IEI Integration Corp.

MODEL:

HTB-100-HM170

IEI Fanless Medical Embedded System with Intel® Core™ i7-6822EQ / i5-6442EQ Processor, Isolated COM Ports, GbE LAN, HDMI, VGA, USB 3.0, Audio, RoHS Compliant,

User Manual

Rev. 1.03 – May 18, 2018

RoHS Lead Free

Revision

Date	Version	Changes
May 18, 2018	1.03	Modified power adapter specifications
March 27, 2018	1.02	Modified COM port isolation specification (from 4 kV to 2.5 kV)
February 21, 2018	1.01	Modified M.2 slot specification
October 2, 2017	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.

OPERATING INSTRUCTION

Follow operating instructions or consult instructions for use.

IEC 60417-5009: STAND-BY

IEC 60417-5021: EQUIPOTENTIALITY

IEC 60417-5032: ALTERNATING CURRENT

DIRECT CURRENT

MANUFACTURING DATE

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Introduction

1.1 Overview

Figure 1-1: HTB-100-HM170 Series Medical Embedded System

The HTB-100-HM170 fanless medical embedded system is powered by Intel® Core™ i7-6822EQ or Intel® Core™ i5-6442EQ processor. It is designed for medical applications that require reliable operating and easy maintenance features.

The HTB-100 is compliant with medical standards, including IEC 60601-1 V3.1, IEC 60601-1-2 V4.0, IEC 62304, IEC 62366, ISO 14971 and FCC part 18 Class B, making the medical environment more reliable.

The HTB-100-HM170 accepts a wide range of DC power input (12 V – 28 V), allowing it to be powered anywhere. All of the COM ports support 2.5 kV isolation that meets medical standard. The display interface options include VGA and HDMI with three audio jacks.

The HTB-100-HM170 series systems are all capable of supporting one 2.5” SATA 6Gb/s solid-state drive (SSD) or an mSATA module.

1.2 Features

The HTB-100-HM170 has the following features

- Medical grade with high performance fanless embedded computing
- 6th Gen Intel® Core™ processor platform with Intel® HM170 chipset and DDR4 memory
- Triple independent display with high resolution support; supports up to 4096x2160 resolutions with HDMI interface
- Isolated COM ports for increasing safer applications among devices
- Support six USB ports (two USB 2.0 and four USB 3.0)
- Support one SATA 6Gb/s SSD or HDD
- IP41 compliant top cover and cable cover
- Optional PCIe x16 expansion for adding more flexible expansion functions
- RoHS compliant design

1.3 Model Variations

There are two models in the HTB-100-HM170 medical embedded system series. The two models are all preinstalled with 4 GB of DDR4 memory. The model variations are listed in **Table 1-1** below.

	Processor
HTB-100-HM170-i7/4G-R10	Intel® Core™ i7-6822EQ 2.0 GHz (up to 2.8 GHz, quad-core, 25W TDP)
HTB-100-HM170-i5/4G-R10	Intel® Core™ i5-6442EQ 1.9 GHz (up to 2.7 GHz, quad-core, 25W TDP)

Table 1-1: Model Variations

1.4 External Overview

The HTB-100-HM170 RoHS compliant, fanless medical embedded system features industrial grade components that offer longer operating life, high shock/vibration resistance and endurance over a wide temperature range. The HTB-100-HM170 combines these features in an aluminum enclosure, offering system integrators and

developers the best selection of robust and high performance computing system platforms for medical applications.

1.4.1 Front Panel

The front panel of the HTB-100-HM170 provides access to the following external I/O connectors and buttons/switches as shown in **Figure 1-2** below.

- 2 x RJ-45 GbE
- 1 x HDMI 2.0 port
- 1 x VGA port
- 2 x RS-232 (DB-9 with 2.5 kV isolation)
- 2 x RS-232/422/485 (DB-9 with 2.5 kV isolation)
- 4 x USB 3.0 ports
- 3 x Audio jacks (line-in, line-out and mic-in)
- 1 x Power input jack
- 1 x AT/ATX power mode switch
- 1 x Reset button
- 1 x Power button (with LED status indicator: ON: blue; OFF: dark)
- 1 x HDD LED status indicator (green)

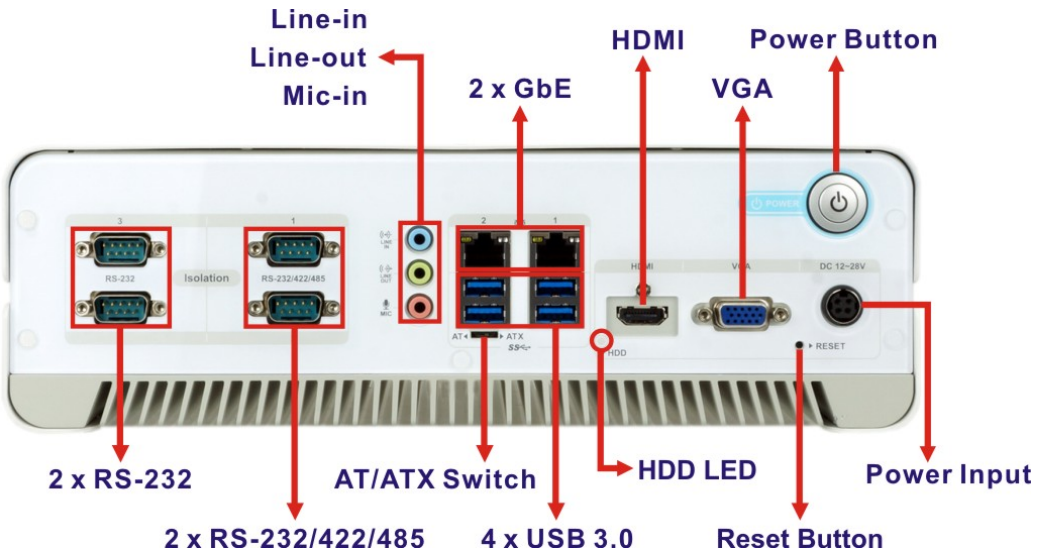


Figure 1-2: Front Panel

1.4.2 Rear Panel

An overview of the rear panel is shown in **Figure 1-3**.

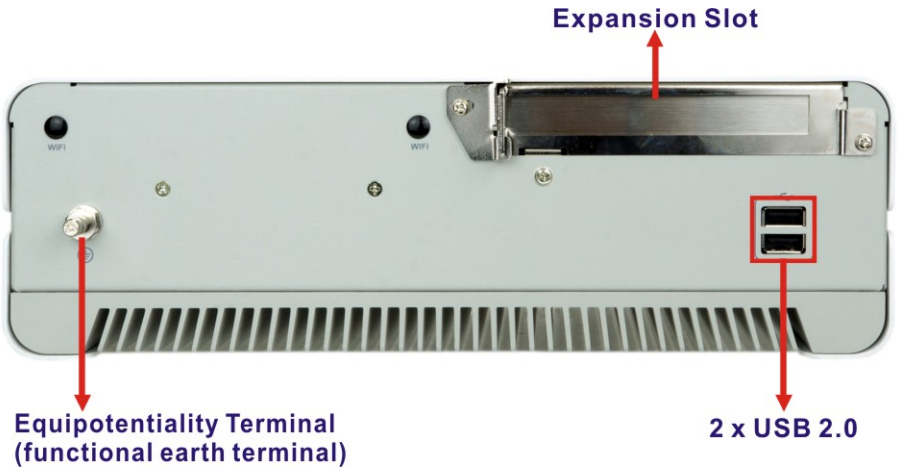


Figure 1-3: Rear Panel

1.5 Technical Specifications

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

	HTB-100-HM170
CPU	Intel® Core™ i7-6822EQ 2.0 GHz (up to 2.8 GHz, quad-core, 25W TDP) Intel® Core™ i5-6442EQ 1.9 GHz (up to 2.7 GHz, quad-core, 25W TDP)
Chipset	Intel® HM170
System Memory	2 x 260-pin DDR4 SO-DIMM slot (system max. 32 GB) Preinstalled one 4.0 GB DDR4 SDRAM SO-DIMM
Thermal Solution	Fanless
Ethernet	2 x RJ-45 PCIe GbE by Intel® I211 Ethernet controller
Display	1 x HDMI 2.0 port (up to 4096x2160 @ 60 Hz) 1 x VGA port (up to 1920x1200 @ 60 Hz)

Serial Port	2 x RS-232 (DB-9 with 2.5 kV isolation) 2 x RS-232/422/485 (DB-9 with 2.5 kV isolation)
USB	2 x USB 2.0 ports 4 x USB 3.0 ports
Audio	Realtek ALC662 5.1-channel High Definition Audio (HDA) 1 x Audio line-in 1 x Audio line-out 1 x Audio mic-in
Storage	1 x 2.5” SATA 6Gb/s HDD/SSD bay
Expansion	1 x PCIe x16 slot 1 x Half-size PCIe Mini card slot 1 x Full-size PCIe Mini card slot with mSATA support (colay with SATA) 1 x M.2 2230 slot (A-key & E-key; USB or PCIe signal)
Chassis Construction	Extruded aluminum alloy
Power Requirement	12 V – 28 V DC
Power Supply	150 W medical-grade power adapter
	Input: 90 V AC ~ 264 V AC, 47 Hz ~ 63 Hz, 2.0 A ~ 0.85 A
	Output: 150 W Max., 19 V ⎓ 7.89 A
Power Consumption	19 V @ 4.4 A (with Intel® Core™ i7-6822EQ processor and 4 GB DDR4 memory)
Operating Shock	Half-sine wave shock 5G; 11ms; 100 shocks per axis
Operating Vibration	MIL-STD-810G 514.6C-1 (with SSD)
Operating Temperature	0ºC – 40ºC with air flow (SSD)
Storage Temperature	-40ºC – 70ºC with air flow (SSD)
Humidity	10% – 95%, non-condensing

Color	Silver + Grayish blue
Mounting	Wall mounting
Weight (Net/Gross)	2.2 kg / 3.0 kg
Dimensions (W x D x H)	294 mm x 209 mm x 90.2 mm
Safety/EMC	CE, FCC class B part 18, IEC 60601-1 V3.1, IEC 60601-1-2 V4.0, IEC 62304, IEC 62366, ISO 14971
IP Rating	IP 41 compliant top cover
Supported OS	Microsoft Windows 8 or 8.1 Microsoft Windows 10 Microsoft Windows Embedded Standard 7

Table 1-2: Technical Specifications

1.6 Dimensions

The dimensions of the HTB-100-HM170 are shown in **Figure 1-4**.

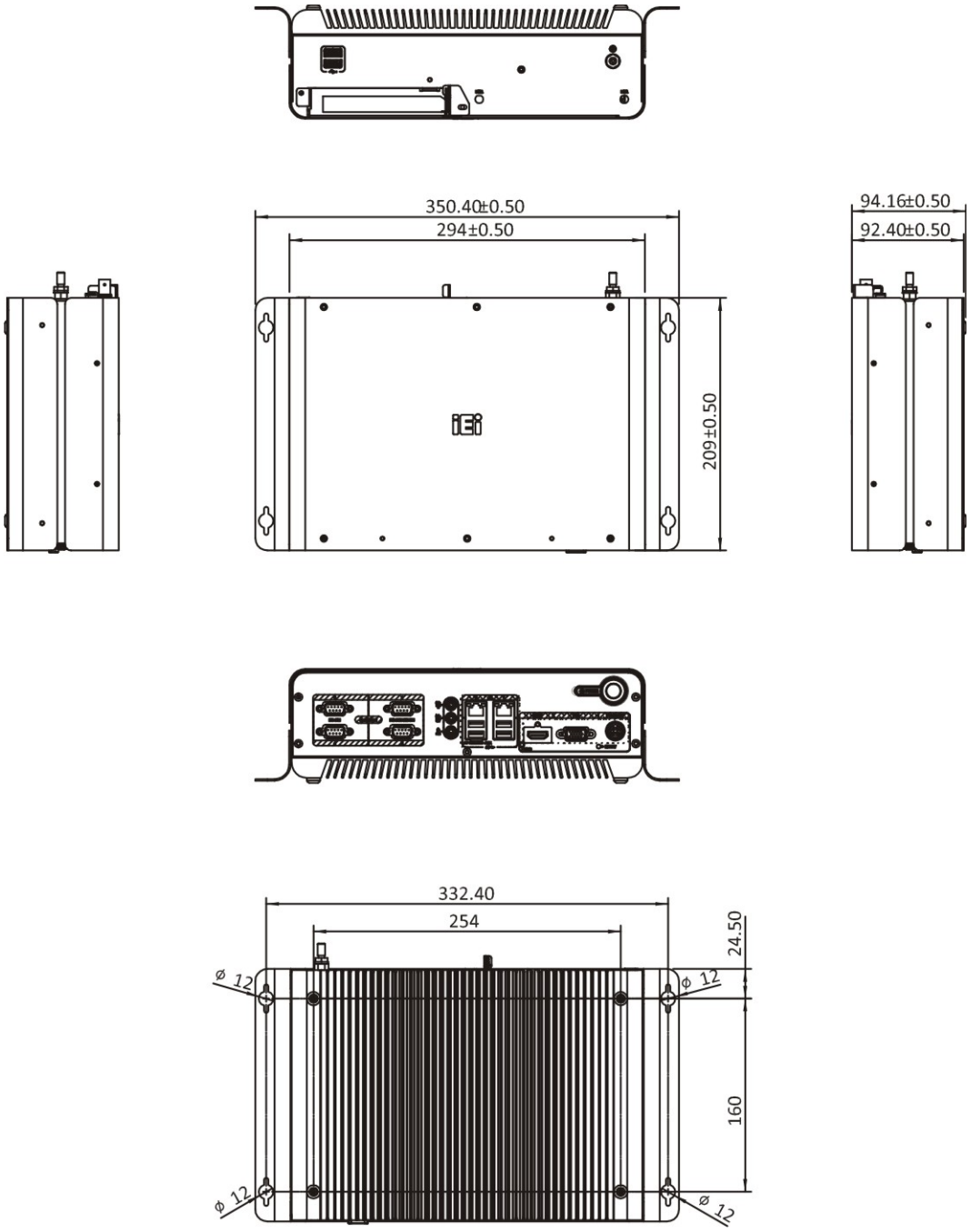


Figure 1-4: Dimensions (mm)

Chapter

2

Unpacking

2.1 Unpacking

To unpack the medical 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-100-HM170 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The HTB-100-HM170 medical embedded system is shipped with the following components:

Quantity	Item	Image
1	HTB-100-HM170 medical embedded system	

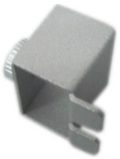
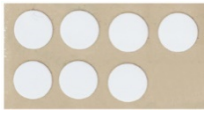
1	Power cord	
1	Medical-grade power adapter (150 W, 19 V DC output)	
1	Grounding cable	
1	HDMI cable holder	
5	Screws (M3*4) for HDD installation	
1	Spare screw (M2*4) for M.2 installation	
2	Spare screws (M2*3) for PCIe Mini card installation	
4	Spare screws (M3*6) for mounting brackets	
7	Stickers for external chassis screws	

Table 2-1: Package List

2.3 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Cable cover	
Wi-Fi kit (**P/N**: EMB-WIFI-KIT02E-R10)	

Chapter

3

Installation

3.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the maintenance of the HTB-100-HM170 may result in permanent damage to the HTB-100-HM170 and severe injury to the user.

WARNING:

Please do not touch patient and this medical device at the same time.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the HTB-100-HM170. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the HTB-100-HM170 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-100-HM170, place it on an anti-static pad. This reduces the possibility of ESD damaging the HTB-100-HM170.
- ***Only handle the edges of the PCB***: When handling the PCB, hold the PCB by the edges.

NOTE:

It is recommended to use the stickers shipped with the product to cover the two screws on the top cover (see below) before ESD testing.

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-100-HM170, installation instructions and configuration options.
- **DANGER! Disconnect Power**: Power to the HTB-100-HM170 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-100-HM170 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-100-HM170. The HTB-100-HM170's cooling vents must not be obstructed by any objects. Blocking the vents can cause overheating of the HTB-100-HM170. Leave at least 5 cm of clearance around the HTB-100-HM170 to prevent overheating.

- **Grounding**: The HTB-100-HM170 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-100-HM170.

3.3 Opening Top Cover

WARNING:

Over-tightening top cover screws will cause damage to the bottom surface. Maximum torque for cover screws is 5 kg-cm (0.36 lb-ft/0.49 N-m).

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 8 retention screws. All screws must be removed (**Figure 3-1**). If some of the screws are attached with stickers, remove the stickers first.

Figure 3-1: Top Cover Retention Screws

Step 2: Gently lift the top cover to remove the cover from the system.

3.4 HDD Installation

The HTB-100-HM170 has one 2.5” HDD bay inside the system. To install an HDD, follow the steps below.

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

Step 2: Locate the HDD brackets inside the system. Remove the four HDD bracket retention screws (**Figure 3-2**), and disconnect the SATA cable and the SATA power cable. Lift the HDD bracket.

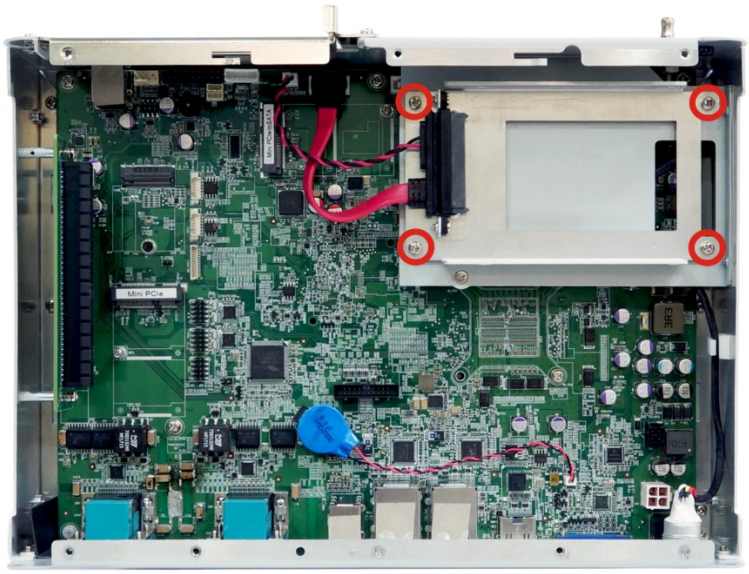


Figure 3-2: HDD Bracket Retention Screws

Step 3: Insert an HDD into the bracket until the HDD is firmly connected with the SATA cable connector. Secure the HDD to the bracket using four retention screws (M3*4), two screws on each side. See **Figure 3-3**.

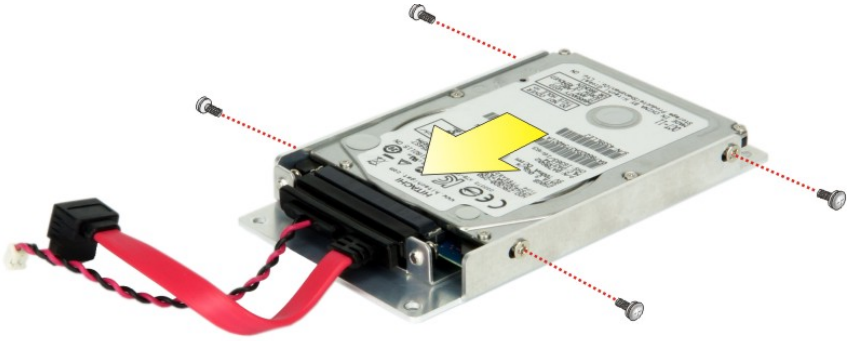


Figure 3-3: Inserting the HDD

Step 4: Install the HDD bracket in the same position it was before.

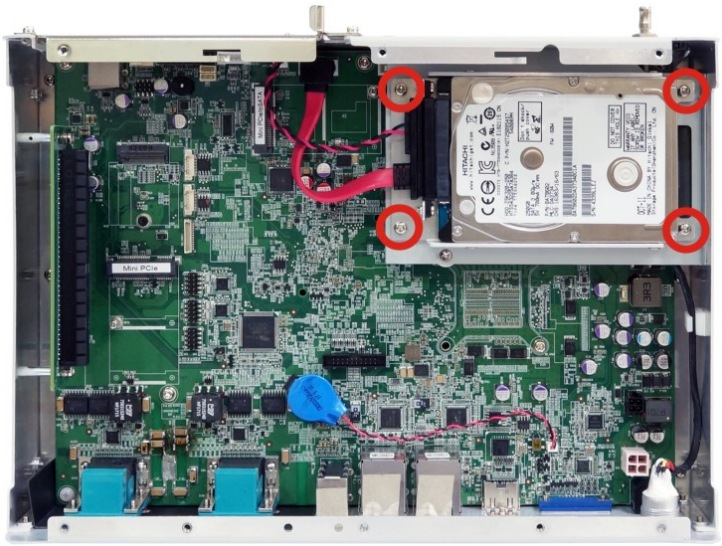


Figure 3-4: Installing the HDD

Step 5: Connect the SATA cables and the SATA power cables to the motherboard.

Step 6: Reinstall the top cover with the previously removed retention screws.

3.5 PCIe Mini Card Installation

The HTB-100-HM170 has two PCIe Mini slot inside the chassis, one for full-size PCIe Mini card and one for half-size PCIe Mini card.

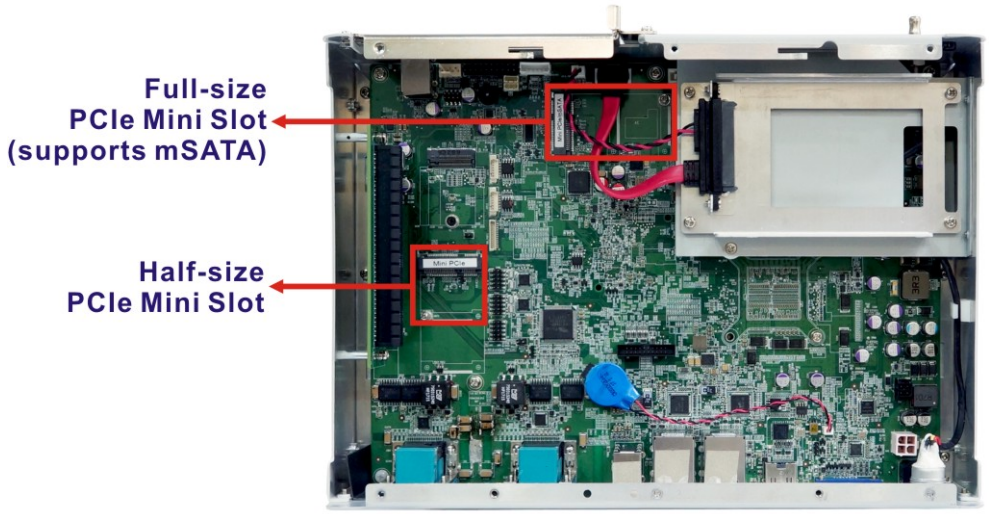


Figure 3-5: PCIe Mini Slot Locations

3.5.1 Full-size PCIe Mini Card Installation

To install a full-size PCIe Mini card, please follow the steps below.

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

Step 2: Locate the PCIe Mini card slot.

Step 3: Remove the retention screw as shown in Figure 3-6.

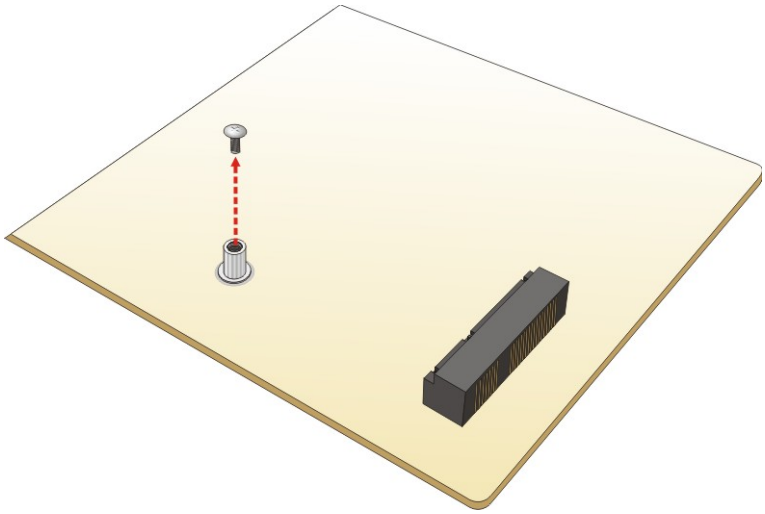


Figure 3-6: Removing the Retention Screw

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 20º (**Figure 3-7**).

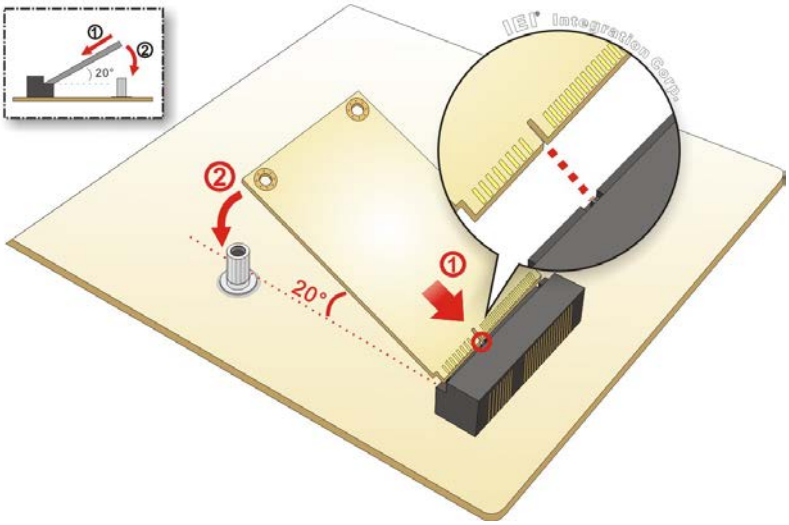


Figure 3-7: Inserting the Full-size PCIe Mini Card into the Slot at an Angle

Step 5: Secure the full-size PCIe Mini card with the retention screw previously removed (**Figure 3-8**).

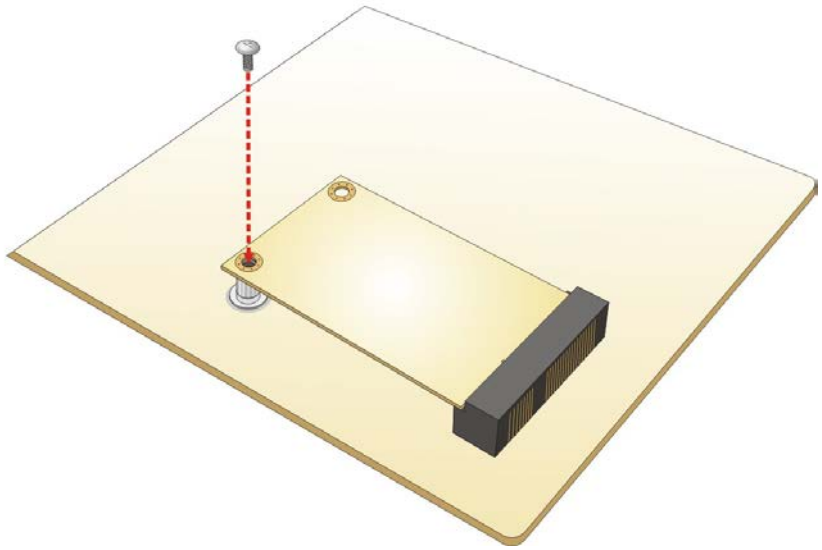


Figure 3-8: Securing the Full-size PCIe Mini Card

3.5.2 Half-size PCIe Mini Card Installation

To install a half-size PCIe Mini card, please follow the steps below.

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

Step 2: Locate the PCIe Mini card slot.

Step 3: Remove the retention screw as shown in Figure 3-9.

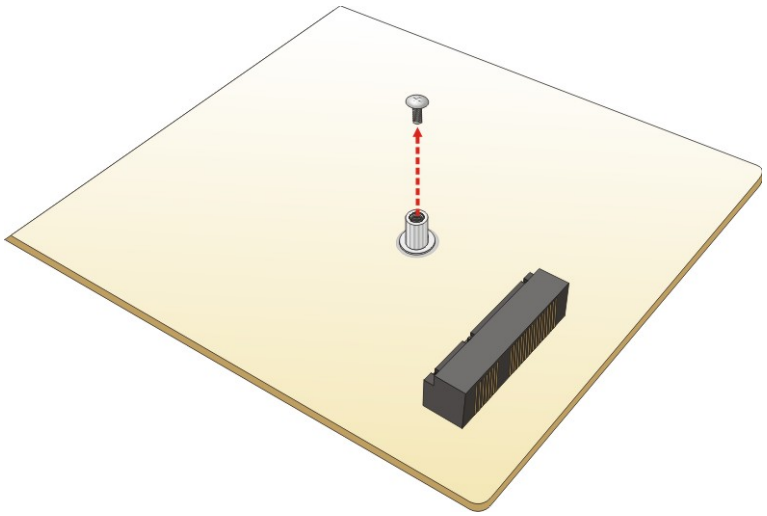


Figure 3-9: Removing the Retention Screw

Step 4: Line up the notch on the card with the notch on the slot. Slide the PCIe Mini card into the slot at an angle of about 20º (**Figure 3-10**).

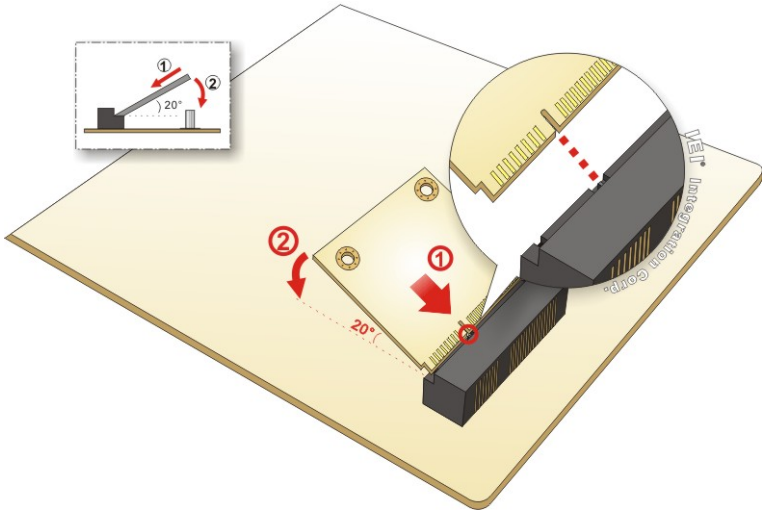


Figure 3-10: Inserting the Half-size PCIe Mini Card into the Slot at an Angle

Step 5: Secure the half-size PCIe Mini card with the retention screw previously removed (**Figure 3-11**).

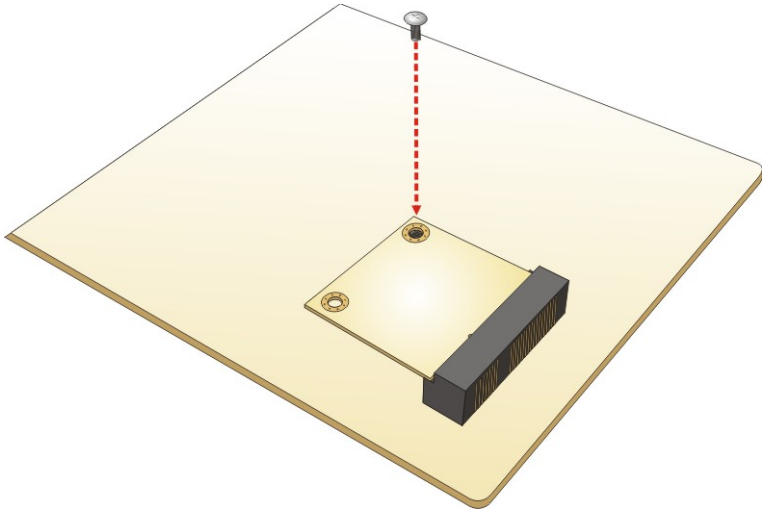


Figure 3-11: Securing the Half-size PCIe Mini Card

3.6 M.2 Module Installation

To install an M.2 module, please follow the steps below.

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

Step 2: Locate the M.2 module slot. Remove the on-board retention screw as shown below.

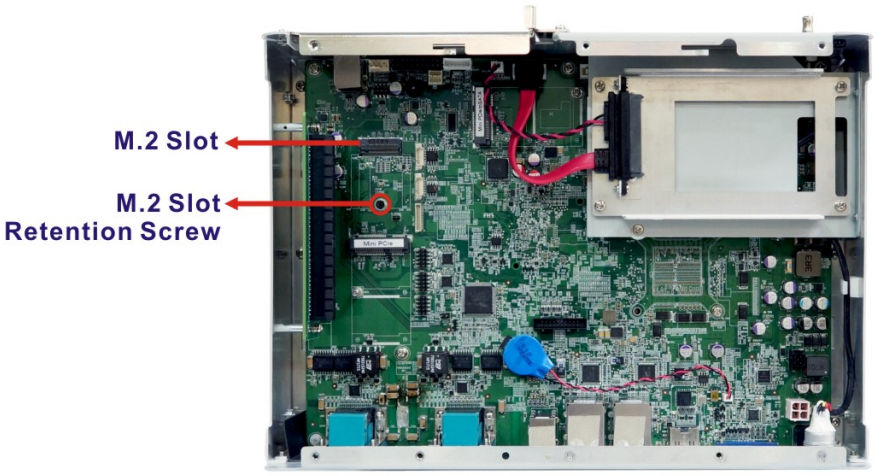


Figure 3-12: M.2 Module Slot Location

Step 3: Line up the notch on the module with the notch on the slot. Slide the M.2 module into the socket at an angle of about 20º (**Figure 3-13**).

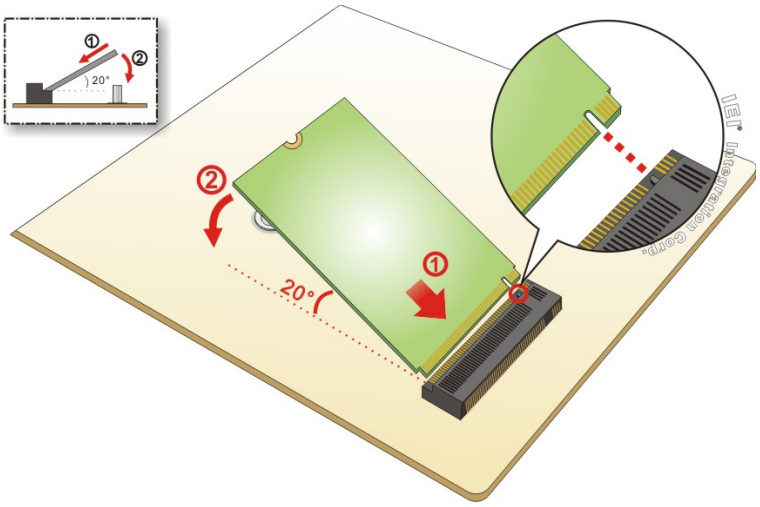


Figure 3-13: Inserting the M.2 Module into the Slot at an Angle

Step 4: Secure the M.2 module with an M2*3 retention screw (**Figure 3-14**).

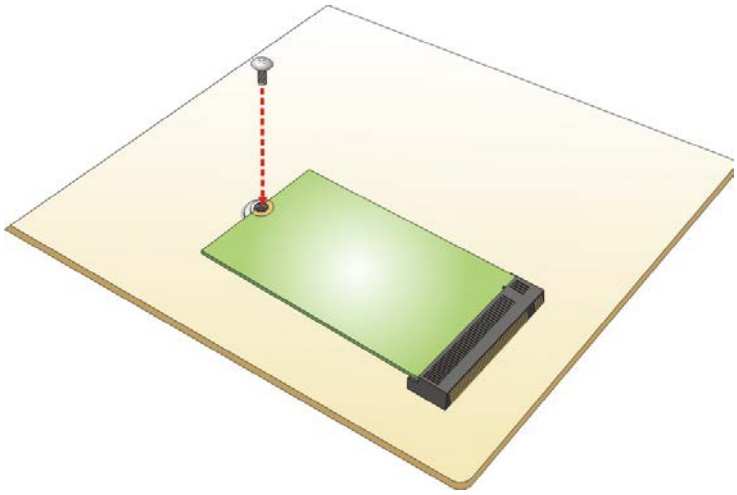


Figure 3-14: Securing the M.2 Module

3.7 Serial Device Connection

The HTB-100-HM170 series has four isolated serial ports on the front panel, including two RS-232/422/484 ports (COM1 and COM2) and two RS-232 ports (COM3 and COM4). The pinouts of the serial ports are listed in the following sections.

NOTE:

The default settings for COM1 and COM2 are set to RS-232. To configure the COM port mode, please change the BIOS options in Advanced → Super IO Configuration → Serial Port Configuration (refer to **Section 4.3.3.1.1** and **4.3.3.1.2**).

3.7.1 RS-232 Serial Port (COM3, COM4)

The pinouts of the RS-232 serial port are listed in the following table.

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

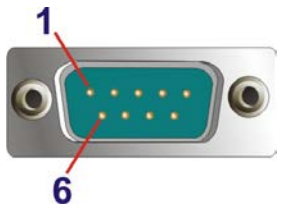


Table 3-1: RS-232 Serial Port (COM1) Pinouts

3.7.2 RS-232/422/485 Serial Port (COM1, COM2)

The RS-232/422/485 mode selection of COM1 and COM2 is made through the system BIOS. Please refer to **Section 4.3.3.1.1** and **4.3.3.1.2** for selecting COM port mode. The default setting for COM1 and COM2 is RS-232.

The RS-232/422/485 serial port pinouts are listed in the following table.

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	--	--

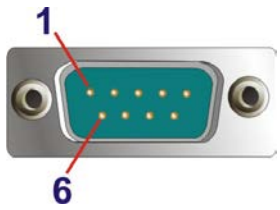


Table 3-2: RS-232/422/485 Serial Port Pinouts

3.8 HDMI Cable Holder Installation

The HDMI cable connected to the HTB-100-HM170 can be secured with a cable holder to prevent disconnection. To secure the HDMI cable, please follow the steps below.

Step 1: Remove the HDMI cable holder screw on the front panel (**Figure 3-15**).

Figure 3-15: HDMI Cable Holder Screw

Step 2: Insert the HDMI connector of the HDMI cable into the HDMI cable holder as shown below.

Figure 3-16: Insert into the HDMI Cable Holder

Step 3: Connect the HDMI cable to the HDMI connector of the HTB-100-HM170 and secure the HDMI cable holder with the previously removed screw (**Figure 3-13**).

Figure 3-17: Secure the HDMI Cable Holder

Step 4: Secure the HDMI cable by fastening the captive screw under the holder (**Figure 3-14**).

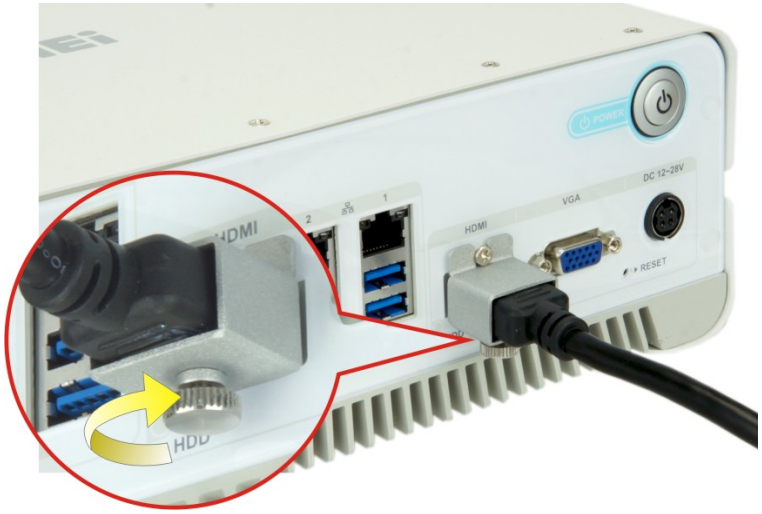


Figure 3-18: Secure the HDMI Cable

3.9 Grounding Cable Connection

To protect the HTB-100-HM170 from static electricity, the grounding cable that came with the system has to be connected. To connect the grounding cable, please follow the steps below.

Step 1: Connect the grounding cable to the equipotentiality terminal on the rear panel of the HTB-100-HM170 (**Figure 3-15**).

Step 2: Use the hand clamp on the other end of the grounding cable to clip on the Earth's conductive surface.

Figure 3-19: Grounding Cable Connection

3.10 Mounting the System

WARNING:

Use suitable mounting apparatus and be sure to secure the screws of the mounting apparatus tightly to avoid risk of injury.

To mount the HTB-100-HM170 onto a wall or some other surface, please follow the steps below.

Step 1: The two mounting brackets are attached on the two side panels of the HTB-100-HM170. Remove the mounting brackets by removing the two retention screws on each side (**Figure 3-20**).

Figure 3-20: Mounting Bracket Retention Screws

Step 2: Orient the mounting bracket to make the mounting holes in the bracket face outwards.

Step 3: Align the two retention screw holes in each bracket with the retention screw holes on the side panel.

Step 4: Secure the bracket to the system by inserting the two previously removed retention screws (M3*6) into each bracket (**Figure 3-21**).

Figure 3-21: Mounting Bracket Installation

Step 5: Drill holes in the intended installation surface.

Step 6: Align the mounting holes in the sides of the mounting brackets with the predrilled holes in the mounting surface.

Step 7: Insert four retention screws, two in each bracket, to secure the system to the mounting surface.

3.11 Cable Cover Installation (Optional)

An optional cable cover can be installed on the HTB-100-HM170 for the user to easily manage cables. To install the cable cover, please follow the instruction below.

Step 1: Remove four retention screws from the HTB-100-HM170, two on the side panels and two on the top panel. If the two screws on the top panel are attached with stickers, remove the stickers first. See **Figure 3-22**.

Figure 3-22: Side Screws Removal

Step 2: Secure the cable cover to the HTB-100-HM170 with four retention screws (**Figure 3-23**). Ensure to secure the two top panel screws in the slot (not the large opening) of the keyhole in the cable cover.

Figure 3-23: Cable Cover Installation

3.12 AT/ATX Mode Selection

AT or ATX power mode can be used on the HTB-100-HM170. The selection is made through an AT/ATX switch located on the front panel (**Figure 3-24**).

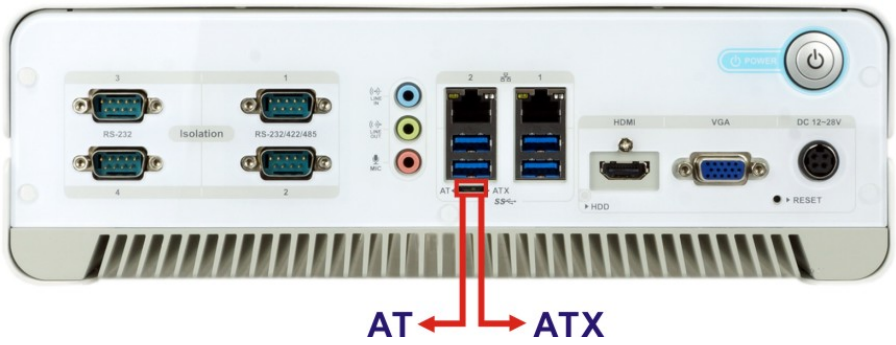


Figure 3-24: AT/ATX Mode Select Switch Location

3.13 Power-On Procedure

3.13.1 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 medical embedded system please make sure of the following:

- The top cover is installed
- All peripheral devices (VGA/HDMI monitor, serial communications devices etc.) are connected
- The power cables are plugged in
- The system is securely mounted

3.13.2 Power-on Procedure

WARNING:

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

CAUTION:

The power adapter came with the HTB-100-HM170 is a forming part of the medical device.

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-100-HM170 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.

Step 2: Connect the power adapter to the power connector of the HTB-100-HM170.

Step 3: Short-press the power button until the power LED lights on in blue (**Figure 3-25**).

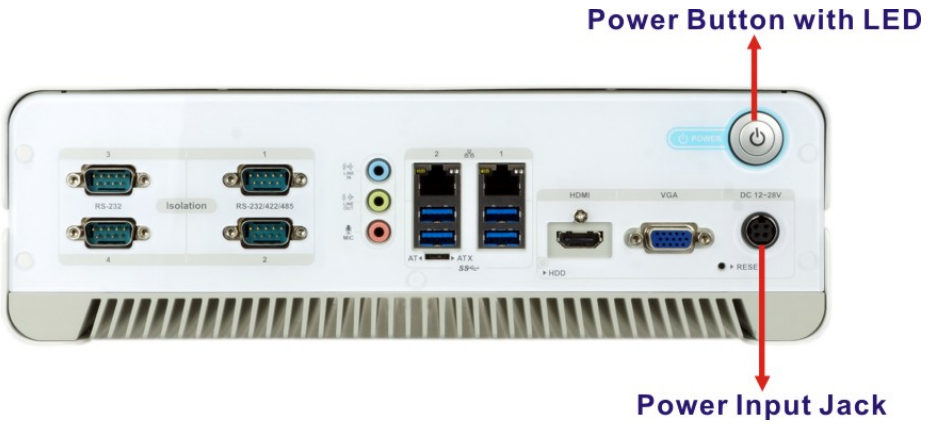


Figure 3-25: Power Button and Power LED

3.14 Clear CMOS

If the HTB-100-HM170 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 3-26**.

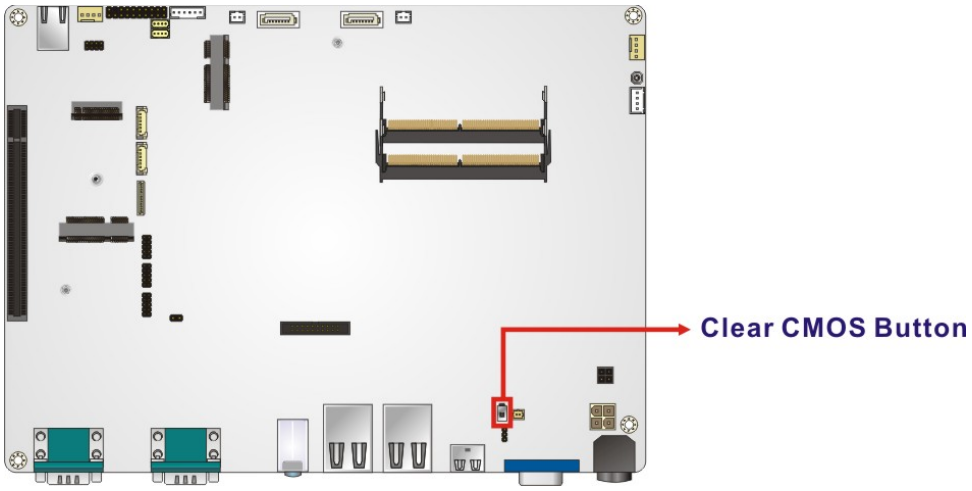


Figure 3-26: Clear CMOS Button

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.

3.15 Driver Installation

All the drivers for the HTB-100-HM170 are available on IEI Resource Download Center (https://download.ieiworld.com). Type HTB-100-HM170 and press Enter to find all the relevant software, utilities, and documentation.

Figure 3-27: IEI Resource Download Center

IEI provides the following drivers for Windows 8 and Windows 10 operating systems.

- Chipset
- Graphics
- Serial IO
- Intel MEBX
- LAN
- Audio

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.

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 **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the "**Press Delete to enter SETUP**" message appears on the screen.

If the message disappears before the **DELETE** 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.

Key	Function
Up arrow	Move to the item above
Down arrow	Move to the item below
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

Key	Function
-	Decrease the numeric value or make changes
Page up	Move to the next page
Page down	Move to the previous page
Esc	Main Menu – Quit and do not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Load previous values
F3 key	Load optimized defaults
F4 key	Save changes and Exit BIOS

Table 4-1: BIOS Navigation Keys

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** or the **F1** key again.

4.1.4 BIOS Menu Bar

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

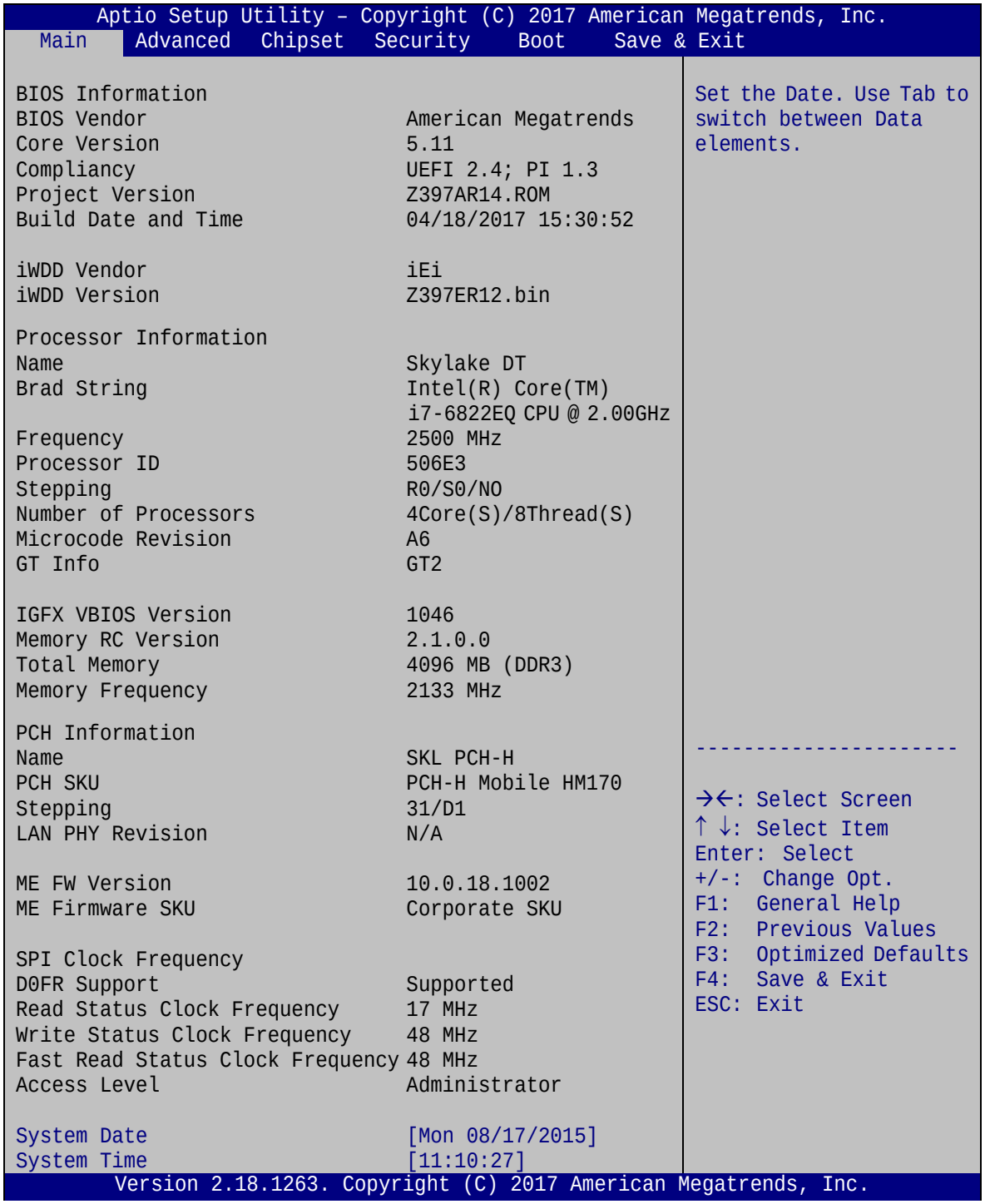
- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Security – Sets User and Supervisor Passwords.
- Boot – Changes the system boot configuration.
- Save & Exit – Selects exit options and loads default settings

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.



BIOS Menu 1: Main

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

➔ **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!

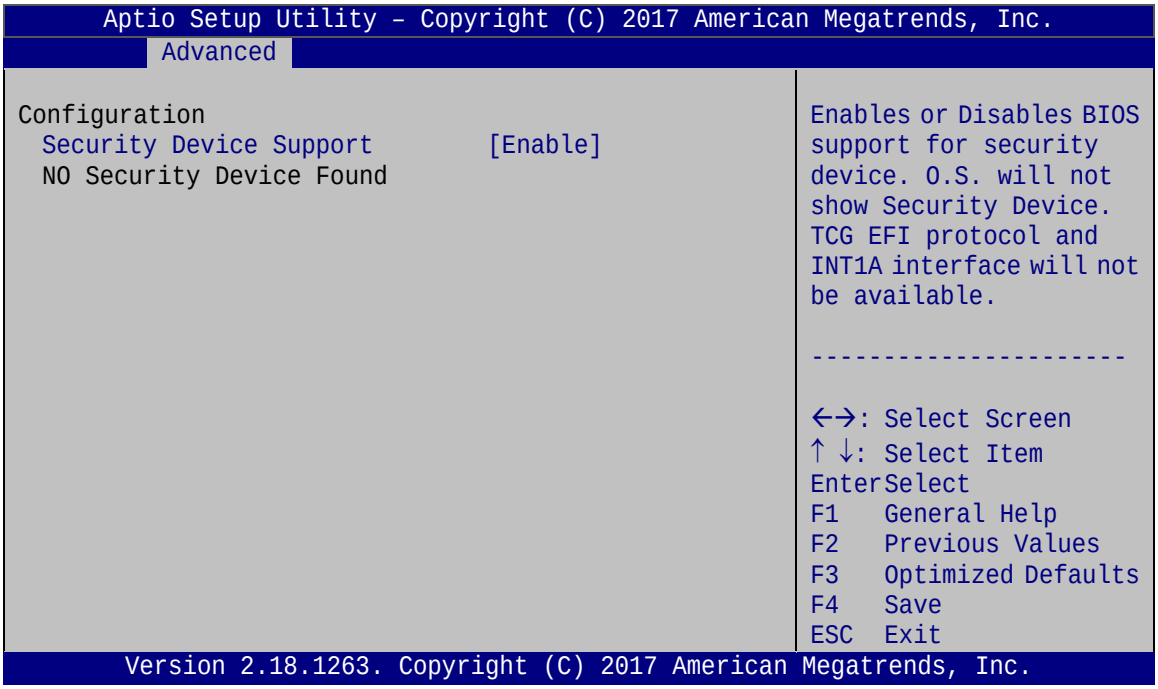
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

```
      Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
  Main    Advanced  Chipset   Security    Boot    Save & Exit

> Trusted Computing                          System ACPI Parameters
> ACPI Settings
> Super IO Configuration
> iWDD H/W Monitor
> RTC Wake Settings                          ----------------------
> Serial Port Console Redirection
> CPU Configuration                          →←: Select Screen
> SATA Configuration                         ↑ ↓: Select Item
> NVMe Configuration                         Enter: Select
> USB Configuration                          +/-:  Change Opt.
> iEi Feature                                F1:  General Help
                                             F2:  Previous Values
                                             F3:  Optimized Defaults
                                             F4:  Save & Exit
                                             ESC: Exit
       Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Menu 2: Advanced

4.3.1 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 3**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 3: Trusted Computing

➔ **Security Device Support [Enable]**

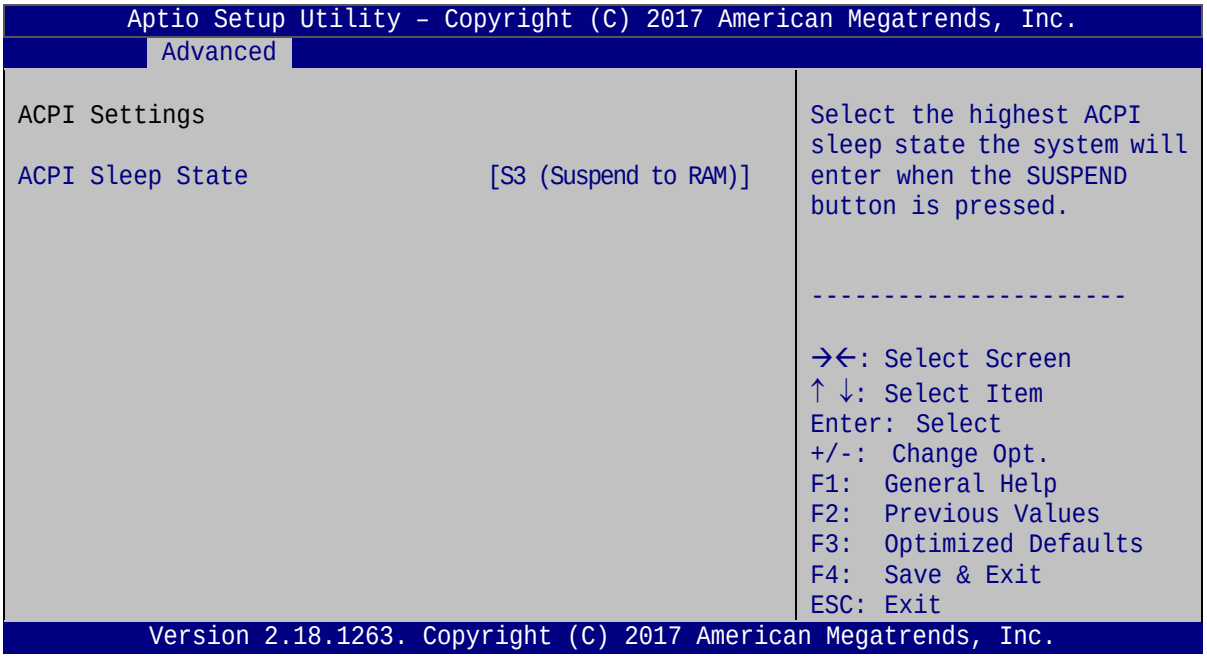
Use the **Security Device Support** option to configure support for the security device.

➔ **Disable** Security device support is disabled.

➔ **Enable** **DEFAULT** Security device support is enabled.

4.3.2 ACPI Settings

The **ACPI Settings** menu (**BIOS Menu 4**) configures the Advanced Configuration and Power Interface (ACPI) options.



BIOS Menu 4: ACPI Settings

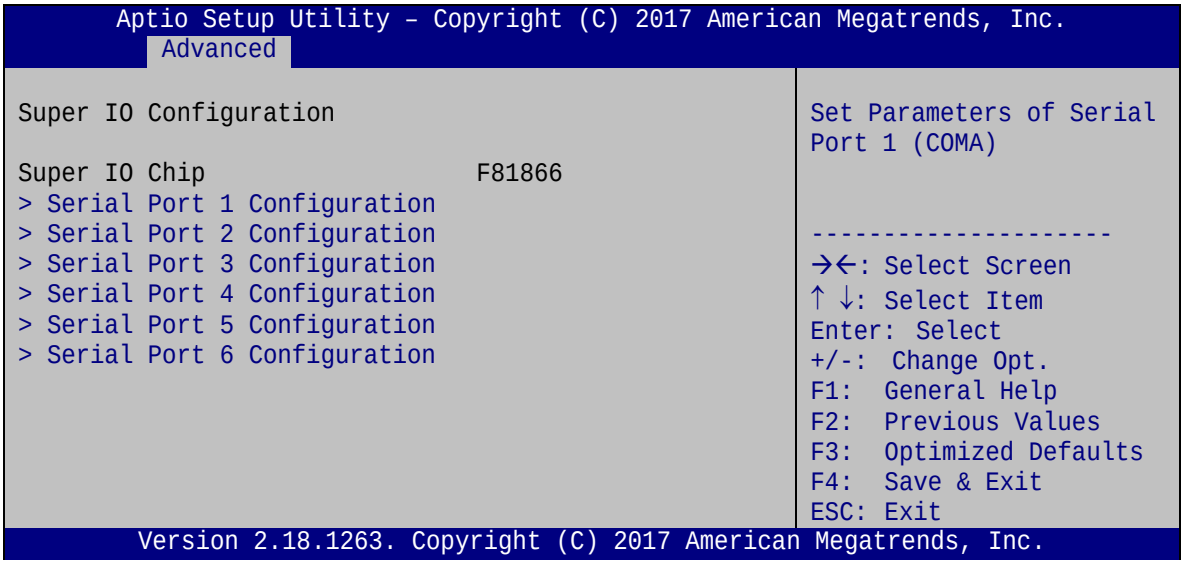
➔ **ACPI Sleep State [S3 (Suspend to RAM)]**

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.

4.3.3 Super IO Configuration

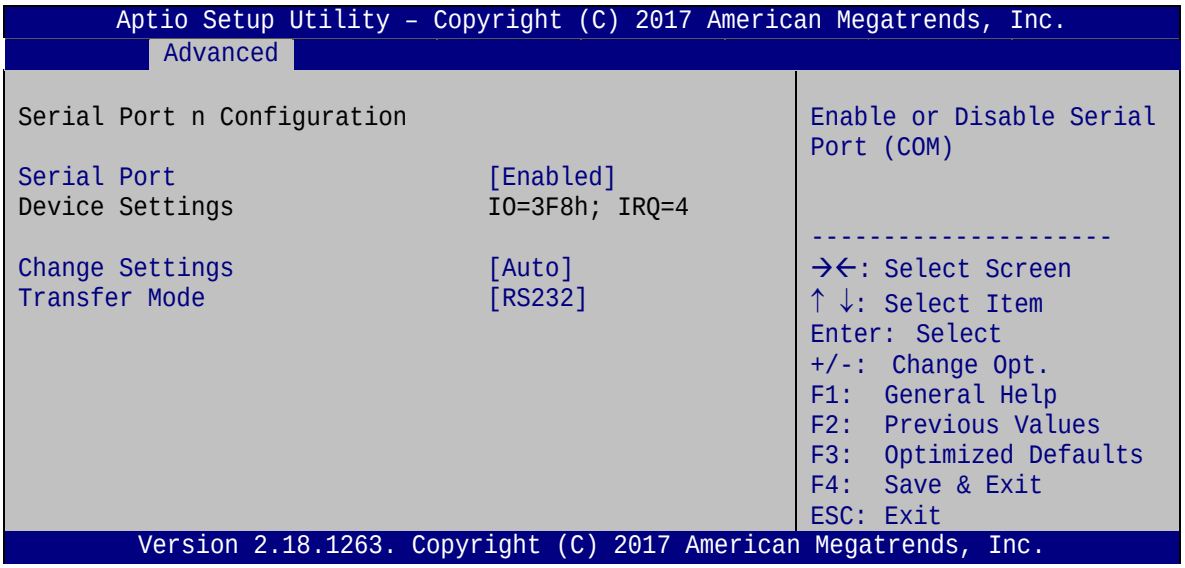
Use the **Super IO Configuration** menu (**BIOS Menu 5**) to set or change the configurations for the serial ports.



BIOS Menu 5: Super IO Configuration

4.3.3.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 6**) to configure the serial port n.



BIOS Menu 6: Serial Port n Configuration Menu

4.3.3.1.1 Serial Port 1 Configuration

➔ **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

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=3F8h; IRQ=4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ4
➔ **IO=3F8h; IRQ=3,4,11**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 11
➔ **IO=2F8h; IRQ=3,4,11**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 11
➔ **IO=3E8h; IRQ=3,4,11**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 11
➔ **IO=2E8h; IRQ=3,4,11**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 11

➔ **Transfer Mode [RS232]**

Use the **Transfer Mode** option to select the Serial Port 1 signaling mode.

➔ **RS422**	Serial Port 1 signaling mode is RS-422
➔ **RS485**	Serial Port 1 signaling mode is RS-485

➔ **RS232** **DEFAULT** Serial Port 1 signaling mode is RS-232

4.3.3.1.2 Serial Port 2 Configuration

➔ **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

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.

➔ **IO=2F8h; IRQ=3** Serial Port I/O port address is 2F8h and the interrupt address is IRQ3

➔ **IO=3F8h; IRQ=3,4,11** Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 11

➔ **IO=2F8h; IRQ=3,4,11** Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 11

➔ **IO=3E8h; IRQ=3,4,11** Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 11

➔ **IO=2E8h; IRQ=3,4,11** Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 11

➔ **Transfer Mode [RS232]**

Use the **Transfer Mode** option to select the Serial Port 2 signaling mode.

➔ **RS422**		Serial Port 2 signaling mode is RS-422
➔ **RS485**		Serial Port 2 signaling mode is RS-485
➔ **RS232**	**DEFAULT**	Serial Port 2 signaling mode is RS-232

4.3.3.1.3 Serial Port 3 Configuration

➔ **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

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=3E8h; IRQ=11**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ11
➔ **IO=3F8h; IRQ=3,4,11**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 11
➔ **IO=2F8h; IRQ=3,4,11**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 11
➔ **IO=3E8h; IRQ=3,4,11**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 11
➔ **IO=2E8h; IRQ=3,4,11**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 11

- **IO=2D0h; IRQ=3,4,11** — Serial Port I/O port address is 2D0h and the interrupt address is IRQ3, 4, 11
- **IO=2E0h; IRQ=3,4,11** — Serial Port I/O port address is 2E0h and the interrupt address is IRQ3, 4, 11

4.3.3.1.4 Serial Port 4 Configuration

➔ **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

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

- **Auto** DEFAULT — The serial port IO port address and interrupt address are automatically detected.
- **IO=2E8h; IRQ=11** — Serial Port I/O port address is 2E8h and the interrupt address is IRQ11
- **IO=3F8h; IRQ=3,4,11** — Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 11
- **IO=2F8h; IRQ=3,4,11** — Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 11
- **IO=3E8h; IRQ=3,4,11** — Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 11
- **IO=2E8h; IRQ=3,4,11** — Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 11
- **IO=2D0h; IRQ=3,4,11** — Serial Port I/O port address is 2D0h and the interrupt address is IRQ3, 4, 11

➔ **IO=2E0h; IRQ=3,4,11**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ3, 4, 11

4.3.3.1.5 Serial Port 5 Configuration

➔ **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

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2D0h; IRQ=11**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ11
➔ **IO=3F8h; IRQ=3,4,11**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 11
➔ **IO=2F8h; IRQ=3,4,11**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 11
➔ **IO=3E8h; IRQ=3,4,11**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 11
➔ **IO=2E8h; IRQ=3,4,11**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 11
➔ **IO=2D0h; IRQ=3,4,11**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ3, 4, 11
➔ **IO=2E0h; IRQ=3,4,11**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ3, 4, 11

4.3.3.1.6 Serial Port 6 Configuration

➔ **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

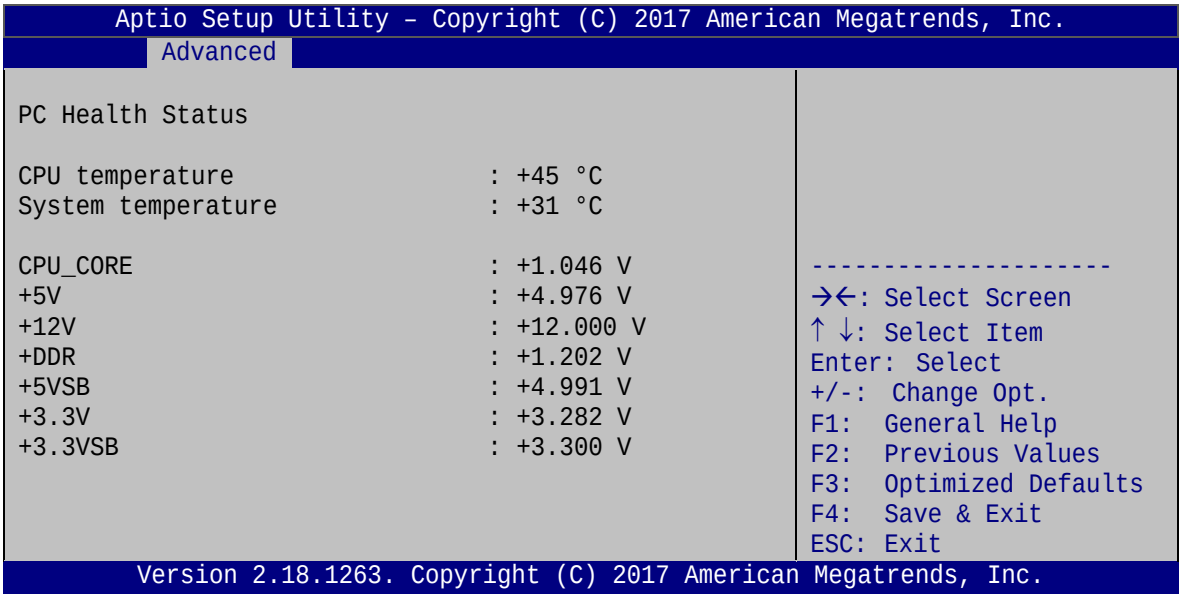
➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2E0h; IRQ=11**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ11
➔ **IO=3F8h; IRQ=3,4,11**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 11
➔ **IO=2F8h; IRQ=3,4,11**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 11
➔ **IO=3E8h; IRQ=3,4,11**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 11
➔ **IO=2E8h; IRQ=3,4,11**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 11
➔ **IO=2D0h; IRQ=3,4,11**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ3, 4, 11
➔ **IO=2E0h; IRQ=3,4,11**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ3, 4, 11

4.3.4 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 7**) displays operating temperature and fan speeds.



BIOS Menu 7: iWDD H/W Monitor

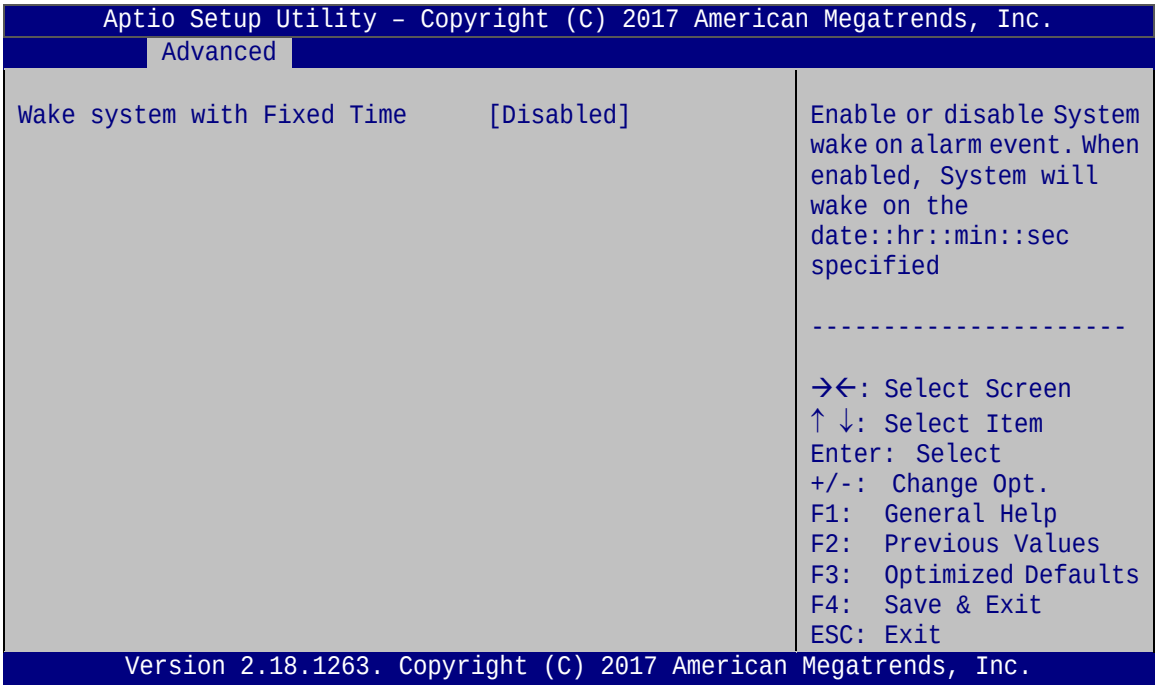
➔ **PC Health Status**

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

- Temperature
  - CPU temperature
  - System temperature
- Voltages:
  - CPU_CORE
  - +5V
  - +12V
  - +DDR
  - +5VSB
  - +3.3V
  - +3.3VSB

4.3.5 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 8**) enables the system to wake at the specified time.



BIOS Menu 8: 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

Wake up minute

Wake up second

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

4.3.6 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 9**) 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.

```
Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
      Advanced

COM1                                      Console Redirection
Console Redirection      [Disabled]       Enable or Disable
> Console Redirection Settings

COM2
Console Redirection      [Disabled]       ---------------------
> Console Redirection Settings             →←: Select Screen
                                          ↑ ↓: Select Item
COM3                                      Enter: Select
Console Redirection      [Disabled]       +/-:  Change Opt.
> Console Redirection Settings             F1:  General Help
                                          F2:  Previous Values
COM4                                      F3:  Optimized Defaults
Console Redirection      [Disabled]       F4:  Save & Exit
> Console Redirection Settings             ESC: Exit

COM5
Console Redirection      [Disabled]
> Console Redirection Settings

COM6
Console Redirection      [Disabled]
> Console Redirection Settings

Legacy Console Redirection
> Legacy Console Redirection Settings

Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Menu 9: Serial Port Console Redirection

➔ **Console Redirection [Disabled]**

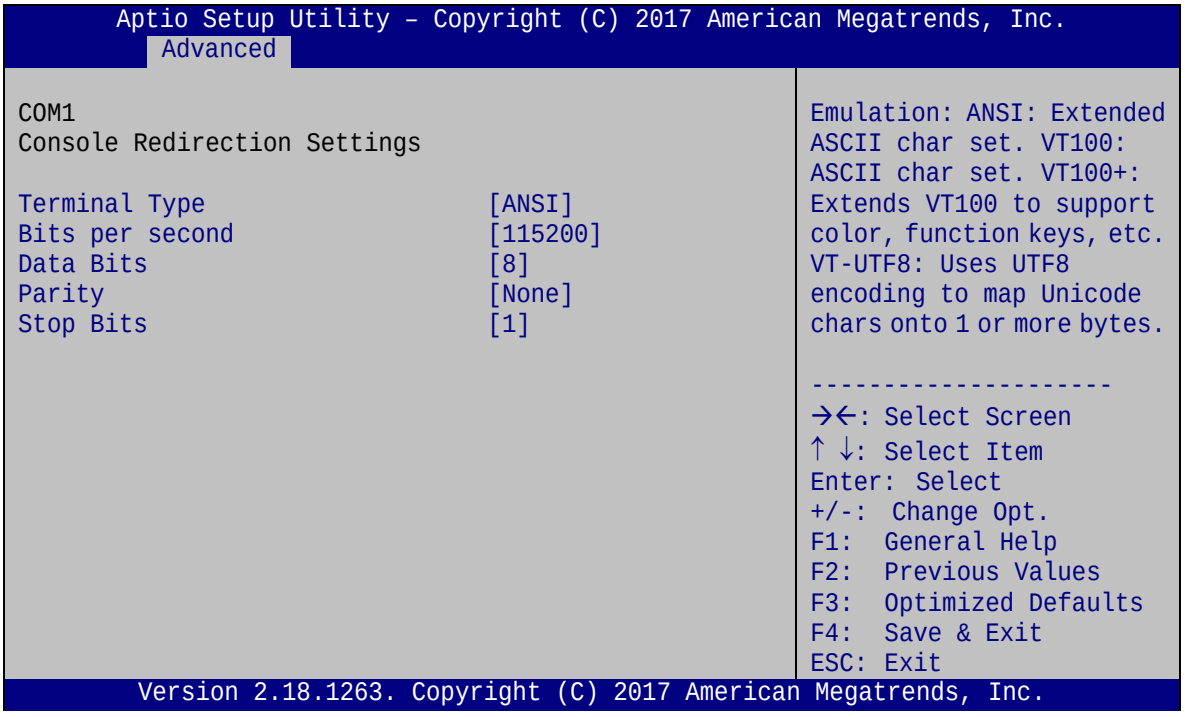
Use **Console Redirection** option to enable or disable the console redirection function.

➔ **Disabled** **DEFAULT** Disabled the console redirection function

➔ **Enabled** Enabled the console redirection function

4.3.6.1 Console Redirection Settings

Use the **Console Redirection Settings** menu (**BIOS Menu 10**) to configure console redirection settings of the specified serial port. This menu appears only when the Console Redirection is enabled.



BIOS Menu 10: Console Redirection Settings

➔ **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.
- ➔ **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.

4.3.7 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 11**) to view detailed CPU specifications and configure the CPU.

```
Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
          Advanced

CPU Configuration                                  Enabled for Windows XP and
                                                   Linux (OS optimized for
Intel(R) Core(R) i7-6822EQ CPU @ 2.00GHz           Hyper-Threading
CPU Signature                    506E3             Technology) and Disabled
Microcode Patch                  A6                for other OS (OS not
Max CPU Speed                    2000 MHz          optimized for
Min CPU Speed                    800 MHz           Hyper-Threading
CPU Speed                        2500 MHz          Technology). When
Processor Cores                  4                 Disabled only on thread per
Hyper Threading Technology       Supported         enabled core is enabled.
Intel VT-x Technology            Supported
Intel SMX Technology             Supported
64-bit                           Supported
EIST Technology                  Supported

L1 Data Cache                    32 KB x 4         ----------------------
L1 Code Cache                    32 KB x 4
L2 Cache                         256 KB x 4        →←: Select Screen
L3 Cache                         8 MB              ↑ ↓: Select Item
                                                   Enter: Select
Hyper-threading                  [Enabled]         +/-:  Change Opt.
Active Processor Cores           [All]             F1:  General Help
Intel Virtualization Technology  [Enabled]         F2:  Previous Values
Intel(R) SpeedStep(tm)           [Enabled]         F3:  Optimized Defaults
Intel TXT(LT) Support            [Disabled]        F4:  Save & Exit
                                                   ESC: Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Menu 11: CPU Configuration

The CPU Configuration menu (**BIOS Menu 11**) lists the following CPU details:

- CPU Signature: Lists the CPU signature value.
- Microcode Patch: Lists the microcode patch being used.
- Max CPU Speed: Lists the maximum CPU processing speed.
- Min CPU Speed: Lists the minimum CPU processing speed.
- CPU Speed: Lists the CPU speed.
- Processor Cores: Lists the number of the processor core
- Hyper Threading Technology: Indicates if Intel HT Technology is supported by the CPU.
- Intel VT-x Technology: Indicates if Intel VT-x Technology is supported by the CPU.
- Intel SMX Technology: Indicates if Intel SMX Technology is supported by the CPU.
- 64-bit: Indicates if 64-bit system is supported by the CPU.
- Intel EIST Technology: Indicates if Intel SpeedStep Technology is supported by the CPU.
- L1 Data Cache: Lists the amount of data storage space on the L1 cache.
- L1 Code Cache: Lists the amount of code storage space on the L1 cache.
- L2 Cache: Lists the amount of storage space on the L2 cache.
- L3 Cache: Lists the amount of storage space on the L3 cache.

➔ **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.

➔ **Active Processor Cores [All]**

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

➔	**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.

➔ **Intel Virtualization Technology [Enabled]**

Use the **Intel 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** Disables Intel Virtualization Technology.
- ➔ **Enabled** **DEFAULT** Enables Intel Virtualization Technology.

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

Use the **Intel(R) SpeedStep(tm)** option to enable or disable the Enhanced Intel® SpeedStep™ Technology (EIST).

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

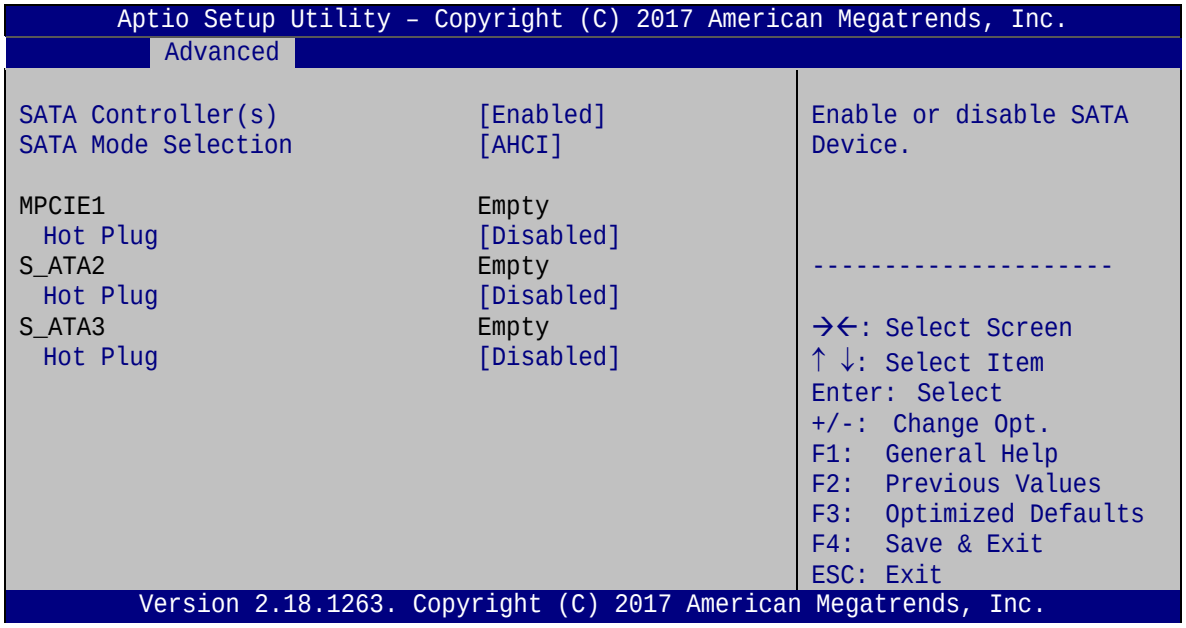
➔ **Intel TXT(LT) Support [Disabled]**

Use the **Intel TXT(LT) Support** option to enable or disable the Intel Trusted Execution Technology.

- ➔ **Disabled** **DEFAULT** Disables Intel Trusted Execution Technology.
- ➔ **Enabled** Enables Intel Trusted Execution Technology.

4.3.8 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 12**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 12: SATA Configuration

➔ **SATA Controller(s) [Enabled]**

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

- ➔ **Enabled** **DEFAULT** Enable SATA controller.
- ➔ **Disabled** Disable SATA controller.

➔ **SATA Mode Selection [AHCI]**

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

- ➔ **AHCI** **DEFAULT** Configures SATA devices as AHCI device.
- ➔ **RAID** Configures SATA devices as RAID device.

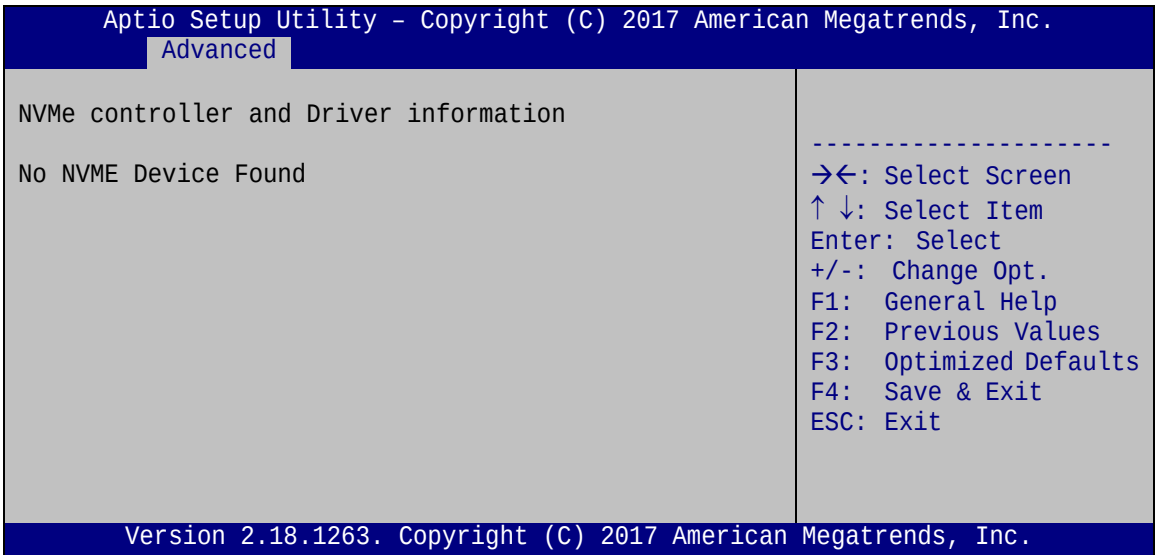
➔ **Hot Plug [Disabled]**

Use the **Hot Plug** option to enable or disable the hot plug function of the SATA port.

➔	**Disabled**	**DEFAULT**	Disables the hot plug function of the SATA port.
➔	**Enabled**		Enables the hot plug function of the SATA port.

4.3.9 NVMe Configuration

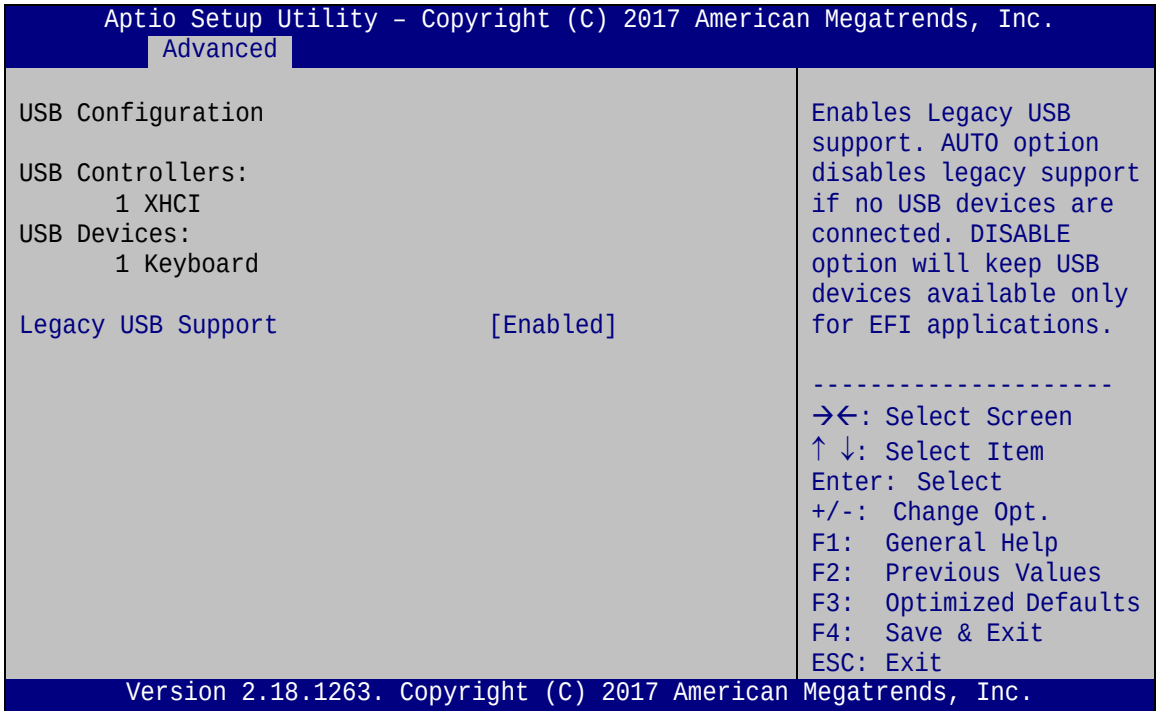
Use the **NVMe Configuration** menu (**BIOS Menu 13**) to change and/or set the configuration of the NVMe devices installed in the system.



BIOS Menu 13: Intel(R) Rapid Start Technology Configuration

4.3.10 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

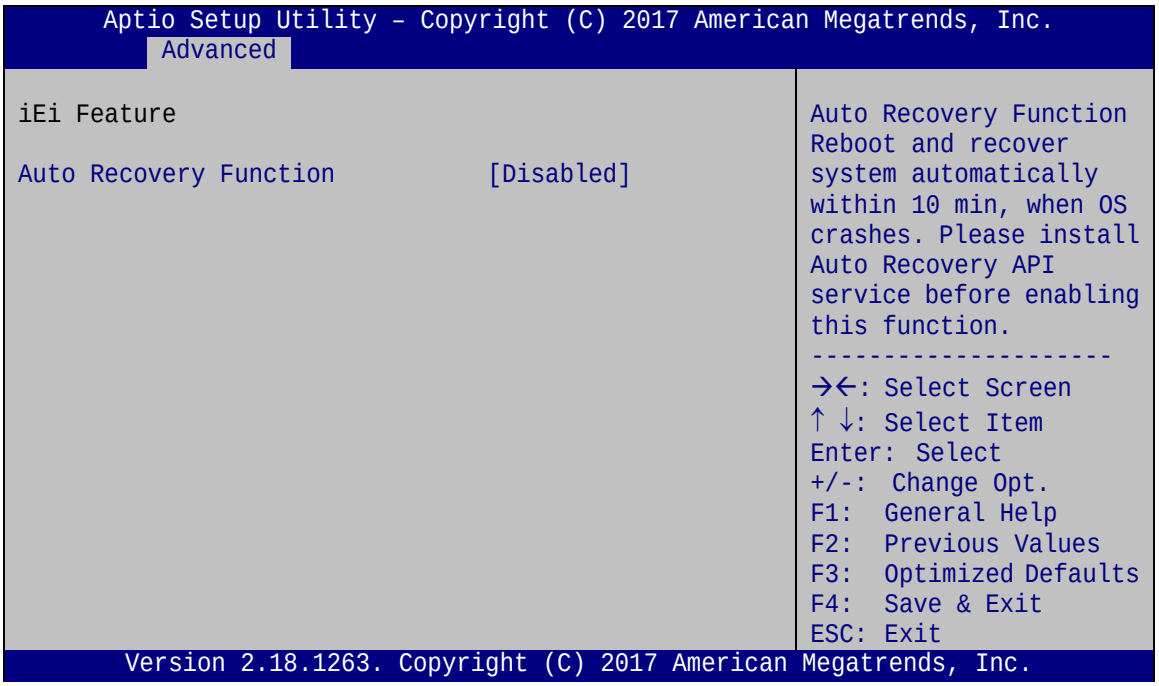
➔ **Legacy USB Support [Enabled]**

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

4.3.11 IEI Feature

Use the **IEI Feature** menu (**BIOS Menu 15**) to configure One Key Recovery function.



BIOS Menu 15: iEi Feature

➔ **Auto Recovery Function [Disabled]**

Use the **Auto Recovery Function** BIOS option to enable or disable the auto recovery function of the IEI One Key Recovery.

➔ **Disabled** **DEFAULT** Auto recovery function disabled

➔ **Enabled** Auto recovery function enabled

4.4 Chipset

Use the **Chipset** menu (**BIOS Menu 16**) to access the PCH-IO and System Agent (SA) configuration menus.

WARNING!

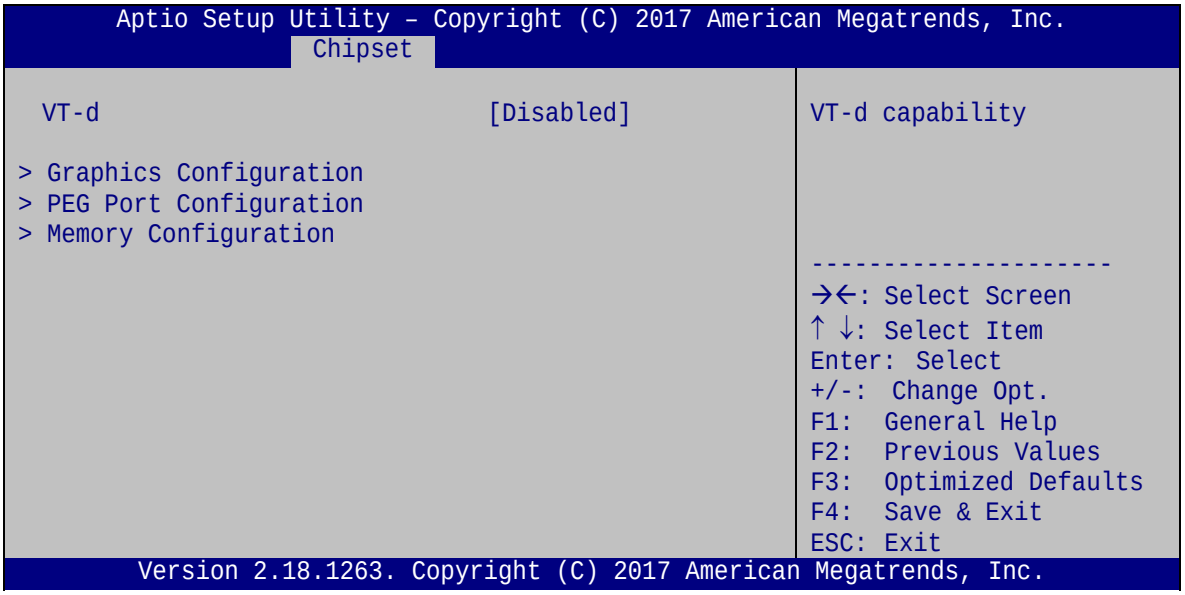
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

```
        Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
  Main    Advanced  Chipset  Security    Boot    Save & Exit

> System Agent (SA) Configuration                 System Agent (SA)
> PCH-IO Configuration                            Parameters


                                                  ---------------------
                                                  →←: Select Screen
                                                  ↑ ↓: Select Item
                                                  Enter:  Select
                                                  +/-:  Change Opt.
                                                  F1:   General Help
                                                  F2:   Previous Values
                                                  F3:   Optimized Defaults
                                                  F4:   Save & Exit
                                                  ESC:  Exit
          Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Menu 16: Chipset

4.4.1 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 17**) to configure the System Agent (SA) parameters.



BIOS Menu 17: System Agent (SA) Configuration

➔ **VT-d [Disabled]**

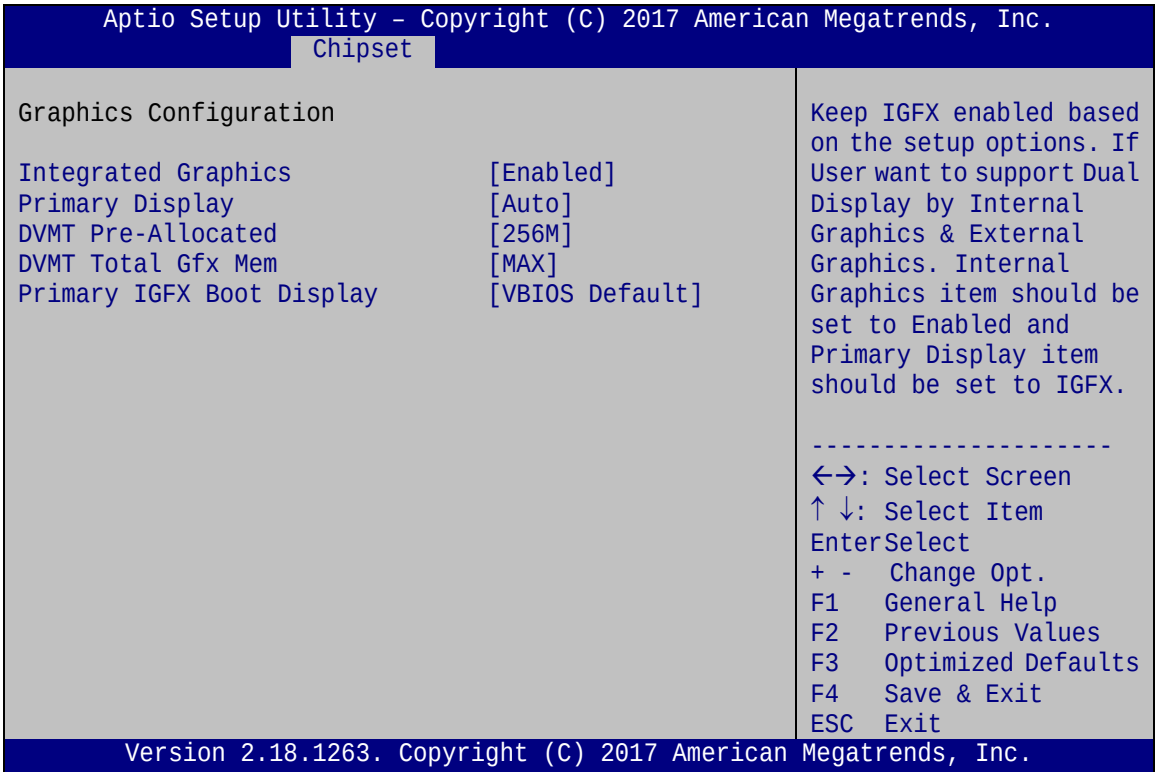
Use the **VT-d** option to enable or disable VT-d support.

➔ **Disabled** **DEFAULT** Disables VT-d support.

➔ **Enabled** Enables VT-d support.

4.4.1.1 Graphics Configuration

Use the **Graphics Configuration** submenu (**BIOS Menu 18**) to configure the graphics settings.



BIOS Menu 18: Graphics Configuration

➔ **Internal Graphics [Enabled]**

Use the **Internal Graphics** option to enable or disable the internal graphics device.

- ➔ **Auto** The internal graphics device is automatically detected and enabled.
- ➔ **Disabled** Disable the internal graphics device.
- ➔ **Enabled** **DEFAULT** Enable the internal graphics device.

➔ **Primary Display [Auto]**

Use the **Primary Display** option to select the graphics controller used as the primary boot device. Configuration options are listed below:

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

➔ **DVMT Pre-Allocated [256M]**

Use the **DVMT Pre-Allocated** option to specify the amount of system memory that can be used by the internal graphics device.

➔ **32M**		32 MB of memory used by internal graphics device
➔ **64M**		64 MB of memory used by internal graphics device
➔ **128M**		128 MB of memory used by internal graphics device
➔ **256M**	**DEFAULT**	256 MB of memory used by internal graphics device
➔ **512M**		512 MB of memory used by internal graphics device

➔ **DVMT Total Gfx Mem [MAX]**

Use the **DVMT Total Gfx Mem** option to specify the maximum amount of memory that can be allocated as graphics memory. Configuration options are listed below.

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

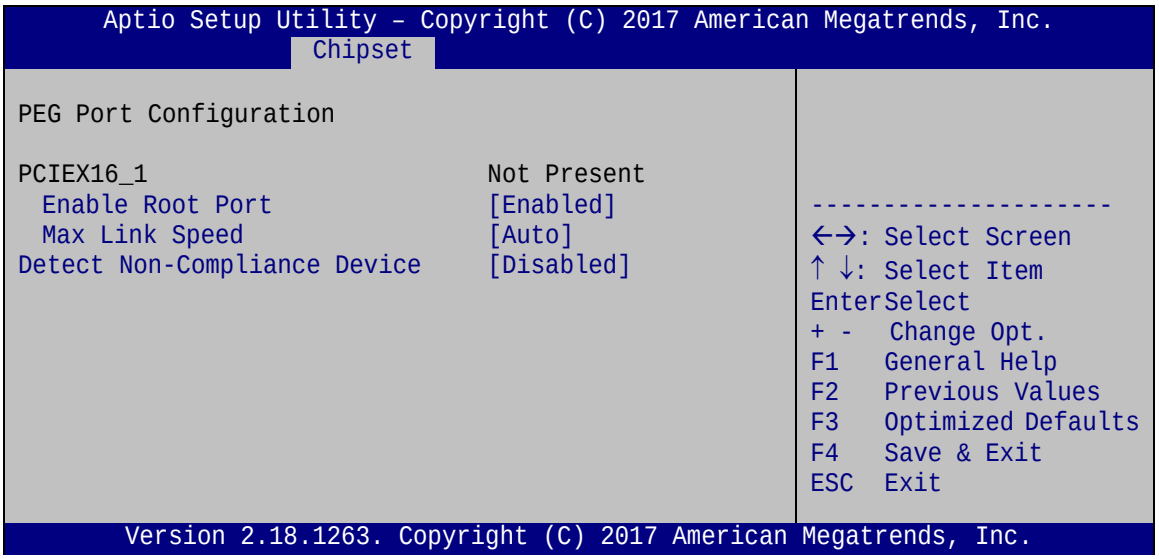
➔ **Primary IGFX Boot Display [VBIOS Default]**

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

- VBIOS Default **DEFAULT**
- HDMI1
- VGA1
- DP1

4.4.1.2 PEG Port Configuration

Use the **PEG Port Configuration** submenu (**BIOS Menu 19**) to configure the PCIe settings.



BIOS Menu 19: NB PCIe Configuration

➔ **Enable Root Port [Enabled]**

Use the **Enable Root Port** option to enable or disable the root port of PCI Express.

➔	**Disabled**		Disables the root port of PCI Express.
➔	**Enabled**	**DEFAULT**	Enables the root port of PCI Express.
➔	**Auto**		Automatically detect the root port of PCI Express

➔ **Max Link Speed [Auto]**

Use the **Max Link Speed** option to configure PEG 0:1: 0 max. speed. Configuration options are listed below.

- Auto **Default**
- Gen1
- Gen2
- Gen3

➔ **Detect Non-Compliance Device [Disabled]**

Use the **Detect Non-Compliance Device** option to detect non-compliance PCIe device in PEG.

➔ **Disabled** **DEFAULT** Do not detect non-compliance PCIe device in PEG

➔ **Enabled** Detect non-compliance PCIe device in PEG

4.4.1.3 Memory Configuration

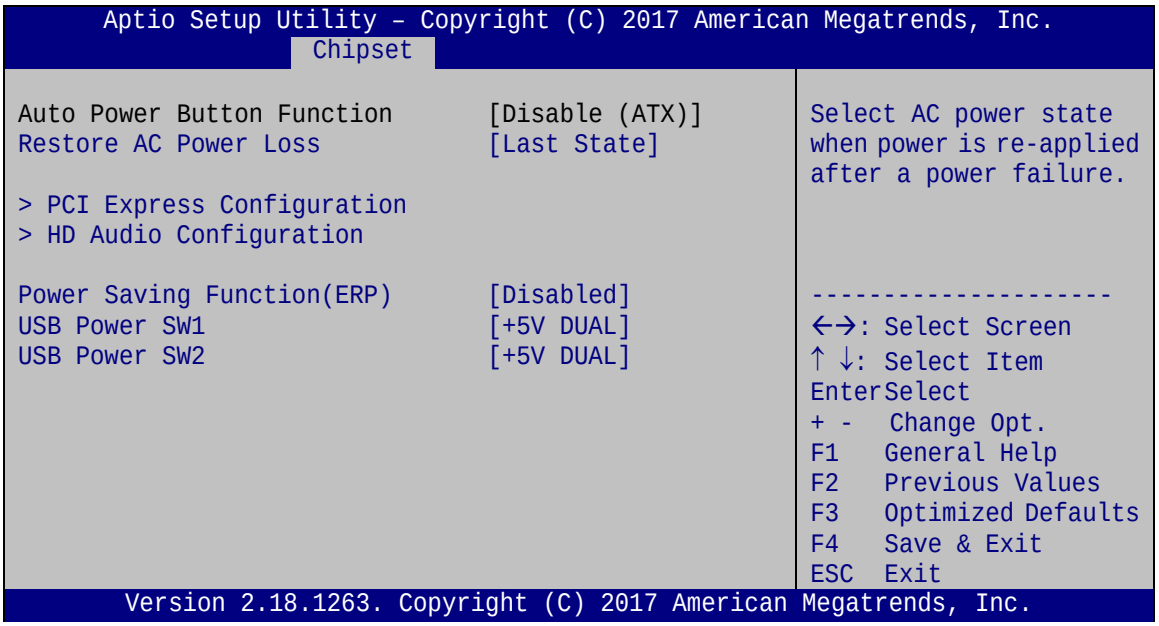
Use the **Memory Configuration** menu (**BIOS Menu 20**) to view the memory information.

```
Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
                     Chipset

Memory Configuration

Total Memory                    4096 MB

DIMM1                           4096 MB
DIMM2                           Not Present
                                              ---------------------
                                              ←→: Select Screen
                                              ↑ ↓: Select Item
                                              EnterSelect
                                              + -   Change Opt.
                                              F1    General Help
                                              F2    Previous Values
                                              F3    Optimized Defaults
                                              F4    Save & Exit
                                              ESC   Exit

Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Menu 20: Memory Configuration

4.4.2 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 21**) to configure the PCH parameters.



BIOS Menu 21: PCH-IO Configuration

➔ **Restore AC Power Loss [Last State]**

Use the **Restore AC Power** 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 four external USB 3.0 connectors 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 DUAL**	**DEFAULT**	Power is provided to the external USB 3.0 connectors when the system is in S3/S4 sleep state
➔ **+5V**		Power is not provided to the external USB 3.0 connectors when the system is in S3/S4 sleep state

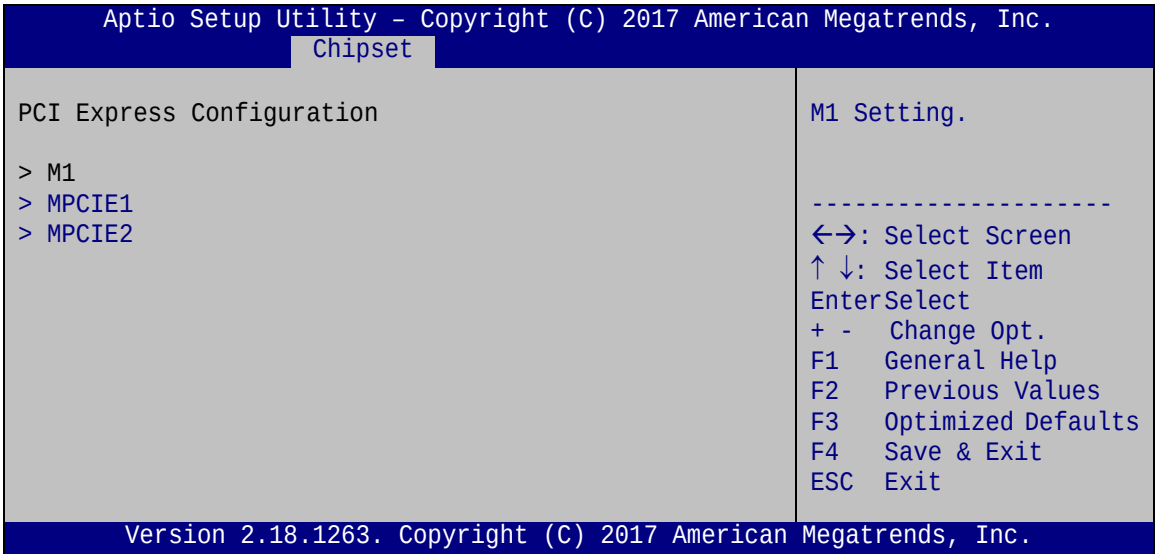
➔ **USB Power SW2 [+5V DUAL]**

Use the **USB Power SW2** BIOS option to configure whether to provide power to the two external USB 2.0 connectors 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 DUAL**	**DEFAULT**	Power is provided to the external USB 2.0 connectors when the system is in S3/S4 sleep state
➔ **+5V**		Power is not provided to the external USB 2.0 connectors when the system is in S3/S4 sleep state

4.4.2.1 PCI Express Configuration

Use the **PCI Express Configuration** submenu (**BIOS Menu 22**) to configure the PCI Express slots.



BIOS Menu 22: PCI Express Configuration

The **M1**, **MPCIE1** and **MPCIE2** submenus both contain the following options:

➔ **PCIe Speed [Auto]**

Use the **PCIe Speed** option to configure the PCIe interface speed.

- Auto **DEFAULT**
- Gen 1
- Gen 2
- Gen 3

➔ **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.

4.4.2.2 HD Audio Configuration

Use the **HD Audio Configuration** submenu (**BIOS Menu 23**) to configure the High Definition Audio codec.

```
Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
                    Chipset
HD Audio Configuration                    | Control Detection of the
                                          | Azalia device.
HD Audio                    [Auto]        | Disable = Azalia will be
                                          | unconditionally
                                          | disabled
                                          | Enabled = Azalia will be
                                          | unconditionally
                                          | Enabled.
                                          | Auto = Azalia will be
                                          | enabled if present,
                                          | disabled otherwise.
                                          |
                                          | ----------------------
                                          | ←→: Select Screen
                                          | ↑ ↓: Select Item
                                          | EnterSelect
                                          | + -   Change Opt.
                                          | F1    General Help
                                          | F2    Previous Values
                                          | F3    Optimized Defaults
                                          | F4    Save & Exit
                                          | ESC   Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Menu 23: PCH Azalia Configuration

➔ **HD Audio [Auto]**

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

➔ **Disabled**		The High Definition Audio controller is disabled.
➔ **Enabled**		The High Definition Audio controller is enabled.
➔ **Auto**	**DEFAULT**	The High Definition Audio controller is automatically detected and enabled.

4.5 Security

Use the **Security** menu (**BIOS Menu 24**) to set system and user passwords.

```
      Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
  Main    Advanced   Chipset   Security    Boot    Save & Exit

Password Description                          |  Set Administrator
                                              |  Password
If ONLY the Administrator's password is set,  |
then this only limits access to Setup and is  |
only asked for when entering Setup.           |
If ONLY the User's password is set, then this |  ---------------------
is a power on password and must be entered to  |
boot or enter Setup. In Setup the User will   |  →←: Select Screen
have Administrator rights.                    |  ↑ ↓: Select Item
The password length must be                   |  Enter: Select
in the following range:                       |  +/-: Change Opt.
Minimum length                    3           |  F1: General Help
Maximum length                    20          |  F2: Previous Values
                                              |  F3: Optimized Defaults
Administrator Password                        |  F4: Save & Exit
User Password                                 |  ESC: Exit
      Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Menu 24: Security

➔ **Administrator Password**

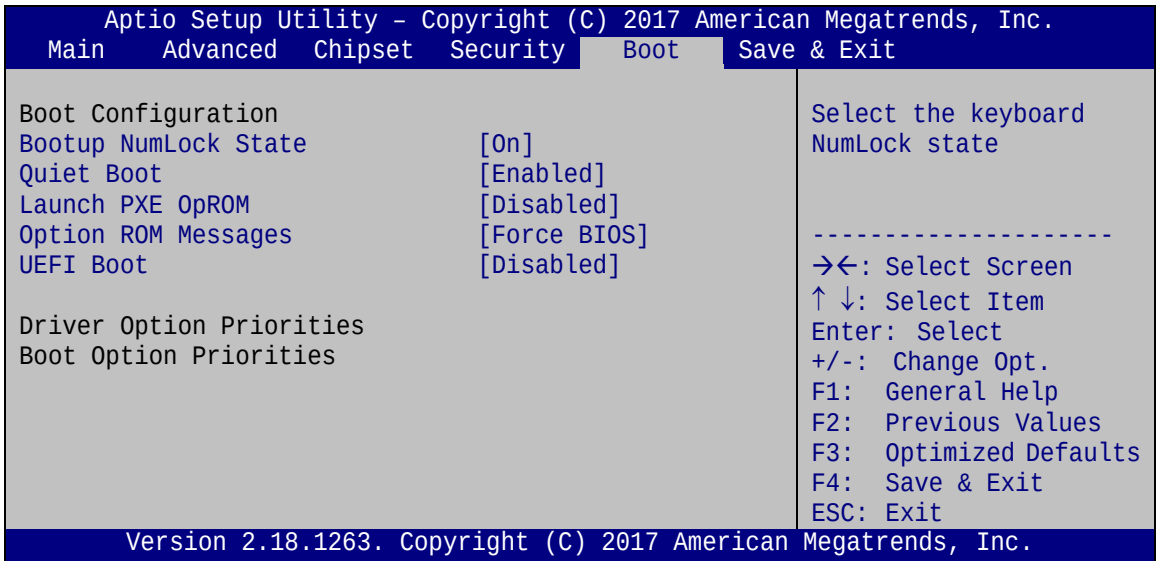
Use the **Administrator Password** to set or change an administrator password.

➔ **User Password**

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

4.6 Boot

Use the **Boot** menu (**BIOS Menu 25**) to configure system boot options.



BIOS Menu 25: 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.

➔ **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

➔ **Launch PXE OpROM [Disabled]**

Use the **Launch PXE OpROM** option to enable or disable boot option for legacy network devices.

➔	**Disabled**	**DEFAULT**	Ignore all PXE Option ROMs
➔	**Enabled**		Load PXE Option ROMs

➔ **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.

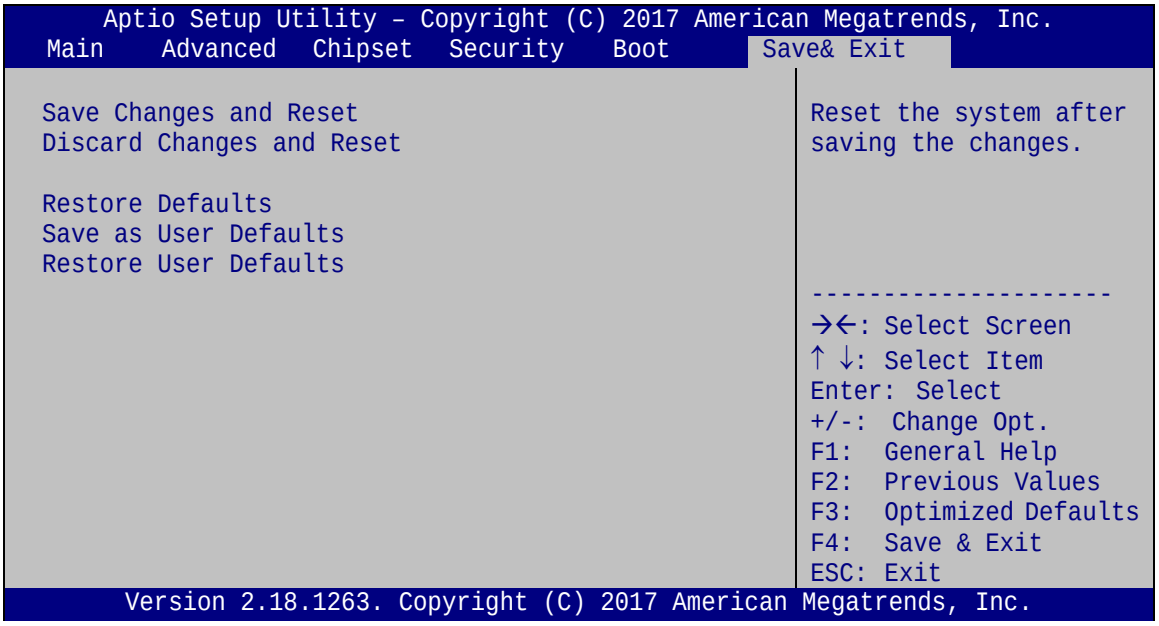
➔ **UEFI Boot [Disabled]**

Use the **UEFI Boot** option to enable or disable to boot from the UEFI devices.

➔	**Enabled**		Boot from UEFI devices is enabled.
➔	**Disabled**	**DEFAULT**	Boot from UEFI devices is disabled.

4.7 Save & Exit

Use the **Save & Exit** menu (**BIOS Menu 26**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 26: 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 HTB-100-HM170 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-100-HM170 medical embedded system, the system must be properly maintained. If medical 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.

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.

Step 3: Reset the system using the reset button on the front panel.

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-100-HM170 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-100-HM170 medical 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-100-HM170 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-100-HM170. Please make sure the purchased SO-DIMM complies with the memory specifications of the HTB-100-HM170.

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: Remove five retention screws (one inside the chassis, two on the side panel and two on the rear panel) that attach the internal elevated platform to the chassis. Then, lift the elevated platform to remove it.

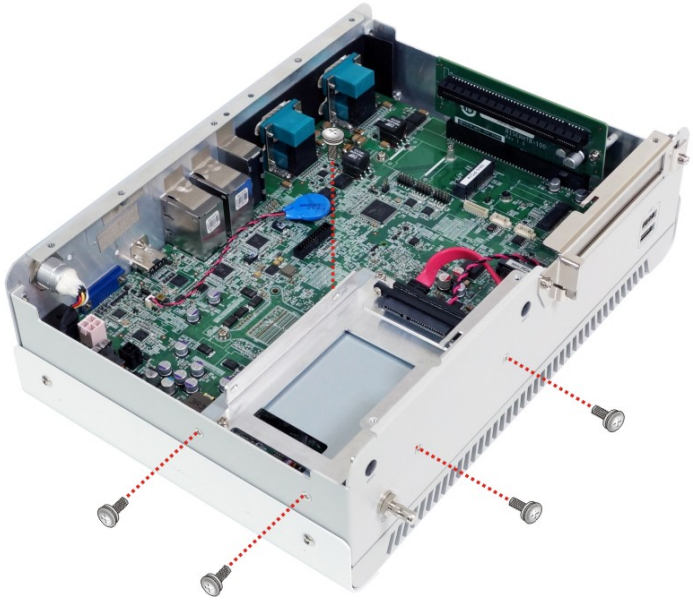


Figure 5-1: Elevated Platform Retention Screws

Step 3: Locate the SO-DIMM on the motherboard.

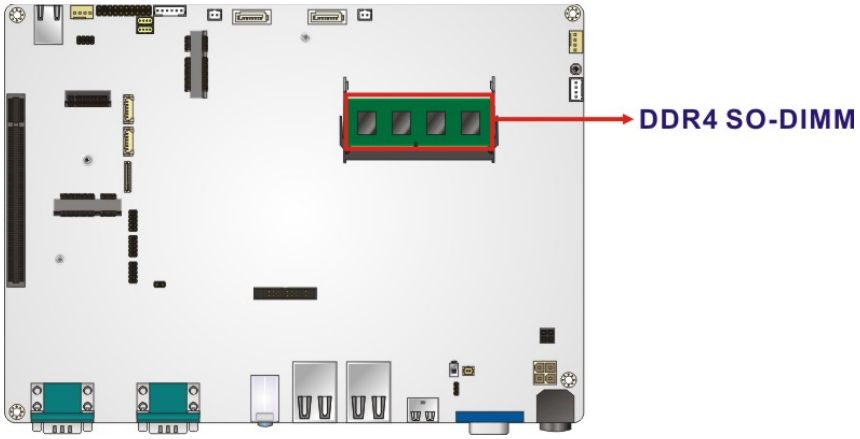


Figure 5-2: SO-DIMM Location

Step 4: Remove the SO-DIMM by releasing the arms on the SO-DIMM socket.

Step 5: 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 5-3**).

Step 6: Insert the SO-DIMM. Push the SO-DIMM chip into the socket at an angle (**Figure 5-3**).

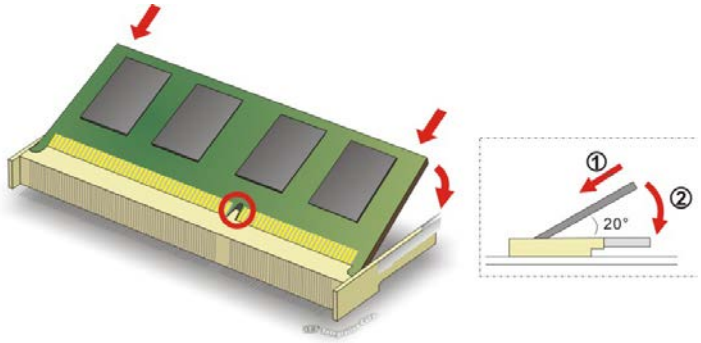


Figure 5-3: SO-DIMM Installation

Step 7: Open the SO-DIMM socket arms. Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM down (See **Figure 5-3**).

Step 8: Secure the SO-DIMM. Release the arms on the SO-DIMM socket. They clip into place and secure the SO-DIMM in the socket.

Chapter

6

Interface Connectors

6.1 Peripheral Interface Connectors

The HTB-100-HM170 medical embedded system motherboard comes with a number of peripheral interface connectors and configuration jumpers. The connector locations are shown in **Figure 6-1**. The Pin 1 locations of the on-board connectors are also indicated in the diagram below. The connector pinouts for these connectors are listed in the following sections.

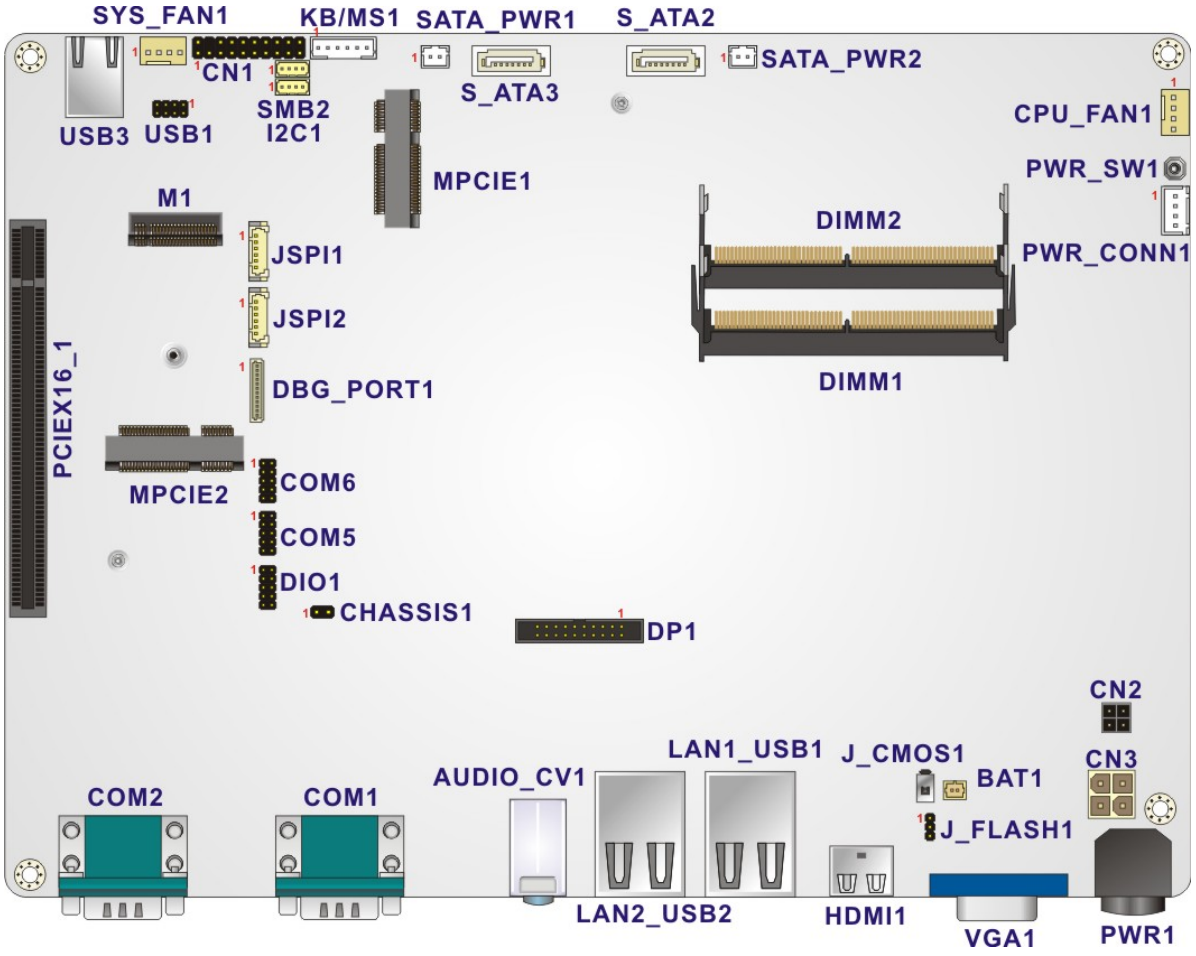


Figure 6-1: Jumper and Connector Locations

6.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. The table below shows a list of the peripheral interface connectors on the HTB-100-HM170's motherboard. Pinouts of these connectors can be found in the following sections.

Connector	Type	Label
+12 V power input connector	4-pin connector	CN3
Battery connector	2-pin wafer	BAT1
Chassis intrusion connector	2-pin header	CHASSIS1
DDR4 SO-DIMM slots	DDR4 SO-DIMM slot	DIMM1, DIMM2
Digital I/O connector	10-pin header	DIO1
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Fan connector (system)	4-pin wafer	SYS_FAN1
I^2C connector	4-pin wafer	I2C1
iDP connector	20-pin box header	DP1
Keyboard/Mouse connector	6-pin wafer	KB/MS1
M.2 slot	M.2 2230 A-key & E-key slot	M1
PCIe x16 slot	PCIe x16 slot	PCIEX16_1
PCIe Mini card/mSATA slot	Full-size PCIe Mini card slot	MPCIE1
PCIe Mini card slot	Half-size PCIe Mini card slot	MPCIE2
RS-232 serial port connectors	10-pin header	COM5, COM6
SATA 6Gb/s drive connectors	7-pin SATA connector	S_ATA2, S_ATAT3
SATA power connectors	2-pin wafer	SATA_PWR1, SATA_PWR2
SMBus connector	4-pin wafer	SMB1

Power button connector	4-pin wafer	PWR_CONN1
SPI flash connector (BIOS)	6-pin wafer	JSPI1
SPI flash connector (EC)	6-pin wafer	JSPI2
TPM connector	20-pin header	CN1
USB 2.0 connector	8-pin header	USB1
VGA power connector	4-pin connector	CN2

Table 6-1: Peripheral Interface Connectors

6.2.1 +12 V Power Input Connector (CN3)

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

Table 6-2: +12 V Power Input Connector (CN3) Pinouts

6.2.2 Battery Connector (BAT1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VBATT	2	GND

Table 6-3: Battery Connector (BAT1) Pinouts

6.2.3 Chassis Intrusion Connector (CHASSIS1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3 VSB	2	CHASSIS OPEN

Table 6-4: Chassis Intrusion Connector (CHASSIS1) Pinouts

6.2.4 Digital I/O Connector (DIO1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	
1	GND	2	+5V	
3	DOUT3	4	DOUT2	
5	DOUT1	6	DOUT0	
7	DIN3	8	DIN2	
9	DIN1	10	DIN0	

Table 6-5: Digital I/O Connector (DIO1) Pinouts

6.2.5 Fan Connector, CPU (CPU_FAN1)

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

Table 6-6: CPU Fan Connector (CPU_FAN1) Pinouts

6.2.6 Fan Connector, System (SYS_FAN1)

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

Table 6-7: System Fan Connector (SYS_FAN1) Pinouts

6.2.7 I²C Connector (I2C1)

PIN NO.	DESCRIPTION
1	GND
2	I2C CLOCK
3	I2C DATA
4	+5 V

Table 6-8: I²C Connector (I2C1) Pinouts

6.2.8 iDP Connector (DP1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HPD	2	AUX+
3	GND	4	AUX-
5	CAD	6	GND
7	GND	8	Lane2+
9	Lane3+	10	Lane2-
11	Lane3-	12	GND
13	GND	14	Lane0+
15	Lane1+	16	Lane0-
17	Lane1-	18	VCC3
19	VCC5	20	N/C

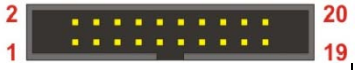


Table 6-9: iDP Connector (DP1) Pinouts

6.2.9 Keyboard/Mouse Connector (KB/MS1)

PIN NO.	DESCRIPTION
1	VCC
2	MSDATA
3	MSCLK
4	KBDATA
5	KBCLOCK
6	GND

Table 6-10: Keyboard/Mouse Connector (KB/MS1) Pinouts

6.2.10 PCIe Mini Slot, Full-size (MPCIE1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5 V
7	VCC3	8	SIM_VCC
9	GND	10	SIM_IO
11	CLK-	12	SIM_CLK
13	CLK+	14	SIM_RST
15	GND	16	SIM_VPP
17	BUF_PLT_RST#	18	GND
19	N/C	20	VCC3
21	GND	22	BUF_PLT_RST#
23	SATA_RXN2_C	24	VCC3
25	SATA_RXP2_C	26	GND
27	GND	28	1.5 V
29	GND	30	SMBCLK
31	SATA_TXN2	32	SMBDATA
33	SATA_TXP2	34	GND
35	GND	36	USBD7-
37	GND	38	USBD7+

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
39	VCC3	40	GND
41	VCC3	42	N/C
43	GND	44	RF_LINK#
45	N/C	46	BLUELED#
47	N/C	48	1.5 V
49	N/C	50	GND
51	M-SATADET	52	VCC3

Table 6-11: Full-size PCIe Mini Slots (MPCIE1) Pinouts

6.2.11 PCIe Mini Slot, Half-size (MPCIE2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5 V
7	VCC3	8	N/C
9	GND	10	N/C
11	CLK_PCIE_MINI2_N	12	N/C
13	CLK_PCIE_MINI2_P	14	N/C
15	GND	16	N/C
17	BUF_PLT_RST#	18	GND
19	N/C	20	VCC3
21	GND	22	BUF_PLT_RST#
23	PCIE_RX4DN	24	VCC3
25	PCIE_RX4DP	26	GND
27	GND	28	1.5 V
29	GND	30	SMBCLK
31	PCIE_TX4DN	32	SMBDATA
33	PCIE_TX4DP	34	GND
35	GND	36	USBD8-
37	GND	38	USBD8+

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
39	VCC3	40	GND
41	VCC3	42	N/C
43	GND	44	RF_LINK#
45	N/C	46	BLUELED#
47	N/C	48	1.5 V
49	N/C	50	GND
51	N/C	52	VCC3

Table 6-12: Half-size PCIe Mini Slots (MPCIE2) Pinouts

6.2.12 RS-232 Serial Port Connectors (COM5, COM6)

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

Table 6-13: RS-232 Serial Port Connector (COM5, COM6) Pinouts

6.2.13 SATA Power Connectors (SATA_PWR1, SATA_PWR2)

PIN NO.	DESCRIPTION
1	+5V
2	GND

Table 6-14: SATA Power Connectors (SATA_PWR1, SATA_PWR2) Pinouts

6.2.14 SMBus Connector (SMB1)

PIN NO.	DESCRIPTION
1	GND
2	SMBUS CLOCK
3	SMBUS DATA
4	+5 V

Table 6-15: SMBus Connector (SMB1) Pinouts

6.2.15 Power Button Connector (PWR_CONN1)

PIN NO.	DESCRIPTION
1	PWRBTN_SW#
2	GND
3	+V3P3A
4	GND

Table 6-16: Power Button Connector (PWR_CONN1) Pinouts

6.2.16 SPI Flash Connector, BIOS (JSPI1)

PIN NO.	DESCRIPTION
1	+SPI_VCC
2	SPI_CS0#_CN
3	SPI_SO0_CN
4	SPI_CLK0_CN
5	SPI_SI0_CN
6	GND

Table 6-17: SPI Flash Connector (JSPI1) Pinouts

6.2.17 SPI Flash Connector, EC (JSPI2)

PIN NO.	DESCRIPTION
1	+SPI_VCC_EC
2	SPI_CS0#_CN_EC
3	SPI_SO0_CN_EC
4	SPI_CLK0_CN_EC
5	SPI_SI0_CN_EC
6	GND

Table 6-18: SPI Flash Connector (JSPI2) Pinouts

6.2.18 TPM Connector (CN1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	FWHPCLK	2	GND
3	LFRAME#	4	KEY
5	PCIRST#	6	VCC
7	LAD3	8	LAD2
9	VCC3	10	LAD1
11	LAD0	12	GND
13	SMBCLK	14	SMBDATA
15	3VDUAL	16	SERIRQ
17	GND	18	CLKRUN#
19	LPCPD#	20	LDRQ#

Table 6-19: TPM Connector (CN1) Pinouts

6.2.19 USB 2.0 Connector (USB1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	
1	VCC	2	GND	
3	-DATA9	4	+DATA10	
5	+DATA9	6	-DATA10	
7	GND	8	VCC	

Table 6-20: USB 2.0 Connector (USB1) Pinouts

6.2.20 VGA Power Connector (CN2)

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

Table 6-21: VGA Power Connector (CN2) Pinouts

6.3 External Interface Panel Connectors

The table below lists the rear panel connectors on the motherboard. Pinouts of these connectors can be found in the following sections.

Connector	Type	Label
Audio jacks	Audio jacks	AUDIO_CV1
HDMI connector	HDMI	HDMI1
LAN and USB3 combo connectors	RJ-45 & USB 3.0	LAN1_USB1, LAN2_USB2
Power input connector	4-pin DIN	PWR1
RS-232/422/485 ports	DB-9	COM1
RS-232 ports	DB-9	COM2
USB 2.0 connector	USB 2.0	USB3

VGA connector	DB-15	VGA1

Table 6-22: Peripheral Interface Connectors

6.3.1 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 6-23: HDMI Connector (HDMI1) Pinouts

6.3.2 Ethernet and USB 3.0 Combo Connectors

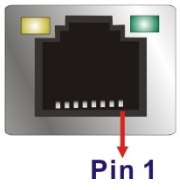
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	
1	MDI0+	5	MDI2-	
2	MDI0-	6	MDI1-	
3	MDI1+	7	MDI3+	
4	MDI2+	8	MDI3-	

Table 6-24: Ethernet Connector Pinouts

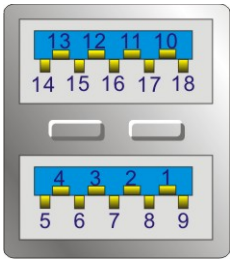
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	
1	+5V	10	+5V	
2	USB2P0_DM0	11	USB2P0_DM1	
3	USB2P0_DP0	12	USB2P0_DP1	
4	GND	13	GND	
5	USB3P0_RXDN0	14	USB3P0_RXDN1	
6	USB3P0_RXDP0	15	USB3P0_RXDP1	
7	GND	16	GND	
8	USB3P0_TXDN0	17	USB3P0_TXDN1	
9	USB3P0_TXDP0	18	USB3P0_TXDP1	

Table 6-25: USB 3.0 Connector Pinouts

6.3.3 Power Input Jack (PWR1)

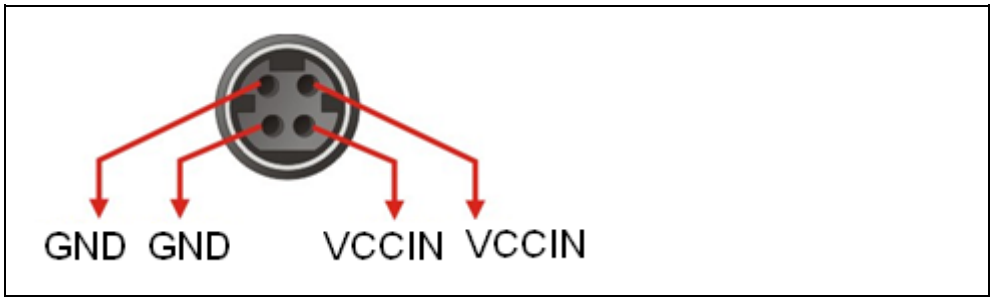


Table 6-26: Power Input Jack (PWR1) Pinouts

6.3.4 USB 2.0 Connectors (USB3)

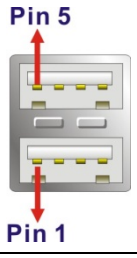
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	
1	+5V	5	+5V	
2	USB2P0_DM2_L	6	USB2P0_DM3_L	
3	USB2P0_DP2_L	7	USB2P0_DP3_L	
4	GND	8	GND	

Table 6-27: USB 2.0 Connectors (USB3) Pinouts

6.3.5 VGA Connector (VGA1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	VGAVCC	10	HOTPLUG
11	NC	12	DDCDAT
13	HSYNC	14	VSYNC
15	DDCCLK		

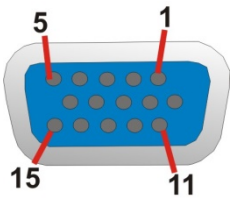


Table 6-28: VGA Connector (VGA1) Pinouts

Appendix

A

Regulatory Compliance

DECLARATION OF CONFORMITY

CE

This equipment is in conformity with the following EU directives:

- EMC Directive 2004/108/EC
- Low-Voltage Directive 2006/95/EC
- RoHS II Directive 2011/65/EU
- Medical Device Directive 93/42/EEC: EN 60601-1

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 обор□дване е в съответствие със съществените изисквания и другите приложими правила на Директива 1999/5/EC.
Česky [Czech] IEI Integration Corp tímto prohlašuje, že tento zařízení 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 o 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/ΕΚ.
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-Dirrettiva 1999/5/EC.
Magyar [Hungarian] IEI Integration Corp nyilatkozom, hogy a berendezés megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.
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.

Româna [Romanian] IEI Integration Corp declară că acest echipament este in conformitate cu cerinţele esenţiale şi 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.

FCC WARNING

This equipment complies with part 18 of the FCC Rules.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

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.

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-100-HM170.

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-100-HM170 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.

- ***Electric shocks can occur*** if the HTB-100-HM170 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-100-HM170.
- ***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-100-HM170 vendor.
- **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-100-HM170 may result in permanent damage to the HTB-100-HM170 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the HTB-100-HM170. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the HTB-100-HM170 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.

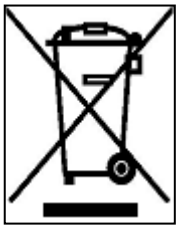
B.1.3 Product Disposal

CAUTION:

Risk of explosion if battery is replaced by an incorrect type. Only certified engineers should replace the on-board battery.

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 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-100-HM170)
- 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-100-HM170, please follow the guidelines below.

WARNING:

- For safety reasons, turn-off the power and unplug the medical embedded system before cleaning.
- If you dropped any material or liquid such as water onto the medical 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-100-HM170, please read the details below.

- To clean the HTB-100-HM170,
  - 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-100-HM170 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-100-HM170.

- ***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-100-HM170.
- ***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**.

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

Hazardous Materials Disclosure

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate 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.

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)
Housing	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O
Battery	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 SJ/T11363-2006 (now replaced by GB/T 26572-2011).

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 SJ/T11363-2006 (now replaced by GB/T 26572-2011).

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	O	O	O	O	O	O
印刷电路板	O	O	O	O	O	O
金属螺帽	O	O	O	O	O	O
电缆组装	O	O	O	O	O	O
电力供应组装	O	O	O	O	O	O
电池	O	O	O	O	O	O

O: 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/T 11363-2006 (现由 GB/T 26572-2011 取代) 标准规定的限量要求以下。

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/T 11363-2006 (现由 GB/T 26572-2011 取代) 标准规定的限量要求。