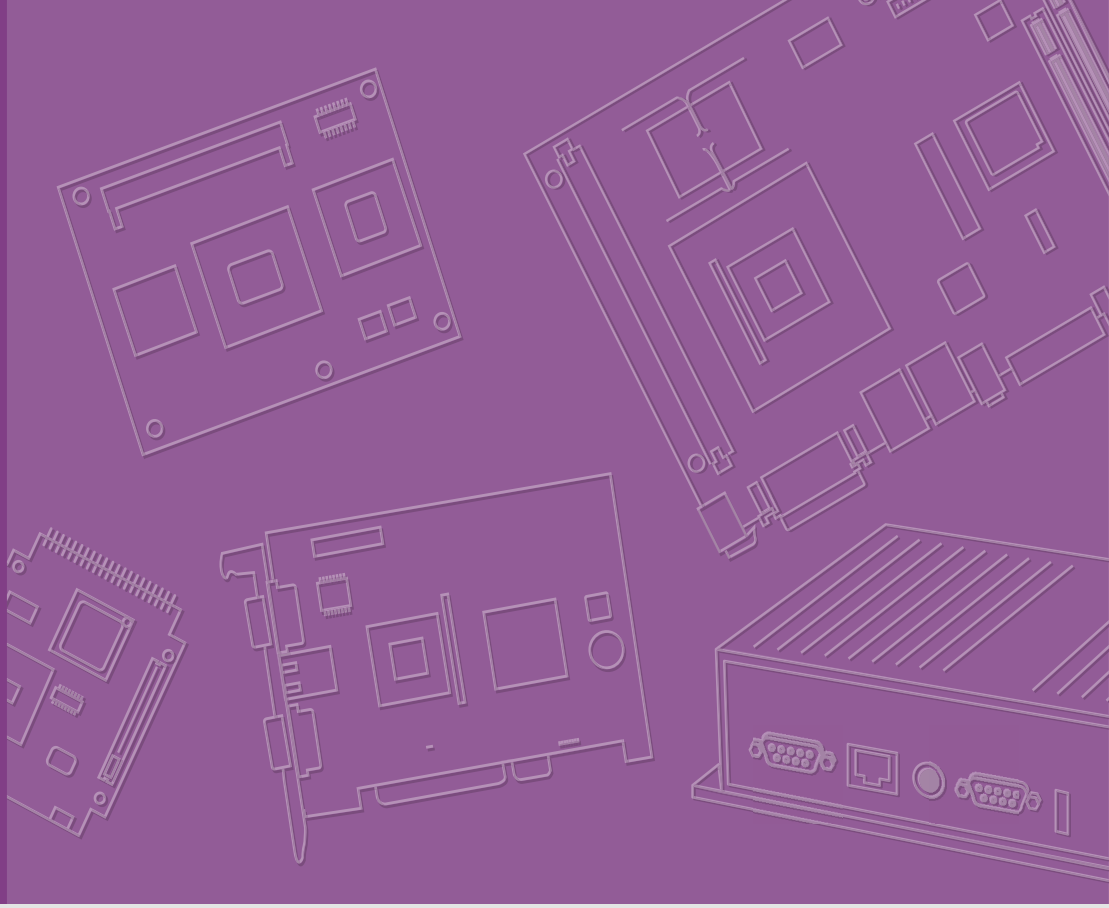


User Manual

DS-540

The Next-Generation KDS Box PC

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.

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

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

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages displayed when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
5. Write the RMA number clearly on the outside of the package and ship the package prepaid to your dealer.

Technical Support and Assistance

1. Visit the Advantech website at www.advantech.com/support to obtain the latest product information.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before calling:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Warnings, Cautions, and Notes/Avertissements, mises en garde et remarques

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



Les avertissements indiquent des conditions qui, si elles ne sont pas observées, peuvent causer des blessures!

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



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

Des précautions sont incluses pour vous aider à éviter d'endommager le matériel ou à perdre des données. par exemple.
Une pile neuve risque d'exploser si elle n'est pas installée correctement. N'essayez pas de recharger, d'ouvrir de force ou de chauffer la batterie. Remplacez la pile 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.



Les notes fournissent des informations supplémentaires facultatives.

Warning! The equipment is not suitable for use in locations where children are likely to be present.



Cet équipement ne convient pas à une utilisation dans des lieux pouvant accueillir des enfants.

Caution! To avoid risk of electric shock, this equipment must only be connected to supply mains with protective earth.



Pour éviter tout risque d'électrocution, cet équipement ne doit être branché réseau d'alimentation avec une terre de protection.

Warning! Restricted access area
Area accessible only to skilled persons and instructed persons with the proper authorization.



Zone d'accès restraint

Zone accessible uniquement aux personnes qualifiées et aux personnes instruites avec l'autorisation appropriée

Safety Instructions

1. Read these safety instructions carefully.
   Lisez attentivement ces instructions de sécurité.
2. Retain this user manual for future reference.
   Conservez ce manuel de l'utilisateur pour référence ultérieure.
3. Disconnect the equipment from all power outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or spray detergents.
   Débranchez cet appareil de toute prise secteur avant le nettoyage. Utilisez un chiffon humide. N'utilisez pas de détergents liquides ou en aérosol pour le nettoyage.
4. For pluggable equipment, the power outlet socket must be located near the equipment and easily accessible.
   Pour les équipements enfichables, la prise de courant doit être située à proximité de l'équipement et doit être facilement accessible.
5. Protect the equipment from humidity.
   Gardez cet équipement à l'abri de l'humidité.
6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
   Placez cet équipement sur une surface fiable lors de l'installation. Le laisser tomber ou le laisser tomber peut causer des dommages.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. Do not cover the openings.
   Les ouvertures sur le boîtier sont destinées à la convection de l'air. Protégez l'équipement de la surchauffe. NE COUVREZ PAS LES OUVERTURES.
8. By means of a power cord connected to a socket-outlet with a grounded connection.
   Au moyen d'un cordon d'alimentation connecté à une prise de courant avec mise à la terre.
9. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
   Positionnez le cordon d'alimentation de sorte que personne ne puisse marcher dessus. Ne placez rien sur le cordon d'alimentation.
10. All cautions and warnings on the equipment should be noted.
    Tous les avertissements et mises en garde sur l'équipement doivent être notés.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage from transient overvoltage.
    Si l'équipement n'est pas utilisé pendant une longue période, débranchez-le de la source d'alimentation pour éviter tout dommage dû à une surtension transitoire.
12. Never pour liquid into an opening. This may cause fire or electrical shock.
    Ne jamais verser de liquide dans une ouverture. Cela pourrait provoquer un incendie ou un choc électrique.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
    Ne jamais ouvrir l'équipement. Pour des raisons de sécurité, l'équipement ne doit être ouvert que par du personnel qualifié.
14. If any of the following occurs, have the equipment checked by service personnel:
    Si l'une des situations suivantes se produit, faites vérifier l'équipement par le personnel de service:
    - The power cord or plug is damaged.
      Le cordon d'alimentation ou la fiche est endommagé.

- Liquid has penetrated the equipment.
  Un liquide a pénétré dans l'équipement.
- The equipment has been exposed to moisture.
  L'équipement a été exposé à l'humidité.
- The equipment is malfunctioning, or does not operate according to the user manual.
  L'équipement ne fonctionne pas bien ou vous ne pouvez pas le faire fonctionner conformément au manuel d'utilisation.
- The equipment has been dropped and damaged.
  L'équipement est tombé et a été endommagé.
- The equipment shows obvious signs of breakage.
  L'équipement présente des signes évidents de rupture.

15. Do not leave the equipment in an environment with a storage temperature of below -20° C (-4° F) or above 60° C (140° F) as this may damage the components. The equipment should be kept in a controlled environment.
    NE PAS LAISSER CET ÉQUIPEMENT DANS UN ENVIRONNEMENT O LA TEMPÉRATURE DE STOCKAGE POURRAIT ÊTRE INFÉRIEURE À -20 ° C (-4 ° F) OU SUPÉRIEURE À 60 ° C (140 ° F). CELA POURRAIT ENDOMMAGER L'ÉQUIPEMENT. L'ÉQUIPEMENT DOIT ÊTRE DANS UN ENVIRONNEMENT CONTRÔLÉ.
16. Any unverified component may cause unexpected damage. To ensure correct installation, always use the components (e.g., screws) provided in the accessory box.
    Tout composant non vérifié peut causer des dommages inattendus. Pour garantir une installation correcte, veuillez toujours utiliser les composants (ex. Vis) fournis avec la boîte d'accessoires.
17. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
    ATTENTION: DANGER D'EXPLOSION EN CAS DE REMPLACEMENT INCORRECT DE LA BATTERIE. REMPLACEZ UNIQUEMENT AVEC LE MÊME TYPE OU LE TYPE ÉQUIVALENT RECOMMANDÉ PAR LE FABRICANT, DÉPOSEZ LES PILES UTILISÉES SELON LES INSTRUCTIONS DU FABRICANT.
18. Always disconnect the power cord from the chassis before manually handling the hardware. Do not implement connections or configuration changes while the device is powered on. Sudden power surges may damage sensitive electronic components.
19. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).
    Le niveau de pression acoustique au poste de l'opérateur selon la norme CEI 704-1: 1982 n'est pas supérieur à 70 dB (A).
20. RESTRICTED ACCESS AREA: The equipment should only be installed in a Restricted Access Area.
    ZONE D'ACCÈS RESTRICTED: L'équipement ne doit être installé que dans une zone d'accès restreint.
21. By means of a power cord connected to a socket-outlet with earthing connection.
    Au moyen d'un cordon d'alimentation relié à une prise de courant avec mise à la terre.
22. The product is intended to be supplied by a UL Listed Adapter or DC power source suitable for use at Tma 60°C min., whose output meets PS2 (or LPS) requirements and is rated: 12–24 V_{DC}, 5–2.5 A, with mating connector. If further

assistance is needed, please contact Advantech for more information.
Le produit est destiné à être alimenté par un adaptateur répertorié UL ou une source d'alimentation CC adaptée à une utilisation à Tma 60°C min., dont la sortie est conforme aux exigences PS2 (ou LPS) et est évaluée à: 12–24 V_{DC}, 5–2,5 A, avec connecteur correspondant. Si vous avez besoin d'aide supplémentaire, veuillez contacter Advantech pour plus d'informations.

23. DISCLAIMER: These instructions are provided according to IEC 704-1 standards.
Advantech disclaims all responsibility for the accuracy of any statements contained herein.
AVERTISSEMENT: Cet ensemble d'instructions est donné conformément à la norme CEI 704-1.
Advantech décline toute responsabilité quant à l'exactitude des déclarations contenues dans ce document.

Packing List

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

- 1 x DS-540
- 1 x 19V Power Adapter
- 4 x M4-45L Screws (P/N: 1930008874)

Ordering Information

Part Number	Description
DS-5400F-U0A1E	DS-540,N150,Barebones
DS-5400F-U0A1U	DS-540,N150,Barebones,MIT

DS-540 Series Part Number

DS-5400F-U0A1E	DS-5400F-T0A1E	DS-5400F-P0A1E	DS-5400F-U1A1E
DS-5400F-U0A1U	DS-5400F-T0A1U	DS-5400F-P0A1U	DS-5400F-U1A1U
DS-5400F-T1A1E	DS-5400F-P1A1E	DS-5400F-U2A1E	DS-5400F-T2A1E
DS-5400F-T1A1U	DS-5400F-P1A1U	DS-5400F-U2A1U	DS-5400F-T2A1U
DS-5400F-P2A1E	DS-5400F-U3A1E	DS-5400F-T3A1E	DS-5400F-P3A1E
DS-5400F-P2A1U	DS-5400F-U3A1U	DS-5400F-T3A1U	DS-5400F-P3A1U
DS-5400F-U0A2E	DS-5400F-T0A2E	DS-5400F-P0A2E	DS-5400F-U1A2E
DS-5400F-U0A2U	DS-5400F-T0A2U	DS-5400F-P0A2U	DS-5400F-U1A2U
DS-5400F-T1A2E	DS-5400F-P1A2E		
DS-5400F-T1A2U	DS-5400F-P1A2U		
DS5400F2601-T	DS5400F2901-T	DS5400F2802-T	DS5400F2703-T
DS5400F2701-T	DS5400F2602-T	DS5400F2902-T	DS5400F2803-T
DS5400F2801-T	DS5400F2702-T	DS5400F2603-T	DS5400F2903-T

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Chapter 1

General Introduction

1.1 Introduction

The DS-540 is a purpose-built KDS box PC powered by the Intel® Twin Lake N150 processor. Designed for Kitchen Display System (KDS), retail, and digital signage applications, it supports a wide operating temperature range of 0°C to 60°C and a 12–24 V_{DC} power input for reliable operation in demanding environments. The DS-540 provides versatile I/O connectivity, including triple independent display outputs (HDMI 2.1 TMDS, VGA, and USB Type-C DisplayPort Alt Mode), one 2.5GbE LAN port, four USB 3.2 Gen2 ports, one USB Type-C port, and two RS-232 COM ports. Additional features include optional USB Type-C Power-In and M.2 2242 M-Key and M.2 2230 E-Key expansion slots for storage and wireless connectivity.

1.2 Product Features

1.2.1 General

- Built-in Intel® Processor N150 (Twin Lake) CPU
- Supports 3 independent displays (HDMI + USB Type-C + VGA)
- Supports DDR5 4800 MHz, up to 16 GB
- Supports M.2 2242 M-Key for storage

1.2.2 Display

- **Controller:** Intel® UHD chipset
- **Resolution:**
  - HDMI 1 support up to 3840 × 2160 @ 60 Hz UHD
  - VGA supports up to 1920 x 1200 @ 60Hz WUXGA
  - USB-C support up to 3840 × 2160 @ 60 Hz UHD

1.2.3 Thermal Solution

- Fanless Design

1.3 Hardware & Software Specifications

- **CPU:** Intel® Twin Lake N150
- **System Chipset:** Built-in CPU
- **Graphic chipset:** Integrated graphics built in Processor
- **BIOS:** AMI uEFI 256 Mbit
- **System Memory:** Single channel DDR5 4800 MHz 262 pin SO-DIMM
- **Storage:** M.2 2242 M Key (SATA/PCIe)
- **SUSI:** SUSI is Advantech's unique hardware management that provided in standard DS-540 Win11 and Ubuntu Linux. The function below are included.
  - Watchdog Timer
  - Hardware Monitor
  - System information
- **IO Interfaces:**
  - 1 x HDMI 2.1 TMDS
  - 1 x VGA WUXGA
  - 1 x USB-C
  - 4 x USB 3.2 Gen2
  - 1 x RJ45
  - 2 x COM RS-232, DB9 with 5V/12V powered

  - 1 x Audio Jack
- **Ethernet Chipset:**
  - **Controller:** Realtek RTL8125K-CG
  - **Speed:** 10/100/1000/2500 Mbps
  - **Interface:** 1 x RJ-45 jack with LED
  - **Standard:** IEEE 802.3u (100BASE-TX), IEEE 802.3ab (1000BASE-T), and IEEE 802.3bz (2.5GBASE-T) compliant
- **Resolution:**
  - HDMI 2.1 TMDS x 1, @3840x2160 60Hz
  - VGA x 1, up to 1920 x 1200 @ 60Hz (WUXGA)
  - USB-C x 1 @3840x2160 60Hz
- **Expansion:**
  - M.2 2242 M Key x 1 for Storage (SATA/PCIe)
  - M.2 2230 E Key x 1 for WIFI/Bluetooth Module
- **Operating System:** Windows 11 IoT LTSC, Ubuntu 24.04

1.4 Mechanical Specification

1.4.1 Dimension

180 x 150 x 35 mm (L x W x H)

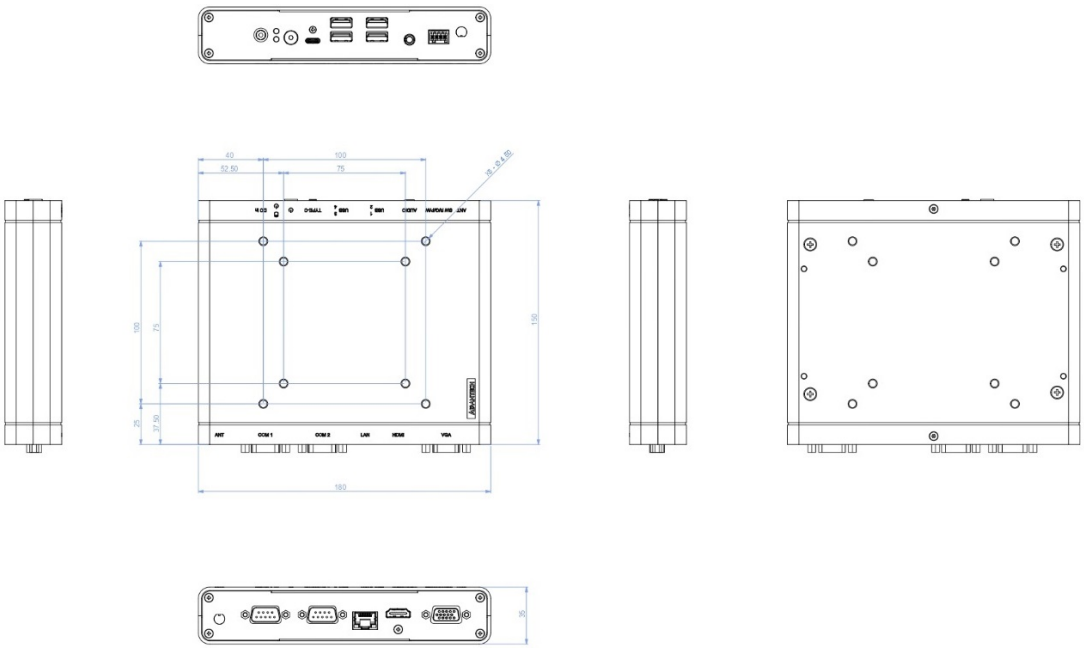


Figure 1.1 Dimensions

1.4.2 Weight

- 1.2 kg

1.5 Power Requirements

1.5.1 System Power

- **Power Input:** 12–24 V_{DC}, 5–2.5 A

1.5.2 RTC Battery

- Lithium 3V/620mAh 45mm 2P CR2450

1.6 Environmental Specifications

- **Operating Temperature:** 0° C ~ 60° C @0.7m/s air flow
- **Relative Humidity:** 95% @ 40° C (Non Condensing)
- **Storage Temperature:** -40 ~ 85° C (-40 ~185° F)
- **Vibration Loading During Operation:** 3 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 3 axes, 1 hr/axis
- **Shock During Vibration:** 30 G, IEC 60068-2-27, half sine, 11 ms duration, 6 faces, 3 times/face
- **Safety Certification:** UL, CB, CCC, BSMI, UKCA
- **EMC Certification:** CE/FCC Class B, CCC, BSMI

Chapter 2

Hardware Configuration

This chapter introduces external IO and the installation of DS-540 series Hardware.

2.1 DS-540 System I/O

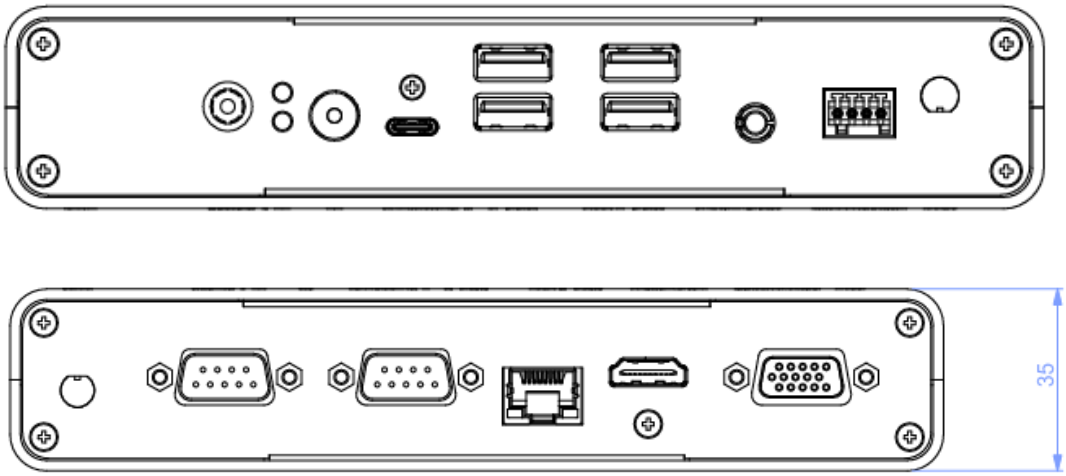


Figure 2.1 DS-540 I/O

2.1.1 LED

Below LED indicator means power on status when it shows green.



Figure 2.2 Power

Below LED indicator means SSD status when it shows yellow.



Figure 2.3 LED - SSD

2.1.2 Power Button

Push below button to power on/off DS-540.

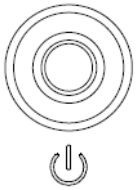


Figure 2.4 Power ON/OFF Button

2.1.3 HDMI Connector

DS-540 offers one integrated 19-pin receptacle connector HDMI 2.1 TMDS interfaces. The HDMI link supports resolutions up to 3840 x 2160 @ 60 Hz.

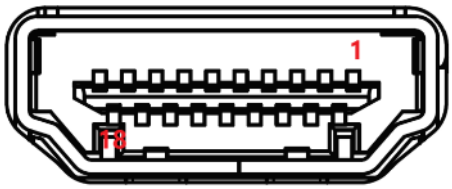


Figure 2.5 HDMI Connector

Table 2.1: HDMI Connector Pin Definition

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

2.1.4 USB-C Connector

DS-540 support 1 x USB-C. USB-C (5V/3A): Support 1 x DP 1.4a 4K @60Hz + 1 x USB 3.2 Gen2x1. Please refer to Table 2.2 for its pin assignments.

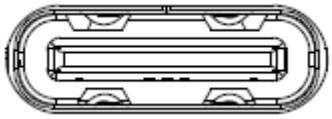


Figure 2.6 USB-C connector

Table 2.2: USB-C Connector Pin Assignments

Pin	Signal	Pin	Signal
1	GND	13	GND
2	SSTXp1	14	SSRXp1
3	SSTXn1	15	SSRXn1
4	VBUS	16	VBUS
5	CC1	17	SBU2
6	DP1	18	DN2
7	DN1	19	DP2
8	SBU1	20	CC2
9	VBUS	21	VBUS
10	SSRXn2	22	SSTXn2
11	SSRXp2	23	SSTXp2
12	GND	24	GND

2.1.5 USB 3.2 – Gen2 Connector

The DS-540 supports 4 x USB 3.2. The USB interfaces comply with USB UHCI, Rev. 3.0 standards. Please refer to Table 2.3 for pin assignments.

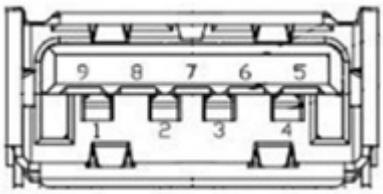


Figure 2.7 USB 3.2 connector

Table 2.3: USB 3.2 Gen2 Connector Pin Assignments

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

2.1.6 Ethernet Connector (2.5GbE)

The DS-540 is equipped with up to 1 x Ethernet controllers that are fully compliant with IEEE 802.3 rmv 10/100/1000/2500 Mbps CSMA/CD standards. These Ethernet ports provide a standard RJ-45 jack connector with LED indicators on the front side to show Active/Link status (Green LED on the right) and Speed status (Yellow/Green LED on the left).

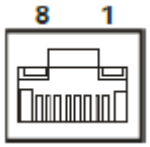


Figure 2.8 RJ45 connector

Table 2.4: Ethernet Connector Pin Assignment

Pin	100/1000/2500 BaseT Signal Name
1	TX+
2	TX-
3	RX+
4	MDI2+
5	MDI2-
6	RX-
7	MDI3+
8	MDI3-

Table 2.5: LED

Right side LED: Green LED	
Link Status	Always turn on without transmitting/receiving data
Activity status	Flash
Left side LED: Green/Orange LED	
Status	Display
10/100Mbps	Always off
1 Gbps	Orange
2.5 Gbps	Green

2.1.7 COM1/COM2 Connector

DS-540 provides two 9-pin COM connector, which support pure RS232 serial communication interface ports. The default setting is 0V, if you want to use 5V or 12V powered COM, you can adjust jumper to change settings.

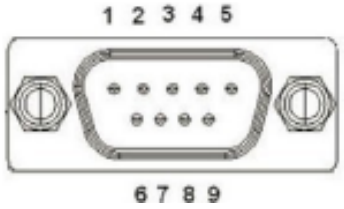


Table 2.6: COM Connector Pin Definition

Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI (0V/5V/12V jumper option)

2.1.8 Audio Connector

The DS-540 features 1 phone jack connectors that support stereo Line-Out and Mic-In audio ports. The audio chip is controlled by ALC888S and is compliant with the Azalea standard.

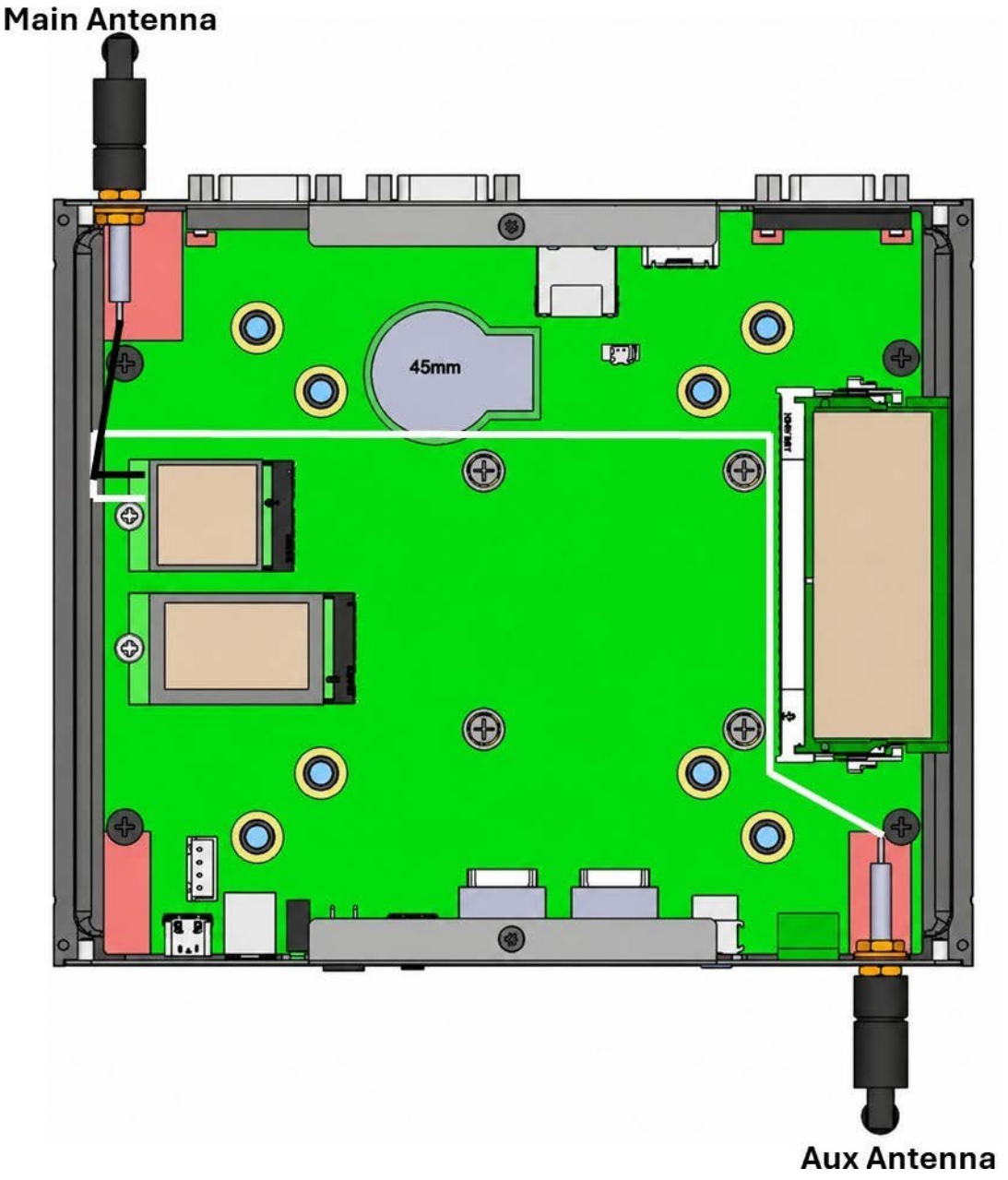


Figure 2.9 Audio connector

2.1.9 WiFi Antenna

The DS-540 provides two WiFi antenna connectors for connecting SMA antennas.

For optimal wireless performance, please position the antennas vertically as shown in the figure below. Proper antenna orientation helps improve wireless signal reception and transmission efficiency.



2.1.10 VGA Connector

DS-540 provides an integrated 15-pin female VGA video interface, which supports resolutions up to 1920 × 1200 @ 60 Hz (WUXGA). Please refer to Table 2.1.10 for its pin assignments.

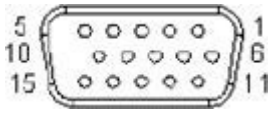


Figure 2.10 VGA Connector

Table 2.7: VGA Connector Pin Assignments

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

2.1.11 Remote Switch

The DS-540 provides the remote switch connector for power on/off. From the left to the right are Reset, reset button (R), GND(G), Power button (P), and watch dog (W) out put signal.

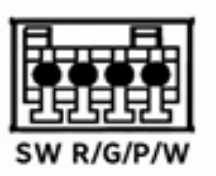


Table 2.8: Remote Switch Connector Pin Assignments

Pin	Signal Name	Operating Instructions
R	Reset Button	Short R to G for within 1 second, and the system will reboot.
G	Ground	Ground (G) is the common reference point for control signals.
P	Power Button	Short P to G for within 1 second, and the system will powere on.
W	Watchdog output signal	Internal pull High, the WDT will pull down for 1 seconds.

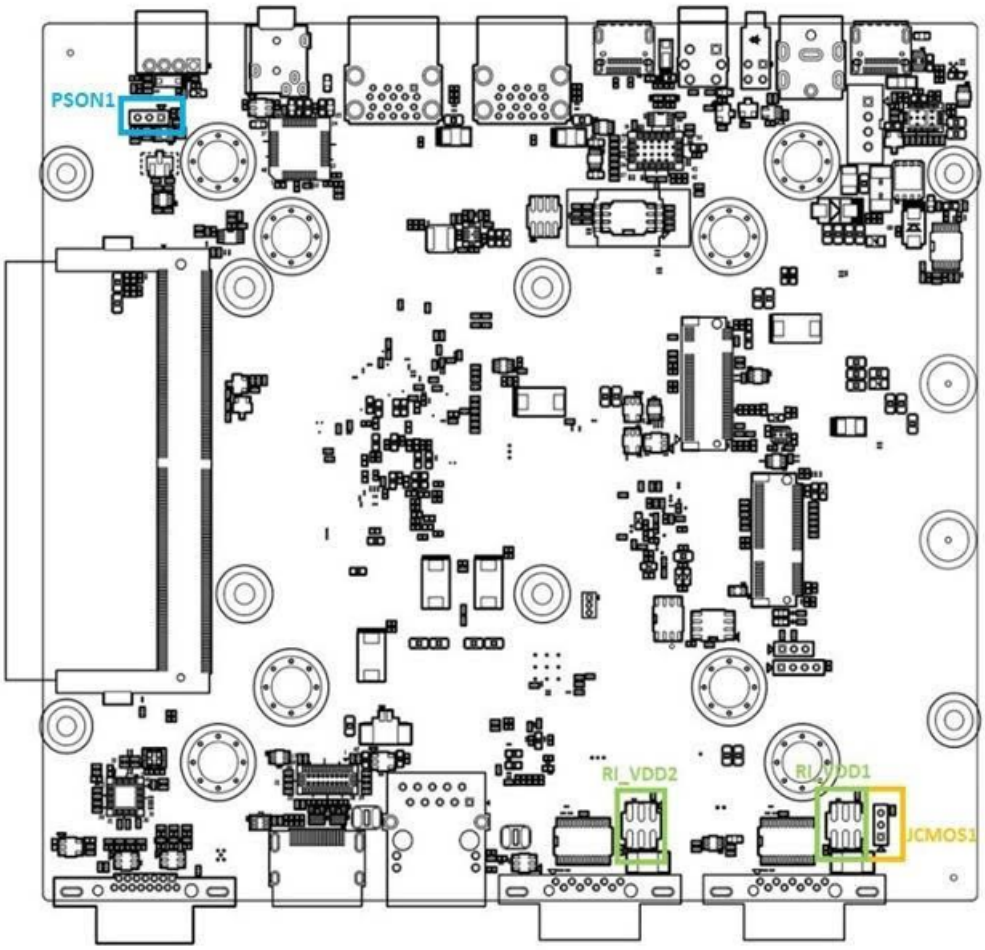
2.2 Jumpers

The DS-540 has a number of jumpers that allow you to configure your system to suit your application. The table below lists the functions of the various jumpers.

2.2.1 Jumper List

Table 2.9: Jumper List

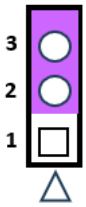
PSON1	AT/ATX
JCMOS1	Clear CMOS
RI_VDD1	COM port power
RI_VDD2	COM port power



2.2.2 Jumper Settings

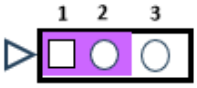
2.2.2.1 AT/ATX (PSON1)

Table 2.10: PSON1 Auto Power On Settings	
Description	**Cash drawer power**
Setting	Function
(1-2)	Boot up by AT
(2-3)	Boot up by ATX (Default)



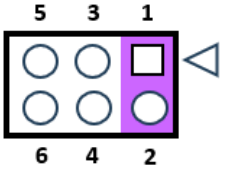
2.2.2.2 Clear CMOS (JCMOS1)

Table 2.11: JCMOS1 Clear CMOS Settings	
Description	**PIN HEADER 1X3P 2.00mm 180D(M) DIP**
Setting	Function
(1-2)	Normal Operation (Default)
(2-3)	Clear CMOS



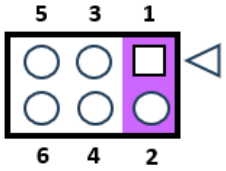
2.2.2.3 COM Port Power (RI_VDD1)

Table 2.12: RI_VDD1 COM port power Setting	
Description	**PIN HEADER 1X3P 2.00mm 180D(M) DIP**
Setting	Function
(1-2)	Normal Operation (Default)
(3-4)	COM port 5V
(5-6)	COM port 12V



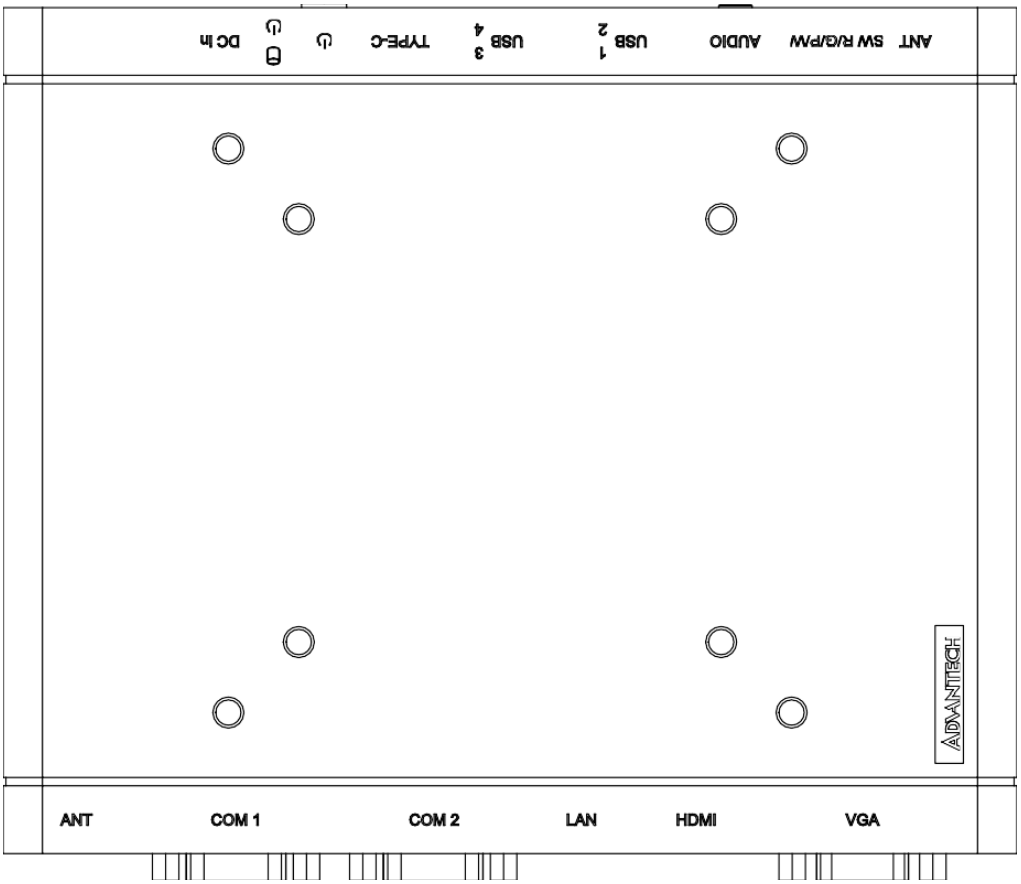
2.2.2.4 COM Port Power (RI_VDD2)

Table 2.13: RI_VDD1 COM port power Setting	
Description	**PIN HEADER 1X3P 2.00mm 180D(M) DIP**
Setting	Function
(1-2)	Normal Operation (Default)
(3-4)	COM port 5V
(5-6)	COM port 12V



2.3 Connectors

2.3.1 DS-540 External I/O Locations



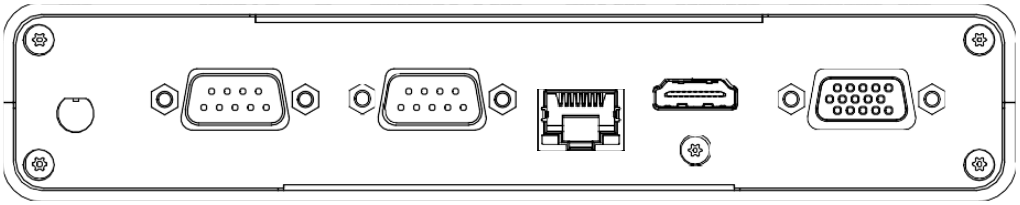


Figure 2.11 DS-540 Front I/O Connector Diagrams (DC-in SKU)

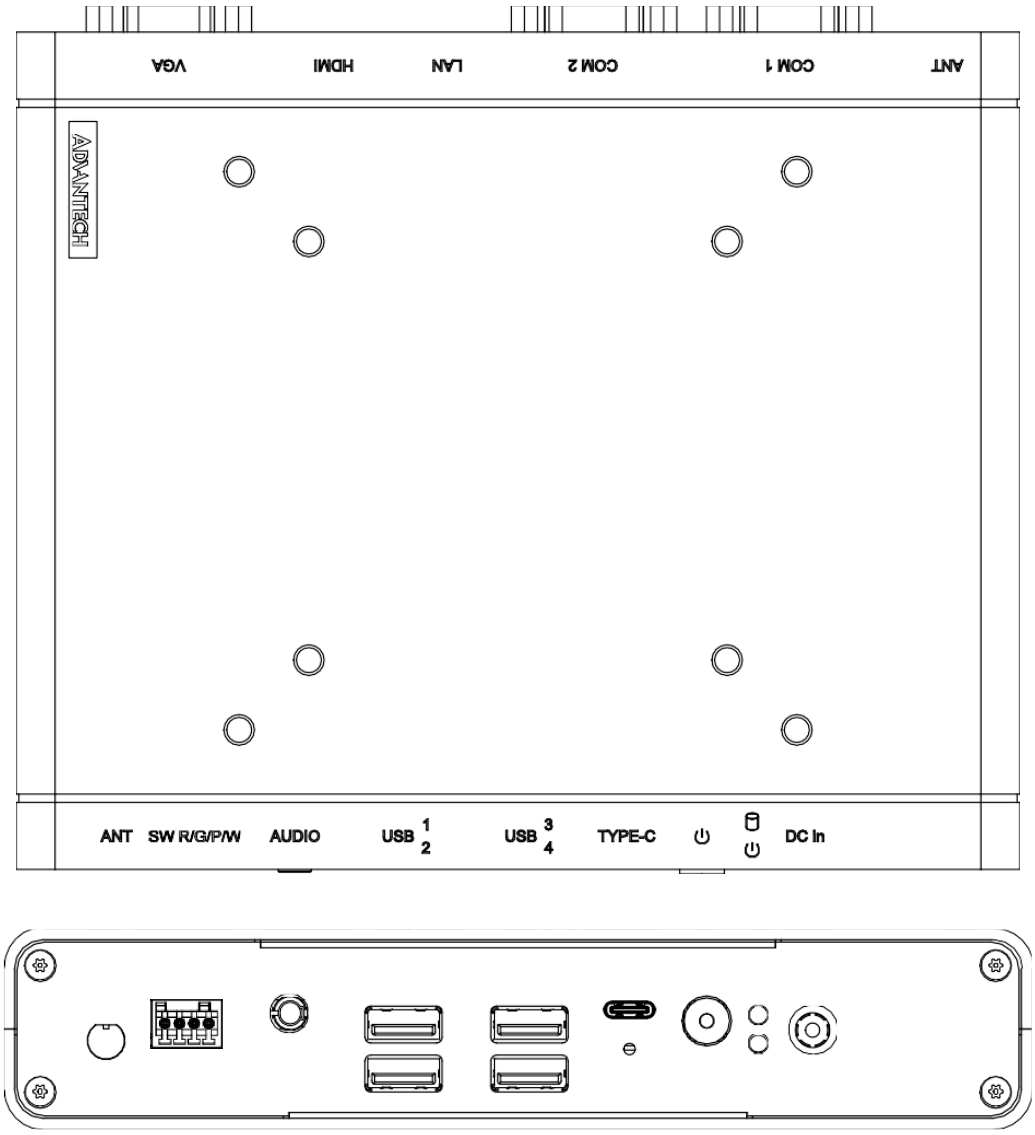


Figure 2.12 DS-540 Rear I/O Connector Diagrams (DC-in SKU)

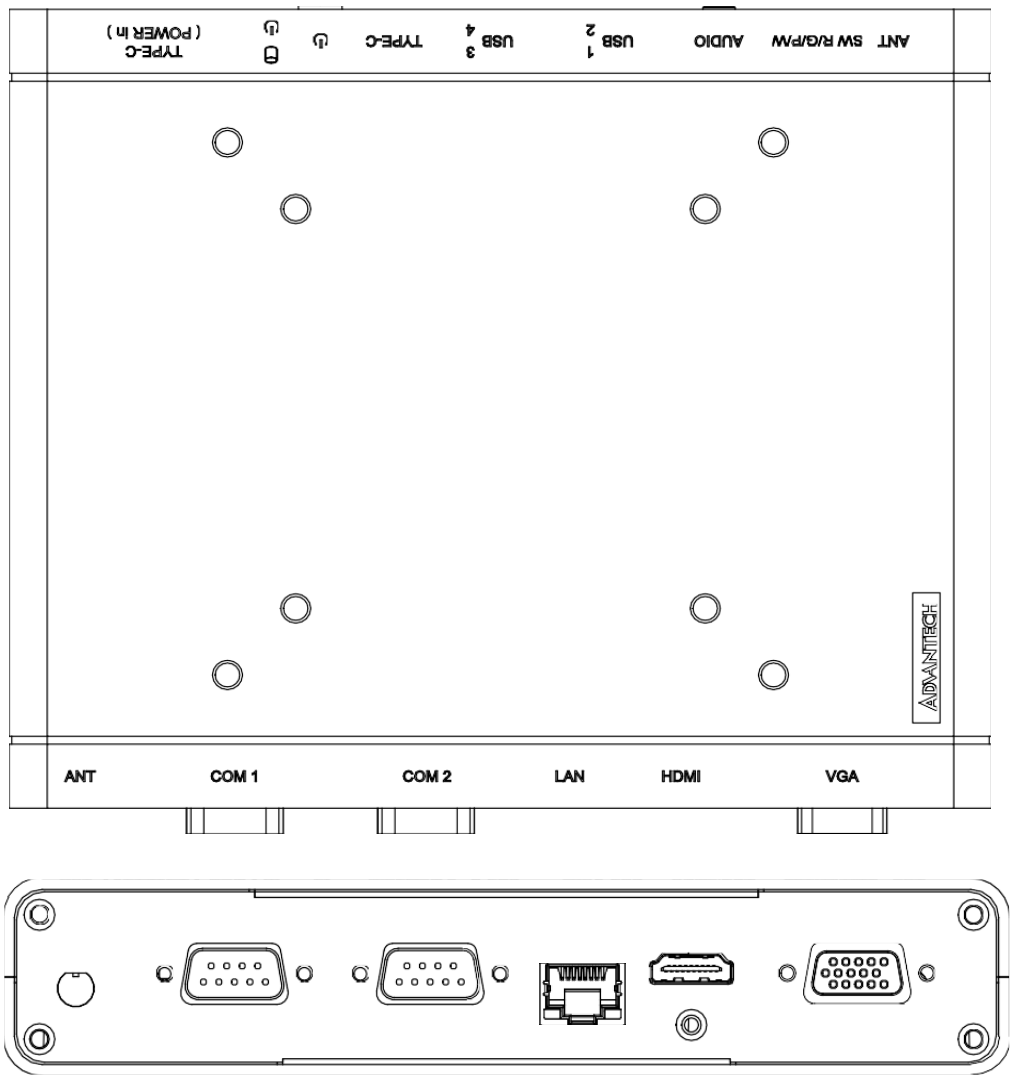


Figure 2.13 DS-540 Front I/O Connector Diagrams (Type-C Power in SKU)

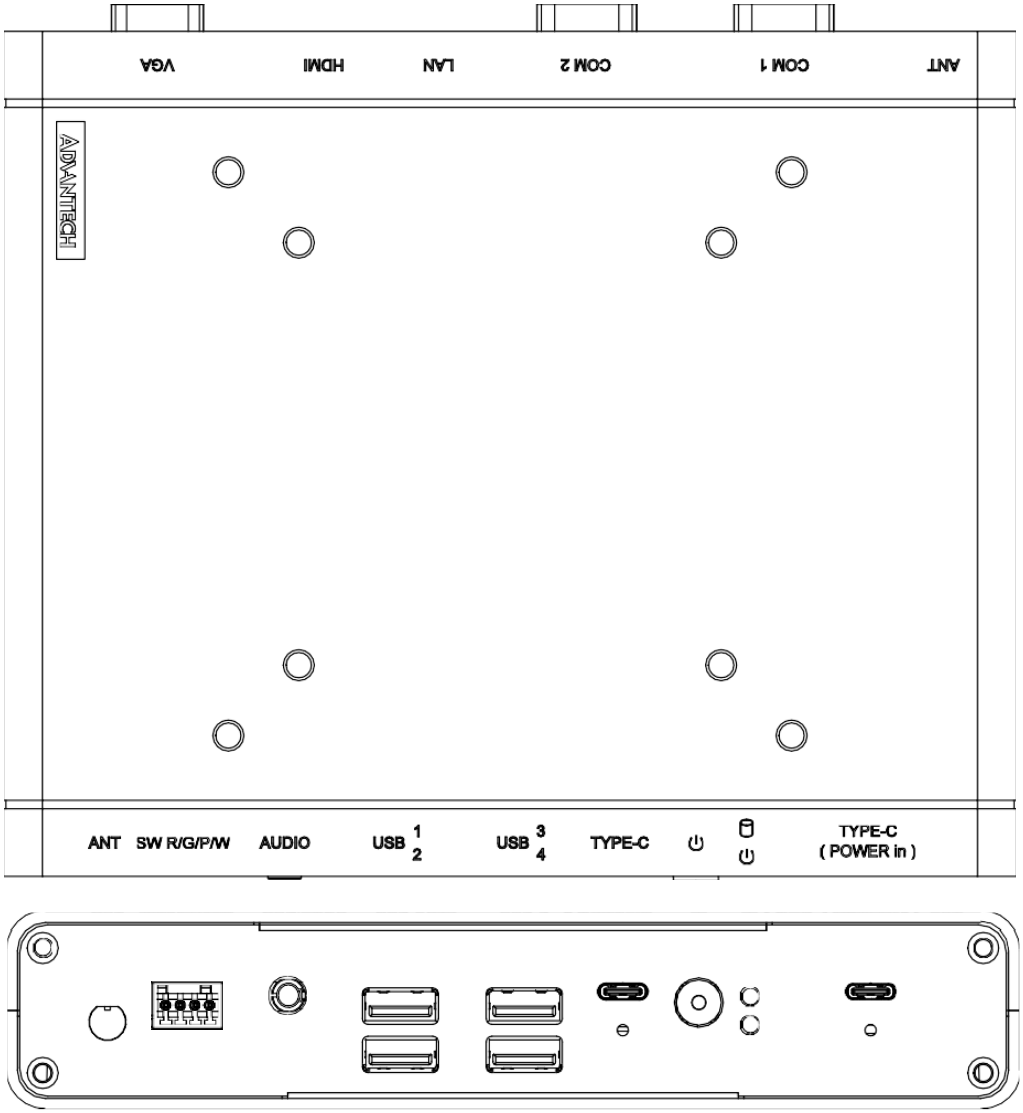


Figure 2.14 DS-540 Rear I/O Connector Diagrams (Type-C Power in SKU)

2.4 Installation

2.4.1 Exploded View

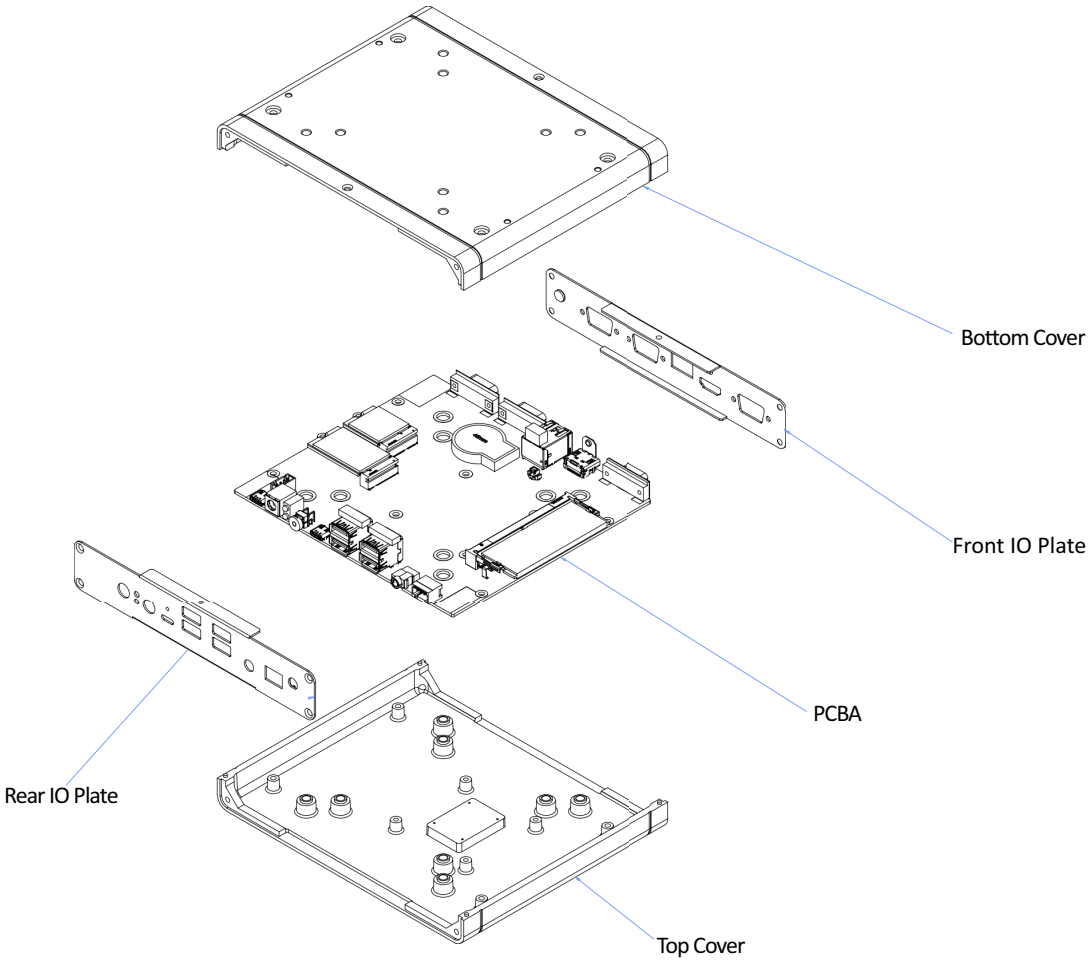
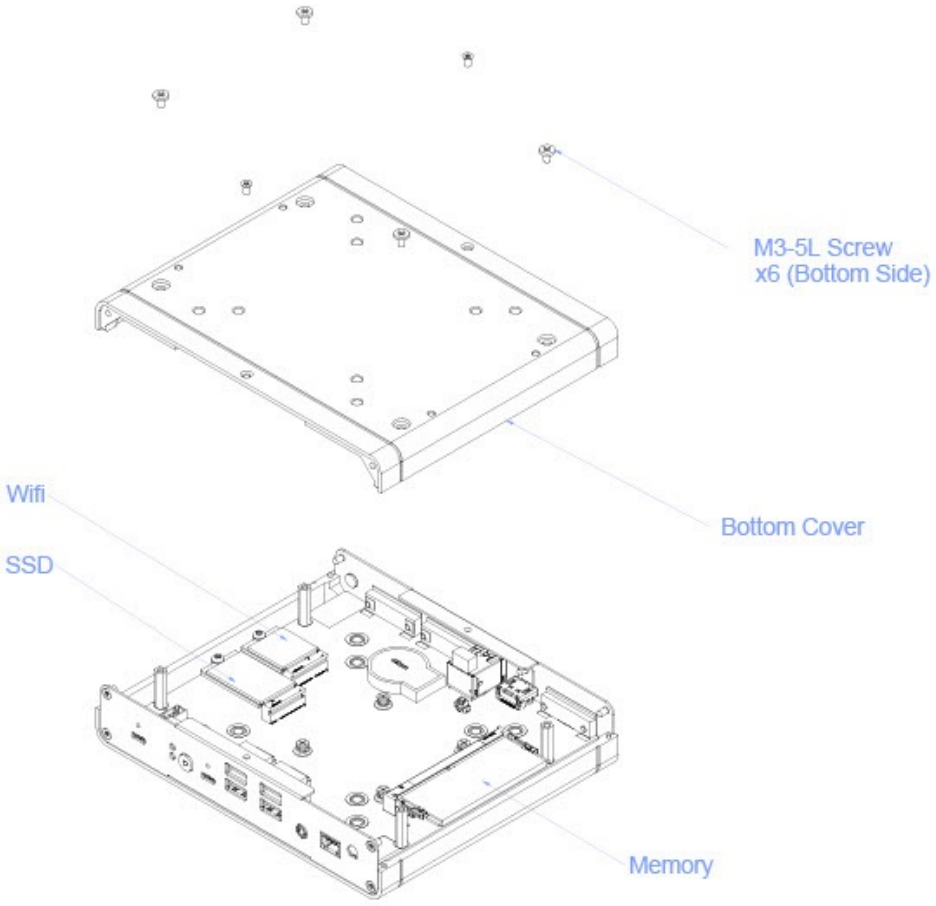


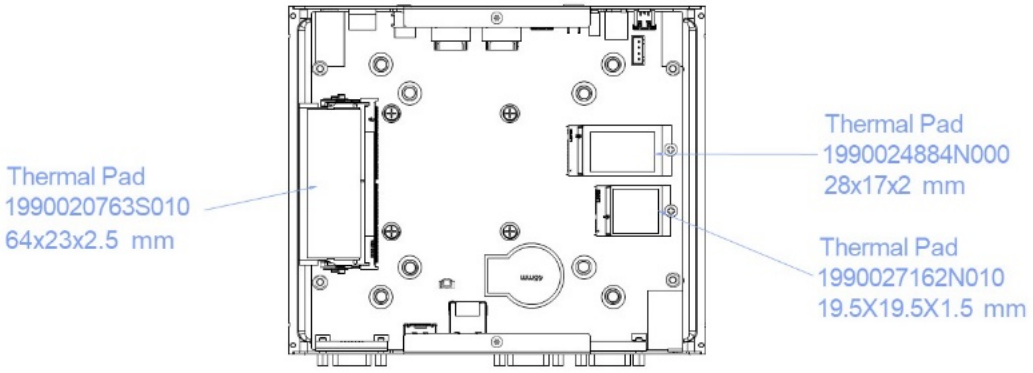
Figure 2.15 DS-540 system exploded view

2.4.2 Memory and M.2 M-key/E-key Installation

1. Remove the screws securing the front and rear panels, and then remove the panels.
2. Loosen the six screws securing the bottom cover, and remove the bottom cover.
3. Install the memory module.
4. Install the M.2 M-Key 2242 module with the M3-5L screw (P/N: 1935030500) and thermal pad.
5. Install the M.2 E-Key 2230 module with the M3-5L screw (P/N: 1935030500) and thermal pad.

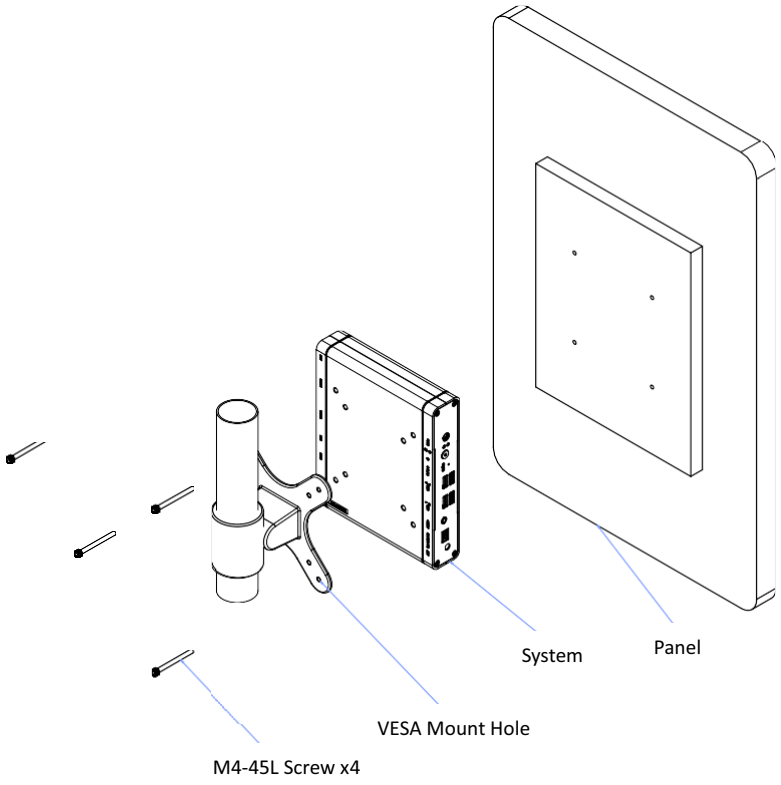


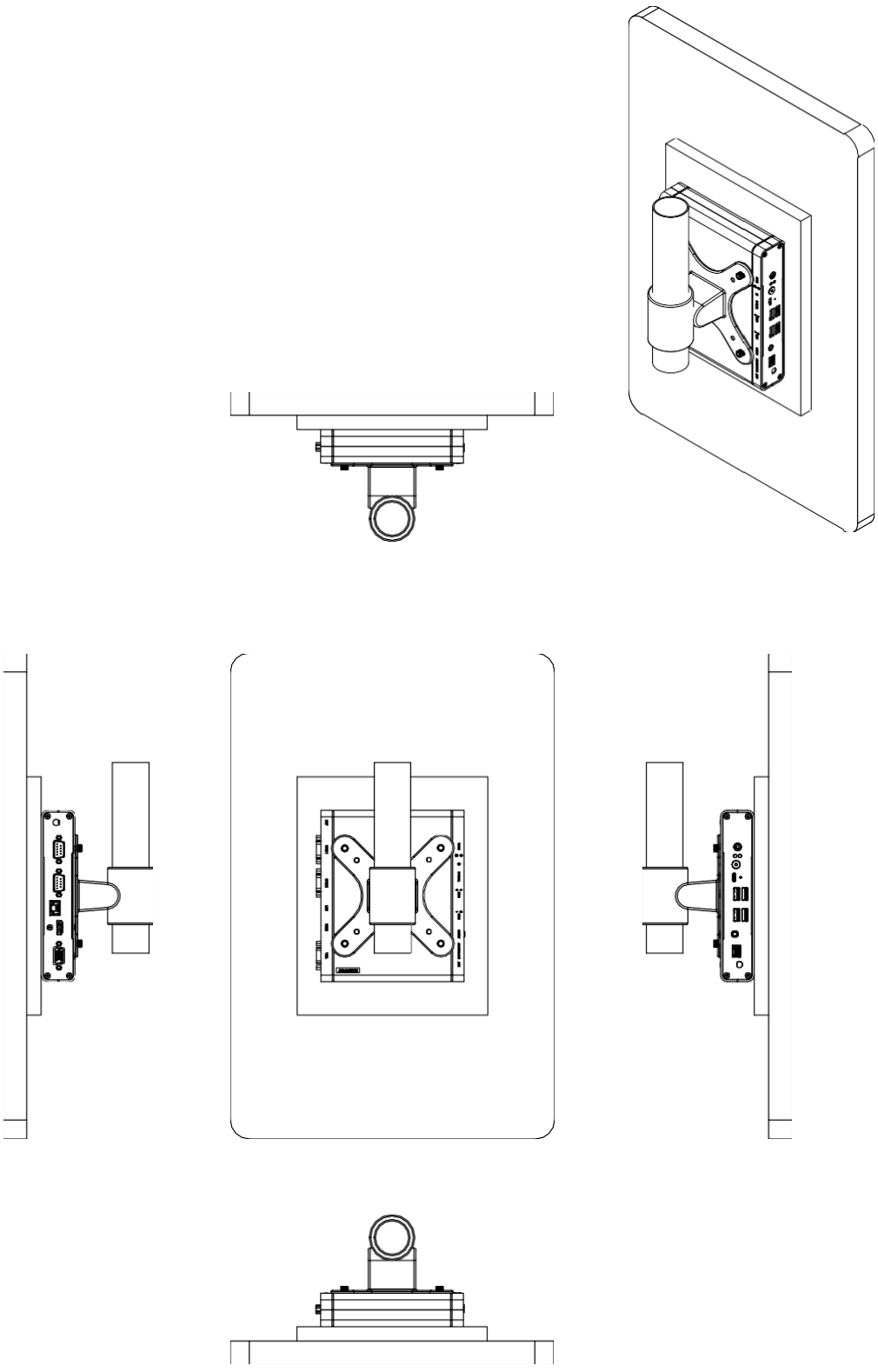
- The accessory package includes CPU, memory and M.2 thermal pads.
  - Memory Thermal PAD, PN: 1990020763S010
  - M.2 Thermal PAD, PN: 1990027162N010
  - SSD Thermal PAD, PN: 1990024884N000
    Please attach it according to the markings on the both sides of the spreader bracket.



2.4.3 Mounting Installation

- VESA mount fasten the four screws, M4-45L screws, 1930008874





Chapter 3

BIOS Settings

3.1 BIOS Introduction

AMIBIOS has been integrated into motherboards for over two decades. With the AMIBIOS Setup program, users can modify BIOS settings and control various system features. This chapter describes the basic navigation of the DS-540 BIOS setup screens.



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

3.2 Entering the Setup

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

3.2.1 Main Setup

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



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

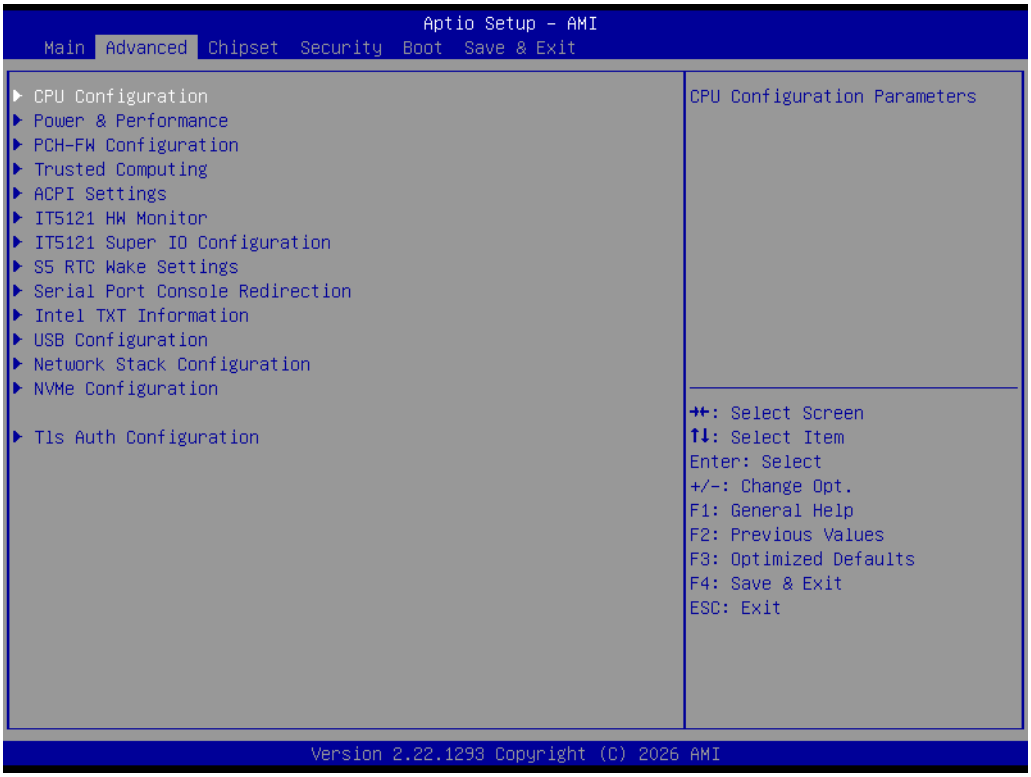
Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

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

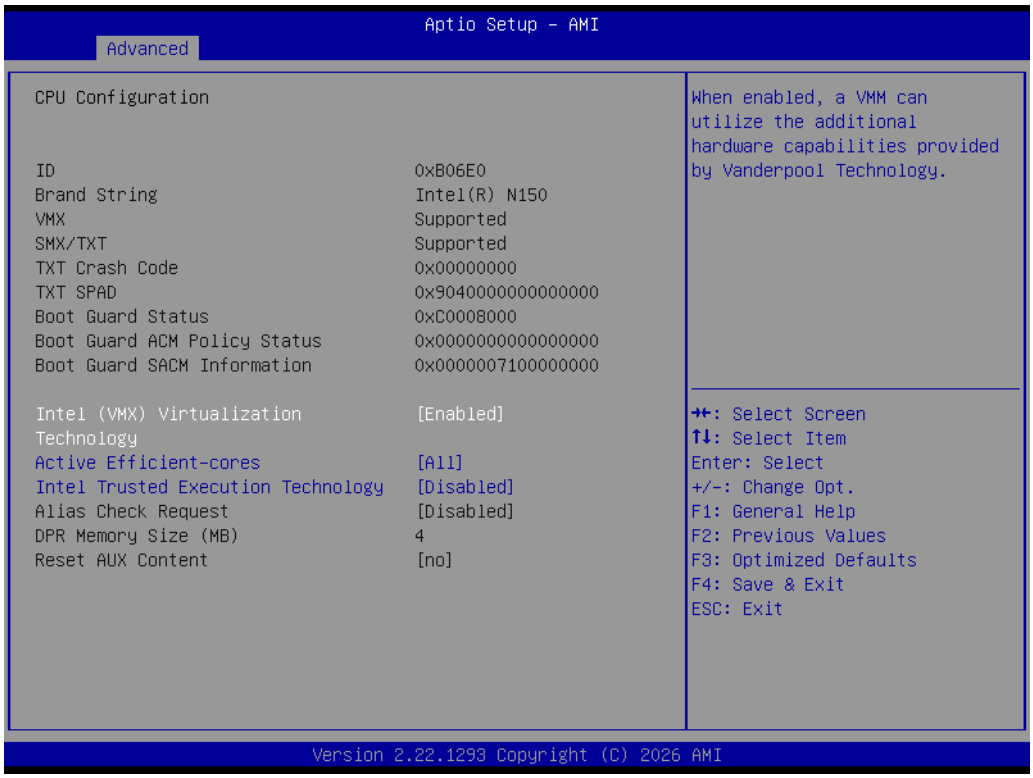
3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the BIOS Setup Utility to enter the Advanced BIOS Setup page.

Select any of the items in the left frame of the screen, such as CPU Configuration, to access the sub menu for that item. The options for any of the Advanced BIOS Setup items can be displayed by highlighting the item using the keys.



3.2.2.1 Advanced → CPU Configuration



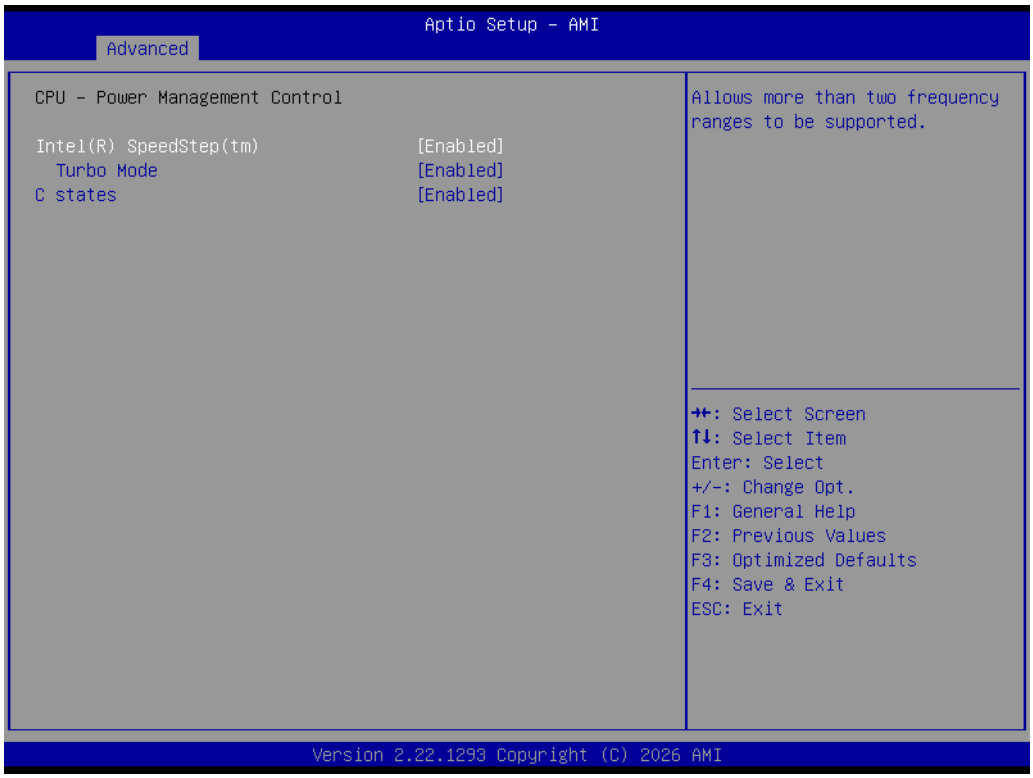
- **Intel (VMX) Virtualization**
  Enable/Disable Intel VMX Virtualization support.
- **Active Processor Cores**
  Enable all or 1/2/3.
- **Intel Trusted Execution Technology**
  Enable/Disable Intel® Trusted Execution Technology (Intel® TXT).

3.2.2.2 Advanced → Power & Performance



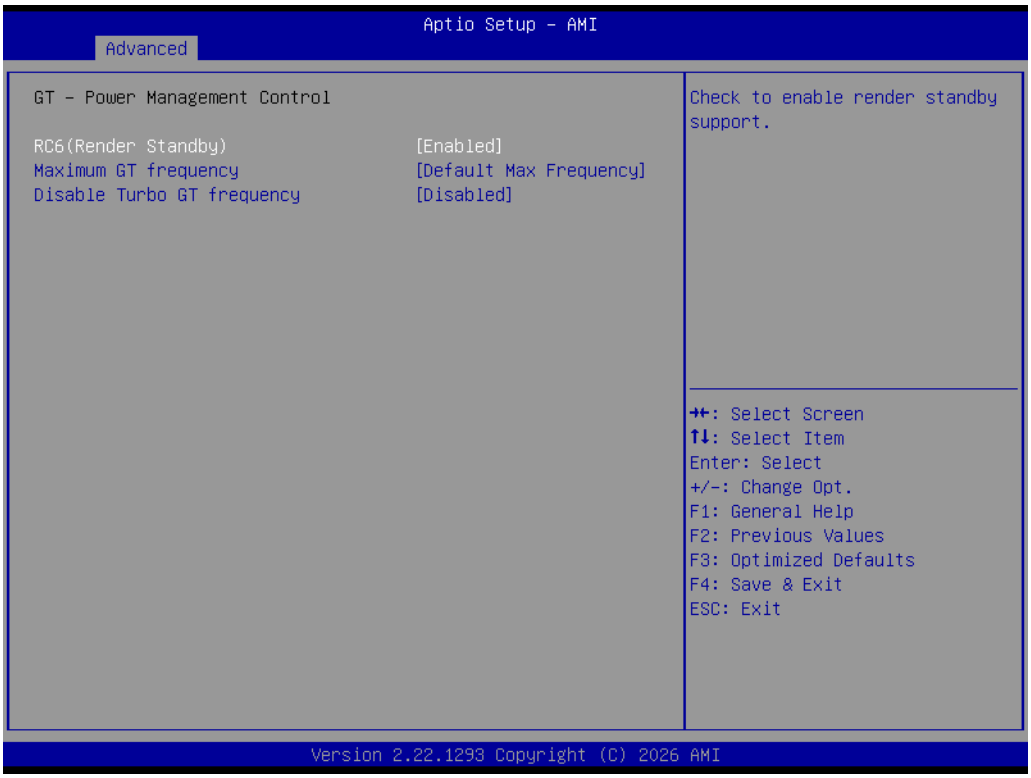
- **CPU – Power Management Control**
  CPU – Power Management Control Options.
- **GT – Power Management Control**
  GT – Power Management Control Options.

3.2.2.2.1 CPU - Power Management Control



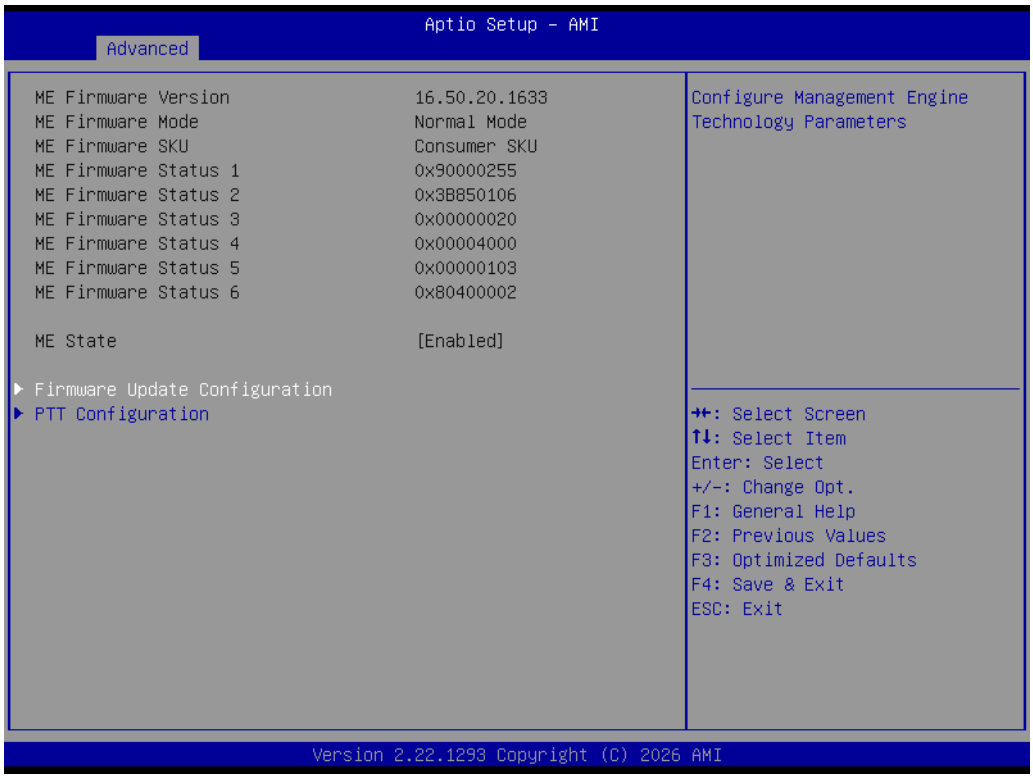
- **Intel® SpeedStep™**
  Enable/disable Intel SpeedStep support.
- **Turbo mode**
  Enable/disable Turbo mode.
- **C states**
  Enable/disable CPU Power Management.

3.2.2.2.2 GT - Power Management Control



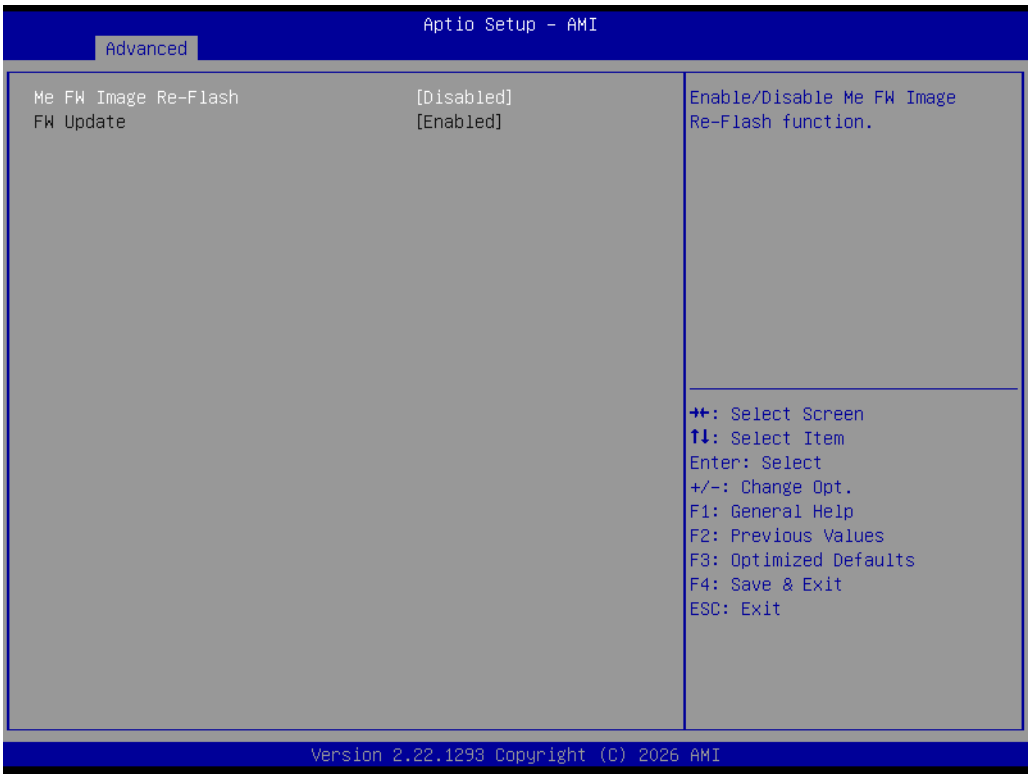
- **RC6 (Render Standby)**
  Check to enable render standby support.
- **Maximum GT frequency**
  Maximum GT frequency limited by user.
- **Disable Turbo GT frequency**
  Enable/Disable Turbo GT frequency.

3.2.2.3 Advanced → PCH-FW Configuration



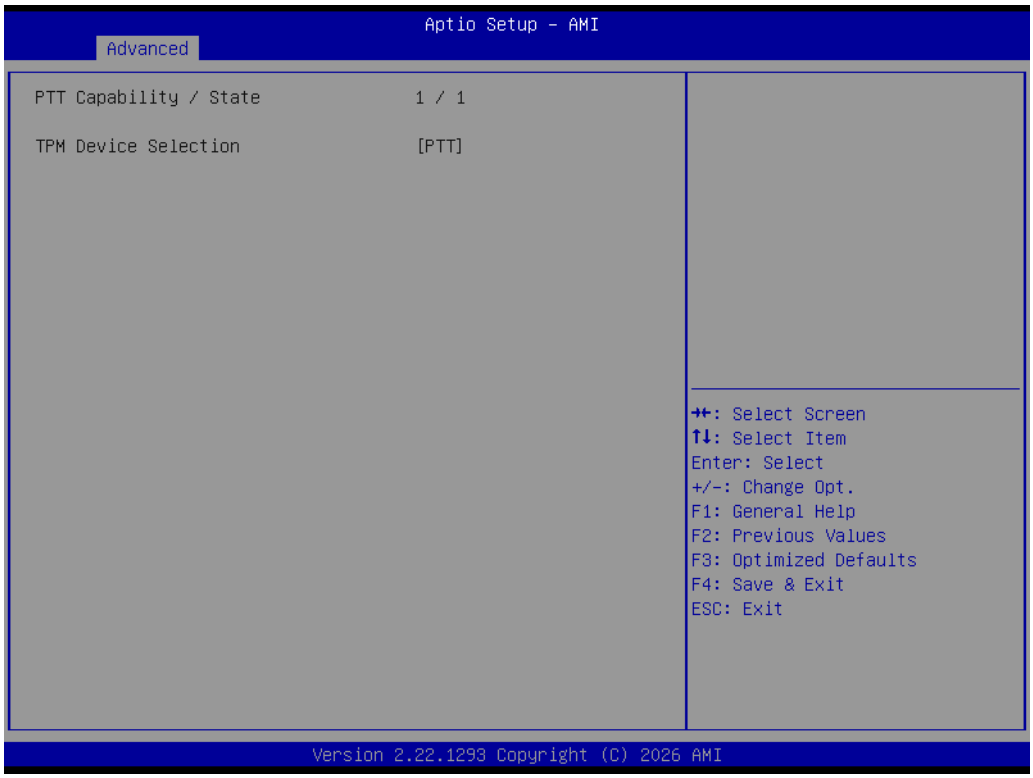
- **ME State**
  When Disabled, ME will be put ME into Temporarily Disabled Mode.
- **Firmware Update Configuration**
  Configure Management Engine Technology Parameters.
- **PTT Configuration**
  Configure PTT Parameters.

3.2.2.3.1 Firmware Update Configuration



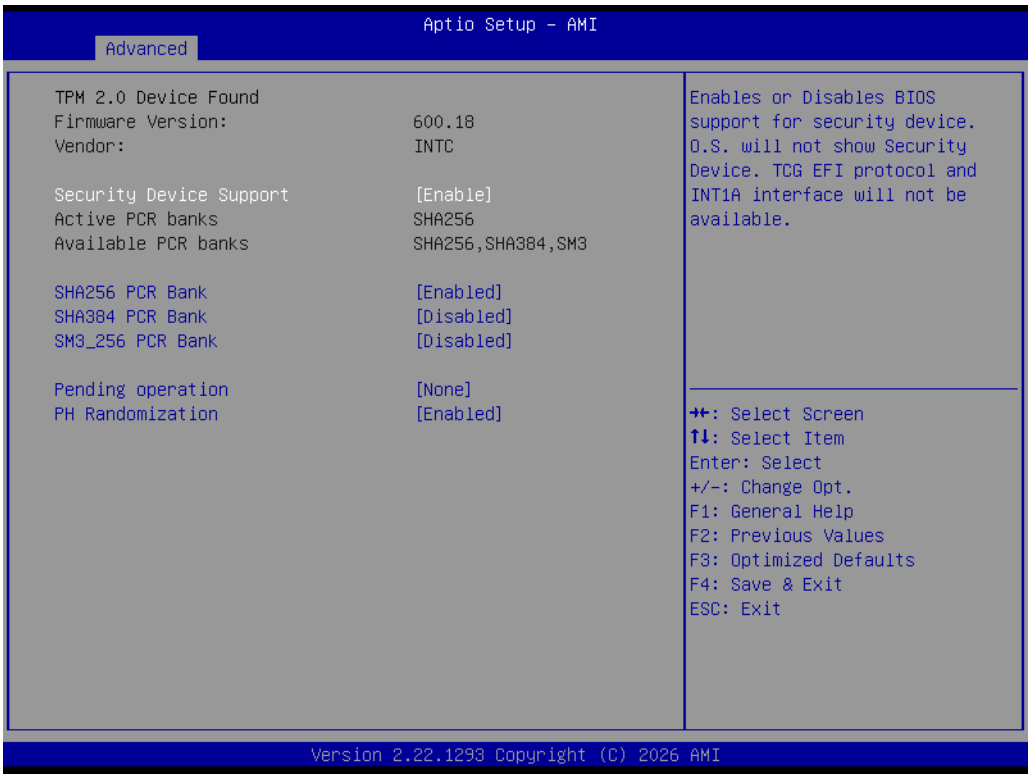
- **Me FW Image Re-Flash**
  Enable/Disable Me FW Image Re-Flash.
- **FW Update**
  Enable/Disable FW Update.

3.2.2.3.2 PTT Configuration



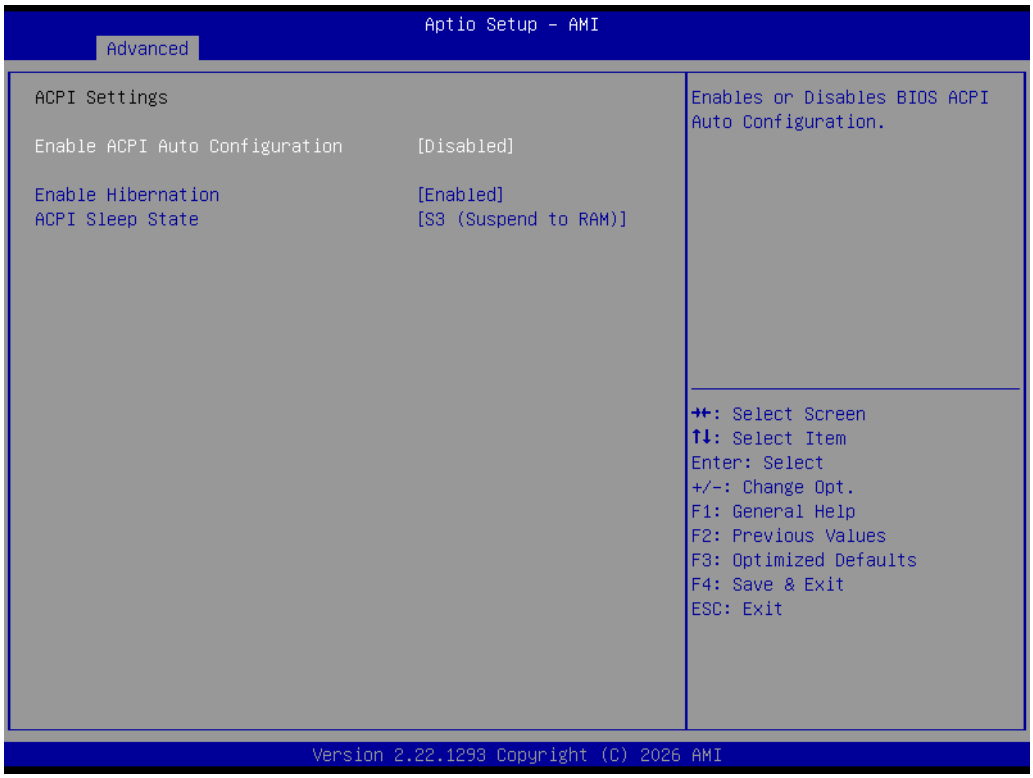
- **TPM Device Selection**
  Select PTT or dTPM.

3.2.2.4 Advanced → Trusted Computing



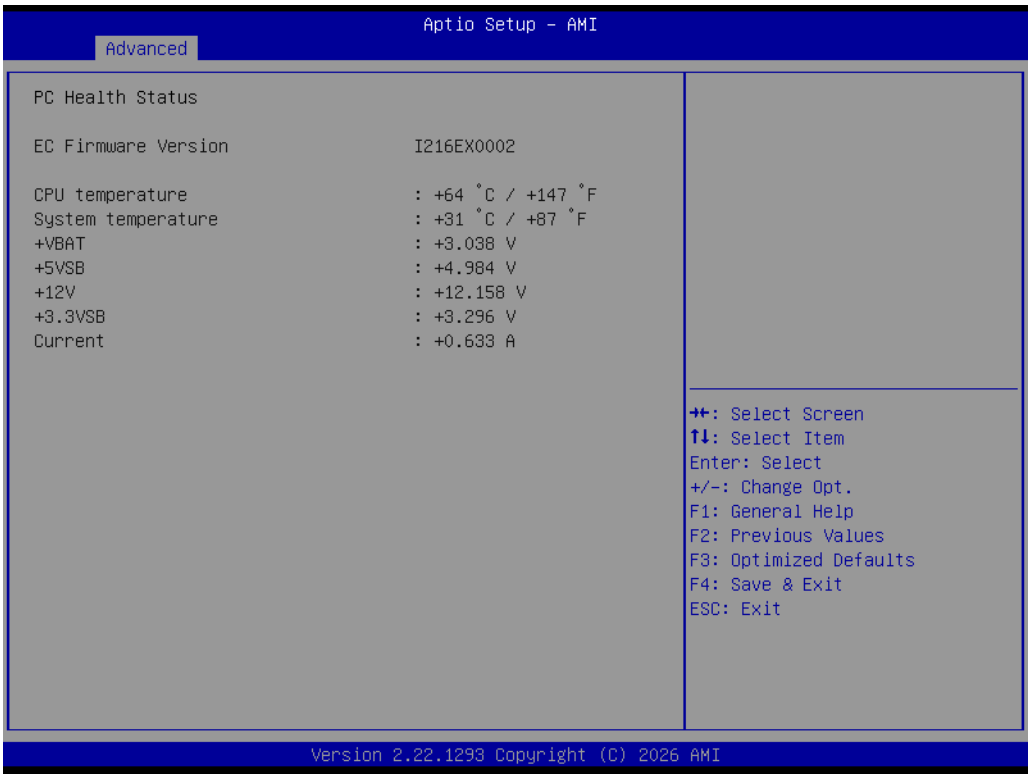
- **Security Device Support**
  Enable/Disable BIOS support for security device.
- **SHA256 PCR Bank**
  Enable/Disable SHA256 PCR Bank.
- **SHA384 PCR Bank**
  Enable/Disable SHA384 PCR Bank.
- **Pending operation**
  Schedule an Operation for the Security Device.
- **PH Randomization**
  Enable/Disable Platform Hierarchy Randomization.

3.2.2.5 Advanced → ACPI Settings

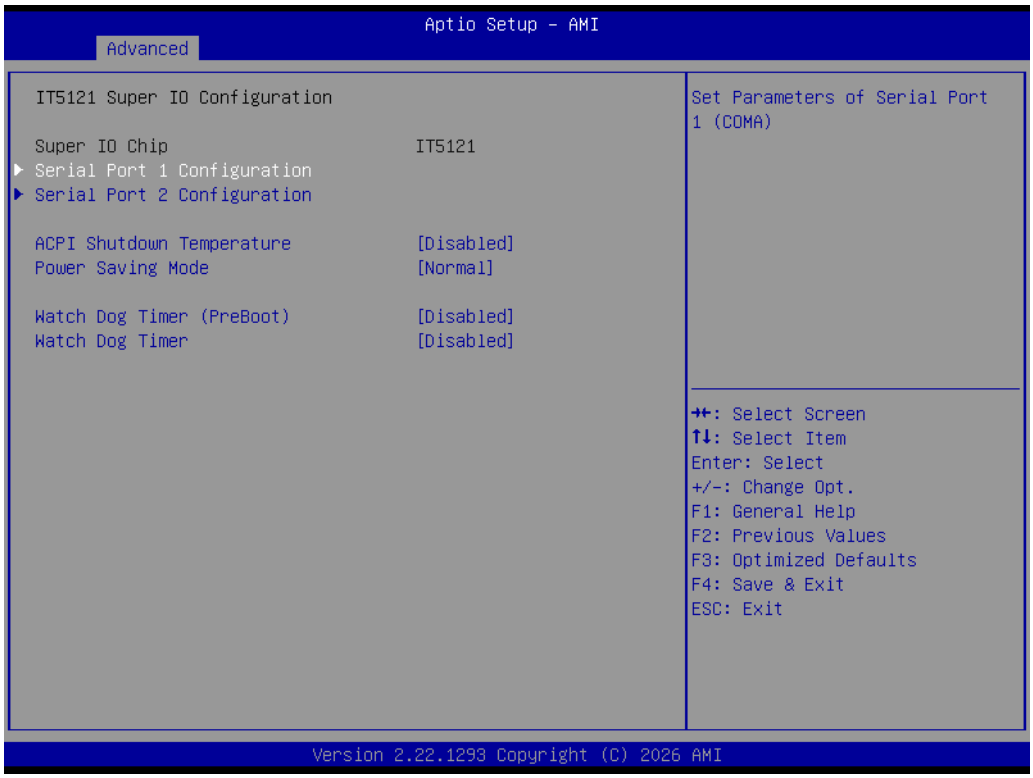


- **Enable ACPI Auto Configuration**
  Enable or disable ACPI Auto Configuration.
- **Enable Hibernation**
  Enable or disable Hibernation.
- **ACPI Sleep State**
  Select S3 (Suspend to RAM) or suspend Disabled.

3.2.2.6 Advanced → IT5121 HW Monitor

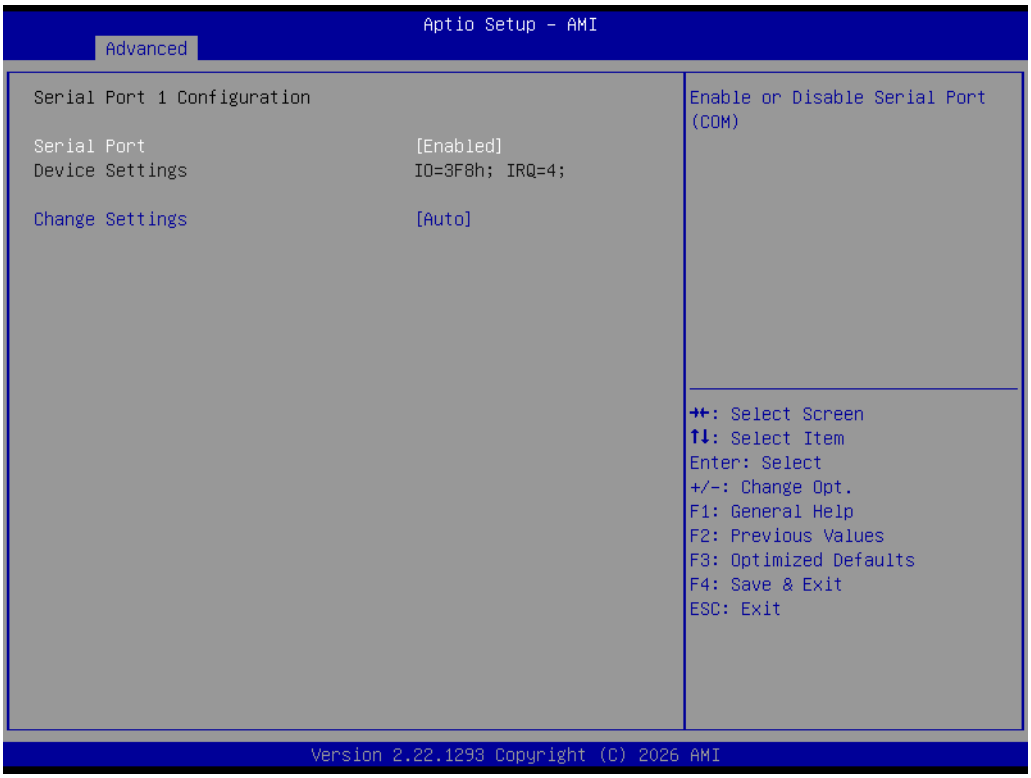


3.2.2.7 Advanced → IT5121 Super IO Configuration



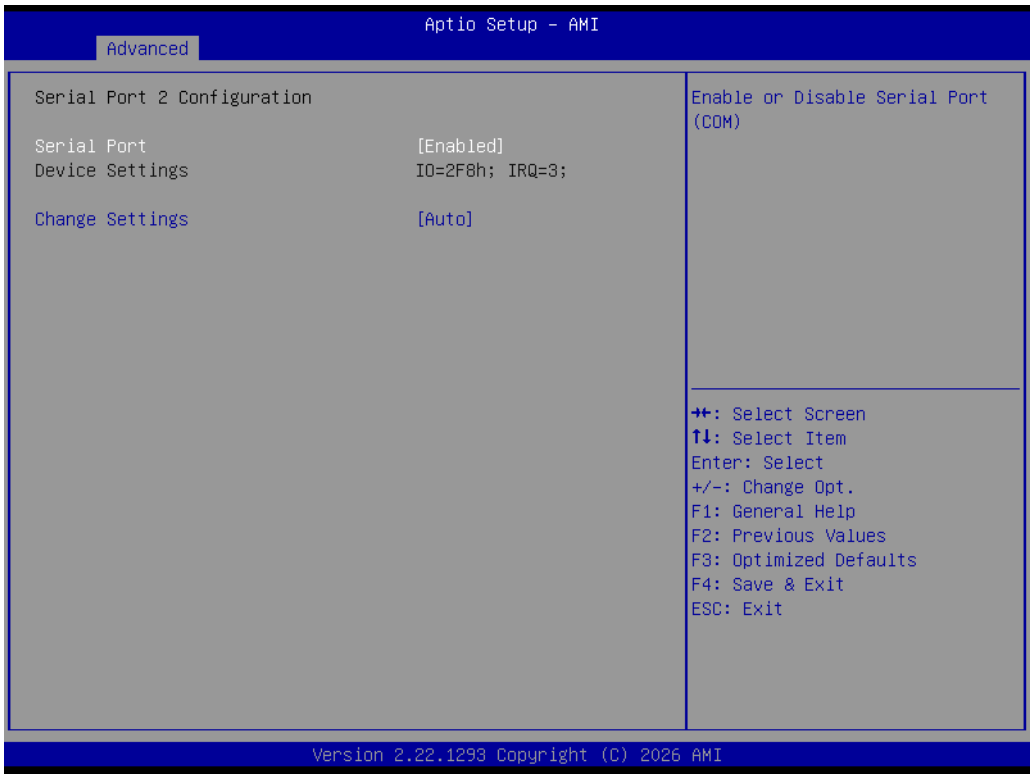
- **Serial Port Description**
- **ACPI Shutdown Temperature**
  Disabled
  70° C/158° F
  75° C/167° F
  80° C/176° F
  85° C/185° F
  90° C/194° F
  95° C/205° F
- **Watch Dog Timer (PreBoot)**
  Enable or disable Watch Dog Timer (PreBoot).
- **Watch Dog Timer**
  Enable or disable Watch Dog Timer.

3.2.2.7.1 Advanced → IT5121 Super IO Configuration → Serial Port 1 Configuration



- **Serial Port**
  Enable/Disable serial port (COM).
- **Change Settings**
  Select an optional settings for Super IO device.

3.2.2.7.2 Advanced → IT5121 Super IO Configuration → Serial Port 2 Configuration



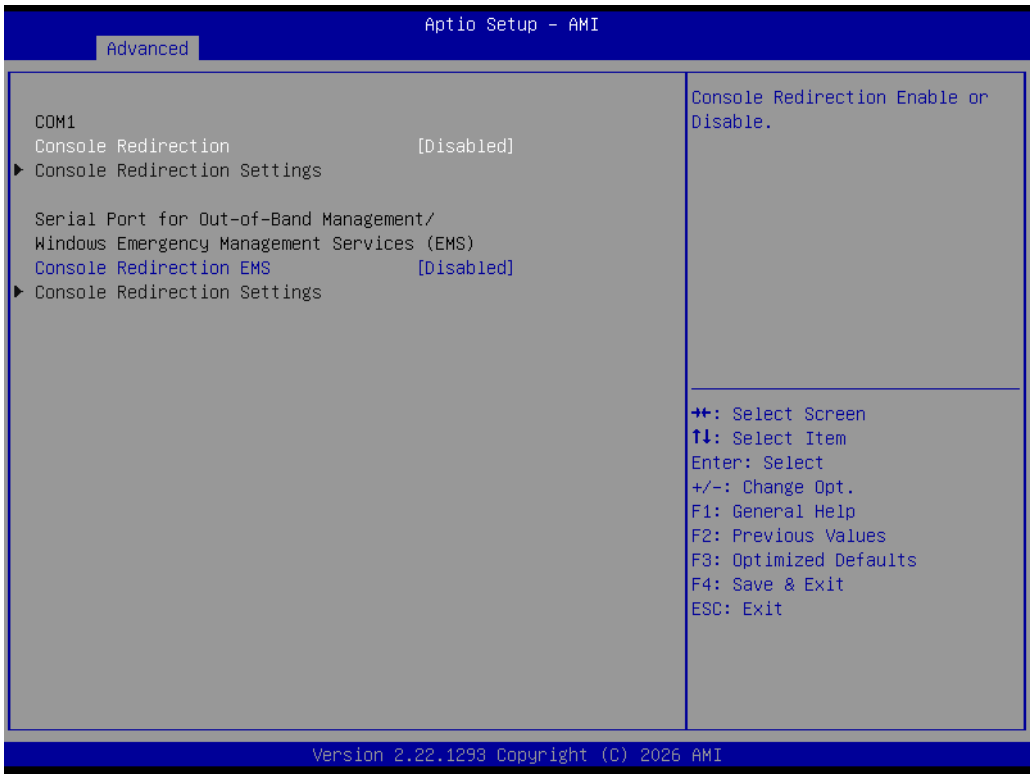
- **Serial Port**
  Enable/Disable serial port (COM).
- **Change Settings**
  Select an optional settings for Super IO device.

3.2.2.8 Advanced → S5 RTC Wake Settings



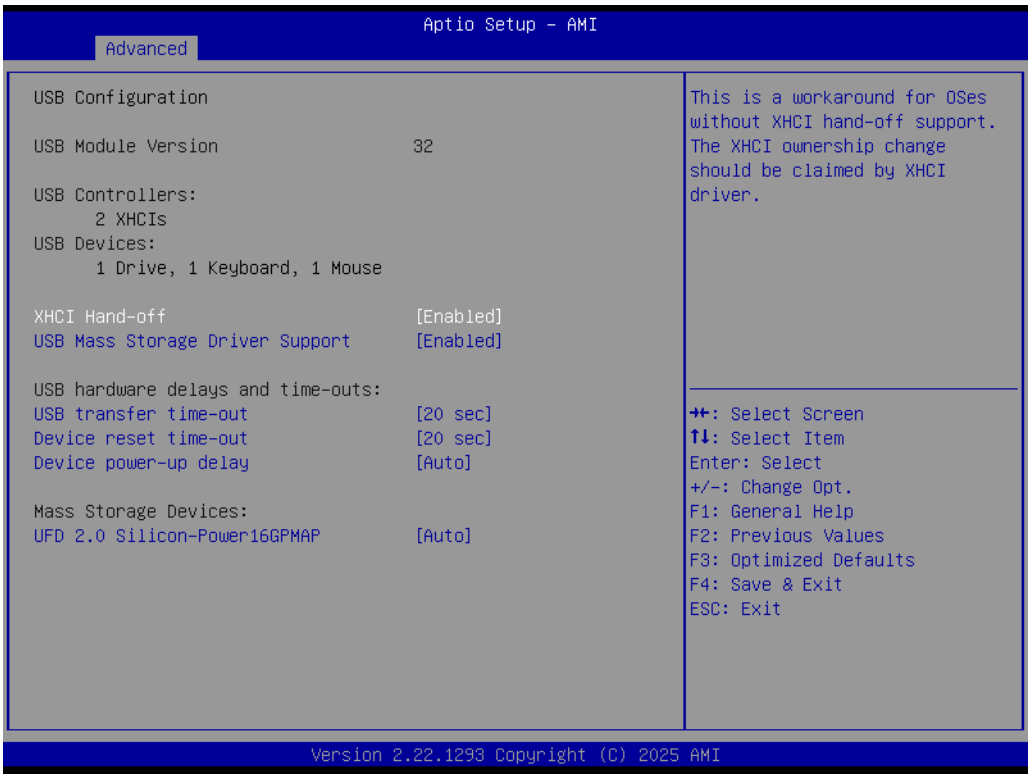
- **Wake system from S5**
  Enable or disable system wake on alarm events. Select Fixed Time for the system to wake at the specified day:hr:min:sec.

3.2.2.9 Advanced → Serial Port Console Redirection



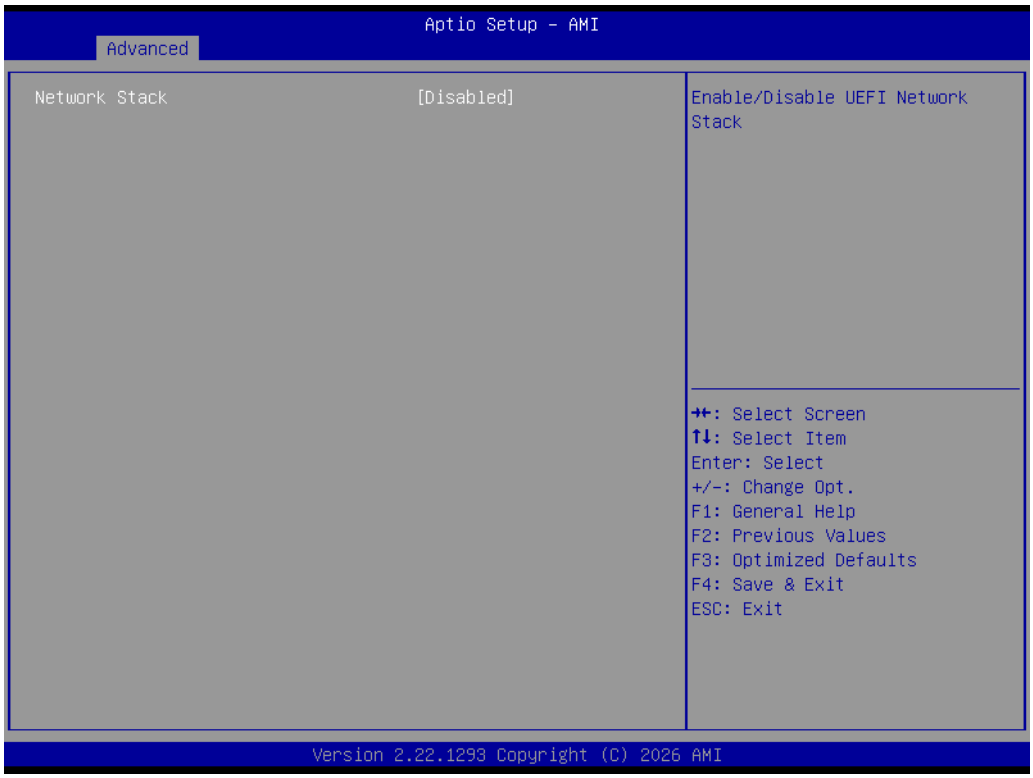
- **Console Redirection**
  Console Redirection Enable or Disable.
- **Console Redirection EMS**
  This item allows users to Enable or Disable console redirection for Microsoft Windows Emergency Management Services (EMS).

3.2.2.10 Advanced → USB Configuration



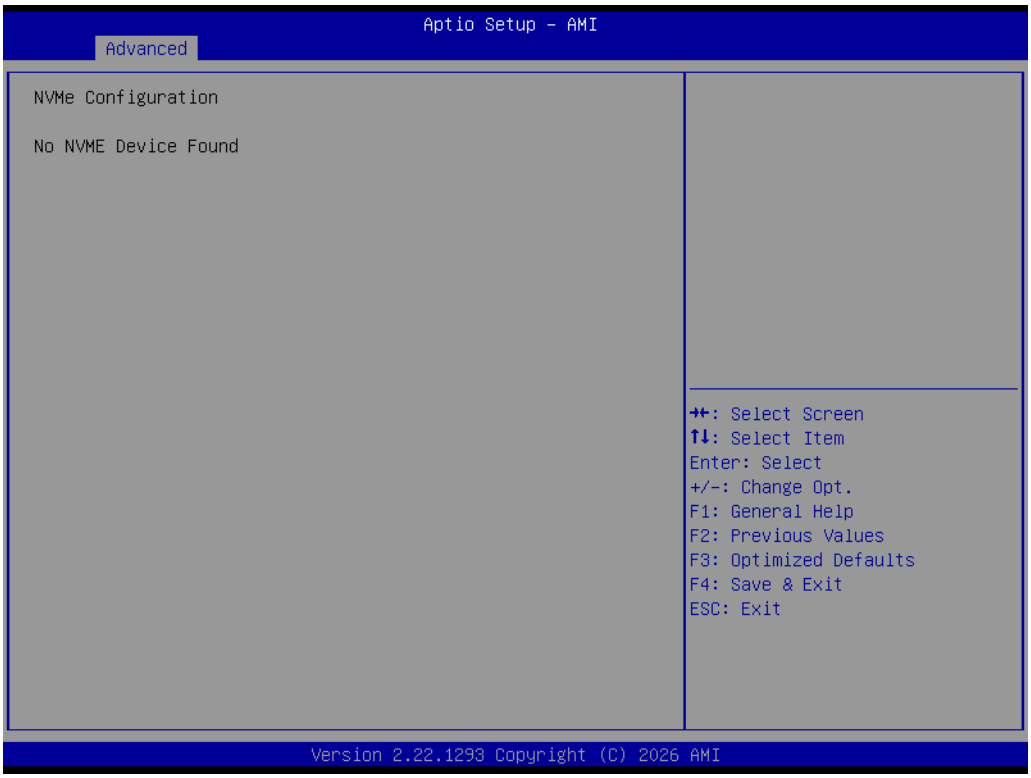
- **XHCI Hand-off**
  Enable or disable XHCI Hand-off.
- **USB Mass Storage Driver Support**
  Enable or disable USB Mass Storage Driver Support.
- **USB transfer time-out**
  Configure time for USB transfer time-out.
- **Device reset time-out**
  Configure time for Device reset time-out.
- **Device power-up delay**
  Auto or Manual set.
- **Mass Storage Devices**
  Auto or Floppy or Forced FDD or Hard Disk or CD-ROM.

3.2.2.11 Advanced → Network Stack Configuration



- **Network Stack**
  Enable or disable network boot functionality (e.g., PXE) by initializing the UEFI network stack.

3.2.2.12 Advanced → NVMe Configuration



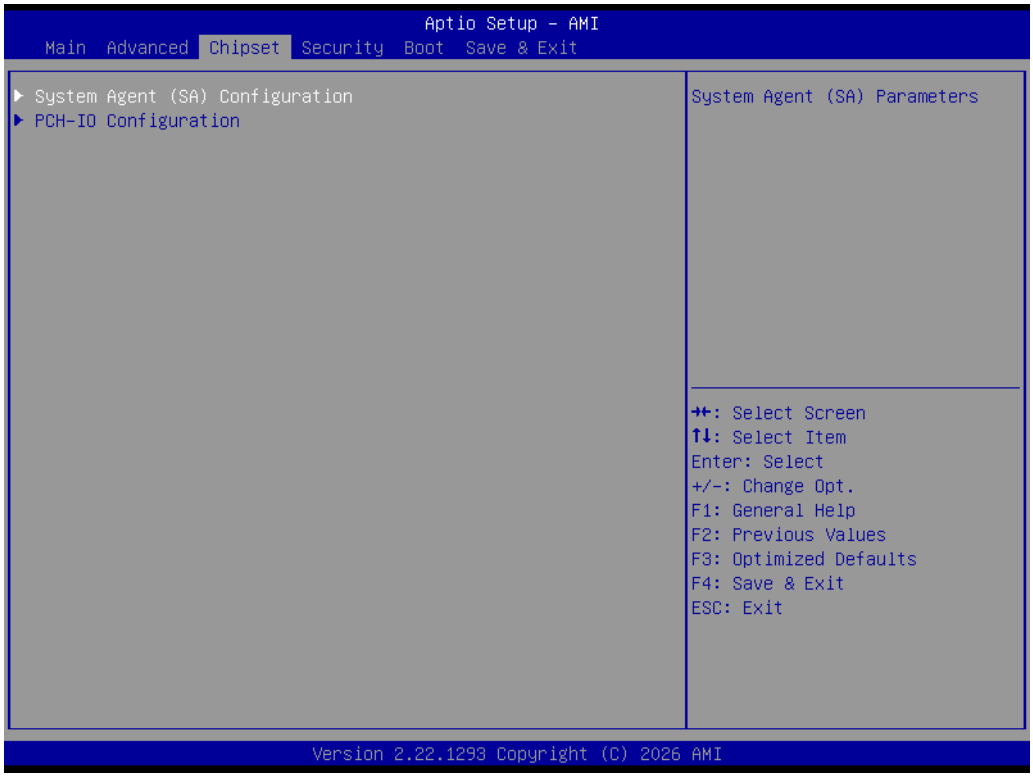
Displays information about the detected NVMe device.

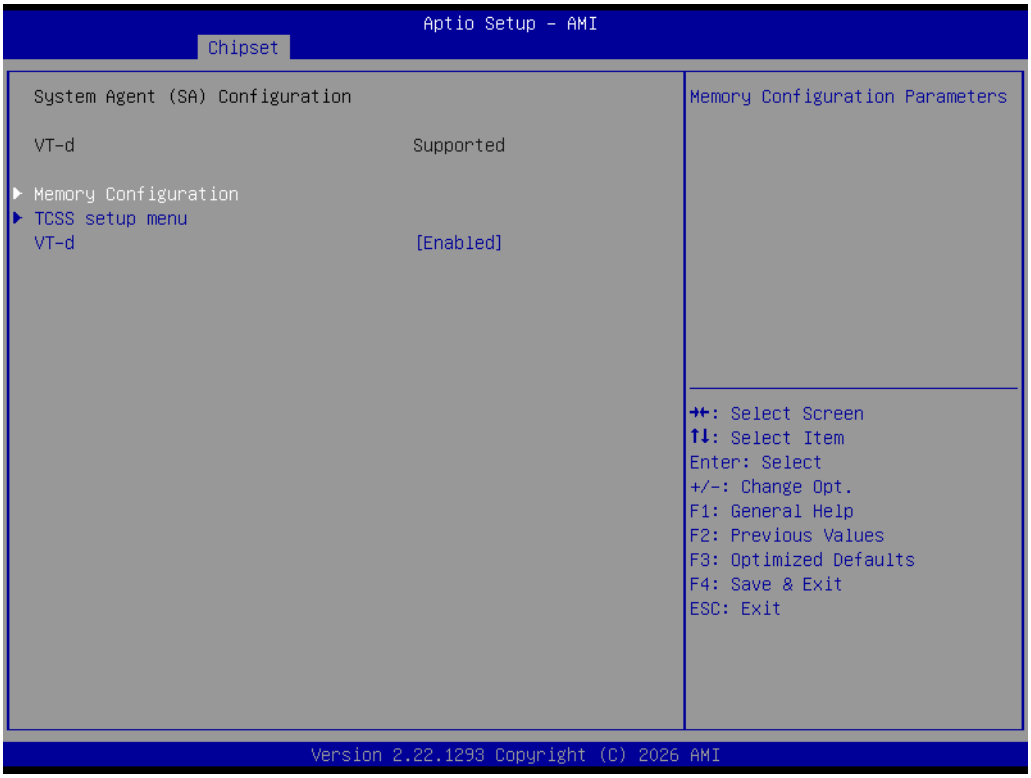
3.2.3 Chipset

Select the Chipset tab from the DS-540 setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section.

The Plug and Play BIOS Setup screen is shown below.

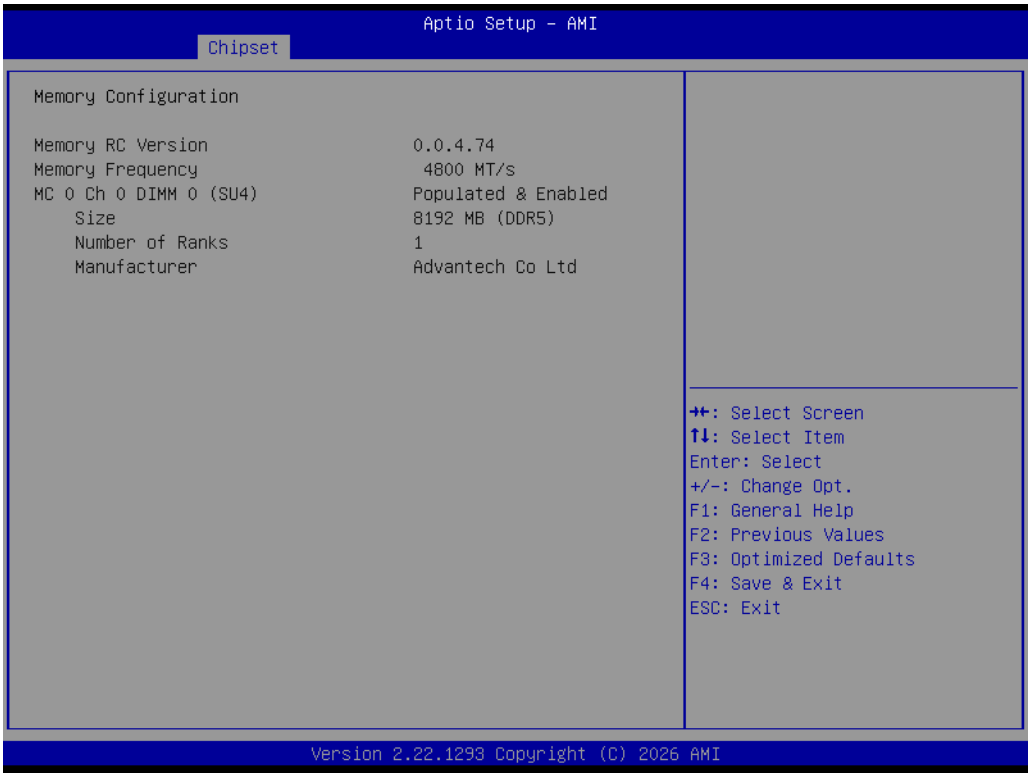
3.2.3.1 Chipset → System Agent (SA) Configuration





- **Memory Configuration**
  Memory Configuration Parameters.
- **VT-d**
  Enable/Disable VT-D.

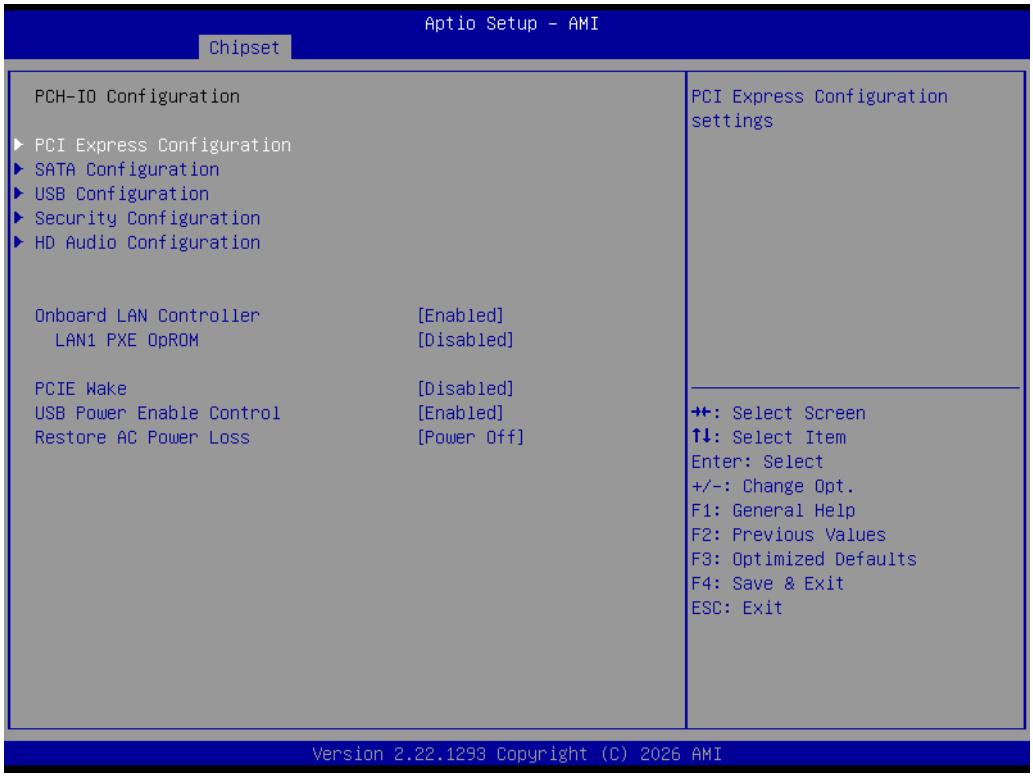
3.2.3.1.1 Chipset → System Agent (SA) Configuration → Memory Configuration



3.2.3.1.2 Chipset → System Agent (SA) Configuration → TCSS Configuration

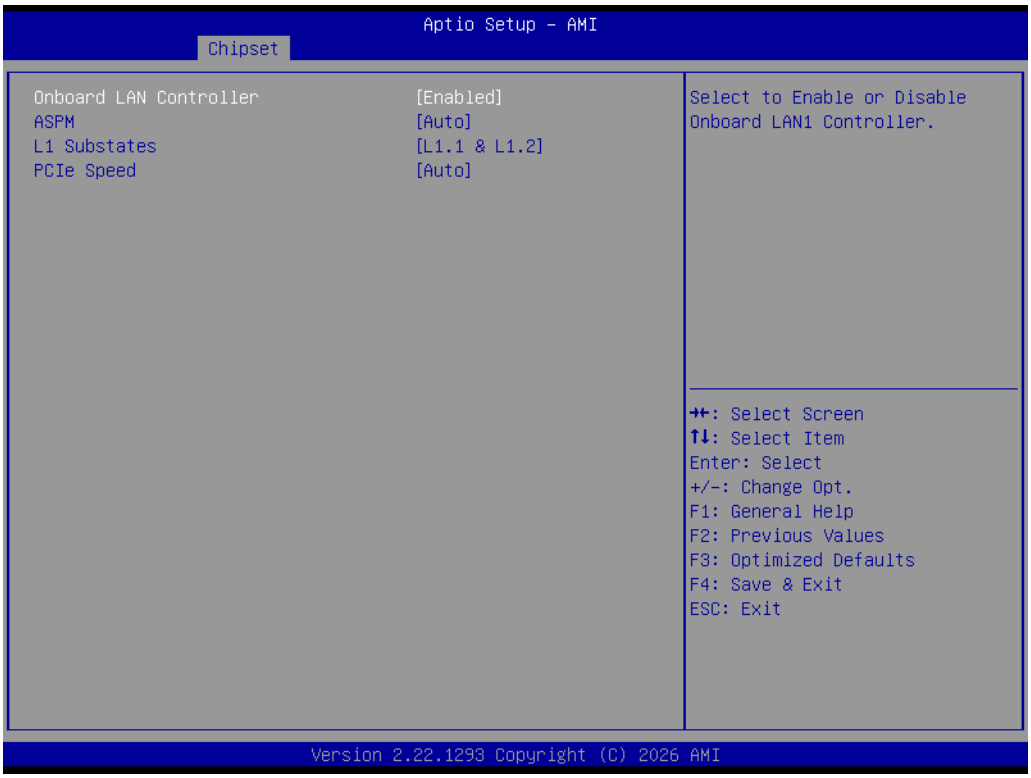
- **TCSS xHCI Support**
  Enable/Disable TCSS xHCI.

3.2.3.2 Chipset → PCH-IO Configuration



- **PCI Express Configuration**
  PCI Express Device Options Settings.
- **SATA Configuration**
  SATA Device Options Settings.
- **USB Configuration**
  USB Configuration Settings.
- **Security Configuration**
  Security Configuration Settings.
- **HD Audio Configuration**
  HD Audio Subsystem Configuration Settings.
- **Onboard LAN1/2 Controller**
  Select to Enable or Disable onboard LAN1/2 Controller.
- **LAN1/2 PXE ROM**
  Enable/Disable boot option ROM for LAN1/2 Controller.
- **PCIE Wake**
  Enable/Disable PCIE Wake
- **USB Power Enable Control**
  Enable/Disable USB Power.
- **Restore AC Power Loss**
  Specify what state to go to when power is re-applied after a power failure (G3 state).

3.2.3.2.1 Chipset → PCH-IO Configuration → PCI Express Configuration



- **Onboard LAN Controller**
  Select to Enable/Disable onboard LAN Controller.
- **M.2 M Key**

■ **Chipset → PCH-IO Configuration → PCI Express Configuration → On board LAN Controller**



– Onboard LAN Controller
  Select to Enable/Disable onboard LAN Controller.
– ASPM
  Set the ASPM Level.
– L1 Substates
  PCI Express L1 Substates settings.
– PCIe Speed
  Configure PCIe Speed.

- **Chipset → PCH-IO Configuration → PCI Express Configuration → PCI Express Root Port 9**



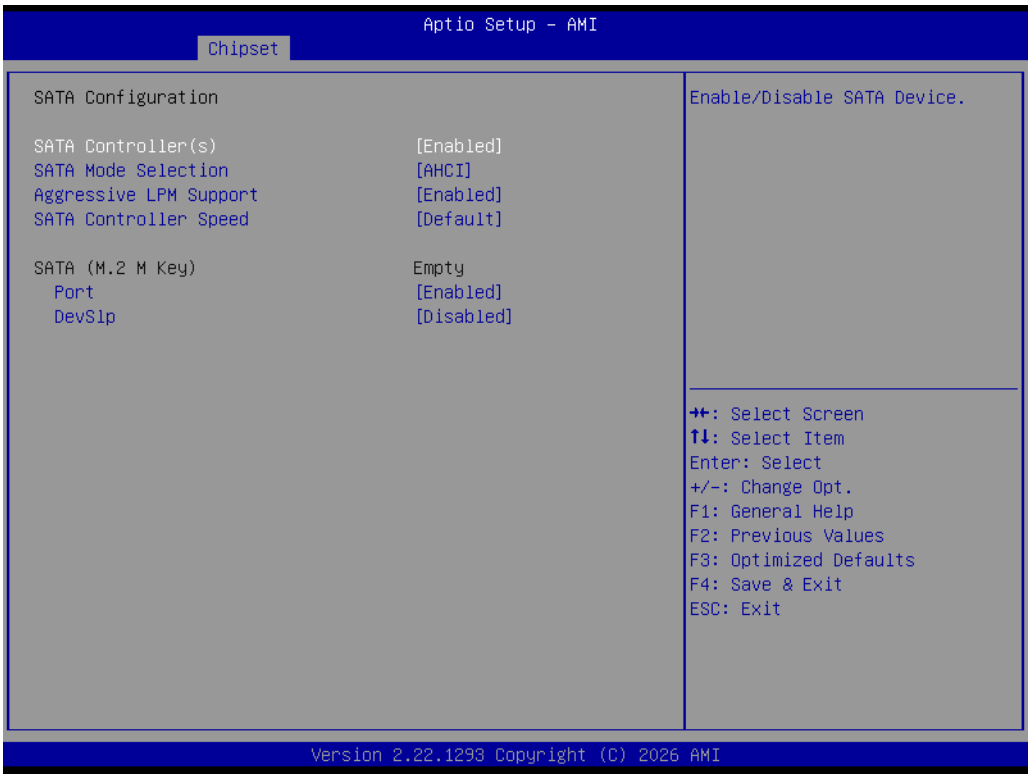
  - PCI Express Root Port 9
    Control the PCI Express Root Port.
  - ASPM
    Set the ASPM Level.
  - L1 Substates
    PCI Express L1 Substates settings.
  - PCIe Speed
    Configure PCIe Speed.

■ **Chipset → PCH-IO Configuration → PCI Express Configuration → PCI Express Root Port 11**



– PCI Express Root Port 11
  Control the PCI Express Root Port.
– ASPM
  Set the ASPM Level.
– L1 Substates
  PCI Express L1 Substates settings.
– PCIe Speed
  Configure PCIe Speed.

3.2.3.2.2 Chipset → PCH-IO Configuration → SATA Configuration

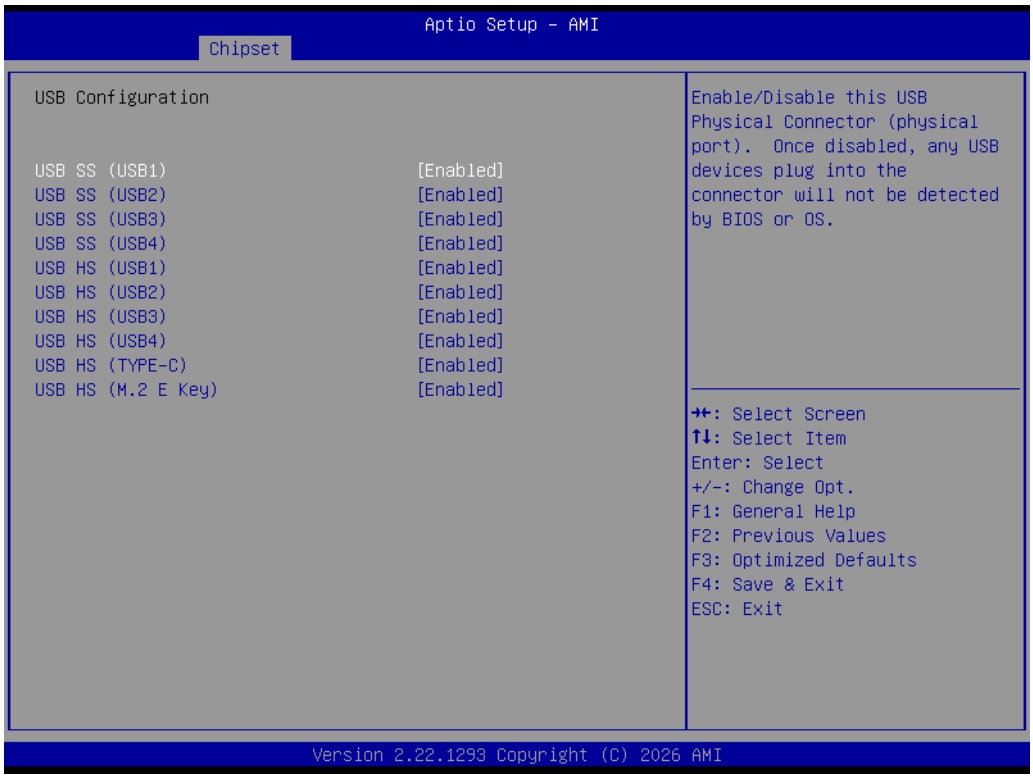


- **SATA Controller(s)**
  Enable/Disable SATA Device.
- **SATA Mode Selection**
  Determine how the SATA controller operates.
- **Aggressive LPM Support**
  Enable PCH to aggressively enter link power state.
- **SATA Controller Speed**
  Indicates the maximum speed the SATA controller can support.

M.2 SATA Port

- **Port 1**
  Enable/Disable SATA Port.
- **SATA Port 1 DevSlp**
  Enable/Disable SATA Port 1 DevSlp. For DevSlp to work, both hard drive and SATA port need to support DevSlp function, otherwise an unexpected behavior might happen.

3.2.3.2.3 Chipset → PCH-IO Configuration → USB Configuration



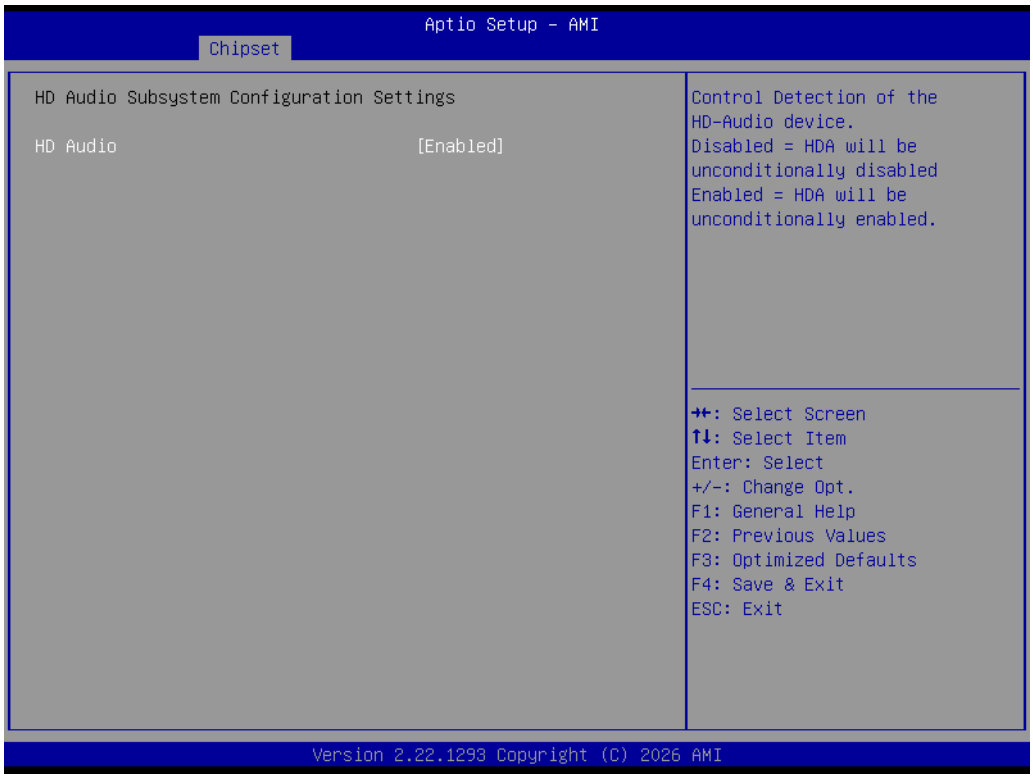
- **USB SS (USB3_1)**
  Enable/Disable USB3 Port 1.
- **USB SS (USB3_2)**
  Enable/Disable USB3 Port 2.
- **USB SS (USB3_3)**
  Enable/Disable USB3 Port 3.
- **USB SS (USB3_4)**
  Enable/Disable USB3 Port 4.
- **USB HS (USB3_1)**
  Enable/Disable USB3 Port 1.
- **USB HS (USB3_2)**
  Enable/Disable USB3 Port 2.
- **USB HS (USB3_3)**
  Enable/Disable USB3 Port 3.
- **USB HS (USB3_4)**
  Enable/Disable USB3 Port 4.
- **USB HS TYPEC1**
  Enable/Disable TYPEC Port 1.
- **M.2 E-Key Port**
  Enable/Disable M.2 USB Port.

3.2.3.2.4 Chipset → PCH-IO Configuration → Security Configuration



- **RTC Memory Lock**
  Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM.
- **BIOS Lock**
  Enable/Disable the PCH BIOS Lock Enable feature.

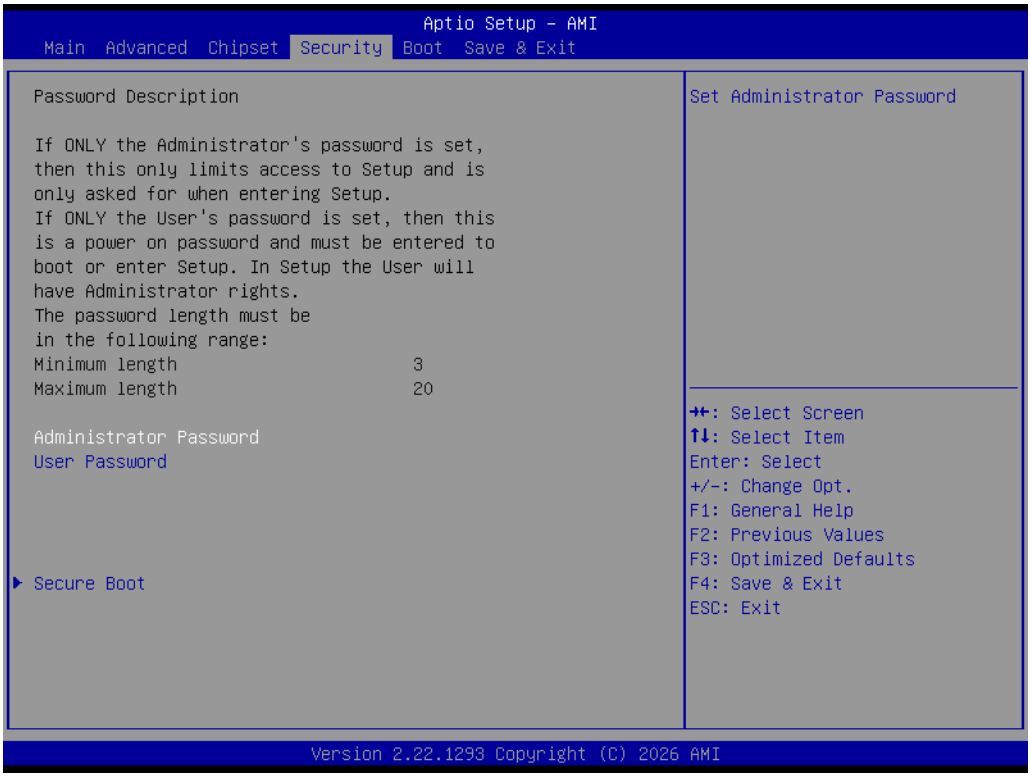
3.2.3.2.5 Chipset → PCH-IO Configuration → HD Audio Configuration



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

3.2.4 Security

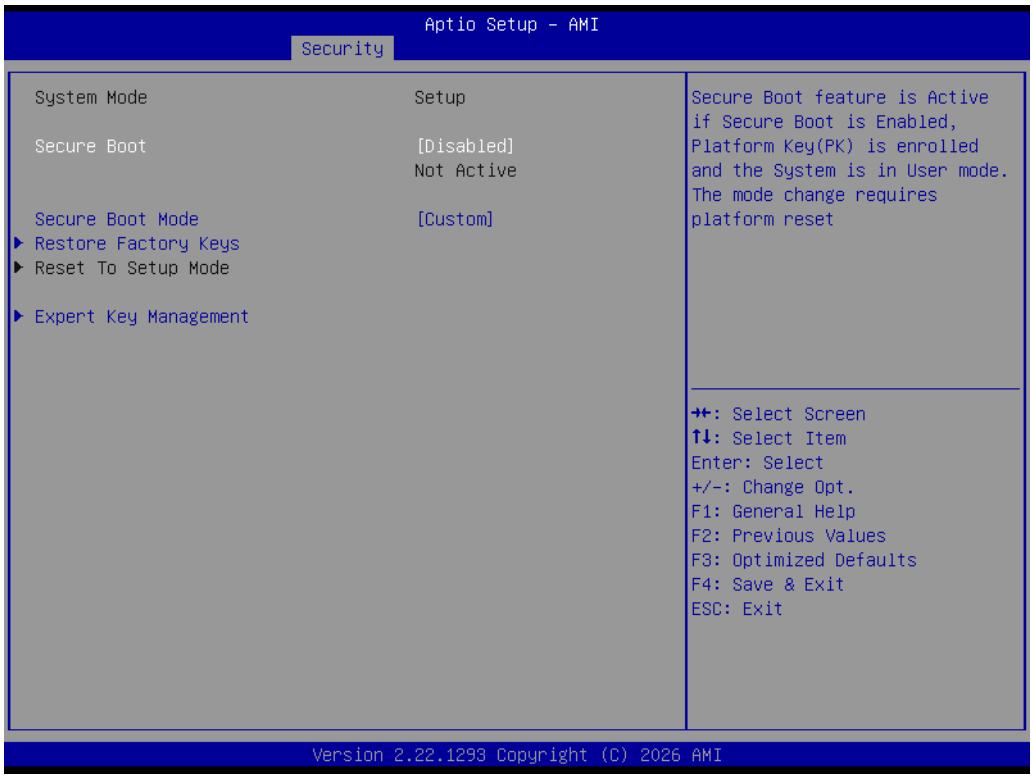
Select Security Setup from the DS-540 Setup main BIOS setup menu. All Security Setup options, such as password protection and virus protection are described in this section.



To access the sub-menu for the following items, select the item and press <Enter>:

- **Change Administrator/User Password**
  Select this option and press <ENTER> to access the sub-menu, and then type in the password.
- **Secure Boot**
  Secure Boot Configurations.

3.2.4.1 Security → Secure Boot



- **Secure Boot**
  The 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 a 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.
- **Restore Factory Keys**
  Force System to User Mode. Install factory default Secure Boot Key databases.
- **Expert Key Management**
  Enables expert users to modify Secure Boot Policy variables without variable authentication.

3.2.4.2 Security → Expert Key Management



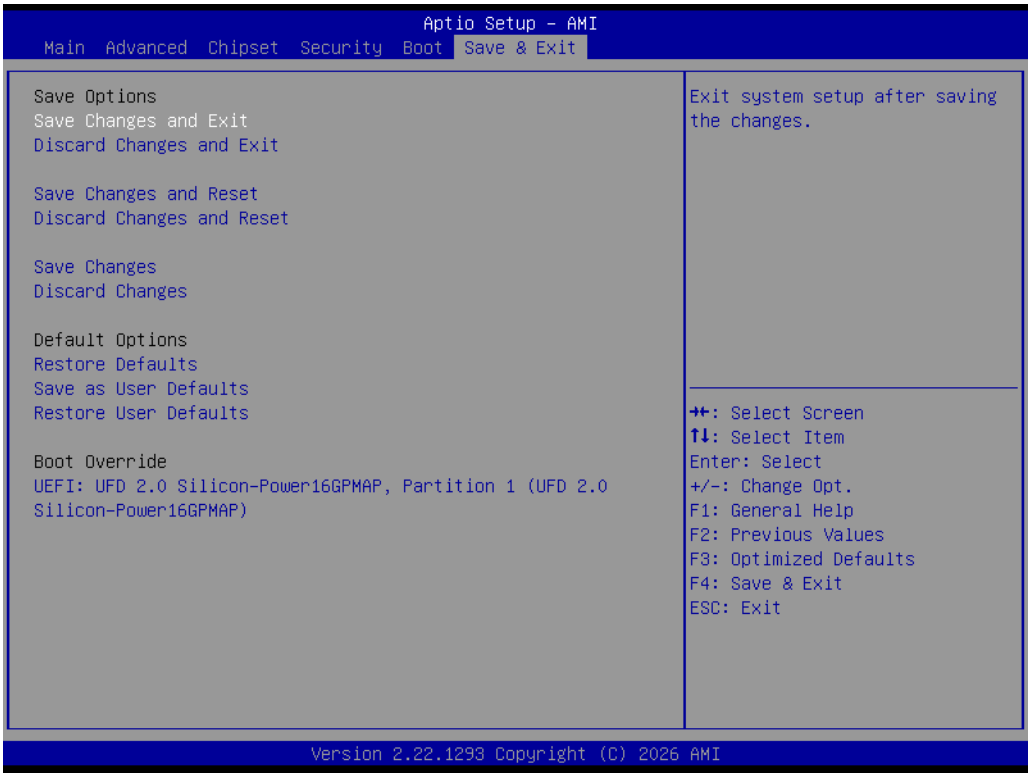
- **Factory Key Provision**
  Enable or disable Factory Key Provision.

3.2.5 Boot



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

3.2.6 Save & Exit



- **Changes and Exit**
  Exit system setup after saving the changes.
- **Discard Changes and Exit**
  Exit system setup without saving any changes.
- **Save Changes and Reset**
  Reset the system after saving the changes.
- **Discard Changes and Reset**
  Reset system setup without saving any changes.
- **Save Changes**
  Save Changes done so far to any of the setup options.
- **Discard Changes**
  Discard Changes done so far to any of the setup options.
- **Restore Defaults**
  Restore/Load Default values for all the setup options.
- **Save as User Defaults**
  Save the changes done so far as User Defaults.
- **Restore User Defaults**
  Restore the User Defaults to all the setup options.
- **Boot Override**
  Boot device select can override your boot priority.

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