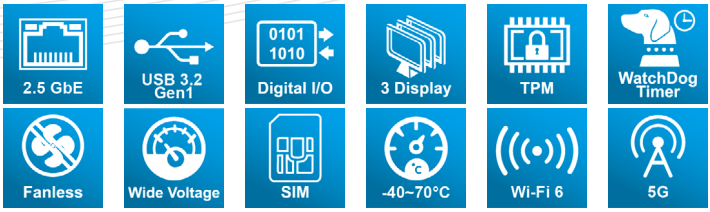
AIV-TGH7Bx

In-Vehicle Computer

Intel® Core™ Xeon, i7, i5, i3 Processor
(Tiger Lake Platform)



User Manual

Acrosser Technology Co., Ltd.
www.acrosser.com

Disclaimer

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Purpose

This document is intended to provide the information about the features and use of the product.

Audience

The intended audiences are technical personnel, not for general audiences.

WARNING

Danger of explosion if batteries are incorrectly replaced. Always replace the battery with the same specifications. Dispose of used batteries according to the manufacturer's instructions.

Before running the system, make sure the power cord is firmly plugged into the socket.

CAUTION


IEC 60417-6042 (2010-11)


IEC 60417-6172 (2012-09)

All power cords must be disconnected during product repair.

Ver: 102
Date: Feb. 5, 2024

To read this User Manual on your smart phone, you will have to install an APP that can read PDF file format first. Please find the APP you prefer from the APP Market.

Table of Contents

1. Introduction

AIV-TGH7Bx Series adopt the newest Intel® 11th Gen. Tiger Lake H high-performance platform for wide operation temperature in-vehicle computers.

Powered by the latest 11th Gen Intel® Core™ i7/i5 Processor, HYPERLINK "https://www.acrosser.com/en/Products/In-Vehicle-Computer/In-Vehicle-PCs/AIV-TGH7BX" AIV-TGH7Bx Series delivers high-performance data computing, and the newest Intel® Iris® Xe Graphics and TSN technology provide graphics real-time operation and a wide range of 9V to 24V power input.

AIV-TGH7Bx is a powerful solution for in-vehicle computers, passenger information computers, charging equipment controllers, Autonomous Mobile Robot controller and any AIoT/Industry 4.0 applications.

1.1. Specifications

CPU	• 11th Generation Intel® Core™ Processor Family (Tiger Lake H)
Chipset	• **i7-11850HE** 8 core, base frequency 2.6GHz, max single core turbo frequency 4.7Ghz, TDP is 35W/45W • **i5-11500HE** 6 core, base frequency 2.6GHz, max single core turbo frequency 4.5Ghz, TDP is 35W/45W • **i3-11100HE** 4 core, base frequency 2.4GHz, max single core turbo frequency 4.4Ghz, TDP is 35W/45W
Memory	• 1x DDR4-3200 Memory supports up to 32 GB
Graphic Controller	• Intel® Iris® X Graphics
Video Interface	• 1x HDMI: Up to 4096 x 2304 • 2x DP: Up to 4096 x 2304
Ethernet	• LAN 1: RJ45 Type Intel® I225GigE LAN • LAN 2: RJ45 Type Intel® I219 GigE LAN
USB	• 4x Type A USB 3.2 Gen2
Serial Port	• 2x RS-232/RS422/485
Display	• 1x HDMI • 2x DP
Audio	• Realtek® HD Codec • 1x Mic-in, 1x Line-out, 1x Line-in
Disk Bay	• 2x 2.5" SSD Bay
DIO	• DIO x 16, DB25 type connector

Serial Port	• 2x RS-232
DC-in	• 9~24V DC-in power input with power ignition, w/ 3pin terminal block
Antenna type	• 2x Wifi U.FL Antenna (When install half size mPCIe wifi+BT module • 4x 3G/4G/5G/GNSS U.FL Antenna (Diversity, MIMO) (When install M.2 3042 type 4G/5G/GNSS module)
SATA	• 2x 2.5” Easy Access drive trays w/ SATA III (6Gbps), support S/W RAID 0, 1 • Max. Current: 2A
Mini PCIe	• 1x Half Size Mini PCIe slot
M.2	• 1x M.2 B key(3052) • 1x M.2 M key(2280) (PCIe 4.0[x4])
SIM	• 1x Nano SIM slot
Hardware Monitoring	• CPU Voltage • CPU & System Temperature
Watchdog Timer	• Software Programmable 0~255 seconds, 0=Disable
OS support	• Ubuntu 20.04.2/Kernel 5.8 or Linux 4.18 kernel • Window 10, 64 bit
Chassis	• Aluminum heatsink + metal chassis
Dimension	• 276.00mm x 175.00mm x 91mm (Include Wall mount)
Operating Temperature	• Fanless Design • 45W TDP CPU: -40°C to 70°C (-40°F to 158°F)
Storage Temperature	• -40°C to 80°C (-40°F to 176°F)
Humidity	• 5% to 95% Humidity, non-condensing
Vibration	• IEC 60068-2-64 • SSD: 5Grms, 5Hz to 500Hz, 3 Axis
Shock	• IEC 60068-2-27 • SSD: 50G @ wallmount, Half-sine, 11ms
Certification	• CE / FCC class A

1.2. Packing List

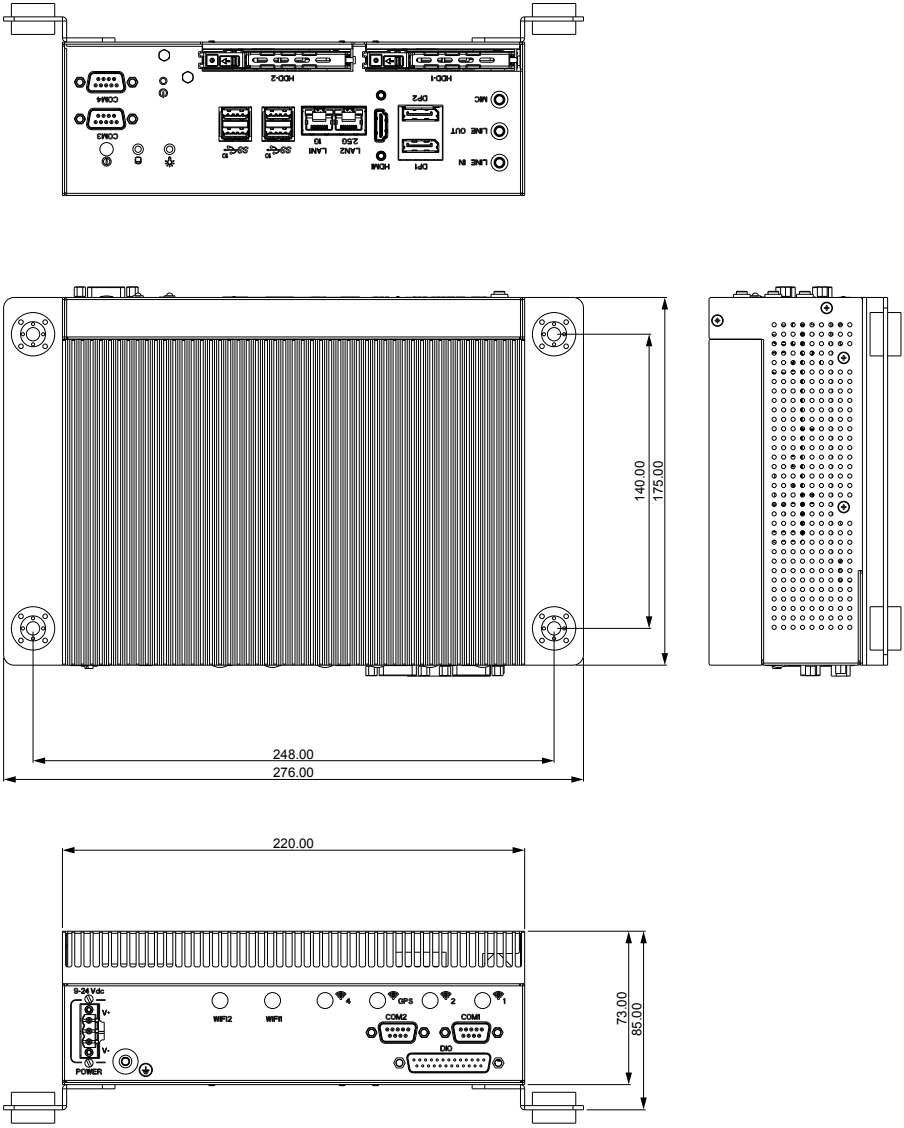
Check if the following items are included in the package.

	Item	Q'ty
☐	AIV-TGH7Bx	1
☐	3-Pin Terminal block	1
☐	Wall mount bracket and screws kits	1
☐	M3x4L m.2 module screws set	1
☐	M.2 module bracket	1
☐	HDMI Locking Bracket	1

1.3. System Dissection

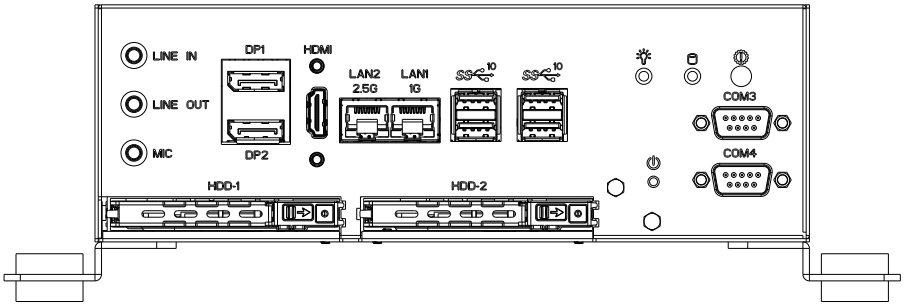
1.3.1. Dimensions

(Unit: mm)

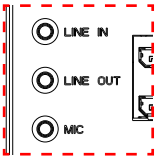


(The peripherals shown in this layout dimensions are used for illustration only, may not come with the package.)

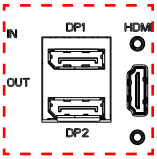
1.3.2. Front I/O Panel



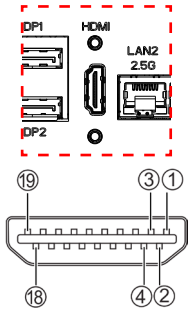
Line In, Line Out, MIC

	LINE IN: Audio input jack. LINE OUT: Audio output jack. MIC: Microphone input jack.

DP1, DP2

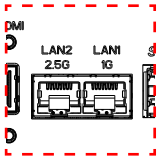
	DP Connector (Standard Specification)

HDMI



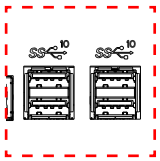
Pin #	Signal	Pin #	Signal
1	DATA2+	**2**	GND
3	DATA2-	**4**	DATA1+
5	GND	**6**	DATA1-
7	DATA0+	**8**	GND
9	DATA0-	**10**	CAN_L
11	GND	**12**	
13	NC	**14**	NC
15	DDCCL	**16**	DDCDA
17	GND	**18**	+5V
19	HPD		

LAN1(1G), LAN2(2.5G)

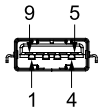


LAN Speed		Link/Seppd LED	Active LED
1G	1G	Orange	Yellow
	100M	Green	Yellow
	10M	Off	Yellow
2.5G	2.5G	Green	Yellow
	1G	Orange	Yellow
	100/10M	Off	Yellow

USB1 ~ USB4

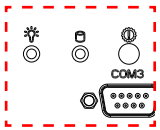


Standard Type A USB3.2 GEN 2



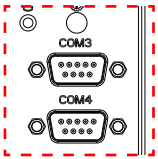
Pin #	Signal	Pin #	Signal
1	VCC5	5	SS_RX -
2	DATA-	6	SS_RX +
3	DATA+	7	GND
4	GND	8	SS_TX -
		9	SS_TX +

Status/HDD/Power LED Indicator



Light	Display
Yellow	Power
Green	SATA Device Activity
Green	Status

COM3, COM4



Pin #	RS-232 Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

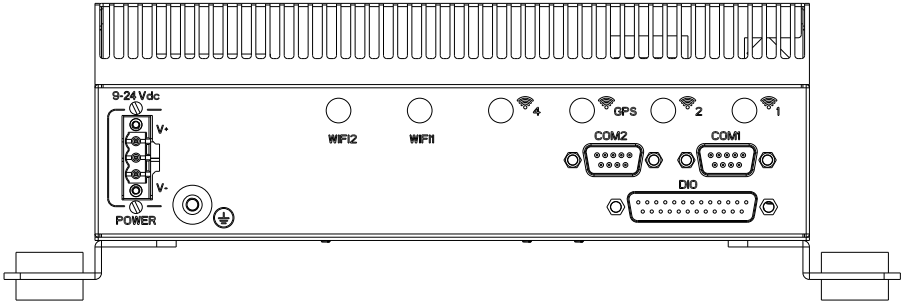
Power Button

You may use a thin and long object to reach into the hole and push the button in.

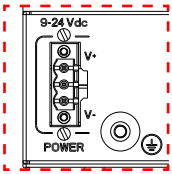
HDD-1 ~ HDD-2

HDD bays reserved for installation of your 2.5" hard disks (H: 7mm).

1.3.3. Rear I/O Panel



POWER



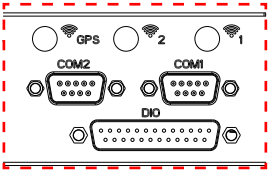
DC power input connector

Pin #	Signal
V+	9V ~ 24V
IGN	NC
V-	GND

ANT1 ~ ANT6

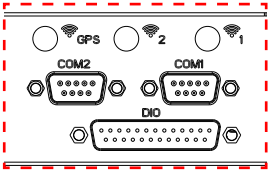
Reserved for installation of 6x optional SMA-type antennas.

COM1, COM2



Pin #	RS-232 Signal	RS-422 Signal	RS-485 Signal
1	DCD	RS-422_TX-	RS-485_D-
2	RX	RS-422_TX+	RS-485_D+
3	TX	RS-422_RX+	
4	DTR	RS-422_RX-	
5	GND	GNA	GND
6	DSR		
7	RTS		
8	CTS	+5V/+12V (0.5A)	+5V/+12V (0.5A)
9	RI		

DIO



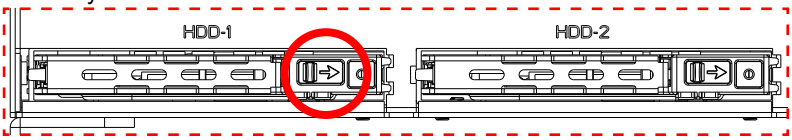
Pin #	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	GND	GND	
3	DIO_1	I/O	+5V
4	DIO_2	I/O	+5V
5	DIO_3	I/O	+5V
6	DIO_4	I/O	+5V
7	DIO_5	I/O	+5V
8	DIO_6	I/O	+5V
9	DIO_7	I/O	+5V
10	DIO_8	I/O	+5V
11	DIO_9	I/O	+5V
12	DIO_10	I/O	+5V
13	DIO_11	I/O	+5V
14	DIO_12	I/O	+5V
15	DIO_13	I/O	+5V
16	DIO_14	I/O	+5V
17	DIO_15	I/O	+5V
18	DIO_16	I/O	+5V
19	NA		
20	NA		
21	NA		
22	NA		
23	NA		
24	NA		
25	NA		

2. Components Assembly

The products shown in this procedule are used for illustration only, may not reflect the exact outlooks.

2.1. SSD Installation

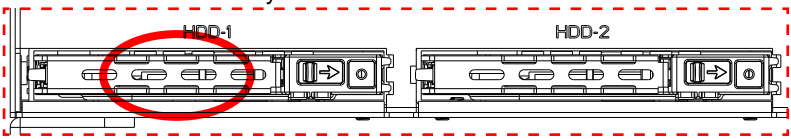
Step 1: As shown in the red circle, slide the door buckle to the right to take out the SSD tray.



Step 2: Follow the deployment direction to insert the SSD. Please pay attention to the insertion direction. The red circle chown is a hollow hole.

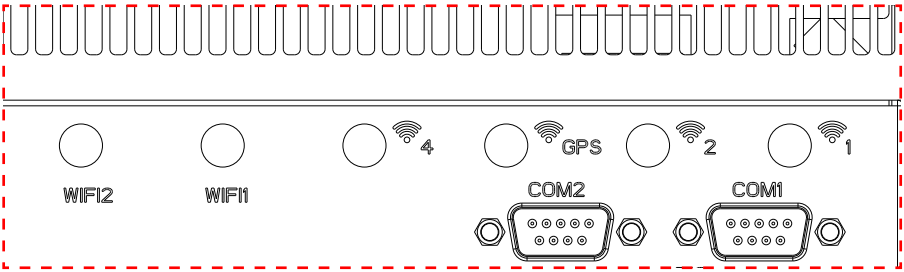
Step 3: Place the SSD firmly into position. The 2 screws provided in the accessories package is used for spare only.

Step 4: Insert the SSD tray into the system and press the part shown with red circle to attach with the system.



2.2. Antenna Connection

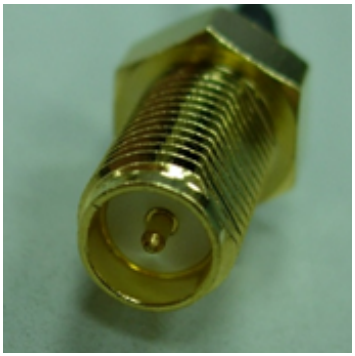
Connect your antennas needed according to your system configuration.



You will have to match the gender in connecting antenna plug with socket.

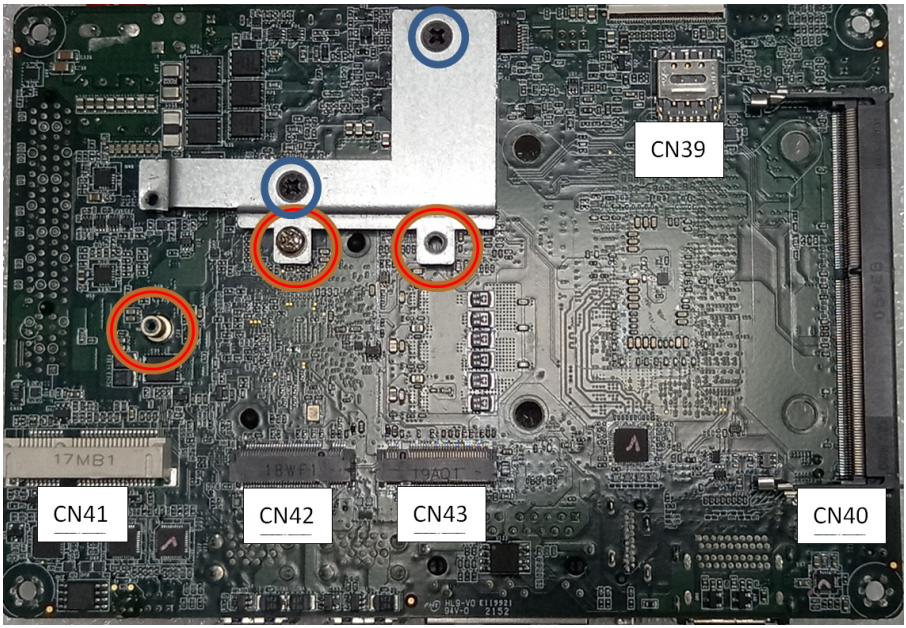
Connect a male type antenna to the female type socket (GPS):

Connect a female type antenna to the male type socket (WiFi/BT):



2.3. PCB Parts Description

Connect your antennas needed according to your system configuration.



- **CN39: NANO SIM Card Socket**

  Install NANO SIM card here.

- **CN40: DDR4 SO-DIMM Slot**

  When installing memory module, please note that both ends of the memory and solt are firmly attached.

- **CN41: Mini-Card Slot (Half-Size)**

  Before installation, take the screw from the accessories package. Screw tight the module to the standoff as shown in the red circle.

- **CN42: M.2 B Key Slot 3042**

  For model 3052: Take out the screws from the accessories package before installation. Insert the module, and then lock it with the screws into the screw holes marked with blue circle as shown in the photo.

  For model 3042: Take out the bracket and screws from the accessories package before installation. As shown in the photo, lock the bracket with the two screws into the screw holes marked with blue circle first, and then insert the module, lock screws into the holes marked with red circle.

  Note: CN42 3042 cannot support CN43 2280 at the same time.

- **CN43: M.2 M Key Slot 2242**

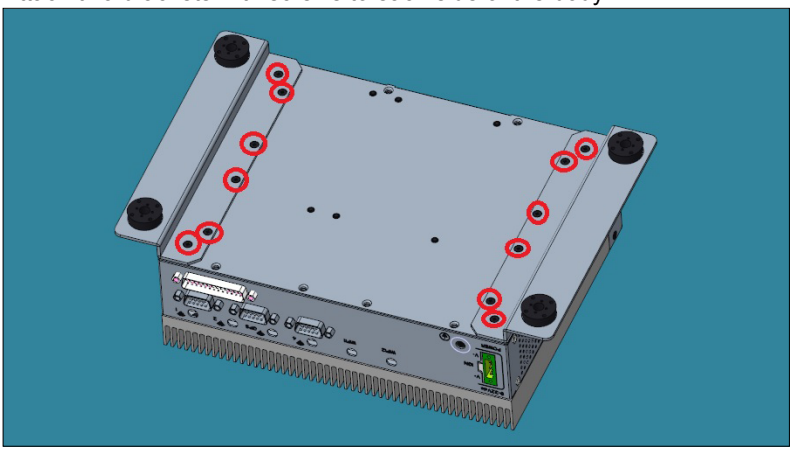
  For model 2280: Take out the screws from the accessories package before installation. Insert the module, and then lock it with the screws into the screw holes marked with blue circle as shown in the photo.

  Note: CN43 2280 cannot support CN43 3052 at the same time.

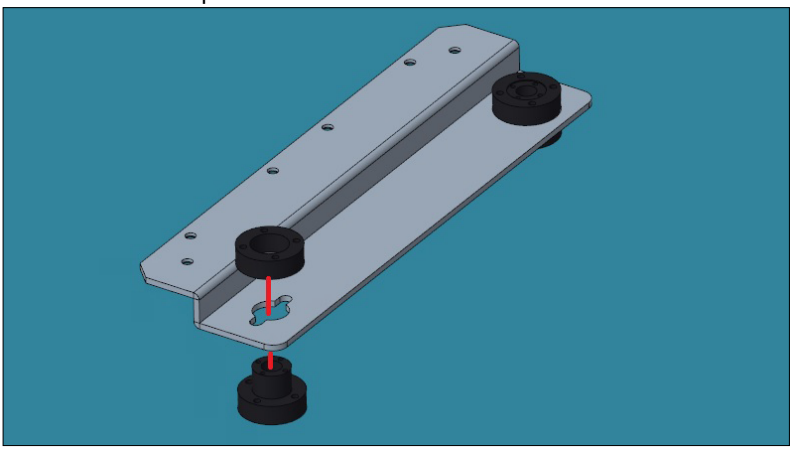
  For model 2242: Take out the bracket and screws from the accessories package before installation. As shown in the photo, lock the bracket with the two screws into the screw holes marked with blue circle first, and then insert the module, lock screws into the holes marked with red circle.

2.4. Foot-bracket Assembly

Step 1: Attach two brackets with screws to each side of the body.



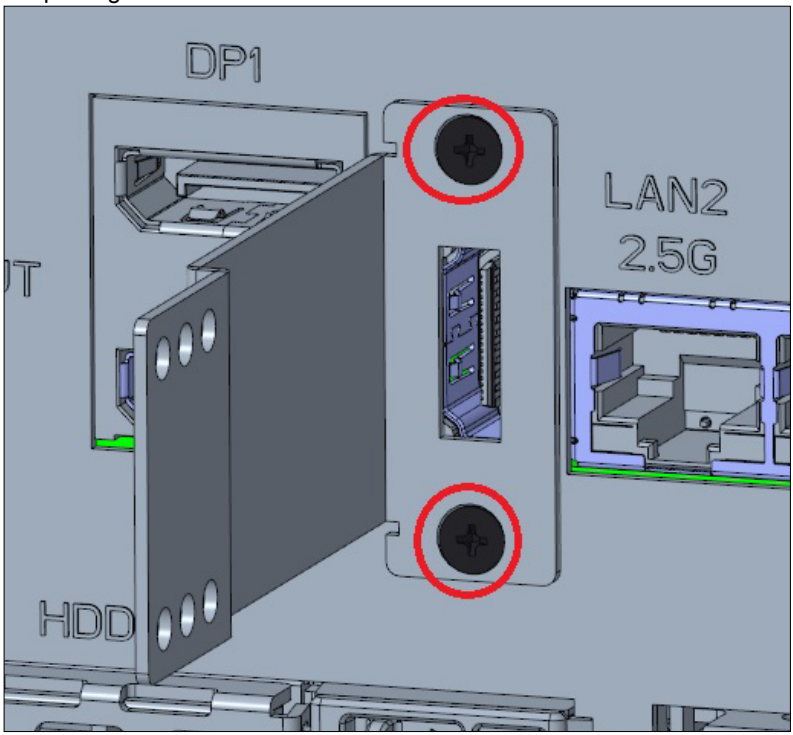
Step 2: Attach four rubber pads to the bracket holes.



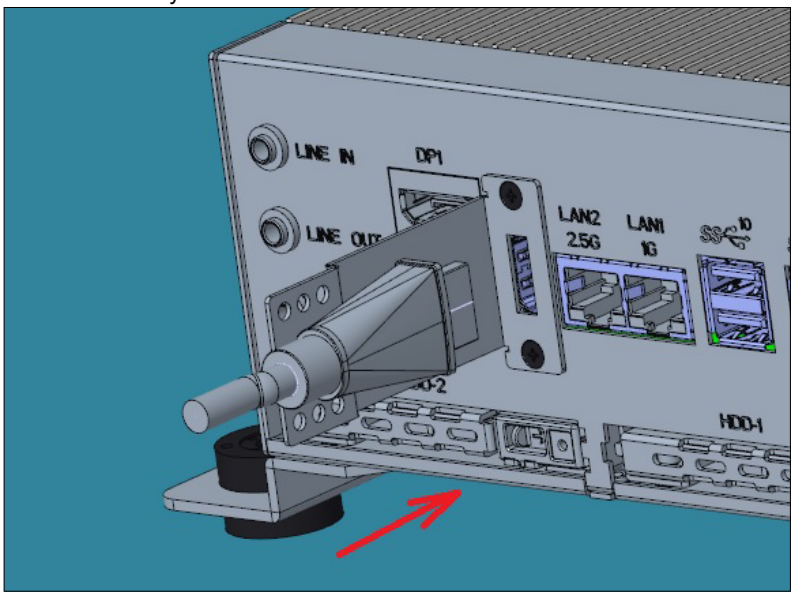
2.5. HDMI Cable Connection

You can find in the package an HDMI locking-bracket set. This gaget is designed to secure your HDMI cable connection.

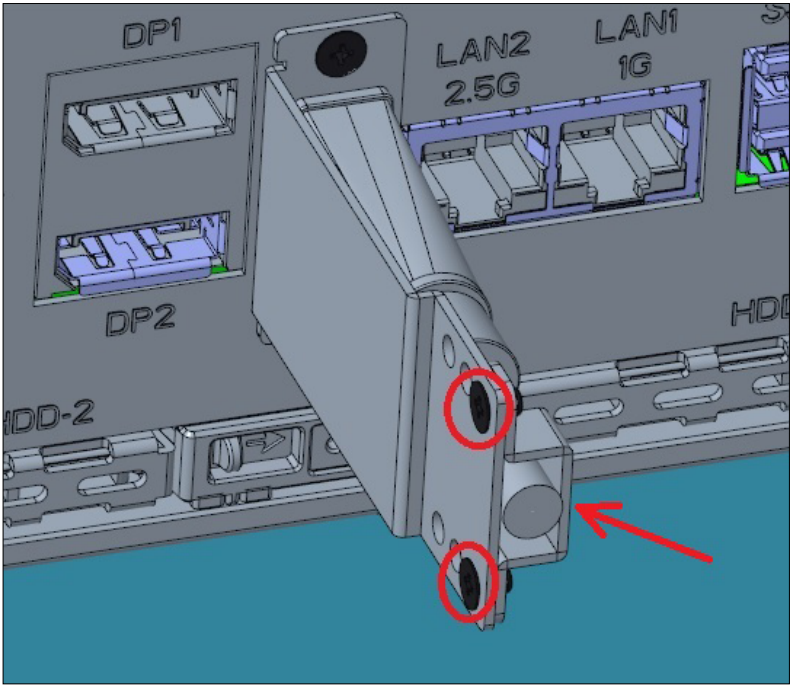
Step 1: Lock the HDMI locking-bracket with the two black screws that came with the package.



Step 2: Plug your HDMI cable head into the HDMI socket. Firmly push the HDMI cable all the way into the socket.



Step 3: Fasten the HDMI cable-end with a cable-holder. Lock the cable-end to the bracket with this cable-holder by two screws that came with the package. (There are two types of cable-holder provided: 4mm and 7mm. Use the type 4mm for HDMI cable of thinner than 6mm in diameter. Use the type 7mm for HDMI cable of thicker than 6mm in diameter.)
Choose the holes that allows the screw to lock the cable-end with cableholder.



3. BIOS Settings

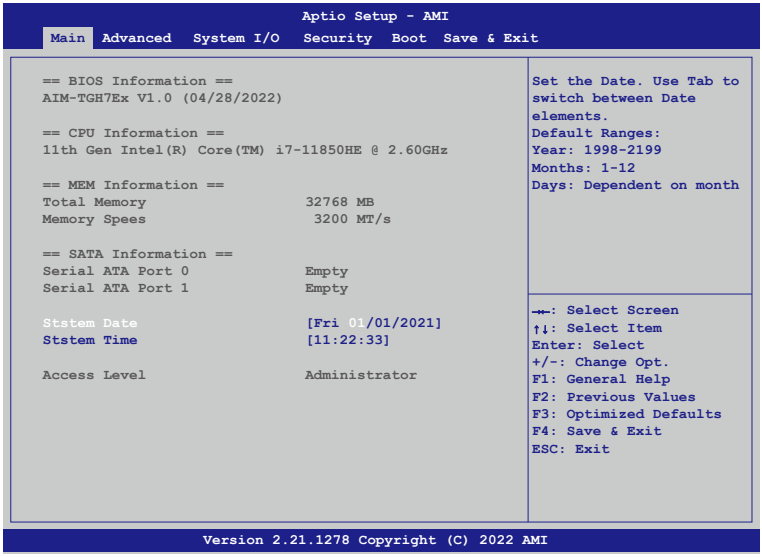
The AMI BIOS ROM has a pre-installed Setup program that allows users to modify basic system configurations, which is stored in the battery-backed CMOS RAM and BIOS NVRAM so that the information is retained when the power is turned off.

To enter BIOS Setup, press <Del> or <F2> immediately while your computer is powering up.

The function for each interface can be found below.

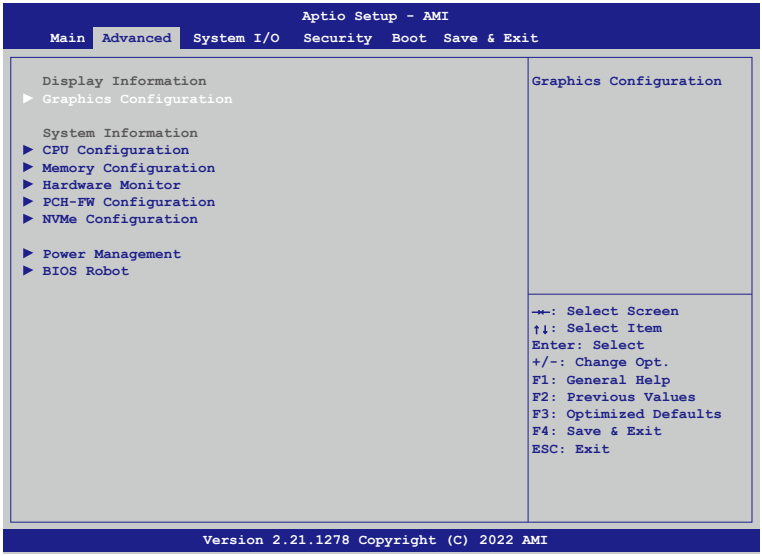
- Main – Date and time can be set here. Press <Tab> to switch between date elements
- Advanced – Enable/ Disable boot option for legacy network devices
- System I/O – For configuring PCI Express settings
- Security – The setup administrator password can be set here
- Boot – Enable/ Disable Quiet Boot option
- Save & Exit – Save your changes and exit the program

3.1. Main Setup



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

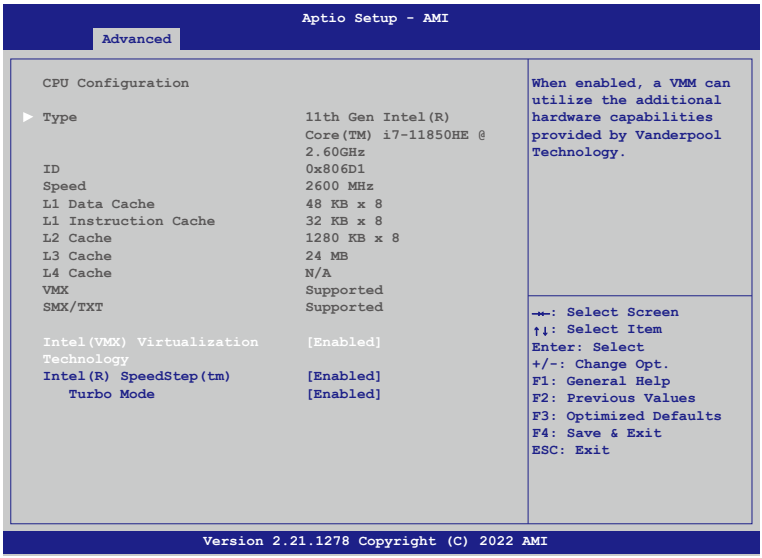
3.2. Advanced Setup



3.2.1. Advanced Setup: Graphics Configuration

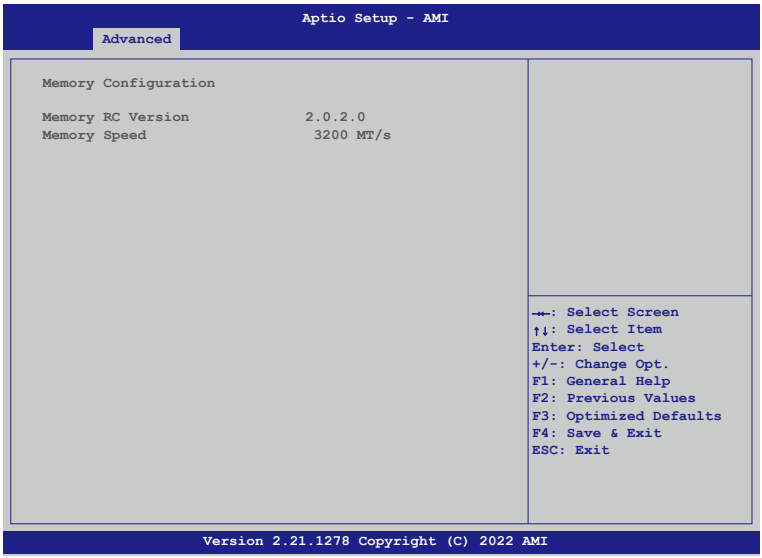
- **LVDS Panel Configuration**
  Configure LVDS panel parameters.

3.2.2. Advanced Setup: CPU Configuration



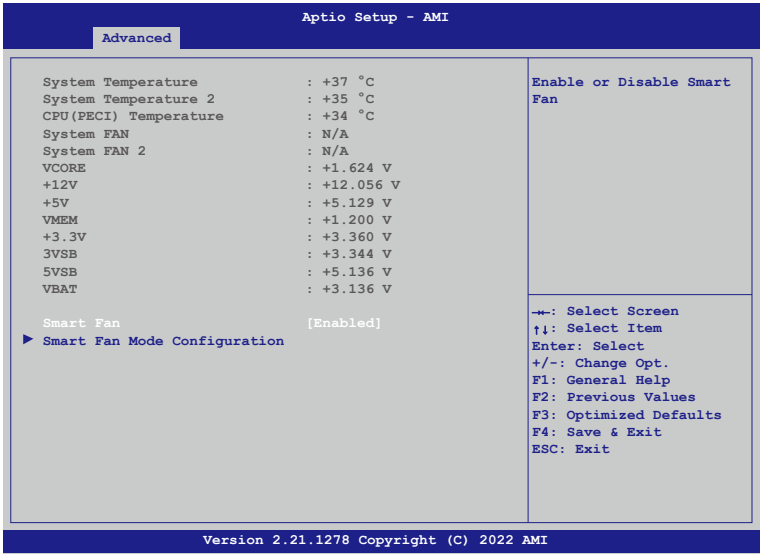
- **Intel(VMX) Virtualization Technology**
  When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
- **Intel(R) SpeedStep(tm)**
  Allows more than two frequency ranges to be supported.
- **Turbo Mode**
  Enable/Disable processor Turbo Mode (requires EMTTM enabled too). Auto means enabled.

3.2.3. Advanced Setup: Memory Configuration



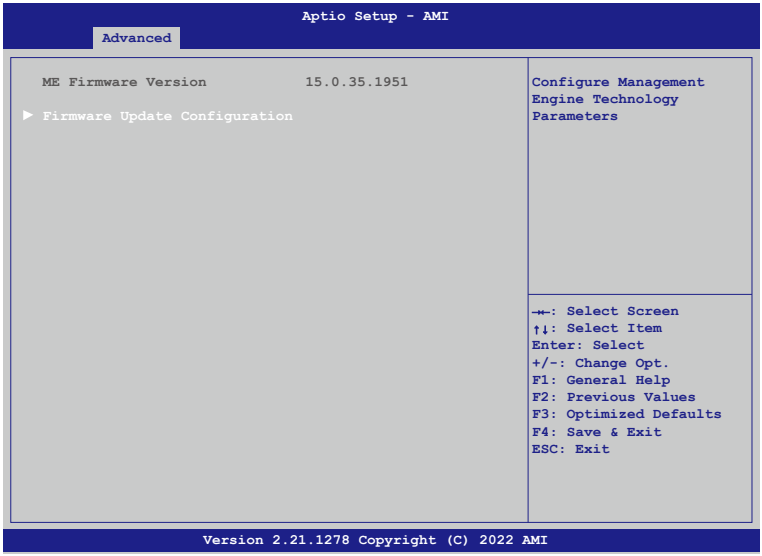
- **Memory Configuration**
  Memory Configuration Parameters.

3.2.4. Advanced Setup: Hardware Monitor



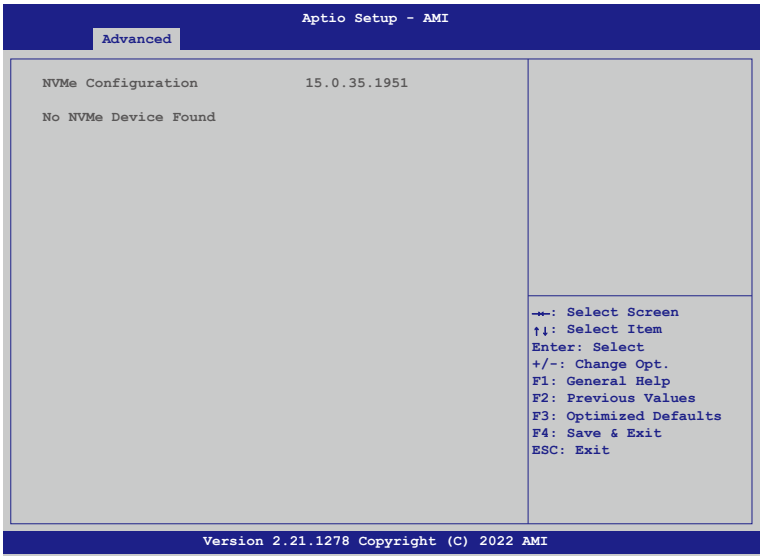
- **Smart Fan**
  Enable or Disable Smart Fan.
- **Smart Fan Mode Configuration**
  Smart Fan Mode Select.

3.2.5. Advanced Setup: PCH-FW Configuration



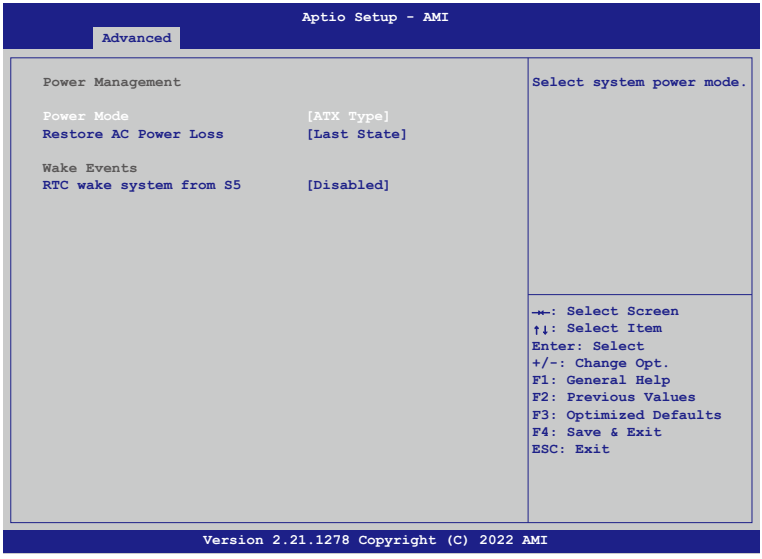
- **Firmware Update Configuration**
  Configure Management Engine Technology Parameters.

3.2.6. Advanced Setup: NVMe Configuration



- **NVMe Configuration**
  NVMe Device Options Settings.

3.2.7. Advanced Setup: Power Management



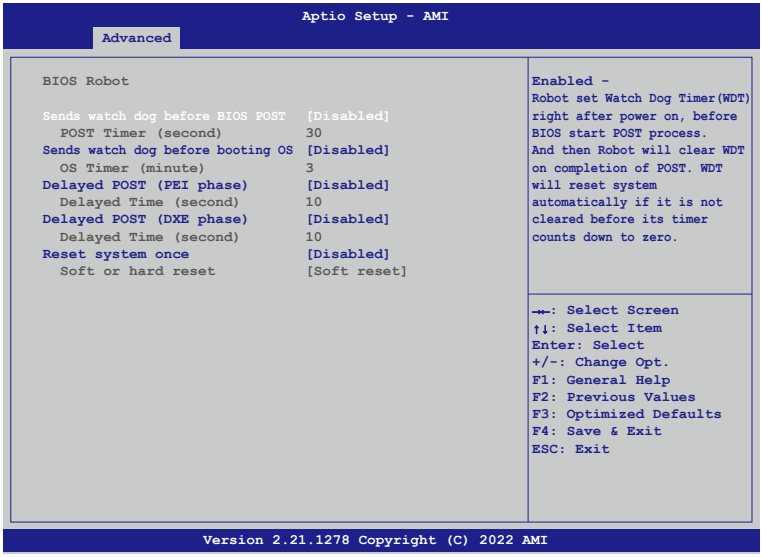
- **Power Mode**
  Select system power mode.
- **Restore AC Power Loss**
  Restore AC Power Loss: To decide the behavior after system power cut then resupply.

  Note: The CMOS battery must present.
- **RTC wake system from S5**
  Fixed Time: System will wake on the hr:min:sec specified.

  Dynamic Time: System will wake on the current time + Increase minute(s).

  Bypass: BIOS will not control RTC wake function during system shutdown.

3.2.8. Advanced Setup: BIOS Robot



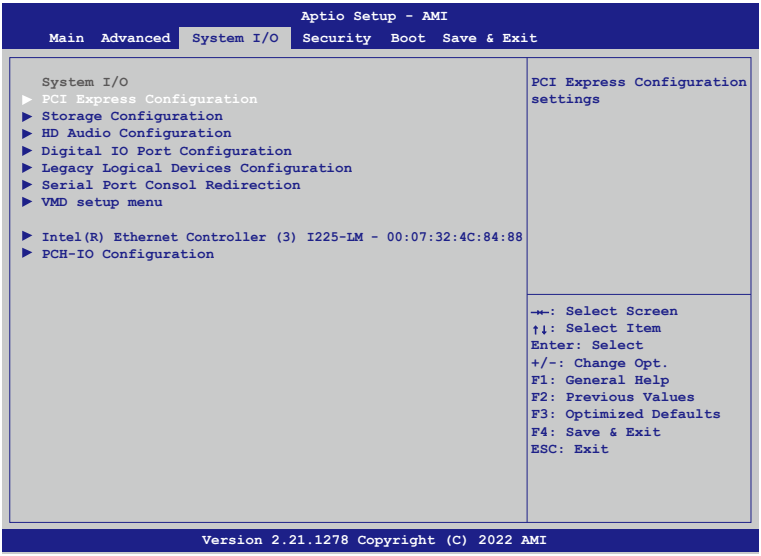
- **Sends watch dog before BIOS POST**
  Enabled - Robot set Watch Dog Timer(WDT) right after power on, before BIOS start POST process. And then Robot will clear WDT on completion of POST. WDT will reset system automatically if it is not cleared before its timer counts down to zero.
- **Sends watch dog before booting OS**
  Enabled - Robot set Watch Dog Timer(WDT) POST completion, before BIOS transfer control to OS.

  WARNING: Before enabling this function, a program in OS must be in responsible for clearing WDT. Also, this function should be disabled if OS is going to update itself.
- **Delayed POST (PEI phase)**
  Enabled - ROBOT holds BIOS from starting POST right after power on. This allows BIOS POST to start with stable power or start after system is physically warmed-up.

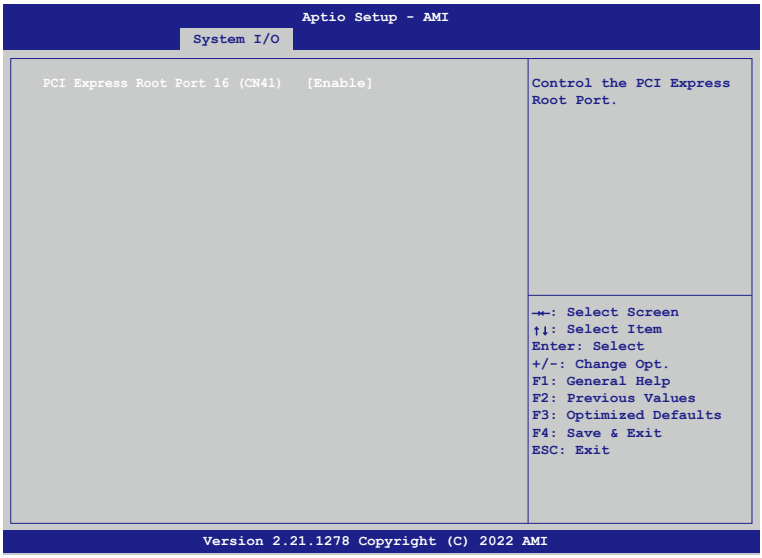
Note: ROBOT does this before ‘Sends watch dog’.

- **Delayed POST (DXE phase)**
  Enabled - ROBOT holds BIOS before POST completion. This allows BIOS POST to start with stable power or start after system is physically warmed-up.
  Note: ROBOT does this after ‘Sends watch dog before BIOS POST’.
- **Reset system once**
  Enabled - ROBOT resets system for one time on each boot. This will send a soft or hard reset to onboard devices, thus puts devices to more stable state.

3.3. System I/O Setup

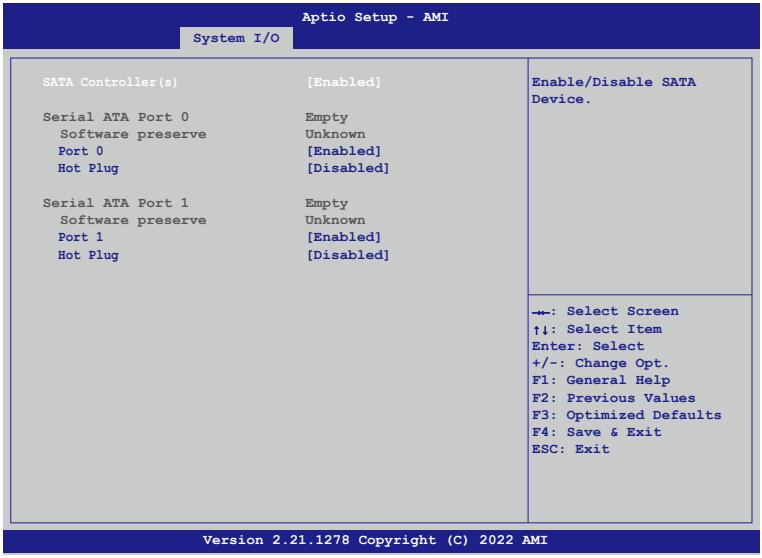


3.3.1. System I/O Setup: PCI Express Configuration



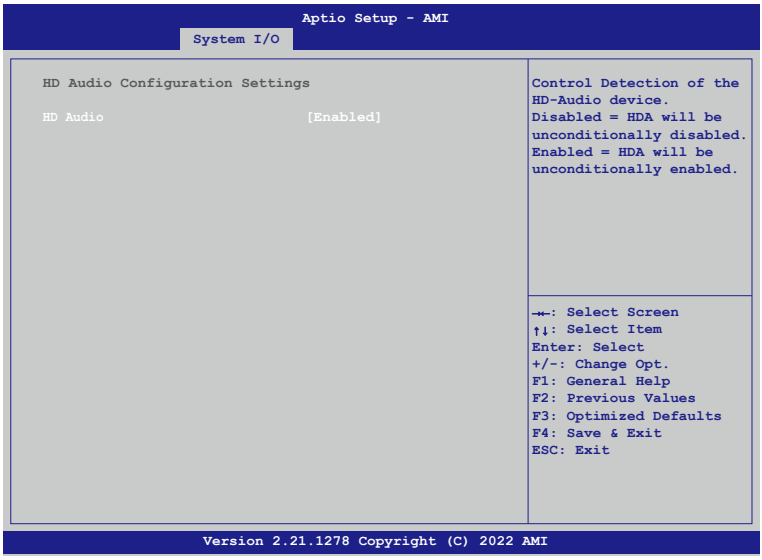
- **PCI Express Root Port 16 (CN41)**
  Control the PCI Express Root Port.

3.3.2. System I/O Setup: Storage Configuration



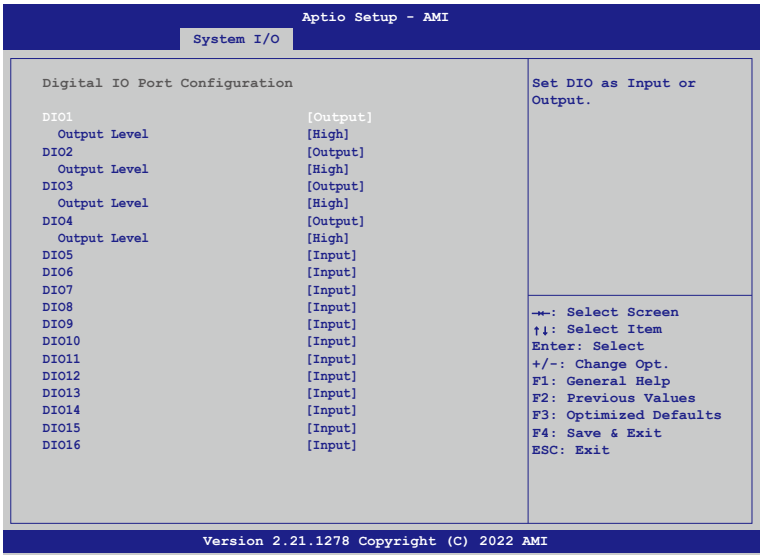
- **SATA Controller(s)**
  Enable/Disable SATA Device.
- **Port 0**
  Enable/Disable SATA Port.
- **Hot Plug**
  Designates this port as Hot Pluggable.

3.3.3. System I/O Setup: HD Audio Configuration



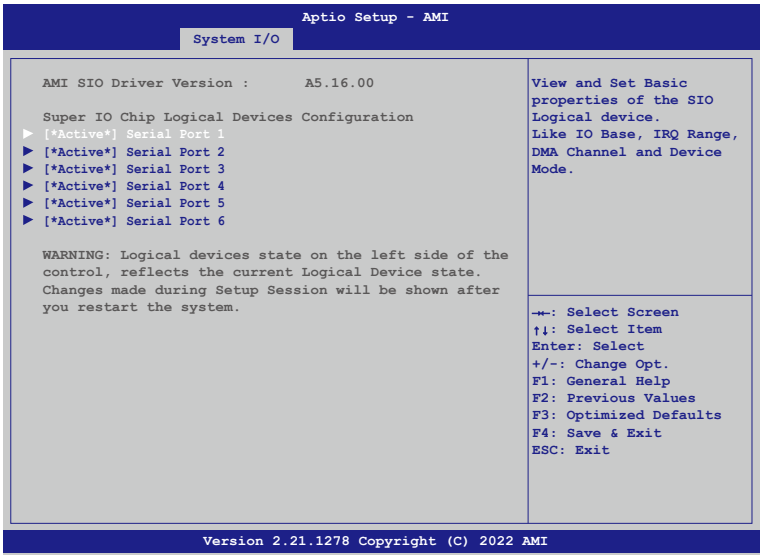
- **HD Audio**
  Control Detection of the HD-Audio device.
  Disabled: HDA will be unconditionally disabled.
  Enabled: HDA will be unconditionally enabled.

3.3.4. System I/O Setup: Digital IO Port Configuration



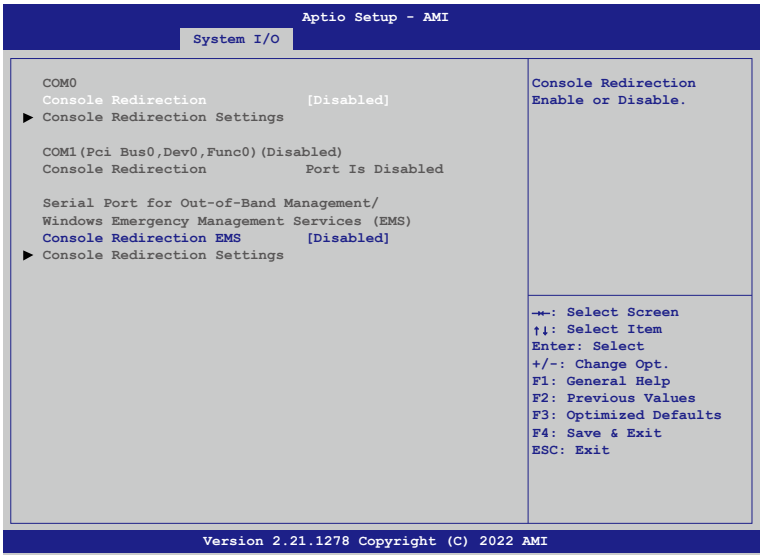
- **DIO1 ~ DIO16**
  Set DIO as Input or Output.
- **Output Level**
  Set output level when DIO pin is output.

3.3.5. System I/O Setup: Legacy Logical Devices Configuration



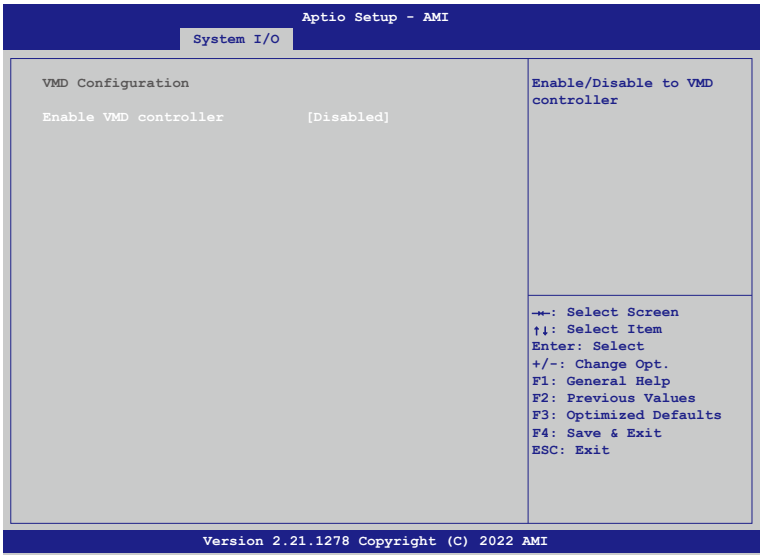
- **[*Active*] Serial Port 1 ~ 6**
  View and Set Basic properties of the SIO Logical device. Like IO Base, IRQ Range, DMA Channel and Device Mode.

3.3.6. System I/O Setup: Serial Port Consol Redirection



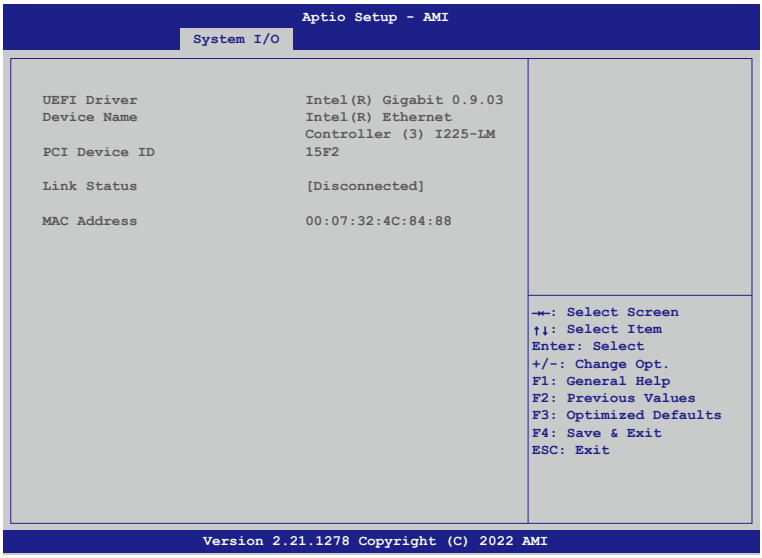
- **Console Redirection**
  Console Redirection Enable or Disable.
- **Console Redirection EMS**
  Console Redirection Enable or Disable.

3.3.7. System I/O Setup: VMD setup menu



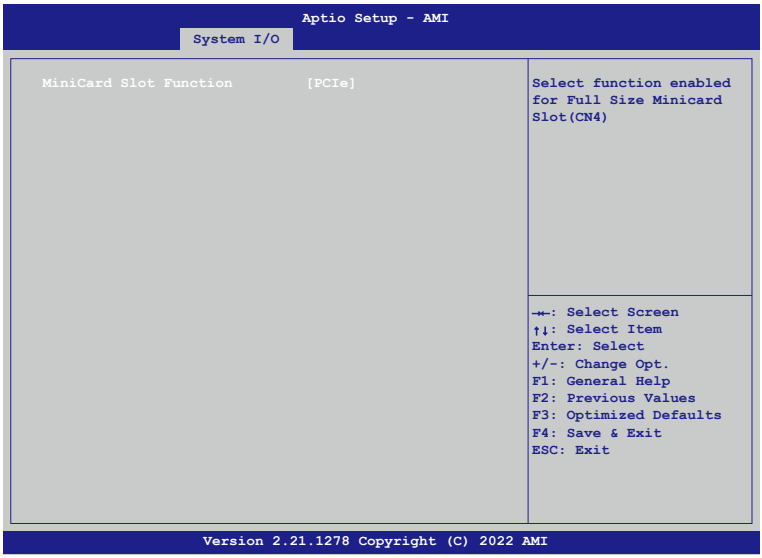
- **Enable VMD controller**
  Enable/Disable to VMD controller.

3.3.8. System I/O Setup: Intel(R) Ethernet Controller



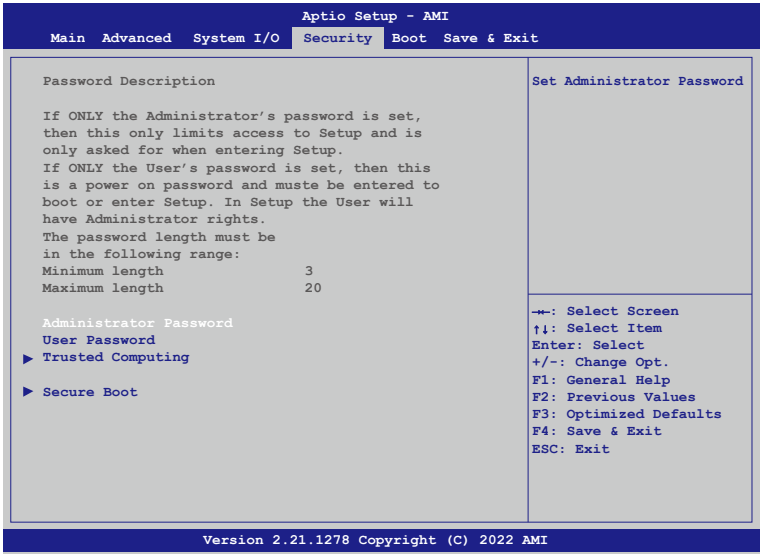
Configure Gigabit Ethernet device parameters.

3.3.9. System I/O Setup: PCH-IO Configuration



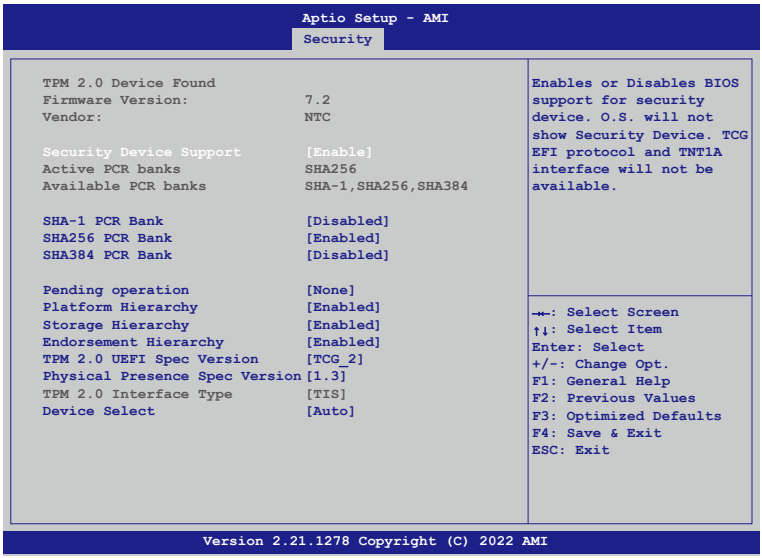
- **MiniCard Slot Function**
  Select function enabled for Full Size Minicard Slot(CN4).

3.4. Security Setup



- **Administrator Password**
  Set Administrator Password.
- **User Password**
  Set User Password.

3.4.1. Trusted Computing



- **Security Device Support**
  Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and TNT1A interface will not be available.
- **SHA-1 PCR Bank**
  Enable or Disable SHA-1 PCR Bank.
- **SHA256 PCR Bank**
  Enable or Disable SHA256 PCR Bank.
- **SHA384 PCR Bank**
  Enable or Disable SHA384 PCR Bank.
- **Pending operation**
  Schedule an Operation for the Security Device.

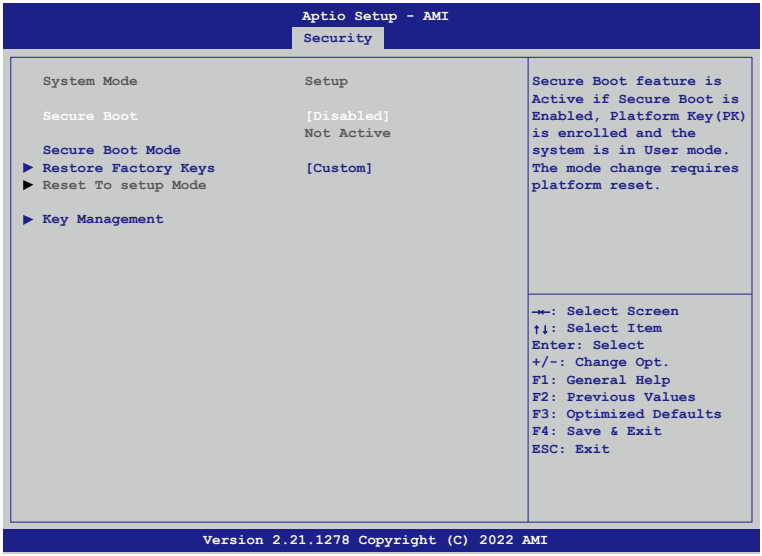
  NOTE: Your computer will reboot during restart in order to change the State of Security Device.
- **Platform Hierarchy**
  Enable or Disable Platform Hierarchy.
- **Storage Hierarchy**
  Enable or Disable Storage Hierarchy.
- **Endorsement Hierarchy**
  Enable or Disable Endorsement Hierarchy.
- **TPM 2.0 UEFI Spec Version**
  Select the TCG2 Spec Version Support.

TCG_1_2: The Compatible mode for Win8/Win10.

TCG_2: Support new TCG2 protocol and event format for Win10 or later.

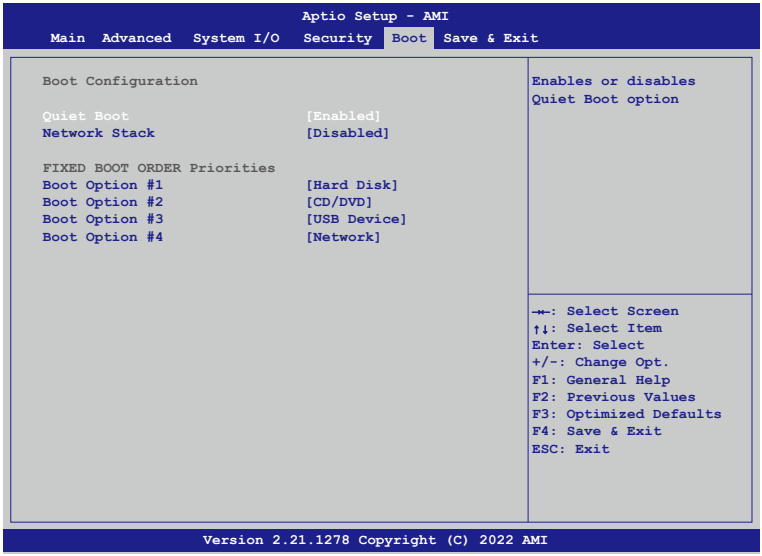
- **Physical Presence Spec Version**
  Select to tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.
- **Device Select**
  TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both the default set to TPM 2.0 devices, if not found. TPM 1.2 devices will be enumerated.

3.4.2. Secure Boot



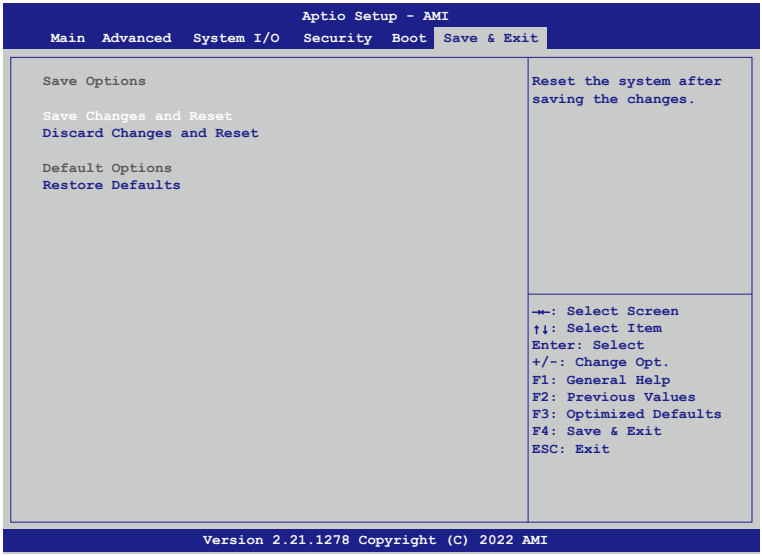
- **Security Boot**
  Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the system is in User mode. The mode change requires platform reset.
- **Secure Boot Mode**
  Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.
- **Restore Factory Keys**
  Force System to User Mode. Install factory default Secure Boot databases.
- **Key Management**
  Enables expert users to modify Secure Boot Policy variables wihout full authentication.

3.5. Boot Setup



- **Quiet Boot**
  Enabled or disables Quiet Boot option.
- **Network Stack**
  Enable/Disable UEFI Network Stack.
- **Boot Option #1**
  Set the system boot order.

3.6. Save & Exit Setup



- **Save Changes and Reset**
  Reset the system after saving the changes.
- **Discard Changes and Exit**
  Exit system setup without saving any changes.
- **Restore Defaults**
  Restore/Load Default values for all the setup options.

4. FAQ

Q 1. Where can I find the serial number of this product?

- The serial number (S/N) is a label printed with alpha-numeric character. You can find the S/N label on the bottom of this product or on its packing box.

Technical Support Form

We deeply appreciate your purchase of Acrosser products. Please find the "**tech_form.doc**" file in our utility CD. If you have any questions or problems about Acrosser products, please fill in the following information. We will answer your questions in the shortest time possible.

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- Your Company Name: _____
- Your Contact Info: _____ Phone Number: _____
- Your E-Mail Address: _____
- Your Company Address: _____

  _____
- Acrosser Model Name: _____
- Acrosser Serial Number: _____

Describe System Configuration

- CPU Type: _____
- Memory Size: _____
- Storage Device (e.g. HDD, CF, or SSD): _____
- Additional Peripherals (e.g. Graphic Card): _____
- Operating System & Version (e.g. Windows 7 Embedded): _____
- Special API or Driver: _____

  (If yes, please provide it for debug.)
- Running Applications: _____
- Others: _____

Describe Your Problems or Questions:

Send the above information to one of the following Acrosser contacts:

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Acrosser Headquarters

241402新北市三重區重新路5段609巷4號3樓之8
Rm. 8, 3F., No. 4, Ln. 609, Sec. 5, Chongxin Rd., Sanchong Dist., New Taipei City 241402, Taiwan
TEL: +886-2-29999000
FAX: +886-2-29992887

Acrosser Taichung Office

40858台中市南屯區保安八街28號3樓之1
3F.-1, No. 28, Bao'an 8th St., Nantun Dist., Taichung City 40858, Taiwan
TEL: +886-4-23370715
FAX: +886-4-23373422

Acrosser China Subsidiary

深圳市欣扬通电子有限公司
深圳市福田区泰然八路安华工业区4栋5层505室
(邮编: 518040)
Room 505, Floor 5, Building 4, Anhua Industrial Zone, Tairan 8th Road, Futian District, Shenzhen, China (Postal: 518040)
TEL: +86-755-83542210
FAX: +86-755-83700087

Acrosser USA Inc.

324 W. Blueridge Avenue, Orange CA 92865, USA
TEL: +1-714-728-6964