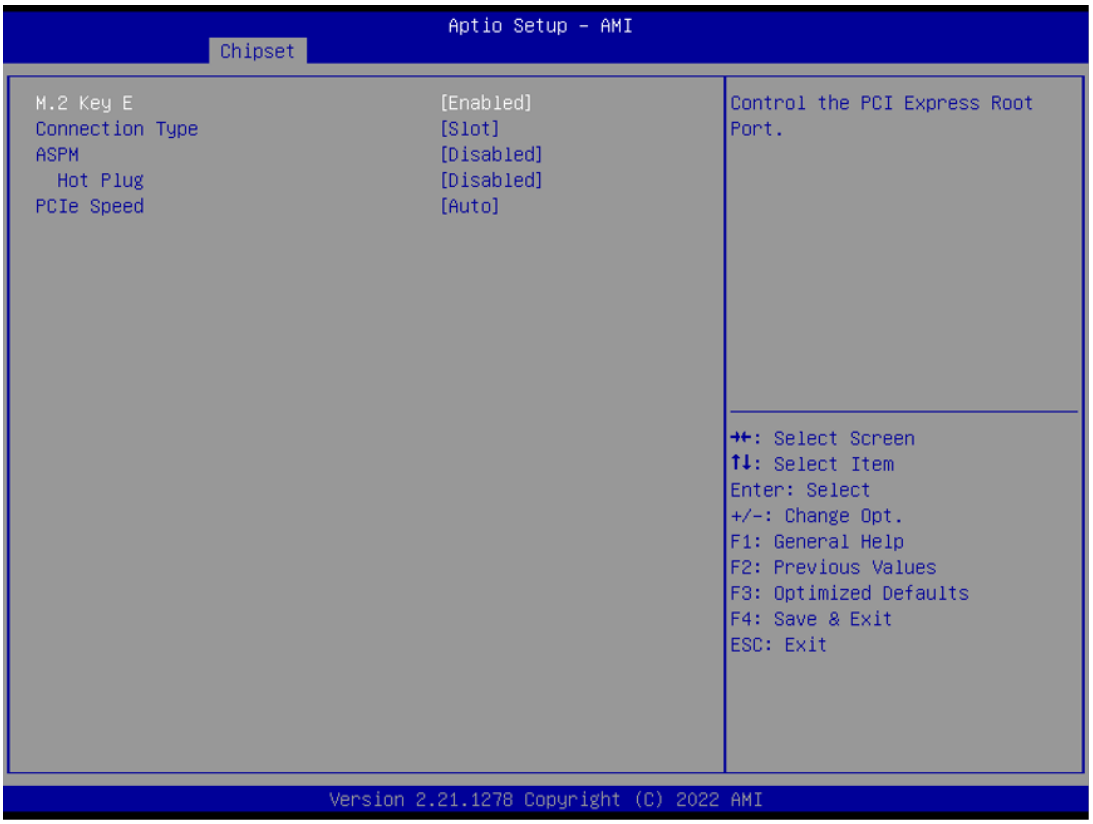


Figure 5.27 M.2 Key Configuration

- **M.2 Key E**
- Disable/Enable
- **Connection Type**
  Buit-in/ Slot
- **ASPM**
  - Hot Plug
  - Disable
- **PCIe Speed**
  Auto/Gen1/Gen2/Gen3

SATA and RST Configuration

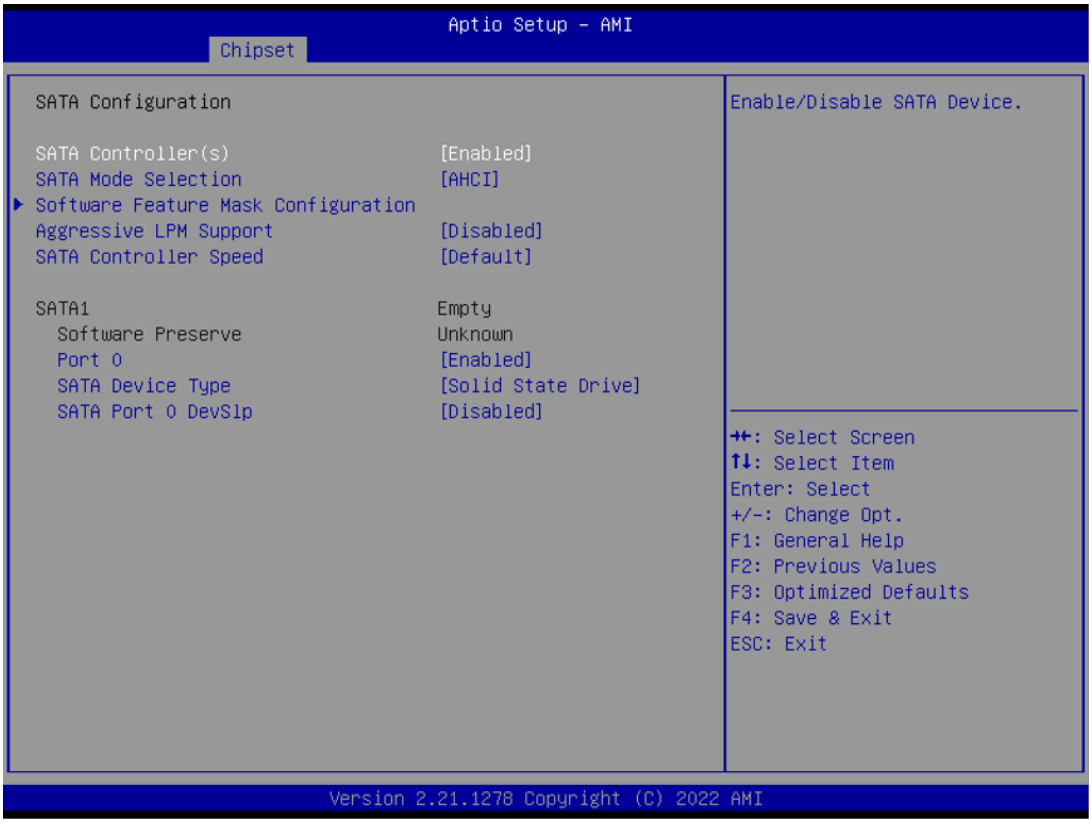


Figure 5.28 SATA Configuration

- SATA Controller(s)
  Enable/Disable SATA Device.
- SATA Mode Selection
  Determines how SATA controller(s) operate.
- Software Feature Mask Configuration
  Enable/Disable SATA Device.
- Aggressive LPM Support
- SATA Controller Speed
  Indicates the maximum speed the SATA controller can support.
- Port 0
  Enable or Disable SATA port.
  - SATA Device Type
  - SATA Port 0 DevSlp
- Port 1
  Enable or Disable SATA port.
- SATA Device Type
- SATA Port 0 DevSlp

USB Configuration

Figure 5.29 USB Configuration

– USB Port Disable Override
  Disable/Enable

Security Configuration

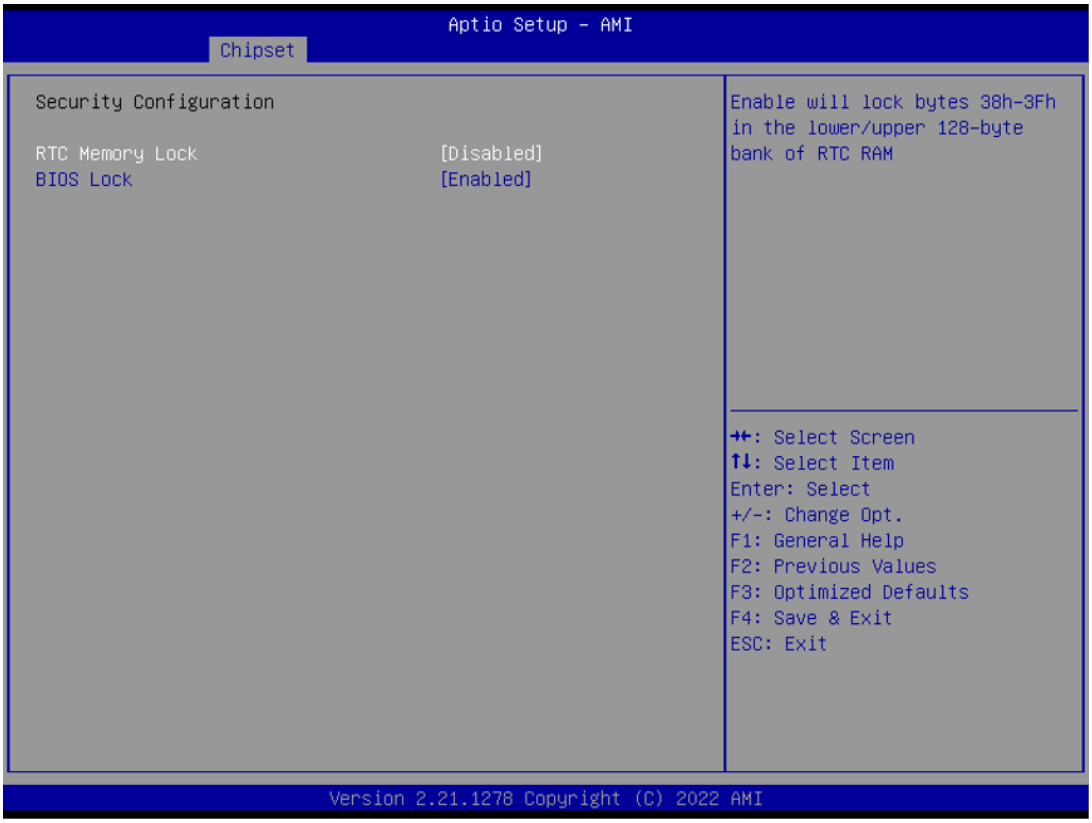


Figure 5.30 Security Configuration Settings

- RTC Memory Lock
  Disable/Enable
- BIOS Lock
  Disable/Enable

– HD

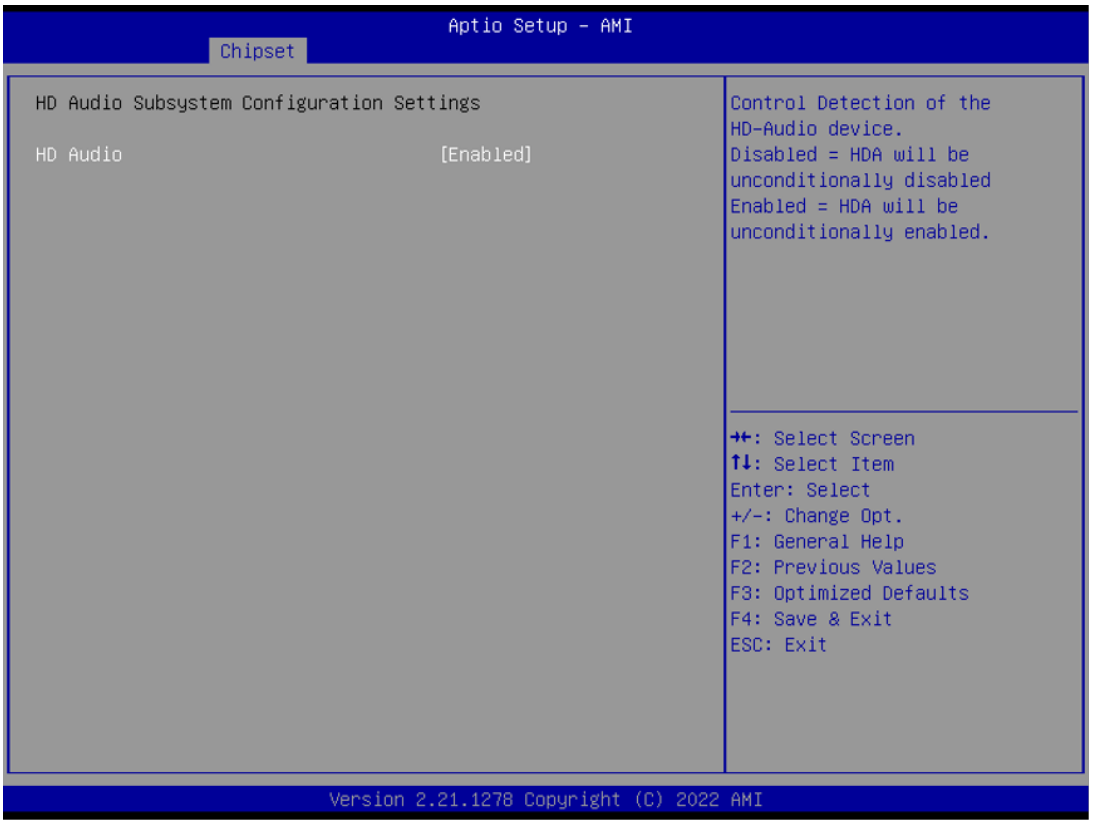


Figure 5.31 HD Audio Configuration

– HD Audio
Control Detection of the HD-Audio device.
- Disabled= HDA will be unconditionally disabled
- Enabled= HDA will be unconditionally enabled
- Auto= HDA will be enabled if present, disabled otherwise

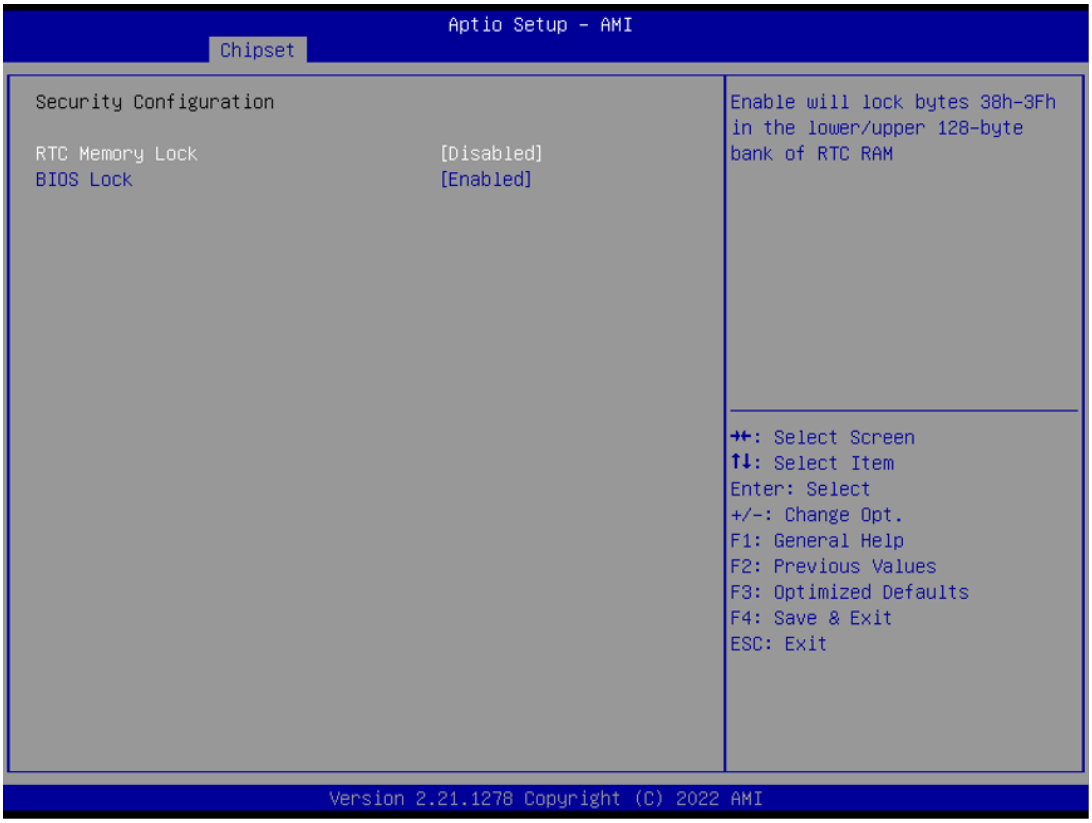


Figure 5.32 Security Configuration Settings

- RTC Memory Lock
  Disable/Enable
- BIOS Lock
  Disable/Enable

5.2.3.3 Security Boot

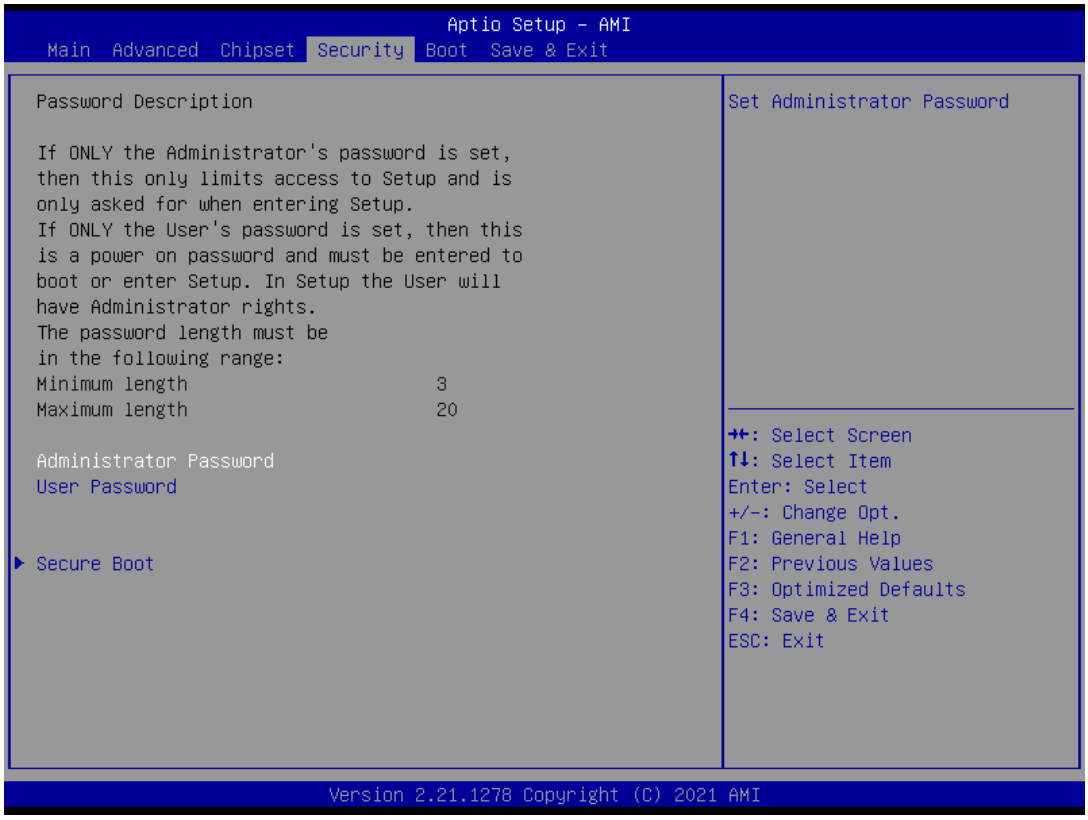


Figure 5.33 Security Setup

Select Security Setup from the Setup main BIOS setup menu. All Security Setup options, such as password 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.

5.2.4 Boot Settings

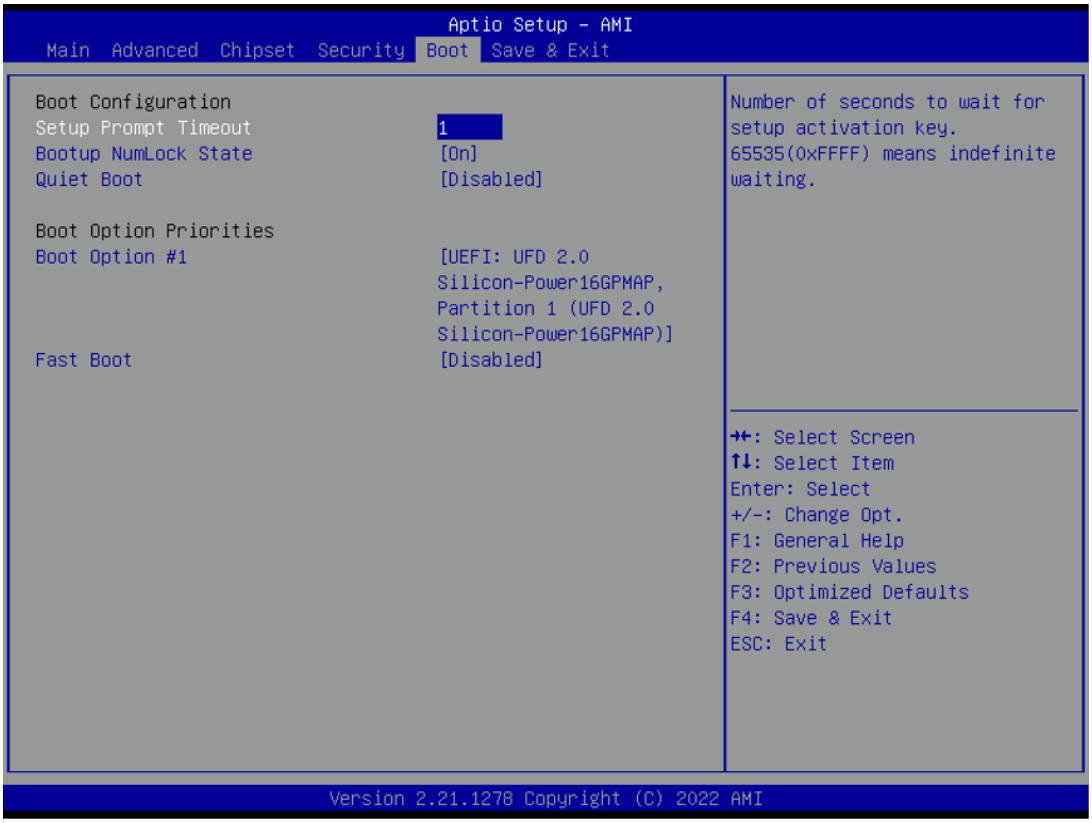


Figure 5.34 Boot Settings

- **Setup Prompt Timeout**
  Default 1
- **Bootup NumLock State**
  On/Off
- **Quiet Boot**
  Disable/Enable
- **Boot Option #1**
- **Fast Boot**
  Disable/Enable

5.2.5 Save & Exit

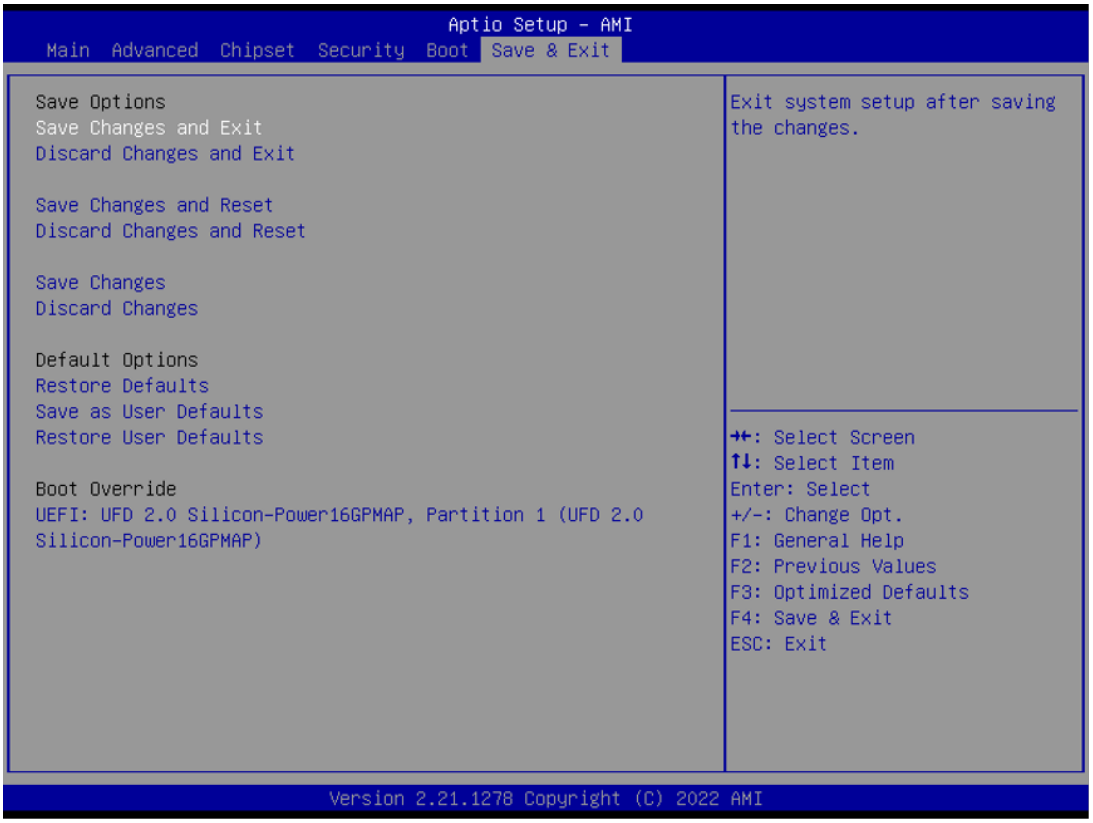


Figure 5.35 Save & Exit

- **Save Changes and Exit**
- **Discard Changes and Exit**
- **Save Changes and Reset**
- **Discard Changes and Reset**
- **Save Changes**
- **Discard Changes**
- **Restore Defaults**
- **Save as User Defaults**
- **Restore User Defaults**

Chapter 6

S/W Introduction and Installation

- S/W Introduction
- Driver Installation
- Advantech iManager

6.1 S/W Introduction

Advantech Embedded Software Services' mission is to "Enhance quality of life with Advantech platforms and Microsoft Windows embedded technology." We enable Windows Embedded software products on Advantech platforms to more effectively support the embedded computing community. Customers are freed from the hassle of dealing with multiple vendors (Hardware suppliers, System integrators, Embedded OS distributor) for projects. Our goal is to make Windows Embedded Software solutions easily and widely available to the embedded computing community.

6.2 Driver Installation

The Intel Chipset Software Installation (CSI) utility installs the Windows INF files that outline how the operating system and chipset components will be configured.

6.2.1 Windows Driver Setup

TS-207 supports Windows* 10. To install the drivers on a windows- based operation system, please connect to internet and browse the website http:// support.advantech.com.tw and download the drivers that you want to install and fol- low Driver Setup instructions to complete the installation.

6.2.2 Other OS

TS-207 supports Linux: Ubuntu (by Request)

6.3 Advantech iManager

Advantech's platforms come equipped with iManager, a micro controller that provides embedded features for system integrators. Embedded features have been moved from the OS/BIOS level to the board level to increase reliability and simplify integration.

iManager runs whether the operating system is running or not; it can count the boot times and running hours of the device, monitor device health, and provide an advanced watchdog to handle errors. iManager also comes with a secure and encrypted EEPROM for storing important security keys or other customer defined information. All the embedded functions are configured through API and provide corresponding utilities. These APIs comply with PICMG EAPI (Embedded Application Programmable Interface) specifications and unify in the same structures. This makes these embedded features easier to integrate, speed up development, and provide software continuity during hardware upgrade. Please refer to Advantech iManager 2.0 Software API User Manual for more details.

Control

GPIO

General Purpose Input/Output is a flexible parallel interface that allows a variety of custom connections. It allows users to monitor the level of signal input or set the output status to switch on/off a device. Our API also provides Programmable GPIO, which allows developers to dynamically set the GPIO input or output status.

SMBus

SMBus is the System Management Bus defined by Intel® Corporation in 1995. It is used in personal computers and servers for low-speed system management communications. The SMBus API allows a developer to interface a embedded system environment and transfer serial messages using the SMBus protocols, allowing multiple simultaneous device control.

I²C

I²C is a bi-directional two wire bus that was developed by Philips for use in their televisions in the 1980s.
The I²C API allows a developer to interface with an embedded system environment and transfer serial messages using the I²C protocols, allowing multiple simultaneous device control.

Display

Brightness Control

The Brightness Control API allows a developer to interface with an embedded device to easily control brightness.

Backlight

The Backlight API allows a developer to control the backlight (screen) on/off in an embedded device.

Monitor

Watchdog

A watchdog timer (WDT) is a device that performs a specific operation after a certain period of time if something goes wrong and the system does not recover on its own.
A watchdog timer can be programmed to perform a warm boot (restarting the system) after a certain number of seconds.

Hardware Monitor

The Hardware Monitor (HWM) API is a system health supervision API that inspects certain condition indexes, such as fan speed, temperature and voltage.

Hardware Control

The Hardware Control API allows developers to set the PWM (Pulse Width Modulation) value to adjust fan speed or other devices; it can also be used to adjust the LCD brightness.

Power Saving

CPU Speed

Make use of Intel SpeedStep technology to reduce power power consumption. The system will automatically adjust the CPU Speed depending on system loading.

System Throttling

Refers to a series of methods for reducing power consumption in computers by lowering the clock frequency. These APIs allow the user to lower the clock from 87.5% to 12.5%.

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 of the publisher.

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

© Advantech Co., Ltd. 2023