



MODEL:
HTB-210-Q470

**Embedded System Supports Intel® Core™ i5-10500TE CPU,
DDR4, RS-232/422/485, 2.5GbE LAN, USB 3.2 Gen 1,
PCIe x16/x4, M.2, SATA 6Gb/s, HDMI, DP and RoHS**

User Manual



Revision



Date	Version	Changes
October 29, 2021	1.00	Initial release



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Manual Conventions

**WARNING**

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously.

**CAUTION**

Cautionary messages should be heeded to help reduce the chance of losing data or damaging the product.

**NOTE**

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes.

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Chapter

1

Introduction



1.1 Overview



Figure 1-1: HTB-210-Q470 Embedded System

The HTB-210-Q470 embedded system supports 10th Generation Intel® Core™ i5-10500TE processor. It is designed for applications that require reliable operating and easy maintenance features.

The HTB-210-Q470 provides one PCIe x16 slot and one PCIe x4 slot for building AI applications by installing accelerator cards. Its I/O interfaces include two USB 3.2 Gen 1 ports, two USB 2.0 ports, two 2.5GbE, one serial port, one DP and one HDMI.

The HTB-210-Q470 series systems are all capable of supporting one 2.5" SATA 6Gb/s solid-state drive (SSD) or M.2 SSD modules.

1.2 Features

The HTB-210-Q470 has the following features

- Compact edge device with great computing and graphics performance
- Supports 10th Gen. Intel® Core™ i5-10500TE CPU and Intel® Q470 chipset
- Dual ECC & non-ECC unbuffered SO-DIMM slots supporting up to 128 GB of memory
- PCIe x16 slot supports NVIDIA GPU accelerator cards
- PCIe x4 slot supports capture card or other applications



HTB-210-Q470 Embedded System

1.3 Front Panel

An overview of the front panel is shown in **Figure 1-2** below.

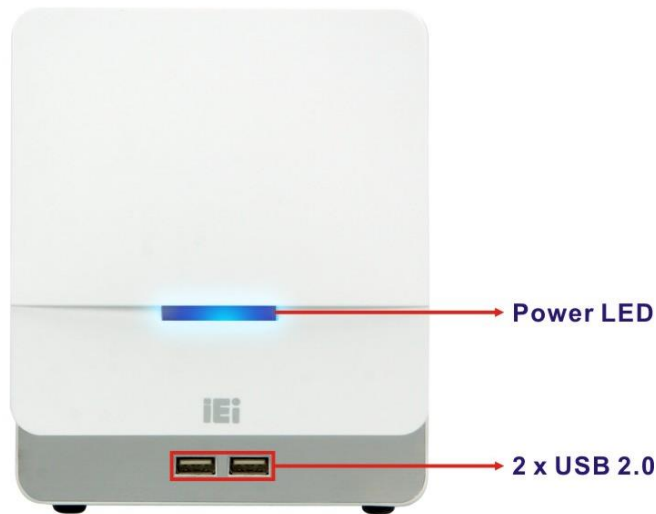


Figure 1-2: Front Panel

1.4 Rear Panel

The rear panel of the HTB-210-Q470 provides access to the following external I/O connectors, button and expansion slots as shown in **Figure 1-3**.

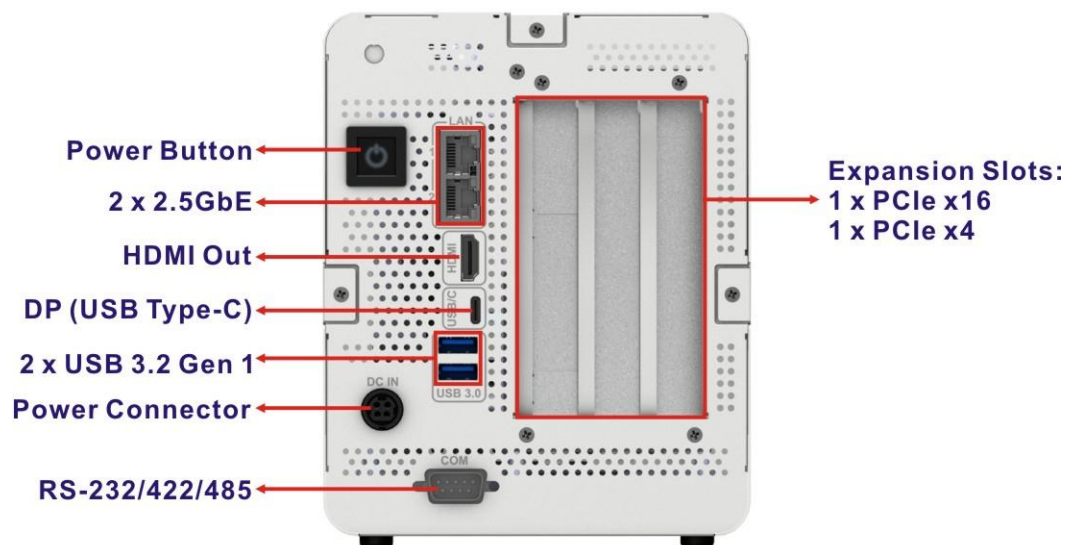


Figure 1-3: Rear Panel

1.5 Bottom Panel

The bottom panel has a HDD access panel for HDD installation or replacement.

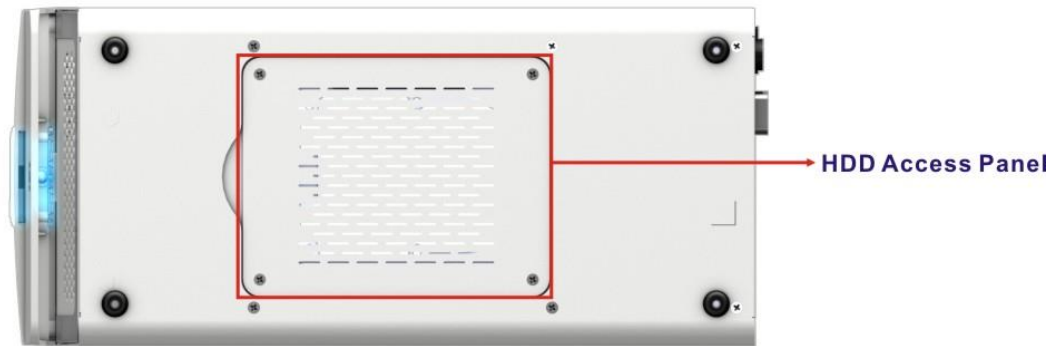


Figure 1-4: Bottom Panel

1.6 Technical Specifications

The specifications for the Intel based embedded systems are listed below.

	HTB-210-Q470
CPU	Support Intel® Core™ i5-10500TE (6 cores, 35W TDP)
Chipset	Intel® Q470
System Memory	2 x 260-pin 2666/2133 MHz dual-channel DDR4 SO-DIMM ECC/non-ECC unbuffered memory slot (system max. 128 GB)
Motherboard	IEI HPCIE-Q470 CPU card
Thermal Solution	Smart fan
Ethernet	2 x 2.5GbE connectors via Intel® I225-V PCIe controllers
Display	1 x HDMI output port (up to 4096x2304 @ 30Hz)
Serial Port	1 x RS-232/422/485 (DB-9)
USB	1 x USB/DP connector (USB Type-C) 2 x USB 2.0 ports 2 x USB 3.2 Gen 1 (5Gb/s) ports

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Storage	1 x 2.5" SATA 6Gb/s HDD/SSD bay
Expansion	1 x PCIe 3.0 x16 slot 1 x PCIe 3.0 x4 slot 1 x M.2 A-key 2230 slot (PCIe x2 and USB 2.0) 1 x M.2 M-key 2280 slot (PCIe x4 and SATA)
Button/Switch	1 x Power button 1 x AT/ATX switch (on-board)
Chassis Construction	Metal housing (SECC)
Power Requirement	19 V DC
Power Supply	180 W power adapter 100 V – 240 V AC input , 19 V DC output
Operating Shock	Half-sine wave shock 5G; 11ms; 100 shocks per axis
Operating Vibration	MIL-STD-810G 514.6C-1 (with SSD)
Operating Temperature	0°C – 40°C
Storage Temperature	-20°C – 60°C
Humidity	10% – 95%, non-condensing
Net Weight	2.8 kg
Dimensions (W x D x H)	140 mm x 306.7 mm x 171 mm
Supported Accelerator Card	NVIDIA Quadro P2200 (75W) NVIDIA Tesla T4 (75W)
Supported OS	Microsoft Windows 10 Linux
Safety/ECM	UL/ cUL FCC Part 15 Class B EN 62368-1 Ed.2 + RMF EN 55032 + EN 55035

Table 1-1: Technical Specifications

1.7 Dimensions

The dimensions of the HTB-210-Q470 are shown in **Figure 1-5**.

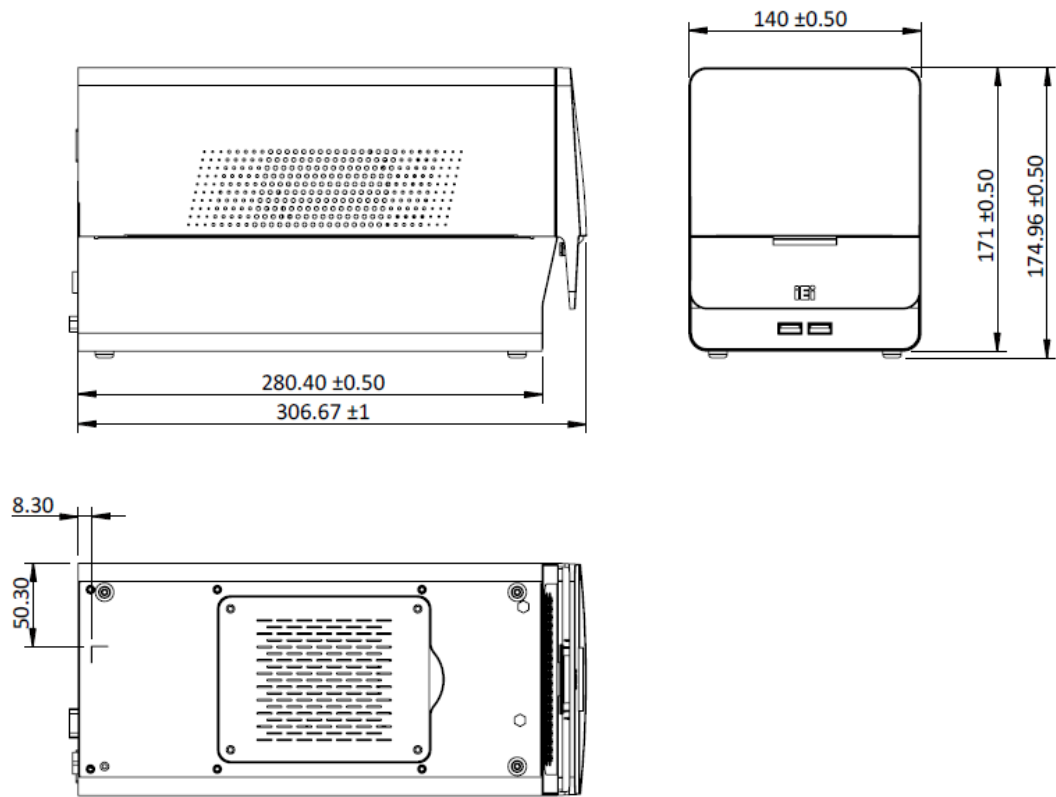


Figure 1-5: Dimensions (mm)

Chapter

2

Unpacking

2.1 Unpacking

To unpack the embedded system, follow the steps below:

- Step 1:** Use box cutters, a knife or a sharp pair of scissors that seals the top side of the external (second) box.
- Step 2:** Open the external (second) box.
- Step 3:** Use box cutters, a knife or a sharp pair of scissors that seals the top side of the internal (first) box.
- Step 4:** Lift the system out of the boxes.
- Step 5:** Remove both polystyrene ends, one from each side.
- Step 6:** Make sure all the components listed in the packing list are present.

2.2 Packing List



NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the HTB-210-Q470 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The HTB-210-Q470 embedded system is shipped with the following components:

HTB-210-Q470 Embedded System





Quantity	Item	Image
1	HTB-210-Q470 embedded system	
1	Power cord	
1	180 W power adapter	
4	Screws (M3*4) for HDD installation	

Table 2-1: Package List

2.3 Optional Items

The following is the optional component which may be separately purchased:

Item and Part Number
Fan module for NVIDIA Tesla T4, assembly-to-order (P/N: 19FHTB210-000001-RS)

Table 2-2: Optional Item

Chapter

3

Installation

3.1 Anti-static Precautions

**WARNING:**

Failure to take ESD precautions during the maintenance of the HTB-210-Q470 may result in permanent damage to the HTB-210-Q470 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the HTB-210-Q470. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the HTB-210-Q470 is accessed internally, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband:*** Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding:*** Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** When configuring the HTB-210-Q470, place it on an anti-static pad. This reduces the possibility of ESD damaging the HTB-210-Q470.
- ***Only handle the edges of the PCB:*** When handling the PCB, hold the PCB by the edges.

3.2 Installation Precautions

During installation, be aware of the precautions below:

- **Manufacturer authorization:** Do not modify this equipment without authorization of manufacturer.
- **Read the user manual:** The user manual provides a complete description of the HTB-210-Q470, installation instructions and configuration options.
- **DANGER! Disconnect Power:** Power to the HTB-210-Q470 must be disconnected during the installation process. Failing to disconnect the power may cause severe injury to the body and/or damage to the system.
- **Qualified Personnel:** The HTB-210-Q470 must be installed and operated only by trained and qualified personnel. Maintenance, upgrades, or repairs may only be carried out by qualified personnel who are familiar with the associated dangers.
- **Air Circulation:** Make sure there is sufficient air circulation when installing the HTB-210-Q470. The HTB-210-Q470's cooling vents must not be obstructed by any objects. Blocking the vents can cause overheating of the HTB-210-Q470. Leave at least 5 cm of clearance around the HTB-210-Q470 to prevent overheating.
- **Grounding:** The HTB-210-Q470 should be properly grounded. The voltage feeds must not be overloaded. Adjust the cabling and provide external overcharge protection per the electrical values indicated on the label attached to the back of the HTB-210-Q470.

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3.3 Opening Top Cover

Before the internal components can be installed, the top cover must be opened. To open the top cover, please follow the steps below:

Step 1: Remove the top cover retention screws. The top cover is secured to the chassis with 3 retention screws. All screws must be removed (**Figure 3-1**).



Figure 3-1: Top Cover Retention Screws

Step 2: Slide the top cover towards the rear side and gently lift the top cover to remove the cover from the system.



3.4 HDD Installation

The HTB-210-Q470 has one 2.5" HDD bay inside the bottom of the system. To install an HDD, follow the steps below.

Step 1: Turn over the system. Locate the HDD access panel. Loosen the four retention screws and remove the panel.

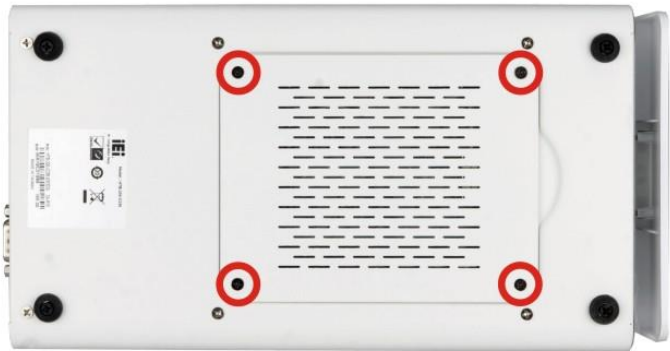


Figure 3-2: HDD Access Panel Retention Screws

Step 2: Locate the HDD brackets inside the system. Remove the two HDD bracket retention screws (**Figure 3-3**). Remove the HDD bracket from the system.



Figure 3-3: HDD Bracket Retention Screws

Step 3: Place an HDD in the bracket. Secure the HDD to the bracket using four retention screws (M3*4) came with the system, two screws on each side. See **Figure 3-4**.



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Figure 3-4: Inserting the HDD

Step 4: Insert the HDD bracket in the chassis. Slide the HDD bracket to connect the HDD to the SATA connector. Secure the HDD bracket by installing the two retention screws previously removed.



Figure 3-5: Installing the HDD

Step 5: Re-install the HDD access panel. In a diagonal pattern, tighten each screw a few turns then move to the next one, until they are all secured. Do not overtighten the screws.

3.5 M.2 Module Installation

The HTB-210-Q470 has one M.2 M-key slot for M.2 2280 module and one M.2 A-key slot for M.2 2230 module. To install M.2 modules into the HTB-210-Q470, follow the steps below.

- Step 1:** Remove the top cover from the HTB-210-Q470. See **Section 3.3**.
- Step 2:** Locate the M.2 slots on the motherboard (Figure 3-6). The M.2 M-key slot is on the front side, and the M.2 A-key slot is on the solder side.

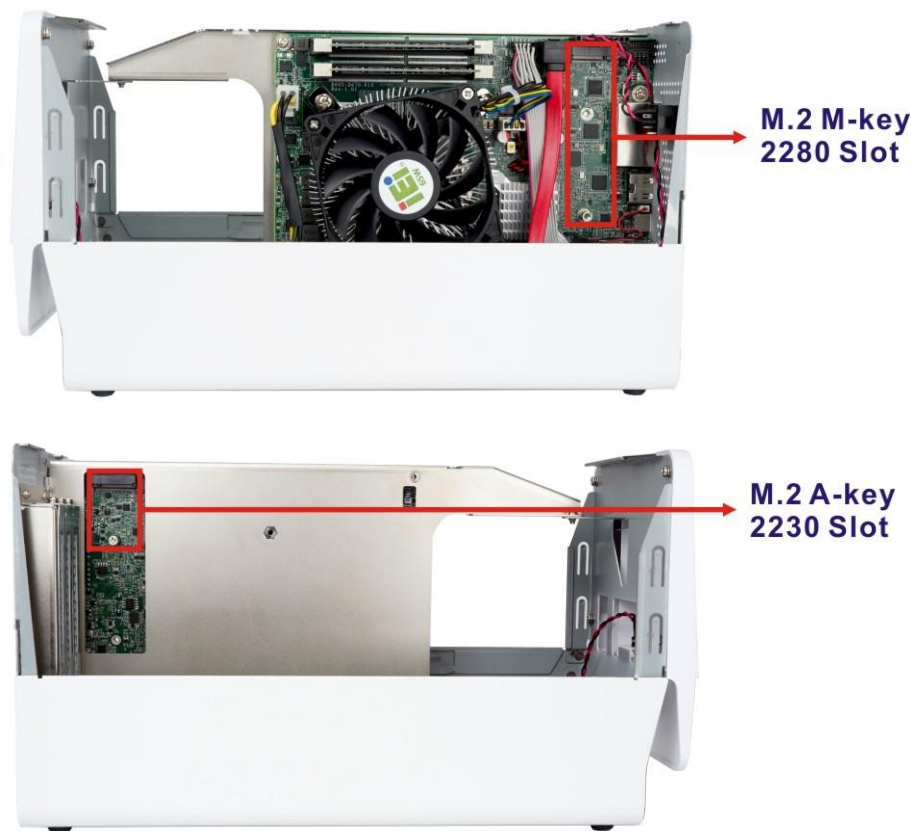


Figure 3-6: M.2 Slot Locations

HTB-210-Q470 Embedded System

Step 3: Remove the on-board retention screw as shown in Figure 3-7.

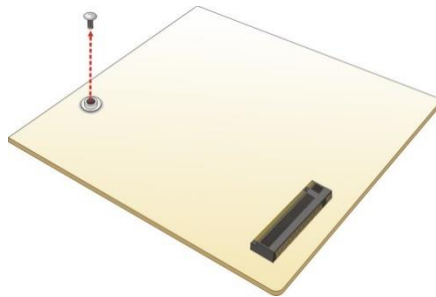


Figure 3-7: Removing the M.2 Module Retention Screw

Step 4: Line up the notch on the card with the notch on the slot. Slide the PCIe Mini card into the socket at an angle of about 20° (**Figure 3-8**).

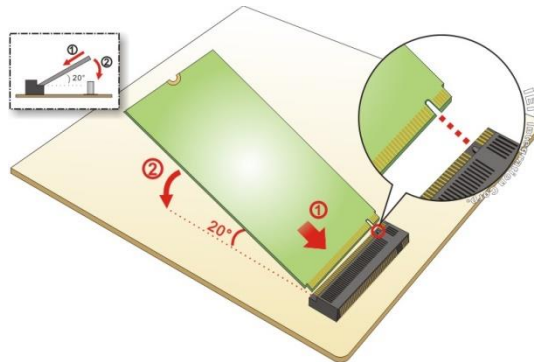


Figure 3-8: Inserting the M.2 Module into the Slot at an Angle

Step 5: Secure the M.2 module with the previously removed retention screw (**Figure 3-9**).

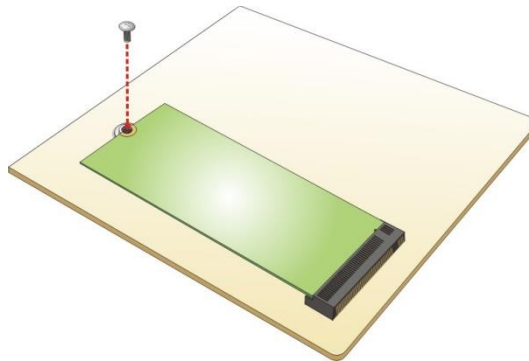


Figure 3-9: Securing the M.2 Module



3.6 Expansion Card Installation

The HTB-210-Q470 supports one PCIe 3.0 x16 slot and one PCIe 3.0 x4 slot. To install an expansion card, follow the steps below.

- Step 1:** Remove the top cover. See **Section 3.3** above.
- Step 2:** Locate an empty PCIe slot on the backplane.

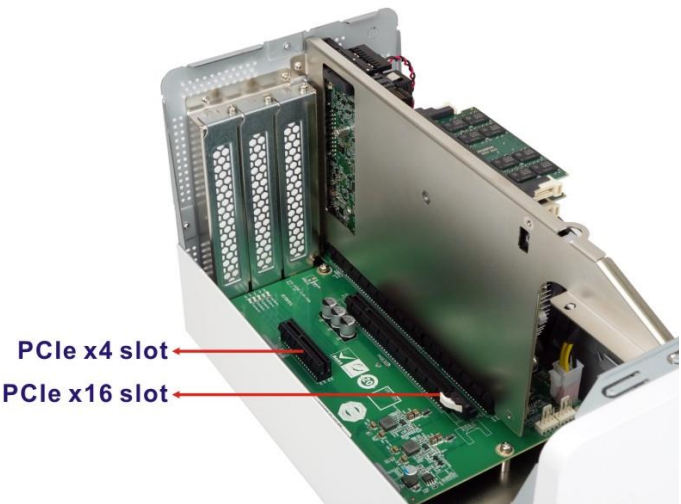


Figure 3-10: PCIe Slot Locations

- Step 3:** Remove the blank bracket panel on the rear panel of the HTB-210-Q470 that aligns with the empty PCIe slot. Save this bracket screw.
- Step 4:** Align an expansion card to a PCIe slot. Press down gently, but firmly, to seat the expansion card correctly in the slot.
- Step 5:** Install the bracket screw to secure the expansion card to the system chassis.
- Step 6:** Re-install the top cover and secure it with the three retention screws previously removed.



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3.7 Clear CMOS

If the HTB-210-Q470 fails to boot due to improper BIOS settings, the clear CMOS button clears the CMOS data and resets the system BIOS information. To do this, remove the system top cover first (see **Section 3.3**). Locate the clear CMOS button and push the button for three seconds, then restart the system. The clear CMOS button location is shown in **Figure 3-11**.



Figure 3-11: Clear CMOS Button

If the “CMOS Settings Wrong” message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu.

3.8 RS-232/422/485 Serial Device Connection

The HTB-210-Q470 series has one RS-232/422/484 port (COM1) on the rear panel. The pinouts of the serial port are listed below.

The default setting for COM1 is set to RS-232. To configure the COM port mode, change the BIOS options in **Advanced → F81804 Super IO Configuration → Serial Port 1 Configuration** (refer to **Section 4.3.5.1**).

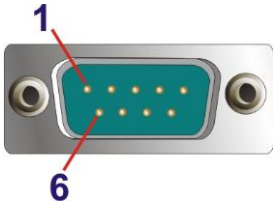
PIN NO.	RS-232	RS-422	RS-485	
1	DCD	TXD422-	TXD485-	
2	RXD	TXD422+	TXD485+	
3	TXD	RXD422+	--	
4	DTR	RXD422-	--	
5	GND	--	--	
6	DSR	--	--	
7	RTS	--	--	
8	CTS	--	--	
9	RI	--	--	

Table 3-1: RS-232/422/485 Serial Port Pinouts

3.9 Power-On Procedure

3.9.1 Installation Checklist

**WARNING:**

Make sure a power supply with the correct input voltage is being fed into the system. Incorrect voltages applied to the system may cause damage to the internal electronic components and may also cause injury to the user.

To power on the embedded system please make sure of the following:

- The top cover is installed
- All peripheral devices (HDMI monitor, serial communications devices etc.) are connected

3.9.2 Power-on Procedure

**WARNING:**

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

**CAUTION:**

Position the power cord so that people cannot step on it. Do not place anything over the power cord. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient over voltage.

To power-on the HTB-210-Q470 please follow the steps below:

- Step 1:** Connect the power cord to the power adapter. Connect the other end of the power cord to a power source. **Ensure to connect the power cord to a socket-outlet with earthing connection.**
- Step 2:** Connect the power adapter to the power connector of the HTB-210-Q470.
- Step 3:** Short-press the power button, and the power LED on the front panel will light on in blue (**Figure 3-12**).



Figure 3-12: Power Button and Power LED

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3.10 Available Drivers

All the drivers for the HTB-210-Q470 are available on IEI Resource Download Center (<https://download.ieiworld.com>). Type HTB-210-Q470 and press Enter to find all the relevant software, utilities, and documentation.

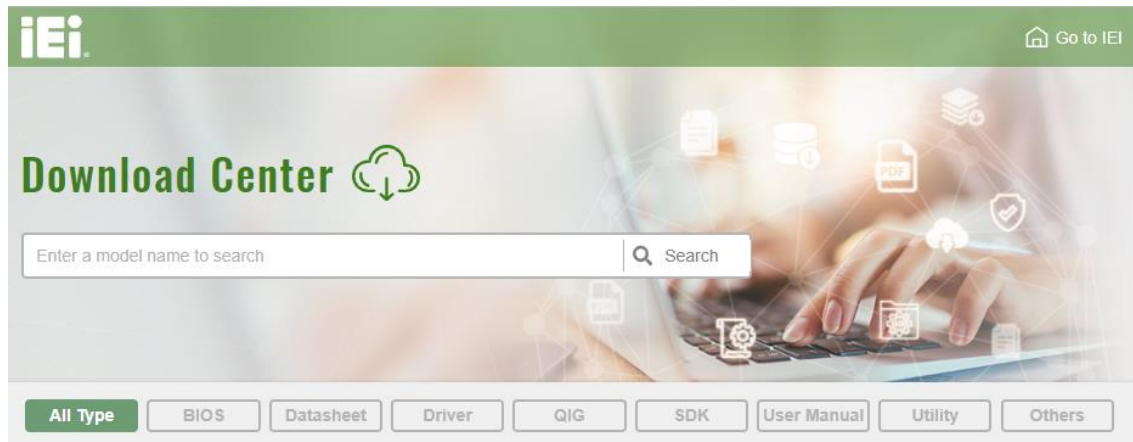
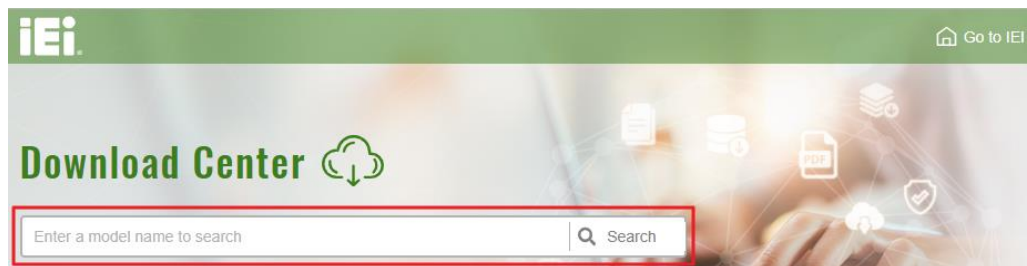


Figure 3-13: IEI Resource Download Center

3.10.1 Driver Download

To download drivers from IEI Resource Download Center, follow the steps below.

Step 1: Go to <https://download.ieiworld.com>. Type HTB-210-Q470 and press Enter.



Step 2: All product-related software, utilities, and documentation will be listed. You can choose **Driver** to filter the result.



All TypeBIOSDatasheetDriverQIGSDKUser ManualUtilityOthers

WAFER-BT-i1

Product Info ▶

Embedded Computer ▶ Single Board Computer ▶ Embedded Board

3.5" SBC with Intel® 22nm Atom™/Celeron® on-board SoC

Driver

File Name	Published	Version	File Checksum
7B000-001033-RS V2.3.iso (2.23 GB) 	2017/10/03	2.30	3B2DB1F792779A93A8F50DDBC3943E30

Step 3: Click the driver file name on the page and you will be prompted with the following window. You can download the entire ISO file (❶), or click the small arrow to find an individual driver and click the file name to download (❷).

7B000-001168-RS_V1.4.iso

X

❶

Click here to download entire ISO file. (2.99 GB)

* Download individual file *

❷

Docs

1.Chipset

10.1.1.12.zip (2.7 MB)

2.VGA

3.Audio

4.Lan

5.USB 3.0

6.Serial IO

7.TXE

8.Manual

NOTE:

To install software from the downloaded ISO image file in Windows 8, 8.1 or 10, double-click the ISO file to mount it as a virtual drive to view its content.

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Chapter

4

BIOS

4.1 Introduction

The BIOS is programmed onto the BIOS chip. The BIOS setup program allows changes to certain system settings. This chapter outlines the options that can be changed.



NOTE:

Some of the BIOS options may vary throughout the life cycle of the product and are subject to change without prior notice.

4.1.1 Starting Setup

The UEFI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DEL** or **F2** key as soon as the system is turned on or
2. Press the **DEL** or **F2** key when the “**Press DEL or F2 to enter SETUP**” message appears on the screen.

If the message disappears before the **DEL** or **F2** key is pressed, restart the computer and try again.

4.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in the following table.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+	Increase the numeric value or make changes
-	Decrease the numeric value or make changes
Page Up	Move to the previous page
Page Dn	Move to the next page

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Key	Function
Esc	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2	Load previous values
F3	Load optimized defaults
F4	Save changes and Exit BIOS

4.1.3 Getting Help

When **F1** is pressed, a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window, press **Esc**.

4.1.4 Unable to Reboot after Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the clear CMOS button described in **Chapter 3**.

4.1.5 BIOS Menu Bar

The **menu bar** on top of the BIOS screen has the following main items:

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Security – Sets User and Supervisor Passwords.
- Boot – Changes the system boot configuration.
- Save & Exit – Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

4.2 Main



The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.
The **Main** menu gives an overview of the basic system information.

Aptio Setup - AMI		
Main	Advanced	Chipset
BIOS Information		Set the Date. Use Tab to switch between Date elements.
BIOS Vendor	American Megatrends	
Core Version	5.17	
Compliance	UEFI 2.7; PI 1.6	
Project Version	Z695TEST30C.BIN	
Build Date and Time	07/09/2021 20:29:45	
iWDD Vendor		iEi
iWDD Version	Z695ET06.bin	
Processor Information		
Name	CometLake DT	
Type	Intel(R) Core(TM)	
	i5-10500TE CPU @ 2.30GHz	
Speed	2300 MHz	
ID	0xA0653	
Stepping	G1	
Package	LGA1200	
Number of Processors	6Core(s) / 12Thread(s)	
Microcode Revision	EA	
GT Info	GT2 (0x9BC8)	
IGFX GOP Version	9.0.1107	
Memory RC Version	0.0.0.67	
Total Memory	32768 MB	
Memory Frequency	2133 MHz	
PCH Information		
Name	CML PCH-H	
PCH SKU	Q470	
Stepping	A0	
Dual Output Fast Read Support	Not supported	
Read ID/Status Clock Freq	17 MHz	
Write and Erase Clock Freq	17 MHz	
Fast Read Clock Freq	17 MHz	
ME FW Version	14.1.53.1649	
ME Firmware SKU	Corporate SKU	
Access Level	Administrator	
System Date	[Thu 01/02/2020]	
System Time	[15:10:27]	
Version 2.21.1278. Copyright (C) 2021 AMI		

BIOS Menu 1: Main

The **Main** menu has two user configurable fields:



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→ System Date [xx/xx/xx]

Use the **System Date** option to set the system date. Manually enter the day, month and year.

→ System Time [xx:xx:xx]

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

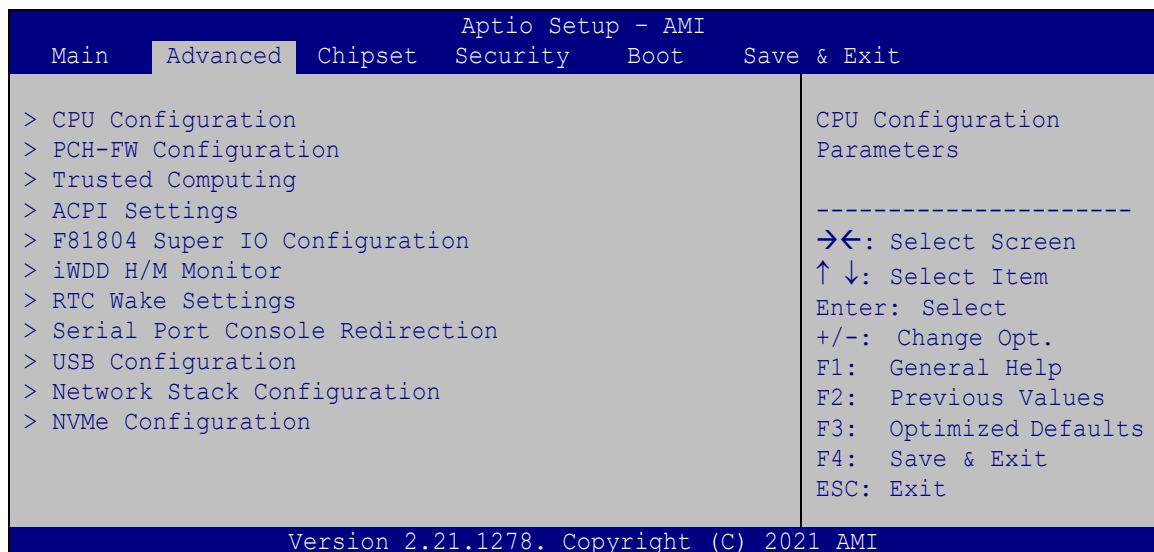
4.3 Advanced

Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:



WARNING!

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.



BIOS Menu 2: Advanced

4.3.1 CPU Configuration



Use the **CPU Configuration** menu (**BIOS Menu 3**) to view detailed CPU specifications or enable the Intel Virtualization Technology.

Aptio Setup - AMI		
Advanced		
CPU Configuration		When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Type	Intel(R) Core(TM) i5-10500TE CPU @ 2.30GHz	
ID	0xA0653	
Speed	2300 MHz	
L1 Data Cache	32 kB x 6	
L1 Instruction Cache	32 kB x 6	
L2 Cache	256 kB x 6	
L3 Cache	12 MB	
L4 Cache	N/A	
VMX	Supported	
SMX/TXT	Supported	
Intel (VMX) Virtualization Technology	[Disabled]	-----
Active Processor Cores	[All]	→←: Select Screen
Hyper-Threading	[Enabled]	↑↓: Select Item
Intel Trusted Execution Technology	[Disabled]	Enter: Select
Intel(R) SpeedStep(tm)	[Enabled]	+/-: Change Opt.
C states	[Disabled]	F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit
Version 2.21.1278. Copyright (C) 2021 AMI		

BIOS Menu 3: CPU Configuration

→ Intel® (VMX) Virtualization Technology [Disabled]

Use the **Intel® (VMX) Virtualization Technology** option to enable or disable virtualization on the system. When combined with third party software, Intel® Virtualization technology allows several OSs to run on the same system at the same time.

- **Disabled** **DEFAULT** Disables Intel® Virtualization Technology.
- **Enabled** Enables Intel® Virtualization Technology.

→ Active Processor Cores [All]

Use the **Active Processor Cores** BIOS option to enable numbers of cores in the processor package.



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- ➔ **All** **DEFAULT** Enable all cores in the processor package.
- ➔ **1** Enable one core in the processor package.
- ➔ **2** Enable two cores in the processor package.
- ➔ **3** Enable three cores in the processor package.
- ➔ **4** Enable four cores in the processor package.
- ➔ **5** Enable five cores in the processor package.

➔ **Hyper-threading [Enabled]**

Use the **Hyper-threading** BIOS option to enable or disable the Intel Hyper-Threading Technology.

- ➔ **Disabled** Disables the Intel Hyper-Threading Technology.
- ➔ **Enabled** **DEFAULT** Enables the Intel Hyper-Threading Technology.

➔ **Intel(R) SpeedStep(tm) [Enabled]**

Use the **Intel(R) SpeedStep(tm)** option to enable or disable the Intel® SpeedStep Technology which allows more than two frequency ranges to be supported.

- ➔ **Disabled** Disables Intel® SpeedStep Technology
- ➔ **Enabled** **DEFAULT** Enables Intel® SpeedStep Technology

➔ **C states [Disabled]**

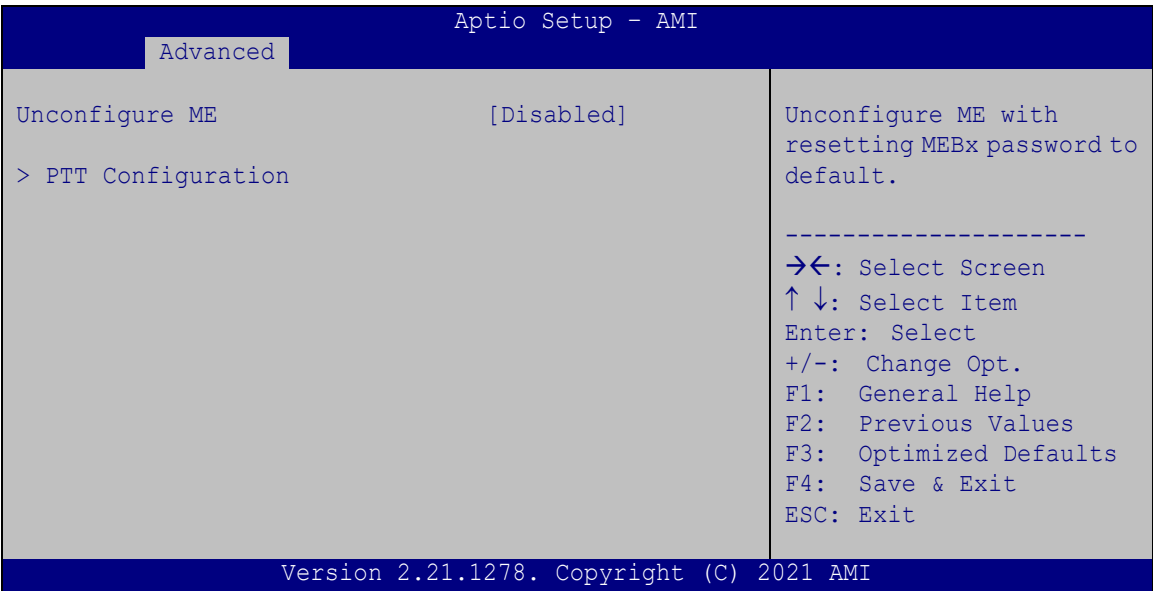
Use the **C states** option to enable or disable the CPU C states.

- ➔ **Disabled** **DEFAULT** Disables the CPU C states.
- ➔ **Enabled** Enables the CPU C states.



4.3.2 PCH-FW Configuration

The **PCH-FW Configuration** menu (**BIOS Menu 4**) allows Intel® Active Management Technology (AMT) options to be configured.



BIOS Menu 4: PCH-FW Configuration

➔ **Unconfigure ME [Disabled]**

Use the **Unconfigure ME** option to perform ME unconfigure without password operation.

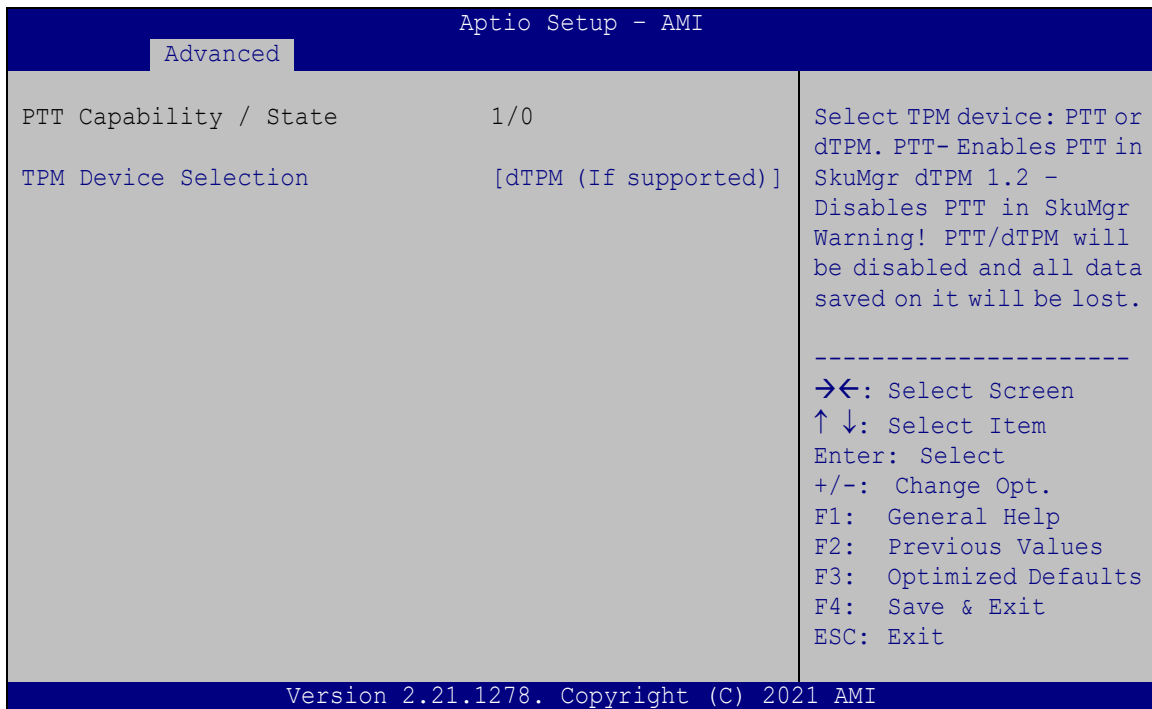
- ➔ **Disabled** **DEFAULT** Not perform ME unconfigure
- ➔ **Enabled** To perform ME unconfigure



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4.3.2.1 PTT Configuration

Use the **PTT Configuration** menu (**BIOS Menu 5**) to configure settings related to the Trusted Platform Module (TPM).



BIOS Menu 5: PTT Configuration

→ TPM Device Selection [dTPM (If supported)]

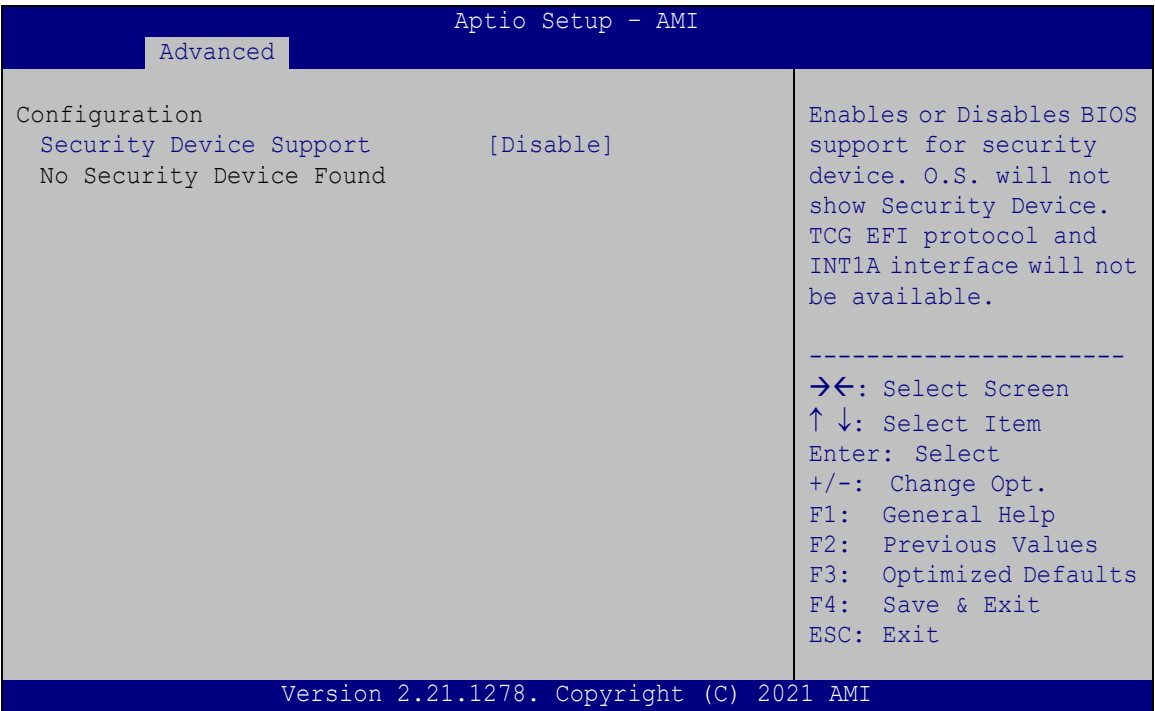
Use the **TPM Device Selection** option to configure support for the TPM.

- **dTPM** (If **DEFAULT** Disable PTT in SkuMgr.
supported)
- **PTT** Enable PTT in SkuMgr



4.3.3 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 6**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 6: Trusted Computing

➔ Security Device Support [Disable]

Use the **Security Device Support** option to configure support for the security device.

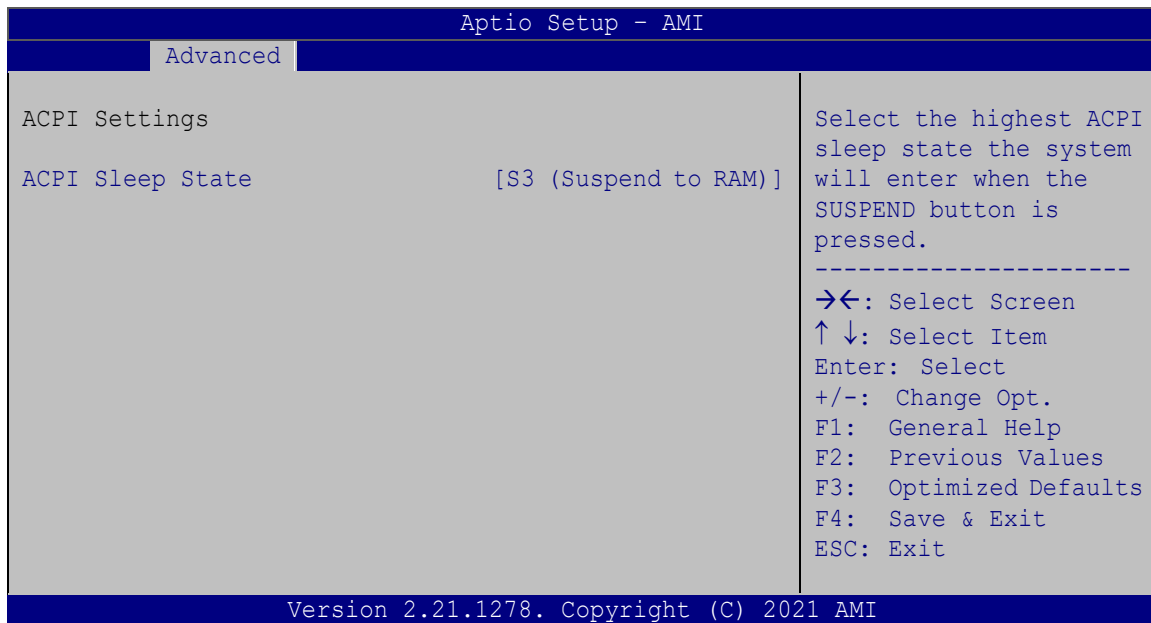
- ➔ **Disable** **DEFAULT** Security device support is disabled.
- ➔ **Enable** Security device support is enabled.



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4.3.4 ACPI Settings

The **ACPI Settings** menu (**BIOS Menu 7**) configures the Advanced Configuration and Power Interface (ACPI) options.

**BIOS Menu 7: ACPI Configuration**→ **ACPI Sleep State [S3 (Suspend to RAM)]**

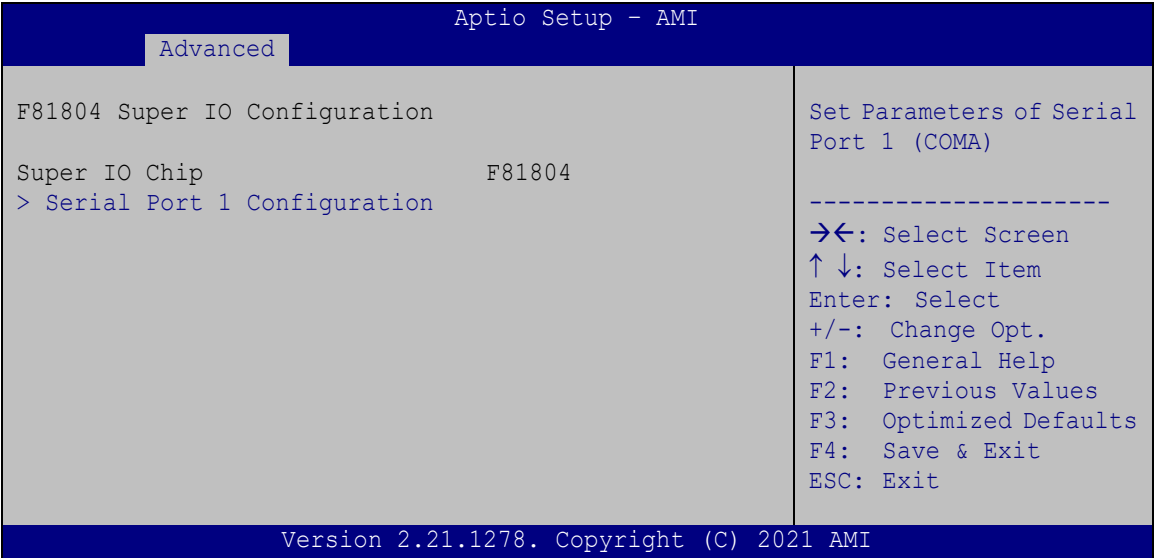
Use the **ACPI Sleep State** option to specify the sleep state the system enters when it is not being used.

- | | | | |
|---|----------------------------|----------------|---|
| → | S3 (Suspend to RAM) | DEFAULT | The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved. |
|---|----------------------------|----------------|---|



4.3.5 F81804 Super IO Configuration

Use the **F81804 Super IO Configuration** menu (**BIOS Menu 8**) to set or change the configurations for the serial ports and parallel port.



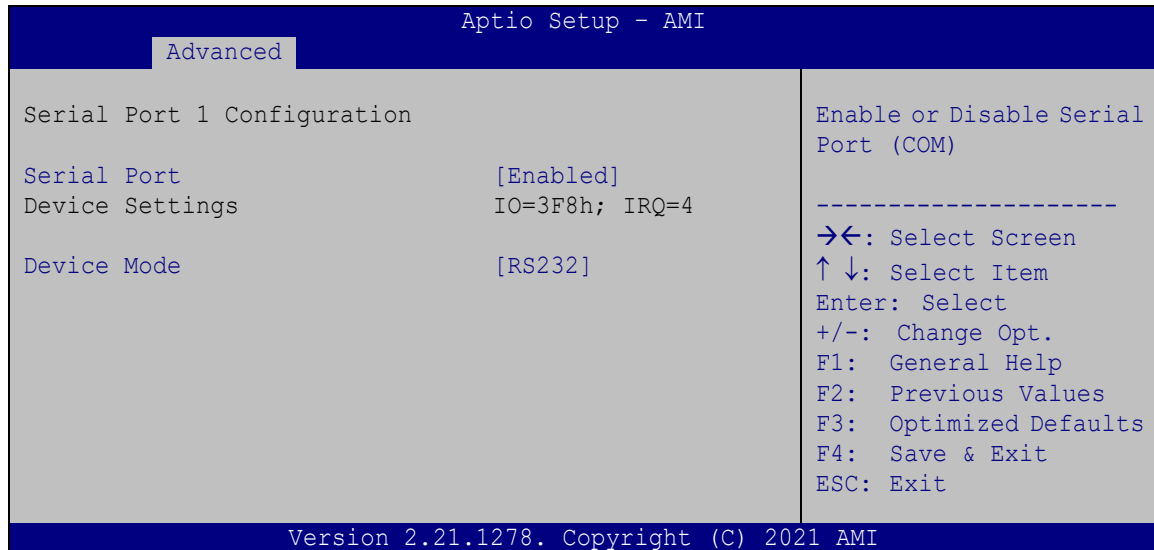
BIOS Menu 8: F81804 Super IO Configuration



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4.3.5.1 Serial Port 1 Configuration

Use the **Serial Port 1 Configuration** menu (**BIOS Menu 9**) to configure the serial port 1.



BIOS Menu 9: Serial Port 1 Configuration Menu

➔ Serial Port [Enabled]

Use the **Serial Port** option to enable or disable the serial port.

- ➔ **Disabled** Disable the serial port
- ➔ **Enabled** **DEFAULT** Enable the serial port

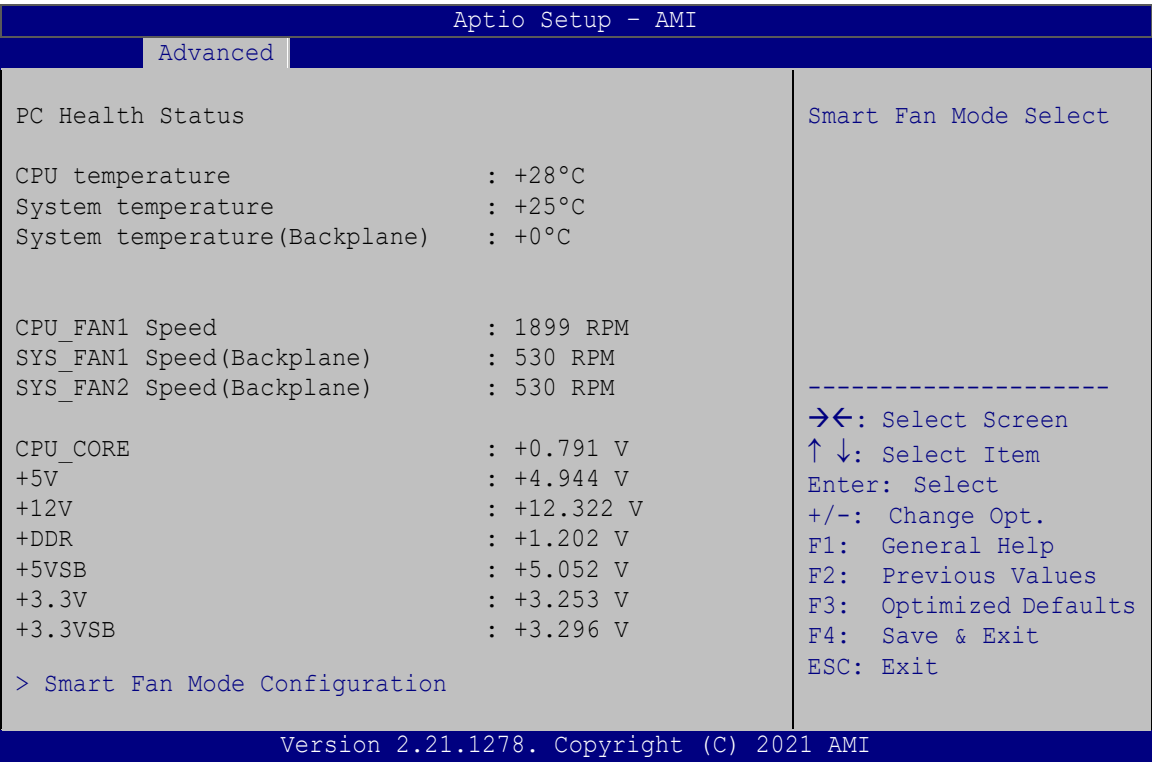
➔ Device Mode [RS232]

The serial port allows setting the data transfer mode to RS-232, RS-422 or RS-485.



4.3.6 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 10**) contains the fan configuration submenu, and displays operating temperature, fan speeds and system voltages.



BIOS Menu 10: iWDD H/W Monitor

➔ PC Health Status

The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures:
 - CPU Temperature
 - System Temperature
 - System Temperature (backplane)
- Fan Speed:
 - CPU Fan Speed
 - System Fan Speed
- Voltages:
 - CPU_CORE
 - +5V

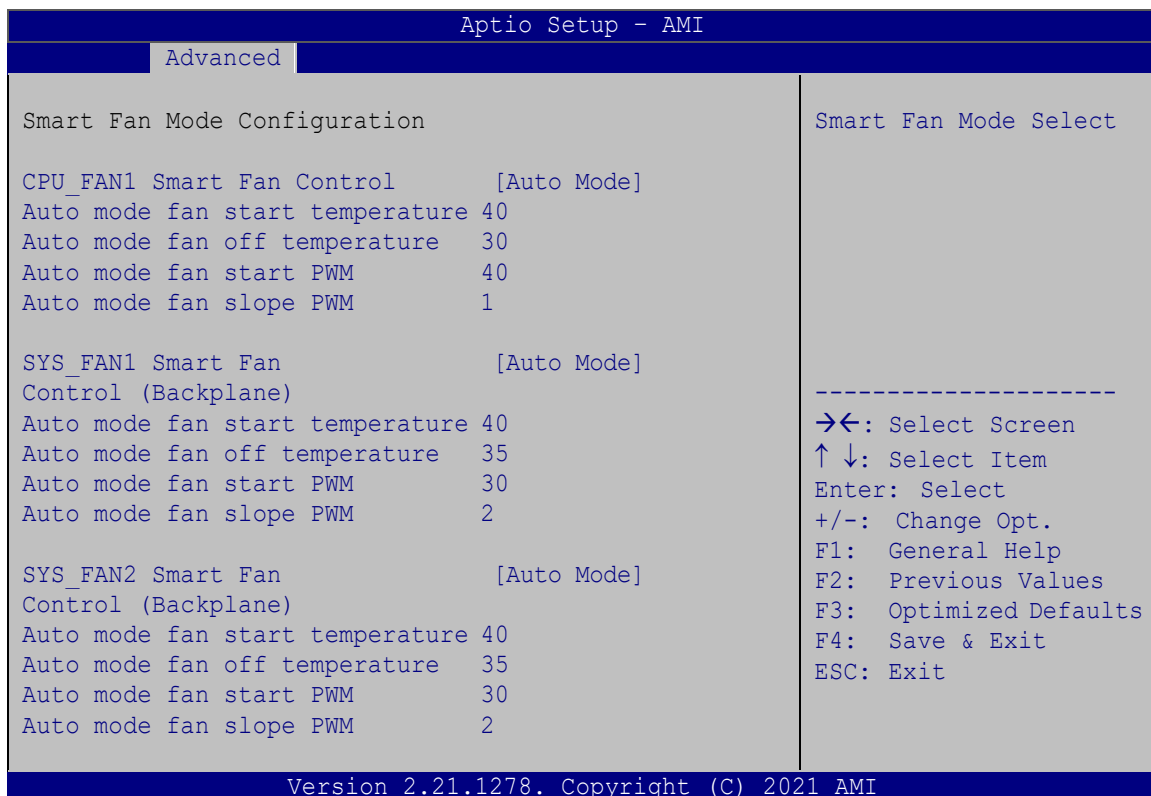


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- +12V
- +DDR
- +5VSB
- +3.3V
- +3.3VSB

4.3.6.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (BIOS Menu 11) to configure fan speed settings.



BIOS Menu 11: Smart Fan Mode Configuration

➔ CPU_FAN1/SYS_FAN1/SYS_FAN2 Smart Fan Control [Auto Mode]

Use the **CPU_FAN1/SYS_FAN1/SYS_FAN2 Smart Fan Control** option to configure the CPU fan.

➔ **Manual Mode**

The fan spins at the speed set in the Manual Mode option

→ **Auto Mode****DEFAULT**

The fan adjusts its speed using these settings:

Auto mode fan start temperature

Auto mode fan off temperature

Auto mode fan start PWM

Auto mode fan slope PWM

→ **Auto mode fan start temperature [40]**

**WARNING:**

Setting this value too high may cause the fan to rotate at full speed only when the CPU is at a very high temperature and therefore cause the system to be damaged.

The **Auto mode fan start temperature** option can only be set if the **CPU_FAN1/SYS_FAN1/SYS_FAN2 Smart Fan Control** option is set to **Auto Mode**. If the system temperature is between **Start Temperature** and **Off Temperature**, the fan speed change to be **Start PWM**. To set a value, select the **Auto mode fan start temperature** option and enter a decimal number between 1 and 100.

→ **Auto mode fan off temperature [30]**

**WARNING:**

Setting this value too high may cause the fan to speed up only when the CPU is at a very high temperature and therefore cause the system to be damaged.

The **Auto mode fan off temperature** option can only be set if the **CPU_FAN1/SYS_FAN1/SYS_FAN2 Smart Fan control** option is set to **Auto Mode**. If the system temperature is lower than **Auto mode fan off temperature**, the fan speed

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change to be lowest. To set a value, select the **Auto mode fan off temperature** option and enter a decimal number between 1 and 100.

➔ Auto mode fan start PWM [40]

The **Auto mode fan start PWM** option can only be set if the **CPU_FAN1/SYS_FAN1/SYS_FAN2 Smart Fan control** option is set to **Auto Mode**. Use the **Auto mode fan start PWM** option to set the PWM start value. To set a value, select the **Auto mode fan start PWM** option and enter a decimal number between 1 and 100.

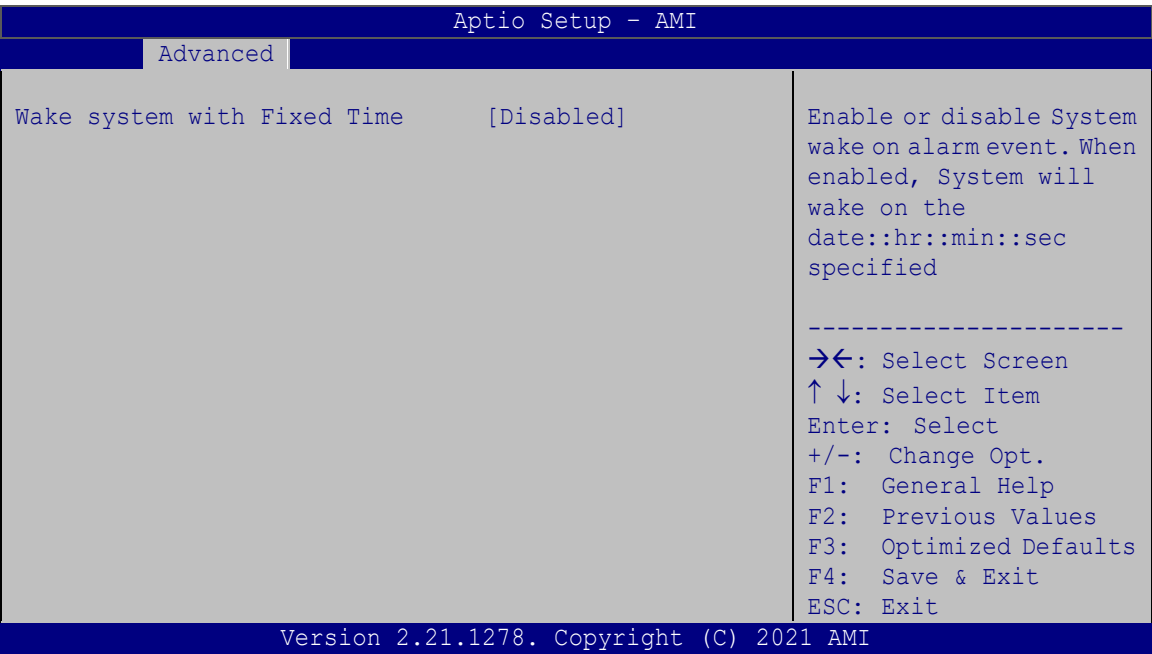
➔ Auto mode fan slope PWM [2]

The **Auto mode fan slope PWM** option can only be set if the **CPU_FAN1/SYS_FAN1/SYS_FAN2 Smart Fan control** option is set to **Auto Mode**. Use the **Auto mode fan slope PWM** option to select the linear rate at which the PWM mode increases with respect to an increase in temperature. To set a value, select the **Auto mode fan slope PWM** option and enter a decimal number between 1 and 8.



4.3.7 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 12**) enables the system to wake at the specified time.



BIOS Menu 12: RTC Wake Settings

→ **Wake system with Fixed Time [Disabled]**

Use the **Wake system with Fixed Time** option to enable or disable the system wake on alarm event.

- **Disabled** **DEFAULT** The real time clock (RTC) cannot generate a wake event.
- **Enabled** If selected, the **Wake up every day** option appears allowing you to enable to disable the system to wake every day at the specified time. Besides, the following options appear with values that can be selected:
 - Wake up date
 - Wake up hour



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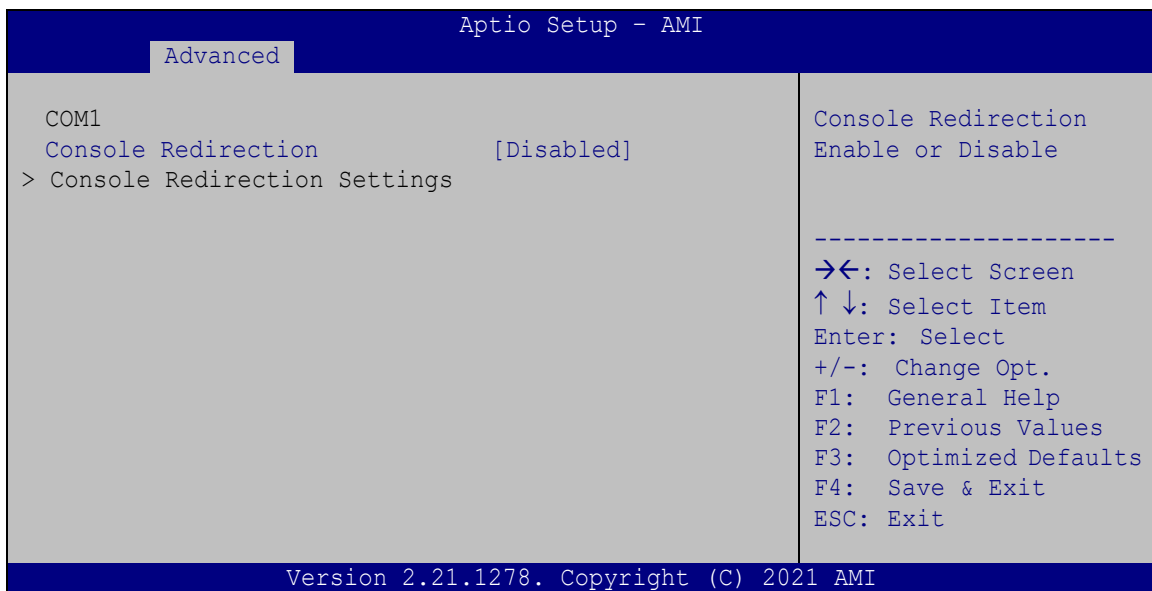
Wake up minute

Wake up second

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

4.3.8 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 13**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.



BIOS Menu 13: Serial Port Console Redirection

→ Console Redirection [Disabled]

Use **Console Redirection** option to enable or disable the console redirection function.

- **Disabled** **DEFAULT** Disabled the console redirection function
- **Enabled** Enabled the console redirection function

The following options are available in the **Console Redirection Settings** submenu when the **Console Redirection** option is enabled.

→ Terminal Type [ANSI]

Use the **Terminal Type** option to specify the remote terminal type.

- | | | | |
|---|----------------|----------------|-------------------------------------|
| → | VT100 | | The target terminal type is VT100 |
| → | VT100+ | | The target terminal type is VT100+ |
| → | VT-UTF8 | | The target terminal type is VT-UTF8 |
| → | ANSI | DEFAULT | The target terminal type is ANSI |

→ Bits per second [115200]

Use the **Bits per second** option to specify the serial port transmission speed. The speed must match the other side. Long or noisy lines may require lower speeds.

- | | | | |
|---|---------------|----------------|--|
| → | 9600 | | Sets the serial port transmission speed at 9600. |
| → | 19200 | | Sets the serial port transmission speed at 19200. |
| → | 57600 | | Sets the serial port transmission speed at 57600. |
| → | 115200 | DEFAULT | Sets the serial port transmission speed at 115200. |

→ Data Bits [8]

Use the **Data Bits** option to specify the number of data bits.

- | | | | |
|---|----------|----------------|--------------------------|
| → | 7 | | Sets the data bits at 7. |
| → | 8 | DEFAULT | Sets the data bits at 8. |

→ Parity [None]

Use the **Parity** option to specify the parity bit that can be sent with the data bits for detecting the transmission errors.

- | | | | |
|---|-------------|----------------|---|
| → | None | DEFAULT | No parity bit is sent with the data bits. |
| → | Even | | The parity bit is 0 if the number of ones in the data bits is even. |

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- ➔ **Odd** The parity bit is 0 if the number of ones in the data bits is odd.
- ➔ **Mark** The parity bit is always 1. This option does not provide error detection.
- ➔ **Space** The parity bit is always 0. This option does not provide error detection.

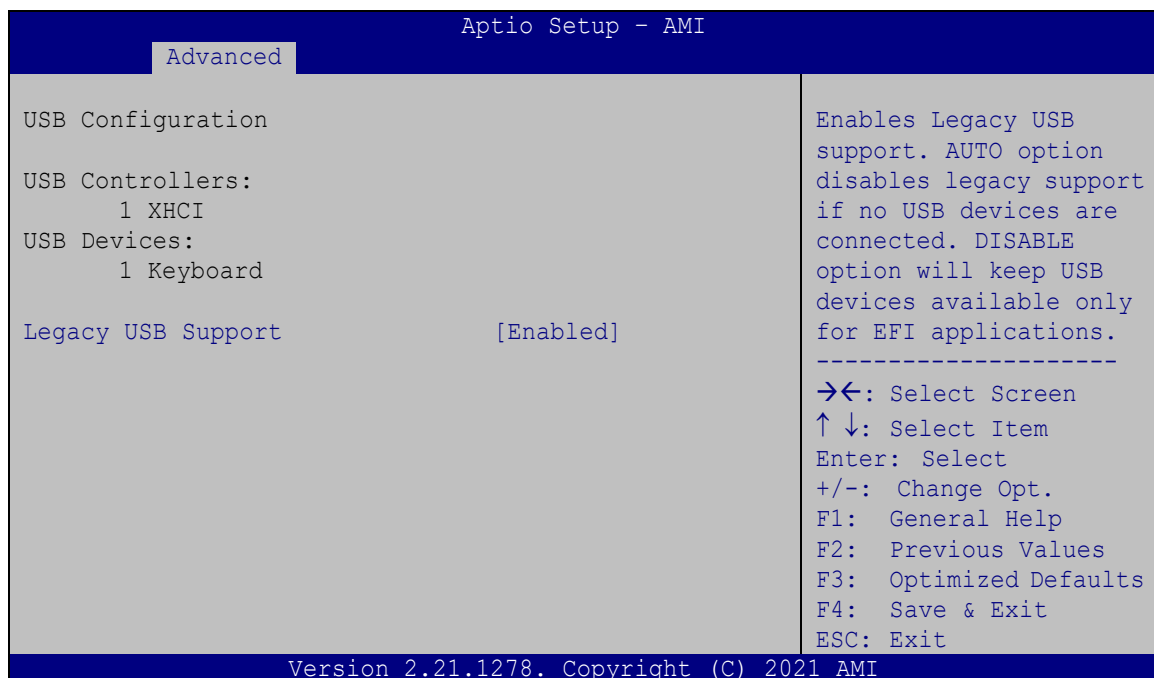
➔ **Stop Bits [1]**

Use the **Stop Bits** option to specify the number of stop bits used to indicate the end of a serial data packet. Communication with slow devices may require more than 1 stop bit.

- ➔ **1** **DEFAULT** Sets the number of stop bits at 1.
- ➔ **2** Sets the number of stop bits at 2.

4.3.9 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 14**) to read USB configuration information and configure the USB settings.



BIOS Menu 14: USB Configuration



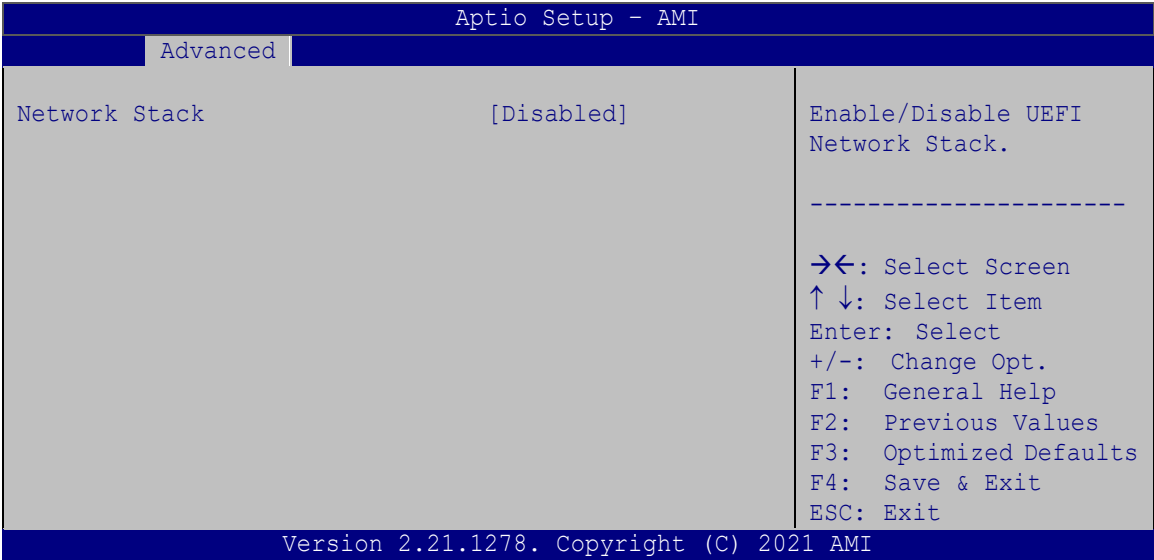
➔ Legacy USB Support [Enabled]

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

- ➔ **Enabled** **DEFAULT** Legacy USB support enabled
- ➔ **Disabled** Legacy USB support disabled
- ➔ **Auto** Legacy USB support disabled if no USB devices are connected

4.3.10 Network Stack Configuration

Use the **Network Stack Configuration** menu (**BIOS Menu 15**) to configure network stack settings.



BIOS Menu 15: Network Stack Configuration



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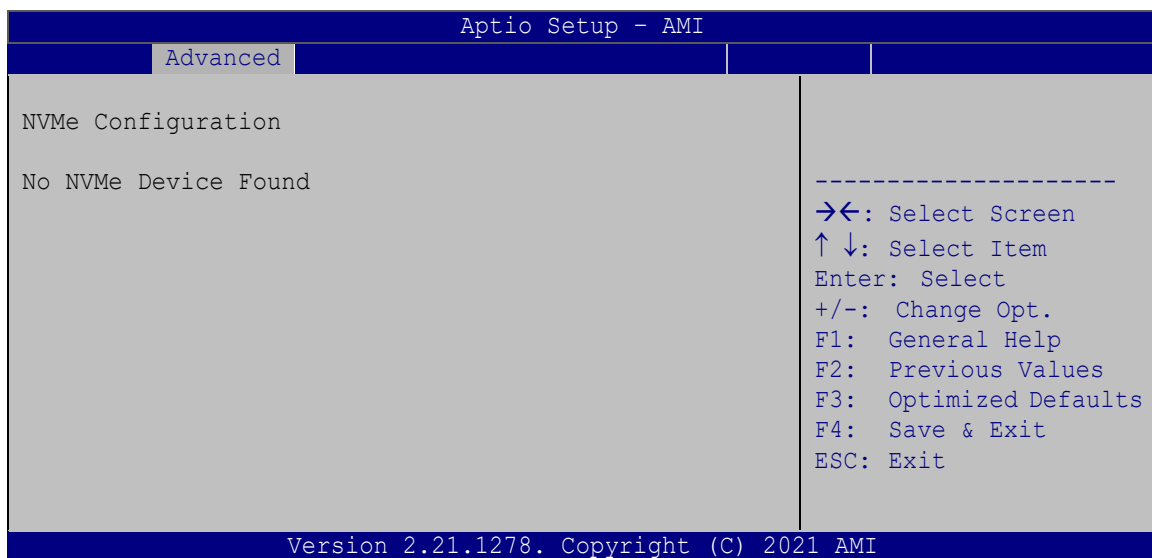
→ Network Stack [Disabled]

Use the **Network Stack** BIOS option to enable or disable UEFI network stack.

- **Disabled** **DEFAULT** UEFI network stack disabled
- **Enabled** UEFI network stack enabled

4.3.11 NVMe Configuration

Use the **NVMe Configuration (BIOS Menu 16)** menu to display the NVMe controller and device information.



BIOS Menu 16: NVMe Configuration



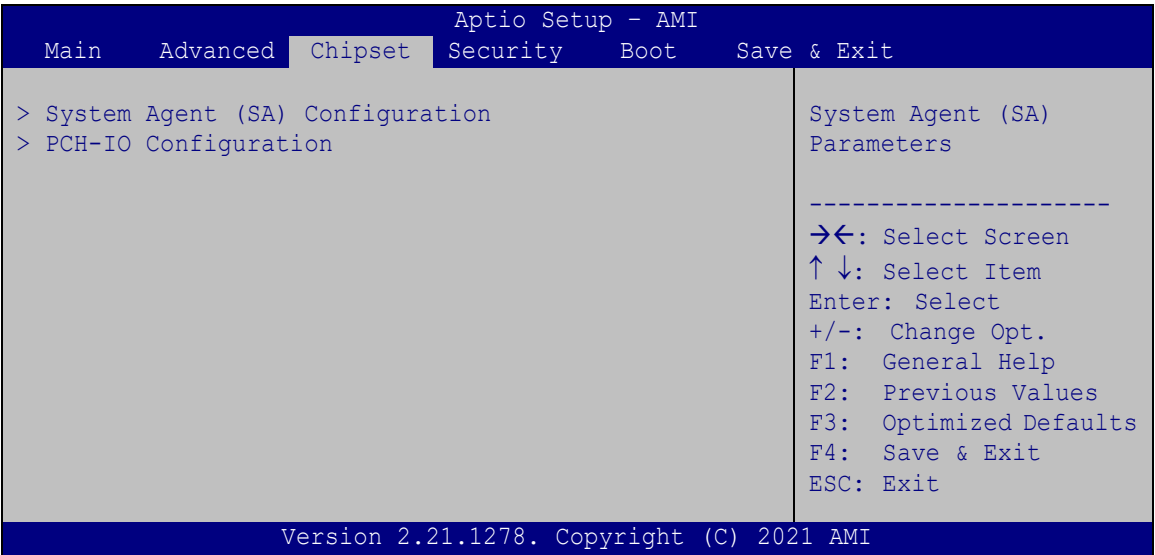
4.4 Chipset

Use the **Chipset** menu (**BIOS Menu 17**) to access the PCH IO and System Agent (SA) configuration menus.



WARNING!

Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



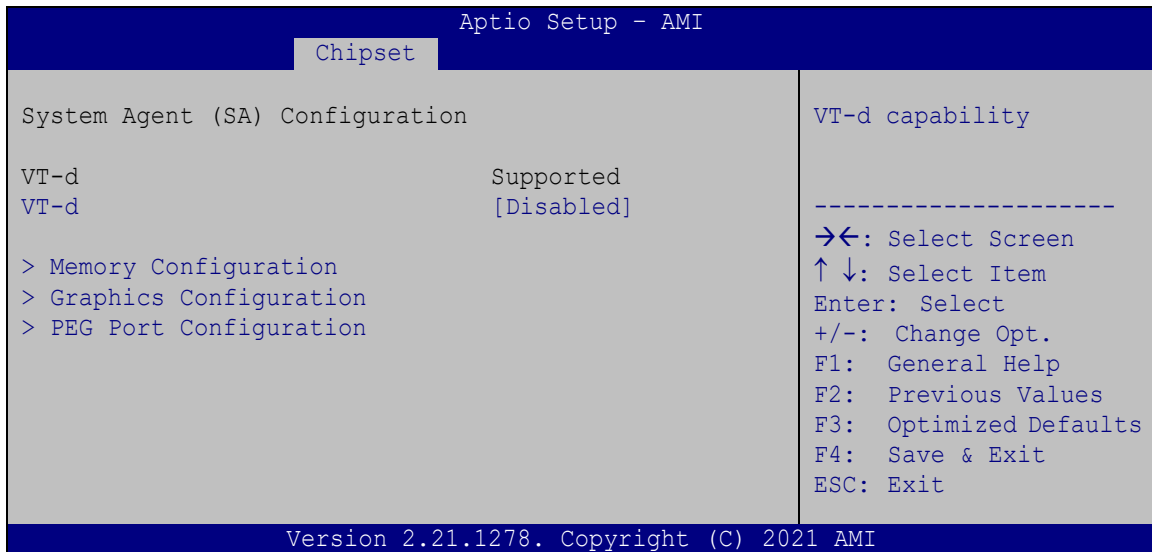
BIOS Menu 17: Chipset



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4.4.1 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 18**) to configure the System Agent (SA) parameters.



BIOS Menu 18: System Agent (SA) Configuration

→ VT-d [Disabled]

Use the **VT-d** option to enable or disable VT-d capability.

- **Disabled** **DEFAULT** Disables VT-d capability.
- **Enabled** Enables VT-d capability.



4.4.1.1 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 19**) to view memory information.

Aptio Setup - AMI			
Chipset			
Memory Configuration			
CHA_DIMM0#	Populated & Enabled	----- →←: Select Screen ↑ ↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Size	16384 MB (DDR4)		
Number of Ranks	2		
Manufacturer	Unknown		
CHB_DIMM0#	Populated & Enabled		
Size	16384 MB (DDR4)		
Number of Ranks	2		
Manufacturer	Unknown		
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BIOS Menu 19: Memory Configuration

4.4.1.2 Graphics Configuration

Use the **Graphics Configuration** (**BIOS Menu 20**) menu to configure the video device connected to the system.

Aptio Setup - AMI		
Chipset		
Graphics Configuration		Select which f
Primary Display	[Auto]	IGFX/PEG/PCIE Graphics
Internal Graphics	[Enabled]	device should be Primary
DVMT Pre-Allocated	[64M]	Display Or select SG for
DVMT Total Gfx Mem	[MAX]	Switchable Gfx.

		→←: Select Screen
		↑ ↓: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit
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BIOS Menu 20: Graphics Configuration



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→ Primary Display [Auto]

Use the **Primary Display** option to select the display device used by the system when it boots. Configuration options are listed below.

- Auto **DEFAULT**
- IGFX
- PEG
- PCIE

→ Internal Graphics [Enabled]

Use the **Internal Graphics** option to keep IGFX enabled basing on the setup options. The following options are available:

- Auto
- Disabled
- Enabled **DEFAULT**

→ DVMT Pre-Allocated [64M]

Use the **DVMT Pre-Allocated** option to set the amount of system memory allocated to the integrated graphics processor when the system boots. The system memory allocated can then only be used as graphics memory, and is no longer available to applications or the operating system. Configuration options are listed below:

- 32M
- 64M **DEFAULT**

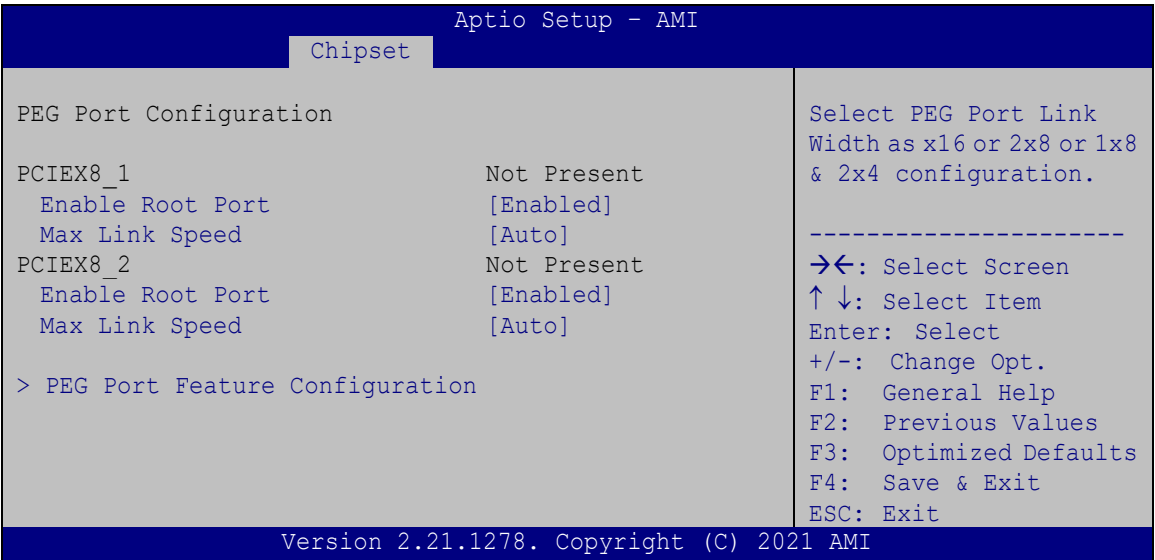
→ DVMT Total Gfx Mem [MAX]

Use the **DVMT Total Gfx Mem** option to select DVMT5.0 total graphic memory size used by the internal graphic device. The following options are available:

- 128M
- 256M
- MAX **DEFAULT**



4.4.1.3 PEG Port Configuration



BIOS Menu 21: PEG Port Configuration

➔ Enable Root Port [Enabled]

Use the **Enable Root Port** option to enable or disable the PCI Express (PEG) controller.

- ➔ Disabled Disables the PCI Express (PEG) controller.
- ➔ Enabled **DEFAULT** Enables the PCI Express (PEG) controller.

➔ Max Link Speed [Auto]

Use the **Max Link Speed** option to select the maximum link speed of the PCI Express slot.
The following options are available:

- Auto **DEFAULT**
- Gen1
- Gen2
- Gen3

➔ Detect Non-Compliance Device [Disabled]

Use the **Detect Non-Compliance Device** option to enable or disable detecting if a non-compliance PCI Express device is connected to the PCI Express slot.

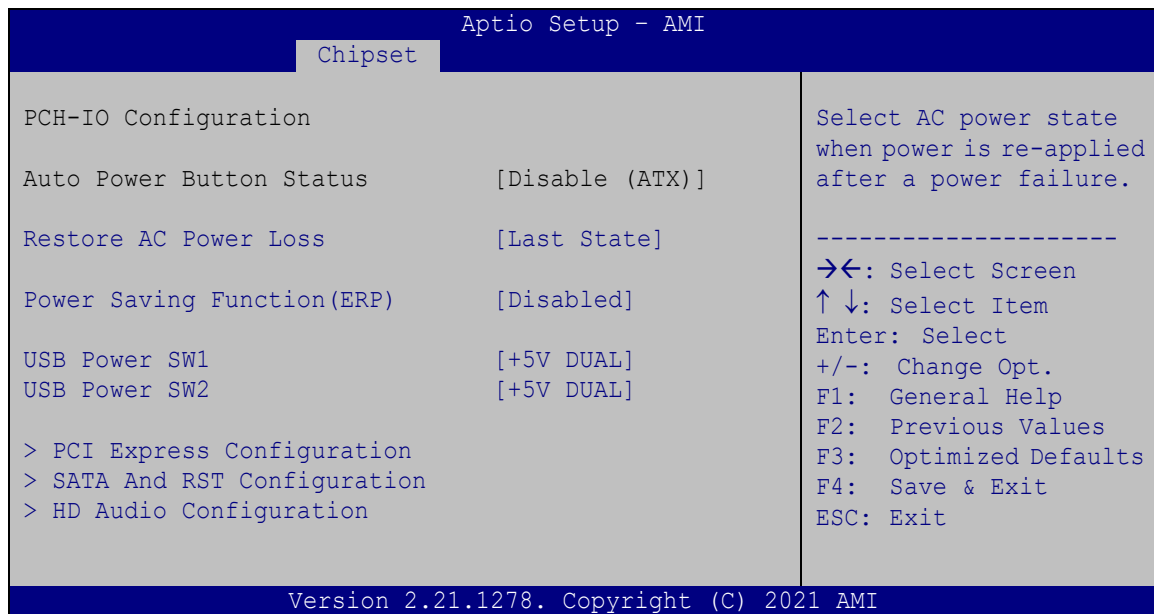


HTB-210-Q470 Embedded System

- | | | | |
|---|-----------------|----------------|---|
| ➔ | Disabled | DEFAULT | Disables to detect if a non-compliance PCI Express device is connected to the PCI Express slot. |
| ➔ | Enabled | | Enables to detect if a non-compliance PCI Express device is connected to the PCI Express slot. |

4.4.2 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 22**) to configure the PCH parameters.



BIOS Menu 22: PCH-IO Configuration

➔ Restore AC Power Loss [Last State]

Use the **Restore AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

- | | | | |
|---|-------------------|----------------|--|
| ➔ | Power Off | | The system remains turned off |
| ➔ | Power On | | The system turns on |
| ➔ | Last State | DEFAULT | The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off. |



➔ **Power Saving Function(ERP) [Disabled]**

Use the **Power Saving Function(ERP)** BIOS option to enable or disable the power saving function.

- ➔ **Disabled DEFAULT** Power saving function is disabled.
- ➔ **Enabled** Power saving function is enabled. It will reduce power consumption when the system is off.

➔ **USB Power SW1 [+5V DUAL]**

Use the **USB Power SW1** BIOS option to configure whether to provide power to the corresponding USB connectors (**Table 4-1**) when the system is in S3/S4 sleep state. This option is valid only when the above **Power Saving Function (ERP)** BIOS option is disabled.

- ➔ **+5V DEFAULT** Power is provided to the USB connectors when the
DUAL system is in S3/S4 sleep state
- ➔ **+5V** Power is not provided to the USB connectors when the
 system is in S3/S4 sleep state

➔ **USB Power SW2 [+5V DUAL]**

Use the **USB Power SW2** BIOS option to configure whether to provide power to the corresponding USB connectors (**Table 4-1**) when the system is in S3/S4 sleep state. This option is valid only when the above **Power Saving Function (ERP)** BIOS option is disabled.

- ➔ **+5V DEFAULT** Power is provided to the USB connectors when the
DUAL system is in S3/S4 sleep state
- ➔ **+5V** Power is not provided to the USB connectors when the
 system is in S3/S4 sleep state

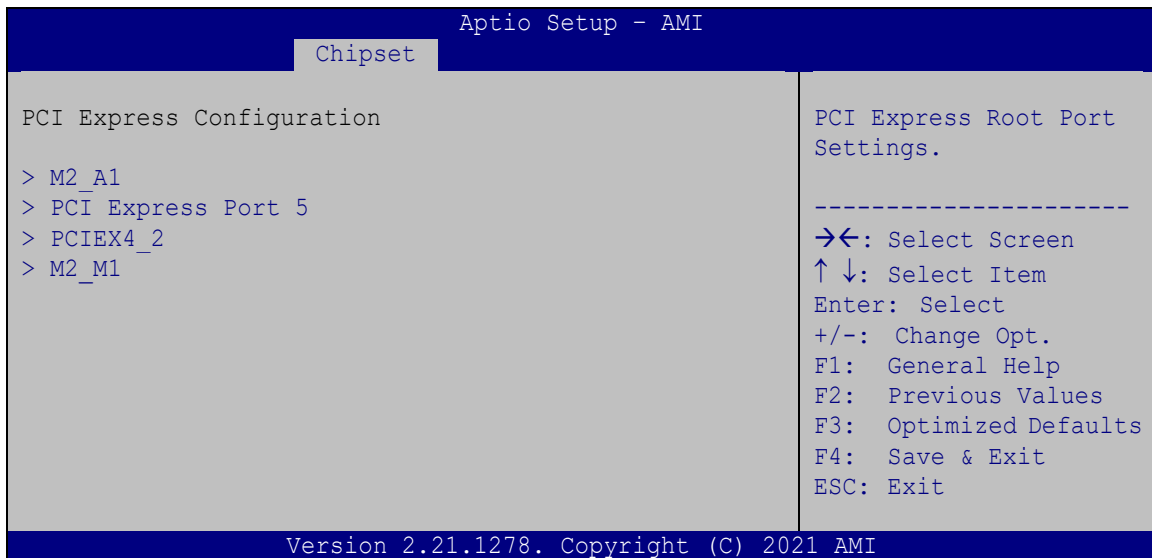


HTB-210-Q470 Embedded System

BIOS Options	Configured USB Ports
USB Power SW1	External USB 3.2 Gen 1 port (rear panel) External USB 3.2 Gen 1 port (rear panel)
USB Power SW2	External USB 2.0 ports (front panel) External USB 2.0 ports (front panel)

Table 4-1: BIOS Options and Configured USB Ports

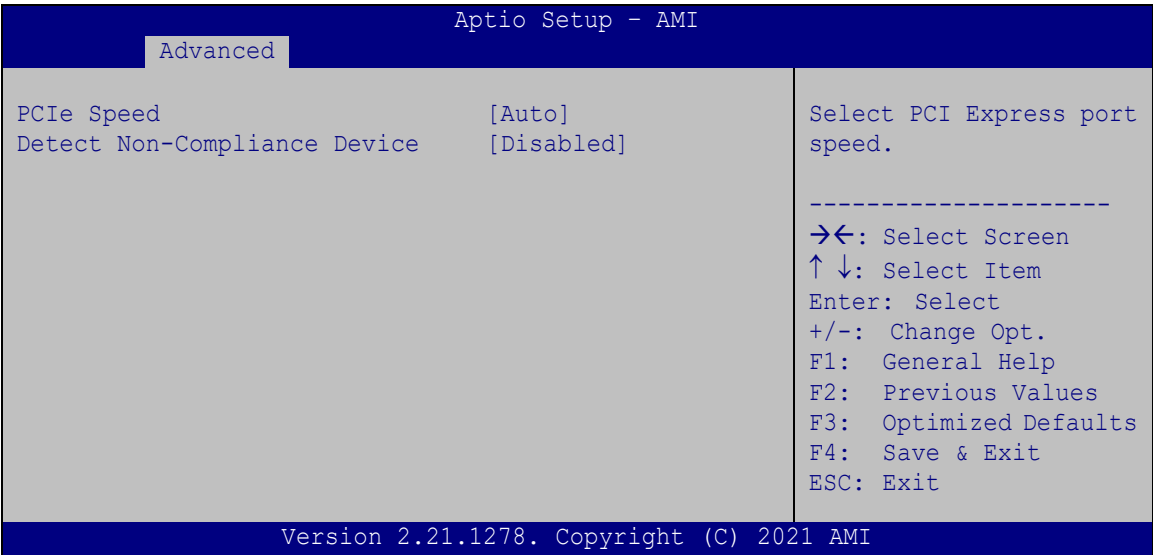
4.4.2.1 PCI Express Configuration



BIOS Menu 23: PCI Express Configuration



4.4.2.1.1 PCI Express Port



BIOS Menu 24: PCI Express Port Submenu

➔ PCIe Speed [Auto]

Use this option to select the support type of the PCI Express slots. The following options are available:

- Auto **DEFAULT**
- Gen1
- Gen2
- Gen3

➔ Detect Non-Compliance Device [Disabled]

Use the **Detect Non-Compliance Device** option to enable or disable detecting if a non-compliance PCI Express device is connected to the PCI Express slot.

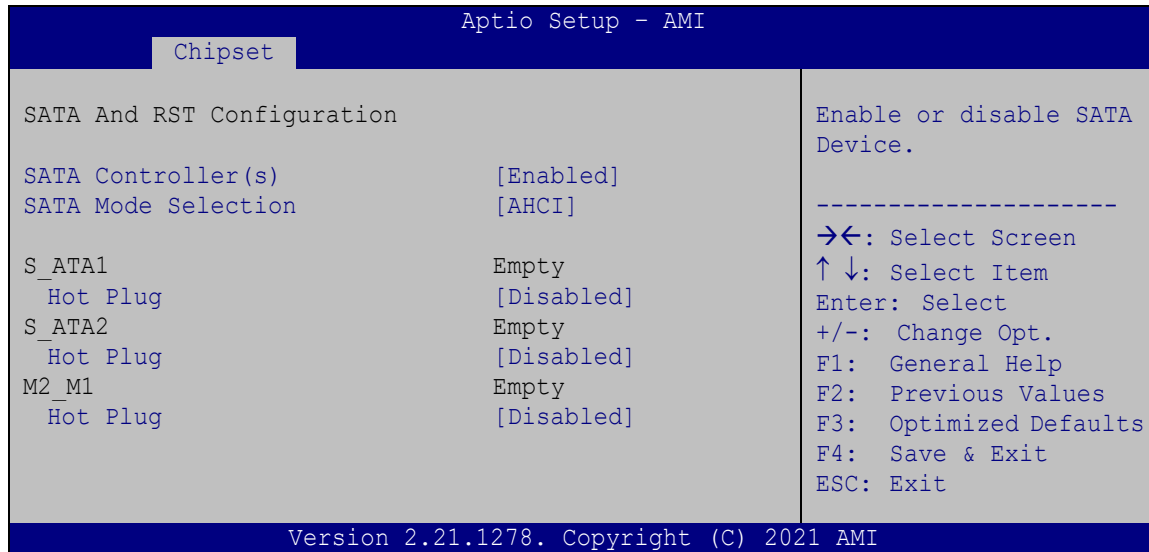
- ➔ **Disabled** **DEFAULT** Disables to detect if a non-compliance PCI Express device is connected to the PCI Express slot.
- ➔ **Enabled** Enables to detect if a non-compliance PCI Express device is connected to the PCI Express slot.



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4.4.2.2 SATA and RST Configuration

Use the **SATA and RST Configuration** menu (**BIOS Menu 25**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 25: SATA and RST Configuration

→ SATA Controller(s) [Enabled]

Use the **SATA Controller(s)** option to configure the SATA controller(s).

- **Enabled** **DEFAULT** Enables the on-board SATA controller(s).
- **Disabled** Disables the on-board SATA controller(s).

→ SATA Mode Selection [AHCI]

Use the **SATA Mode Selection** option to determine how the SATA devices operate.

- **AHCI** **DEFAULT** Configures SATA devices as AHCI device.
- **Intel RST** Configures SATA devices as RAID device.
 with Intel
 Optane
 System
 Acceleration



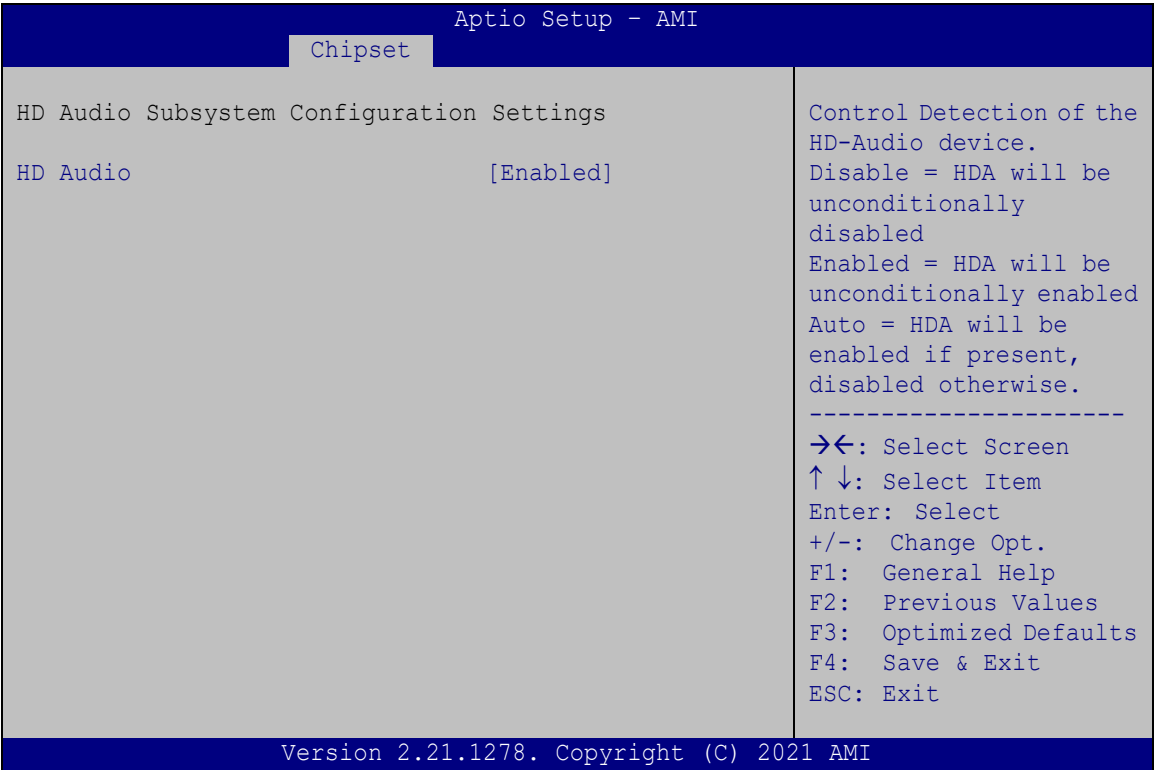
➔ Hot Plug [Disabled]

Use the **Hot Plug** option to designate the correspondent SATA port as hot-pluggable.

- ➔ **Disabled** **DEFAULT** Disables the hot-pluggable function of the SATA port.
- ➔ **Enabled** Designates the SATA port as hot-pluggable.

4.4.2.3 HD Audio Configuration

Use the **HD Audio Configuration** menu (**BIOS Menu 26**) to configure the PCH Azalia settings.



BIOS Menu 26: HD Audio Configuration

➔ HD Audio [Enabled]

Use the **HD Audio** option to enable or disable the High Definition Audio controller.

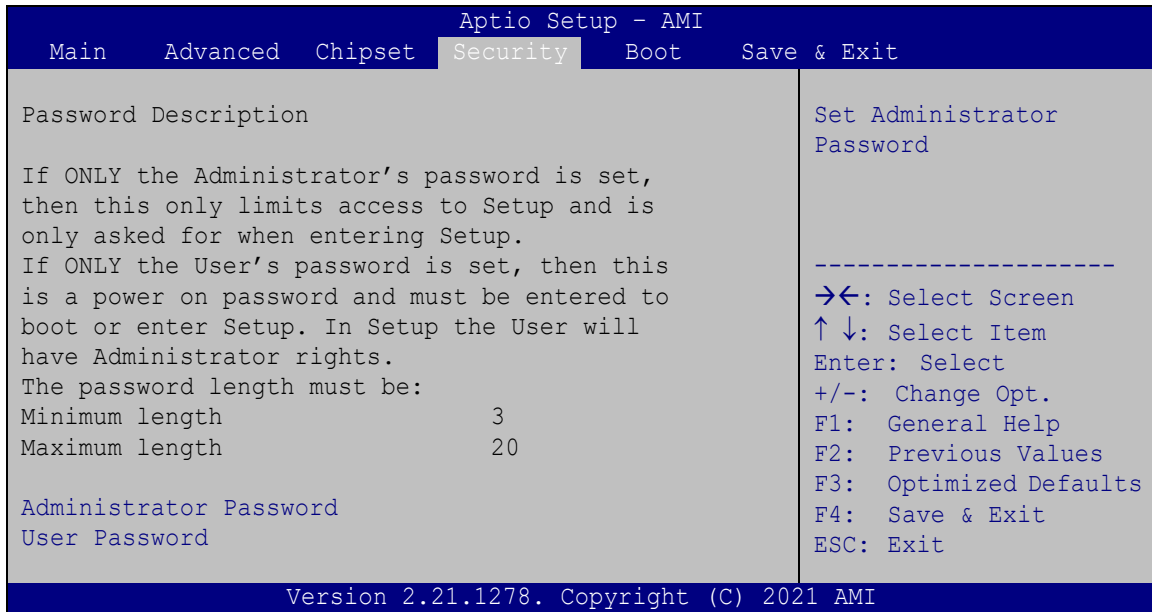
- ➔ **Disabled** The onboard High Definition Audio controller is disabled.
- ➔ **Enabled** **DEFAULT** The onboard High Definition Audio controller is enabled.



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4.5 Security

Use the **Security** menu (**BIOS Menu 27**) to set system and user passwords.



BIOS Menu 27: Security

➔ Administrator Password

Use the **Administrator Password** to set or change a administrator password.

➔ User Password

Use the **User Password** to set or change a user password.

4.6 Boot

Use the **Boot** menu (**BIOS Menu 28**) to configure system boot options.

Aptio Setup - AMI		
Main	Advanced	Chipset
Security	Boot	Save & Exit
Boot Configuration		Select the keyboard
Bootup NumLock State		NumLock state
Quiet Boot		[On]
		[Enabled]
Option ROM Messages		[Force BIOS]
Boot Option Priorities		

		→←: Select Screen
		↑ ↓: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit
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BIOS Menu 28: Boot

➔ **Bootup NumLock State [On]**

Use the **Bootup NumLock State** BIOS option to specify if the number lock setting must be modified during boot up.

- ➔

On

DEFAULT

Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.
- ➔

Off

Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

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→ Quiet Boot [Enabled]

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

- | | | | |
|---|-----------------|----------------|---|
| → | Disabled | | Normal POST messages displayed |
| → | Enabled | DEFAULT | OEM Logo displayed instead of POST messages |

→ Option ROM Messages [Force BIOS]

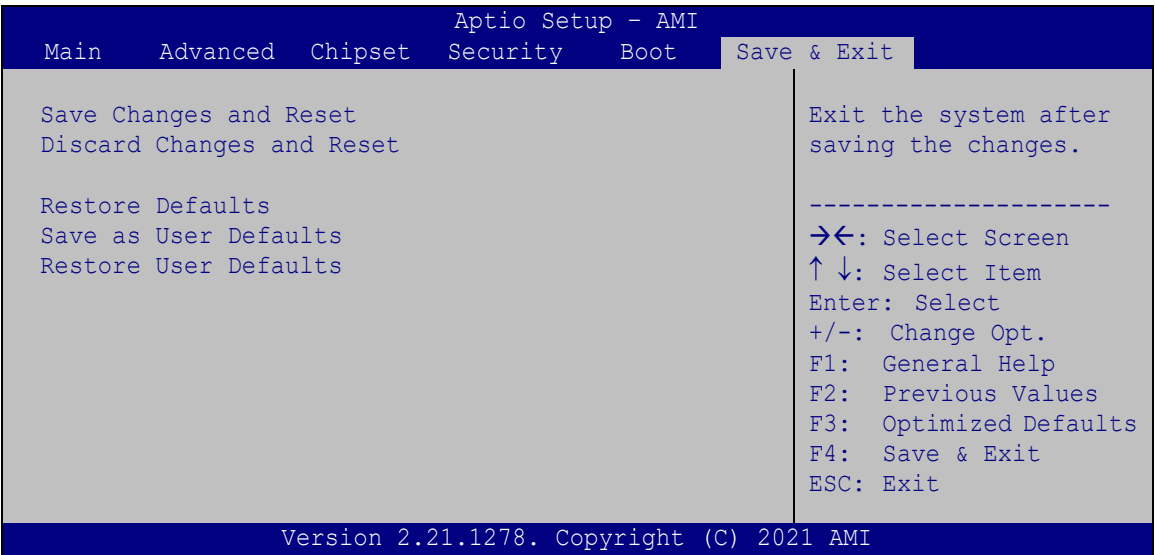
Use the **Option ROM Messages** option to set the Option ROM display mode.

- | | | | |
|---|---------------------|----------------|----------------------------------|
| → | Force BIOS | DEFAULT | Sets display mode to force BIOS. |
| → | Keep Current | | Sets display mode to current. |



4.7 Save & Exit

Use the **Safe & Exit** menu (**BIOS Menu 29**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 29: Save & Exit

➔ **Save Changes and Reset**

Use the **Save Changes and Reset** option to save the changes made to the BIOS options and reset the system.

➔ **Discard Changes and Reset**

Use the **Discard Changes and Reset** option to exit the system without saving the changes made to the BIOS configuration setup program.

➔ **Restore Defaults**

Use the **Restore Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F3 key can be used for this operation.**

➔ **Save as User Defaults**

Use the **Save as User Defaults** option to save the changes done so far as user defaults.

➔ **Restore User Defaults**

Use the **Restore User Defaults** option to restore the user defaults to all the setup options.



Chapter

5

Troubleshooting and Maintenance

**WARNING:**

Take Anti-Static precautions whenever maintenance is being carried out on the system components. Failure to take anti-static precautions can cause permanent system damage.

5.1 System Maintenance Overview

**NOTE:**

When doing maintenance operations on the system, please follow the instructions in this chapter. Failure to follow these instructions may lead to personal injury and system damage.

To preserve the working integrity of the HTB-210-Q470 embedded system, the system must be properly maintained. If embedded system components need replacement, the proper maintenance procedures must be followed to ensure the system can continue to operate normally.

5.2 System Troubleshooting

This section provides some simple troubleshooting suggestions.

5.2.1 The System Doesn't Turn On

If after turning the system on, there is no power (indicated by the power LED on the power button not turning on) please do the following:

- Step 1:** Check that the power cable connector is properly connected to the power input jack on the system front panel.
- Step 2:** Check that the power cable connector is properly plugged into the power source.
- Step 3:** Make sure the power button is turned on.

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Step 4: Plug the system into a monitor and check to see if anything appears on the screen. If the boot-up screen appears it means the power LED has failed. To fix this problem, contact an IEI sales representative directly.

5.2.2 The System Doesn't Boot Up

If the system doesn't boot up please do the following:

Step 1: Check the power is turned on. See Section 5.2.1 above.

Step 2: Make sure the SO-DIMM module is properly installed.

5.2.3 More Troubleshooting

Nothing appears on the monitor after booting up the system: Make sure the monitor is properly connected to the system and the monitor is connected to a power supply and turned on.



WARNING!

If all troubleshooting measures have been taken and the system still fails to start, contact the IEI reseller or vendor you purchased the HTB-210-Q470 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@ieiworld.com.

5.3 Component Replacement Procedure



WARNING!

Users are not advised to attempt to repair or replace any internal or external components of the HTB-210-Q470 embedded system other than those listed below. If any other components fail or need replacement, contact the IEI reseller or vendor you purchased the HTB-210-Q470 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@ieiworld.com.

5.3.1 SO-DIMM Replacement



WARNING:

Using incorrectly specified SO-DIMM may cause permanently damage the HTB-210-Q470. Please make sure the purchased SO-DIMM complies with the memory specifications of the HTB-210-Q470.

For dual channel configuration, always install two identical memory modules that feature the same capacity, timings, voltage, number of ranks and the same brand.

To replace a SO-DIMM memory module into a SO-DIMM socket, please follow the steps below.

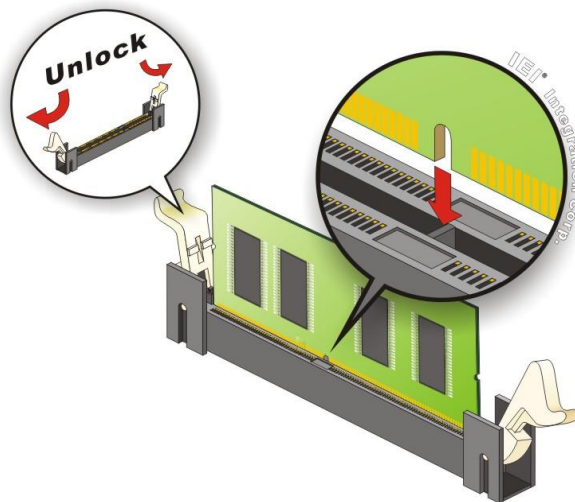
Step 1: Follow the instruction described in **Section 3.3** to remove the top cover.

Step 2: Locate the SO-DIMM on the motherboard.

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**Figure 5-1: SO-DIMM Location**

- Step 3:** Push both handles outward. The memory module is ejected by a mechanism in the socket. Remove the SO-DIMM.
- Step 4:** Align the new SO-DIMM with the socket. The SO-DIMM must be oriented in such a way that the notch in the middle of the SO-DIMM must be aligned with the plastic bridge in the socket (**Figure 5-2**).
- Step 5:** Once aligned, press down until the SO-DIMM is properly seated and the two handles are clipped into place (**Figure 5-2**).

**Figure 5-2: SO-DIMM Installation**

Chapter

6

Interface Connectors

HTB-210-Q470 Embedded System

6.1 Peripheral Interface Connectors

The connector locations of the system motherboard (HPCIE-C236) are shown in Table 6-1.

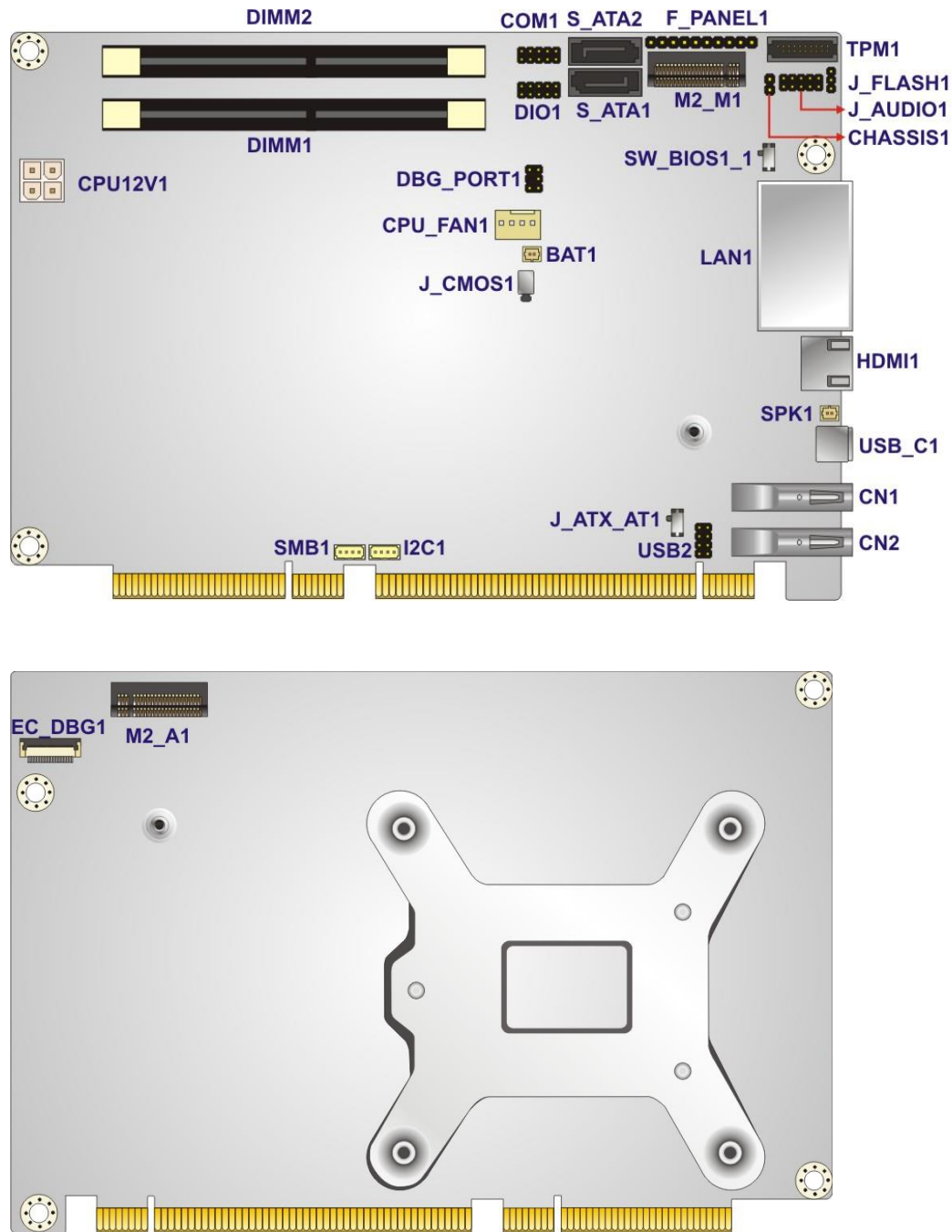


Figure 6-1: Main Board Layout Diagrams



6.2 Internal Peripheral Connectors

Internal peripheral connectors on the motherboard and are only accessible when the motherboard is outside of the chassis. The table below shows a list of the connectors on the motherboard.

Connector	Type	Label
+12V ATX power connector	4-pin Molex power connector	CPU12V1
Audio kit connector	10-pin header	J_AUDIO1
Battery connector	2-pin wafer	BAT1
Buzzer connector	2-pin wafer	SPK1
Chassis intrusion connector	2-pin header	CHASSIS1
DDR4 SO-DIMM slots	260-pin DDR4 SO-DIMM slot	DIMM1, DIMM2
Debug port connector	6-pin header	DBG_PORT1
Digital I/O connector	10-pin header	DIO1
EC debug connector	20-pin wafer	EC_DBG1
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Front panel connector	10-pin header	F_PANEL1
I ² C connector	4-pin wafer	I2C1
RS-232/422/485 serial ports	10-pin header	COM1
SATA 6Gb/s drive connector	7-pin SATA connector	S_ATA1, S_ATA2
SMBus connector	4-pin wafer	SMB1
TPM connector	20-pin box header	TPM1
USB 2.0 connectors	8-pin header	USB2

Table 6-1: Peripheral Interface Connectors



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6.2.1 +12V ATX Power Connector (CPU12V1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	3	+12V
2	GND	4	+12V

Table 6-2: +12V ATX Power Connector (CPU12V1) Pinouts**6.2.2 Audio Kit Connector (J_AUDIO1)**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDA_SYNC	2	HDA_BIT_CLK
3	HDA_SDOUT	4	HDA_SPKR
5	HDA_SDIN	6	HDA_RST#
7	HDA_VCC	8	HDA_GND
9	HDA_+12V	10	HDA_GND

Table 6-3: Audio Kit Connector (J_AUDIO1) Pinouts**6.2.3 Battery Connector (BAT1)**

PIN NO.	DESCRIPTION
1	+3V
2	GND

Table 6-4: Battery Connector (BAT1) Pinouts**6.2.4 Buzzer Connector (SPK1)**

PIN NO.	DESCRIPTION
1	+V5S
2	PC_BEEP

Table 6-5: Buzzer Connector (SPK1) Pinouts

6.2.5 Chassis Intrusion Connector (CHASSIS1)

PIN NO.	DESCRIPTION
1	+3.3VSB
2	CHASSIS OPEN

Table 6-6: Chassis Intrusion Connector (CHASSIS1) Pinouts

6.2.6 Debug Port Connector (DBG_PORT1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	SMCLK_EC
3	NC	4	SMDAT_EC
5	GND	6	PLTRST_N

Table 6-7: Debug Port Connector (DBG_PORT1) Pinouts

6.2.7 Digital I/O Connector (DIO1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+5V
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 6-8: Digital I/O Connector (DIO1) Pinouts

6.2.8 Fan Connectors (CPU_FAN1)

PIN NO.	DESCRIPTION
1	GND
2	+12V
3	FANIO
4	PWM

Table 6-9: Fan Connector (CPU_FAN1) Pinouts

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6.2.9 Front Panel Connector (F_PANEL1)

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power Button	1	NC	Power LED	6	PWR_LED+
	2	PWR_BTN+		7	PWR_LED+
	3	PWR_BTN-		8	PWR_LED-
HDD LED	4	HDD_LED+	Reset	9	RESET+
	5	HDD_LED-		10	RESET-

Table 6-10: Front Panel Connector (F_PANEL1) Pinouts

6.2.10 I²C Connector (I2C1)

PIN NO.	DESCRIPTION
1	GND
2	I ² C Data
3	I ² C CLK
4	+5V

Table 6-11: I²C Connector (I2C1) Pinouts

6.2.11 RS-232/422/485 Connector (COM1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	RI
3	SIN	4	CTS
5	SOUT	6	RTS
7	DTR	8	DSR
9	GND	10	GND

Table 6-12: RS-232/422/485 Connector (COM1) Pinouts

6.2.12 SATA Connectors (S_ATA1, S_ATA2)

Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 6-13: SATA Connectors (S_ATA1, S_ATA2) Pinouts

6.2.13 SMBus Connector (SMB1)

PIN NO.	DESCRIPTION
1	GND
2	SMBus Data
3	SMBus CLK
4	+5V

Table 6-14: SMBus Connector (SMB1) Pinouts

6.2.14 USB 2.0 Connector (USB2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USB_VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	USB_VCC

Table 6-15: USB 2.0 Connector (USB2) Pinouts

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6.2.15 TPM Connector (TPM1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NC	2	SPI_TPM_CS0#
3	SPI_TPM_GPIO	4	SPI_TPM_CS1#
5	GND	6	+3.3V
7	SPI_TPM_CLK	8	SPI_IO2
9	SPI_IO3	10	SPI_TPM_SO
11	SPI_TPM_HOLD-	12	SPI_TPM_SI
13	SPI_TPM_CS2-	14	GND
15	SPI_TPM_WP	16	SERIRQ_TPM
17	SPI_TPM_PIRQ	18	+3.3V_SPI
19	PCIE_RST-	20	+3.3V_SPI

Table 6-16: TPM Connector (TPM1) Pinouts

6.3 External Interface Panel Connectors

The table below lists the connectors on the external I/O panel.

Connector	Type	Label
2.5GbE ports	Dual RJ-45	LAN1
HDMI connector	HDMI	HDMI1
USB/DP connector	USB Type-C	USB_C1
USB 3.2 Gen 1 ports	USB Type-A	CN1, CN2

Table 6-17: External Peripheral Connectors

6.3.1 Ethernet Connectors (LAN1)

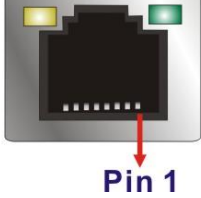
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	LED A LED B
1	MDI0+	5	MDI2+	
2	MDI0-	6	MDI2-	
3	MDI1+	7	MDI3+	
4	MDI1-	8	MDI3-	

Table 6-18: Ethernet Connectors (LAN1) Pinouts

LED	Description	LED	Description
A	on: linked blinking: data is being sent/received	B	off: 10/100 Mb/s orange: 1 Gb/s green: 2.5 Gb/s

Table 6-19: Ethernet Connector LEDs

6.3.2 HDMI Connector (HDMI1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDMI_DATA2+	11	GND
2	GND	12	HDMI_CLK#
3	HDMI_DATA2#-	13	N/C
4	HDMI_DATA1+	14	N/C
5	GND	15	HDMI_SCL
6	HDMI_DATA1#-	16	HDMI_SDA
7	HDMI_DATA0+	17	GND
8	GND	18	+5VCC
9	HDMI_DATA0#-	19	HDMI_HPD
10	HDMI_CLK+		

Table 6-20: HDMI Connector (HDMI1) Pinouts

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6.3.3 USB/DP Connector (USB_C1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
A1	GND	B1	GND
A2	TX1_D+	B2	TX2_D+
A3	TX1_D-	B3	TX2_D-
A4	VBUS	B4	VBUS
A5	CC1	B5	CC2
A6	D+	B6	D+
A7	D-	B7	D-
A8	SBU1	B8	SBU2
A9	VBUS	B9	VBUS
A10	RX2_D-	B10	RX1_D-
A11	RX2_D+	B11	RX1_D+
A12	GND	B12	GND

Table 6-21: USB/DP Connector (USB_C1) Pinouts

6.3.4 USB 3.2 Gen 1 Connectors (CN1, CN2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VBUS	6	STDA_SSRX_P
2	DATA-	7	GND
3	DATA+	8	STDA_SSTX_N
4	GND	9	STDA_SSTX_P
5	STDA_SSRX_N		

Table 6-22: USB 3.2 Gen 1 Connectors (CN1, CN2) Pinouts



6.4 Jumpers

The following table shows a list of jumpers on the HTB-210-Q470 motherboard.

Jumper Name	Type	Label
AT/ATX power select switch	Switch	J_ATX_AT1
BIOS select switch	Switch	SW_BIOS1_1
Flash descriptor security override	3-pin header	J_FLASH1

Table 6-23: Jumpers

6.4.1 AT/ATX Power Select Switch (J_ATX_AT1)

Setting	Description
1-2	ATX mode (default)
3-4	AT mode

Table 6-24: AT/ATX Power Select Switch (J_ATX_AT1) Settings

6.4.2 BIOS Select Switch (SW_BIOS1_1)

Setting	Description
1-2	BIOS 1 (default)
3-4	BIOS 2

Table 6-25: BIOS Select Switch (SW_BIOS1_1) Settings



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6.4.3 Flash Descriptor Security Override Jumper

The Flash Descriptor Security Override jumper (J_FLASH1) allows to enable or disable the ME firmware update. Refer to Table 6-26 for the jumper settings.

Setting	Description
Open	Disabled (default)
Short	Enabled

Table 6-26: Flash Descriptor Security Override Jumper Settings

To update the ME firmware, please follow the steps below.

- Step 1:** Before turning on the system power, short the Flash Descriptor Security Override jumper.
- Step 2:** Update the BIOS and ME firmware, and then turn off the system power.
- Step 3:** Remove the metal clip on the Flash Descriptor Security Override jumper.
- Step 4:** Restart the system. The system will reboot 2 ~ 3 times to complete the ME firmware update.

Appendix

A

Regulatory Compliance

DECLARATION OF CONFORMITY



This equipment is in conformity with the following EU directives:

- EMC Directive 2014/30/EU
- Low-Voltage Directive 2014/35/EU
- RoHS II Directive 2015/863/EU

If the user modifies and/or install other devices in the equipment, the CE conformity declaration may no longer apply.

If this equipment has telecommunications functionality, it also complies with the requirements of the R&TTE Directive 1999/5/EC.

English

IEI Integration Corp declares that this equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Български [Bulgarian]

IEI Integration Corp. декларира, че този обект е в съответствие със съществените изисквания и другите приложими правила на Директива 1999/5/EC.

Česky [Czech]

IEI Integration Corp tímto prohlašuje, že tento zařzení je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.

Dansk [Danish]

IEI Integration Corp erklærer herved, at følgende udstyr overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.

Deutsch [German]

IEI Integration Corp, erklärt dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 1999/5/EU.

Eesti [Estonian]

IEI Integration Corp deklareerib seadme seadme vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

Español [Spanish]

IEI Integration Corp declara que el equipo cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.

Ελληνική [Greek]

IEI Integration Corp ΔΗΛΩΝΕΙ ΟΤΙ ΕΞΟΠΛΙΣΜΟΣ ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/EK.

Français [French]

IEI Integration Corp déclare que l'appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.

Italiano [Italian]

IEI Integration Corp dichiara che questo apparecchio è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.

Latviski [Latvian]

IEI Integration Corp deklarē, ka iekārta atbilst būtiskajām prasībām un citiem ar to saistītajiem noteikumiem Direktīvas 1999/5/EK.

Lietuvių [Lithuanian]

IEI Integration Corp deklaruoja, kad šis įranga atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.

Nederlands [Dutch]

IEI Integration Corp dat het toestel toestel in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.

Malti [Maltese]

IEI Integration Corp jiddikjara li dan prodott jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Direttiva 1999/5/EC.

Magyar [Hungarian]

IEI Integration Corp nyilatkozom, hogy a berendezés megfelel a vonatkozó alapvető követelményeknek és az 1999/5/EC irányelv egyéb előírásainak.

Polski [Polish]

IEI Integration Corp oświadcza, że wyrobu jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.

Português [Portuguese]

IEI Integration Corp declara que este equipamento está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.

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Româna [Romanian]

IEI Integration Corp declară că acest echipament este în conformitate cu cerințele esențiale și cu celelalte prevederi relevante ale Directivei 1999/5/CE.

Slovensko [Slovenian]

IEI Integration Corp izjavlja, da je ta opreme v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.

Slovensky [Slovak]

IEI Integration Corp týmto vyhlasuje, že zariadenia spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.

Suomi [Finnish]

IEI Integration Corp vakuuttaa täten että laitteet on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.

Svenska [Swedish]

IEI Integration Corp förklarar att denna utrustningstyp står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

ROHS STATEMENT



The label on the product indicates this product conforms to European (EU) Restriction of Hazardous Substances (RoHS) that set maximum concentration limits on hazardous materials used in electrical and electronic equipment.

FCC WARNING

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body.

CHINA ROHS

The label on the product indicates the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Appendix

B

Safety Precautions

**WARNING:**

The precautions outlined in this chapter should be strictly followed. Failure to follow these precautions may result in permanent damage to the HTB-210-Q470.

B.1 Safety Precautions

Please follow the safety precautions outlined in the sections that follow:

B.1.1 General Safety Precautions

Please ensure the following safety precautions are adhered to at all times.

- ***Follow the electrostatic precautions*** outlined below whenever the device is opened.
- ***Make sure the power is turned off and the power cord is disconnected*** whenever the HTB-210-Q470 is being installed, moved or modified.
- ***To prevent the risk of electric shock, make sure power cord is unplugged from wall socket.*** To fully disengage the power to the unit, please disconnect the power cord from the AC outlet. Refer servicing to qualified service personnel. The AC outlet shall be readily available and accessible.
- ***Users must not allow SIP/SOPs and the patient to come into contact at the same time.***
- ***Grounding reliability*** can only be achieved when the equipment is connected to an equivalent receptacle marked “Hospital Only” or “Hospital Grade”.
- ***Do not apply voltage levels that exceed the specified voltage range.*** Doing so may cause fire and/or an electrical shock. Use a power cord that matches the voltage of the power outlet, which has been approved and complies with the safety standard of your particular country.

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- **Electric shocks can occur** if the HTB-210-Q470 chassis is opened when it is running. To avoid risk of electric shock, this device must only be connected to a supply mains with protective earth.
- **Do not drop or insert any objects** into the ventilation openings of the HTB-210-Q470.
- **If considerable amounts of dust, water, or fluids enter the device**, turn off the power supply immediately, unplug the power cord, and contact the HTB-210-Q470 vendor.
- **This equipment is not suitable for use in locations where children are likely to be present.**
- **DO NOT:**
 - Drop the device against a hard surface.
 - In a site where the ambient temperature exceeds the rated temperature

B.1.2 Anti-static Precautions



WARNING:

Failure to take ESD precautions during the installation of the HTB-210-Q470 may result in permanent damage to the HTB-210-Q470 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the HTB-210-Q470. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the HTB-210-Q470 is opened and any of the electrical components are handled, the following anti-static precautions are strictly adhered to.

- **Wear an anti-static wristband:** Wearing a simple anti-static wristband can help to prevent ESD from damaging any electrical component.
- **Self-grounding:** Before handling any electrical component, touch any grounded conducting material. During the time the electrical component is handled, frequently touch any conducting materials that are connected to the ground.

- **Use an anti-static pad:** When configuring or working with an electrical component, place it on an anti-static pad. This reduces the possibility of ESD damage.
- **Only handle the edges of the electrical component:** When handling the electrical component, hold the electrical component by its edges.

B.1.3 Product Disposal



CAUTION:

Risk of explosion if the battery is replaced by an incorrect type;

Replacement of a battery with an incorrect type that can defeat a safeguard (for example, in the case of some lithium battery types);

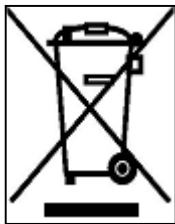
Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, that can result in an explosion;

Leaving a battery in an extremely high temperature surrounding environment that can result in an explosion or the leakage of flammable liquid or gas;

A battery subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas;

Dispose of used batteries according to instructions and local regulations.

- Outside the European Union—If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union—The device that produces less waste and is easier to recycle is classified as electronic device in terms of the European Directive 2012/19/EU (WEEE), and must not be disposed of as domestic garbage.



EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your products, please follow the

guidance of your local authority, or ask the shop where you purchased the product. The

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mark on electrical and electronic products only applies to the current European Union Member States.

Please follow the national guidelines for electrical and electronic product disposal.

B.1.4 Classification

- Power by Class I power supply (IEI, HTB-210-Q470)
- No Applied Part.
- No protection against the ingress of water: IPX0
- Mode of operation: Continuous Operation

The equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide: Not AP or APG Category.

B.2 Maintenance and Cleaning Precautions

When maintaining or cleaning the HTB-210-Q470, please follow the guidelines below.



WARNING:

- For safety reasons, turn-off the power and unplug the embedded system before cleaning.
 - If you dropped any material or liquid such as water onto the embedded system when cleaning, unplug the power cable immediately. Always make sure your hands are dry when unplugging the power cable.
-

B.2.1 Maintenance and Cleaning

Prior to cleaning any part or component of the HTB-210-Q470, please read the details below.

- To clean the HTB-210-Q470,
 - remove dirt with a lightly moistened cloth. Then wipe the external chassis with a soft dry cloth.

- use 75% ethanol alcohol to clean the external chassis.
- Cleaning frequency: follow the cleaning method guidelines of the hospital.
- Never spray or squirt liquids directly onto any other components.
- The interior of the device does not require cleaning. Keep fluids away from the device interior.
- Be cautious of all small removable components when vacuuming the device.
- Never drop any objects or liquids through the openings of the device.

B.2.2 Cleaning Tools

Some components in the HTB-210-Q470 may only be cleaned using a product specifically designed for the purpose. In such case, the product will be explicitly mentioned in the cleaning tips. Below is a list of items to use when cleaning the HTB-210-Q470.

- **Cloth**— Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the device.
- **Water/Ethanol alcohol** – A cloth moistened with water or 75% ethanol alcohol can be used to clean the HTB-210-Q470.
- **Using solvents**—The use of solvents is not recommended when cleaning the device as they may damage the plastic parts.
- **Cotton swabs**—Cotton swaps moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas.
- **Foam swabs**—Whenever possible, it is best to use lint free swabs such as foam swabs for cleaning.

Appendix

C

BIOS Menu Options



C.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in **Chapter 4**.

System Date [xx/xx/xx]	29
System Time [xx:xx:xx]	29
Intel® (VMX) Virtualization Technology [Disabled]	30
Active Processor Cores [All]	30
Hyper-threading [Enabled]	31
Intel(R) SpeedStep(tm) [Enabled]	31
C states [Disabled]	31
Unconfigure ME [Disabled]	32
TPM Device Selection [dTPM (If supported)]	33
Security Device Support [Disable]	34
ACPI Sleep State [S3 (Suspend to RAM)]	35
Serial Port [Enabled]	37
Device Mode [RS232]	37
PC Health Status	38
CPU_FAN1/SYS_FAN1/SYS_FAN2 Smart Fan Control [Auto Mode]	39
Auto mode fan start temperature [40]	40
Auto mode fan off temperature [30]	40
Auto mode fan start PWM [40]	41
Auto mode fan slope PWM [2]	41
Wake system with Fixed Time [Disabled]	42
Console Redirection [Disabled]	43
Terminal Type [ANSI]	44
Bits per second [115200]	44
Data Bits [8]	44
Parity [None]	44
Stop Bits [1]	45
Legacy USB Support [Enabled]	46
Network Stack [Disabled]	47
VT-d [Disabled]	49
Primary Display [Auto]	51
Internal Graphics [Enabled]	51



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DVMT Pre-Allocated [64M]	51
DVMT Total Gfx Mem [MAX]	51
Enable Root Port [Enabled]	52
Max Link Speed [Auto]	52
Detect Non-Compliance Device [Disabled]	52
Restore AC Power Loss [Last State]	53
Power Saving Function(ERP) [Disabled]	54
USB Power SW1 [+5V DUAL]	54
USB Power SW2 [+5V DUAL]	54
PCIe Speed [Auto]	56
Detect Non-Compliance Device [Disabled]	56
SATA Controller(s) [Enabled]	57
SATA Mode Selection [AHCI]	57
Hot Plug [Disabled]	58
HD Audio [Enabled]	58
Administrator Password	59
User Password	59
Bootup NumLock State [On]	60
Quiet Boot [Enabled]	61
Option ROM Messages [Force BIOS]	61
Save Changes and Reset	62
Discard Changes and Reset	62
Restore Defaults	62
Save as User Defaults	62
Restore User Defaults	62

Appendix

D

Watchdog Timer

**NOTE:**

The following discussion applies to DOS environment. IEI support is contacted or the IEI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table D-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

**NOTE:**

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

Example program:

; INITIAL TIMER PERIOD COUNTER

;

W_LOOP:

```
MOV    AX, 6F02H    ;setting the time-out value
MOV    BL, 30        ;time-out value is 48 seconds
INT     15H
```

;

; ADD THE APPLICATION PROGRAM HERE

;

```
CMP     EXIT_AP, 1    ;is the application over?
JNE     W_LOOP        ;No, restart the application
```

```
MOV     AX, 6F02H     ;disable Watchdog Timer
MOV     BL, 0         ;
INT     15H
```

;

; EXIT ;

Appendix

E

Error Beep Code

E.1 PEI Beep Codes

Number of Beeps	Description
1	Memory not Installed
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXE IPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available

E.2 DXE Beep Codes

Number of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met



NOTE:

If you have any question, please contact IEI for further assistance.

Appendix

F

Hazardous Materials Disclosure



F.1 RoHS II Directive (2015/863/EU)

The details provided in this appendix are to ensure that the product is compliant with the RoHS II Directive (2015/863/EU). The table below acknowledges the presences of small quantities of certain substances in the product, and is applicable to RoHS II Directive (2015/863/EU).

Please refer to the following table.

Part Name	Toxic or Hazardous Substances and Elements									
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)	Bis(2-ethylhexyl) phthalate (DEHP)	Butyl benzyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)
Housing	O	O	O	O	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O	O	O	O	O
Battery	O	O	O	O	O	O	O	O	O	O
O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in Directive (EU) 2015/863.										
X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in Directive (EU) 2015/863.										



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F.2 China RoHS

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有“环境友好使用期限”的标签，此期限是估算这些物质“不会有泄漏或突变”的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	○	○	○	○	○	○
印刷电路板	○	○	○	○	○	○
金属螺帽	○	○	○	○	○	○
电缆组装	○	○	○	○	○	○
风扇组装	○	○	○	○	○	○
电力供应组装	○	○	○	○	○	○
电池	○	○	○	○	○	○
<p>○: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11364-2014 與 GB/T26572-2011 标准规定的限量要求以下。</p> <p>X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11364-2014 與 GB/T26572-2011 标准规定的限量要求。</p>						