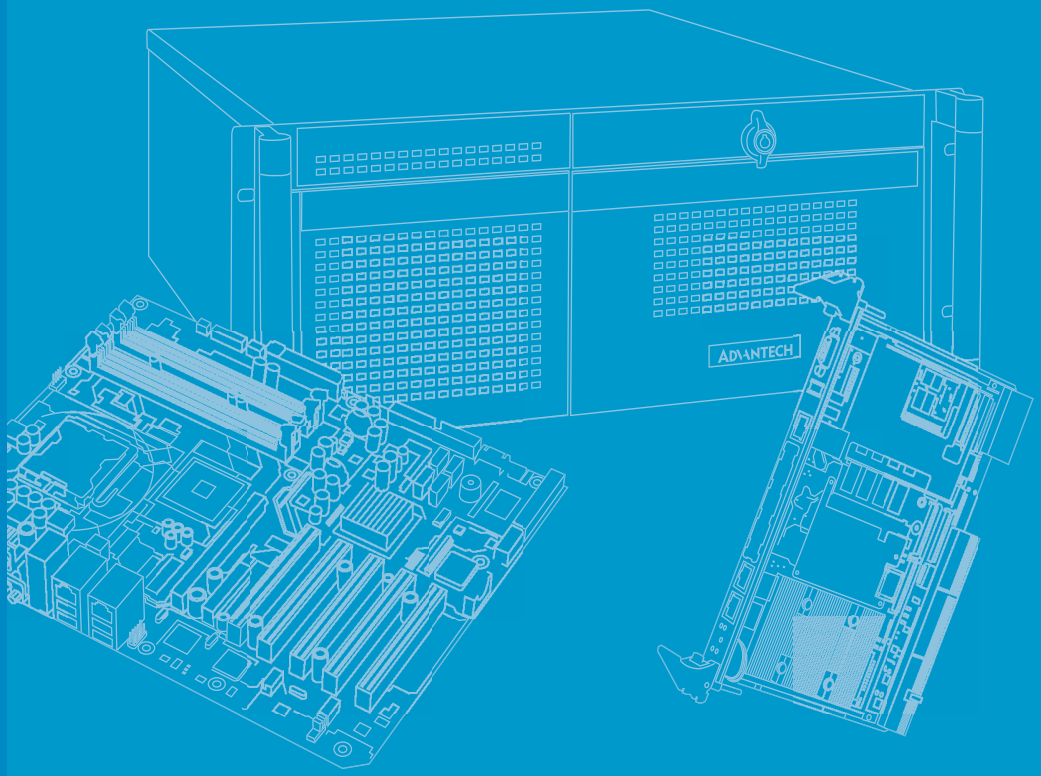

User Manual

ITA-460 Series

Fanless Embedded Industrial Computer with 8th/9th Gen Intel® Core™ i Processor for Vehicle Applications

ADVANTECH

Enabling an Intelligent Planet

Copyright

Acknowledgements

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

Product Warranty (2 years)

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

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

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

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

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any messages displayed onscreen 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 merchandize 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 photograph 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.

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Technical Support and Assistance

1. Visit the Advantech website at http://support.advantech.com 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

A Message to the Customer

Advantech Customer Services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for a laboratory or factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known. Your satisfaction is our primary concern. Below is a guide to Advantech's customer services. To ensure you get the full benefit of our services, please follow the instructions carefully.

Technical Support

We want you to get the best performance possible from your products. If you encounter technical difficulties, we are here to help. You can find answers to the most frequently asked questions in your product documentation. These answers are typically a lot more detailed than the ones provided over the phone.Therefore, please consult this manual first.

If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and can be easily solved over the phone.

In addition, free technical support is available from Advantech engineers every business day. We are always ready to give advice about application requirements or specific information regarding the installation and operation of any of our products.

Initial Inspection

Before setting up the equipment, check that the items listed below are included and in good condition.

- 1 x ITA-460 series industrial computer
- 1 x ITA-460 accessory box

If any of the above items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the ITA-460 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the ITA-460, check it for signs of shipping damage (for example, box damage, scratches, dents). If it is damaged or fails to meet the specifications, notify our service department or your local sales representative immediately. Also, please notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

Declaration of Conformity

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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. Operation of this equipment in a residential area is likely to cause harmful interference. In this event, users are required to correct the interference at their own expense.

Warnings, Cautions, and Notes

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

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

For example, “The battery is at risk of exploding if incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.”

Note! *Notes provide additional optional information.*

Safety Instructions

1. Read these safety instructions carefully.
2. Retain this user manual for future reference.
3. Disconnect the equipment from any power outlet 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 it 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 time, disconnect it from the power source to avoid damage from transient overvoltage.
12. Never pour liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following occurs, have the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated the equipment.
    - The equipment has been exposed to moisture.
    - The equipment is malfunctioning, or does not operate according to the user manual.
    - The equipment has been dropped and damaged.
    - The equipment shows obvious signs of breakage.
15. Do not leave the equipment in an environment with a storage temperature of below -40 °C (-104 °F) or above 55 °C (131 °F) as this may cause damage. The equipment should be kept in a controlled environment.
16. CAUTION: The battery is at risk of exploding if incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.
17. In accordance with IEC 704-1:1982 specifications, the sound pressure level at the operator's position does not exceed 70 dB (A).

DISCLAIMER: These instructions are provided according to the IEC 704-1 specifications. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Consignes de sécurité

1. Lisez attentivement ces consignes de sécurité.
2. Gardez ce manuel pour référence future.
3. Déconnectez cet équipement de toute prise secteur avant de le nettoyer. Utilisez un chiffon humide. Ne pas utilisez de liquide ou de sprays détergents pour le nettoyage.
4. 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. La chute de l'équipement pouvant l'endommager, celui-ci doit être installé surune surface stable.
7. Les ouvertures du boîtier sont nécessaires au refroidissement de l'appareil. Veillez à protéger l'appareil contre la surchauffe. Ne pas couvrir less ouvertures.
8. Assurez-vous que la tension de la source d'alimentation est correcte avant de brancher l'appareil à la prise de courant.
9. Placez le cordon d'alimentation de manière à éviter que des personnes marchent dessus. Veillez à ce qu'aucun objet ne soit placé sur le cordon d'alimentation.
10. Tous les conseils et avertissements concernant ce matériel et son utilisation doivent être lus et compris.
11. Si l'appareil n'est pas utilisé pendant une longue période, débranchez-le de la source d'alimentation pour éviter les dommages causés par des surtensions transitoires.
12. Ne jamais verser de liquide dans une ouverture. Cela peut provoquer un incendie ou un choc électrique.
13. Ne jamais ouvrir l'équipement. Pour des raisons de sécurité, l'équipement ne peut être ouvert que par du personnel qualifié.
14. Si l'une des situations suivantes se présente, faites vérifier le matériel par le personnel de service:
    - Le cordon d'alimentation ou la prise est endommagé.
    - Du liquide a pénétré dans l'appareil.
    - L'équipement a été exposé à l'humidité.
    - L'équipement ne fonctionne pas bien, ou vous ne pouvez pas le faire fonctionner selon le manuel d'utilisation.
    - L'appareil est tombé et est endommagé.
    - L'équipement présente des signes évidents de casse.
15. Ne pas laissez ce matériel dans un environnement où la température de stockage peut descendre en dessous de -40 °C (-40 °F) ou être supérieure à 70 °C (158 °F). Ceci pourrait endommager l'équipement. L'équipement doit être maintenu dans un environnement contrôlé.
16. ATTENTION: Risque d'explosion si la batterie est remplacee de maniere incorrecte. Remplacer uniquement avec un modèle recommandé par le fabricant, et éliminer les piles usagées selon les instructions du fabricant.
17. ATTENTION: Pour éviter tout risque d'electrocution, cet équipement ne doit être branché qu'au réseau d'alimentation avec une terre de protection.

Conformément à la norme CEI 704-1:1982, l'opérateur ne doit pas expérimenter un niveau sonore supérieur à 70 dB (A).

AVERTISSEMENT: Ces consignes suivent la norme CEI 704-1. Advantech décline toute responsabilité concernant l'exactitude des déclarations contenues dans ce document.

Safety Precautions - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from the PC chassis before manual handling. Do not touch any components on the CPU card or other cards while the PC is powered on.
- Disconnect the power before making any configuration changes. A sudden rush of power after connecting a jumper or installing a card may damage sensitive electronic components.

RTC Battery Information

The computer features a battery-powered real-time clock circuit. The battery is at risk of exploding if incorrectly replaced. Replace only with same type recommended by the manufacturer or an equivalent. Discard used batteries according to the manufacturer's instructions.

Disposal of a battery into fire or a hot oven, or by mechanically crushing or cutting the battery, can result in an explosion.

Risque d’explosion si la batterie est remplacee de maniere incorrecte. Remplacer uniquement avec un modèle recommandé par le fabricant, et éliminer les piles usagées selon les instructions du fabricant.

Éliminer une batterie dans un feu ou un four chaud, ou écraser ou couper mécaniquement une batterie peut provoquer une explosion. Veillez à connecter le cordon d'alimentation à une prise de courant avec mise à la terre.

Contents

Chapter 1

Overview

- Introduction
- Specifications
- Power Information
- Environmental Specifications
- System Diagram

1.1 Introduction

ITA-460 is a compact and vehicle computer equipped with a 8th/9th generation Intel® CoreTM i processor, wide voltage input range and special power protection surges design guarding against system damage from transient power. Specifically designed for intelligent transportation and road surveillance applications, It can work in extreme environments with features like the wide working temperature range (-25-60°C) and anti-shock/vibration to pass MIL-STD-810G; this power- ful computing platform can withstand 24/7 operation.

1.2 Specifications

- **CPU:** Intel® 8th/9th Gen Core™ i CPU socket (LGA1151)
- **PCH:** Intel® H310 chipset
- **System Memory:** Onboard 8/16 GB DDR4 2400/2666 MHz and One SO-RIMM memory socket up to 32GB
- **Graphic:** H310: Intel® HD Graphics 610, supports DirectX 12
- **Display:** HDMI : 3840x2160 @ 30 Hz
- **Storage:** Supports 2 x 2.5" SSD and 1 x Full-size mSATA (on main board)
- **Expansion:** 3 x Full-size mini PCIe (1 with SIM card slot for WWAN)
- **Watchdog Timer:** Single chip watchdog 255-level interval timer, setup by soft-ware
- **Ethernet:** 2 x 10/100/1000Mbps with M12 X-coded (F) controller: Intel I210-IT
- **USB:** 2 x USB 3.0 (Type A)
- **Series I/O:** 2 x RS-232/422/485, auto-flow control, DB9 type
- **Audio:** High Definition Audio (HD) by M12 A coded x 1 (1 x line out and 1 x mic in)
- **Dimensions (W x H x D):** 190 x 70 x 220 mm
- **Net Weight:** 4 kg

1.3 Power Information

Table 1.1: Power Input

DC-In Voltage	12V / 24V
Voltage Range	9 ~ 32V (Power input constraint at low power 8~9.6V)
Power Consumption	Typical: 33W Maximum: 95W
Power Connector	1 x M16 (M) 6-pin

1.4 Environmental Specifications

Table 1.2: Environmental Specifications	
Operating Temperature	-25 ~ 60 °C (-13 ~ 140 °F) with industrial
Storage Temperature	-40 ~ 85 °C (-40 ~ 185 °F)
Humidity	95% @ 40 ºC, non-condensing
Vibration	3 Grms @ 5 ~ 500 Hz, random, 8 hr/axis (SSD/mSATA)
Bump	30G Peak acceleration 11 ms duration
Safety/EMC	UL, CCC, BSMI, CE, FCC, Emark

The shock and vibration test were conducted according to the requirements for MIL-STD-810F, Category 1 - Body mounted, Class B.

The wire of the protective earthing conductor shall be green-and-yellow, 18 AWG min. and connecting to earth of building.

Protective earthing is used as a safeguard (if using Class I power sources)	Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet. The power outlet socket should have grounded connection. or See Enclosure / Manual for equivalent details.
Instruction/Installation/Safety Manual	"This product is intended to be supplied by an UL certified power supply or dc source suitable for use at minimum Tma 60 degree C whose output meets SELV or ES1 and is rated 9-32Vdc, 8.2A min., if need further assistance, please contact Advantech for further information."

1.5 System Diagram

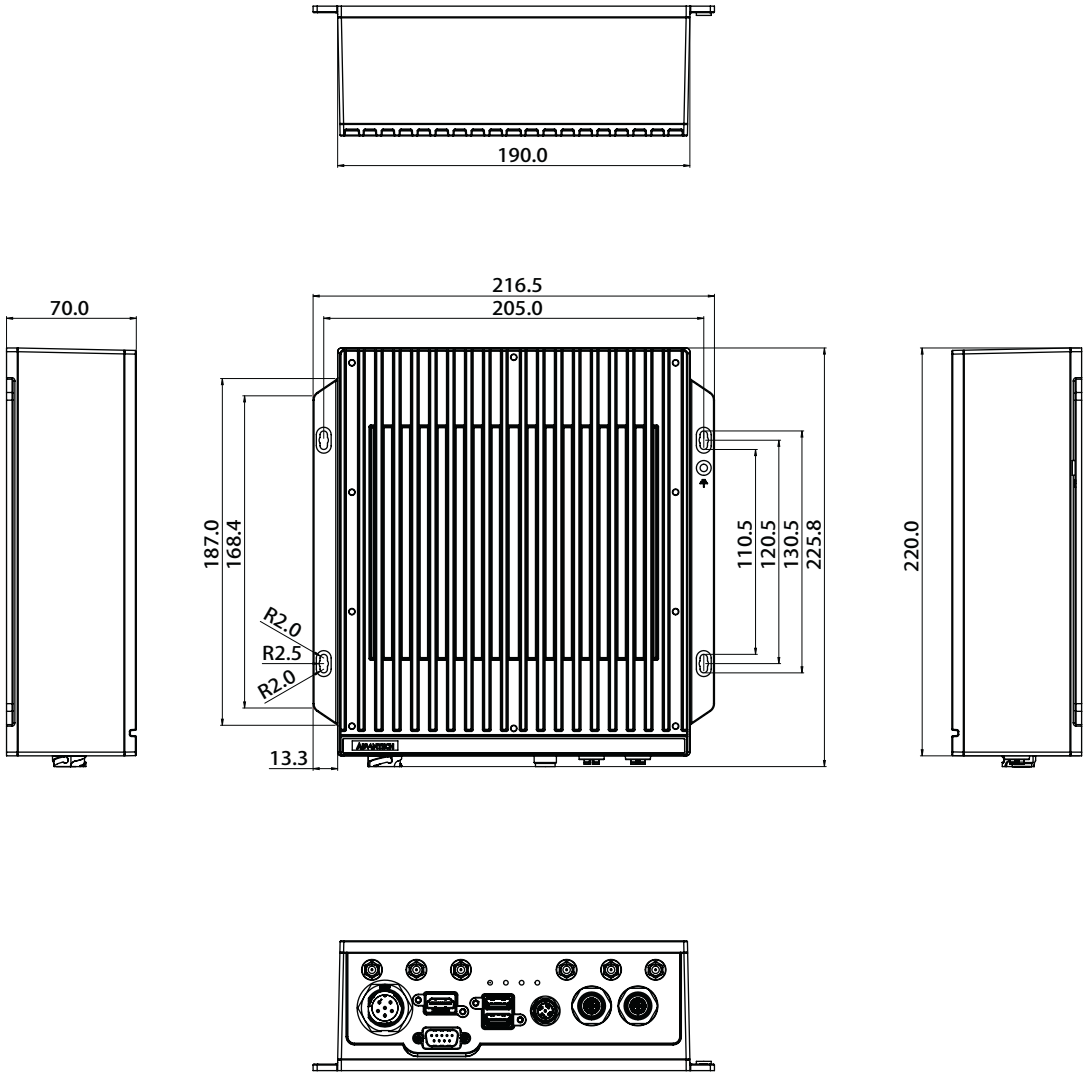


Figure 1.1 ITA-460 System Diagram

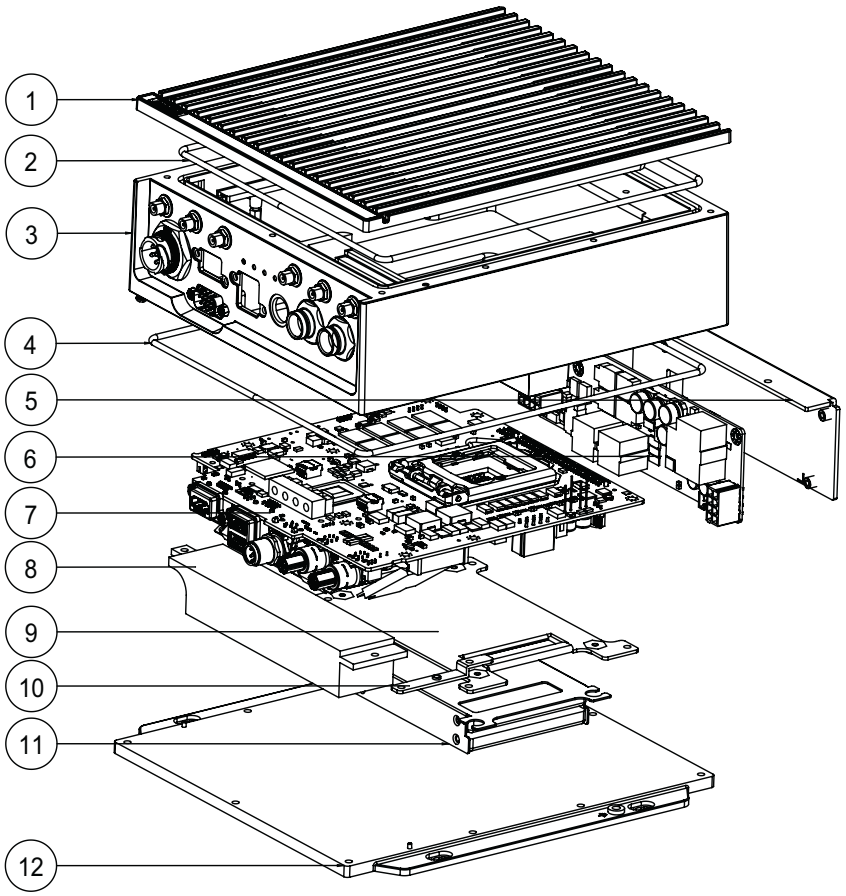


Figure 1.2 ITA-460 Exploded Diagram

Table 1.3: Parts List			
1	Top Cover	7	Main Board
2	Top Rubber	8	Inner Heatsink
3	Waterproof Frame	9	Inner Bracket 1
4	Bottom Rubber	10	Inner Bracket 2
5	Power Bracket	11	SSD Module
6	Power Board	12	Bottom Mount Kit

Chapter 2

H/W Installation

- Introduction
- Jumpers and Connectors
- I/O Connectors

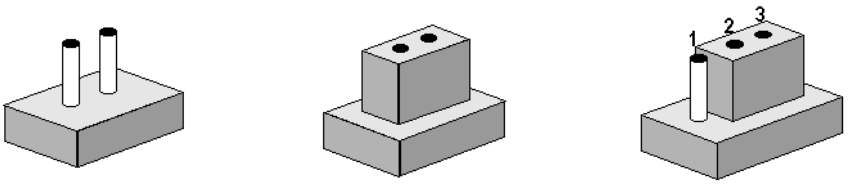
2.1 Introduction

The following sections show the internal jumper settings and external connector pin assignments for configuring the system according to application requirements.

2.2 Jumpers and Connectors

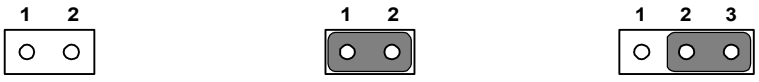
2.2.1 Jumper Description

ITA-460 can be configured for specific applications by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To close a jumper, remove the clip. Some jumpers may have three pins, labelled 1, 2, and 3. For these jumpers, connect either Pins 1 and 2, or Pins 2 and 3.



Open Closed 2-3 Closed

The jumper settings are schematically depicted in this manual as shown below.



Open Closed 2-3 Closed

A pair of needle-nose pliers may be helpful when working with jumpers. If you have any concerns about the best hardware configuration for your application, contact your local distributor or sales representative before making any changes. For most connections, only a standard cable is required.

2.2.2 Jumper and Connector Locations

The main board features a number of connectors and jumpers for system configuration. The location of each jumper and connector on the main board is shown in Figure 2.1. The function of each of the connectors and jumpers is listed in Table 2.1 below.

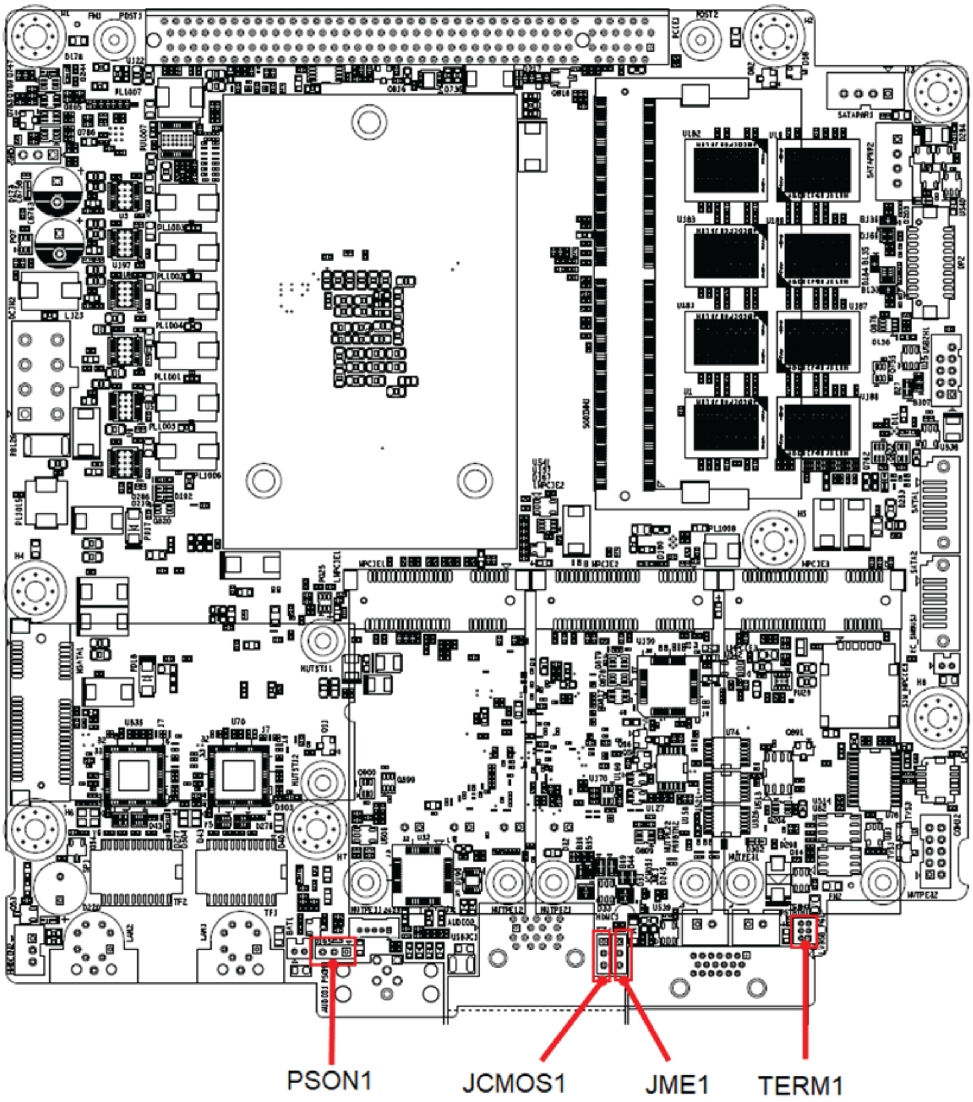


Figure 2.1 Jumper and Connector Locations on Main Board

Table 2.1: Jumpers List

Name	Function
JCOMS1	Clear CMOS
PSON1	System AT/ATX mode option
JME1	ME jumper mode option
TERM1	COM port RS-485 termination option

2.2.2.1 Clear CMOS

ITA-460 single board computer contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset the CMOS data, set CMOS1 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

Table 2.2: JCMOS1 (Clear CMOS Settings)

CMOS1	**Clear CMOS**
Footprint	**3 x 1 Pin**
Setting	**Function**
(1-2)	Normal (Default)
(2-3)	Clear CMOS

2.2.2.2 System AT/ATX mode function option

ITA-460 supports AT or ATX mode and default is ATX module. If you want to change to AT mode you can find AT/ATX mode jumper on the motherboard.

Table 2.3: PSON1 (System AT/ATX mode option)

PSON1	**System AT/ATX mode option**
FootPrint	**3 x 1 Pin**
Setting	**Function**
(1-2)	AT module
(2-3)	ATX module

2.2.2.3 System ME Mode function option

ITA-460 supports ME Enable & Disable and the default is “Disable”. If you want to change the ME mode you can set ME mode jumper on the motherboard

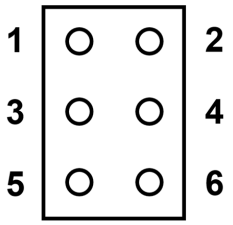
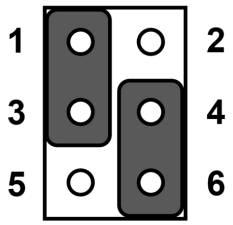
Table 2.4: JME1 (System ME mode option)

JME1	**System ME mode option**
FootPrint	**3 x 1 Pin**
Setting	**Function**
(1-2)	ME Enable (Default)
(2-3)	ME Disable

2.2.2.4 COM port RS-485 termination option

ITA-460 single board computer contains a jumper that can set Watchdog mode.

Table 2.5: TERM1 (COM port RS-485 termination option)

TERM1	COM port RS-485 termination option
FootPrint	3 x 2 Pin open  closed (1-3) and (4-6) 

Setting	Function
(1-2)	COM1 RS-485 has termination
(1-3)	COM1 RS-485 has no termination (Default)
(4-6)	COM2 RS-485 has no termination (Default)
(5-6)	COM2 RS-485 has termination

2.3 I/O Connectors

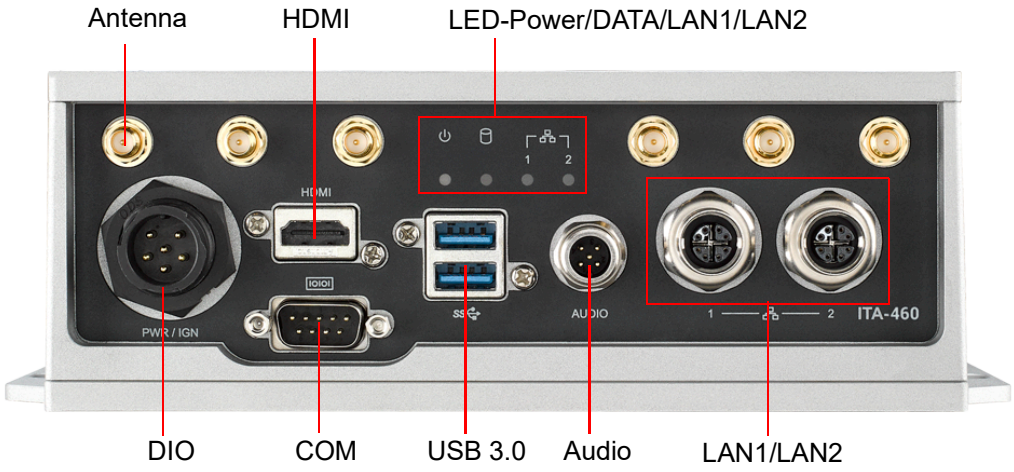


Figure 2.2 ITA-460 I/O View

2.3.1 COM Connector

ITA-460 is equipped with two RS-232/422/485 DB9 connectors. The default setting is RS-232.

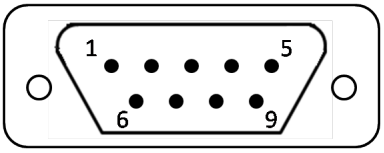


Table 2.6: COM Connector Pin Definitions

	RS-232	RS-422	RS-485
Pin	**Signal Name**	**Signal Name**	**Signal Name**
1	COM1 RTS	COM1 TX+	DATA-
2	COM1 RX	COM1 TX-	DATA+
3	COM1 TX	COM1 RX+	NC
4	COM1 CTS	COM1 RX-	NC
5	GND	GND	GND
6	COM2 RTS	COM2 TX+	NC
7	COM2 RX	COM2 TX-	NC
8	COM2 TX	COM2 RX+	NC
9	COM2 CTS	COM2 RX-	NC

2.3.2 Audio Connector

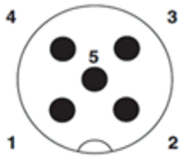


Table 2.7: Audio Connector Pin Definitions			
Pin	**Signal Name**	**Pin**	**Signal Name**
1	Line Out R	5	Audio GND
2	Line Out L		
3	MIC_R		
4	MIC_L		

2.3.3 Power Input Connector

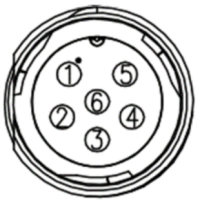


Table 2.8: Power Input Connector Pin Definitions		
Pin	**Signal Name**	
1,2	+8VDC~+36VDC	
3	IGNITION	Connect + VDC over 5V to trig ignition
4,5	GND	
6	PWRBTN	Contact GND to trig power button

2.3.4 Ethernet Connector

ITA-460 provides three 10/100/1000 Mbps Ethernet ports with an M12, X-coded connector.

Table 2.9: Ethernet Connector Pin Definitions			
Pin	**Signal Name**	**Pin**	**Signal Name**
1	MDI0+	5	MDI3+
2	MDI0-	6	MDI3-
3	MDI1+	7	MDI2-
4	MDI1-	8	MDI2+

2.3.5 LED Indicators

The ITA-460 front panel features LEDs that are used to indicate system health and active status. The LED indicator behaviors are explained in the table below.

Table 2.10: LED Indicators

Item	LED	Status	Color	Description
1	PWR	On	Blue	The system is powered on and secure.
		Off		
2	DATA	On	Red	Data is being received/transmitted
		Off		Not active
3	Ethernet	On	Green	System fault alarm
		Off		

Chapter 3

System Setup

- mSATA Installation
- ITA-EM Module Installation
- RTC Battery Installation

3.1 Introduction

The following sections provide instructions for installing the hardware modules into the ITA-460 system.

3.2 mSATA Installation

ITA-460 features one mSATA slot on the main board and three mini PCIe slots on the carrier board.

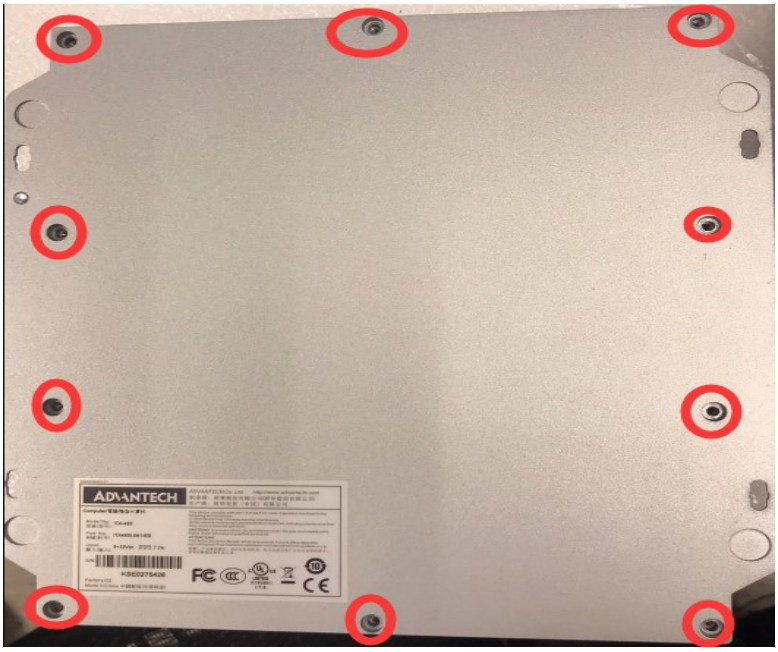


Figure 3.1 Bottom screw locations.

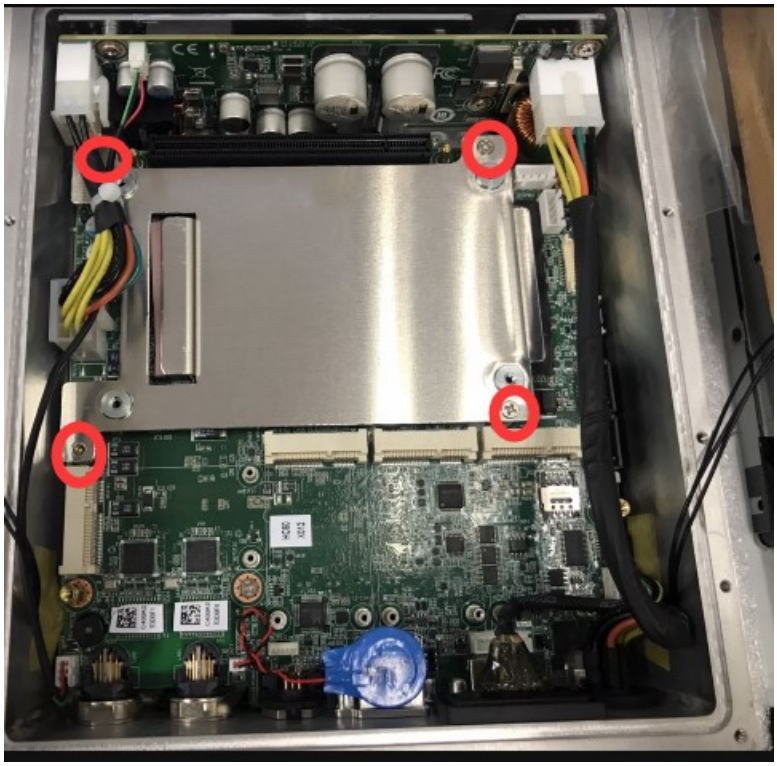


Figure 3.2 SSD Bracket screw locations

Figure 3.3 Mini PCIe and mSATA Locations on Main Board

1. Loosen the screws and open the bottom cover of the device.
2. Loosen the screws to remove the dual-SSD bracket.
3. Insert the mSATA or mini PCIe module.
4. Affix the module in place using two screws.

3.3 SSD Installation

ITA-460 is equipped with one SSD bracket[1] that features Dual SSD socket[2]. To install an SDD, follow the instructions provided on the next page.

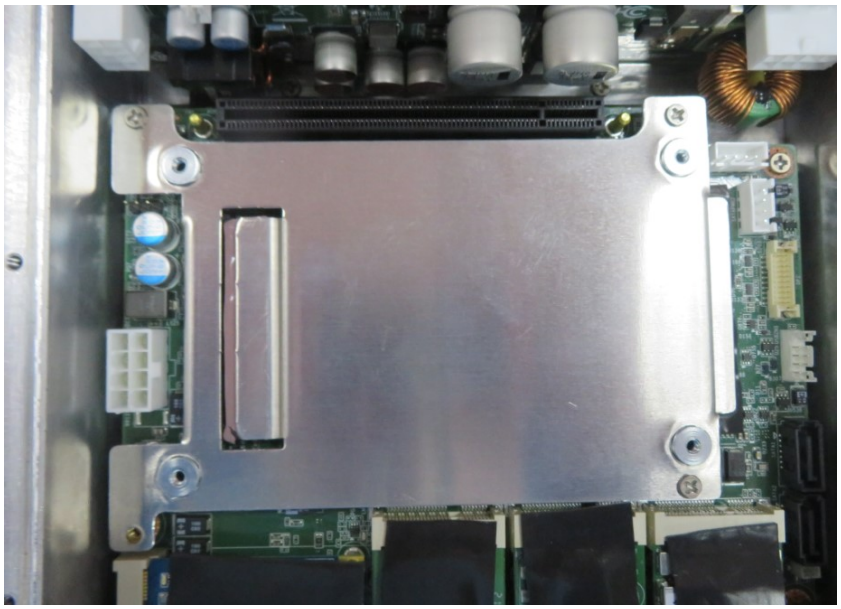


Figure 3.4 SSD Bracket (1)

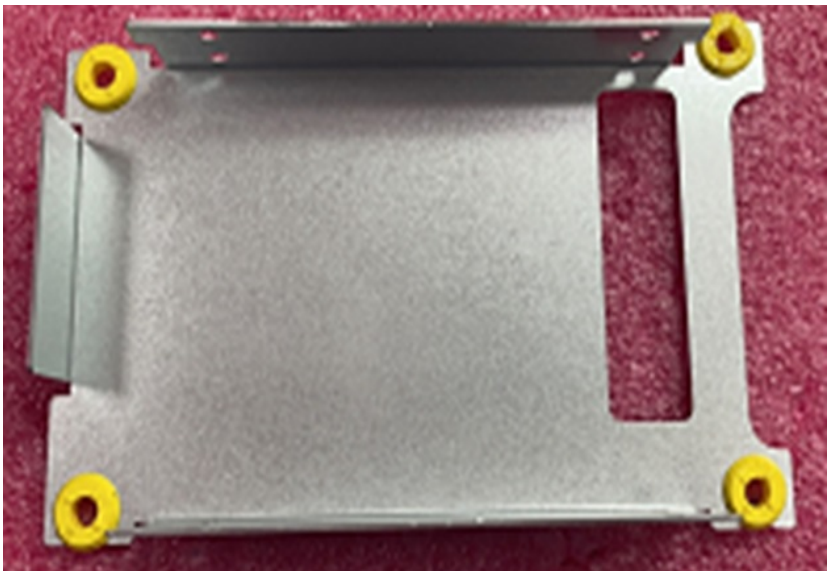


Figure 3.5 Dual-SSD Socket (2)

Figure 3.6 SATA Cable Assembly

Figure 3.7 SSD Screw locations

Figure 3.8 SSD socket screw locations

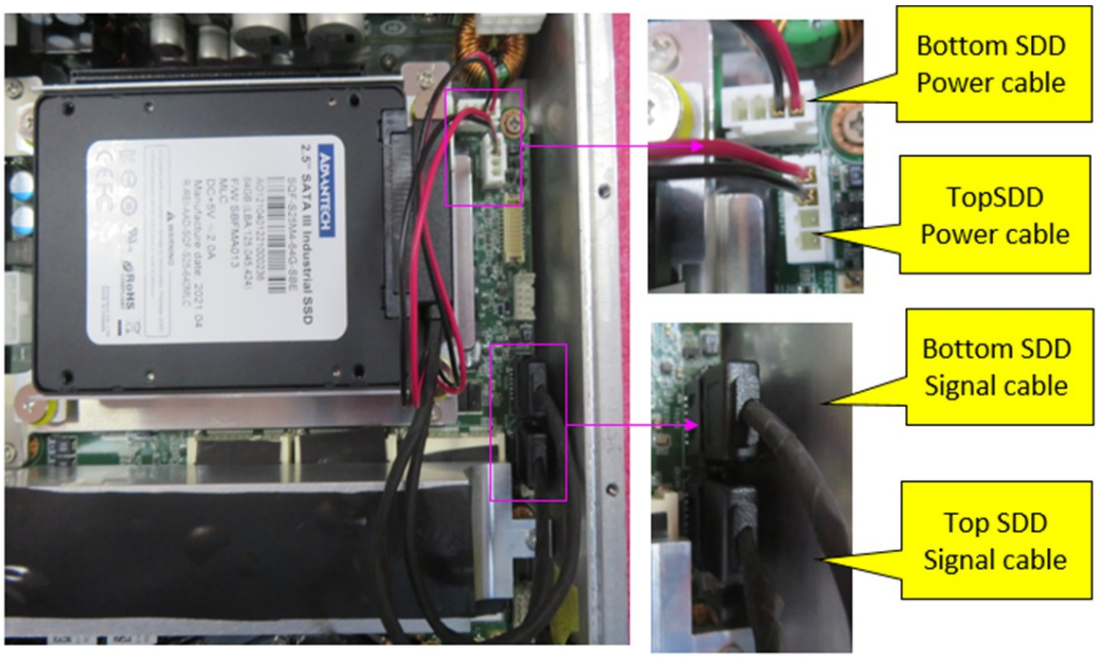


Figure 3.9 SATA cable locations

1. Assemble SATA cable with SSD.
2. Install the SSD onto the socket and secure it in place using eight screws two sides.
3. Install the SSD socket onto the bracket and secure it in place using four screws.
4. Install the SATA cable on the MB.

3.4 CPU Installation

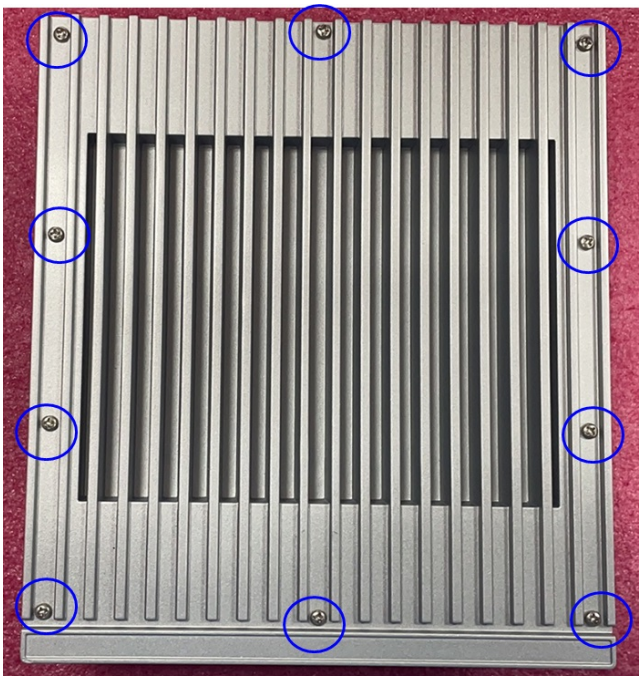


Figure 3.10 Top cover screw locations

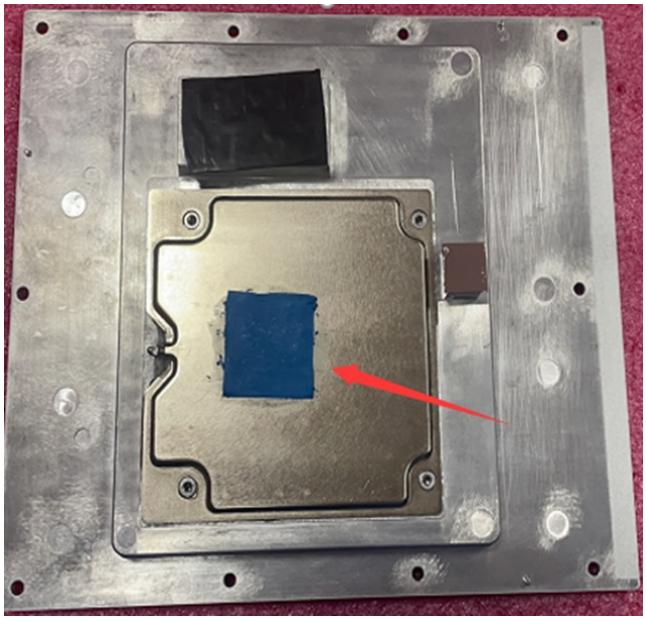


Figure 3.11 CPU thermal pad location

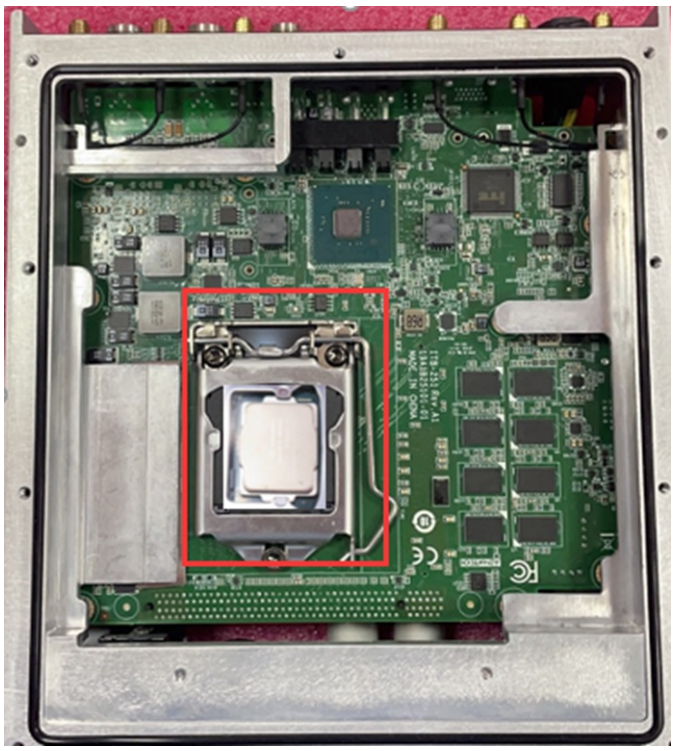


Figure 3.12 CPU Socket

1. Loosen the screws and open the Top cover of the device.
2. Tap the CPU thermal pad on the VC of Top cover.
3. Install the CPU onto the CPU socket.

3.5 RTC Battery Installation

Figure 3.13 RTC battery location

1. Open the bottom cover.
2. Insert the RTC battery into the holder and connect the cable.
3. Fix the BTC battery onto the top of USB conn. via double sided foam tape.

Note! *The RTC battery settings can be configured using the BIOS Setup utility. The +VBAT should be >2.6V. The standard battery lifetime is 3 years+. Users can change the RTC battery according to voltage requirements.*

Chapter 4

BIOS Settings

4.1 Introduction

This chapter explains the basic navigation of the BIOS Setup menus and how to configure the BIOS settings for the ITA-460 series. With the AMI BIOS Setup program, users can modify the BIOS settings and control the device features. The Setup program features several menus with multiple items that for enabling/disabling functions and implementing changes.

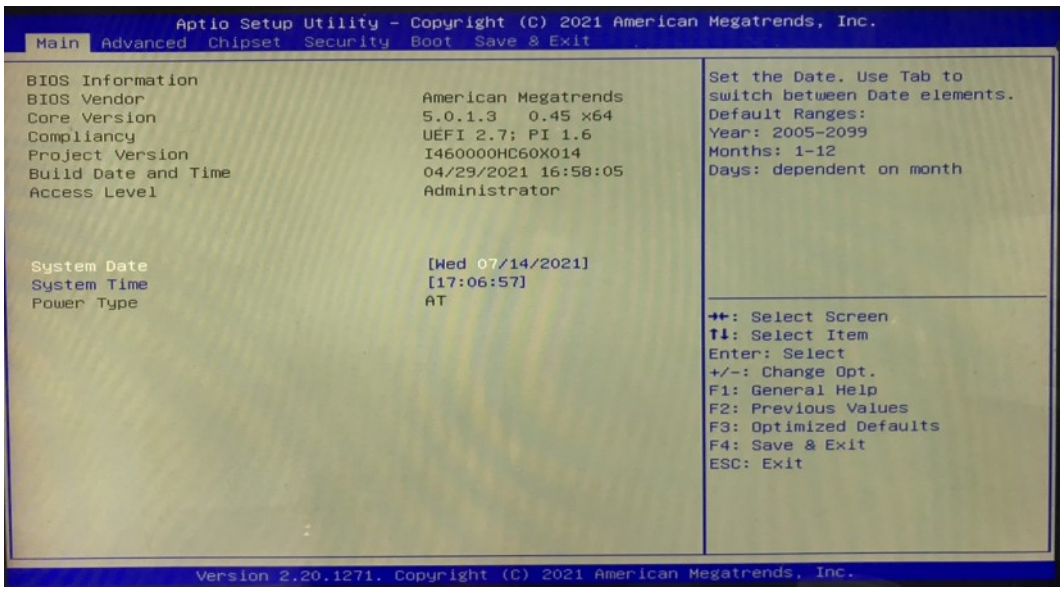


Figure 4.1 Main setup screen

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

4.2 Entering Setup

Power on the computer to enter the POST screen. The BIOS and CPU information will be displayed on screen. Press <DEL> to enter the BIOS Setup utility.

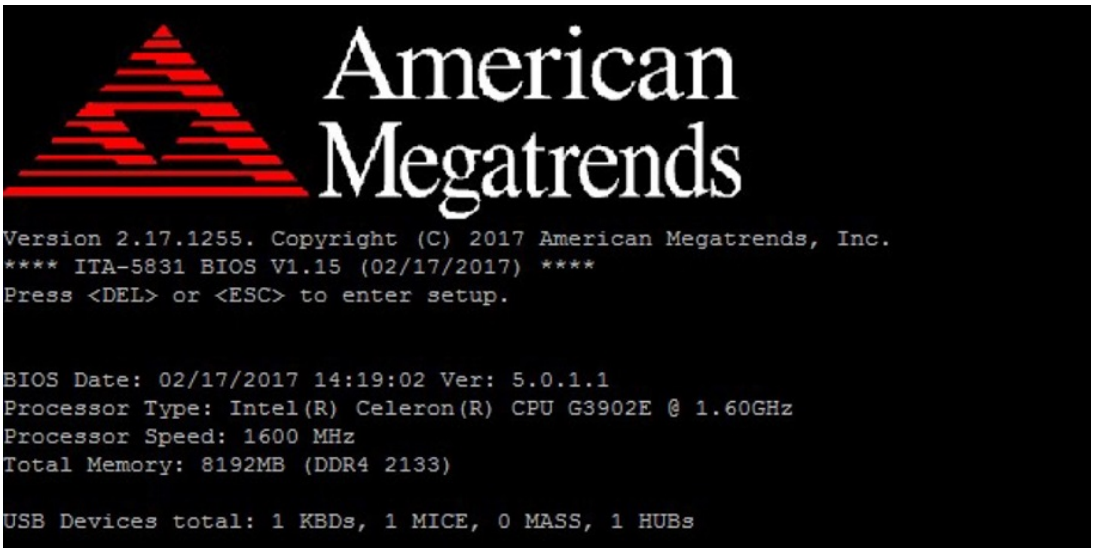


Figure 4.2 AMI BIOS information screen

4.3 Main Setup

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

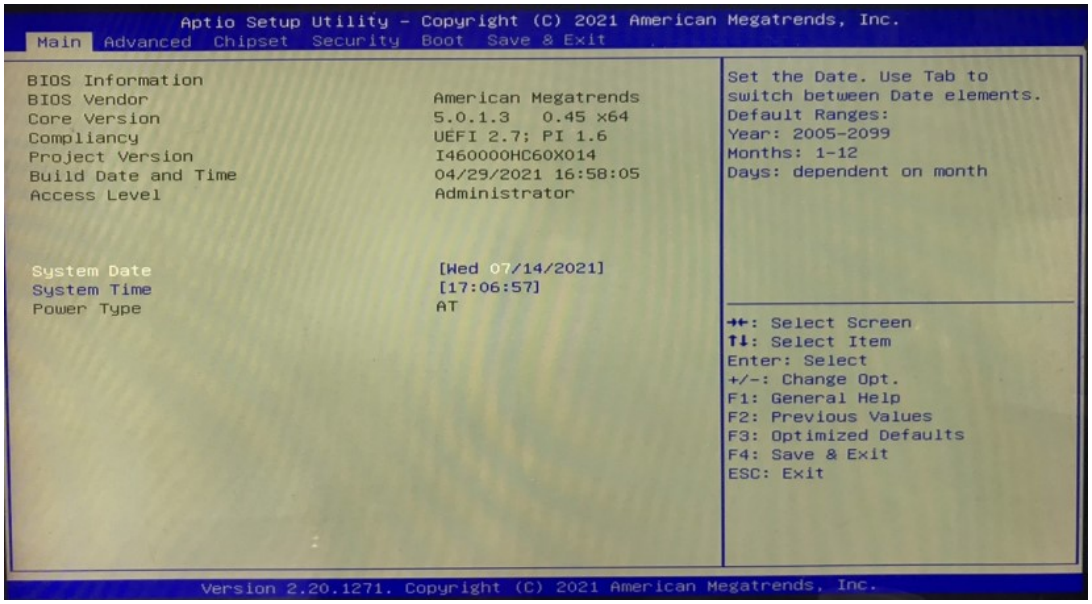


Figure 4.3 Main Setup Screen

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

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

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

4.4 Advanced BIOS Features Setup

Select the Advanced tab from the ITA-460 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.

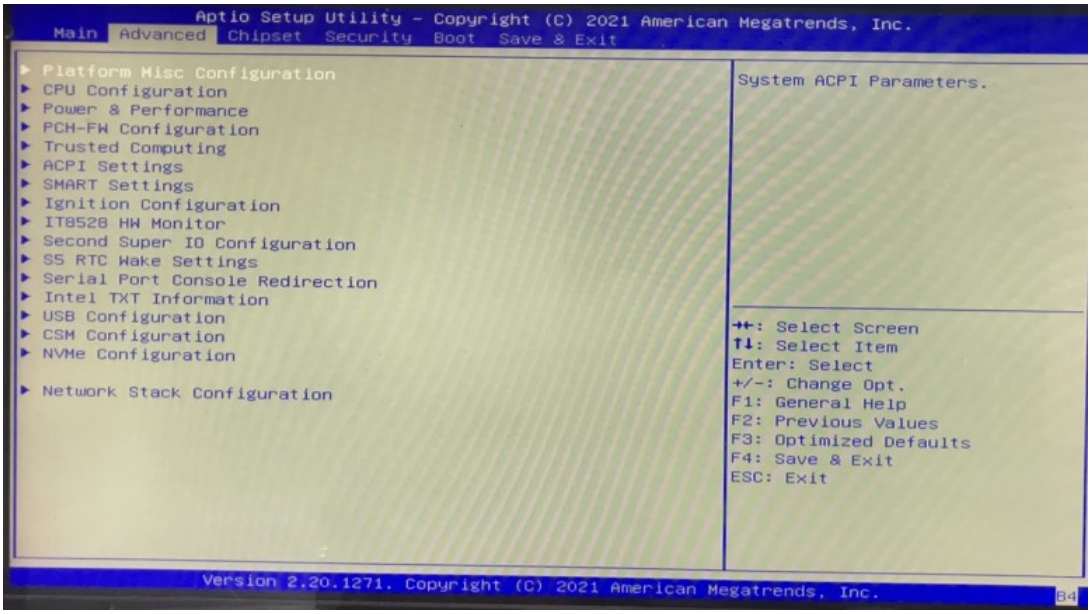


Figure 4.4 Advanced BIOS Features Setup Screen

4.4.1 Platform Misc Configuration

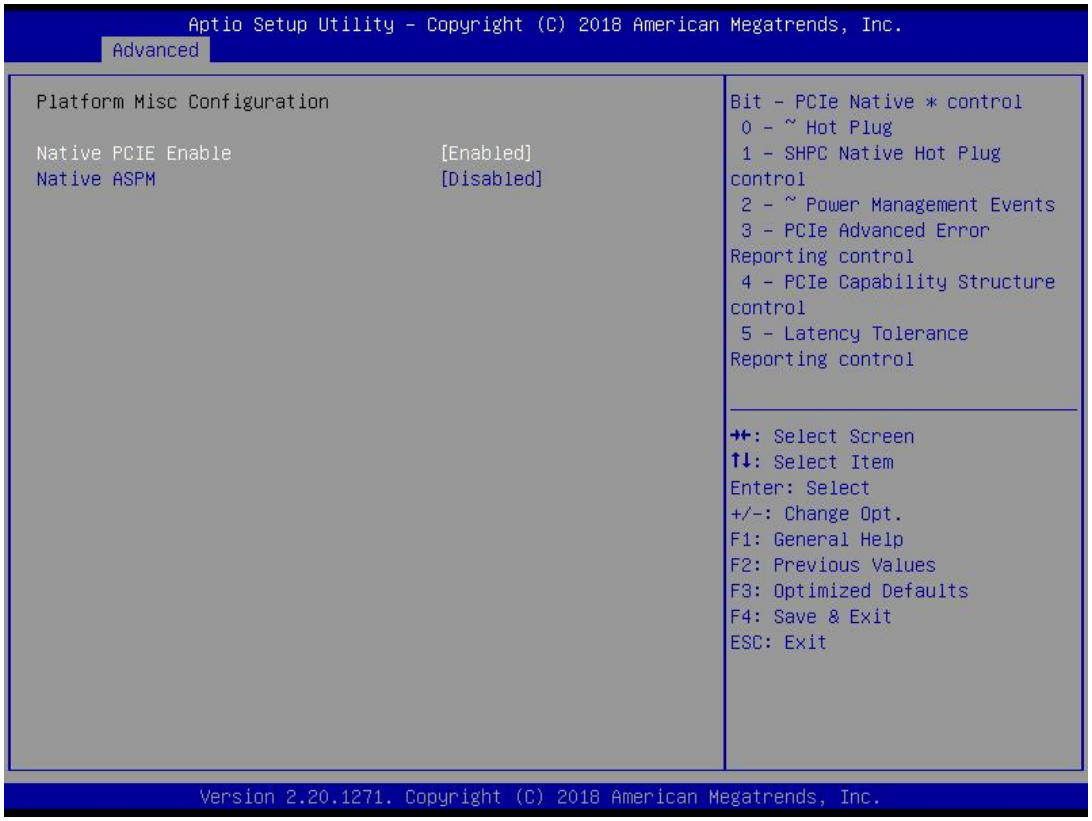


Figure 4.5 Platform Misc Configuration

- **Platform Misc Configuration**
  - **Native PCIE Enable**
    PCI Express Native Support Enable/Disable. This is only available in Vista.
  - **Native ASPM**
    On enable, Vista will control the ASPM support for the device. If disabled, the BIOS will.

4.4.2 CPU Configuration

This page shows the version, mode, type, and SKU of the ME firmware built-in BIOS.

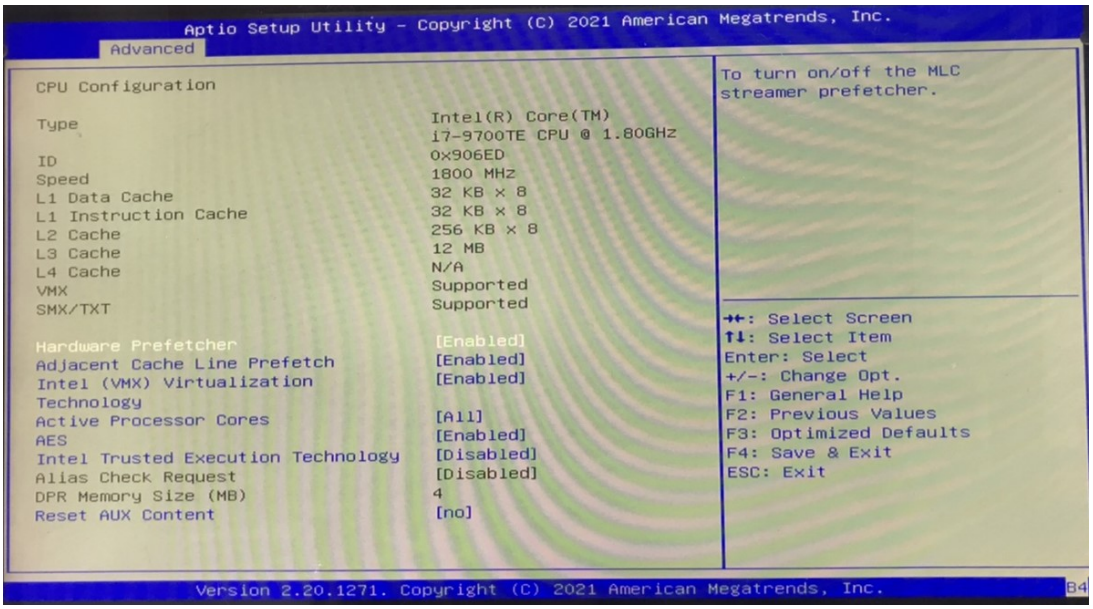


Figure 4.6 CPU Configuration

- **Hardware Prefetcher**

  Hardware Prefetcher is a technique that fetches instructions and/or data from memory into the CPU cache memory well before the CPU needs it to improve the load-to-use latency. You may choose to Enable or Disable it.

- **Adjacent Cache Line Prefetch**

  The Adjacent Cache-Line Prefetch mechanism, like automatic hardware prefetch, operates without programmer intervention. When it is enabled through the BIOS, two 64-byte cache lines are fetched into a 128-byte sector, regardless of whether the additional cache line has been requested or not. You may choose to Enable or Disable it.

- **Intel Virtualization Technology**

  This feature is used to Enable or Disable Intel Virtualization Technology (IVT) extension. It allows multiple operating systems to run simultaneously on the same system by creating virtual machines, each running its own x86 operating system.

- **Active Processor Core**

  Use this item to select the number of processor cores you want to activate when you are using a dual or quad core processor.

- **AES**

  Enable or Disable CPA advanced encryption standard instruction.

- **Intel Trusted Execution Technology**

  "Enable or Disable" utilization of additional hardware capabilities provided by Intel Trusted Execution Technology. Changes require a full power cycle to take effect.

- **Rest AUX Content**

  Reset TPM AUX content. TXT may not be functional after AUX content gets reset.

4.4.3 Power & Performance

This page shows the hardware data accessed by the embedded controller. Users can access this page to obtain the system temperature, voltage, or status informa- tion.

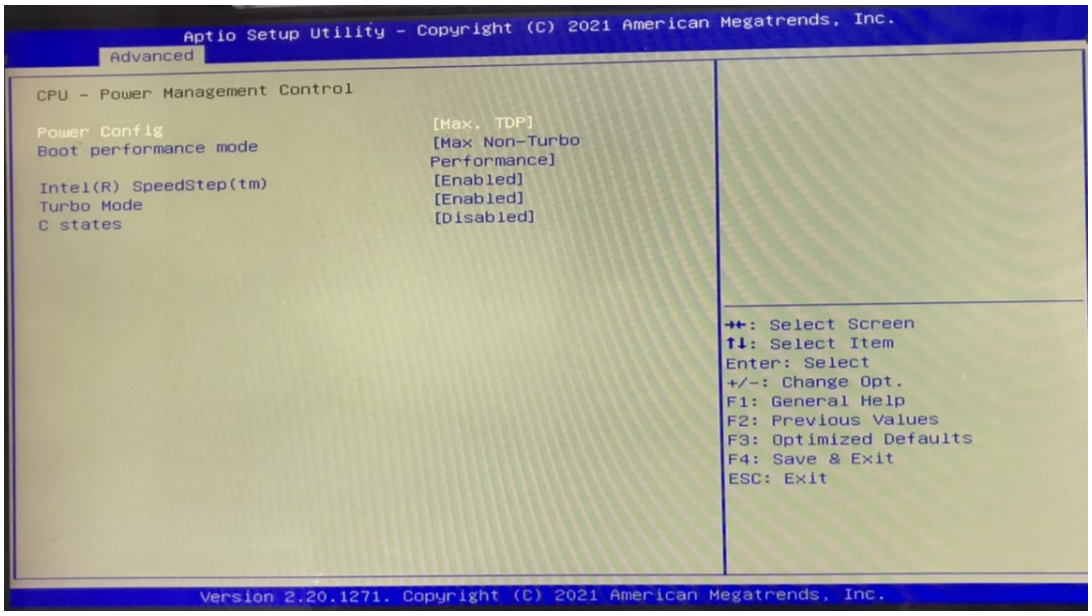


Figure 4.7 CPU Power & Performance

- **Power Config**
  Select the power configuration as Max or Limit to 35W
- **Boot Performance**
  Select the performance state that the BIOS will set before OS handoff.
- **Intel(R) Speedstep(tm)**
  Allows more than two frequency ranges to be supported.
- **Turbo Mode**
  Turbo mode.
- **C states**
  Intel C states setting for power saving.

4.4.4 PCH-FW Configuration

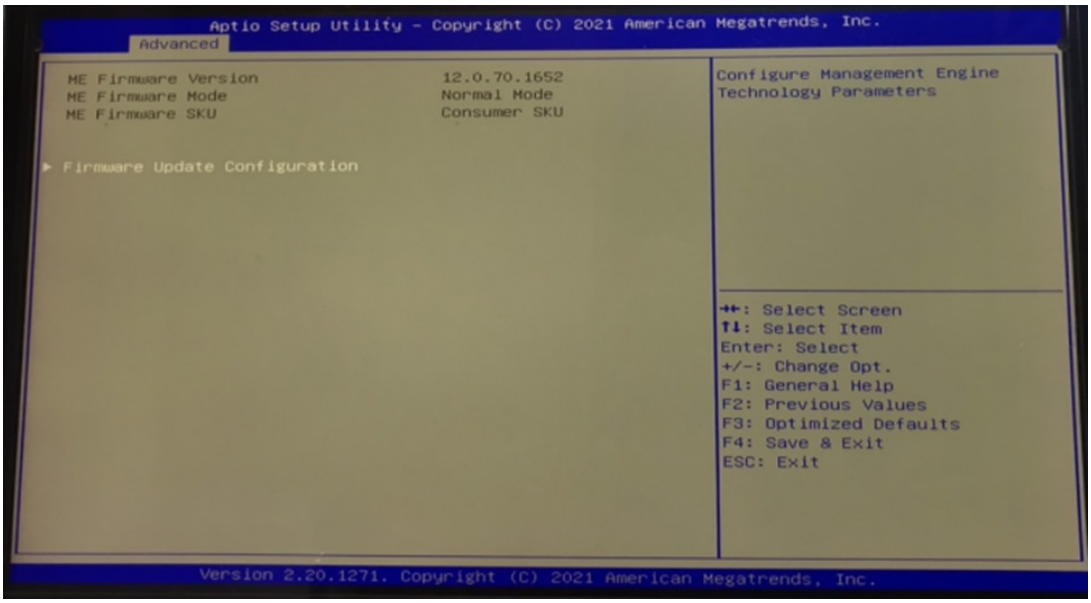


Figure 4.8 PCH-FW Configuration

- **PCH-FW Version**
  PCH-FW page shows Intel ME FW information.

4.4.5 Trusted Computing

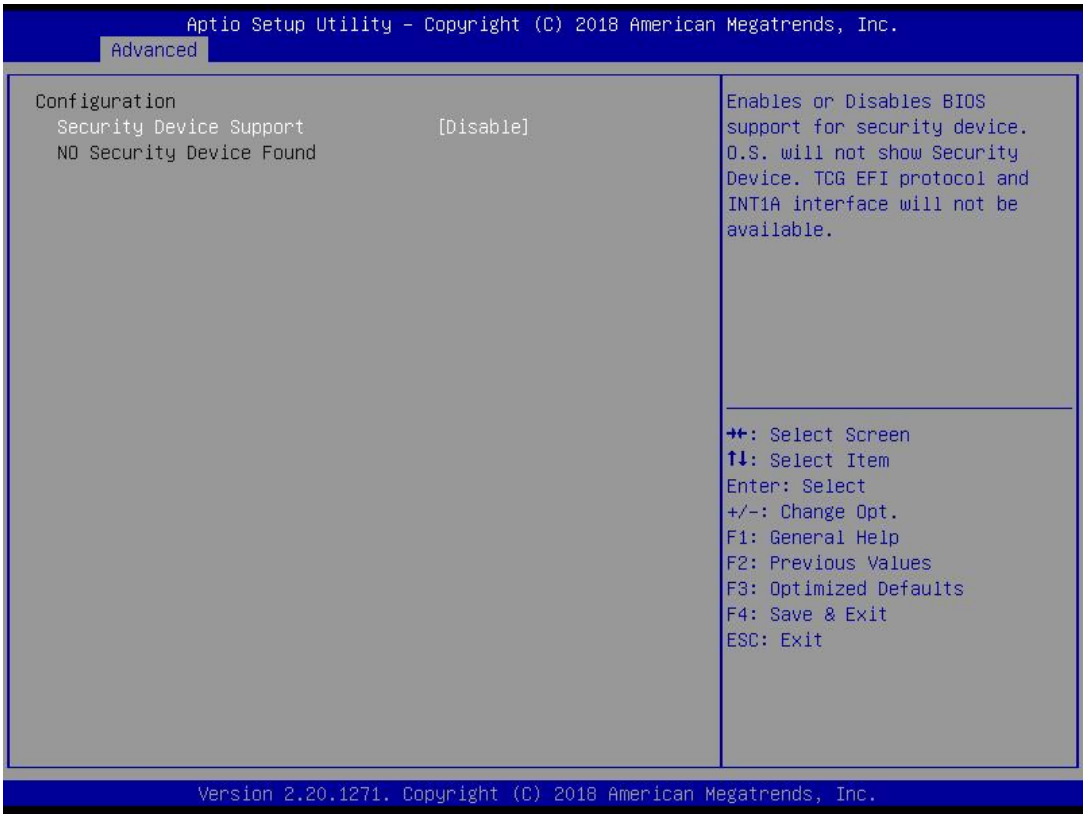


Figure 4.9 TPM Settings

- **TPM Support**
  "Enable or Disable" TPM Support. You can purchase Advantech LPC TPM module to enable TPM function. P/N: PCA-TPM-00B1E.

4.4.6 ACPI Setting

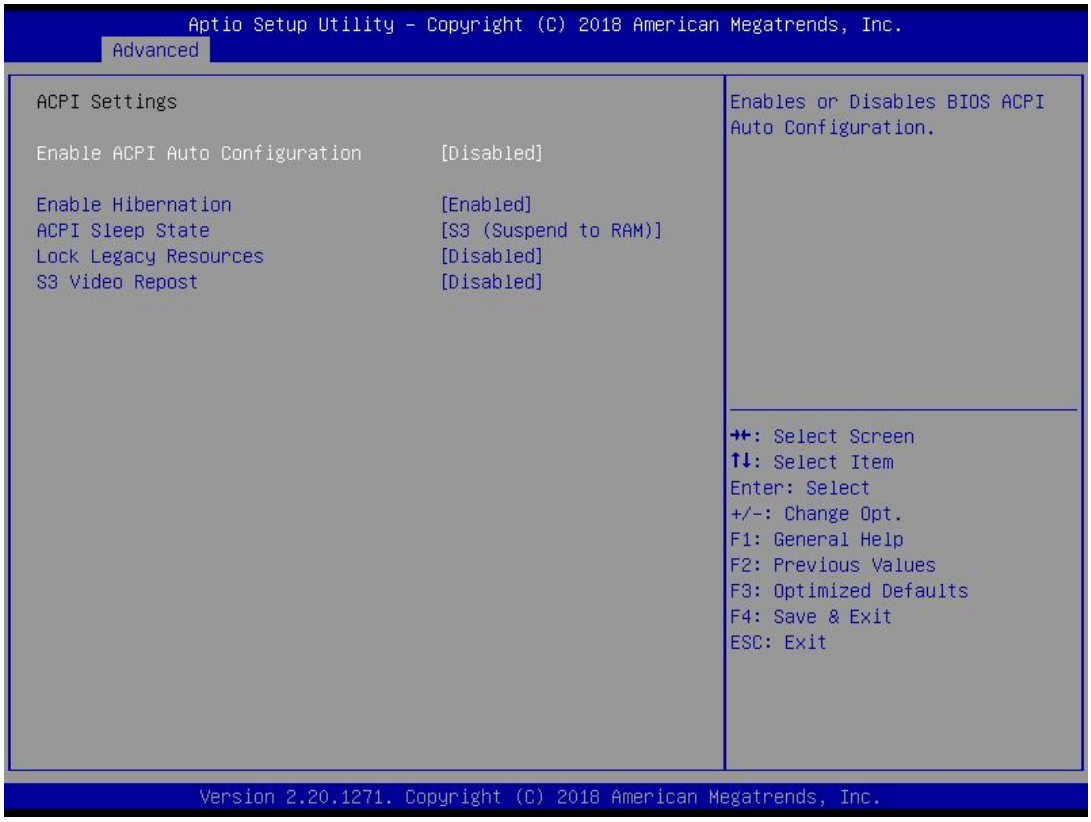


Figure 4.10 ACPI Settings

- **Enable Hibernation**
  Enable or Disable Hibernation (OS/S4 Sleep State). This option may not be applied in some OS.
- **ACPI Sleep State**
  Auto or S1 only or S3 only ACPI Sleep State.
- **Lock Legacy Resources**
  Enable or Disable Lock Legacy Resources.
- **S3 Video Repost**
  Enable or Disable S3 Video Repost.

4.4.7 SMART Settings

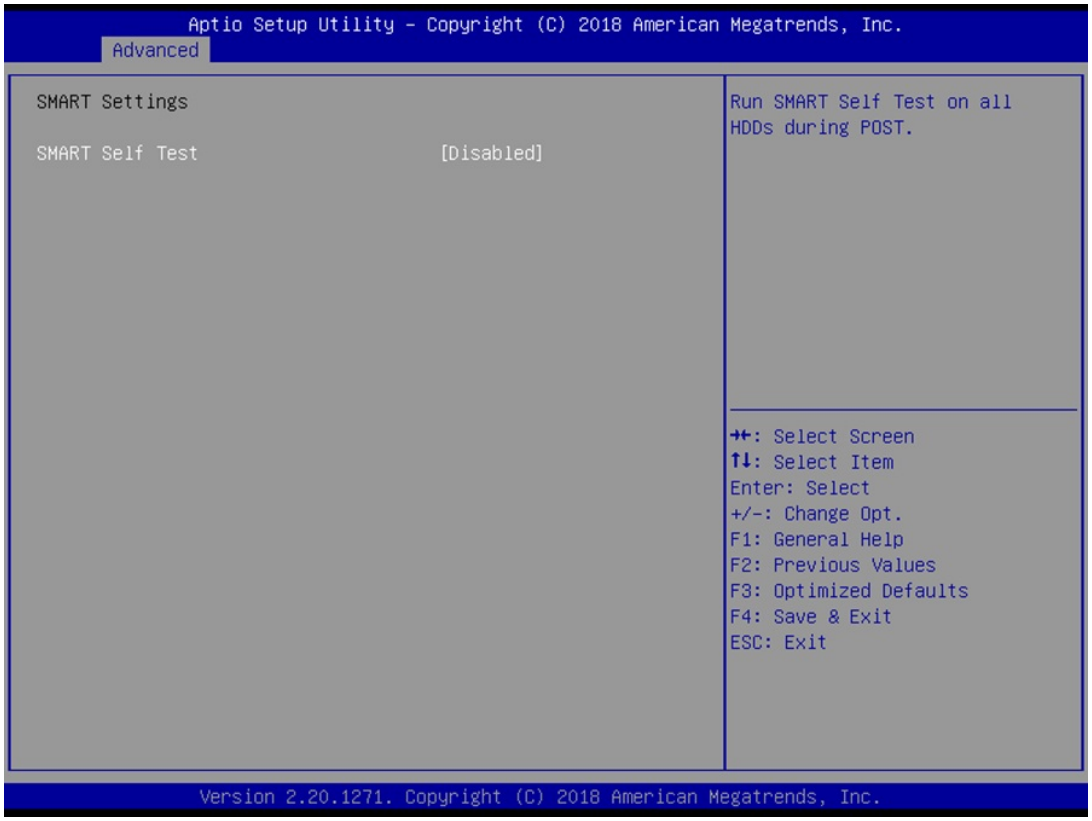


Figure 4.11 SMART Settings

- **SMART Self Test**
  Enable or Disable SMART Self Test on all HDDs during POST

4.4.8 Ignition Configuration

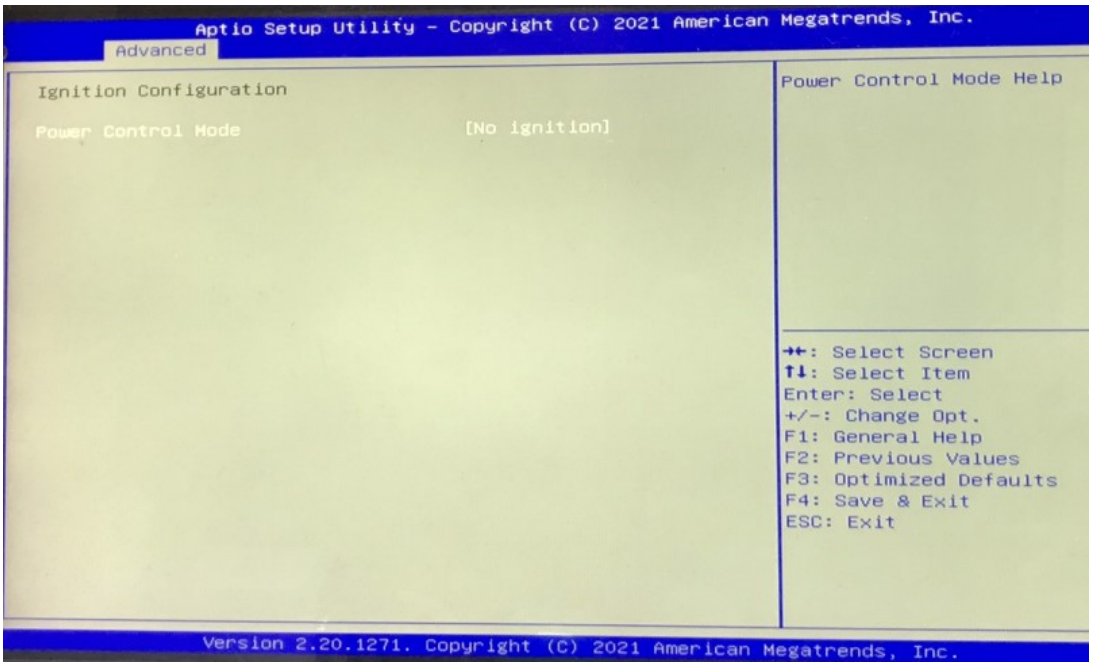


Figure 4.12 Ignition Configuration

4.4.9 IT8528 HW Monitor

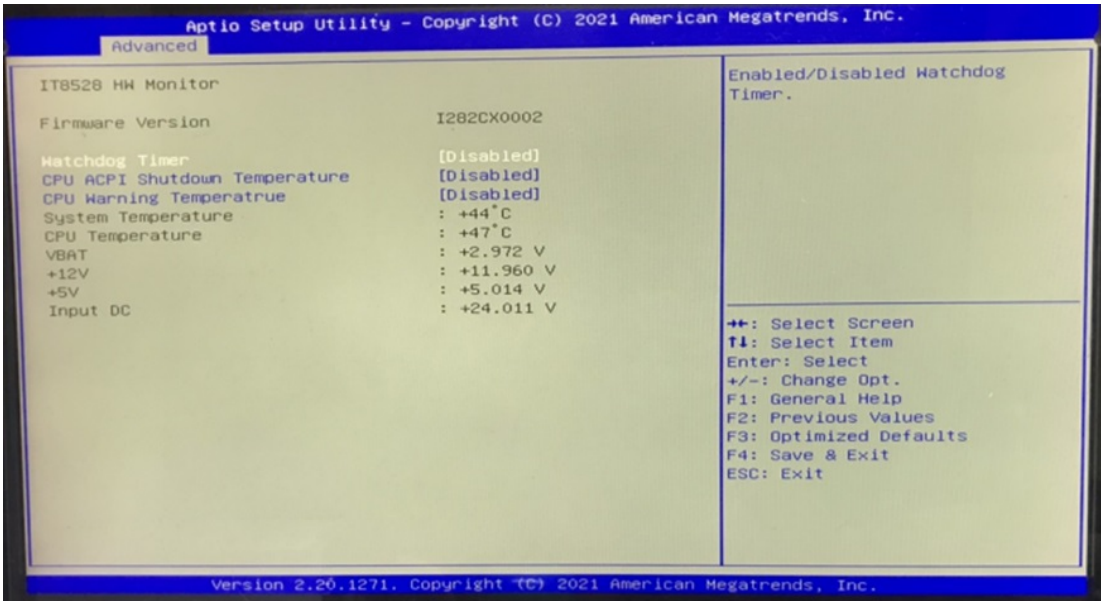


Figure 4.13 PC Health Status

- **CPU(PECI) Warning Temperature**
  Use this item to set the CPU warning temperature. When the system reaches the warning temperature, the speaker will beep.
- **CPU(PECI) ACPI Shutdown**
  Use this item to set the ACPI shutdown temperature. When the system reaches the shutdown temperature, it will be automatically shut down by the ACPI OS to protect the system from overheating damage.
- **Watchdog Timer**
  To Enable or Disable Watchdog Timer.

4.4.10 Second Super IO Configuration

ITA-460 supports 2 x RS-232/422/485 via DB9 cables in accessory box

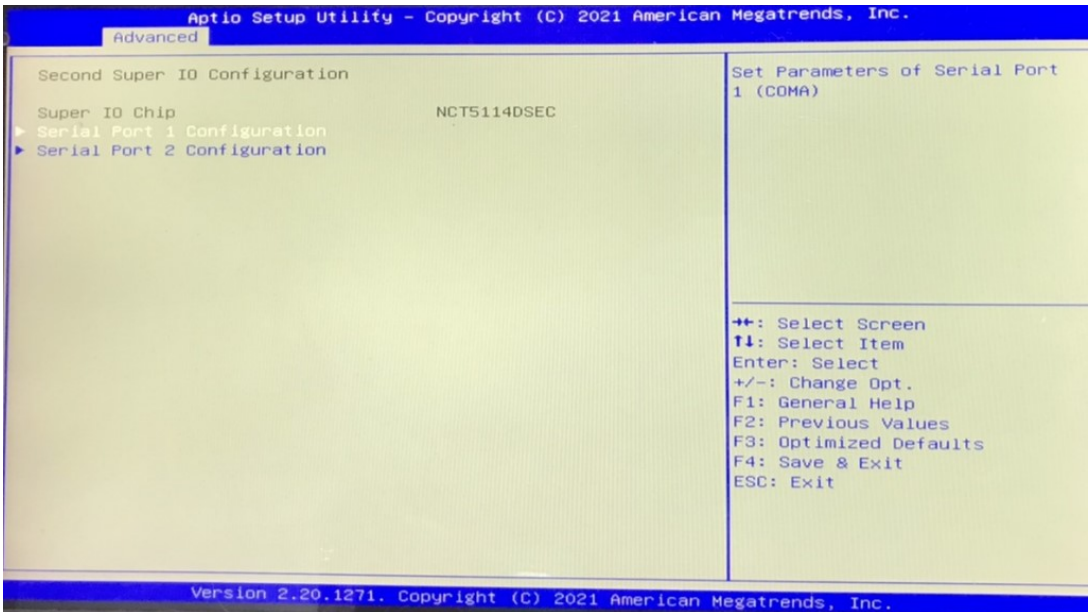


Figure 4.14 Super IO Configuration

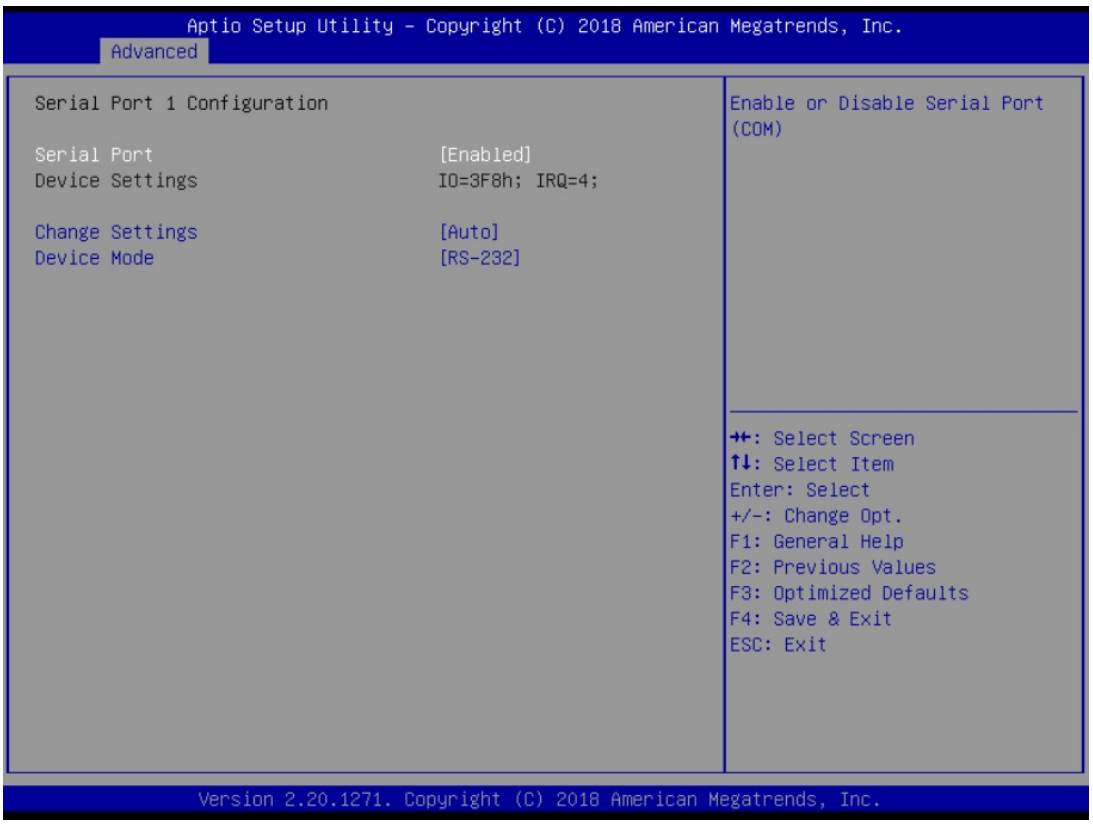


Figure 4.15 Serial Port 1 Configuration

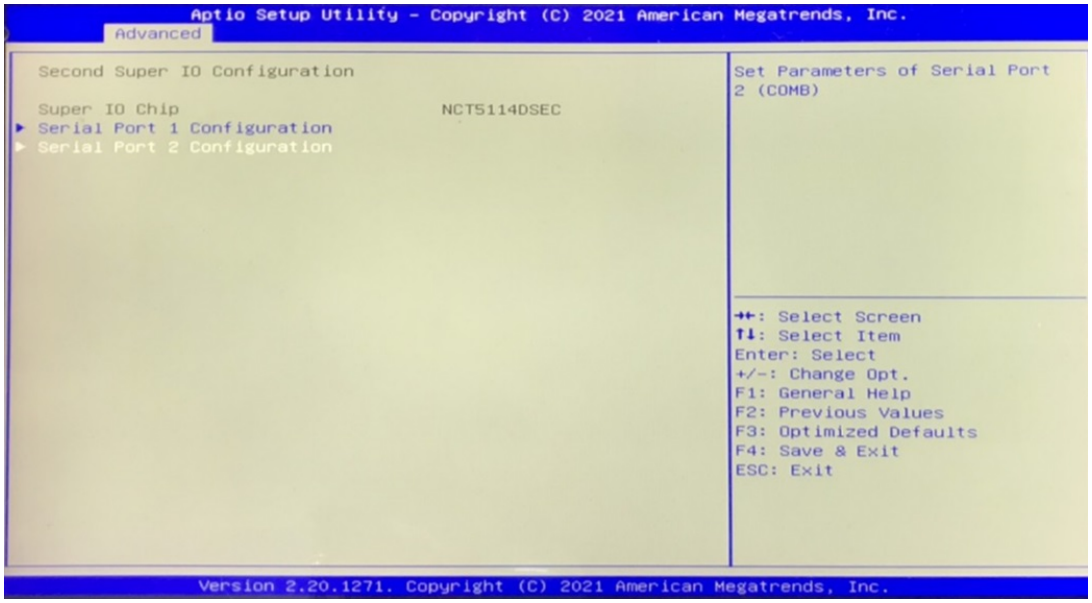


Figure 4.16 Serial Port 2 Configuration

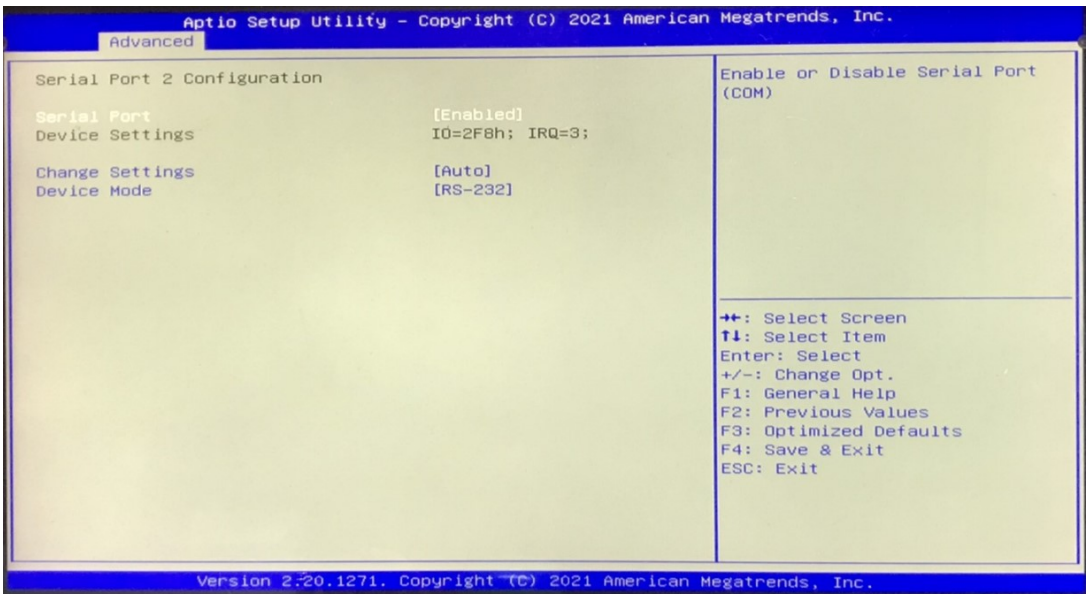


Figure 4.17 Serial Port 2 Configuration

- **Serial Port 1 Configuration**
  - **Serial Port**

    This item allows users to enable or disable Serial Port.
  - **Change Settings**

    This item allows users to Change Settings of the Serial Ports. The default setting is Auto.
  - **Device Mode**

    This item allows users to set the mode of serial port. The default setting is RS-232.When serial port 1 (COM1) is set to RS-485 mode via jumper JSET-COM1, this item should be selected as "RS-485 (Half Duplex)" and further set Auto Direction (Flow) Control setting to "On (enable) or Off (disable)". Default for this Device Mode is "RS-232".
- **Serial Port 2 Configuration**
  - **Serial Port**

    This item allows users to enable or disable Serial Port.
  - **Change Settings**

    This item allows users to Change Settings of Serial Ports. The default setting is Auto.
  - **Device Mode**

    This item allows users to set the mode of serial port. The default setting is RS-232. When serial port 2 (COM2) is set to RS-485 mode via jumper JSET-COM1, this item should be selected as "RS-485 (Half Duplex)" and further set Auto Direction (Flow) Control setting to "On (enable) or Off (disable)". Default for this Device Mode is "RS-232".

4.4.11 S5 RTC Wake Setting

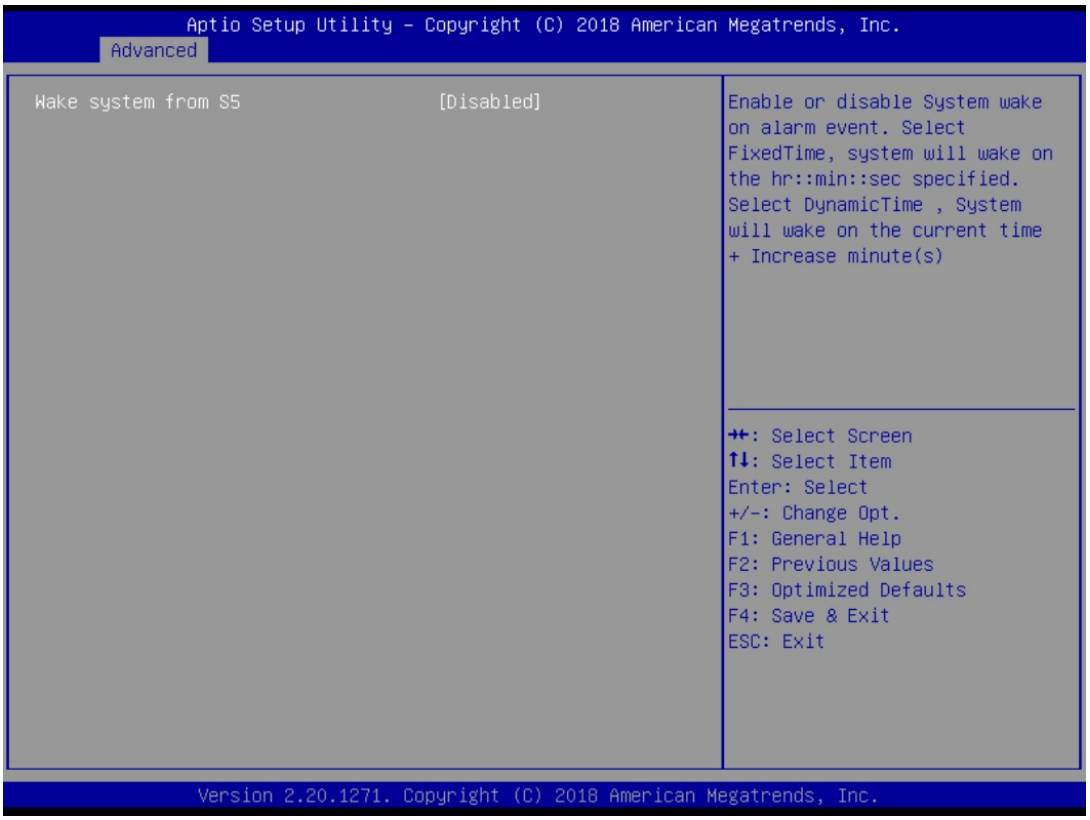


Figure 4.18 S5 RTC Wake Settings

- **Wake system with Fixed Time**
  To Enable or Disable System wake on alarm event. The system will wake on the hr:min:sec as specified.

4.4.12 Serial Port Console Redirection

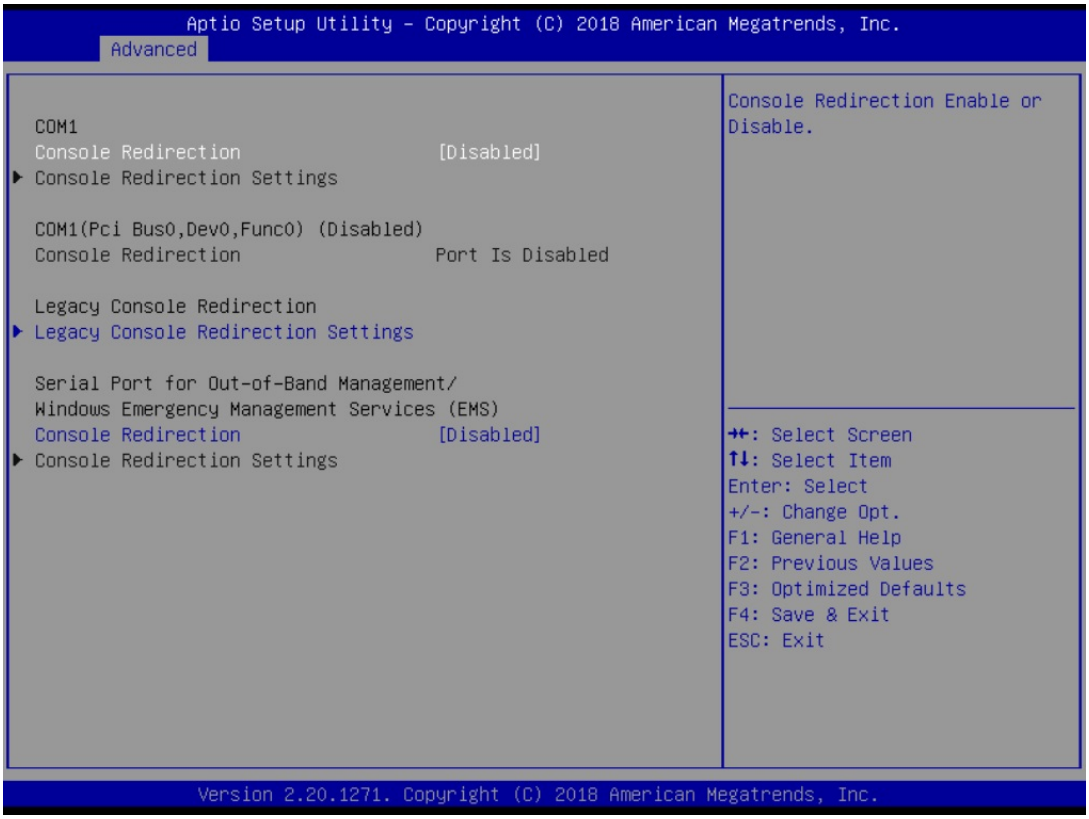


Figure 4.19 Serial Port Console Redirection

- **COM1**
  - **Console Redirection Settings**
    Console Redirection Enable or Disable
- **Legacy Console Redirection**
  - **Legacy Console Redirection Settings**
    Legacy Console Redirection Settings
- **Serial Port for Out-of-Band Management/ Windows Emergency Management services (EMS)**
  - **Console Redirection**
    Console Redirection Enable or Disable

4.4.13 Intel TXT Information

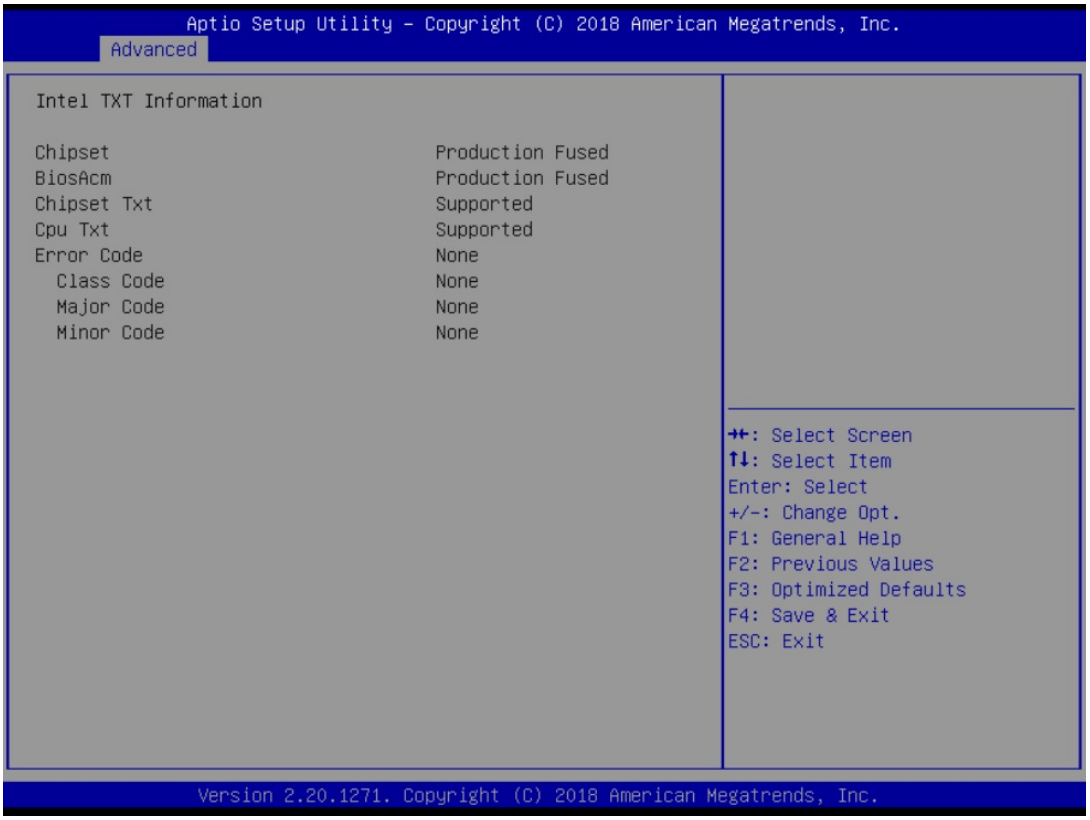


Figure 4.20 Intel TXT Information

4.4.14 USB Configuration

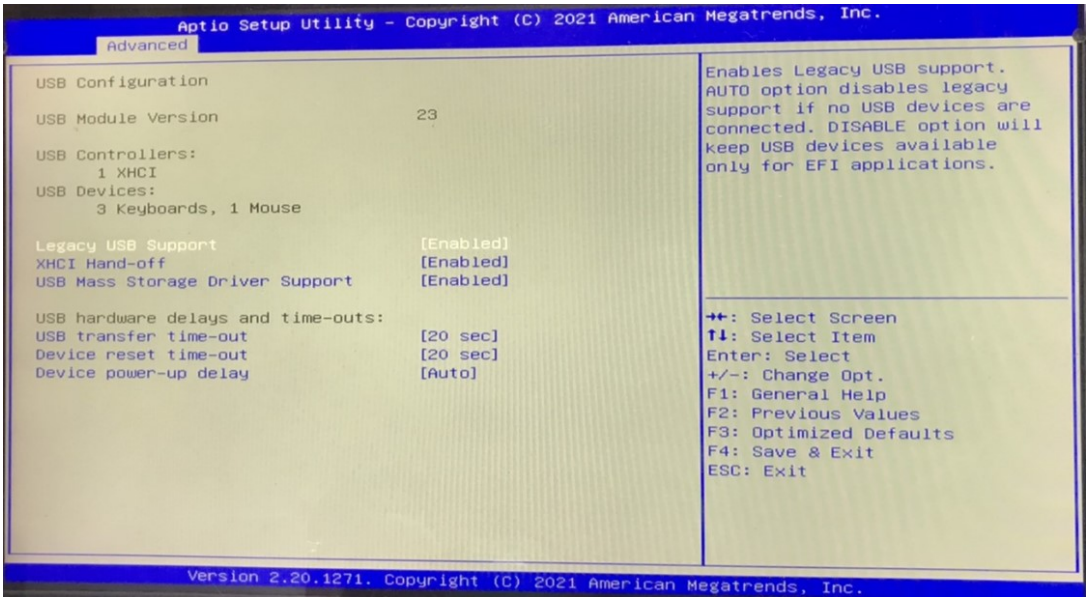


Figure 4.21 USB Configuration

- **Legacy USB Support**
  This is for supporting USB device under legacy OS such as DOS. When choosing Auto, the system will automatically detect if any USB device is plugged into the computer and enable USB legacy mode when a USB device is plugged and disable USB legacy mode when no USB device is plugged.
- **XHCI Hand-off**
  This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
- **USB Mass Storage Driver Support**
  Enable or Disable USB Mass Storage driver support.
- **USB transfer time-out**
  Allows you to select the USB transfer time-out value. [1,5,10,20sec]
- **Device reset time-out**
  Allows you to select the USB device reset time-out value. [10,20,30,40sec]
- **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 take from Hub descriptor.

4.4.15 CSM Configuration

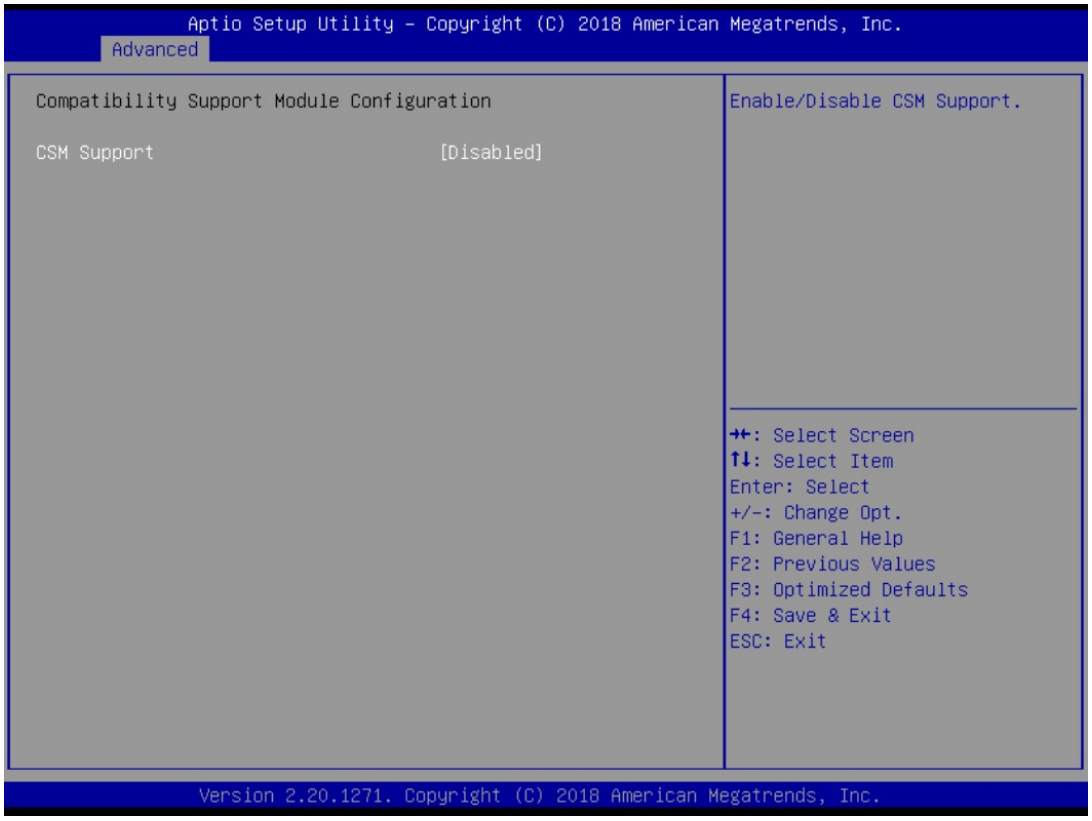


Figure 4.22 CSM Configuration

- **Compatibility Support Module Configuration**
  - **CSM Support**
    Enable/Disable CSM Support.
- **CSM16 Module Version**
  - **GateA20 Active**
    Upon Request - GA20 can be disabled using BIOS services. Do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
  - **Option ROM Message**
    Set display mode for Option ROM.
  - **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
- **Option ROM execution**
  - **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.

4.4.16 Network Stack Configuration

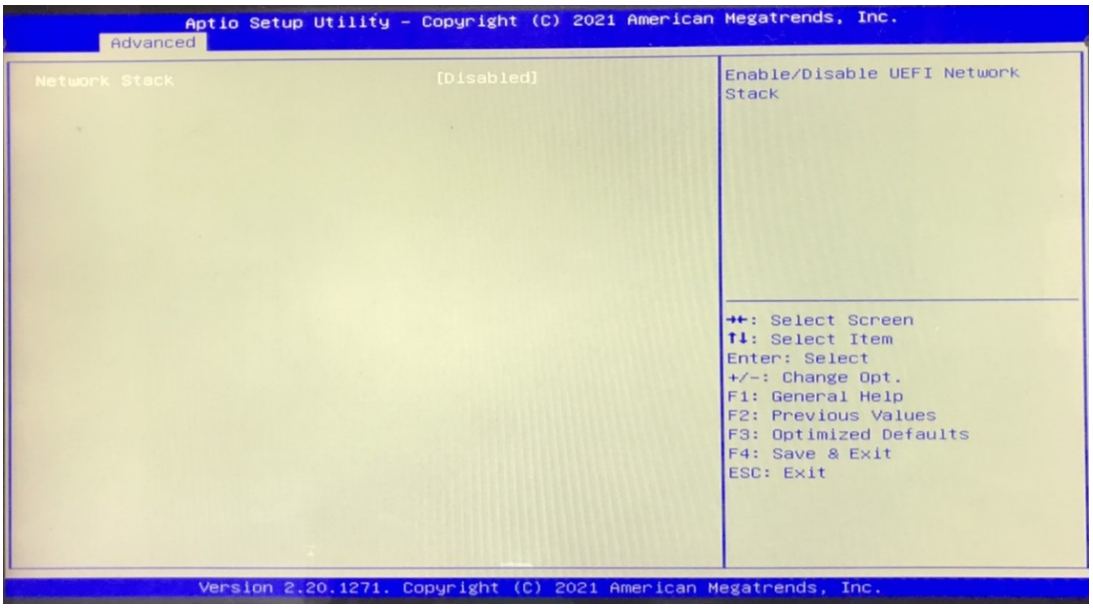


Figure 4.23 Network Stack Configuration

4.5 Chipset Configuration

The PCH and SA setting can be configured via the Chipset Configuration sub-page.

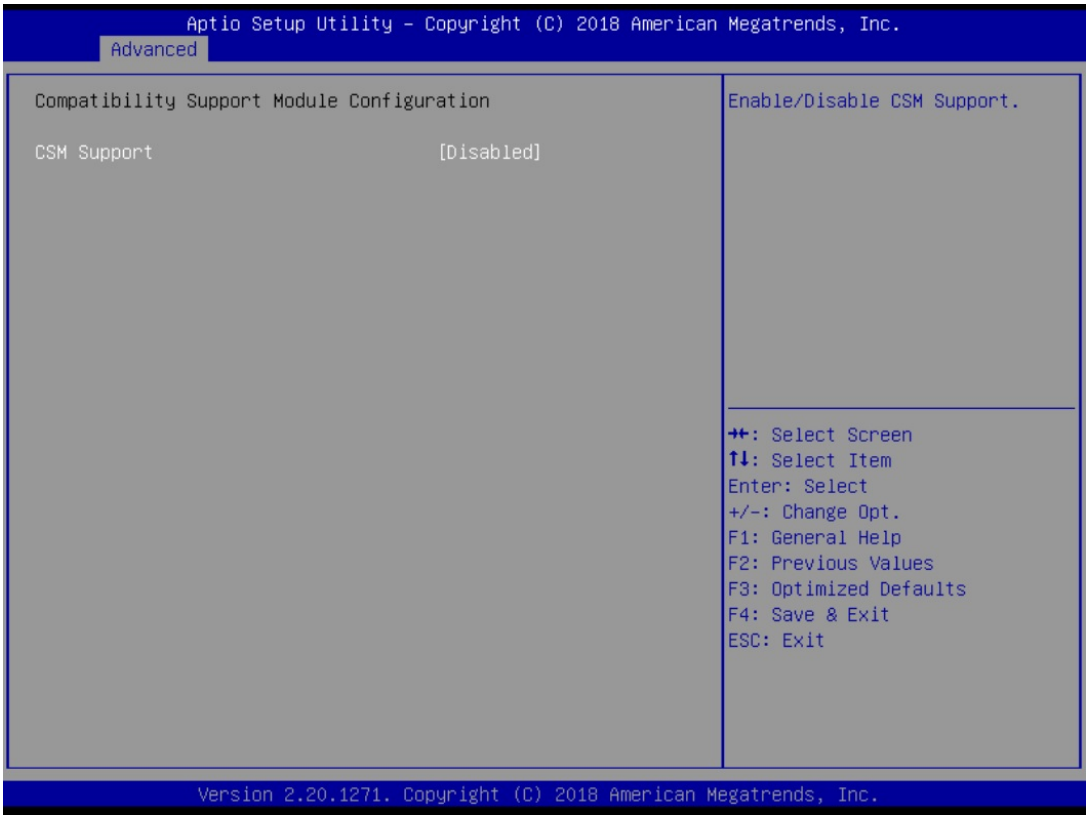


Figure 4.24 Chipset

This page (SAprovides information of the chipset on ITA-460.

4.5.1 System Agent (SA) Configuration

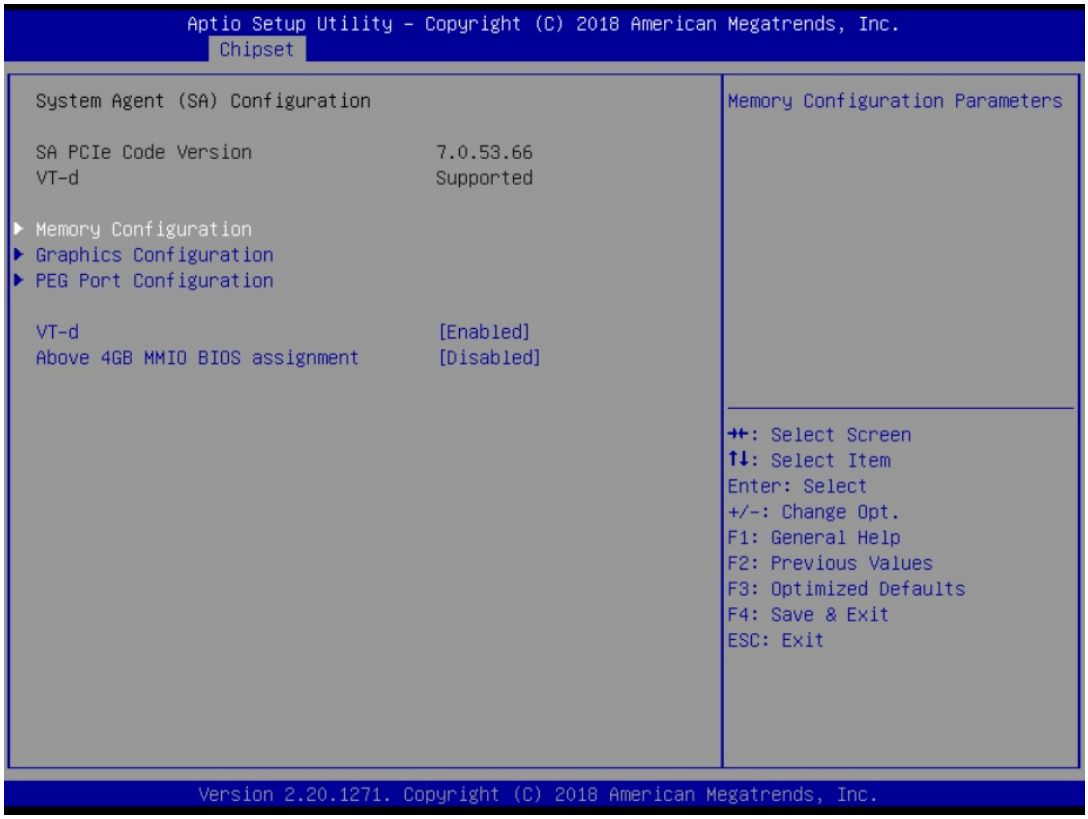


Figure 4.25 System Agent (SA) Configuration

- **VT-d**
  This item allows users to enable/disable VT-d function.
- **Above 4GB MMIO BIOS Assignment**
  This item allows users to enable/disable above 4 GB MMIO BIOS assignment. When the aperture size is 2048 MB, this function is automatically disabled.
- **Graphics Configuration**
  This item allows users to configure the graphics settings.
- **PEG Port Configuration**
  This item allows users to configure PEG ports settings.

4.5.2 Graphics Configuration

Figure 4.26 Graphics Configuration

- **Primary Display**
  Set Primary Display to "Auto", "IGFX", "PEG", "PCI", or "SG".
- **Primary Display**
  Select PEG0/PEG1/PEG2/PEG3 graphics device should be Primary PEG.
- **External Gfx Card Primary Display Configuration**
- **Internal Graphics**
  Auto or Disable or Enable Internal Graphics.

4.5.3 PEG Port Configuration

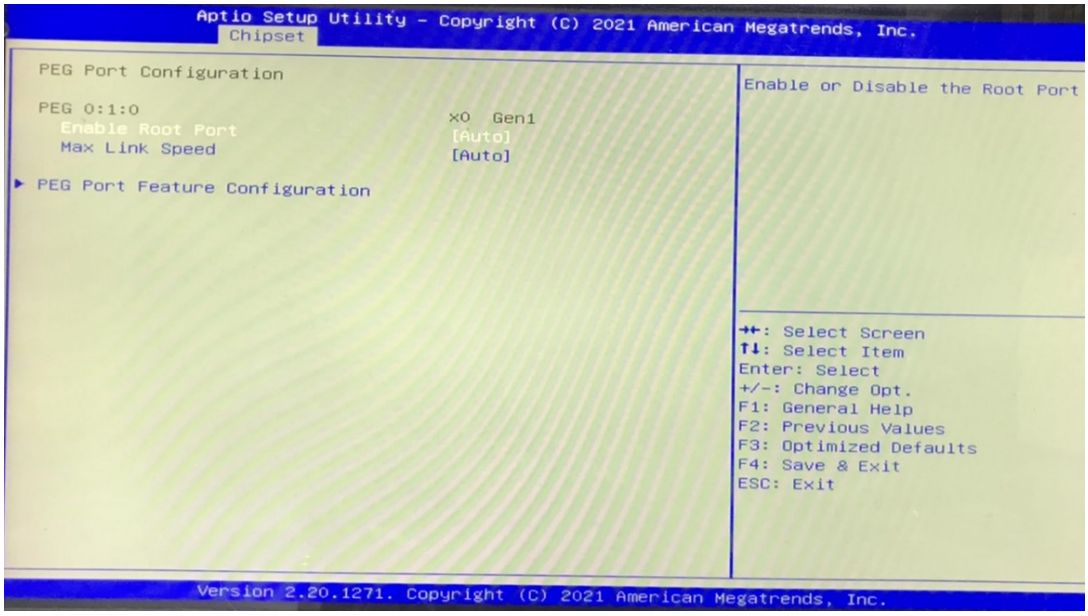


Figure 4.27 PEG Port Configuration

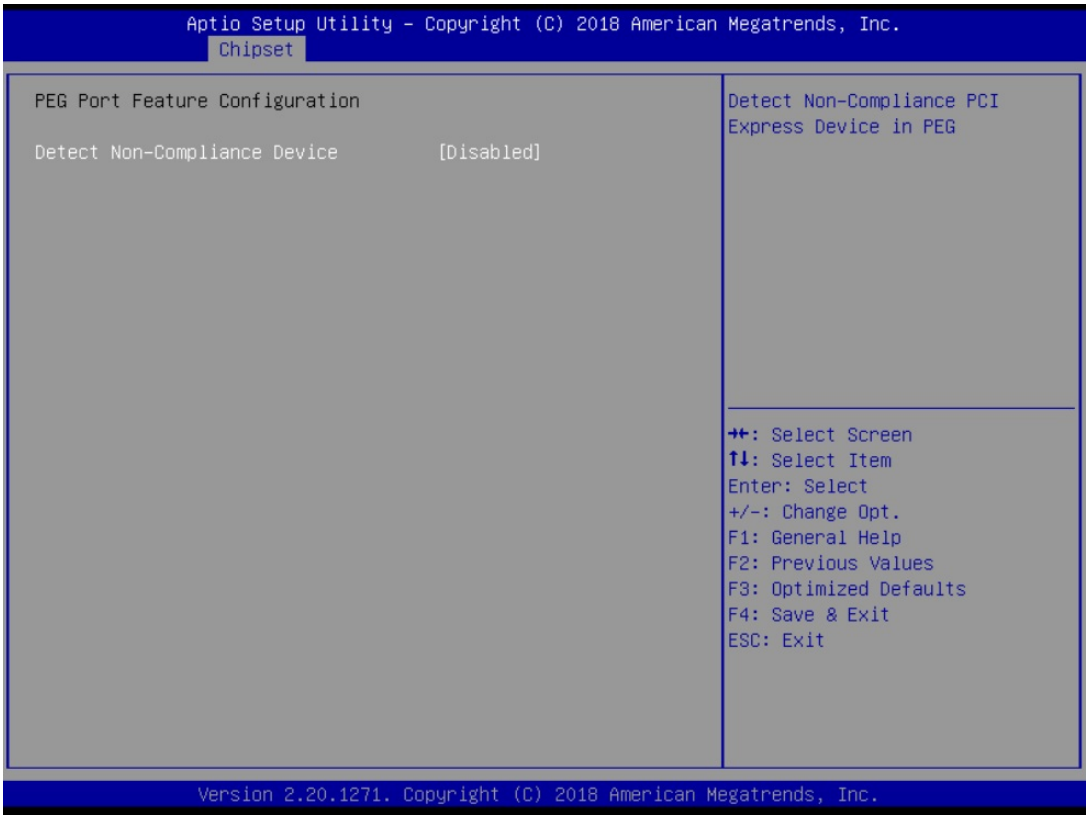


Figure 4.28 PEG Port Feature Configuration

- **Enable Root Port**
  Enable or disable the root port
- **Max Link speed**
  Configure PEG 0:1:0 max speed
- **PEG Port Feature Configuration- Detect Non-Compliance Device**
  Detects non-compliance PCI Express device in PEG. If enabled, it will take more time during POST phase

4.5.4 Memory Configuration

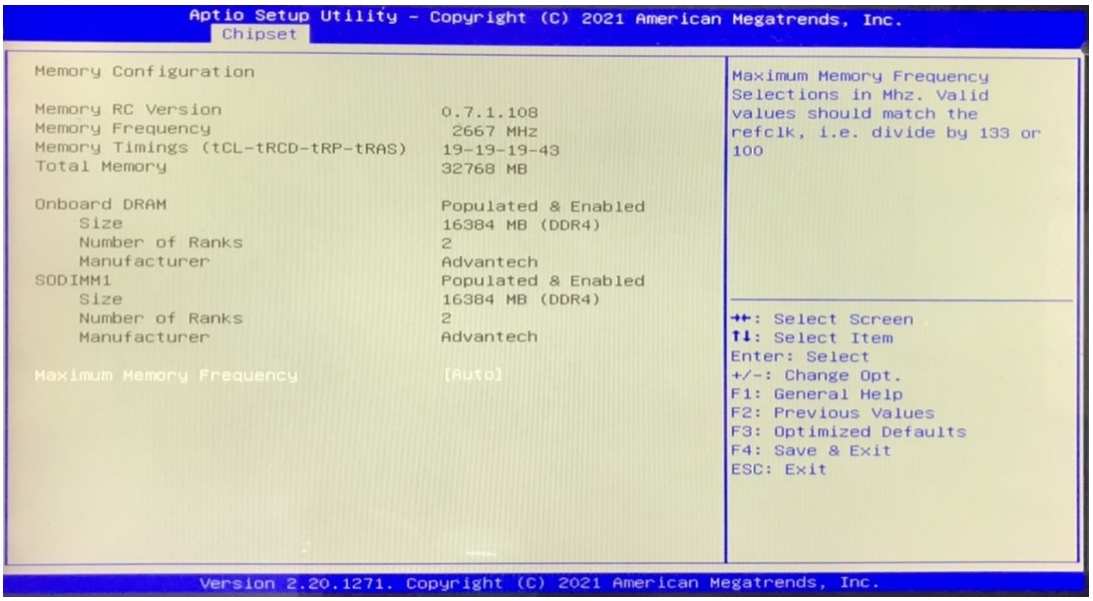


Figure 4.29 Memory Configuration

- **Maximum Memory Frequency**
  Maximum memory frequency selections in Mhz

4.5.5 PCH-IO Configuration

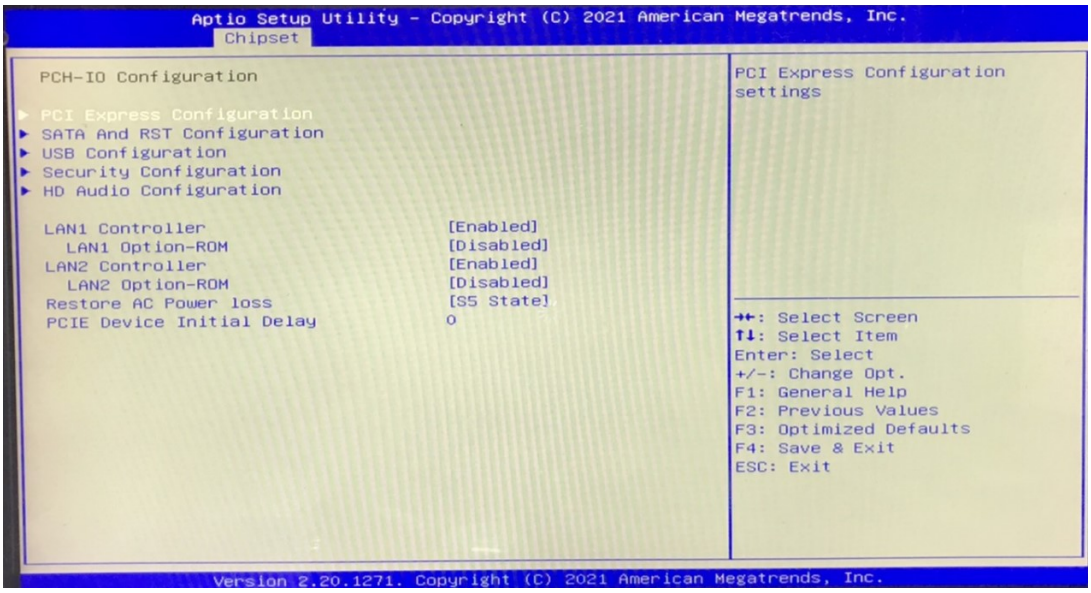


Figure 4.30 PCH-IO Configuration

- **LAN1 Controller**
  Enable or Disable LAN1 controller.
- **LAN 1 Option-ROM**
  Enable or Disable LAN 1 boot option for legacy network devices.
- **LAN2 Controller**
  Enable or Disable LAN2 controller.
- **LAN 2 Option-ROM**
  Enable or Disable LAN 2 boot option for legacy network devices.
- **Restore AC Power Loss**
  S0 State or S5 State or Last State to restore AC Power Loss.

4.5.6 PCI Express Configuration

This page shows that the PCH supports the PCIE root ports. PCIE port 4 is assigned to i219 LAN. The items for configuration are show below.

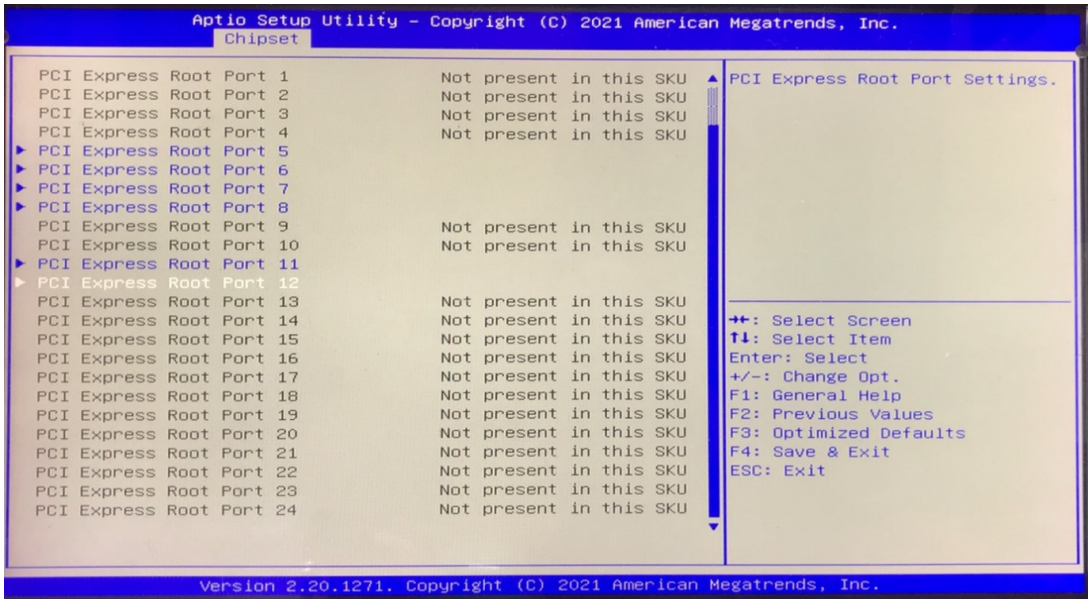


Figure 4.31 PCI Express Root Port

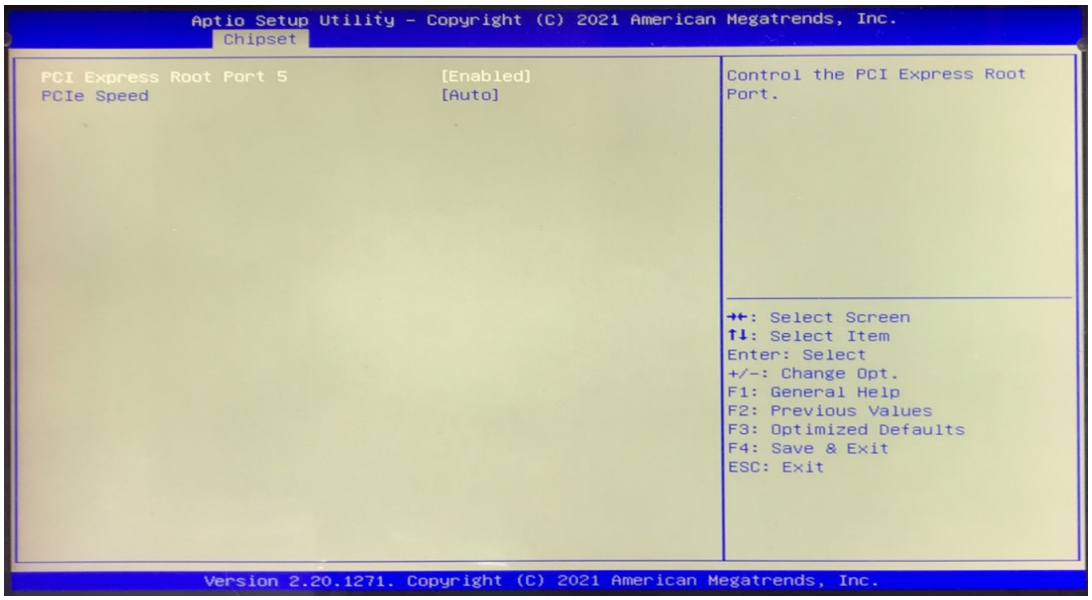


Figure 4.32 PCI Express Root Port Setting

- **PCI Express Root Port 1**
  Enable or Disable PCI Express Root Port.
- **PCIe Speed**
  Select "Auto, Gen1, Gen2, Gen3" for PCIe Speed

4.5.7 SATA and RST Configuration

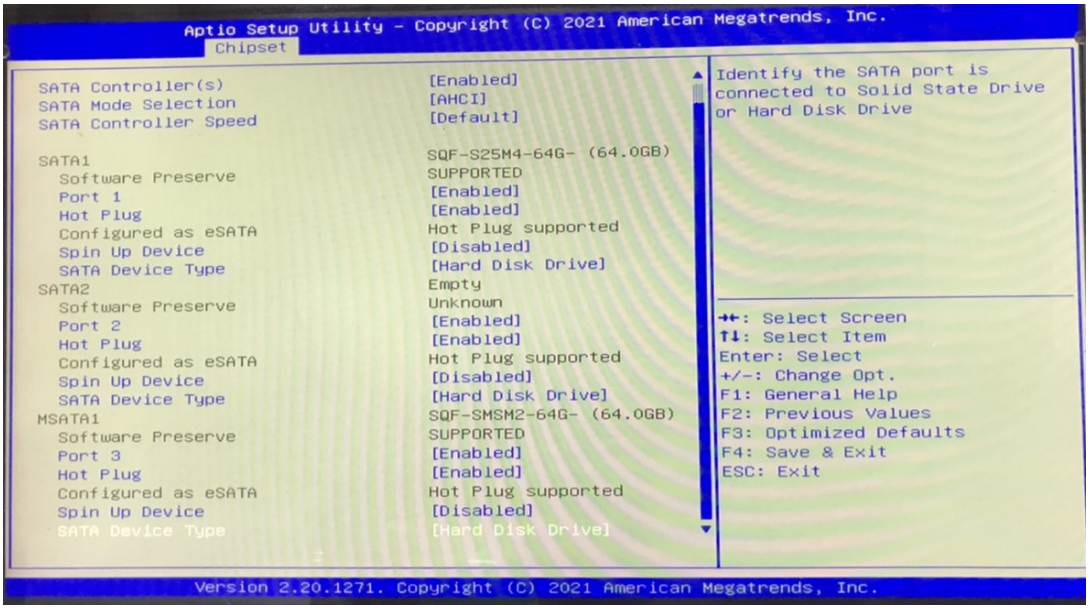


Figure 4.33 SATA Configuration

- **SATA Controller(s)**
  Enable or Disable SATA Controller
- **SATA Mode Selection**
  This can be configured as RAID or AHCI.
- **SATA Controller Speed**
  Indicates the maximum speed the SATA controller can support by selecting. Default, Gen1, Gen2, Gen3.
- **Port 0~3**
  Enable or Disable SATA port 0~3
- **Hot Plug**
  Enable or Disable SATA Hot-Plug
- **Spin up Device**
  Enable or Disable spin up device
- **SATA Device Type**
  To identify the SATA that is connected to a Solid State or Hard Disk Drive.

4.5.8 USB Configuration

Figure 4.34 USB Configuration

- **XHCI Compliance mode**
  Option to "Enable or Disable" XHCI compliance mode. Default is to disable compliance mode.

4.5.9 Security Configuration

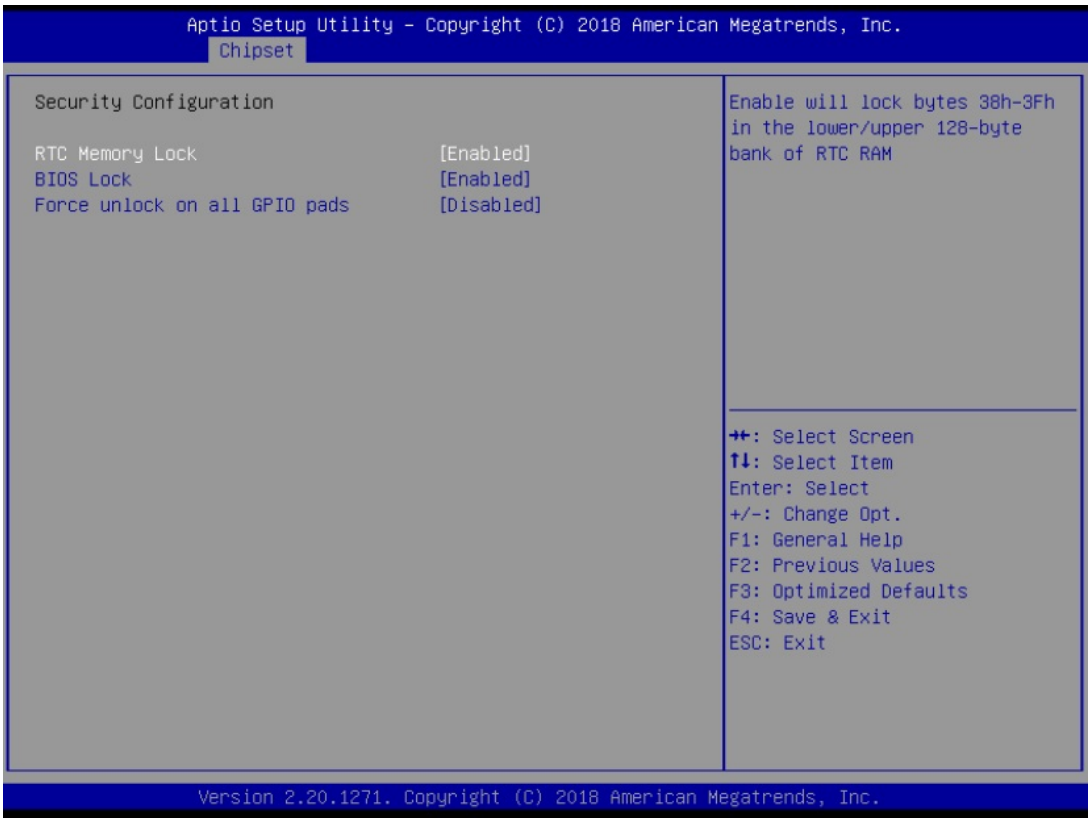


Figure 4.35 Security Configuration

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

4.5.10 HD Audio Configuration

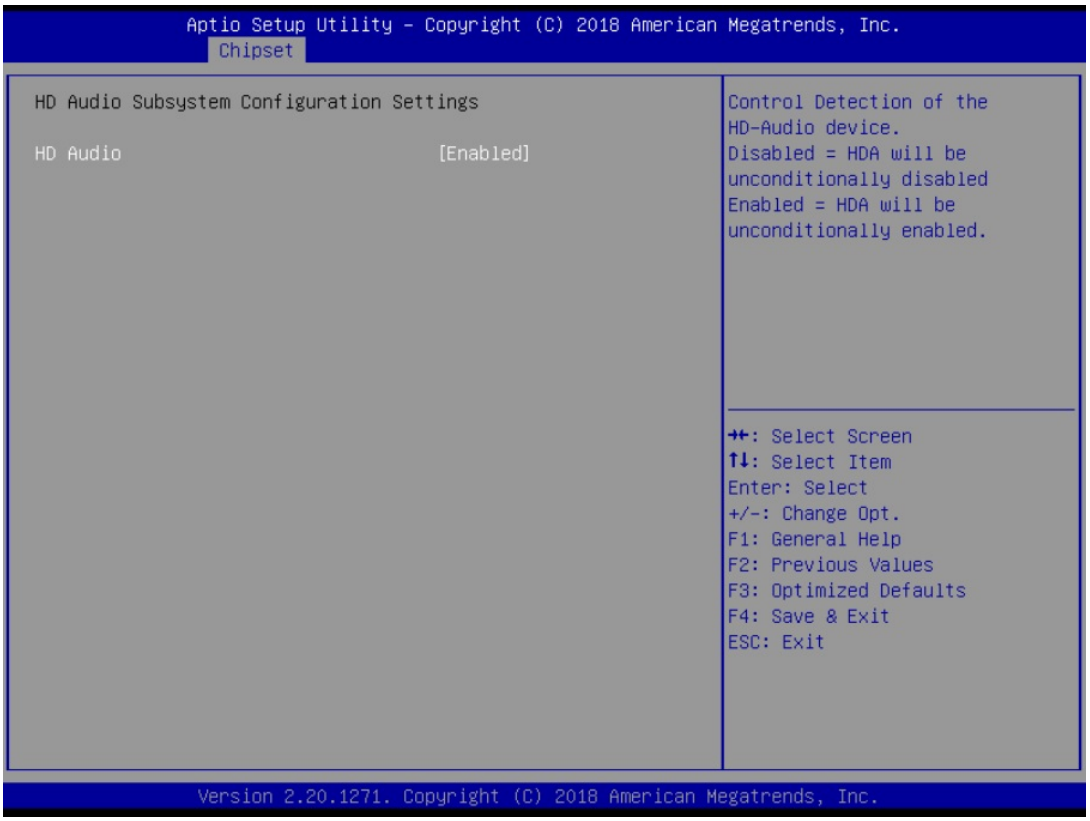


Figure 4.36 HD Audio Configuration

- **HD Audio**
  Control detection of the HD-Audio device.
  Disable = HDA will be unconditionally disabled
  Enable=HDA will be unconditionally enabled

4.6 Security

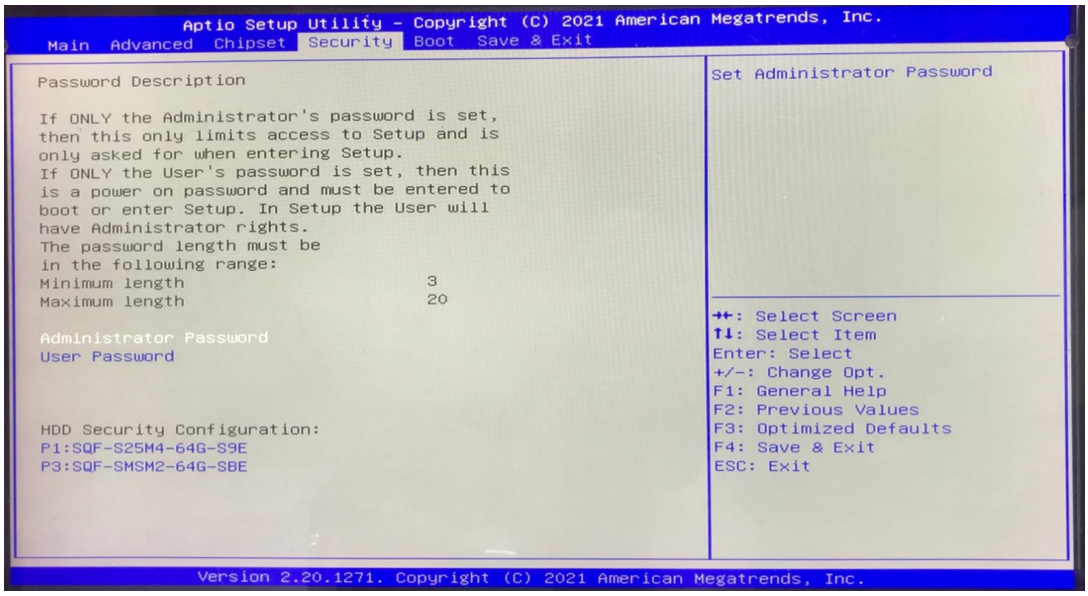


Figure 4.37 Security

In the BIOS Setup utility, select the Security tab. To access the submenu for any of the items, select the item and press <Enter>.

- **Administrator Password**
  This item allows users to set the administrator password. The ideal password length is between 3 and 20 characters.
- **User Password**
  This item allows users to set user passwords. The ideal password length is between 3 and 20 characters.

Note! *If only the User's password is set, the User will have Administrator rights. To set Administrator password is strongly recommended if you have security concerns.*

4.7 Boot

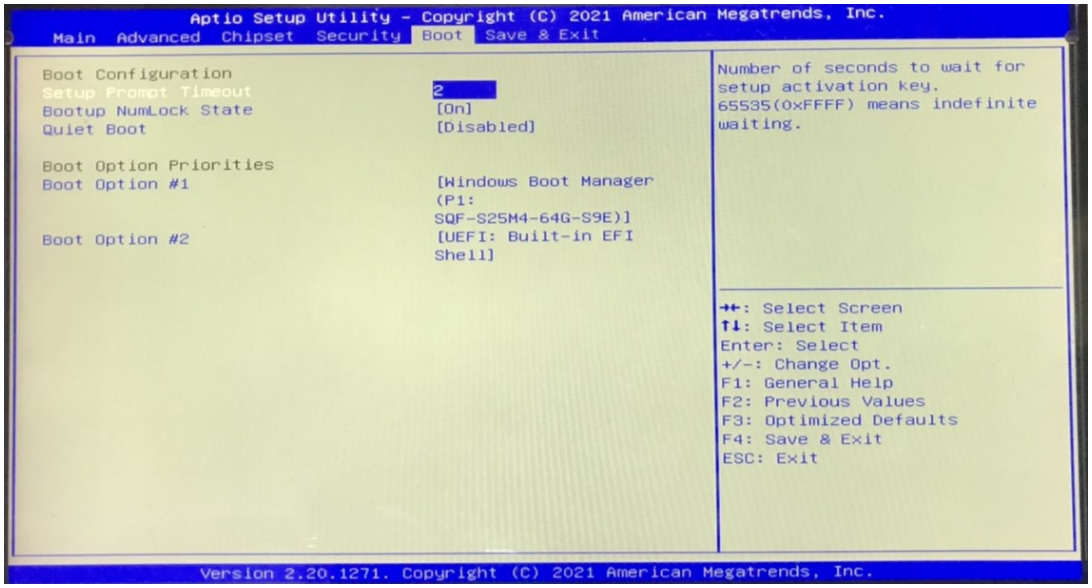


Figure 4.38 Boot

- **Setup Prompt Timeout**
  Use the <+> and <-> keys to adjust the number of seconds to wait for setup activation key.
- **Bootup NumLock State**
  “On or Off” power-on state for the NumLock.
- **Quiet Boot**
  Enable or Disable Quiet Boot option.
- **Boot Option Priorities**
  Sets the boot order.
- **Hard Drive BBS Priorities**
  Sets the order of the legacy devices on this group.

4.8 Save & Exit

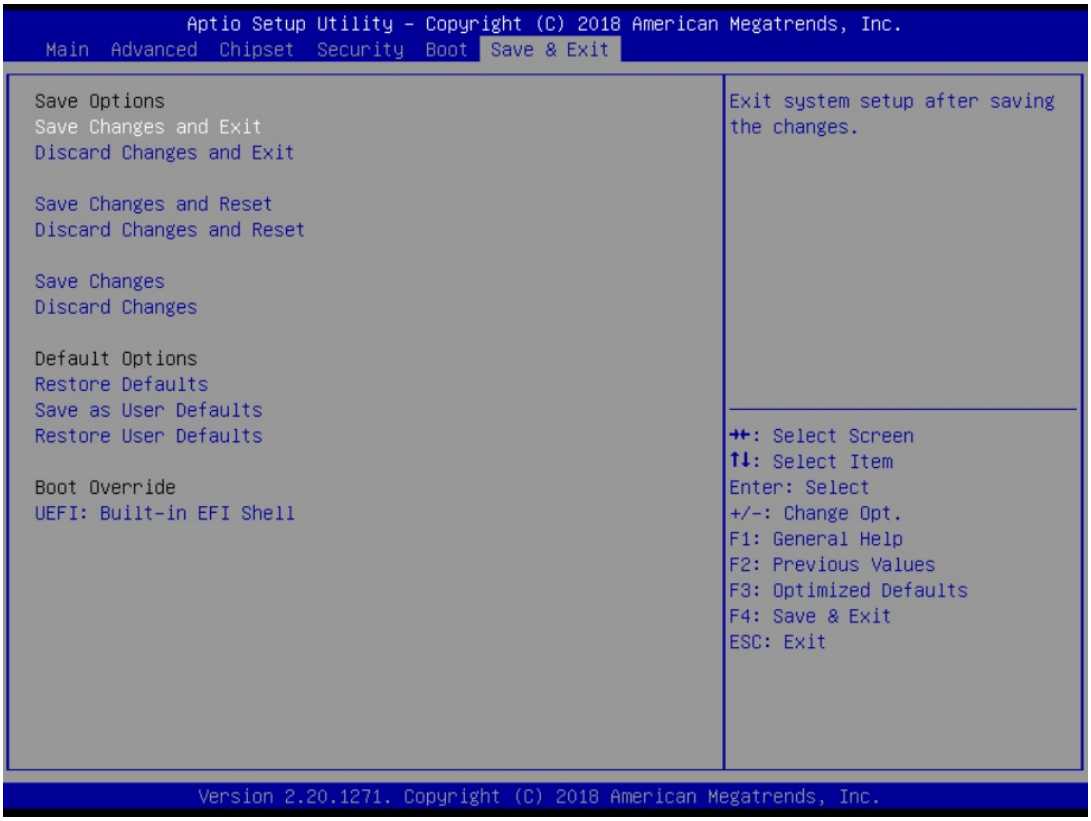


Figure 4.39 Save & Exit

Save Changes and Exit

When you complete system configuration, select this option to save your changes, exit BIOS setup and reboot the computer so the new system configuration parameters can take effect.

1. Select Exit Saving Changes from the Exit menu and press <Enter>. The following message appears:
   Save Configuration Changes and Exit Now?
   [Yes] [No]
2. Select Yes or No.

Discard changes and exit

Select this option to quit Setup without making any permanent changes to the system configuration.

1. Select Exit Discarding Changes from the Exit menu and press <Enter>. The following message appears:
   Quit without saving?
   [Yes] [No]
2. Select Yes to discard changes and exit.

Discard Changes

Select Discard Changes from the Exit menu and press <Enter>.

Chapter 5

Driver Installation

- Introduction
- Windows Driver Setup

5.1 Before you begin

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the ITA-460 are located on Advantech Website.

Note! *For system stability, installing the drivers in the following sequence is highly recommended:*

- *Chipset*
- *Graphics*
- *ME*
- *Other drivers*

Before you begin, it is important to note that most display drivers need to have the relevant software application already installed in the system prior to installing the enhanced display drivers. In addition, many of the installation procedures assume that you are familiar with both the relevant software applications and operating system commands. Review the relevant operating system commands and the pertinent sections of your application software's user manual before performing the installation.

5.2 Introduction

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

This is needed for the proper functioning of the following features:

- Core PCI PnP services
- Serial ATA interface support
- Identification of Intel chipset components in the Device Manager.

Note! *The chipset driver is used for the following versions of Windows, and it has to be installed before installing all the other drivers:*

- *Windows 10 (64bit)*

5.3 Windows Driver Setup

Enter the Advantech support website, then search product ITA-460. You can see "ITA-460" driver inside.

Appendix A

Watchdog Timer

A.1 Programming the Watchdog Timer

The ITA-460's watchdog timer can be used to monitor the software operations and take corrective action if the software fails to function within the programmed period. This section describes the operation of the watchdog timer and procedures for programming it.

A.1.1 Watchdog Timer Overview

The watchdog timer is built into the embedded controller and provides the following user-programmable functions:

- It can be enabled and disabled by user program
- Timer can be set from 1 to 255 seconds or 1 to 255 minutes
- Generates an interrupt or resets signal if the software fails to reset the timer before time-out

A.1.2 Programming the Watchdog Timer

The I/O port address of the watchdog timer is 2E (hex) and 2F (hex). 2E (hex) is the address port. 2F (hex) is the data port. You must first assign the address of register by writing an address value into address port 2E (hex), then write/read data to/from the assigned register through data port 2F (hex).

Table A.1: Watchdog (Warm Reset) Step by Step

Step	Action	Description
00	Read 0x299 port	Clear I/O port
	Wait IBF clear	0x29A, BIT1,=0
01	Write 0x89 to 0x29A	
	Wait IBF clear	0x29A, BIT1, =0
02	Write 0x5E to 0x299 port	
	Wait IBF clear	0x29A, BIT1, =0
03	Write 0x00 to 0x299 port	Set 10 sec (high byte)
	Wait IBF clear	0x29A, BIT1, =0
04	Write 0x89 to 0x29A	
	Wait IBF clear	0x29A, BIT1, =0
05	Write 0x5F to 0x299 port	
	Wait IBF clear	0x29A, BIT1, =0
06	Write 0x64 to 0x299 port	Set 10 sec (low byte)
	Wait IBF clear	0x29A, BIT1, =0
07	Write 0x89 to 0x29A	
	Wait IBF clear	0x29A, BIT1, =0
08	Write 0x57 to 0x299 port	Watchdog Event
	Wait IBF clear	0x29A, BIT1, =0
09	Write 0x04 to 0x299 port	(Warm) Reset event
	Wait IBF clear	0x29A, BIT1, =0
10	Write 0x28 to 0x29A	Start watchdog
	Wait 1~9	sec
	Wait IBF clear	0x29A, BIT1, =0
11	Write 0x29 to 0x29A	Stop watchdog
	Wait IBF clear	0x29A, BIT1, =0
12	Go to Step 07	

Table A.2: Watchdog (Warm Reset) Sample Code

```
#include <cstdlib>
#include <sys/io.h>
#include <unistd.h>
#include <iostream>

using namespace std;

int OBF=0x01, IBF=0x02

int wait_OBF(int Port)
{
	int icount;
	for(icount=0;icount<0xFF;icount++)
	{
		int iValue = inb(Port);

		if((iValue&OBF) == 0x01)
			return true;
		usleep(1000);
	}

	count<< “Wait_OBF failed\n”;
	count.flush();
	return false;
}

int wait_IBF(int Port)
{
	int icount;
	for(icount=0;icount<0xFF;icount++)
	{
		int iValue = inb(Port);

		if((iValue&IBF) == 0x00)
			return true;
		usleep(1000);
	}

	cout << “wait_IBF failed\n”;
	cout.flush();
	return false;
}

void DummyPort()
{
	int iRet = inb(0x299);
	wait_IBF(0x29A);
}
```

Table A.2: Watchdog (Warm Reset) Sample Code

```
void SetWD()
{
	iopl(3);

	DummyPort();

	inb(0x299);
	wait_IBF(0x29A);
	outb(0x89, 0x29A);
	wait_IBF(0x29A);
	outb(0x5E, 0x299);
	wait_IBF(0x29A);
	outb(0x00, 0x299);
	wait_IBF(0x29A);
	outb(0x89, 0x29A);
	wait_IBF(0x29A);
	outb(0x5F, 0x299);
	wait_IBF(0x29A);
	outb(0x64, 0x299);
}

void StartWD()
{
	iopl(3);

	DummyPort();

	outb(0x89, 0x29A);
	wait_IBF(0x29A);
	outb(0x57, 0x299);
	wait_IBF(0x29A);
	outb(0x04, 0x299);
	wait_IBF(0x29A);
	outb(0x28, 0x29A);

}

void StopWD()
{
	iopl(3);

	DummyPort();

	outb(0x29, 0x29A);
	wait_IBF(0x29A);
}

int main(int argc, char** argv) {

	SetWD();

	while(1)
	{
		StartWD();
		usleep(5000000);
		StopWD();
	}
	return 0;
}
```

Appendix B

BSMI RoHS Declaration

BSMI RoHS 限用物質含有情況標示確認表

Declaration of the Presence Condition of the Restricted Substances Marking

設備名稱：電腦 Equipment name	型號 （型式）：ITA-460 Type designation (Type)					
單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr^{+6})	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
電路板	－	○	○	○	○	○
固定组件 （螺絲、螺柱）	－	○	○	○	○	○
內外殼	○	○	○	○	○	○
散熱模組	○	○	○	○	○	○
線材	－	○	○	○	○	○

備考 1.“ 超出 0.1 wt %” 及 “ 超出 0.01 wt %” 係指限用物質之百分比含量超出百分比含量基準值。

Note 1: “Exceeding 0.1 wt %” and “exceeding 0.01 wt %” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考 2.“ ○ ” 係指該項限用物質之百分比含量未超出百分比含量基準值。

Note 2: “○” indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考 3.“ － ” 係指該項限用物質為排除項目。

Note 3: ” The “-” indicates that the restricted substance corresponds to the exemption.

Appendix C

Chinese Language Safety Instructions and Battery Information

C.1 安全指示

1. 請仔細閱讀此安全操作說明。
2. 請妥善保存此用戶手冊供日後參考。
3. 用濕抹布清洗設備前，請從插座拔下電源線。請不要使用液體或去汙噴霧劑清洗設備。
4. 對於使用電源線的設備，設備周圍必須有容易接觸到的電源插座。
5. 請不要在潮濕環境中使用設備。
6. 請在安裝前確保設備放置在可靠的平面上，意外跌落可能會導致設備損壞。
7. 設備外殼的開口是用於空氣對流，從而防止設備過熱。**請不要覆蓋這些開口。**
8. 當您連接設備到電源插座上前，請確認電源插座的電壓是否符合要求。
9. 請將電源線佈置在人們不易絆到的位置，並不要在電源線上覆蓋任何雜物。
10. 請注意設備上的所有警告標識。
11. 如果長時間不使用設備，請將其同電源插座斷開，避免設備被超標的電壓波動損壞。
12. 請不要讓任何液體流入通風口，以免引起火災或者短路。
13. 請不要自行打開設備。為了確保您的安全，請由經過認證的工程師來打開設備。如遇下列情況，請由專業人員來維修：
    - 電源線或者插頭損壞；
    - 設備內部有液體流入；
    - 設備曾暴露在過於潮濕的環境中使用；
    - 設備無法正常工作，或您無法通過用戶手冊來使其正常工作；
    - 設備跌落或者損壞；
    - 設備有明顯的外觀破損。
14. 請不要把設備放置在超出我們建議的溫度範圍的環境，即不要低於 -25° C（-13 ° F）或高於 60° C （140° F），否則可能會損壞設備。
15. 此為 A 級產品，在生活環境中，該產品可能會造成無線電干擾。在這種情況下，可能需要使用者對干擾採取切實可行的措施。
16. 本產品不帶電線元件銷售，應購買已通過 CCC 認證的電線元件。

注意：電腦配置了由電池供電的即時時鐘電路，如果電池放置不正確，將有爆炸的危險。因此，只可以使用製造商推薦的同一種或者同等型號的電池進行替換。請按照製造商的指示處理舊電池。

根據 IEC 704-1:1982 的規定，操作員所在位置的聲壓級不可高於 70dB(A)。

免責聲明：該安全指示符合 IEC 704-1 的要求。研華公司對其內容的準確性不承擔任何法律責任。

C.2 電池信息

電池、電池組和蓄電池不應作為未分類的生活垃圾處理，請使用公共收集系統返回和回收，或哪找當地法規要求進行處理。

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