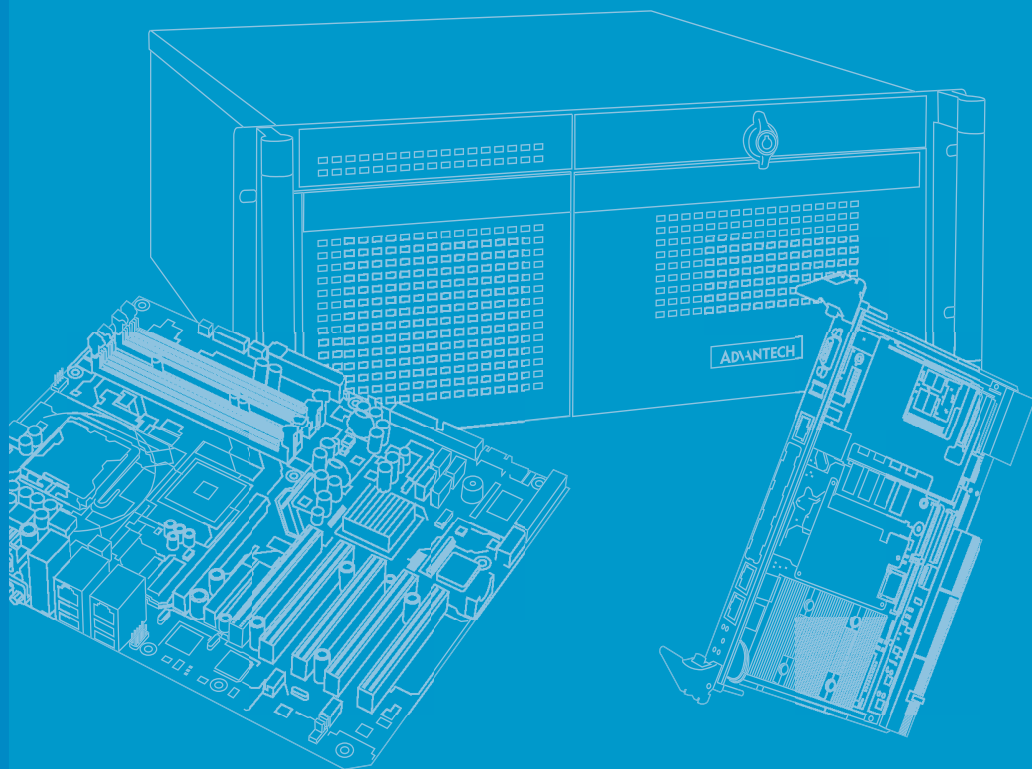




ITA-580/ITA-580G Series

**11th Gen Intel® Core™ H-Series
platform EN 50155 Fanless
Computer; Compliant for Rolling
stock Applications/Designed to
Meet the Standards for Rolling
Stock Applications with MXM
GPU Module Compatibility**

ADVANTECH

Enabling an Intelligent Planet

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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.

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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 on screen when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an return 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 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 visibly on the outside of the package and ship the package prepaid to your dealer.

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 the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which Advantech has come to be known. Your satisfaction is our primary concern. Below is a guide to Advantech's customer services.

Technical Support

We want you to get the best performance possible from your products. Should you encounter technical difficulties, we are here to help. For the most frequently asked questions, the answers are provided in the product documentation. These answers are typically a lot more detailed than the ones we can provide over the phone. 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 nearby, 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-580 series industrial computer
- 2 x Mounting bracket (P/N: 1960014487T003) and 4 x M4 screw (PN:1930007259-01)
- 1 x 2-Pin Phoenix connector P/N: 1652002205

If any of the above items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the product mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the product, check it for signs of shipping damage (for example, damaged box, scratches, dents, etc.). If the product 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.

Safety Instructions

1. Read these safety instructions carefully.
2. Retain this user manual for later reference.
3. Disconnect this equipment from any power outlet before cleaning. Use 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 only be opened by qualified service personnel.
14. The computer will be installation and maintenance by Advantech service personnel, please contact to Advantech for further assistance.

Note! *No modification of this equipment is allowed.*



If there is any other problem, please consult or return the device to your distributor. Do not try to repair a defective device.

15. If one of the following occurs, have the equipment checked by qualified 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 or damaged.
 - The equipment shows obvious signs of breakage.
16. Do not leave this equipment in an environment with a storage temperature of below -40 °C/-40 °F or above 85 °C/185 °F. This may damage the equipment. The equipment should be stored in a controlled environment.
17. CAUTION: Batteries are at risk of exploding if incorrectly replaced. Replace only with the same or equivalent type as recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.
18. This equipment has been tested and found to comply with the limits for Class A digital device. Operation of this equipment in a residential area is likely to cause harmful interference to radio communications. In this event, users are required to correct the interference at their own expense.
19. This equipment is sold without a power cable. We recommend purchasing a CCC-certified power cable.

-
20. In accordance with the IEC 704-1:1982 specifications, the sound pressure level at the operator's position does not exceed 70 dB (A).
21. Connecting earth ground to the equipment.
WARNING: The equipment has a separate protective earthing terminal on the chassis that must be permanently connected to earth ground to adequately ground the chassis and protect the operator from electrical hazards.
Caution: Before equipment installation, ensure that service personnel have attached an appropriate grounding lug to the grounding cable supplied.
To connect earth ground to equipment:
(1) Connect one end of the grounding cable to a proper earth ground.
(2) Place the ground lug attached to the ground cable over the protective earthing terminal.
(3) Secure the grounding lug to the protective earthing terminal with washers and screws.
(4) Dress the grounding cable and ensure that it does not touch or block access to other components.
WARNING: Before powering on the equipment, connect the frame of the equipment to earth. For the earthing wire, green and yellow insulation is required and the cross-sectional area of the conductor must be more than 0.75 mm² or 18 AWG.
WARNING: For protective earthing terminals featuring washers and screws, where a screw is threaded onto it must not be less than twice the pitch of the screw thread (at least 3.5 mm in diameter). Star washers or spring washers can be used.
WARNING: After powering off the equipment and disconnecting the power supply. Then disconnect the equipment frame from the earth.
22. This product is intended to be supplied by a Listed DC power source, rated 24-110Vdc, 3.8-0.8A minimum, Tma 70 degree C minimum, if need further assistance, please contact Advantech for further information
23. The equipment is not intended to be installed and used in a home, school or public area accessible to the general population.
24. The knurled thumbscrews with slotted heads for each Node module should be tighten the screws with a tool after both initial installation and subsequent using.

警告：為避免電磁干擾，本產品不應安裝或使用於住宅環境。

DISCLAIMER: These instructions are provided in accordance with 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 utiliser 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 sur une surface stable.
7. Les ouvertures de l'enceinte sont pour la convection de l'air. Protéger l'équipement contre la surchauffe. Ne pas couvrir les 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.
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. 14. L'ordinateur sera installé et entretenu par le personnel de service d'Advantech, veuillez contacter Advantech pour plus d'assistance.

Note! *Aucune modification de cet équipement n'est autorisée.*



En cas d'autre problème, veuillez consulter ou retourner l'appareil à votre distributeur. N'essayez pas de réparer un appareil défectueux.

15. 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.
16. Ne pas laisser ce matériel dans un environnement où la température de stockage peut descendre en dessous de -40 °C/-40 °F ou être supérieure à 85 °C/180 °F. Ceci pourrait endommager l'équipement. L'équipement doit être maintenu dans un environnement contrôlé.
17. ATTENTION: Danger d'explosion si la batterie est inexactement remplacée. Remplacez seulement avec la même chose ou le type équivalent recommandé par le fabricant. Jetez les batteries utilisées selon les instructions du fabricant.

18. Cet équipement a été testé et déclaré conforme aux limites imposées aux appareils numériques de classe A. L'utilisation de cet équipement dans une zone résidentielle est susceptible de provoquer des interférences nuisibles. Dans ce cas, l'utilisateur sera tenu de corriger les interférences à ses frais.
19. Advantech ne fournit pas de composant d'alimentation pour ce produit, les utilisateurs doivent donc en acheter avec un certificat CCC.
20. Conformément à la norme IEC 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.
21. Connexion de l'équipement à la prise de terre.
Attention: l'équipement a une protection indépendante de mise à la terre, le châssis doit constamment être relié à la terre afin de protéger l'équipement et l'opérateur des risques électriques.
Attention: avant de commencer l'installation, assurez-vous qu'un technicien a installé une cosse adaptée au câble de terre fourni.
Pour relier l'équipement à la terre:
 - (1) Connecter le câble de terre à une prise de terre adaptée.
 - (2) Placer la cosse reliée au câble de terre sûr le boîtier de mise à la terre de la machine.
 - (3) Sécuriser la cosse de terre sur le boîtier de mise à la terre avec des vis et rondelles.
 - (4) Mettre en place le câble de terre en s'assurant qu'elle ne touche pas ou bloque l'accès à d'autres composants.Attention: Avant la mise sous tension de l'équipement, connecter l'appareil à la terre. Pour le fil de terre, vert et jaune l'isolation est nécessaire et la section de conducteur doit être supérieure à 0.75 mm² ou 18 AWG.
Attention: le pas de vis où le boîtier de mise à la terre est vissé ne doit pas être moins de 2 fois le pas de vis (au moins 3.5 mm de diamètre). Des rondelles étoiles ou belleville peuvent être utilisées.
Attention: la déconnexion de la terre du châssis de l'équipement doit se faire après coupure du courant et déconnexion de l'équipement.

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.

Battery Information

Batteries, battery packs, and accumulators should not be disposed of as unsorted household waste. Please use the public collection system to return, recycle, or treat such items in compliance with local regulations.



Warnings, Cautions, and Notes

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



Warning!



Caution! Cautions are included to prevent hardware damage and data losses. For example, "The battery is at risk of exploding if incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions."



Avertissement! Les avertissements indiquent des conditions qui, si elles ne sont pas respectées, peuvent entraîner des blessures!



Avertir! Des précautions sont incluses pour éviter les dommages matériels et les pertes de données. Par exemple, «La batterie risque d'exploser si elle n'est pas remplacée correctement. Remplacez uniquement par le même type ou un type équivalent recommandé par le fabricant. Jetez les piles usagées conformément aux instructions du fabricant.»



Note! Notes provide additional optional information.



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Chapter 1

Overview

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

1.1 Introduction

ITA-580 series powered by Intel 11th Gen. processors with reliable ECC function and built-in 2 x DisplayPort interfaces, 3 x 2.5 GbE ports (with LAN bypass) in M12 X-Coded and wide range 24V - 110VDC input, the computer is also featured TPM 2.0 and 4 x 2.5-inch SSD removable tray. Advantech iDoor tech and multi-expandable socket allow users to fulfill diverse application by expanding a variety of communication modules, including 5G, Wi-Fi 6, GPS, MVB and CANBus.

ITA-580G powered by Intel's 11th Gen. processors and compatible with NVIDIA's Quadro MXM GPU series, delivers a robust solution for AI applications in the rail industry. This computer excels in tasks like accelerated rendering, AI inference, real-time video analysis, and overall computing performance. Designed for rail applications, it seamlessly integrates

2 x DisplayPort interfaces, complemented by 4 additional interfaces from the MXM GPU module. The system also features 3 x 2.5 GbE ports in M12 X-Coded format, wide input support from 24V to 110VDC, TPM 2.0 security, and 2 removable trays for 2.5-inch SSDs.

ITA-580/580G are fully compliance with EN 50155:2021, EN 50121-3-2, EN 50121-4, EN 45545-2:2020 and EN 50121-4 (Wayside) test standard, and ensure stability and reliability system operations on railway critical applications.

1.2 Specifications

- **Processor and Chipset:** 11th Gen Intel® Core™ H-Series platform with RM590E
- **BIOS:** AMI SPI 256 MB flash
- **Memory:** Onboard 8/16 GB DDR4 3200 MHz
- **Graphic:** Intel® UHD Graphics for 11th Gen Intel® Processors
- **Storage:** (ITA-580) Up to 4 x 2.5" 7mm of SSD, support RAID 0/1/5/10 (No SSD tray in default configuration, please select P/N: FRU-ITASSD-0001 of SSD tray) (ITA-580G) Built-in 2 x 2.5" 7mm of SSD tray
 - 1 x Full-size mSATA
- **Expansion:**
 - Mini PCIe 2 x Full-size mini PCIe Socket
 - M.2 2 x M.2 3042/3052 B+M Key/1 x M.2 2230 A+E Key
 - SIM card: 4 x micro SIM slot, each M.2 slot supports dual micro SIM cards
 - PCIe 1 x PCIe16
- **Ethernet:** 3 x 10/100/1000/2500Mbps with M12 X-Coded (F) controller: Intel I226-IT
- **USB:** 4 x USB 3.2 (Type-A), 1 x USB 2.0 with M12 A-Coded (F) 5 pin
- **DP port:**
 - (ITA-580) 2 x DP (Resolution: 4096 x 2304 at 60 Hz)
 - (ITA-580G) 2 x DP port (max resolution up to 4096 x 2304 at 60 Hz), 4 x DP port from MXM (Discrete Mode by selected MXM module)
- **Series I/O:** 2 x RS-232/422/485 with 2KV isolation, auto-flow control, DB9 type
- **Digital I/O:** 1 x 4-bit DI/O with 2KV isolation, DB9 type
- **Audio:** 1 x Line-out, 1 x Mic-In
- **Optional I/O Modules:** 1 x ITA-EM-BA62: Super-cap based battery module (ITA-580)
- MVB, CAN, GPS, Wi-Fi, WWAN, DIO, Serial port, and more (Please contact your sales representative for more information)

- **Dimensions (W x H x D):**
 - ITA-580: 260 x 88 x 197.2 mm/10.24 x 3.46 x 7.76 inch
314.7 x 95 x 197.2 mm/12.36 x 3.74 x 7.76 inch (with mounting kit)
 - ITA-580G: 260 x 140.9 x 197.2 mm/10.24 x 5.51 x 7.76 inch
296 x 142.9 x 197.2 mm/11.7 x 5.6 x 7.76 inch with mounting kit
- **Net Weight:**
 - ITA-580: 4.5KG/9.92 lbs
 - ITA-580G: 6.5KG/14.33 lbs

1.3 System Power

- **Input Voltage:** Wide range power-in $24V_{DC} \sim 110V_{DC}$ ($\pm 40\%$)
- **Power supply information of EN 50155:**
- **Supply interruption (Performance criterion: A):** S3: $110V_{DC}$ /S2: $24V_{DC} \sim 110V_{DC}$
- **Supply change over (Performance criterion: A):** C2: $110V_{DC}$ /C1: $24V_{DC} \sim 110V_{DC}$
- **Power Consumption:** Power input voltage at $24V_{DC}$
- **Idle mode:** 35 Watt
- **Burn-in:** 65 Watt
- **Max. load mode:** 91 Watt
- **Circuit breaker recommendation:**
 - ITA-580: select 10 ampere
 - ITA-580G: select 20 ampere

Note! The power consumption may different depends on the configuration.



- ITA-580 power behavior

1.4 Safety and Environment

1.4.1 Safety and Compliance

1.4.1.1 Safety

- CE, CCC, BSMI, FCC class A, UL 62368

1.4.1.2 Rolling Stock

- EN 50155:2021, EN 50121-3-2, EN 50121-4, EN 45545-2:2020 HL3, NFPA 130

1.4.2 Environment

- **Operating Temperature:**
 - ITA-580: $-40 \sim 70^{\circ}\text{C}$ / $-40 \sim 158^{\circ}\text{F}$ ($85^{\circ}\text{C}/185^{\circ}\text{F}$ for 10 minutes) with industrial grade peripheral device
 - ITA-580G: Operating Temperature: $-40 \sim 70^{\circ}\text{C}$ / $-40 \sim 158^{\circ}\text{F}$ ($85^{\circ}\text{C}/185^{\circ}\text{F}$ for 10 minutes) with industrial grade peripheral device; With 60-watt of MXM module: EN 50155:2021 OT1 ($-25 \sim 55^{\circ}\text{C}$)
- **Storage Temperature:** $-40 \sim 70^{\circ}\text{C}$ / $-40 \sim 158^{\circ}\text{F}$

- **Humidity:** 95% @ 40 °C (non-condensing)
- **Shock and Vibration:** EN 61373 body mount class B

1.5 System Dimension

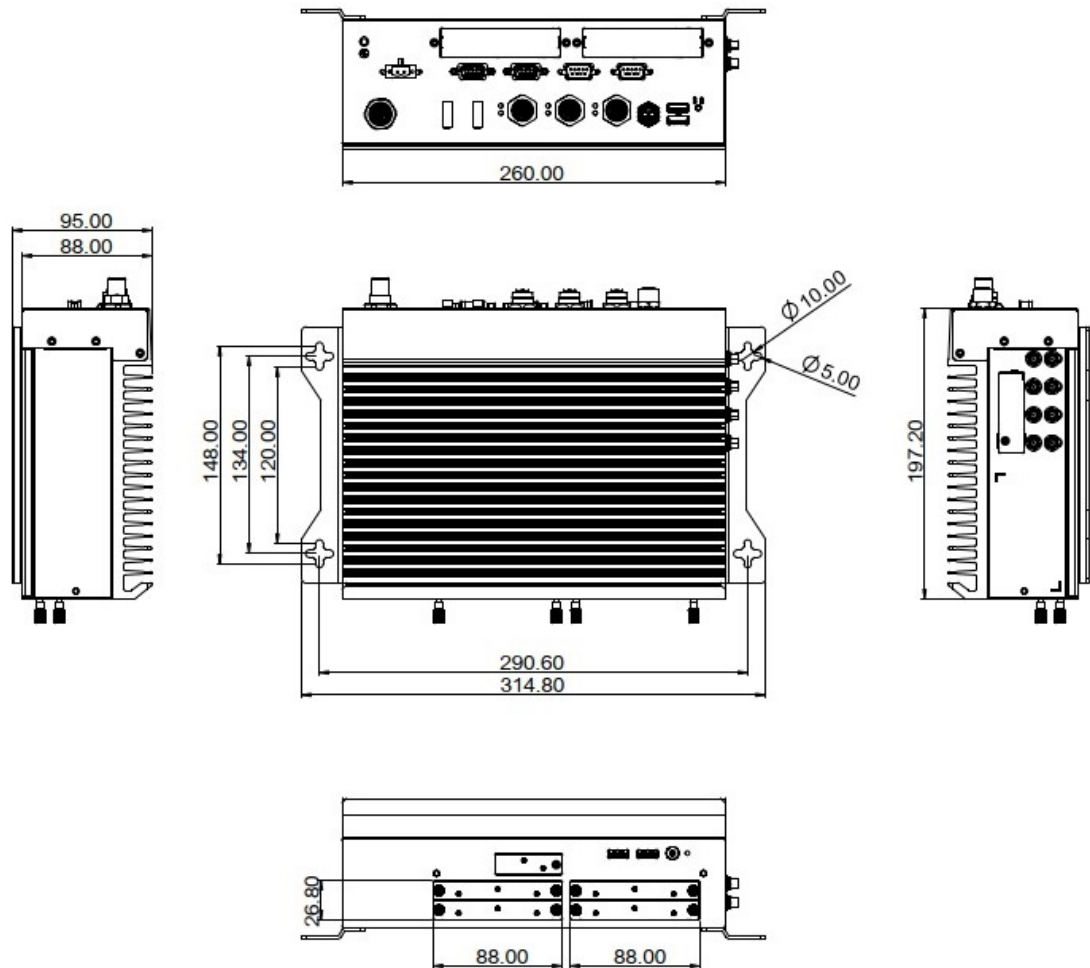


Figure 1.1 ITA-580 Series Dimension Diagram

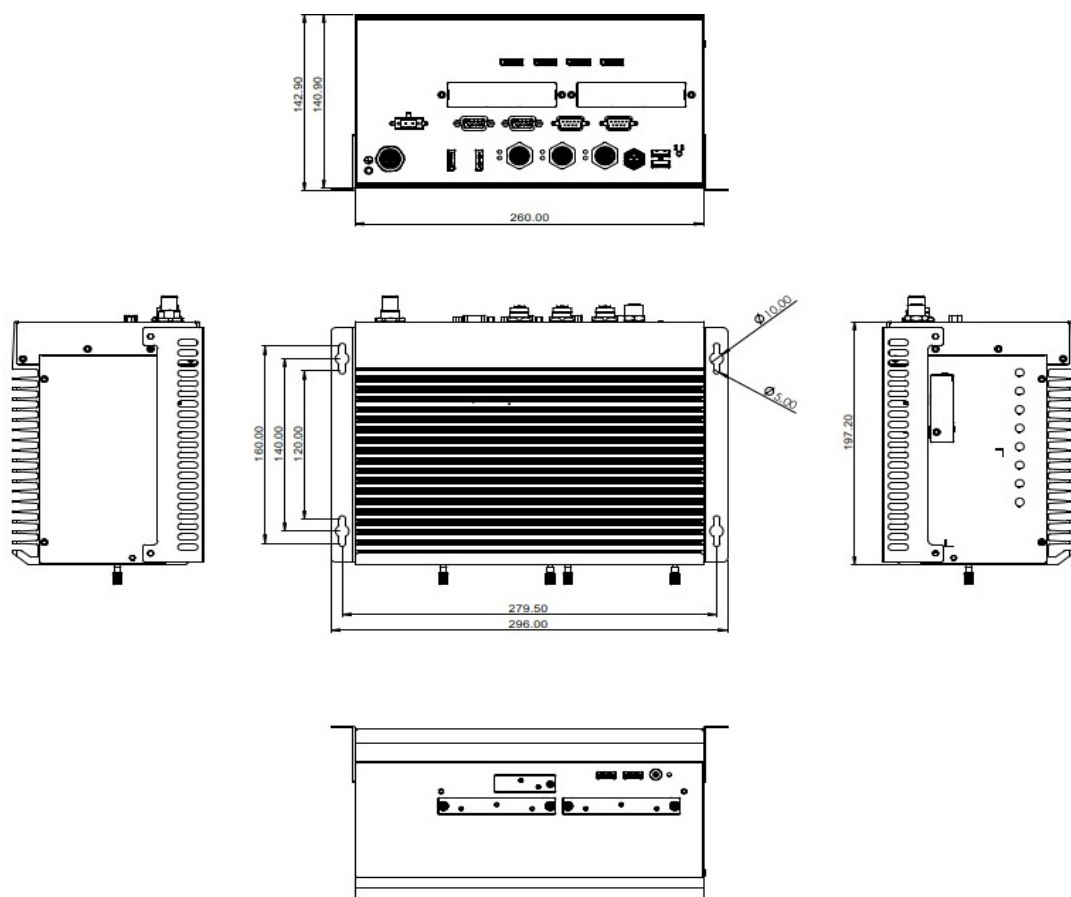


Figure 1.2 ITA-580G Series Dimension Diagram

Chapter 2

H/W Installation

- Introduction
- Jumpers and Connectors
- I/O Connectors

2.1 Introduction

The following sections show the pin assignments for the I/O connectors and bezel key mapping to facilitate application integration.

2.2 I/O Connectors

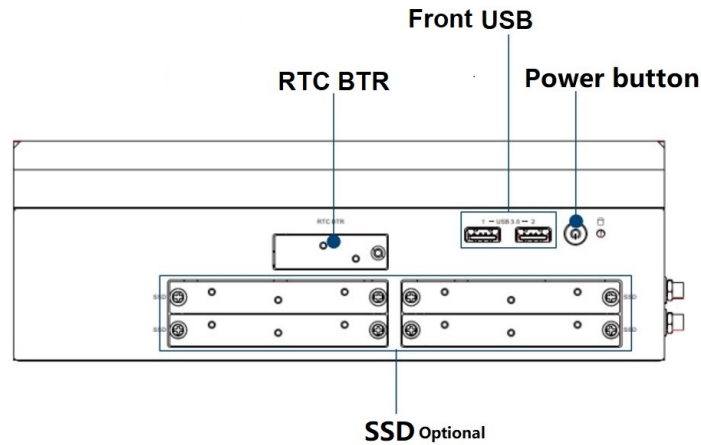


Figure 2.1 ITA-580 I/O view

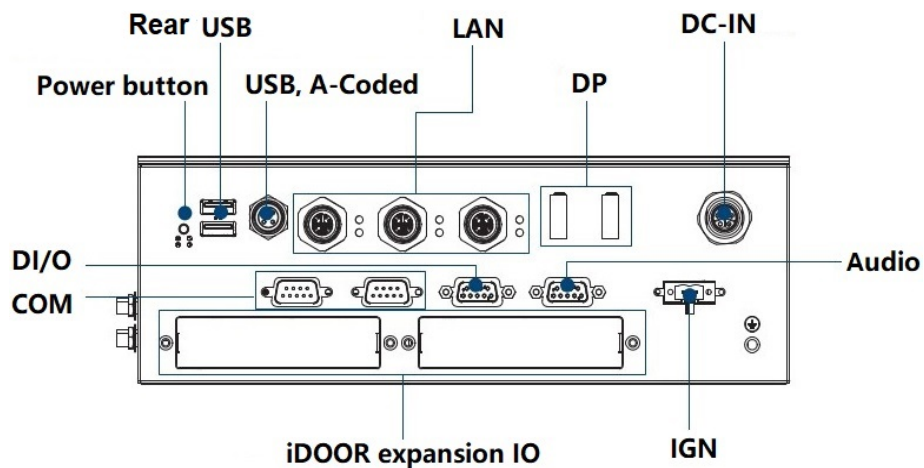


Figure 2.2 ITA-580 I/O view

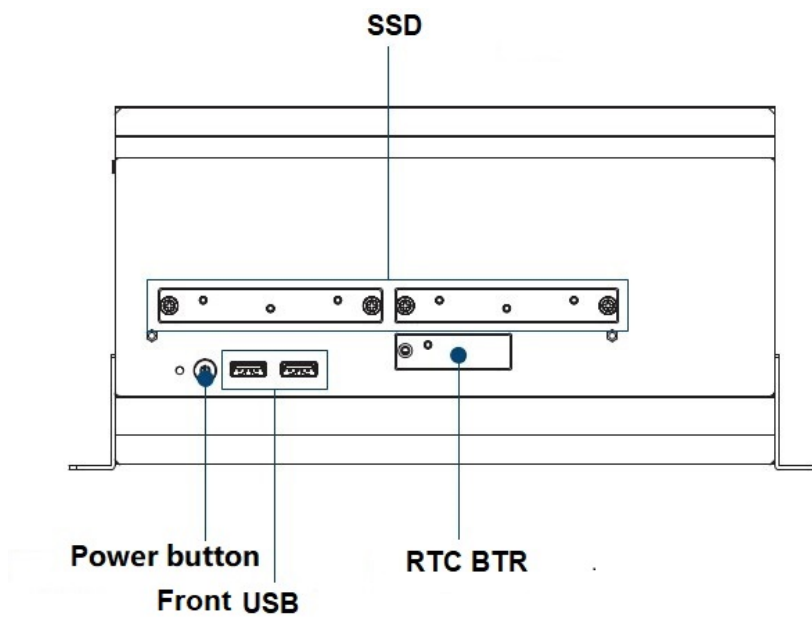


Figure 2.3 ITA-580G I/O view

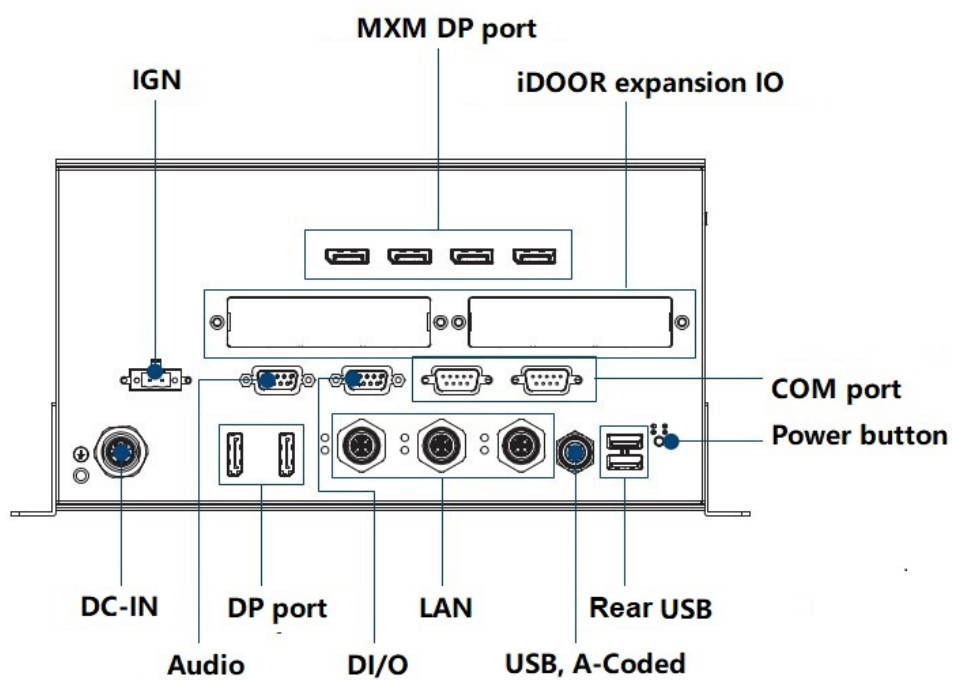


Figure 2.4 ITA-580G I/O view

2.2.1 COM Connector

ITA-580/580G is equipped with two RS-232/422/485 DB9 connectors. The default setting is RS-232.

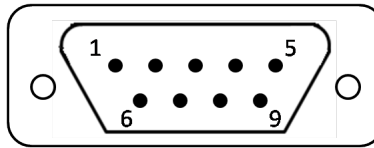


Table 2.1: COM Connector Pin Definitions

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

2.2.2 Audio Connector

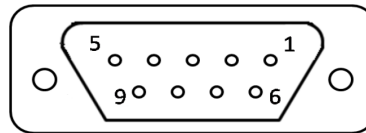


Table 2.2: Audio Connector Pin Definitions

Pin	Signal Name	Pin	Signal Name
1	MICR	6	LOUTR
2	GND_AUD	7	GND_AUD
3	GND_AUD	8	Front_JD
4	MIC_JD	9	LOUTL
5	MICL		

2.2.3 Digital I/O Connector

ITA-580 provides one DIO (8 bit) with DB9 type connector (four DI and four DO).

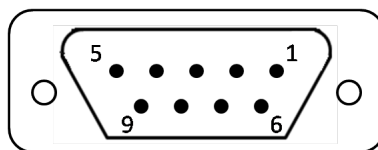


Table 2.3: Digital I/O Connector Pin Definitions

Pin	Signal Name	Pin	Signal Name
1	GPI1	6	GPO1
2	GPI2	7	GPO2
3	GPI3	8	GPO3
4	GPI4	9	GPO4
5	GND		

2.2.4 USB Connector

ITA-580/580G features four USB 3.2 ports with a Type-A connector and one USB 2.0 port with an M12 A-coded female connector. The USB interface can be disabled through BIOS menu

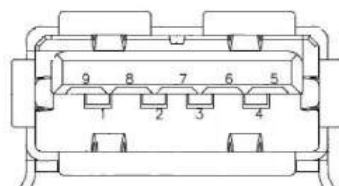


Table 2.4: USB 3.2 Connector Pin Definitions

Pin	Signal Name	Pin	Signal Name
1	+V5(VCC)	6	StdA_SSRX+
2	D-	7	GND_DRAIN
3	D+	8	StdA_SSTX-
4	GND	9	StdA_SSTX+
5	StdA_SSRX-		

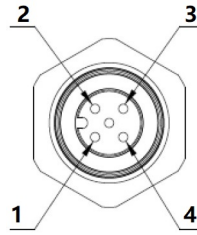


Table 2.5: USB 2.0 Connector Pin Definitions

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

2.2.5 Ethernet Connector

ITA-580/580G offers three 10/100/1000/2500 Mbps ethernet ports with M12, X-Coded (F) connector.



Table 2.6: 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+

2.2.6 Power Input Connector

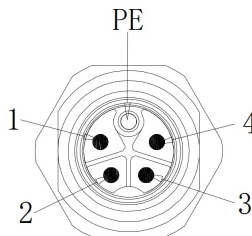


Table 2.7: Power Connector Pin Definitions

Pin	Signal Name	Pin	Signal Name
1	V+	3	V-
2	V-	4	V+
PE	Earth ground		

2.2.7 Display Port Connector

ITA-580/580G offers two of external Display port, which resolution max up to 4096 x 2304 at 60 Hz.

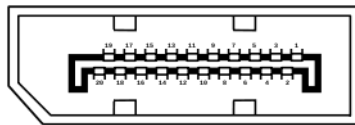


Table 2.8: Display Port Connector Pin Definitions

Pin	Signal Name	Pin	Signal Name
1	DP1_0+	11	GND
2	GND	12	DP1_3-
3	DP1_0-	13	DP1_AUX_EN#
4	DP1_1+	14	GND
5	GND	15	DP1_AUX+
6	DP1_1-	16	GND
7	DP1_2+	17	DP1_AUX-
8	GND	18	DP1_HPD
9	DP1_2-	19	GND
10	DP1_3+	20	+V3.3_DP1/DP2

2.2.8 LED Indicators

The system features 4 LED (s), which are used to indicate active status of computer, the LED behaviors are explained in below table.

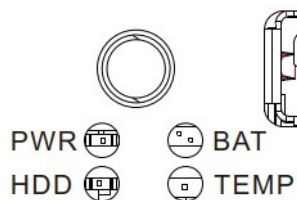
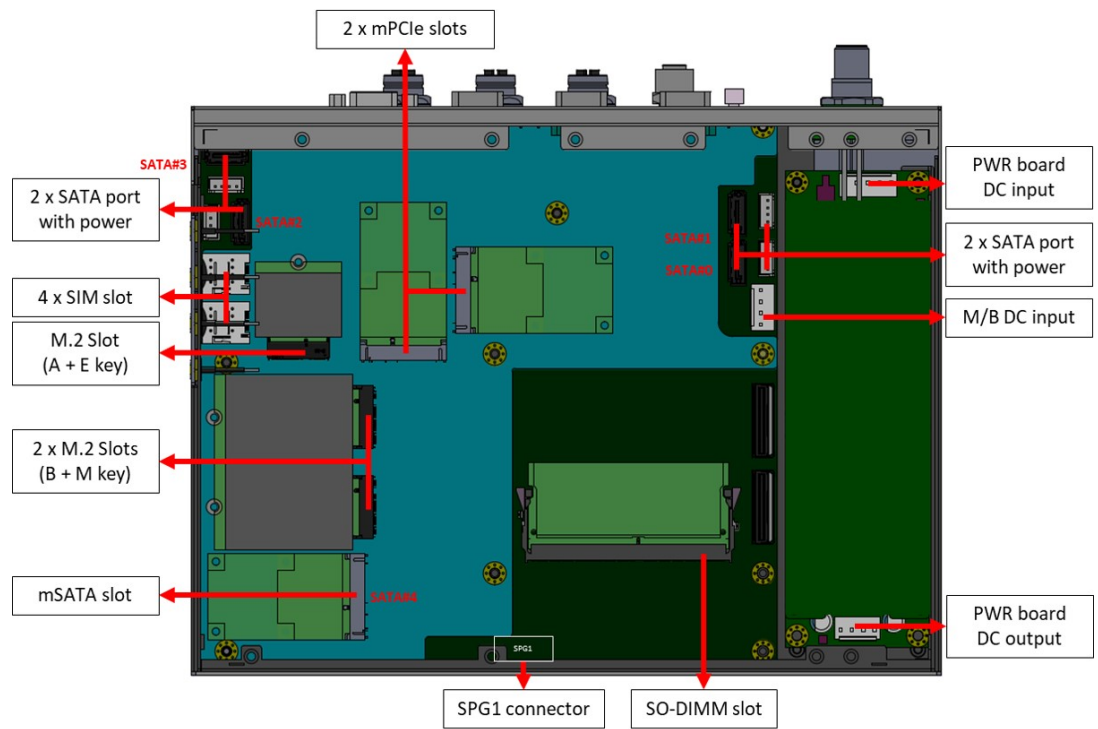


Table 2.9: LED Indicators

Item	LED	Status	Color	Behavior
1	PWR	On	Green	System is powered on
2	Storage	On	Green	Data is reading and writing
		On	Blinking green	Battery is charging
		On	Green	Battery is fully charged and standby
		On	Blinking green and red	Battery is discharging
3	Battery	On	Red	Need to replace a new battery module (ITA-EM-BA62)
		On	Blinking Red/1 sec	Battery is overvoltage (Please contact your sales representative)
		On	Blinking Red/0.5 sec	Battery is input overcurrent (Please contact your sales representative)
4	Temperature	On	Red	Processor is overheating

2.2.9 Internal Connector and Expansion Slot



Chapter 3

System Setup

- mSATA and SSD Kit Installation
- Expansion Module Installation
- RTC Battery Installation
- Antenna and SIM Card Installation

3.1 Introduction

The following sections provide instructions how to insert the various expansion modules into system.

3.2 mSATA and SSD Kit (FRU-ITASD-0001 Optional) Installation

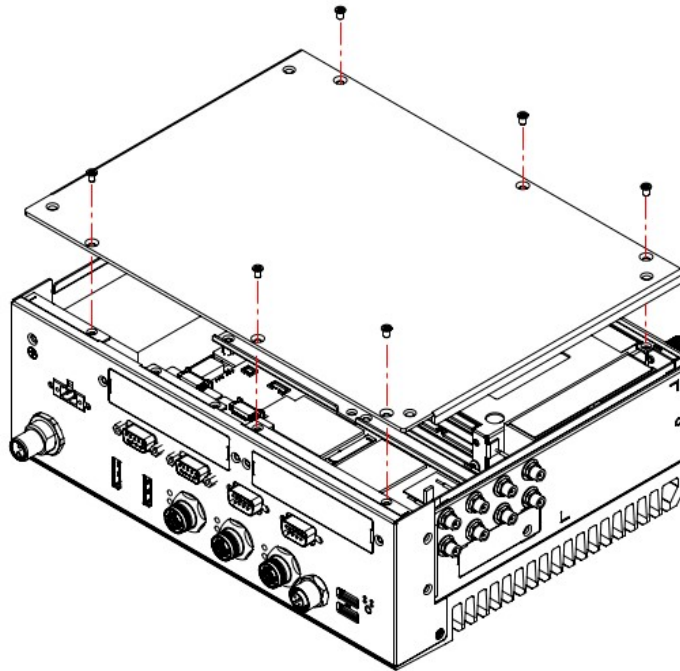


Figure 3.1 ITA-580 Undo bottom cover

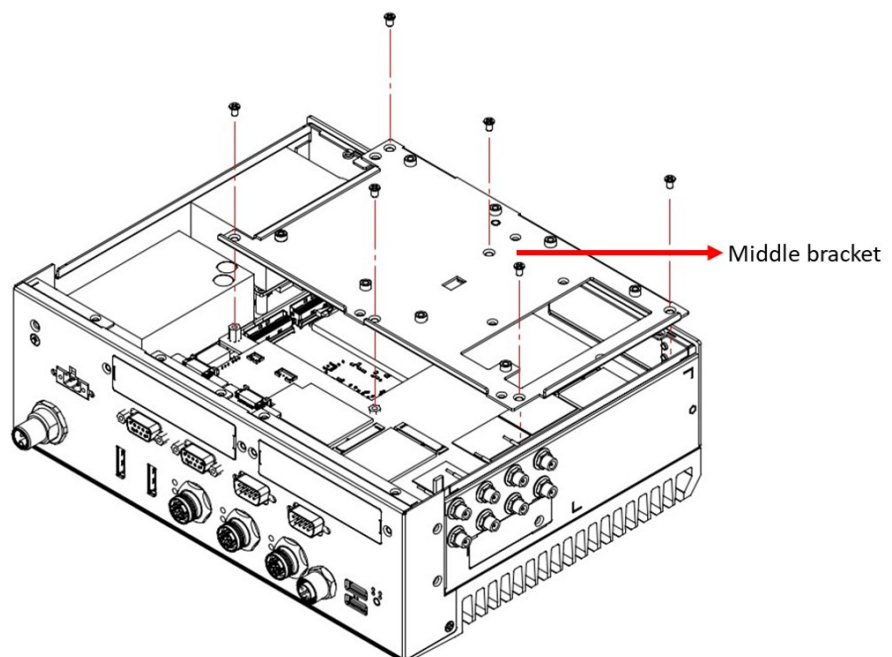


Figure 3.2 ITA-580 undo middle bracket

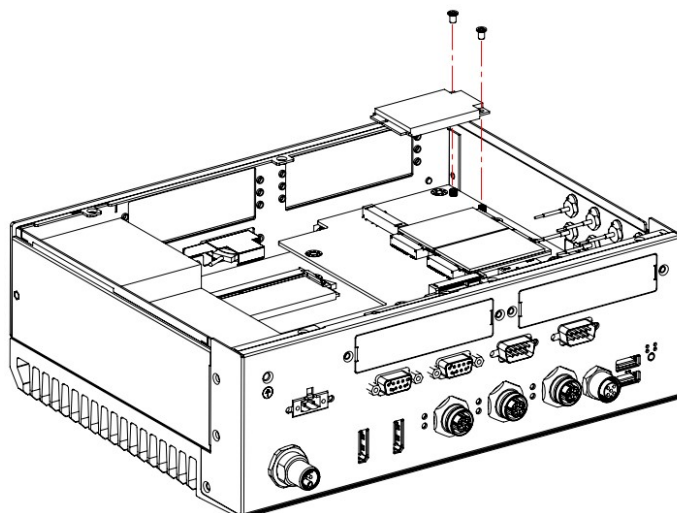


Figure 3.3 ITA-580 insert mSATA module on mSATA1 slot of IO board

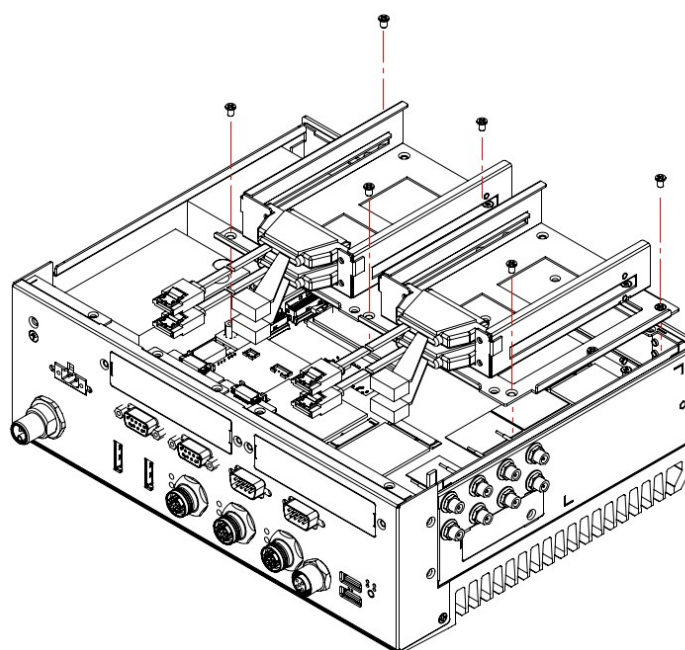


Figure 3.4 ITA-580 SSD kit installation#1

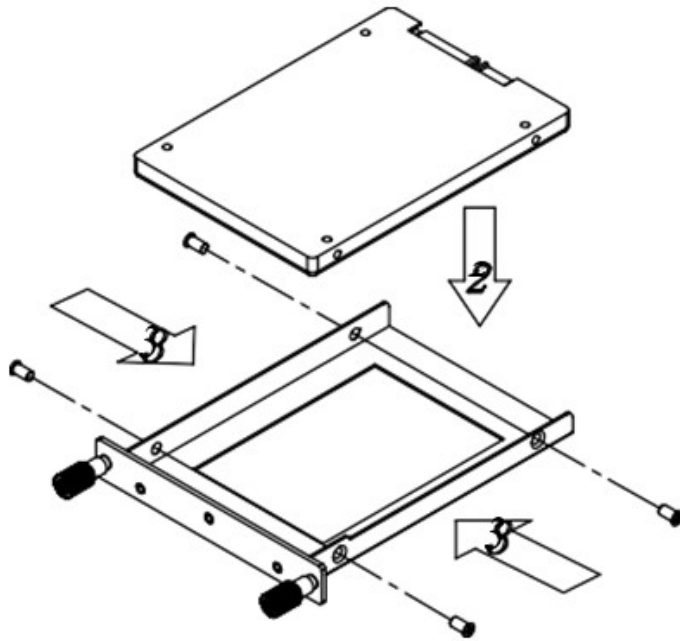


Figure 3.5 ITA-580 SSD kit installation#2

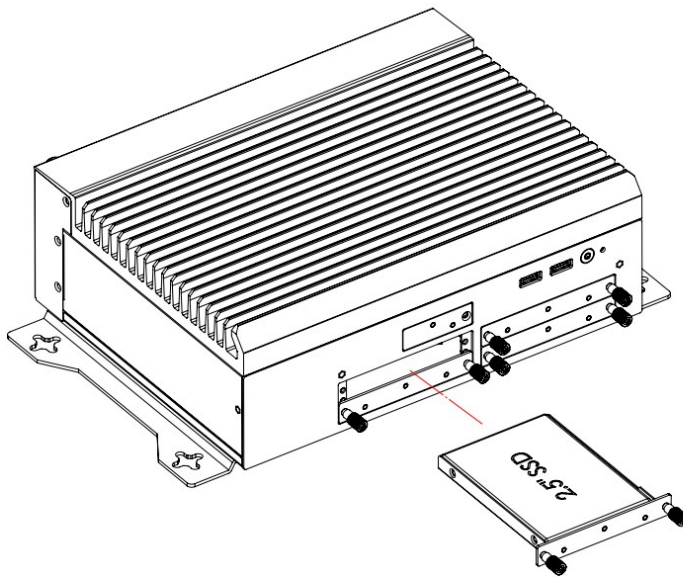


Figure 3.6 ITA-580 SSD kit installation#3

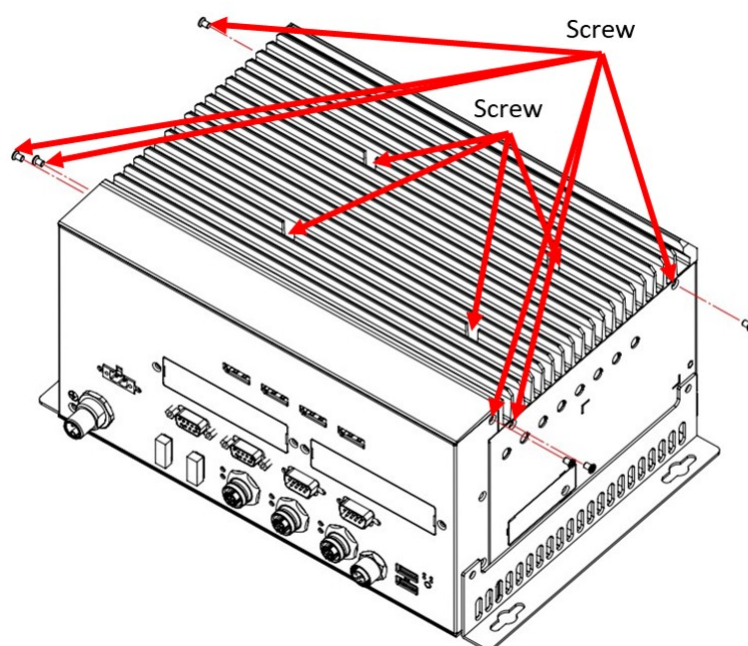


Figure 3.7 ITA-580G GPU heatsink installation#1

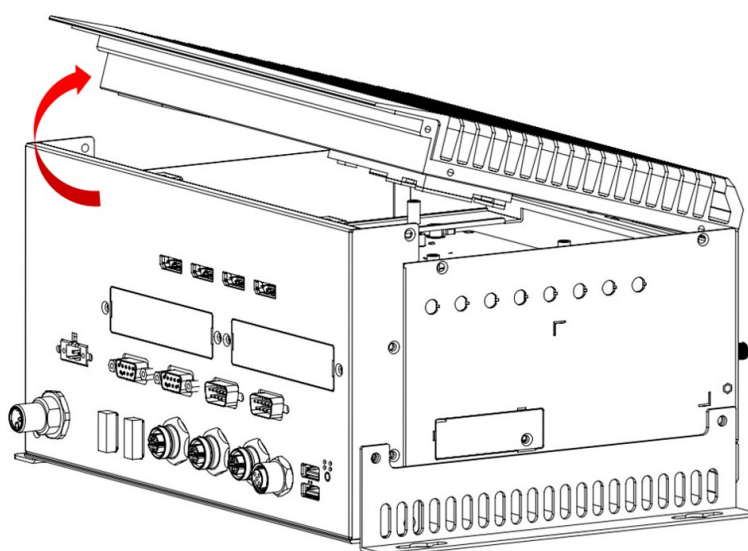


Figure 3.8 ITA-580G GPU heatsink installation#2

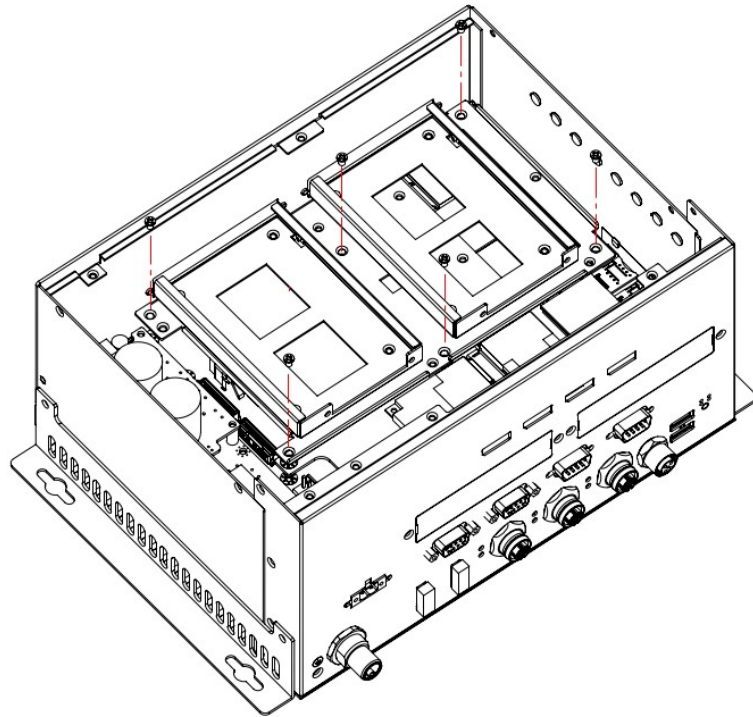


Figure 3.9 ITA-580G SSD installation

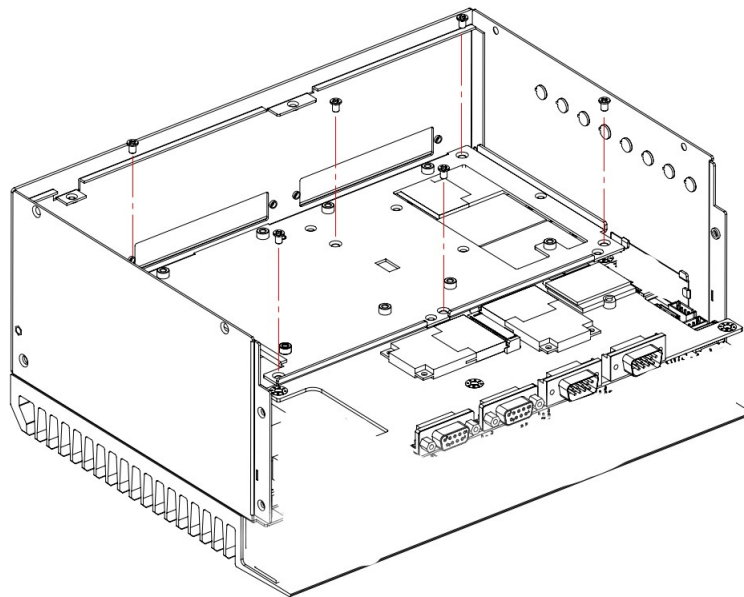


Figure 3.10 ITA-580G SSD bracket installation

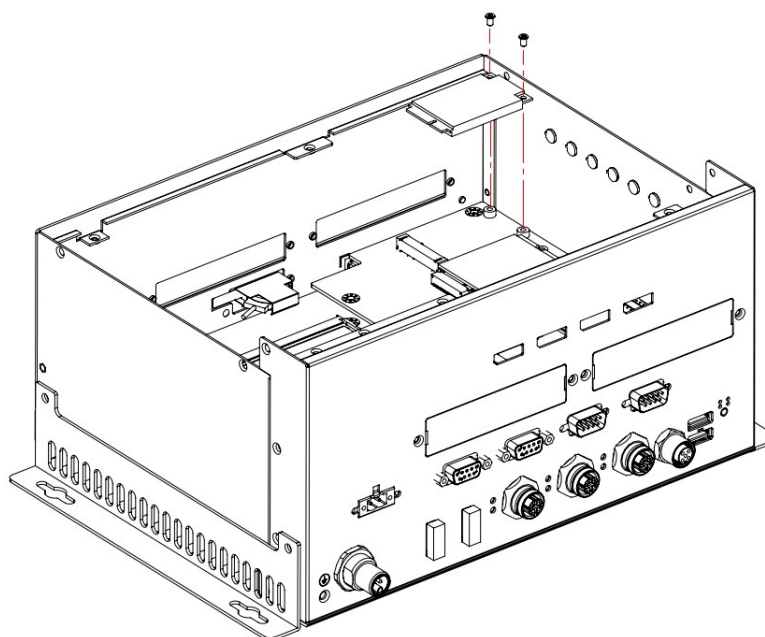


Figure 3.11 ITA-580G mSATA installation

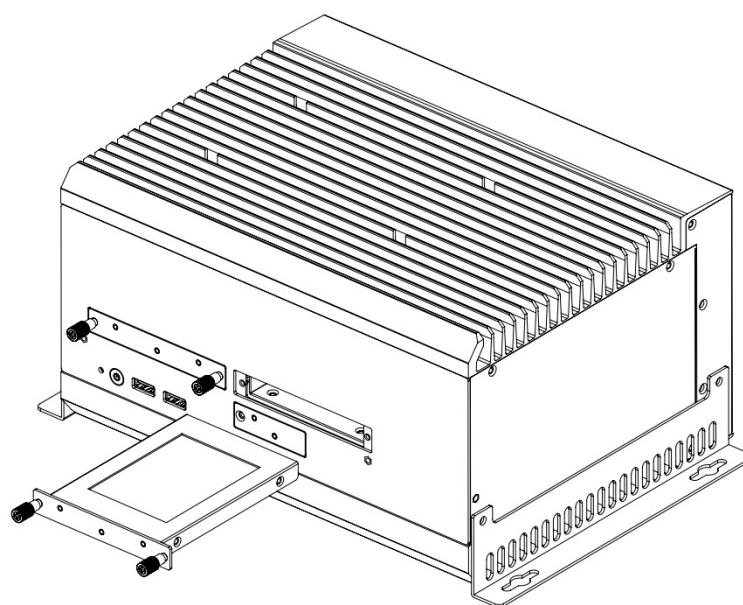


Figure 3.12 ITA-580G SSD tray installation

■ ITA-580

– mSATA installation

1. Undo 6 screws and take off the bottom cover.
2. Undo 6 screws from middle bracket.
3. Insert mSATA module on mSATA1 slot of I/O board.
4. Secure 2 screws (P/N: 1930000198, M2x4L F/S D=4.3 H=0.8) on mSATA module.
5. Replace middle bracket then bottom cover with secured all screws.

– SSD kit installation (FRU-ITASSD-0001 as optional)

1. Undo 6 screws and take off the bottom cover.

2. Secure SSD cage (P/N: 1960107552N000) with 4 screws (P/N: 1930000686) on middle bracket.
3. Secure SATA cables (P/N: 1700029604-01) with 2 screw (P/N: 1930001074) on SSD cage.
4. Insert SATA data cable on SATA0/1/2/3 connector of mainboard.
5. Insert SATA power cable on SATAPWR0/1/2/3 connector of mainboard and make cable straight smoothly.
6. Replace middle bracket then bottom cover with secured all screws.
7. Secure SSD device with 4 screws (P/N: 1930008529) on SSD tray.
8. Replace the bottom cover and secure all screws.
9. Insert SSD tray into SSD slot.
10. Secure the 2 screws of SSD tray till tight.

■ ITA-580G

– mSATA installation

1. Undo 10 screws and take off the top heatsink.
2. Remove SSD tray from ITA-580G.
3. Undo 6 screws from middle bracket.
4. Secure 2 screws (P/N: 1930000198, M2x4L F/S D=4.3 H=0.8) on mSATA module.
5. Replace middle bracket, SSD tray then top heatsink with secured all screws.

– SSD installation

1. Secure SSD device with 4 screws (P/N: 1930008529) on SSD tray.

3.3 Expansion Module Installation

3.3.1 M.2/mPCIe Expansion Module Installation

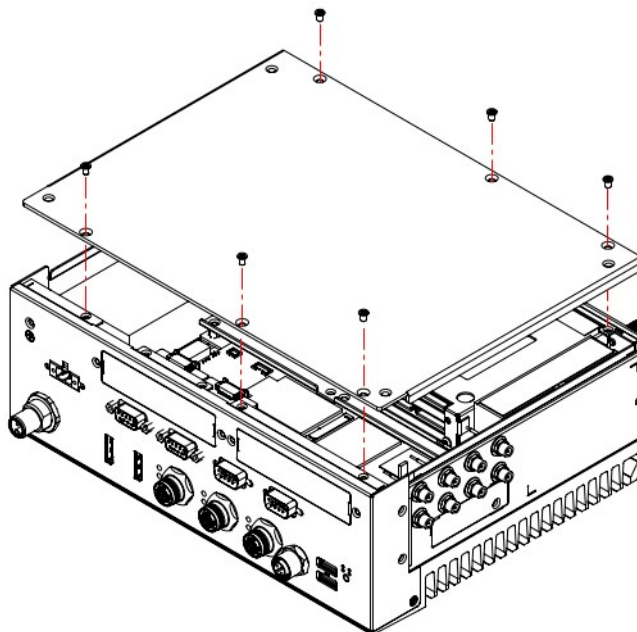


Figure 3.13 ITA-580 Undo bottom cover

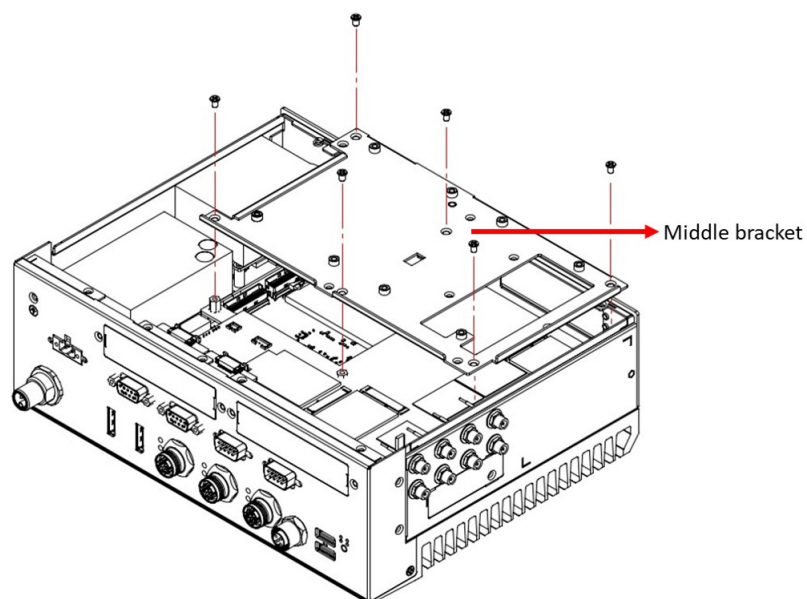


Figure 3.14 ITA-580 undo middle bracket

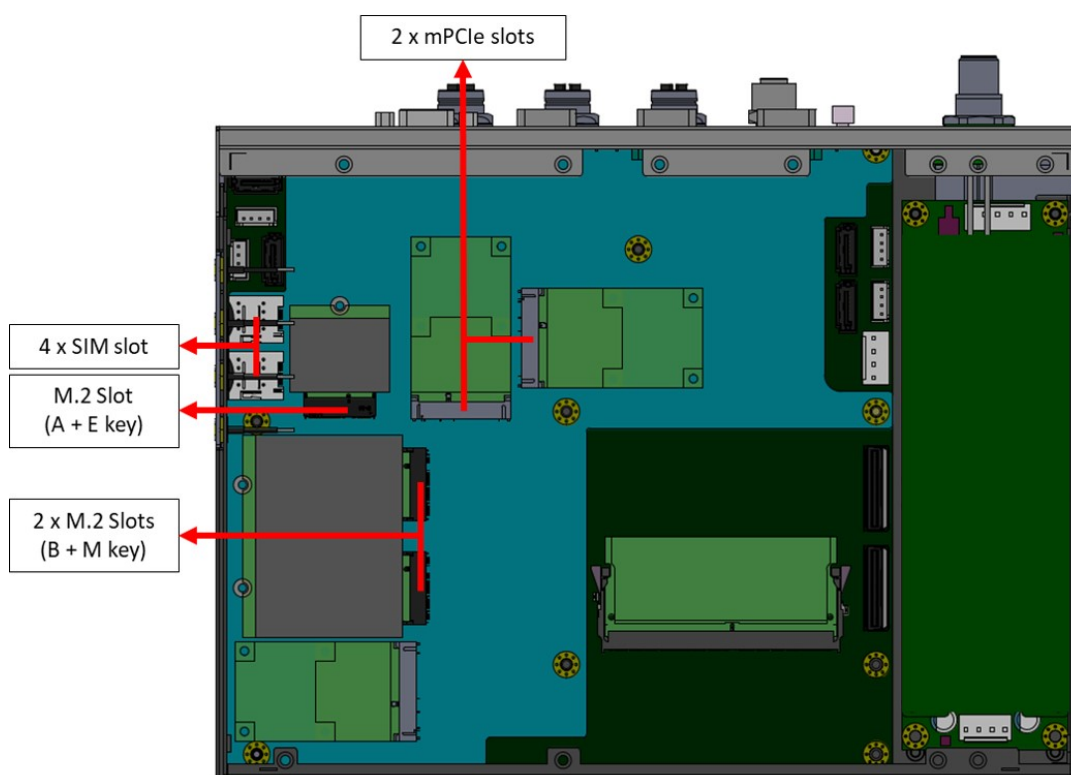
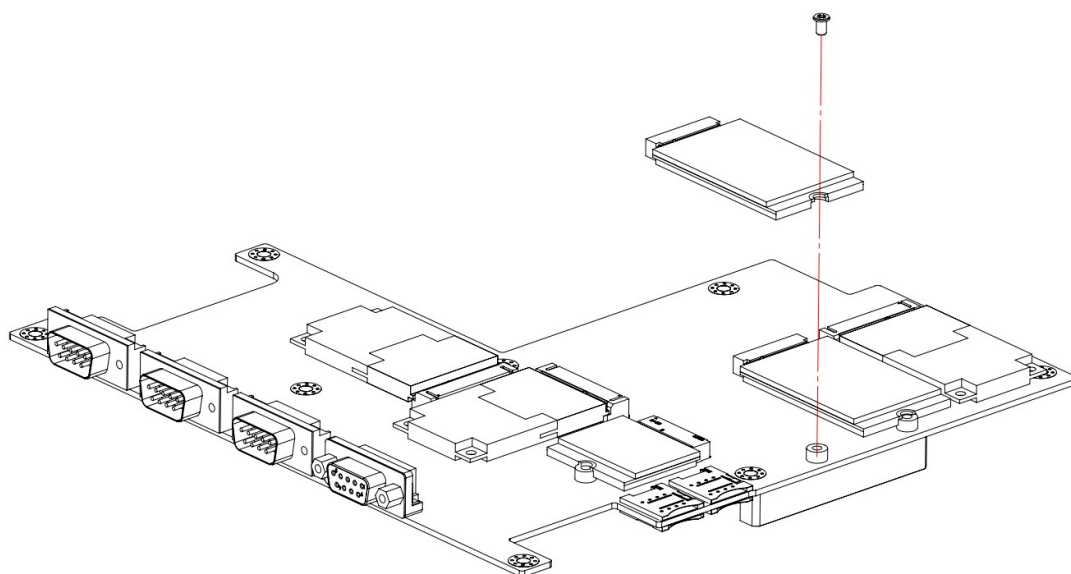
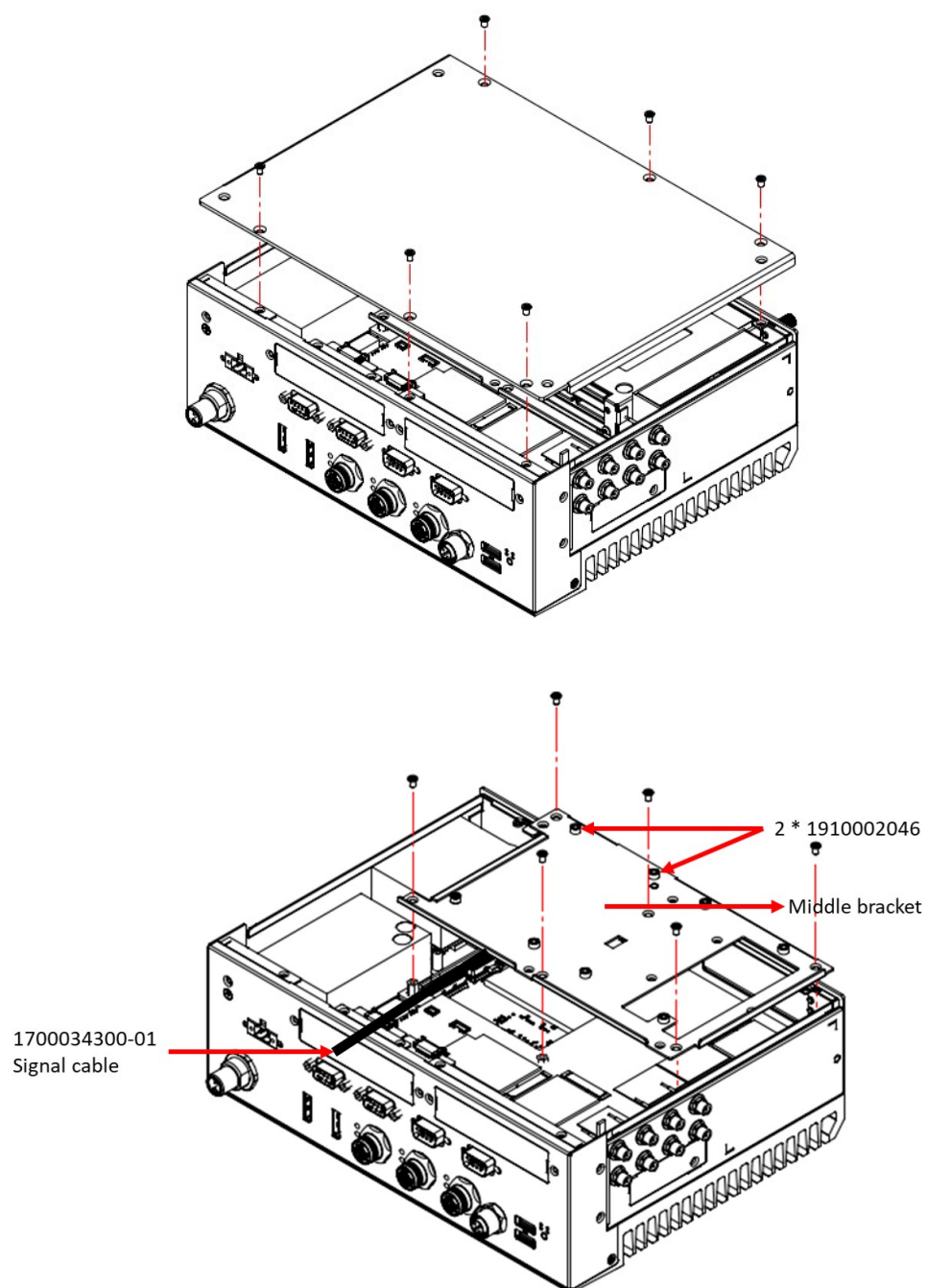


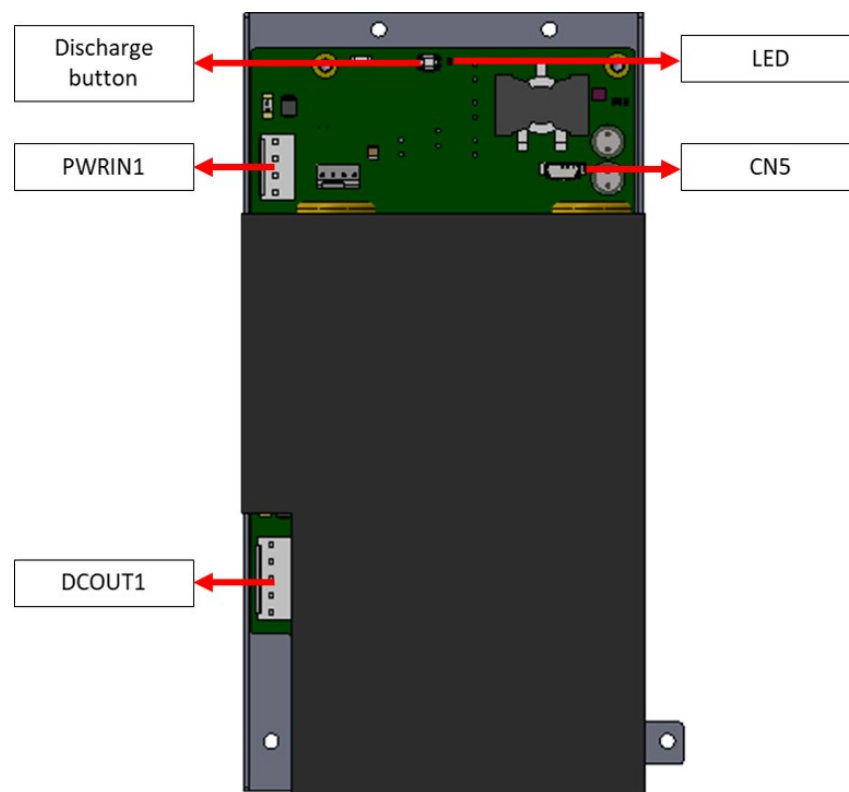
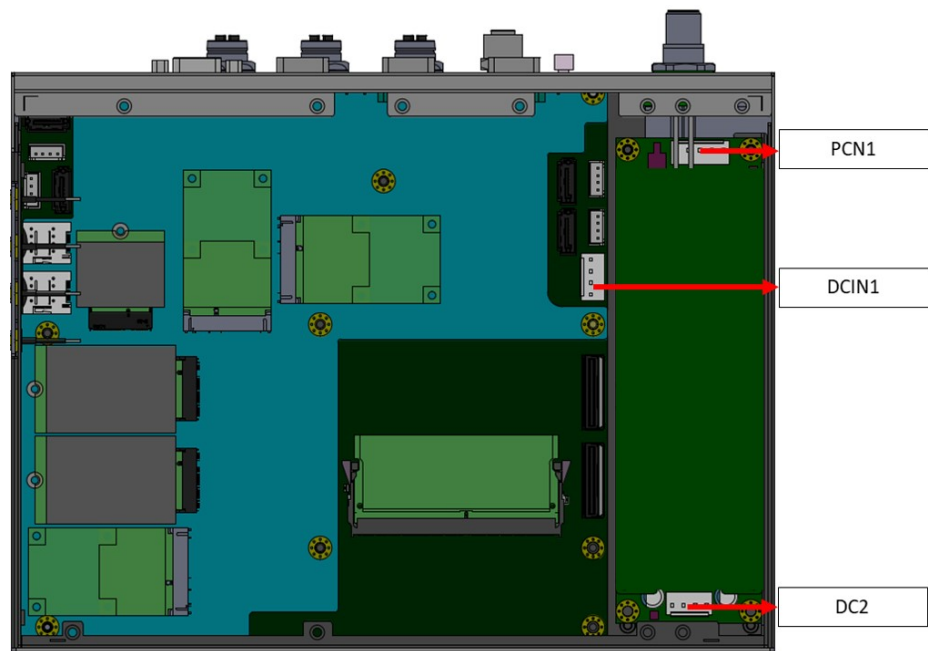
Figure 3.15 ITA-580 Expansion introduction

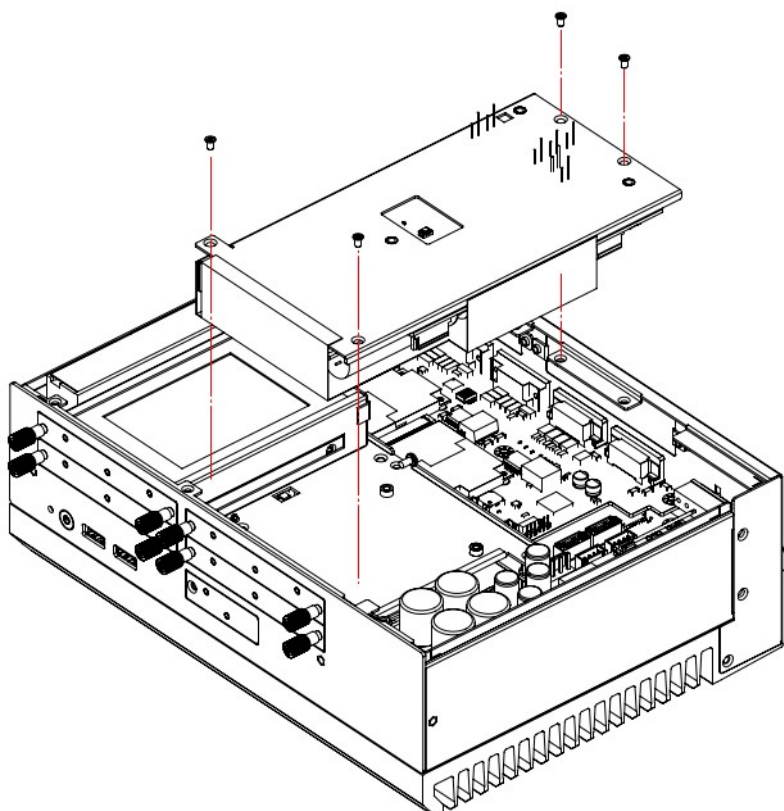


1. Undo 6 screws and take off the bottom cover.
2. Undo 6 screws from middle bracket.
3. Insert an expansion module on required slot on board.
4. Secure option#a / b on mPCIe/M.2 slot option#a. 2 screws (P/N: 1930000198, M2x4L F/S D=4.3 H=0.8) on mPCIe slot with module option#b. 1 screw (P/N: 1930001062, Screw M3x4L F/S D=5.6 H=1 (1+) ST Ni NK).
5. Replace middle bracket then bottom cover with secured all screws.

3.3.2 ITA-EM-BA62 (Super-cap Based Battery) Module Installation







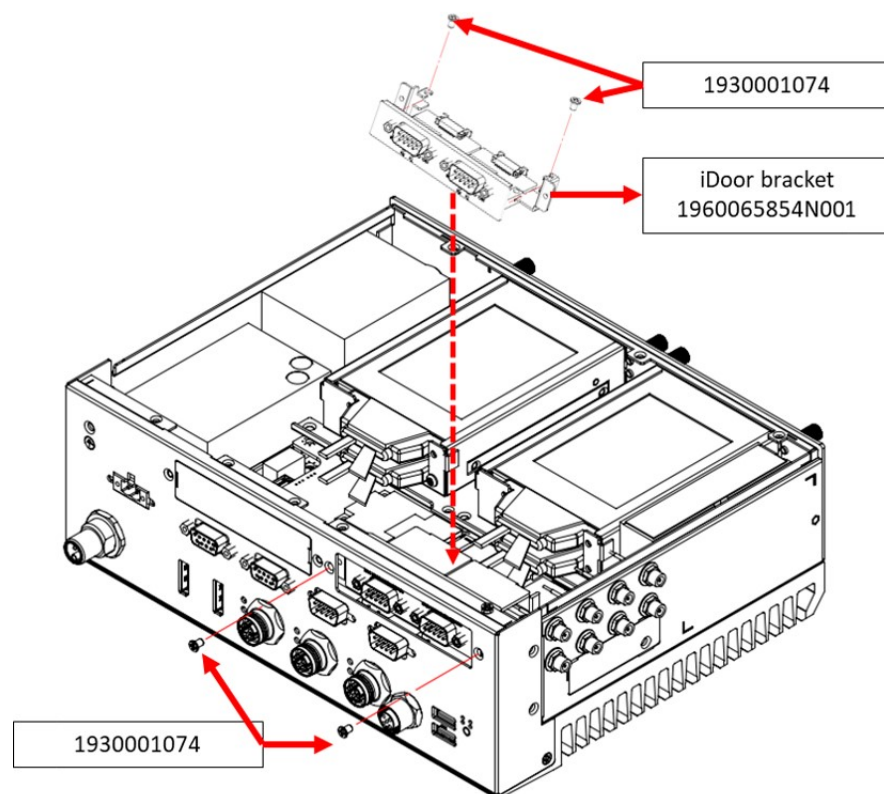
1. Undo 6 screws and take off the bottom cover.
2. Undo 6 screws from middle bracket.
3. Insert signal cable (P/N: 1700034300-01) on SPG1 of mainboard.
4. Replace 6 screw on middle bracket then secure 2 screws (P/N: 1910002046) on iddle bracket.

Note: please make signal cable (P/N: 1700034300-01) straight smoothly.

5. Un-plug power output cable from DCIN1 of mainboard, then insert power output cable on PWRIN1 connector from 9791B16C000 (power board)
6. Insert 5 pins head of power cable (P/N: 1700034299-01) on DCOUT1 connector from 9791B16C000 (power board), another 4 pins head to insert on DCIN1 from mainboard
7. Insert signal cable (P/N: 1700034300-01) on CN5 from 9791B16C000
8. Secure 4 screws (P/N: 1930000686) on middle bracket
9. Replace the bottom cover and secure all screws.

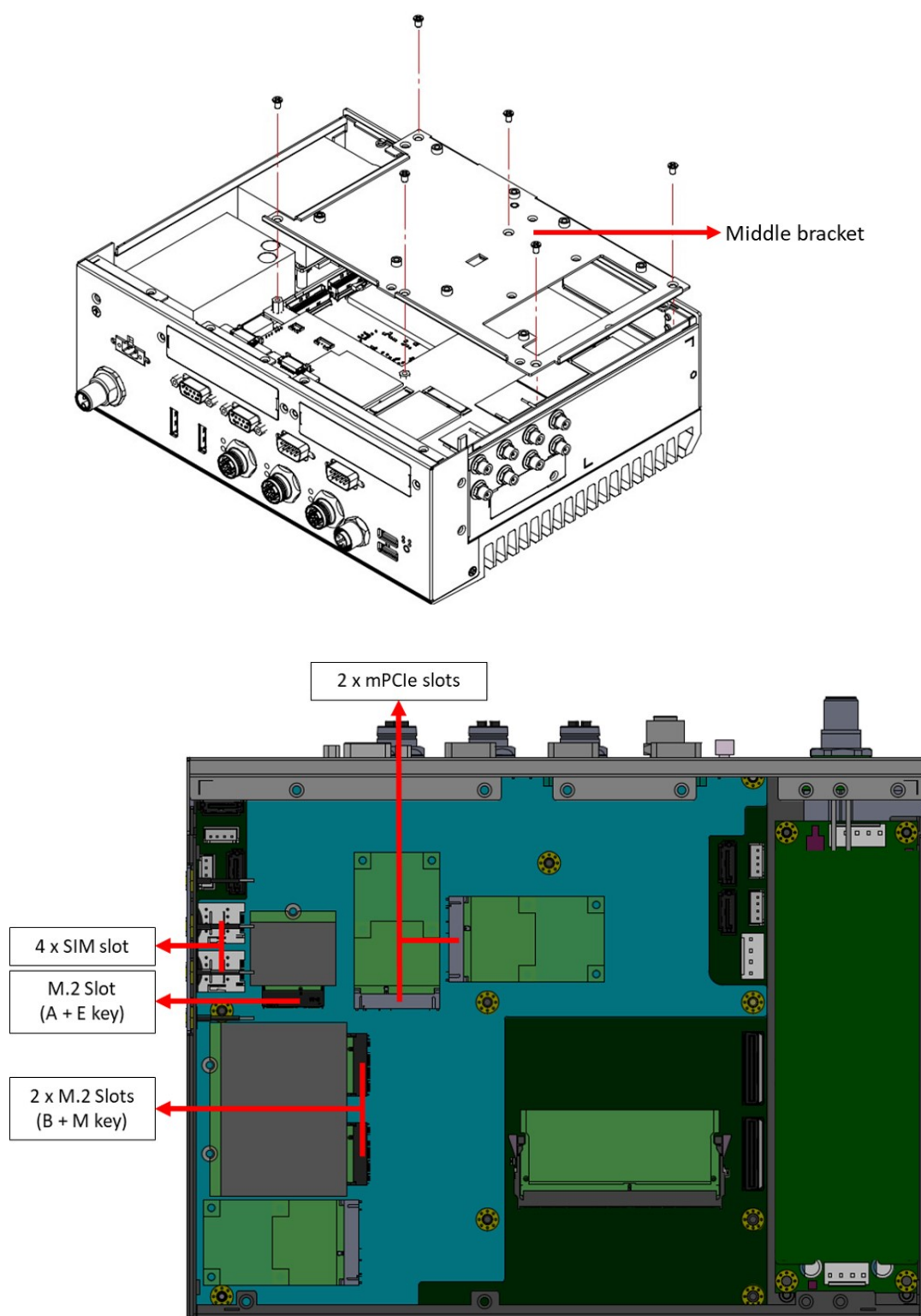
PS: Please press the discharge button of ITA-EM62 till the LED is off before disconnecting the power cable.

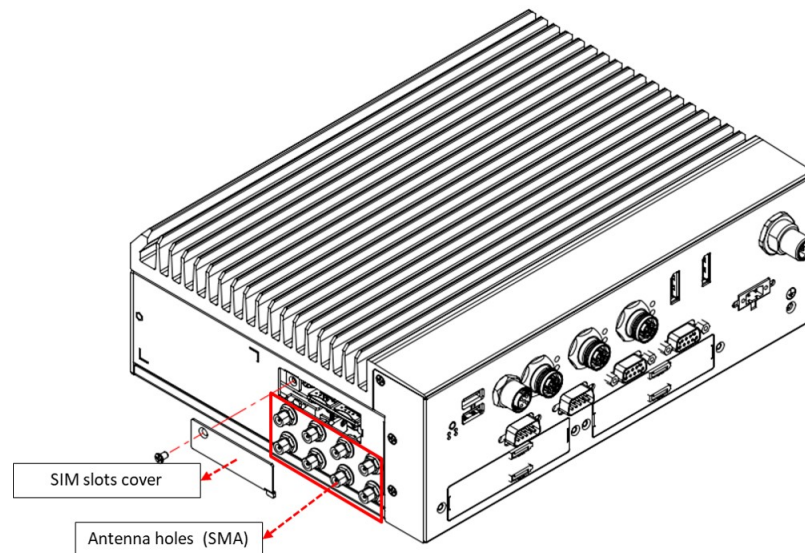
3.3.3 iDoor Module Installation



1. Undo 6 screws and take off the bottom cover.
2. Undo 6 screws from middle bracket.
3. Assemble expansion module on mPCIe slot and secure the screws on the module.
4. Undo 2 screws and remove the iDoor cover from ITA-580.
5. Secure 2 screws (P/N: 1930001074) on iDoor bracket (1960065854N001).
6. Put iDoor module on iDoor window of ITA-580.
7. Secure 2 screws (P/N: 1931020600) with iDoor bracket.
8. Replace the middle bracket, bottom cover and secure all screws.

3.3.4 Wireless Module Installation





M.2 B+M Key slot	SIM slot allocation
M.2-B1	SIM slot#1/2
M.2-B2	SIM slot#3/4

1. Undo 6 screws and take off the bottom cover.
2. Undo 6 screws from middle bracket.
3. Assemble wireless module on mPCIe/M.2 slot and secure the screws on the module.
4. Connect the internal antenna cable to the wireless module.
5. Next, carefully break an opening for the SMA connection on the side to enable the assembly of the internal antenna.

Note: Please ensure that the cables are arranged in a straight and smooth manner.

6. Replace the middle bracket, bottom cover and secure all screws.
7. Undo the screw from SIM cover on side then insert micro SIM into SIM slot.
8. Replace the SIM cover and secure screw.

3.4 RTC Battery Installation

The RTC battery can be accessed via the front panel.

1. Un-do the screw from RTC BTR cover.
2. Insert the RTC battery into the holder and connect the cable.
3. Secure screw on RTC BTR cover on chassis.

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

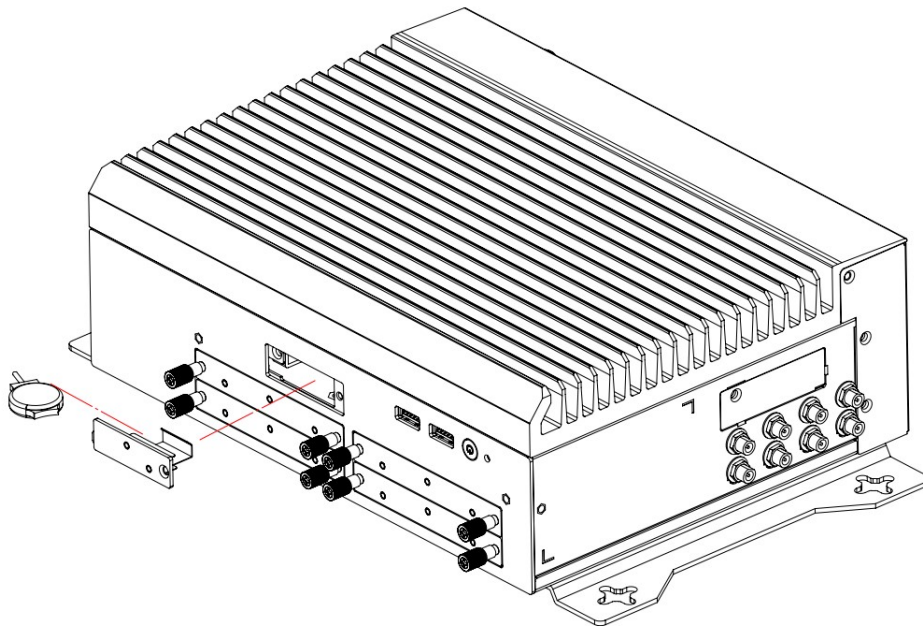


Figure 3.16 RTC Battery Replacement

Chapter 4

AMI BIOS

This chapter details BIOS setup information for the ITA-580.

Sections include:

- Introduction
- Entering Setup
- Hot/Operation Key
- Exit BIOS Setup Utility

4.1 Introduction

AMI BIOS has been integrated into many motherboards for over a decade. The AMI BIOS Setup Utility enables users to modify the BIOS settings and control various system features. This chapter describes the basic navigation of the BIOS Setup Utility.



Figure 4.1 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 flash ROM so it retains the Setup information when the power is turned off.

4.2 Entering Setup

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

4.3 Main Setup

When users first enter the BIOS Setup Utility, users will see the Main setup screen.

Users can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.

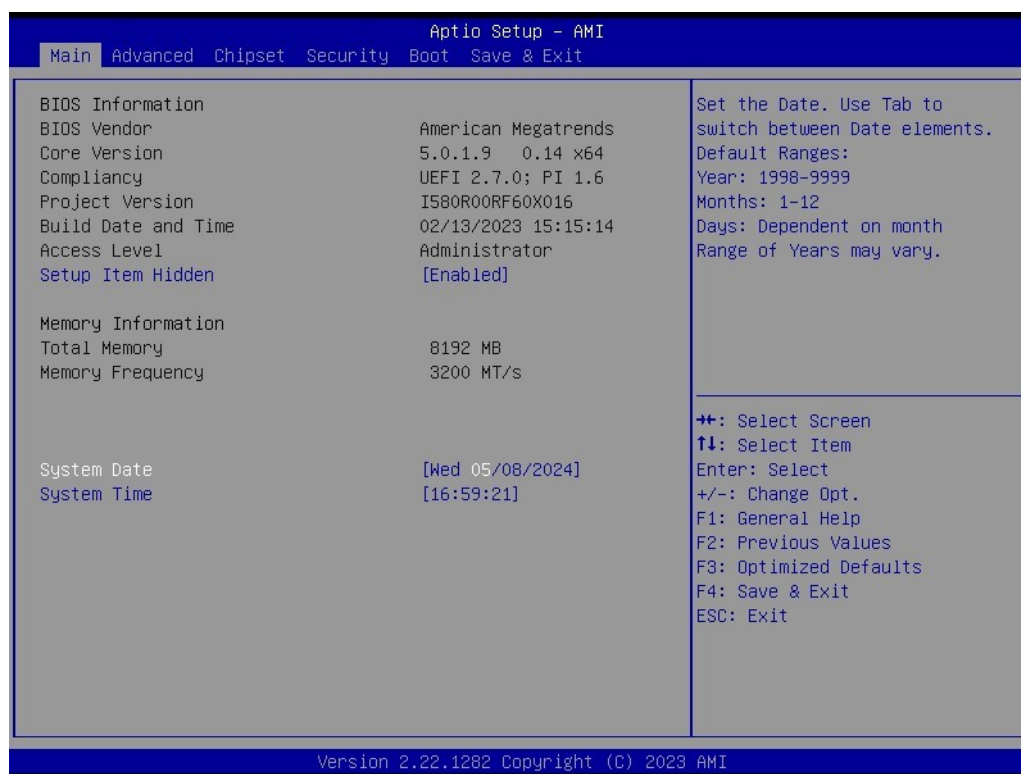


Figure 4.2 Main Setup Screen

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.

4.4 Advanced BIOS Features Setup

Select the Advanced tab from the ITA-580 setup screen to enter the Advanced BIOS Setup screen. Users can select any item in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. Users can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

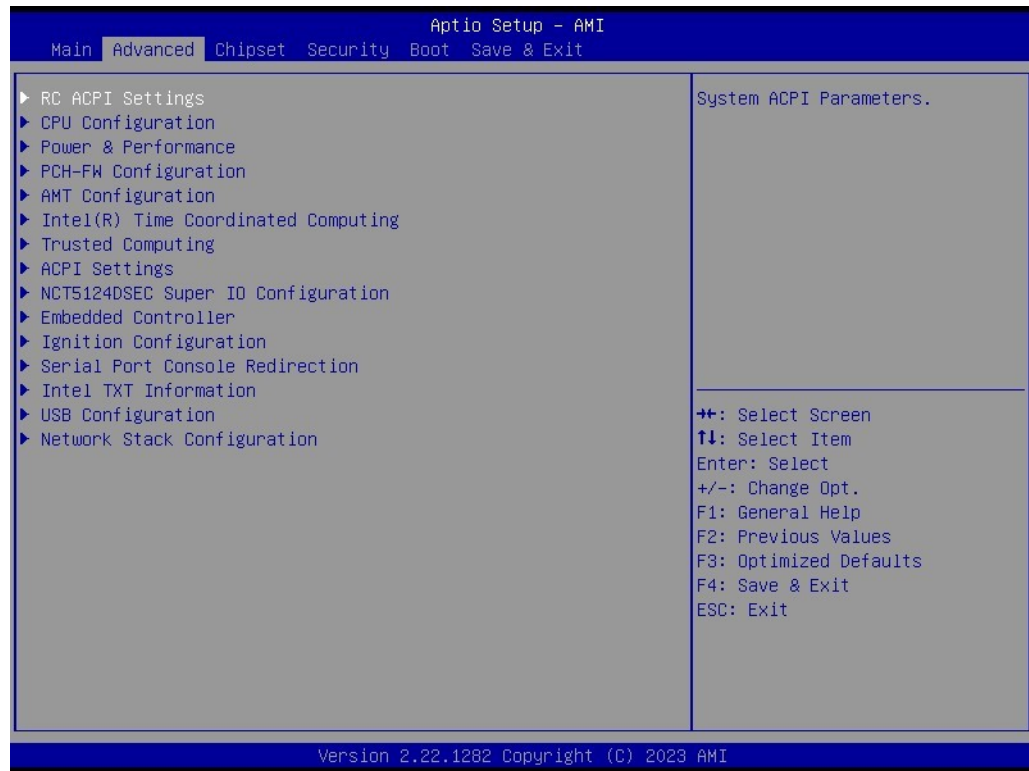


Figure 4.3 Advanced BIOS Features Setup Screen

- **RC ACPI Settings**
System ACPI Parameters.
- **CPU Configuration**
CPU Configuration Parameters.
- **Power & Performance**
Power & Performance Options.
- **PCH-FW Configuration**
Configure Management Engine Technology Parameters.
- **AMT Configuration**
Configure Intel(R) Active Management Technology Parameters.
- **Intel(R) Time Coordinated Computing**
Intel(R) Time Coordinated Computing (Intel(R) TCC) options.
- **Trusted Computing**
Trusted Computing Settings.
- **NCT5124DSEC Super IO Configuration**
Set parameters of serial port (COM1/2) at RS-232 (default)/RS-422/RS-485.
- **ACPI Settings**
ACPI Sleep State.
- **Embedded Controller**
Embedded Controller Parameters.

- **Ignition Configuration**
Ignition Power Mode Parameters for Delay On/Off.
- **Serial Port Console Redirection**
Console Redirection Settings.
- **Intel TXT Information**
Display Intel TXT information.
- **USB Configuration**
USB Configuration Parameters.
- **Network Stack Configuration**
Network Stack Settings.

4.4.1 RC ACPI Settings



Figure 4.4 RC ACPI Settings

- **Low Power S0 Idle Capability**
This variable determines if we enable ACPI Lower Power S0 Idle Capability (Mutually exclusive with Smart connect). While this is enabled, it also disables 8254 timer for SLP_S0 support.

4.4.2 CPU Configuration

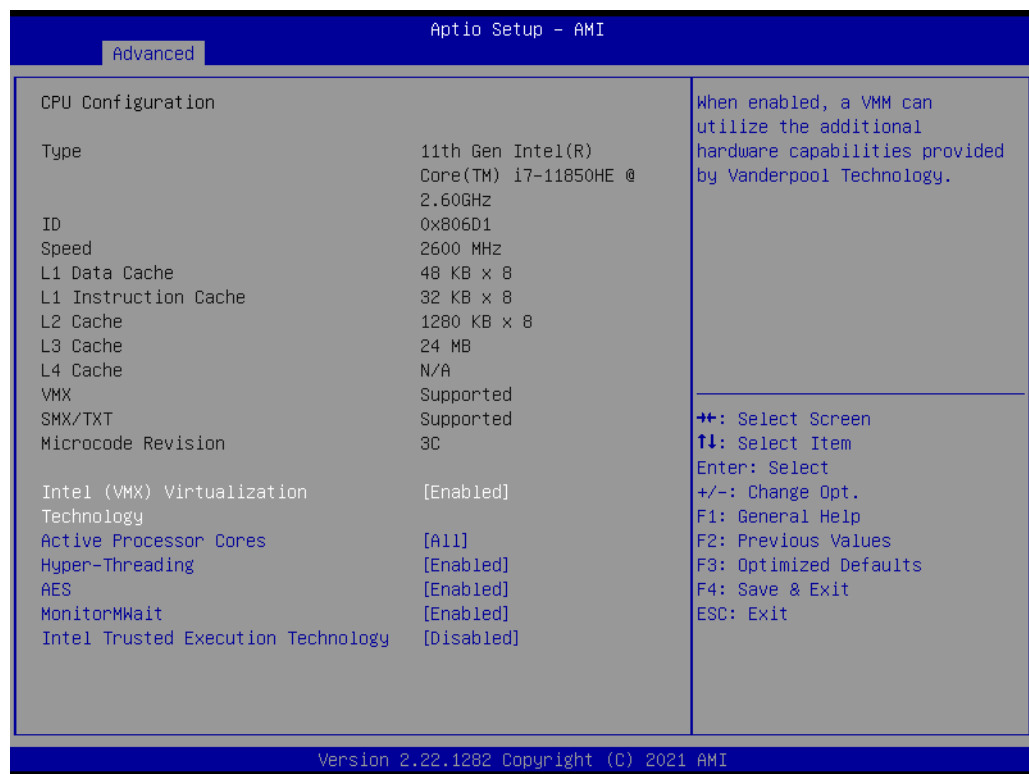


Figure 4.5 CPU Configuration

- **Intel (VMX) Virtualization Technology**
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
- **Active Processor Cores**
Number of cores to enable in each processor package.
- **Hyper-Threading**
Enable or Disable Hyper-Threading Technology.
- **AES**
Enable/Disable AES (Advanced Encryption Standard).
- **MonitorMwait**
Enable/Disable Monitor Mwait.
- **Intel Trusted Execution Technology**
Enables utilization of additional hardware capabilities provided by Intel (R) Trusted Execution Technology.

4.4.3 Power & Performance



Figure 4.6 Power & Performance

- **CPU - Power Management Control**
CPU - Power Management Control Options.
- **GT - Power Management Control**
GT - Power Management Control Options.

4.4.3.1 CPU - Power Management Control



Figure 4.7 Power & Performance

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

■ Config TDP Configurations



Figure 4.8 Config TDP Configurations

- **Configurable TDP Boot Mode**
Configurable TDP Mode as Nominal/Up/Down/Deactivate TDP selection. Deactivate option will set MSR to Nominal and MMIO to Zero.

4.4.3.2 GT - Power Management Control

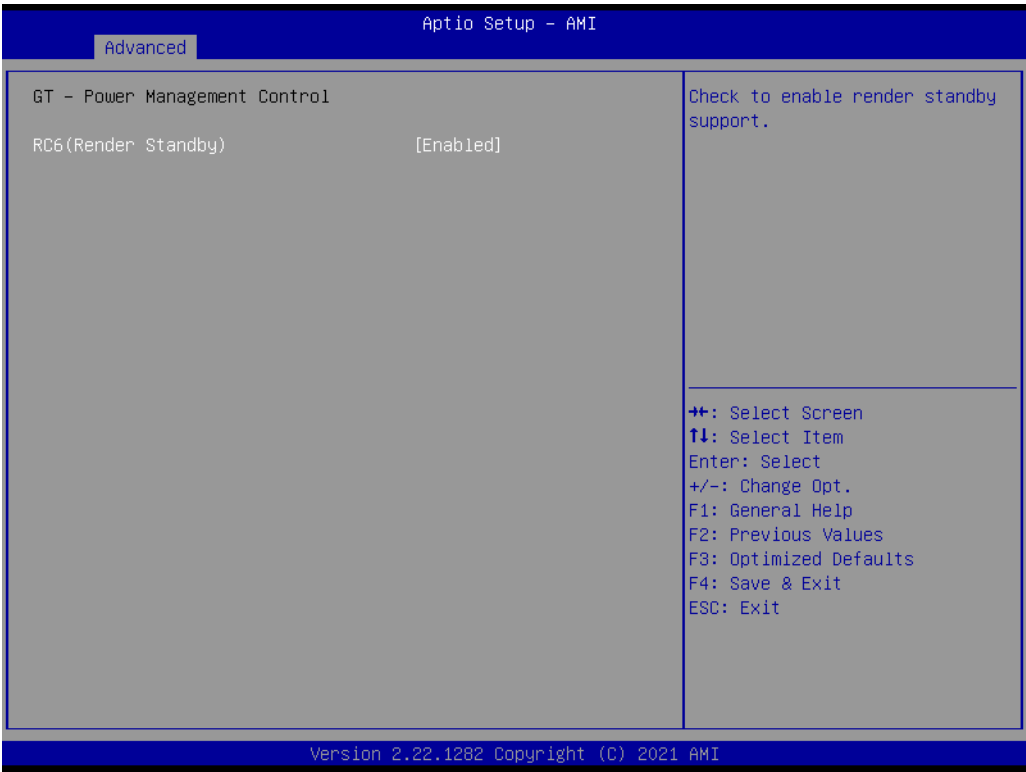


Figure 4.9 GT - Power Management Control

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

4.4.4 PCH-FW Configuration

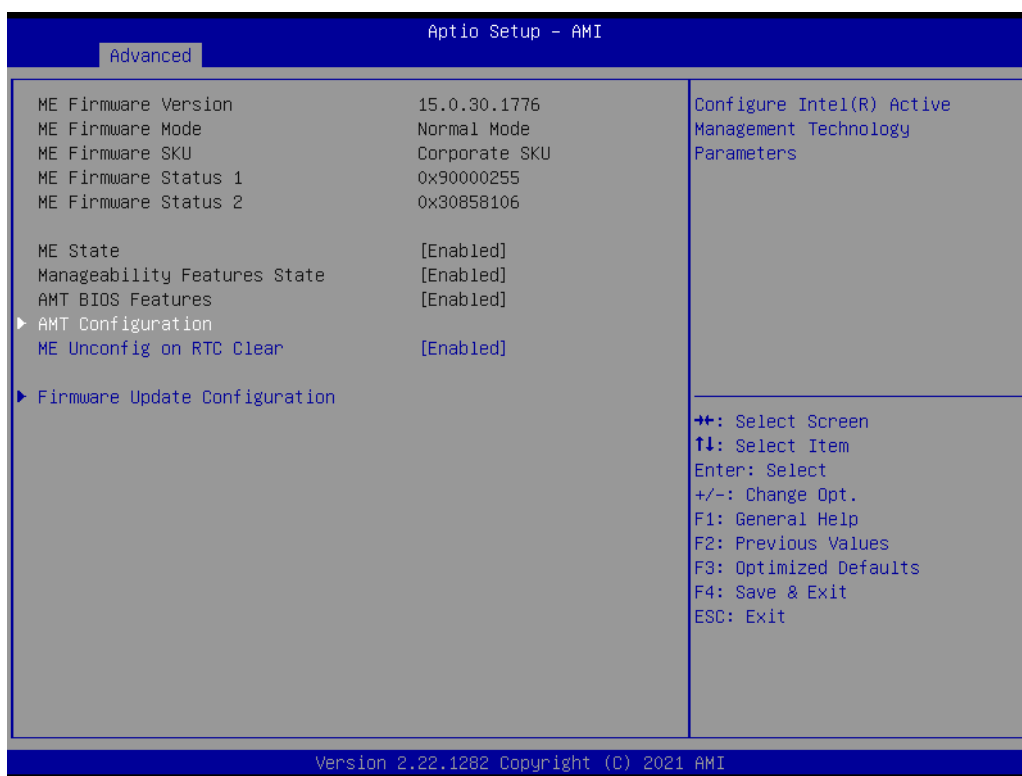


Figure 4.10 PCH-FW Configuration

- **AMT Configuration**
Configure Intel(R) Active Management Technology Parameters.
- **ME Unconfig on RTC Clear**
When Disabled ME will not be unconfigured on RTC clear.
- **Firmware Update Configuration**
Configure Management Engine Technology Parameters.

4.4.4.1 AMT Configuration

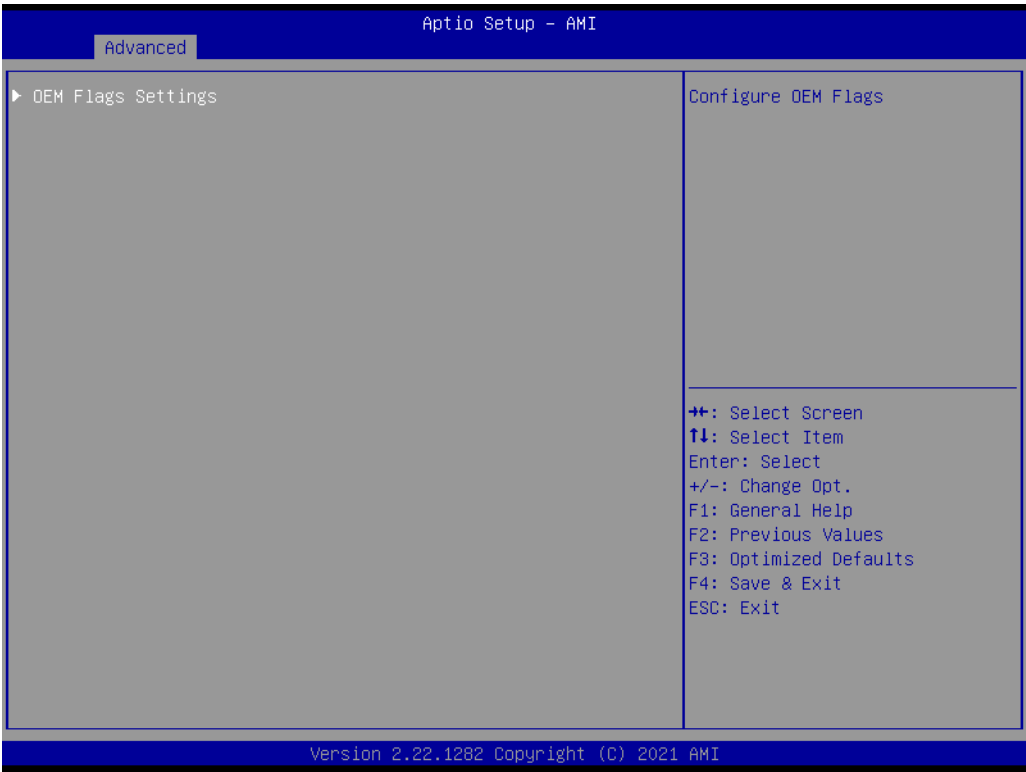


Figure 4.11 AMT Configuration

- **OEM Flags Settings**
Configure OEM Flags.

■ OEM Flags Settings



Figure 4.12 OEM Flags Settings

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

4.4.4.2 Firmware Update Configuration



Figure 4.13 Firmware Update Configuration

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

4.4.5 Intel(R) Time Coordinated Computing

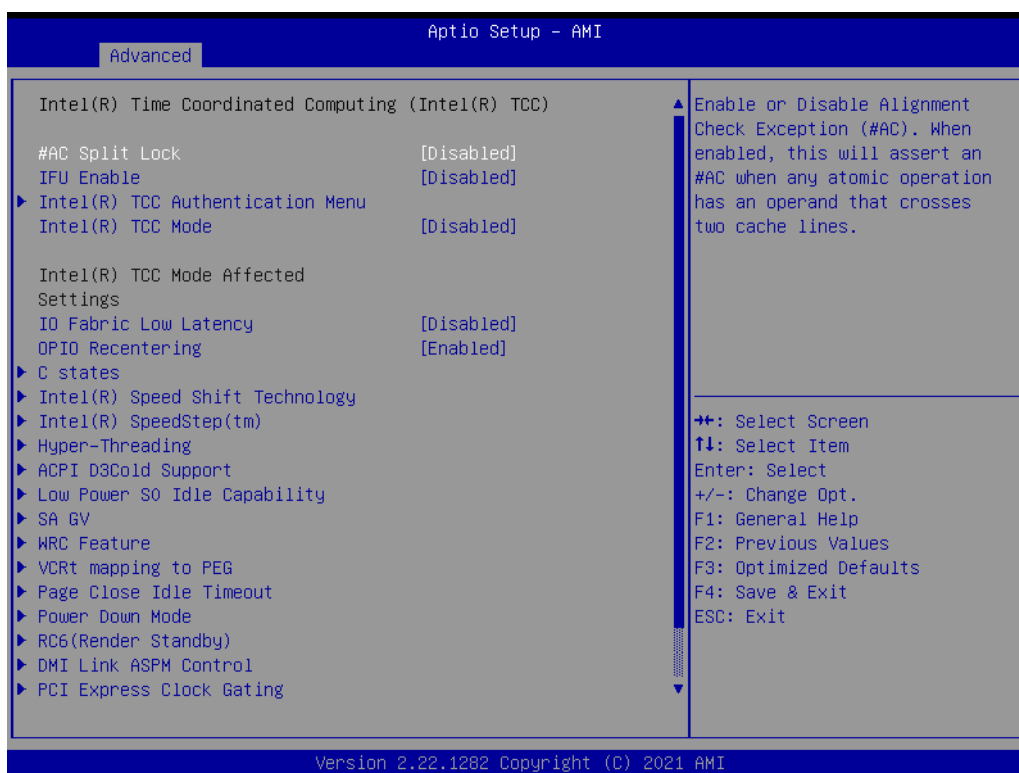


Figure 4.14 Intel(R) Time Coordinated Computing

- **#AC Split Lock**
Enable or Disable Alignment Check Exception (#AC). When enabled, this will assert an #AC when any atomic operation has an operand that crosses two cache lines.
- **IFU Enable**
Enable or Disable Instruction Fetch Unit (IFU). When enabled, Instructions will be prefetch to the cache.
- **Intel(R) TCC Authentication Menu**
Intel(R) TCC Authentication Menu options.
- **Intel(R) TCC Mode**
Enable or Disable Intel(R) TCC Mode. When enabled, this will modify system settings to improve real-time performance. The full list of settings and their current state are displayed below when Intel(R) TCC mode is enabled.
- **IO Fabric Low Latency**
Enable or Disable IO Fabric Low Latency. This will turn off some power management in the PCH IO fabrics. This option provides the most aggressive IO Fabric performance setting. S3 state is NOT supported.
- **OPIO Recentering**
Enable or Disable Opio Recentering to improve Pcie latency.
- **C states**
Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
- **Intel(R) Speed Shift Technology**
Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.

-
- **Intel(R) SpeedStep(tm)**
Allows more than two frequency ranges to be supported.
 - **Hyper-Threading**
Enable or Disable Hyper-Threading Technology.
 - **ACPI D3Cold Support**
Enable/Disable ACPI D3Cold(RTD3) Support.
 - **Low power S0 Idle Capability**
This variable determines if we enable ACPI lower power S0 idle capability (Mutually exclusive with smart connect) While this is enabled, it also disable 8254 timer for SLP_S0 support.
 - **SA GV**
System agent geyserville. Can disable, fix to a specific point, or enable frequency switching.
 - **Page Close Idle Timeout**
Page close idle timeout control.
 - **Power Down Mode**
CKE Power Down Mode Control.
 - **RC6(Render standby)**
Check to enable render standby support.
 - **DMI Link ASPM Control**
The control of Active State Power Management of the DMI Link.
 - **PCI Express Clock Gating**
PCI Express Clock Gating Enable/Disable for each root port.
 - **Legacy IO Low Latency**
Set to enable low latency of legacy IO. Some systems require lower IO latency irrespective of power. This is a tradeoff between power and IO latency.
 - **CPU PCI Express Configuration**
PCH PCI Express Configuration.

4.4.6 Trusted Computing



Figure 4.15 Trusted Computing

- **SHA256 PCR Bank**
Enable or Disable SHA256 PCR Bank.
- **SHA384 PCR Bank**
Enable or Disable SHA384 PCR Bank.
- **Pending operation**
Pending operation.
- **Platform Hierarchy**
Enable or Disable Platform Hierarchy.
- **Storage Hierarchy**
Enable or Disable Storage Hierarchy.
- **Endorsement Hierarchy**
Enable or Disable Endorsement Hierarchy.
- **Physical Presence Spec Version**
Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.
- **Device Select**
TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.

4.4.7 ACPI Settings

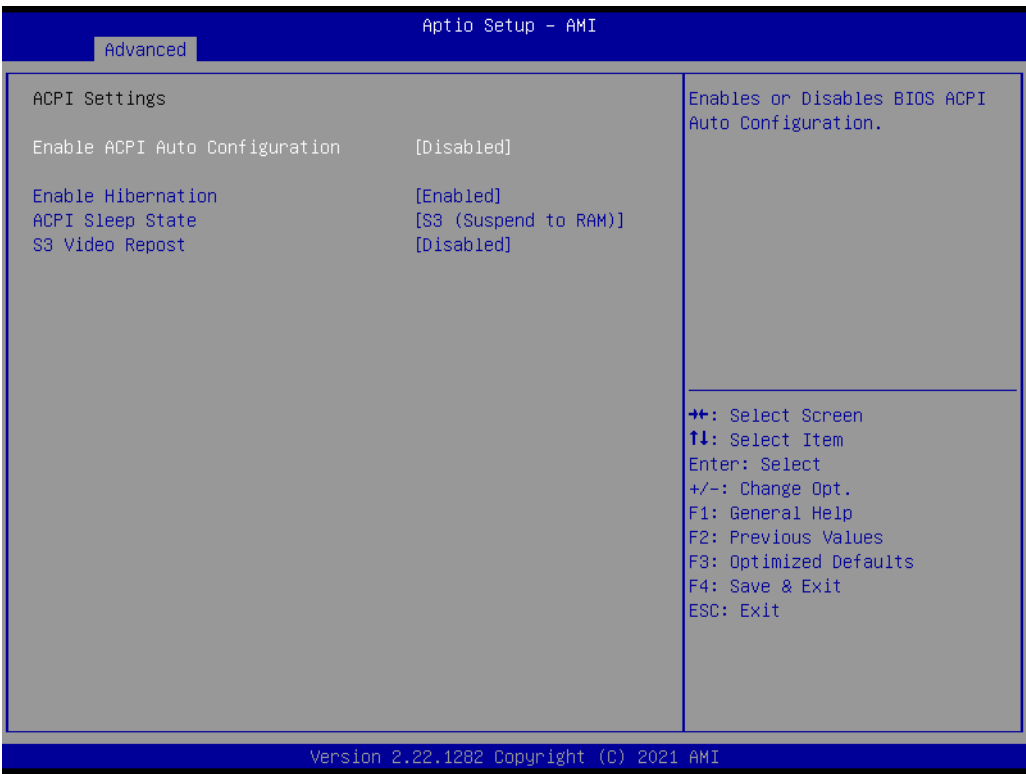


Figure 4.16 ACPI Settings

- **Enable ACPI Auto Configuration**
Enables or Disables BIOS ACPI Auto Configuration.

4.4.8 NCT5124DSEC Super IO Configuration

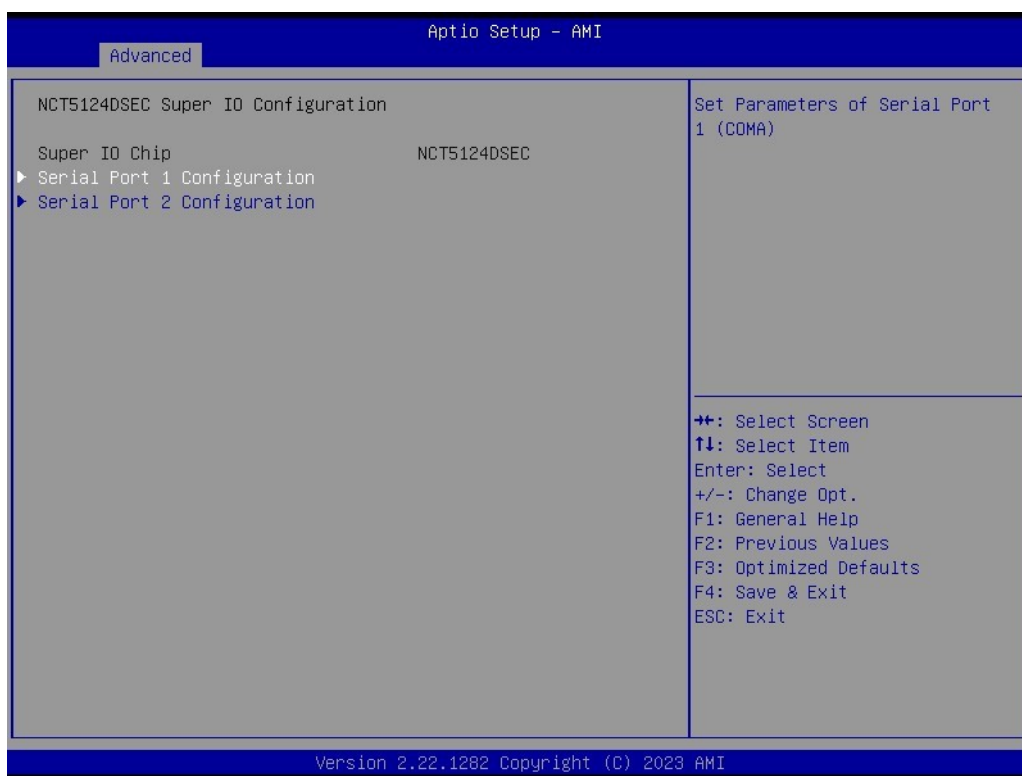


Figure 4.17 NCT5124DSEC Super IO Configuration

4.4.8.1 Device Mode Select and Configuration

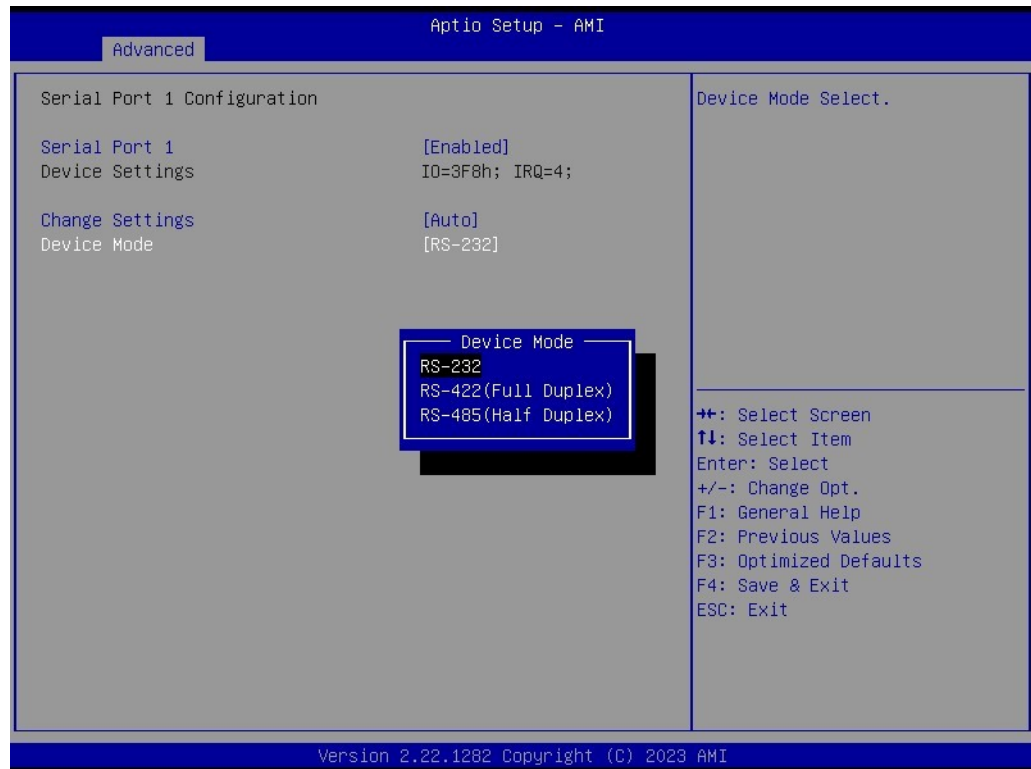


Figure 4.18 Device Mode Select and Configuration

- **Serial Port 1**
Enable or Disable Serial Port (COM1).
Select Device Mode at RS-232/422/485.
- **Serial Port 2**
Enable or Disable Serial Port (COM2).
Select Device Mode at RS-232/422/485.

4.4.9 Embedded Controller

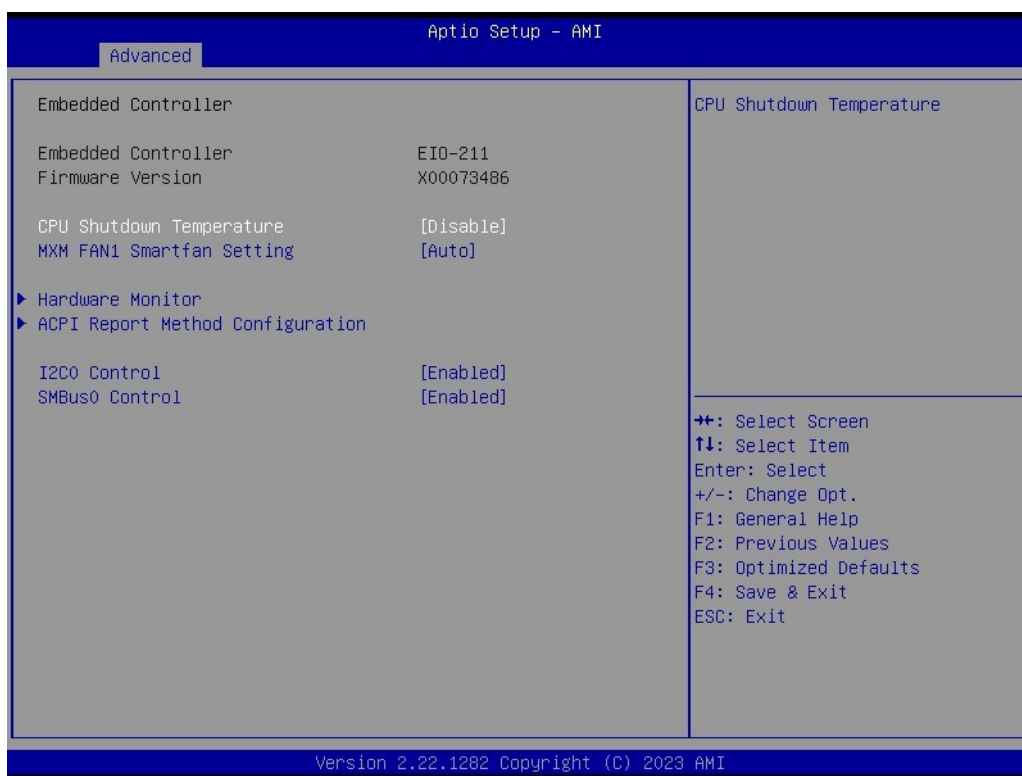


Figure 4.19 Embedded Controller

- **CPU Shutdown Temperature**
CPU Shutdown Temperature.
- **MXM Fan1 Smart Fan Setting (ITA-580G only)**
Control MXM carrier board smart fan function.
- **Hardware Monitor**
Monitor hardware status.
- **ACPI Report Method Configuration**
Select ACPI Reporting Method for EC Devices.
- **I2C0 Control**
Enable/Disable I2C0 controller on RDC-IS200.
- **SMBus0 Control**
Enable/Disable SMBus0 controller on RDC-IS200.

4.4.9.1 Hardware Monitor

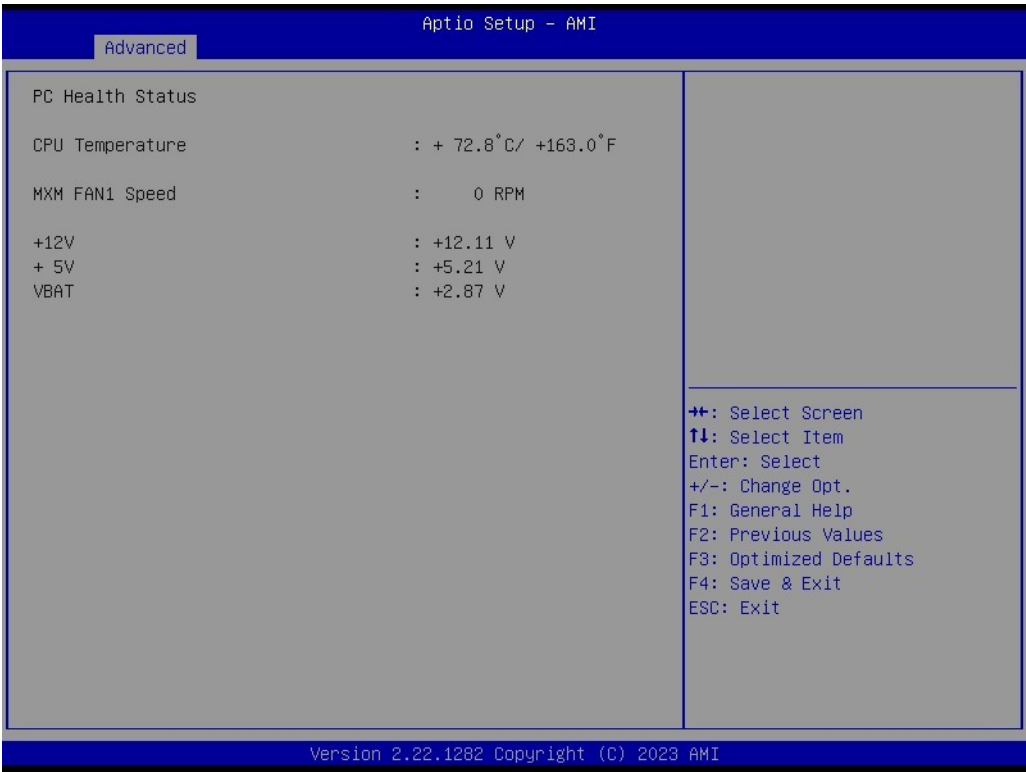


Figure 4.20 Hardware Monitor

4.4.9.2 ACPI Report Method Configuration

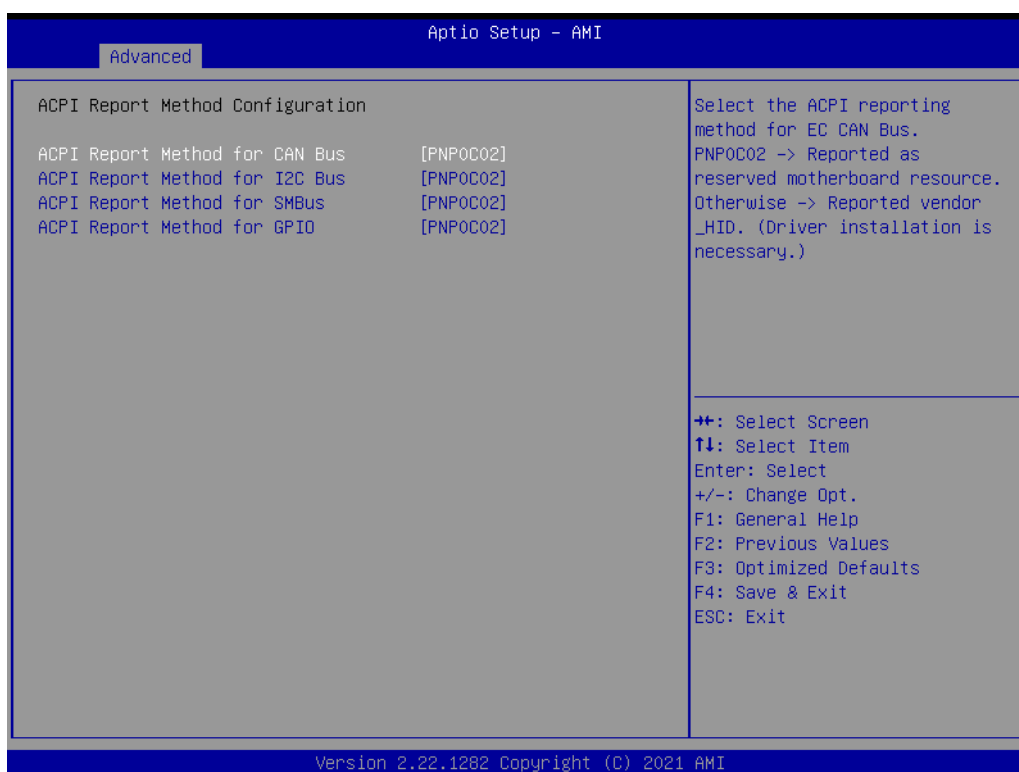


Figure 4.21 ACPI Report Method Configuration

- **CPI Report Method for CAN Bus**
Select the ACPI reporting method for EC CAN Bus. PNP0C02 -> Reported as reserved motherboard resource.
Otherwise -> Reported vendor _HID. (Driver installation is necessary.)
- **ACPI Report Method for I2C Bus**
Select the ACPI reporting method for EC I2C Bus. PNP0C02 -> Reported as reserved motherboard resource.
Otherwise -> Reported vendor _HID. (Driver installation is necessary.)
- **ACPI Report Method for SMBus**
Select the ACPI reporting method for EC SMBus. PNP0C02 -> Reported as reserved motherboard resource.
Otherwise -> Reported vendor _HID. (Driver installation is necessary.)
- **ACPI Report Method for GPIO**
Select the ACPI reporting method for EC GPIO.
PNP0C02 -> Reported as reserved motherboard resource.
Otherwise -> Reported vendor _HID. (Driver installation is necessary.)

4.4.10 Ignition Configuration

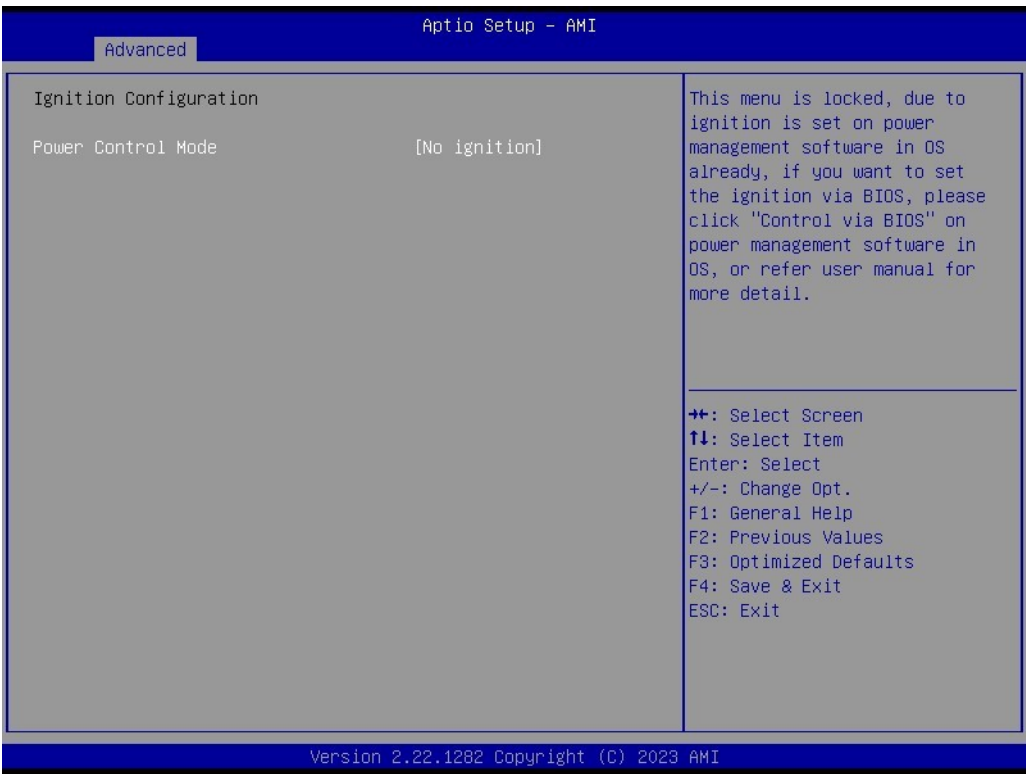
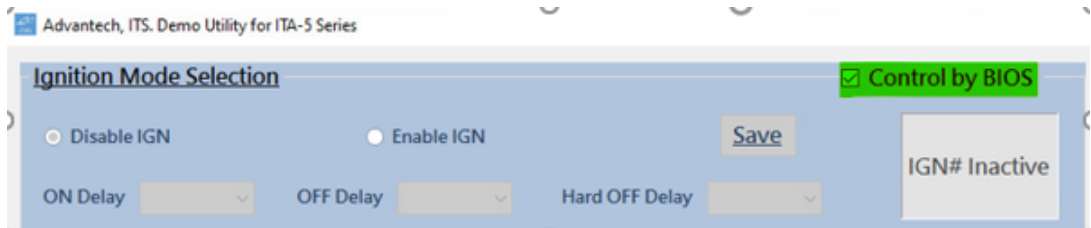


Figure 4.22 Ignition Configuration

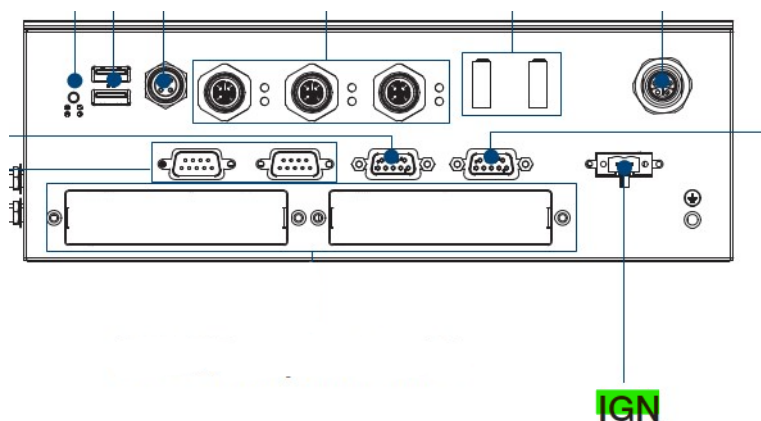
- **Power Control mode**
No ignition (Default) or Enable ignition.

Note:

1. if menu is locked, ignition is set by “Demo Utility” software in OS already, if ignition function needs to be set thought BIOS, please click “Control via BIOS” on Demo Utility” software in OS.



2. Please supply a range of 10Vdc – 30 Vdc to Ignition phoenix connector on ITA-580, then ITA-580 power on/off will be controlled by ignition.



4.4.10.1 Ignition On Delay Mode

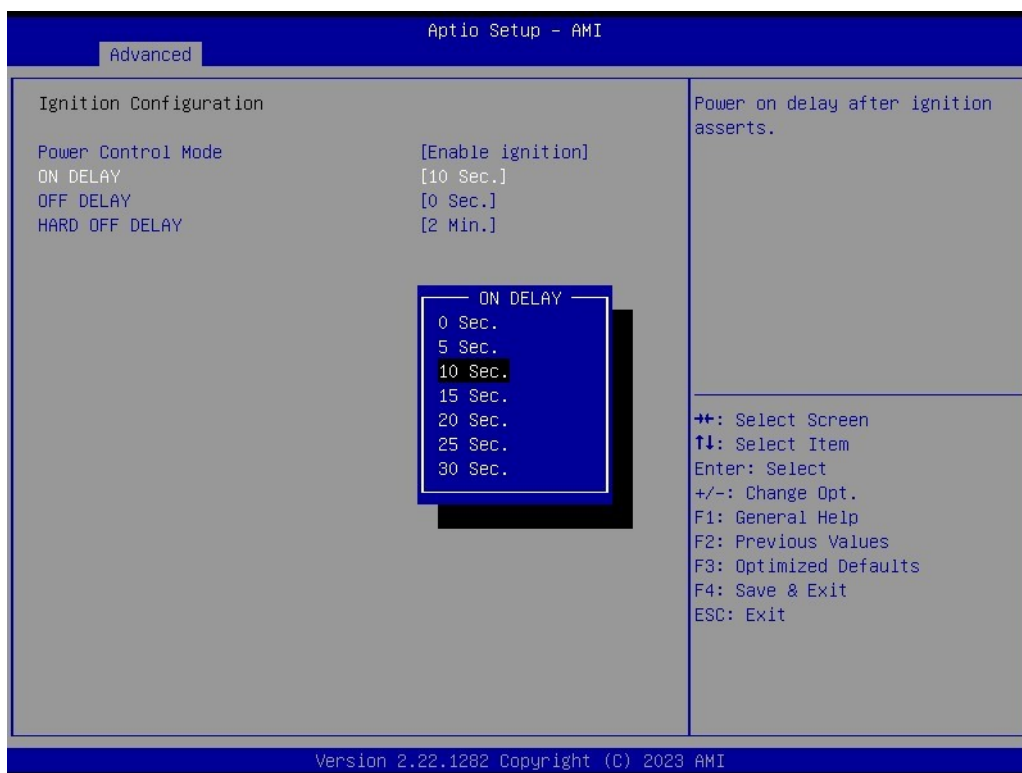


Figure 4.23 On Delay mode

- **ON Delay**
Power on Delay after ignition asserts.

4.4.10.2 Ignition Off Delay Mode

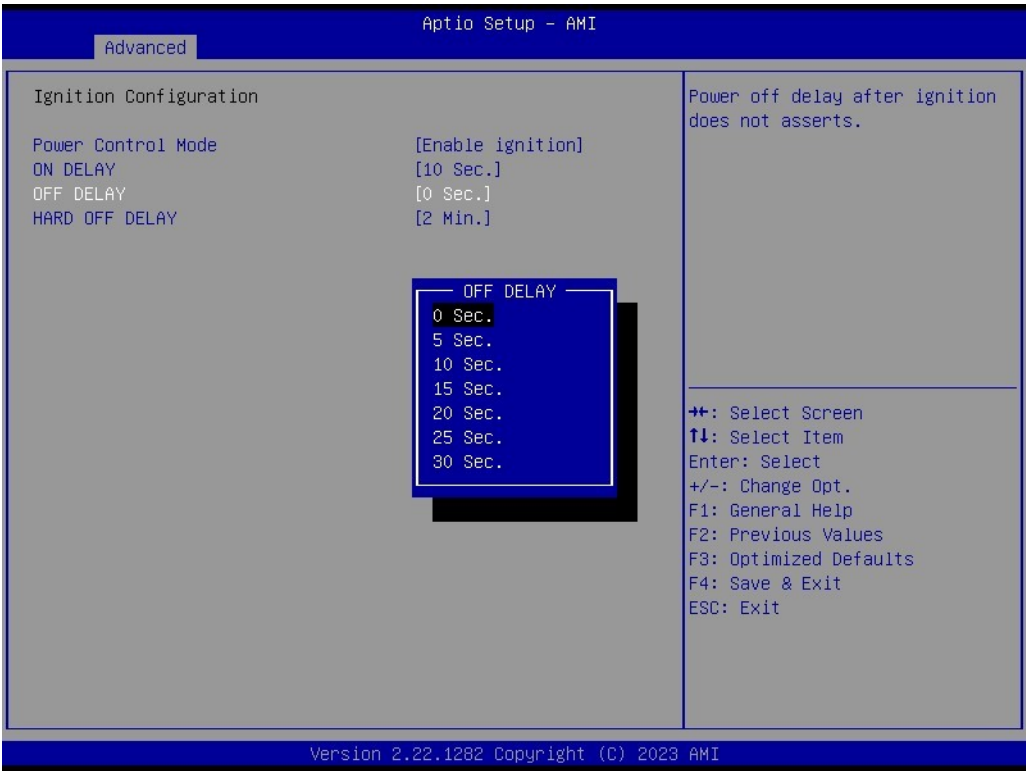


Figure 4.24 Off Delay mode

- **Off Delay**
Off Delay: Power on Delay after ignition asserts.

4.4.10.3 Hard Off Delay Mode



Figure 4.25 Hard Off Delay mode

- **Hard Off Delay**
Time to Force Power Off After Ignition Power off Is too long.

4.4.11 Serial Port Console Redirection

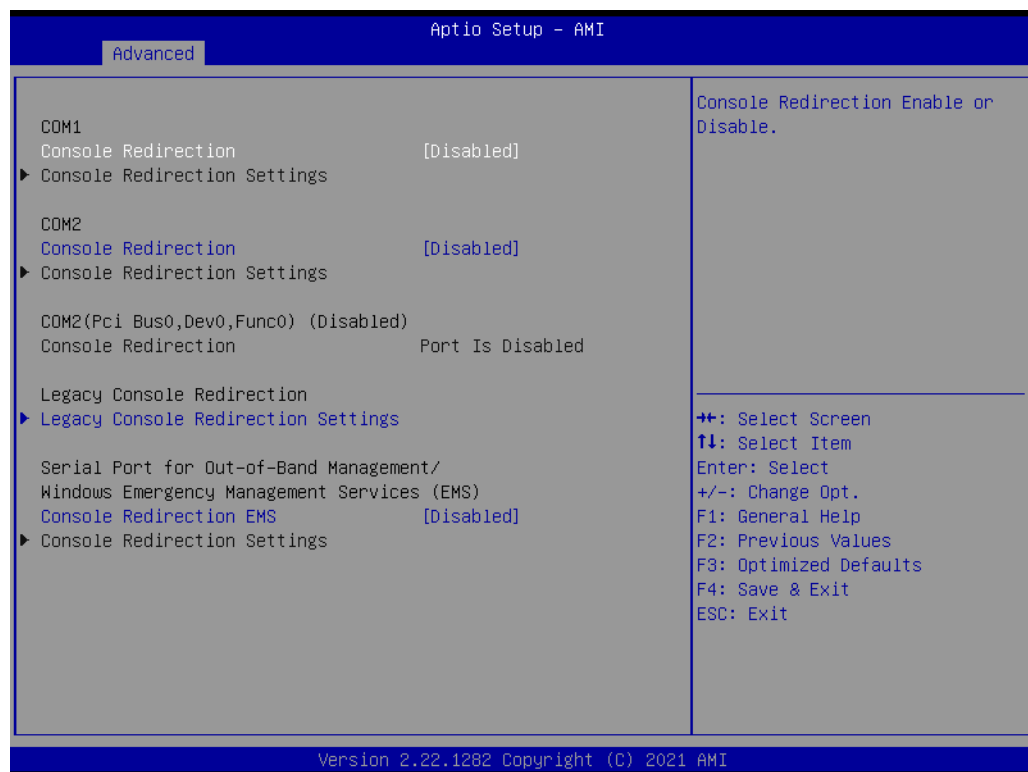


Figure 4.26 Serial Port Console Redirection

- **COM1 Console Redirection**
Console Redirection Enable or Disable.
- **Console Redirection Settings**
The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
- **COM2 Console Redirection**
Console Redirection Enable or Disable.
- **Console Redirection Settings**
The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
- **Legacy Console Redirection**
Legacy Console Redirection Settings.
- **Console Redirection EMS**
Console Redirection Enable or Disable.
- **Console Redirection Settings**
The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

4.4.11.1 COM1 Console Redirection Settings

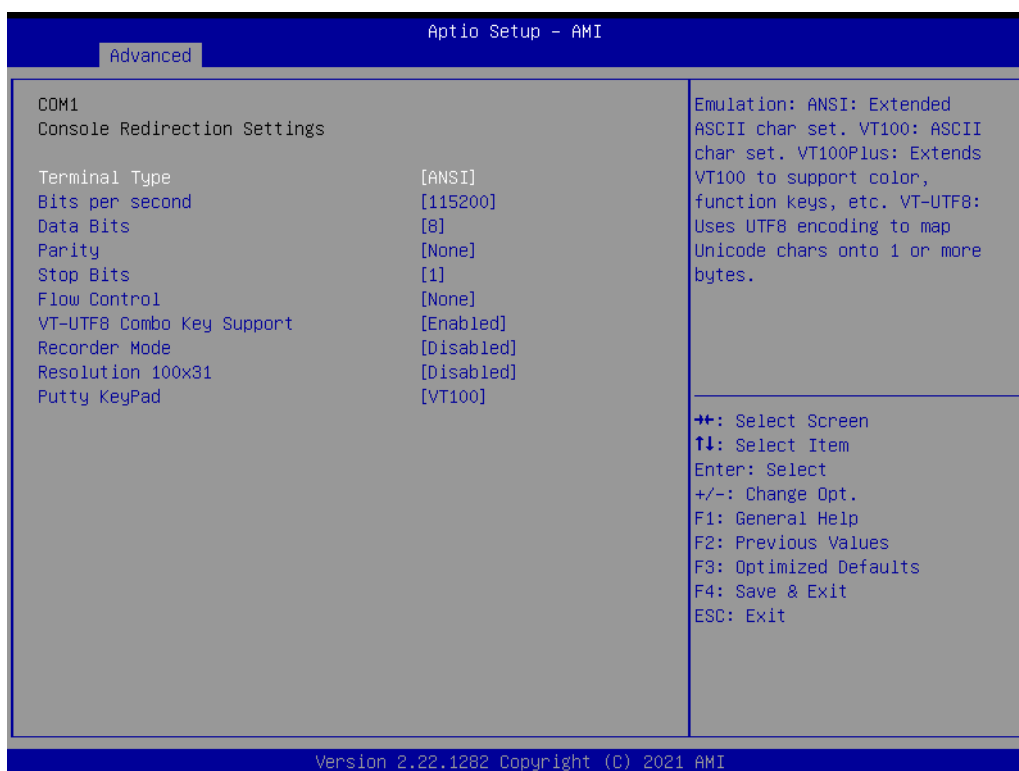


Figure 4.27 COM1 Console Redirection Settings

- **Terminal Type**
Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
- **Bits per second**
Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
- **Data Bits**
Data Bits.
- **Parity**
A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.
- **Stop Bits**
Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
- **Flow Control**
Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
- **VT-UTF8 Combo Key Support**
Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals.

- **Recorder Mode**
With this mode enabled only text will be sent. This is to capture Terminal data.
- **Resolution 100x31**
Enables or disables extended terminal resolution.
- **Putty KeyPad**
Select FunctionKey and KeyPad on Putty.

4.4.11.2 Legacy Console Redirection Settings



Figure 4.28 Legacy Console Redirection Settings

- **Redirection COM Port**
Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.
- **Resolution**
On Legacy OS, the Number of Rows and Columns supported redirection.
- **Redirect After POST**
When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

4.4.11.3 Console Redirection Settings

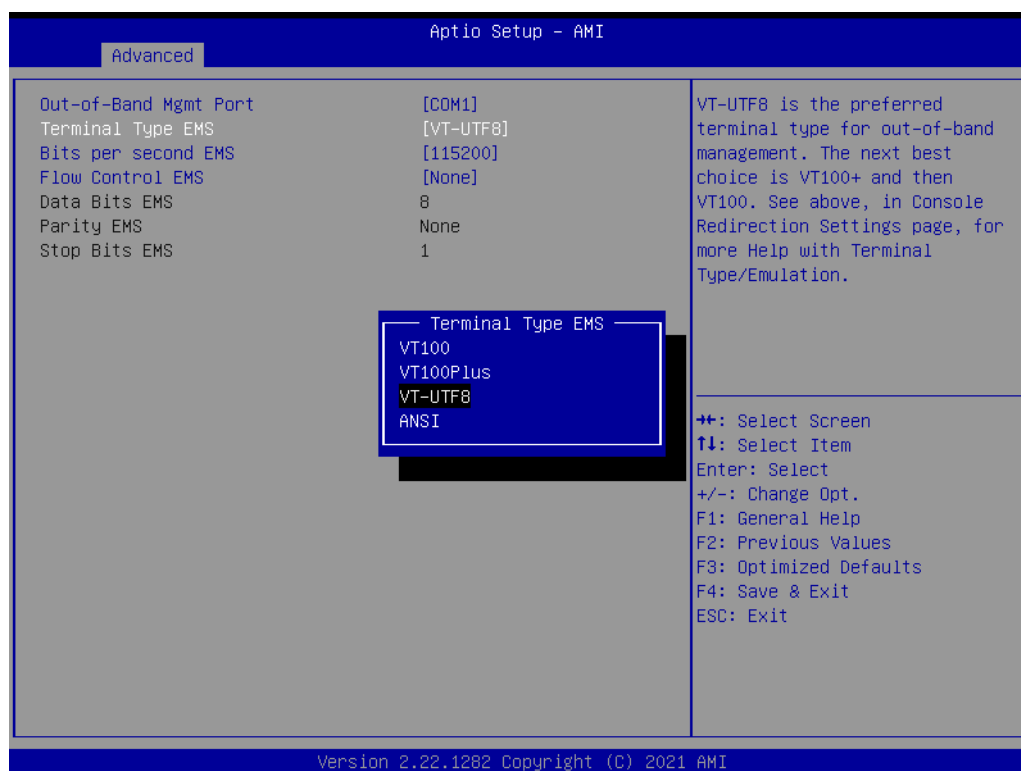


Figure 4.29 Console Redirection Settings

- **Out-of-Band Mgmt Port**
Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.
- **Terminal Type**
VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.
- **Bits per second**
Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
- **Flow Control EMS**
Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
- **Data Bits EMS**
- **Parity**
A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.
- **Stop Bits EMS**
Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

4.4.12 Intel TXT Information

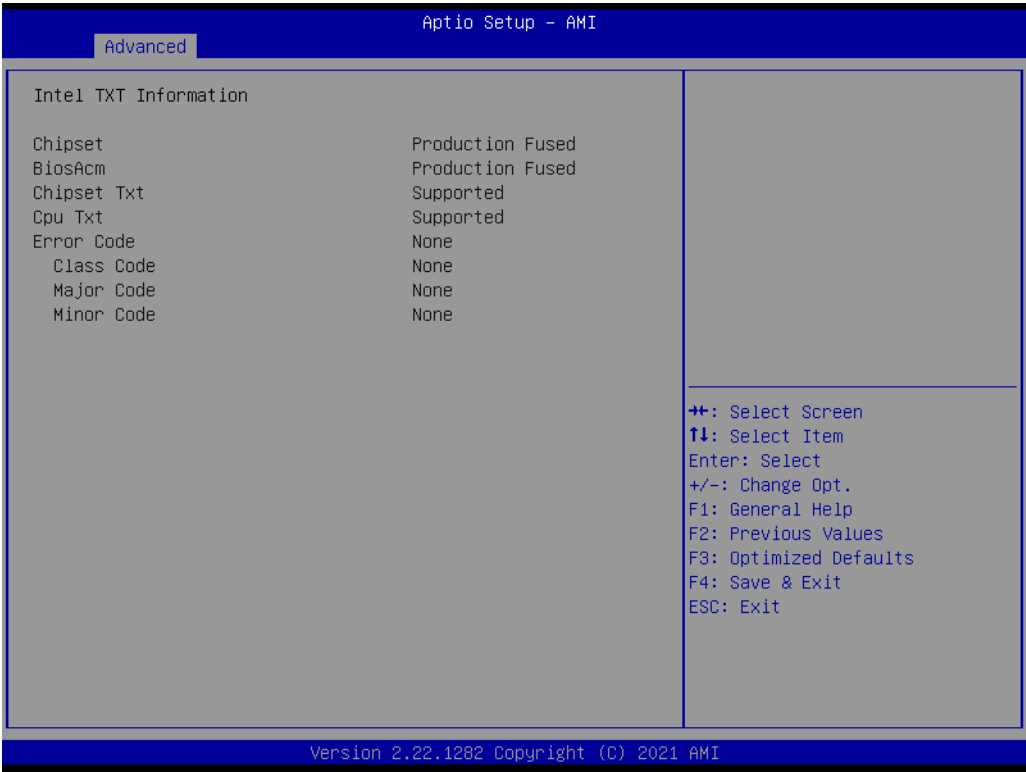


Figure 4.30 Intel TXT Information

4.4.13 USB Configuration

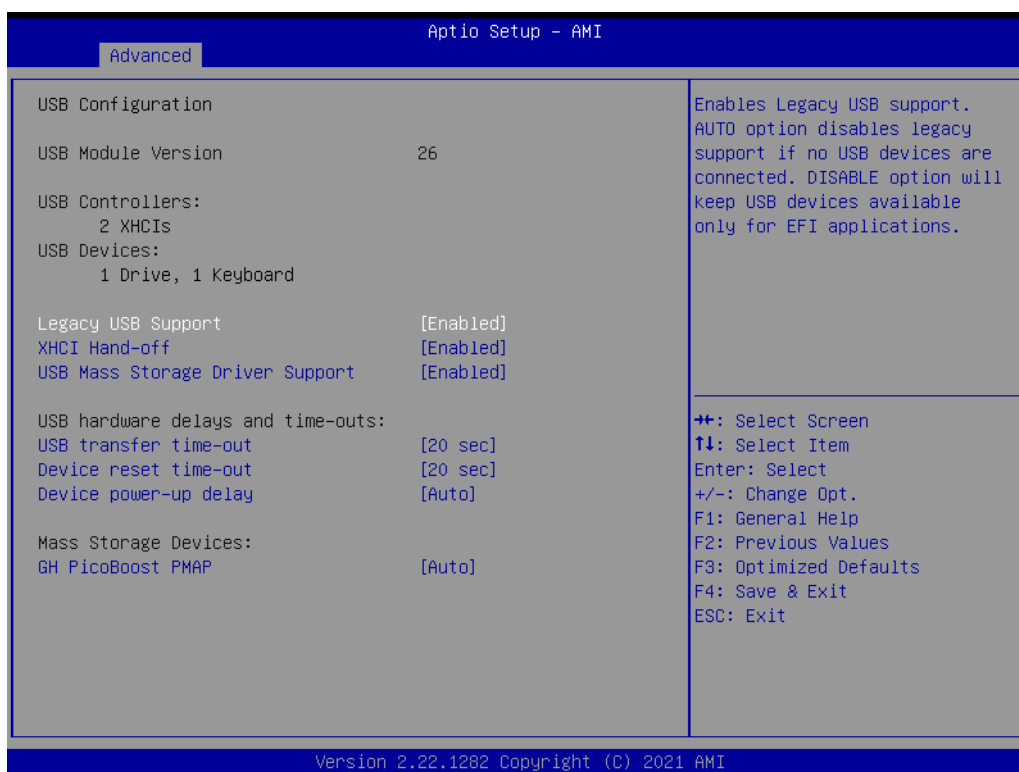


Figure 4.31 USB Configuration

- **Legacy USB Support**
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
- **XHCI Hand-off**
This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
- **USB Mass Storage Driver Support**
Enable/Disable USB Mass Storage Driver Support.
- **USB transfer time-out**
The time-out value for Control, Bulk, and Interrupt transfers.
- **Device reset time-out**
USB mass storage device Start Unit command time-out.
- **Device power-up delay**
Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.
- **GH PicoBoost PMAP**

4.4.14 Network Stack Configuration

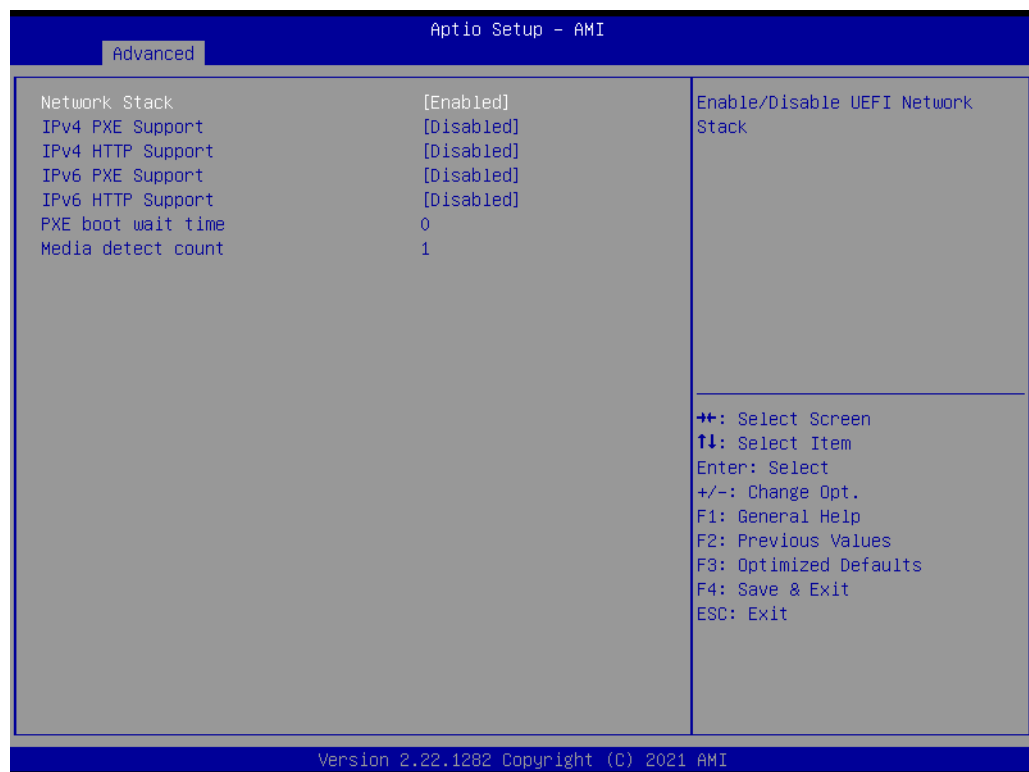


Figure 4.32 Network Stack Configuration

- **Network Stack**
Enable/Disable UEFI Network Stack.
- **IPv4 PXE support**
Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
- **IPv4 HTTP Support**
Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.
- **IPv6 PXE Support**
Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
- **IPv6 HTTP Support**
Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.
- **PXE boot wait time**
Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.
- **Media detect count**
Number of times presence of media will be checked. Use either +/- or numeric keys to set the value.

4.5 Chipset Setup



Figure 4.33 Chipset Setup

- **System Agent (SA) Configuration**
System Agent Parameters.
- **PCH-I/O Configuration**
PCH parameters.

4.5.1 System Agent (SA) Configuration



Figure 4.34 System Agent (SA) Configuration

- **Memory Configuration**
Memory Configuration Parameters.
- **Graphic Configuration**
- **VMD setup menu**
VMD Configuration.
- **VT-d**
VT-d capability.
- **Above 4GB MMIO BIOS assignment**
Enable/Disable above 4GB memory mapped IO BIOS assignment. This is enabled automatically when aperture size is set to 2048MB.

4.5.1.1 Memory Configuration

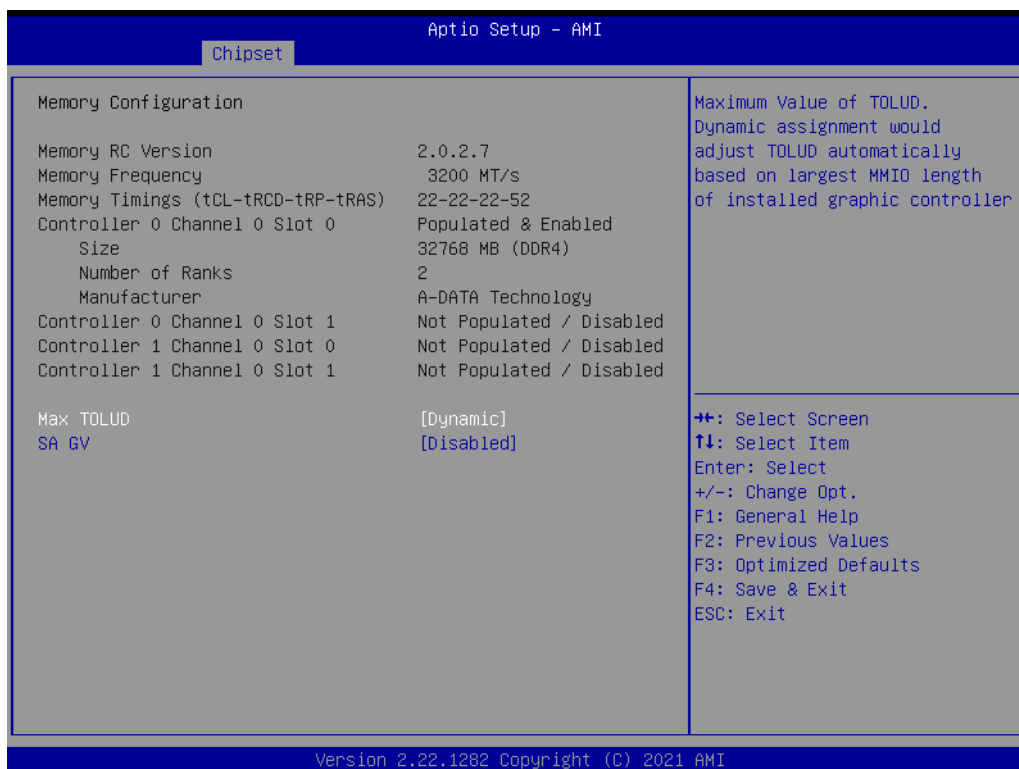


Figure 4.35 Memory Configuration

- **Max TOLUD**
Maximum value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on the largest MMIO length of installed graphic controller.
- **SA GV**
System Agent Geyserville. Can disable, fix to a specific point, or enable frequency switching.

4.5.1.2 Graphics Configuration

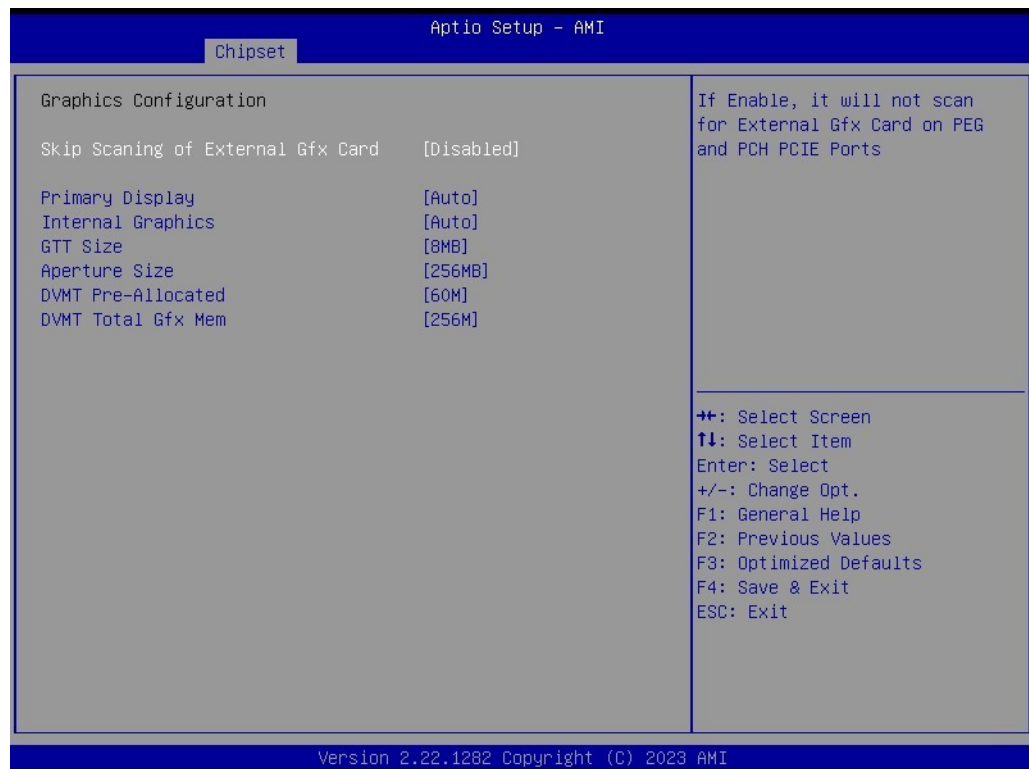


Figure 4.36 Graphics Configuration

- **Skip Scanning of External Gfx Card**
If Enable, it will not scan for External Gfx Card on PEG and PCH PCIE Ports.
- **Primary Display**
Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select HG for Hybrid Gfx.
- **Internal Graphics**
Keep IGFX enabled base on the setup options.
- **GTT Size**
Select the GTT size.
- **Aperture Size**
Select the aperture size. Note: Above 4GB MMIO BIOS assignment is atomically enabled when selecting 2048MB aperture. To use this feature, please disable CSM support.
- **DVMT Pre-Allocated**
Select DVMT5.0 pre-allocated (fixed) Graphics Memory size is used by the internal graphics device.
- **DVMT Total Gfx Mem**
Select DVMT5.0 total graphic memory size is used by the internal graphic device.

4.5.1.3 VMD Setup Menu

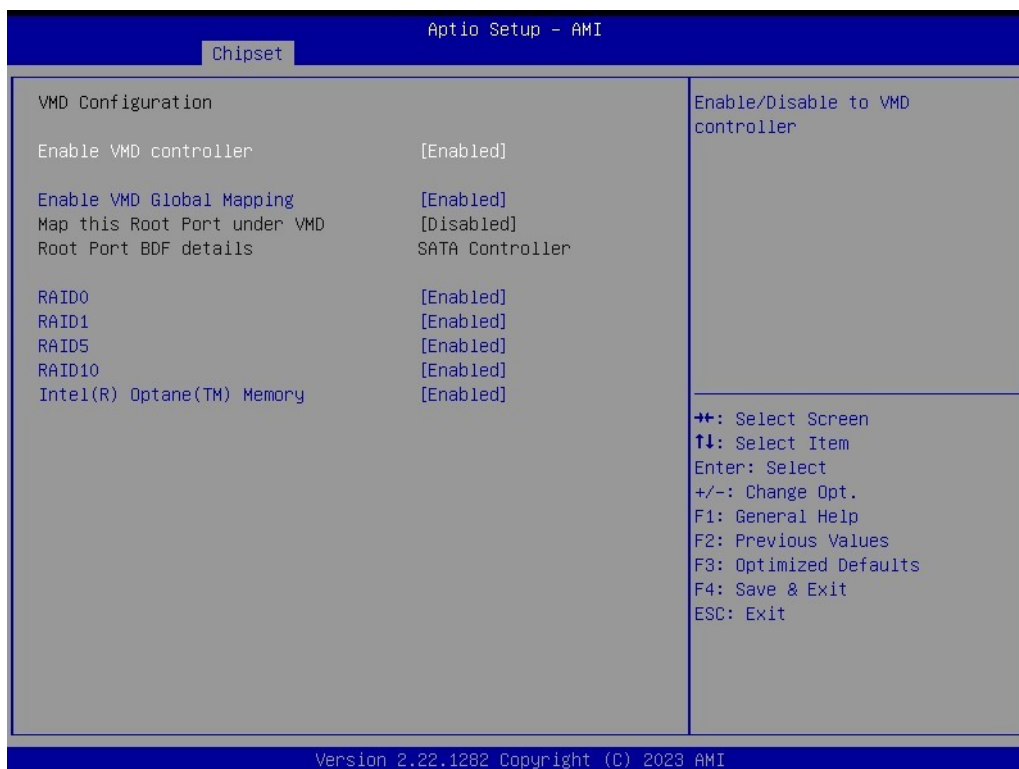


Figure 4.37 VMD Setup Menu

- **Enable VMD controller**
Enable/Disable (default) to VMD controller.
- **Enable VMD Global Mapping**
Enable/Disable to VMD Global Mapping.
- **Map this Root Port under VMD**
- **RAID0**
Enable/Disable RAID0 feature.
- **RAID1**
Enable/Disable RAID1 feature.
- **RAID5**
Enable/Disable RAID5 feature.
- **RAID10**
Enable/Disable RAID10 feature.
- **Intel(R) Optane (TM) Memory**
Enable/Disable System Acceleration with Intel(R) Optane (TM) Memory feature.

Note! Please enable VMD controller before installing operating system.



ITA-580/580G's dedicated OS image part numbers have been pre-installed Intel RST driver.

4.5.1.4 PCI Express Configuration

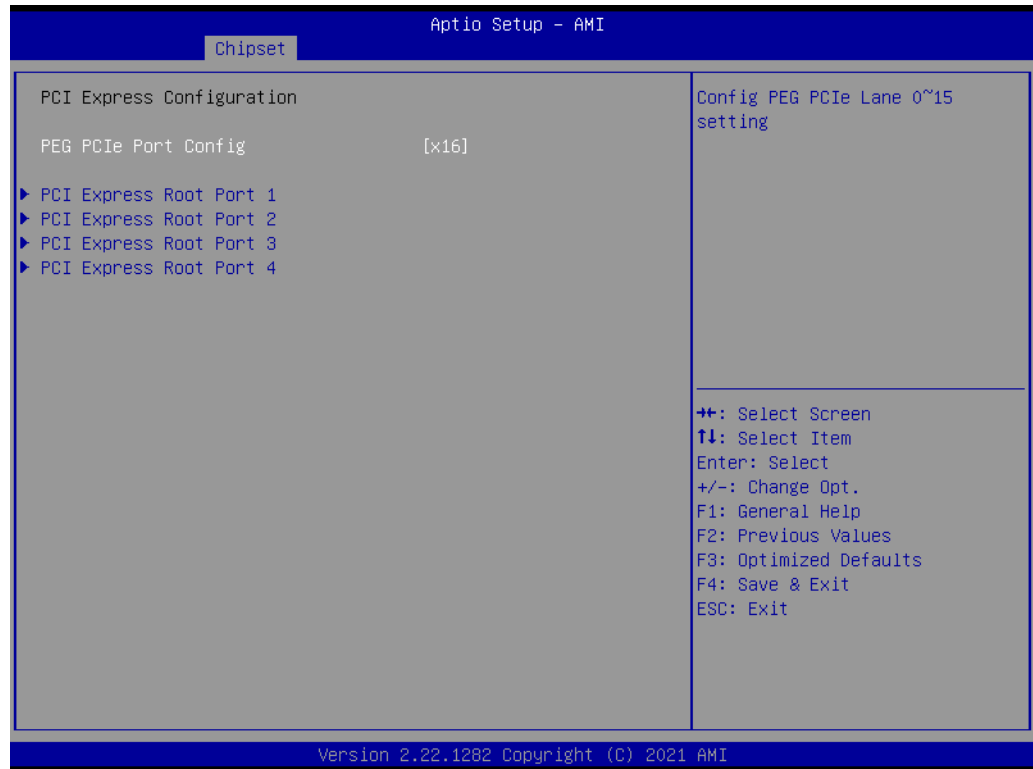


Figure 4.38 PCI Express Configuration

- **PEG PCIe Port Config**
Config PEG PCIe Lane 0~15 setting.
- **PCI Express Root Port 1**
- **PCI Express Root Port 2**
- **PCI Express Root Port 3**
- **PCI Express Root Port 4**

■ PCI Express Root Port 1

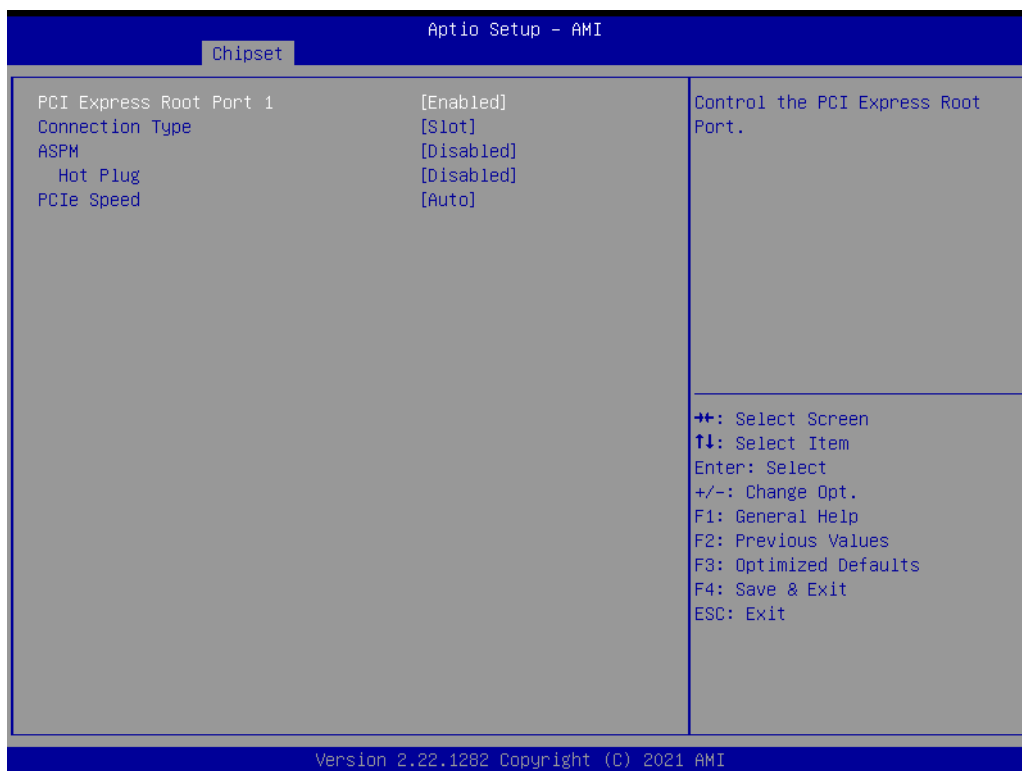


Figure 4.39 PCI Express Root Port 1

- **PCI Express Root Port 1**
Control the PCI Express Root Port.
- **Connection Type**
Built-In: a built-in device is connected to this root port. Slot Implemented bit will be clear. Slot: this root port connects to user-accessible slot. Slot Implemented bit will be set.
- **ASPM**
PCI Express Active State Power Management settings.
- **Hot Plug**
PCI Express Hot Plug Enable/Disable.
- **PCIe Speed**
Configure PCIe Speed.

4.5.2 PCH-IO Configuration



Figure 4.40 PCH-IO Configuration

- **PCI Express Configuration**
PCI Express Configuration settings.
- **SATA Configuration**
SATA device option settings.
- **USB Configuration**
USB Configuration settings.
- **Security Configuration**
Security Configuration settings.
- **HD Audio Configuration**
HD audio subsystem configuration settings.

4.5.2.1 PCI Express Configuration

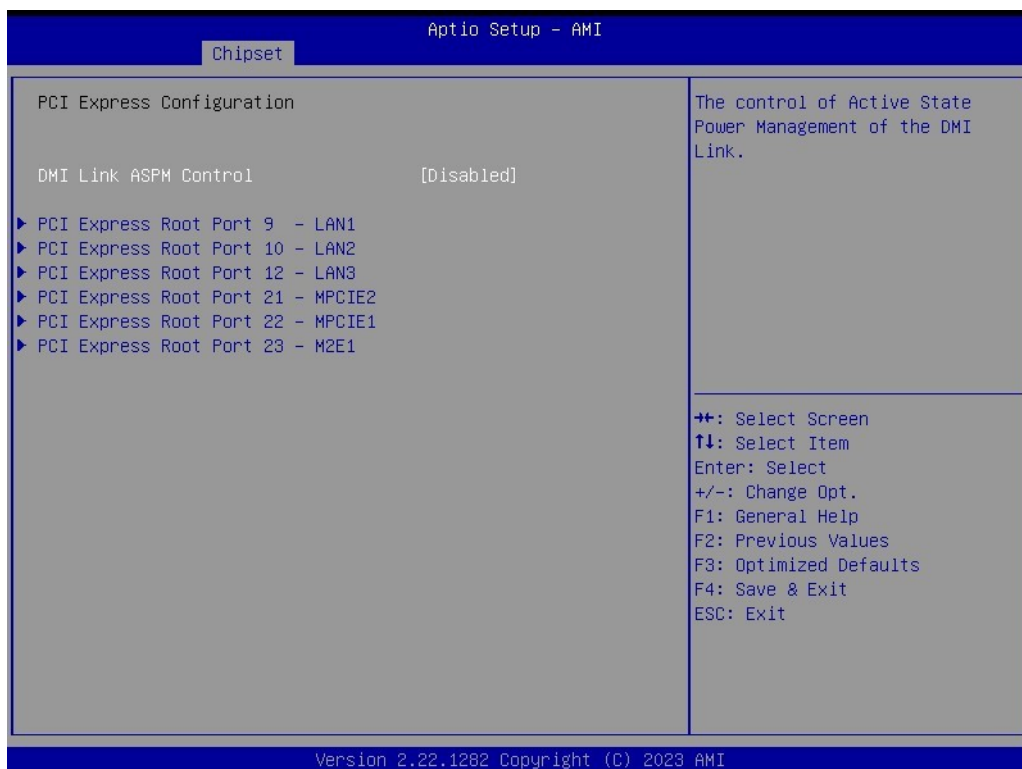


Figure 4.41 PCI Express Configuration

- **DMI Link ASPM Control**
The control of Active State power management of the DMI Link.
- **PCI Express Root Port 9 – LAN1**
Enable or disable LAN1.
- **PCI Express Root Port 10 – LAN2**
Enable or disable LAN2.
- **PCI Express Root Port 12 – LAN3**
Enable or disable LAN3.
- **PCI Express Root Port 21 – MPCIE2**
Enable or disable MPCIE2.
- **PCI Express Root Port 22 – MCPIE1**
Enable or disable MPCIE1.
- **PCI Express Root Port 23 – M2E1**
Enable or disable M2E1.

■ PCI Express Root Port



Figure 4.42 PCI Express Root Port

- **PCI Express Root Port**
Control the PCI Express Root Port.
- **Connection Type**
Built-In: a built-in device is connected to this root port. Slot Implemented bit will be clear. Slot: this root port connects to user-accessible slot. Slot Implemented bit will be set.
- **ASPM**
PCI Express Active State Power Management settings.
- **Hot plug**
PCI Express hot plug enable/disable.
- **PCIe Speed**
Configure PCIe Speed.

4.5.2.2 SATA Configuration

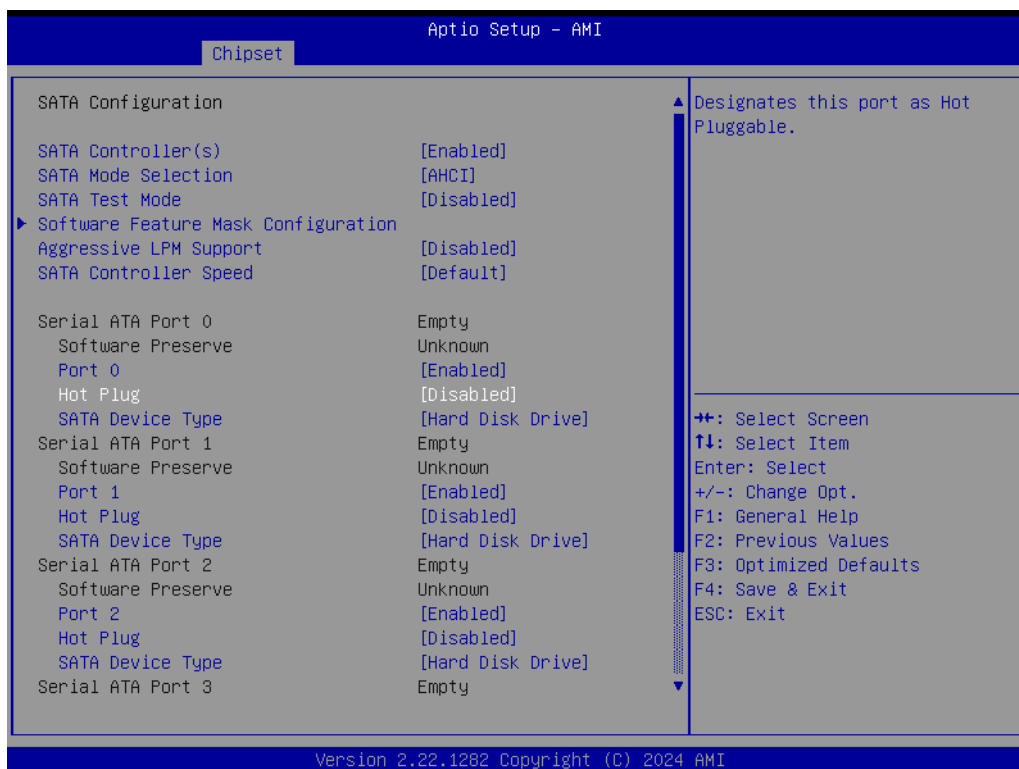


Figure 4.43 SATA Drives

- **SATA Controller(s)**
Enable/Disable SATA Device.
- **SATA Mode Selection**
Determines how SATA controller(s) operate.
- **SATA Test Mode**
Test Mode Enable/Disable (Loop Back).
- **Software Feature Mask Configuration**
RST Legacy OROM/RST UEFI driver will refer to the SWFM configuration to enable/disable the storage features.
- **Aggressive LPM Support**
Enable PCH to aggressively enter link power state.
- **SATA Controller Speed**
Indicates the maximum speed the SATA controller can support.
- **Port 0**
Enable/Disable SATA Port.
- **Hot Plug (SATA Port#0~3)**
Enable/Disable (Default disable)
- **SATA Device Type**
Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

4.5.2.3 USB Configuration

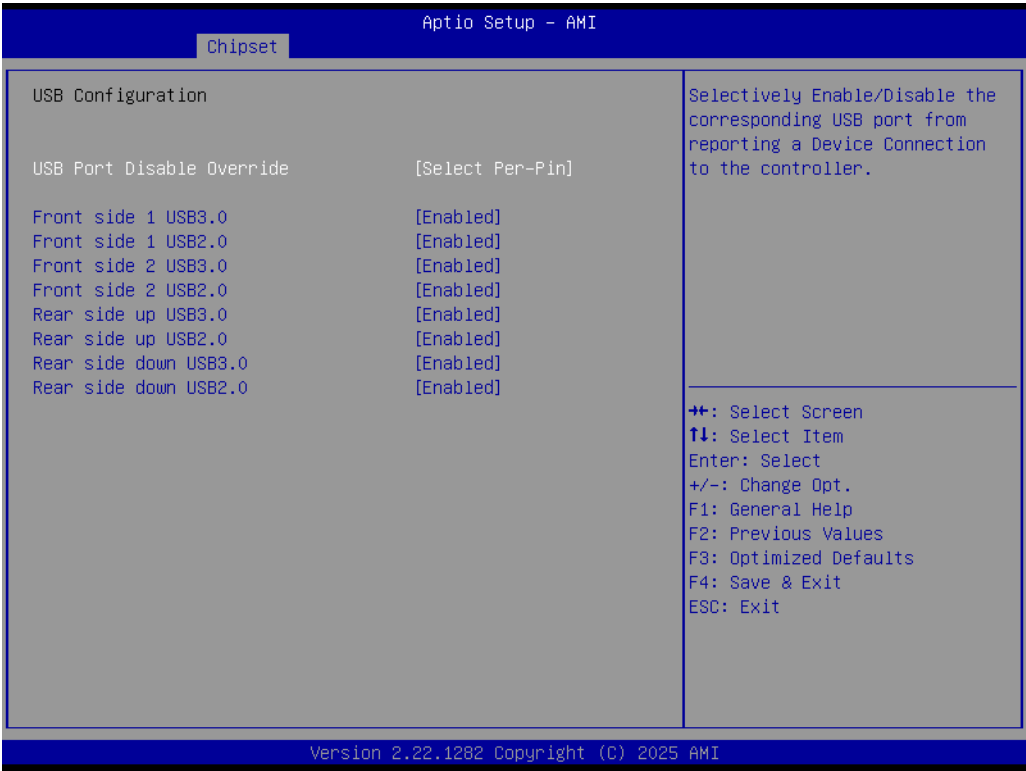


Figure 4.44 USB Configuration

- **USB Port Disable Override**
Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller.
- **Front and Rear side USB3.0/2.0**
Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS. A USB port included both of USB3.0 and 2.0 signal, please disable both USB3.0 and 2.0 at the same time.

4.5.2.4 Security Configuration

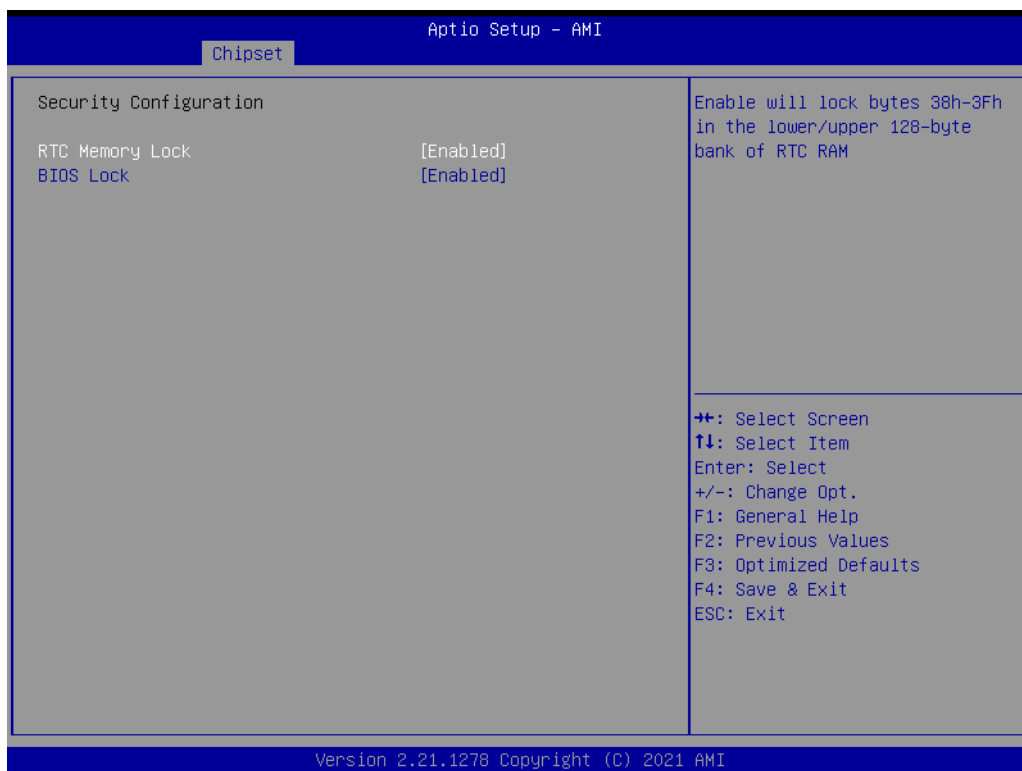


Figure 4.45 Security Configuration

- **RTC Memory Lock**
Enable will lock bytes 38h-3Fh in the lower/upper 126 –byte bank of RTC RAM.
- **BIOS Lock**
Enable/Disable the PCH BIOS lock enable feature. Required to be enabled to ensure SMM protection of flash.

4.5.2.5 HD Audio Subsystem Configuration Settings

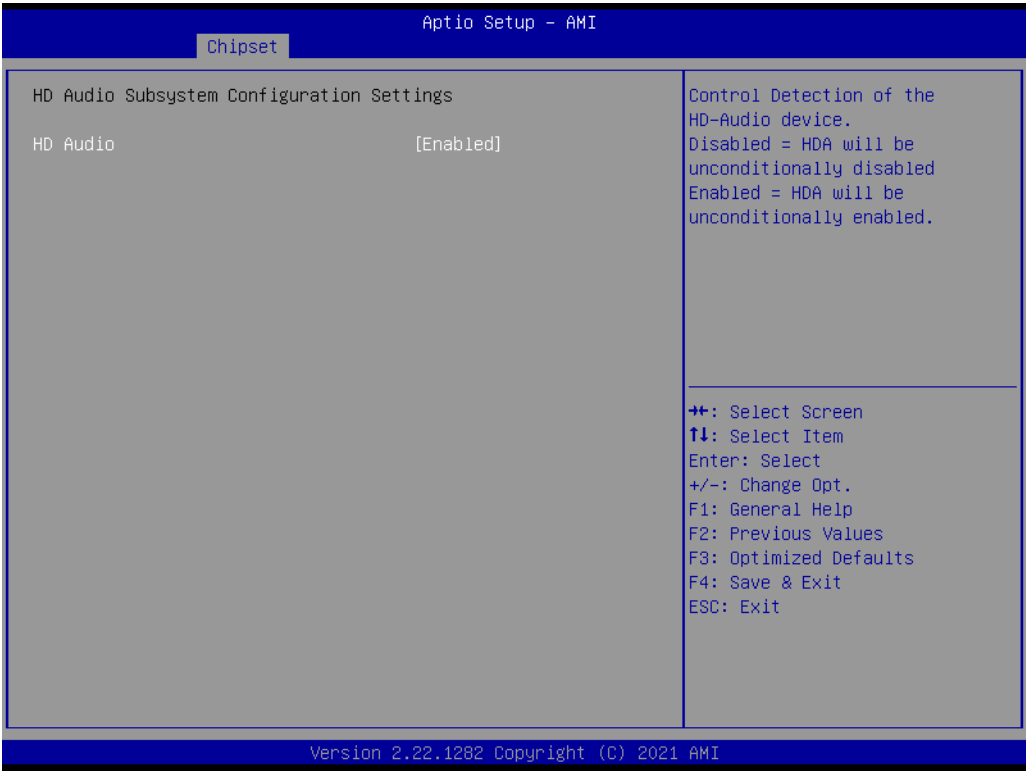


Figure 4.46 HD Audio Subsystem Configuration Settings

- **HD Audio**
Control Detection of the HD-Audio device. Disabled=HDA will be unconditionally disabled. Enabled=HDA will be unconditionally enabled.

4.6 Security Chipset



Figure 4.47 Security Chipset

- **Administrator Password**
Set Setup Administrator Password.
- **User Password**
Set User Password.
- **Secure Boot**
Secure Boot Configuration.

Note: To clear CMOS can't make the password be re-set.

Function	Default	Set up password at Administrator mode	Set up password at both Administrator and User mode	Set up password at user mode
Description	Anybody is able to access and modify any optional item of BIOS and boot to OS.	1. Authorized maintainer is able to entry the password to get in BIOS and modify optional item of BIOS. 2. Boot up to OS.	1. Authorized maintainer is able to entry the Administrator password to get in BIOS and modify optional item of BIOS. 2. Authorized maintainer is able to entry the User password to get in BIOS and read item of BIOS only. 3. It will stop at entry password screen without Administrator or User password, and won't boot up to OS.	1. Authorized maintainer is able to entry the User password to get in BIOS and modify optional item of BIOS. 2. Need to entry the password to boot up to OS. 3. It will stop at entry password screen without User password.
Read/Modification	V	V	V	V
Read	V	V	V	V
Stop at entry password screen			V	V

4.6.1 Secure Boot



Figure 4.48 Secure Boot

- **Secure Boot**
Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset.
- **Secure Boot Mode**
Secure Boot mode options:
Standard or Custom.
In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

4.6.2 Boot Setup



Figure 4.49 Boot Setup

- **Setup Prompt Timeout**
Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
- **Bootup NumLock State**
Select the keyboard NumLock state.
- **Quiet Boot**
Enables or disables Quiet Boot option.
- **Boot Option #1**
Sets the system boot order.
- **Fast Boot**
Enable or Disable FastBoot features. Most probes are skipped to reduce time cost during boot.

4.7 Save & Exit

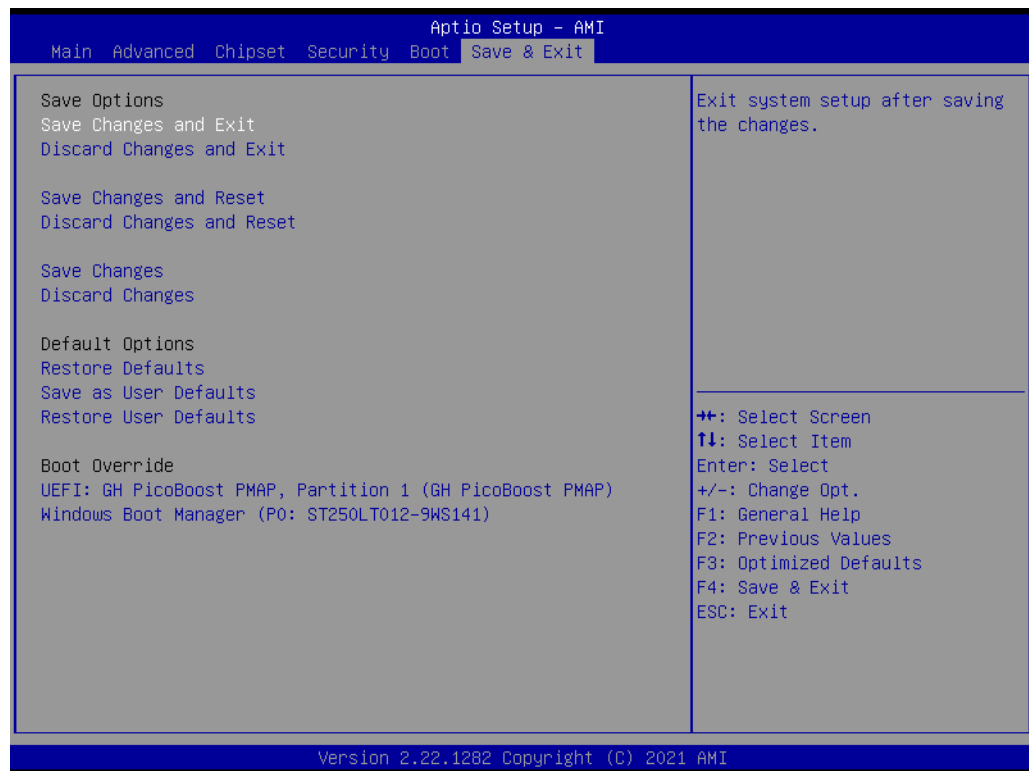


Figure 4.50 Save & Exit

- **Save Changes and Exit**
Exit system setup after saving the changes.
- **Discard Changes and Exit**
Exit system setup without saving any changes.
- **Save Changes and Reset**
Reset the system after saving the changes.
- **Discard Changes and Reset**
Reset system setup without saving any changes.
- **Save Changes**
Save Changes done so far to any of the setup options.
- **Discard Changes**
(005B) Discard Changes done so far to any of the setup options.
- **Restore Defaults**
Restore/Load Default values for all the setup options.
- **Save as User Defaults**
Save the changes done so far as User Defaults.
- **Restore User Defaults**
Restore the User Defaults to all the setup options.
- **Boot Override**

Chapter 5

S/W Introduction & Installation

- S/W Introduction
- Driver Installation

5.1 S/W Introduction

The mission of Advantech Embedded Software Services 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 distributors) for projects. Our goal is to make Windows Embedded Software solutions easily and widely available to the embedded computing community.

5.2 Driver Installation

The Intel Chipset Software Installation (CSI) utility installs the Windows INF files that explain how chipset components are configured to the operating system.

5.2.1 Windows Driver Setup

To install the drivers on a windows-based operation system, please connect to internet and browse the website <http://support.advantech.com.tw>. Next, download the drivers that you want to install. Then follow the Driver Setup instructions to complete the installation.

5.2.2 Other OS

Linux Ubuntu

Appendix **A**

Programming the Watchdog Timer

A.1 Programming the Watchdog Timer

Table A.1: Programming the Watchdog Timer

Trigger Event	Note
IRQ	(BIOS setting default disable)**
SCI	Support
Power Off	Support
H/W Restart	Support

** WDT new driver support automatically selects available IRQ number from BIOS, and then sets it to EC. Only Win10 supports this.

In other OS, it will still use IRQ number from BIOS setting as usual.

For details, please refer to SUSI API User Manual.

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-580 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	—	○	○	○	○	○
內外殼（外殼、 內部框架 … 等）	○	○	○	○	○	○
其它固定組件螺 絲、夾具、卡榫）	—	○	○	○	○	○
線材	—	○	○	○	○	○
揚聲器 / 蜂鳴器	○	○	○	○	○	○
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，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。



廢電池請回收





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