



MODEL:  
**TANK-870e-H110**

Fanless Embedded System with 6th/7th Generation Intel® Core™ processor,  
4GB DDR4 pre-installed memory, VGA/HDMI,  
Two Gigabit Ethernet, RS-232/422/485,  
RoHS Compliant

## User Manual



# Revision

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Date	Version	Changes
24 February 2018	1.01	Add Section 3.3: System Fan Installation (Optional) Update Section 1.2: Model Variations
15 August 2017	1.00	Initial release



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# Manual Conventions

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## 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.



## HOT SURFACE

This symbol indicates a hot surface that should not be touched without taking care.

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Chapter

1

# Introduction

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1.1 Overview



Figure 1-1: TANK-870e-H110

The TANK-870e-H110 is a fanless embedded system for wide range temperature environments. It is powered by the 6th/7th generation Intel® Core™ processor, uses the Intel® H110 chipset and supports two 260-pin DDR4 SDRAM SO-DIMM modules up to 32 GB (4GB memory preinstalled). The TANK-870e-H110 includes one VGA port, one HDMI, two GbE LAN ports, four USB 3.0 ports and two RS-232/422/485 connectors.

1.2 Model Variations

The model variations of the TANK-870e-H110 series are listed below.

Model No.	CPU	Expansion Slots
TANK-870e-H110-i5/4G/3A	Intel® Core i5-6500TE 2.3GHz (up to 3.3 GHz, Quad Core, TDP 35W)	1 x PCIe by 16 & 2 x PCI expansion
TANK-870e-H110-i5/4G/3B		1 x PCIe by 16 & 1 x PCIe by 4 & 1 x PCI expansion
TANK-870e-H110-i5/4G/3C		3 x PCI expansion
TANK-870e-H110-i7/4G/3A	Intel® Core i7-6700TE 2.4GHz (up to 3.4 GHz, Quad Core, TDP 35W)	1 x PCIe by 16 & 2 x PCI expansion
TANK-870e-H110-i7/4G/3B		1 x PCIe by 16 & 1 x PCIe by 4 & 1 x PCI expansion
TANK-870e-H110-i7/4G/3C		3 x PCI expansion

Table 1-1: TANK-870e-H110 Model Variations

## TANK-870e-H110 Embedded System

### 1.3 Features

The TANK-870e-H110 features are listed below:

- 6th/7th Gen Intel® Core™ processor platform with Intel® H110 chipset and DDR4 memory
- Support dual display VGA+HDMI
- On-board internal power connector for providing power to add-on cards
- Great flexibility for hardware expansion

### 1.4 Technical Specifications

The TANK-870e-H110 technical specifications are listed in **Table 1-2**.

Specifications	
Chassis	
Color	Dark silver purple + Silver
Dimensions (WxHxD) (mm)	132.6 x 255.2 x 190
System Fan	Fanless
Chassis Construction	Extruded aluminum alloy
Motherboard	
CPU	Intel 7th Gen Core CPU & Intel® Core™ i7-6700TE (2.4 GHz, quad-core, TDP=35W) Intel® Core™ i5-6500TE (2.3 GHz, quad-core, TDP=35W)
Chipset	Intel® H110
System Memory	2 x 260-pin DDR4 SO-DIMM, one 4 GB pre-installed (system max: 32GB)
Storage	
Hard Drive	1 x 2.5" SATA 6Gb/s HDD/SSD bay
I/O Interfaces	
USB 3.0	4
Ethernet	2 x RJ-45 PCIe GbE by RTL8111G controller



Specifications	
COM Port	2 x RS-232/422/485 (DB-9, w/2.5KV isolation protection)
Display	1 x VGA 1 x HDMI 1.4
Resolution	VGA: Up to 1920 x 1200@60Hz HDMI/DP: Up to 4096×2304@60Hz
Audio	1 x Line-out, 1 x Mic-in
Wireless	1 x 802.11 a/b/g/n/ac (optional)
Expansions	
PCI/PCIe	3A: 1 x PCIe x16 , 2 x PCI 3B: 1 x PCIe x16 , 1 x PCIe x4, 1 x PCI 3C: 3 x PCI
PCIe Mini	1 x Full-size PCIe Mini slot 1 x Full-size PCIe Mini slot (supports mSATA, colay with SATA)
Power	
Power Input	DC Jack: 9 V~36 V DC Terminal Block: 9 V~36 V DC
Power Consumption	19 V@3.44 A (Intel® Core™ i7-6700TE with 8 GB memory)
Internal Power Connector	5V@3A or 12V@3A
Reliability	
Mounting	Wall mount & Din Rail
Operating Temperature	-20°C ~ 60°C for i5-6500TE with air flow (SSD) -20°C ~ 50°C for i7-6700TE with air flow (SSD)
Operating Humidity	10% ~ 95%, non-condensing
Storage Temperature	-40°C ~ 85°C with air flow (SSD)
Storage Humidity	5% ~ 90%, non-condensing
Operating Shock	Half-sine wave shock 5G, 11ms, 100 shocks per axis
Non-Operating Shock	Half-sine wave shock 15G, 11ms, 100 shocks per axis
Operating Vibration	MIL-STD-810G 514.6C-1 (with SSD)



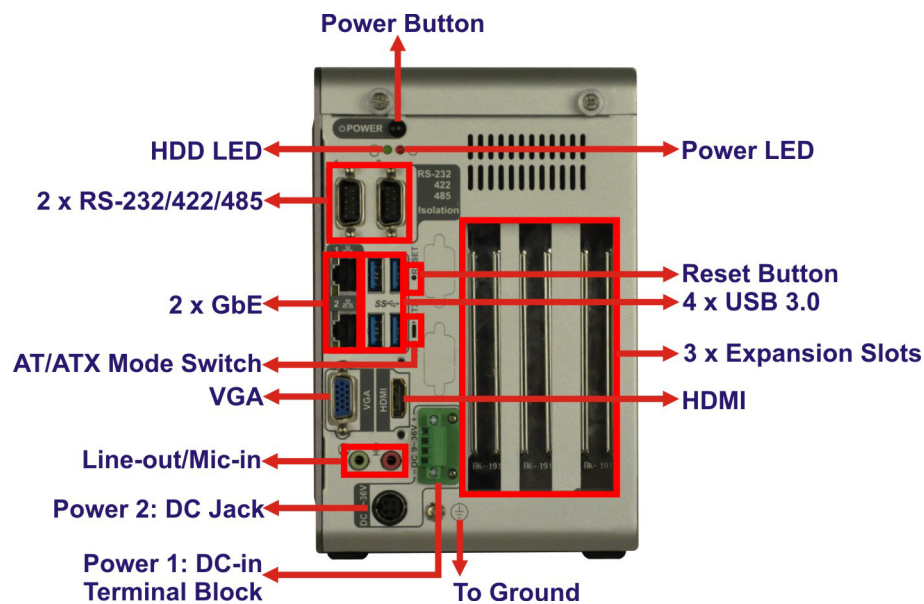
## TANK-870e-H110 Embedded System

Specifications	
Non-Operation Vibration	Half-sine mode IEC-60068-2-06
Weight (Net/Gross)	4.2 kg/6.3 kg
Safety/EMC	CE/FCC
OS	
Supported OS	Microsoft® Windows® 8 Embedded, Microsoft® Windows® Embedded Standard 7 E, Microsoft® Windows® 10 IoT Enterprise

**Table 1-2: Technical Specifications**

### 1.5 Front Panel

The front panel of the TANK-870e-H110 has the following features (**Figure 1-2**):



**Figure 1-2: TANK-870e-H110 Front Panel**

Connectors and buttons on the front panel include the following:

- 1 x HDD LED
- 1 x HDMI port
- 1 x Power LED

- 1 x 4-pin power DC jack for 9 V ~ 36 V power input
- 1 x Power terminal block for 9 V ~ 36 V power input
- 1 x Mic-in port (pink)
- 1 x Line-out port (green)
- 2 x RS-232/422/485 serial ports (DB-9, w/2.5KV isolation protection)
- 2 x Gigabit Ethernet ports (RJ-45)
- 4 x USB 3.0 ports
- 1 x Reset button
- 1 x Power button
- 1 x VGA port
- 1 x To Ground
- 3 x Expansion slots
- 1 x AT/ATX mode switch

## 1.6 Rear Panel

The rear panel of the TANK-870e-H110 has the following features (**Figure 1-2**):



**Figure 1-3: TANK-870e-H110 Rear Panel**



## TANK-870e-H110 Embedded System

### 1.7 Backplane Options

The backplane options of the TANK-870e-H110 are shown below.

#### 12V Power Input Connector

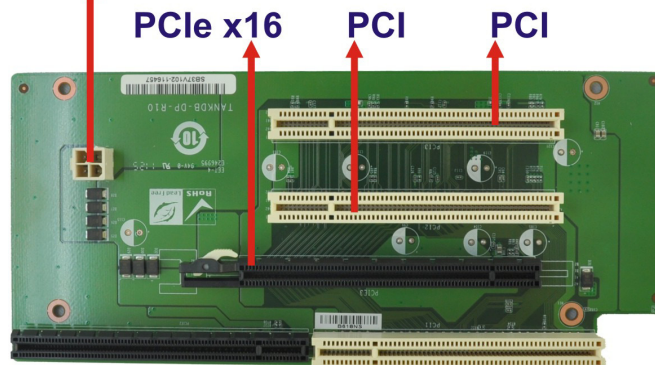


Figure 1-4: HPE-3S6

#### 12V Power Input Connector

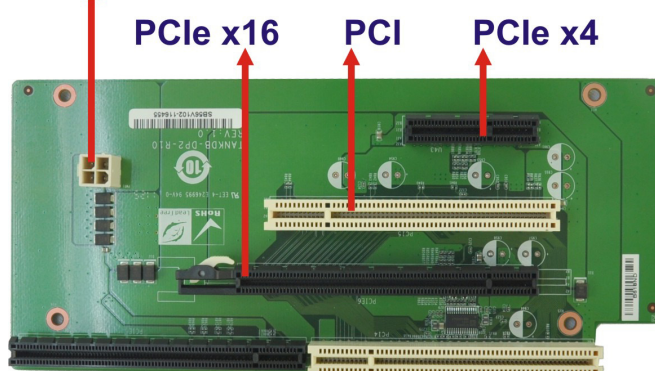


Figure 1-5: HPE-3S7

#### 12V Power Input Connector

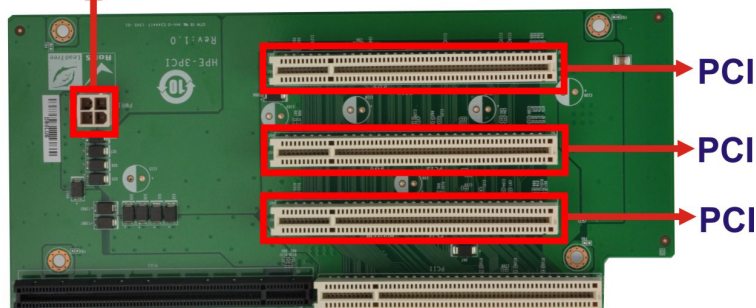


Figure 1-6: HPE-3PCI

The supported signals of the backplane slots are listed below.

Backplane	Slot	Signal
HPE-3S6 (for 3A model)	2 x PCI	PCI
	1 x PCIe x16	PCIe x16
HPE-3S7 (for 3B model)	1 x PCI	PCI
	1 x PCIe x4	PCIe x1
	1 x PCIe x16	PCIe x16
HPE-3PCI (for 3C model)	3 x PCI	PCI

Table 1-3: Supported Signals

The rated voltage and current of the backplanes are listed below.

Rated Voltage	Rated Current
+5 V	7 A
+12 V	3.75 A
-12 V	0.1 A
+3.3 V	8 A

Table 1-4: Rated Voltage and Current



**WARNING:**

The system default power is 120 W. The maximum total power of the backplane to support expansion cards is 45 W. The power of the selected expansion cards cannot exceed the max. power (45 W), otherwise, the system may fail.

## TANK-870e-H110 Embedded System

**NOTE:**

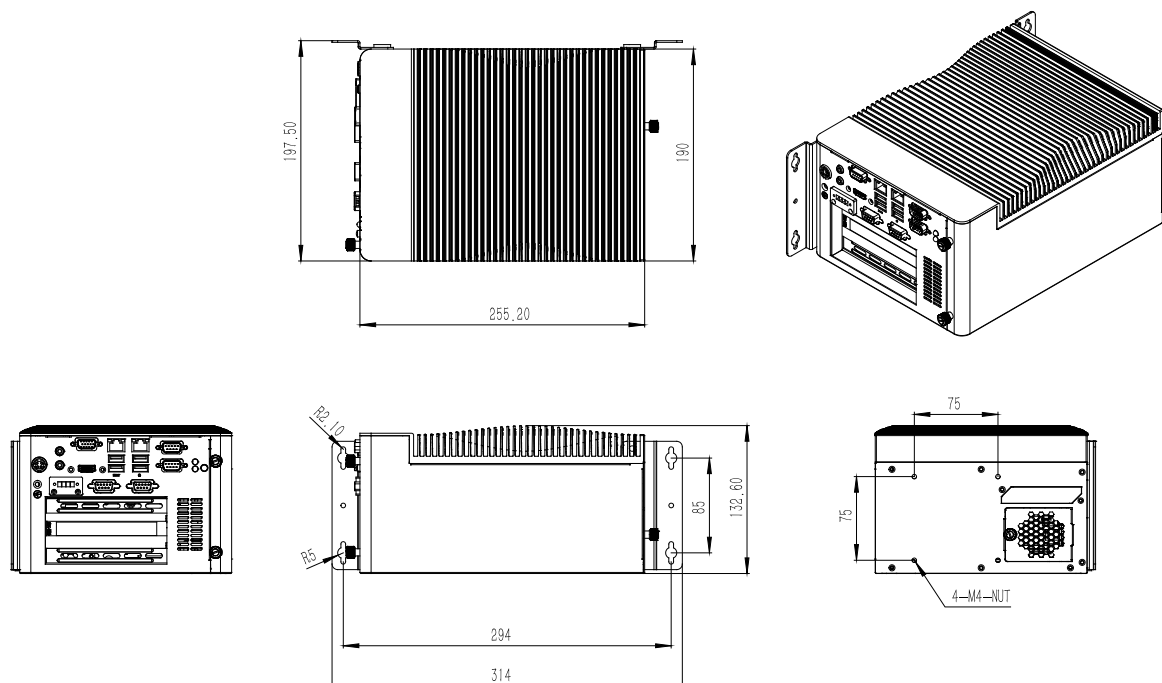
When using an expansion card with high power consumption, it is recommended to install an external power supply to the 12V power input connector on the backplane.

The maximum dimensions of the expansion card should be 190 mm in length and 110 mm in width.

The TANK-870-Q170 provides the most convenient 4-pin internal power connector for add-on card usage, adding more flexibility to the embedded system in industrial environment. The internal power connector supports 5V@3A or 12V@3A power supply.

## 1.8 Physical Dimensions

The physical dimensions of the TANK-870e-H110 are shown in **Figure 1-7**.



**Figure 1-7: TANK-870e-H110 Physical Dimensions (millimeters)**



Chapter

2

# Unpacking

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## 2.1 Anti-static Precautions



### WARNING:

Failure to take ESD precautions during installation may result in permanent damage to the TANK-870e-H110 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the TANK-870e-H110. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the TANK-870e-H110 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 TANK-870e-H110, place it on an anti-static pad. This reduces the possibility of ESD damaging the TANK-870e-H110.

## 2.2 Unpacking Precautions

When the TANK-870e-H110 is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 2.1**.
- Make sure the packing box is facing upwards so the TANK-870e-H110 does not fall out of the box.
- Make sure all the components shown in **Section 2.3** are present.







### 2.3 Unpacking Checklist



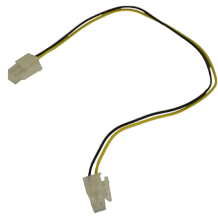


NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the TANK-870e-H110 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to [sales@ieiworld.com](mailto:sales@ieiworld.com).



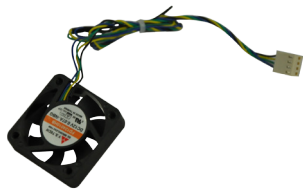
The TANK-870e-H110 is shipped with the following components:

Quantity	Item and Part Number	Image
Standard		
1	TANK-870e-H110	
2	Mounting Brackets	
1	Chassis Screw	
1	HDMI Security Holder	

## TANK-870e-H110 Embedded System

Quantity	Item and Part Number	Image
Standard		
1	Power Cable	
1	One Key Recovery CD	
1	User Manual and Driver CD	

The following table lists the optional items that can be purchased separately.

Optional	
European power cord (P/N: 32702-000400-200-RS)	
Power adapter, <i>FSP120-ABBN2, 9NA1205302, Active PFC, Vin:90~264VAC, 120W, plug=6.5mm, cable=1500mm, Erp (no load 0.15W), Vout:19VDC, 4-pin DIN with lock, CCL, RoHS</i> (P/N: 63040-010120-210-RS)	
Fan, +12V DC, 4-pin, 40 mm x 40 mm x10 mm, 6500RPM, RoHS (P/N: 19Z00-000630-00-RS)	



Optional	
OS Image with Windows® Embedded Standard 7 E 64-bit for TANK-870e-H110 Series, with DVD-ROM, RoHS (P/N: TANK-870e-H110-WES7E64-R10)	
OS Image with Windows Embedded Standard 10 E High End 64-bit for TANK-870e-H110-i7 Series, with DVD-ROM, RoHS (P/N: TANK-870e-H110-W10E64-H-R10)	
OS Image with Windows Embedded Standard 10 E Value 64-bit for TANK-870e-H110-i5 Series, with DVD-ROM, RoHS (P/N: TANK-870e-H110-W10E64-V-R10)	



Chapter

3

# Installation

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### 3.1 Installation Precautions

During installation, be aware of the precautions below:

- **Read the user manual:** The user manual provides a complete description of the TANK-870e-H110, installation instructions and configuration options.
- **DANGER! Disconnect Power:** Power to the TANK-870e-H110 must be disconnected during the installation process, or before any attempt is made to access the rear panel. Electric shock and personal injury might occur if the rear panel of the TANK-870e-H110 is opened while the power cord is still connected to an electrical outlet.
- **Qualified Personnel:** The TANK-870e-H110 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 TANK-870e-H110. The TANK-870e-H110's cooling vents must not be obstructed by any objects. Blocking the vents can cause overheating of the TANK-870e-H110. Leave at least 5 cm of clearance around the TANK-870e-H110 to prevent overheating.
- **Grounding:** The TANK-870e-H110 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 TANK-870e-H110.

### 3.2 Hard Disk Drive (HDD) Installation

To install the hard drive, please follow the steps below:

- Step 1:** Loosen the two thumbscrews on the front panel, slide the cover outward, and then lift the cover up gently (**Figure 3-1**).

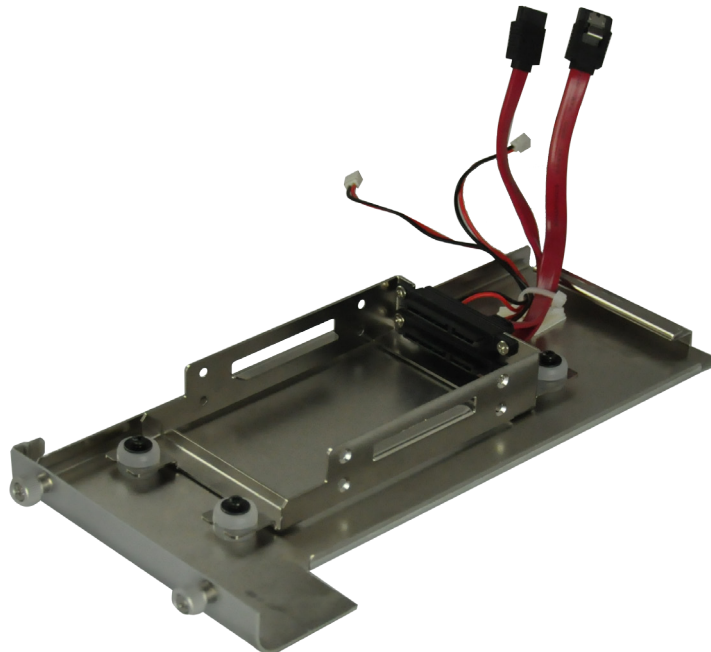


## TANK-870e-H110 Embedded System



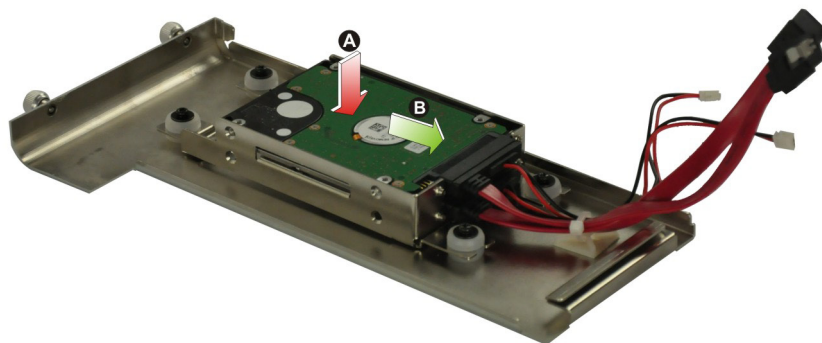
**Figure 3-1: Unscrew the Cover**

**Step 2:** Unplug the SATA signal and power cables connected to the TANK-870e-H110, and then put the cover on a flat surface (**Figure 3-2**).



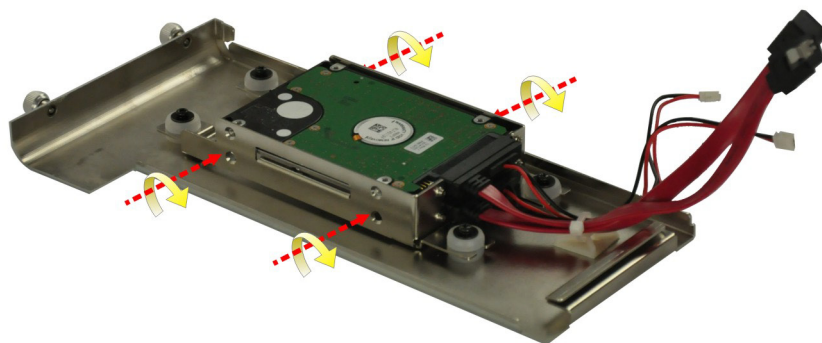
**Figure 3-2: Remove the Cover from TANK-870e-H110**

**Step 3:** Attach the HDD to the HDD bracket, and then slide the HDD to connect with the SATA connector (**Figure 3-3**).



**Figure 3-3: HDD Installation**

**Step 4:** Secure the HDD with the HDD bracket by four retention screws (**Figure 3-4**).



**Figure 3-4: HDD Retention Screws**

**Step 5:** Reconnect the SATA signal and power cables to the TANK-870e-H110.

**Step 6:** Reinstall the cover.

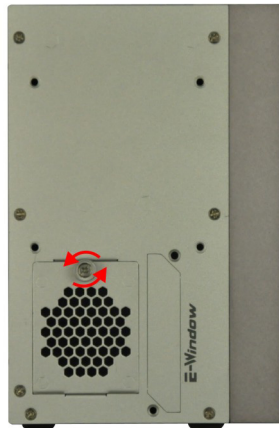
### 3.3 System Fan Installation (Optional)

To install the optional system fan, please follow the steps below:

**Step 1:** Loosen the thumbscrew on the rear panel and remove the fan bracket cover from the system (**Figure 3-5**).

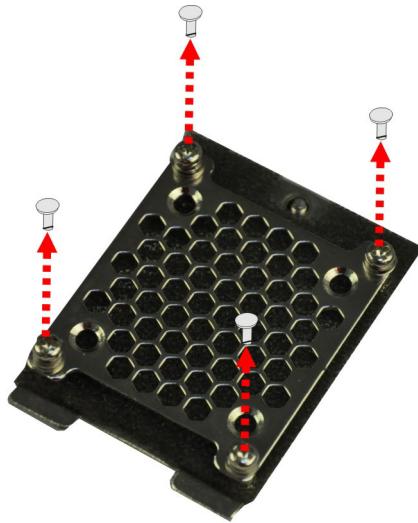


## TANK-870e-H110 Embedded System



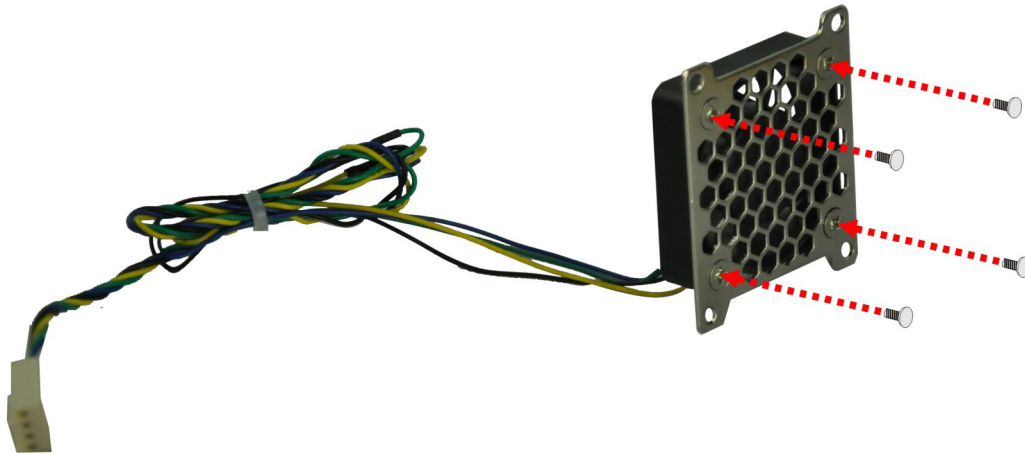
**Figure 3-5: Remove the Fan Bracket Cover from the System**

**Step 2:** Unscrew the four retention screws that secure the fan bracket to the cover.  
(Figure 3-6). Remove the fan bracket from the cover.



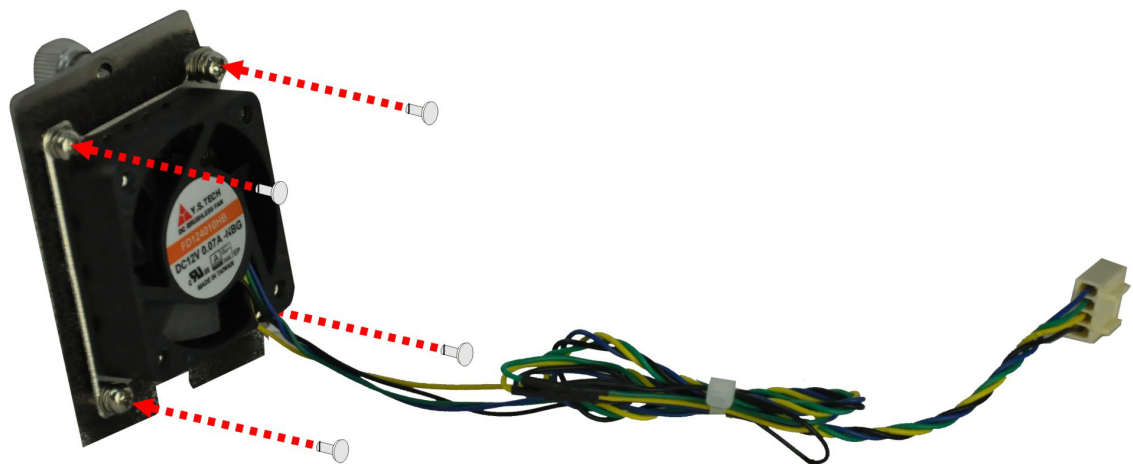
**Figure 3-6: Remove the Fan Bracket from the Cover**

**Step 3:** Attach the system fan to the fan bracket and secure it by four retention screws  
(Figure 3-7).



**Figure 3-7: Secure the System Fan to the Fan Bracket**

**Step 4:** Reinstall the fan bracket with the system fan installed to the cover and secure it by four retention screws (**Figure 3-8**).



**Figure 3-8: Reinstall the Fan Bracket to the Cover**

**Step 5:** Loosen the two thumbscrews on the front panel, slide the cover outward, and then lift the cover up gently (**Figure 3-1**).

**Step 6:** Connect the system fan cable to the **CPU\_FAN1** connector on the motherboard of TANK-870e-H110 (**Figure 4-1**).



## TANK-870e-H110 Embedded System

**Step 7:** Reinstall the fan bracket cover to the system and tighten the thumbscrew on the rear panel.

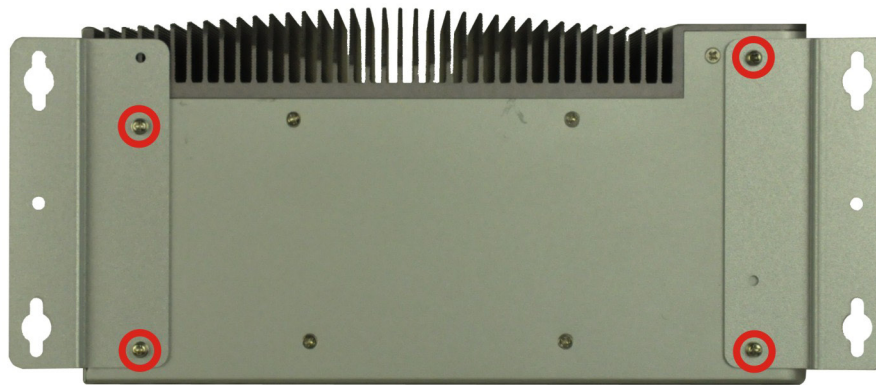
### 3.4 Mounting the System with Mounting Brackets

To mount the embedded system onto a wall or some other surface using the two mounting brackets, please follow the steps below.

**Step 1:** Turn the embedded system to the left side panel.

**Step 2:** Align the two retention screw holes in each bracket with the corresponding retention screw holes on the bottom surface or the left side panel (**Figure 3-9**).

#### Left Side Panel



**Figure 3-9: Mounting Bracket Retention Screws**

**Step 3:** Secure the brackets to the system by inserting two retention screws into each bracket (**Figure 3-9**).

**Step 4:** Drill holes in the intended installation surface.

**Step 5:** Align the mounting holes in the sides of the mounting brackets with the predrilled holes in the mounting surface.

**Step 6:** Insert four retention screws, two in each bracket, to secure the system to the wall.



## 3.5 External Peripheral Interface Connectors

Detailed descriptions of the connectors can be found in the subsections below.

### 3.5.1 AT/ATX Power Mode Selection

The TANK-870e-H110 supports AT and ATX power modes. The setting can be made through the AT/ATX power mode switch on the external peripheral interface panel as shown below.

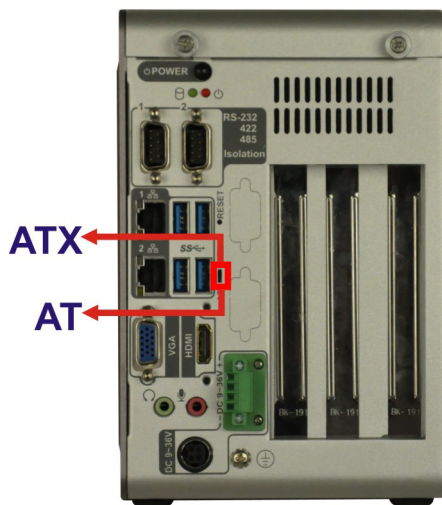


Figure 3-10: AT/ATX Power Mode Switch

### 3.5.2 Audio Connector

The audio jacks connect to external audio devices.

- **Line Out port (Green):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.

## TANK-870e-H110 Embedded System

**Figure 3-11: Audio Connector****3.5.3 HDMI Display Device Connection**

The TANK-870e-H110 has one HDMI connector. The HDMI connector transmits a digital signal to compatible HDMI display devices such as a TV or computer screen.

**3.5.4 LAN Connectors**

The TANK-870e-H110 has two RJ-45 LAN connectors. The LAN connectors allow connection to an external network.

**Figure 3-12: RJ-45 Ethernet Connector**

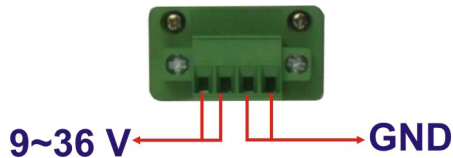
The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 3-1**.

Activity/Link LED		Speed LED	
STATUS	DESCRIPTION	STATUS	DESCRIPTION
Off	No link	Off	10 Mbps connection
Yellow	Linked	Green	100 Mbps connection
Blinking	TX/RX activity	Orange	1 Gbps connection

**Table 3-1: RJ-45 Ethernet Connector LEDs**

### 3.5.5 Power Input, 4-pin Terminal Block

The power connector connects the leads of a 9 V~36 V DC power supply into the terminal block. Make sure that the power and ground wires are attached to the correct sockets of the connector.



**Figure 3-13: 4-pin Terminal Block**

### 3.5.6 Power Input, 4-pin DIN Connector

The power connector connects to the 9 V~36 V DC power adapter.



**Figure 3-14: Power Input Connector**

### 3.5.7 DB-9 RS-232/422/485 Serial Port Connectors

The TANK-870e-H110 has two DB-9 RS-232/422/485 connectors.

### 3.5.8 USB Connectors

The TANK-870e-H110 has four USB 3.0 connectors. The USB ports are for connecting USB peripheral devices to the system.

### 3.5.9 VGA Connector

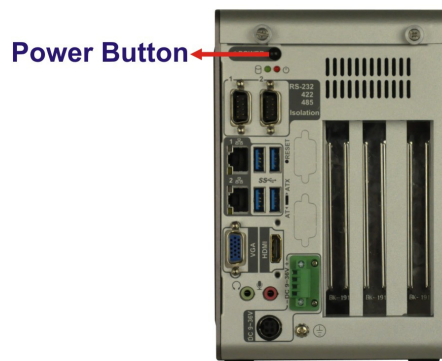
The TANK-870e-H110 has one VGA connector. The VGA connector connects to a monitor that accepts VGA video input.

### 3.6 Powering On/Off the System

**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.

- **Power on** the system: press the power button for 2 seconds
- **Power off** the system: press the power button for 5 seconds

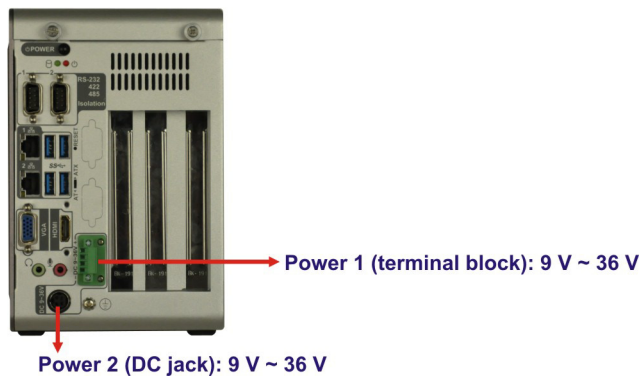


**Figure 3-15: Power Button**

### 3.7 Power

There are two power connectors on the rear panel. Power 1 connector is a DIN connector that can directly connect to a power adapter. Power 2 connector is a 4-pin terminal block. The supported power input voltages are:

- **Power 1 (terminal block):** 9 V ~ 36 V
- **Power 2 (DC jack):** 9 V ~ 36 V



**Figure 3-16: Power Connectors**



**WARNING:**

The TANK-870e-H110 only support single power input and cannot be simultaneously connected to two power sources.



Chapter

4

# System Motherboard

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## 4.1 Overview

This chapter details all the jumpers and connectors of the system motherboard.

### 4.1.1 Layout

The figures below show all the connectors and jumpers of the system motherboard. The Pin 1 locations of the on-board connectors are also indicated in the diagram below.

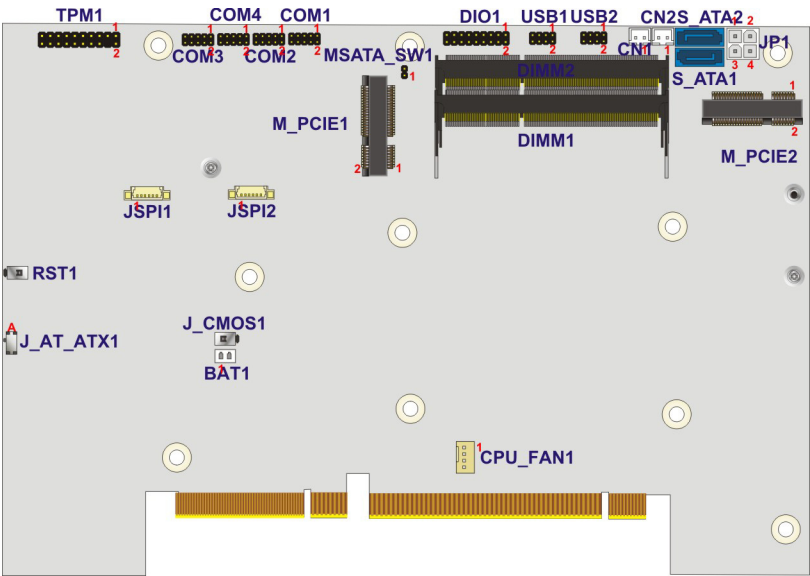


Figure 4-1: System Motherboard (Front)

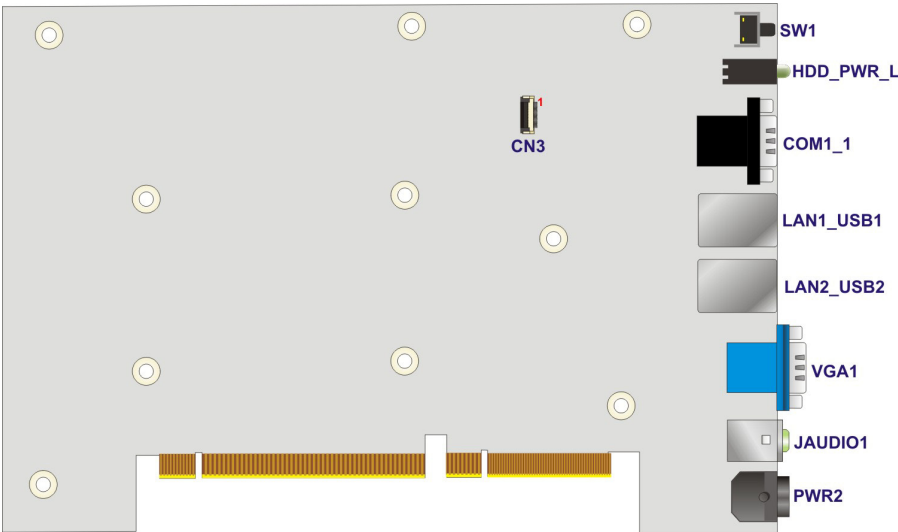


Figure 4-2: System Motherboard (Rear)

## 4.2 Internal Peripheral Connectors

The table below shows a list of the internal peripheral interface connectors on the system motherboard. Pinouts of these connectors can be found in the following sections.

Connector	Type	Label
Backplane power connector	4-pin molex	JP1
Battery connector	2-pin wafer	BAT1
BIOS programming connector	6-pin wafer	JSPI1
CPU fan connector	4-pin wafer	CPU_FAN1
Digital I/O connector	10-pin header	DIO1
DDR4 SO-DIMM slots	DDR4 SO-DIMM slot	DIMM1, DIMM2
EC debug connector	20-pin FPC connector	CN3
EC programming connector	6-pin wafer	JSPI2
PCIe mini Card	Full size	MPCIE1
PCIe mini Card	Full size	MPCIE2
RS-232 serial port connectors	10-pin header	COM1, COM2 COM3, COM4
SATA 6Gb/s drive connectors	7-pin SATA connector	S_ATA1, S_ATA2
SATA power connectors	2-pin wafer	CN1, CN2
TPM connector	20-pin header	TPM1
USB 2.0 connectors	8-pin header	USB1, USB2

**Table 4-1: Peripheral Interface Connectors**

### 4.2.1 Backplane Power Connector (JP1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	+12V	4	+5V

**Table 4-2: Backplane Power Connector Pinouts (JP1)**



4.2.2 Battery Connector (BAT1)

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

Table 4-3: Battery Connector Pinouts (BAT1)

4.2.3 BIOS Programming Connector (JSP11)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+V3.3M_SPI_CON	2	SPI_CS#0_CN
3	SPI_SO_SW	4	SPI_CLK_SW
5	SPI_SI_SW	6	GND

Table 4-4: BIOS Programming Connector Pinouts (JSP11)

4.2.4 CPU Fan Connector (CPU\_FAN1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+V12S
3	FANIO	4	FANOUT

Table 4-5: CPU Fan Connector Pinouts (CPU\_FAN1)

4.2.5 DIO connector (DIO1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC5
3	DIN7	4	DOUT7
5	DIN6	6	DOUT6
7	DIN5	8	DOUT5
9	DIN4	10	DOUT4
11	DIN3	12	DOUT3
13	DIN2	14	DOUT2
15	DIN1	16	DOUT1
17	DIN0	18	DOUT0

Table 4-6: DIO connector Pinouts (DIO1)



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## 4.2.6 EC Debug Connector (CN3)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	KSI0	11	KSO9
2	KSO0	12	KSO10
3	KSO1	13	KSO12
4	KSO2	14	KSI1
5	KSO3	15	KSO11
6	KSO4	16	KSI2
7	KSO5	17	KSI3
8	KSO6	18	GND
9	KSO7	19	GND
10	KSO8	20	GND

**Table 4-7: EC Debug Connector Pinouts (CN3)**

## 4.2.7 EC Programming Connector (JSPI2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+V3.3M_SPI_CON_EC	2	SPI_CS#0_CN_EC
3	SPI_SO_SW_EC	4	SPI_CLK_SW_EC
5	SPI_SI_SW_EC	6	GND

**Table 4-8: EC Programming Connector Pinouts (JSPI2)**

## 4.2.8 RS-232 Serial Port Connectors (COM1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD6	2	DSR6
3	RX6	4	RTS6
5	TX6	6	CTS6
7	DTR6	8	RI6
9	GND	10	GND

**Table 4-9: RS-232 Serial Port Connectors Pinouts (COM1)**





4.2.9 RS-232 Serial Port Connectors (COM2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD2	2	DSR2
3	RX2	4	RTS2
5	TX2	6	CTS2
7	DTR2	8	RI2
9	GND	10	GND

Table 4-10: RS-232 Serial Port Connectors Pinouts (COM2)

4.2.10 RS-232 Serial Port Connectors (COM3)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD3	2	DSR3
3	RX3	4	RTS3
5	TX3	6	CTS3
7	DTR3	8	RI3
9	GND	10	GND

Table 4-11: RS-232 Serial Port Connectors Pinouts (COM3)

4.2.11 RS-232 Serial Port Connectors (COM4)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD4	2	DSR4
3	RX4	4	RTS4
5	TX4	6	CTS4
7	DTR4	8	RI4
9	GND	10	GND

Table 4-12: RS-232 Serial Port Connectors Pinouts (COM4)



## TANK-870e-H110 Embedded System

## 4.2.12 SATA Power Connectors (CN1, CN2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+V5S	2	GND

**Table 4-13: SATA Power Connectors Pinouts (CN1, CN2)**

## 4.2.13 TPM Connector (TPM1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	CLK	2	GND
3	LPC_FRAME#	4	NC
5	PLT_GATED_RST#	6	VCC5
7	LPC_AD3	8	LPC_AD2
9	VCC3	10	LPC_AD1
11	LPC_AD0	12	GND
13	SMB_CLK	14	SMB_DATA
15	V3P3A	16	INT_SERIRQ
17	GND	18	PM_CLKRUN#
19	LPCPD_N	20	TPM_DRQ#0

**Table 4-14: TPM Connector Pinouts (TPM1)**

## 4.2.14 USB 2.0 connectors (USB1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC_USB	2	GND
3	-DATA5	4	+DATA6
5	+DATA5	6	-DATA6
7	GND	8	VCC_USB

**Table 4-15: USB 2.0 connectors Pinouts (USB1)**

## 4.2.15 USB 2.0 connectors (USB2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC_USB	2	GND
3	-DATA7	4	+DATA8



5	+DATA7	6	-DATA8
7	GND	8	VCC_USB

Table 4-16: USB 2.0 connectors Pinouts (USB2)

4.3 External Interface Panel Connectors

The table below shows a list of the external interface panel connectors on the system motherboard. Pinouts of these connectors can be found in the following sections.

Connector	Type	Label
Audio jack (mic, line-out)	Audio jack	JAUDIO1
Ethernet and USB3.0 connectors	RJ-45, USB 3.0 port	LAN1_USB1, LAN2_USB2
HDMI connector	Type A	HDMI1
Power connector	DC jack	PWR2
Power connector	4-pin terminal block	PWR1
RS-232 serial port connectors	Dual DB-9 w/isolation	COM1_1
VGA connector	DB-15	VGA1

Table 4-17: Rear Panel Connectors

4.3.1 Audio Jack (JAUDIO1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	LMIC1-CONN-L
3	GND	4	MIC1-JD
5	LMIC1-CONN-R	22	LFRONT-L
23	GND	24	FRONT-JD
25	LFRONT-R		

Table 4-18: Audio Jack Pinouts (JAUDIO1)

4.3.2 Ethernet and USB 3.0 Connectors (LAN1\_USB1)

PIN	DESCRIPTION	PIN	DESCRIPTION
U1	USBV0L	U10	USBV0L



## TANK-870e-H110 Embedded System

PIN	DESCRIPTION	PIN	DESCRIPTION
U2	DATA1_N	U11	DATA2_N
U3	DATA1_P	U12	DATA2_P
U4	GND	U13	GND
U5	USB3_RX1_N	U14	USB3_RX2_N
U6	USB3_RX1_P	U15	USB3_RX2_P
U7	GND	U16	GND
U8	USB3_TX1_N_R	U17	USB3_TX2_N_R
U9	USB3_TX1_P_R	U18	USB3_TX2_P_R

Table 4-19: USB 3.0 Port Pinouts (USB1)

PIN	DESCRIPTION	PIN	DESCRIPTION
R1	GND	R2	MDI0+
R3	MDI0-	R4	MDI1+
R5	MDI1-	R6	MDI2+
R7	MDI2-	R8	MDI3+
R9	MDI3-	R10	GND
L1	LINK100	L2	LINK1000
L3	LED_LNK#_ACT_LAN1	L4	ILAN1_LINK_PWR

Table 4-20: LAN Pinouts (LAN1)

## 4.3.3 Ethernet and USB 3.0 Connectors (LAN2\_USB2)

PIN	DESCRIPTION	PIN	DESCRIPTION
U1	USBV2L	U10	USBV2L
U2	DATA4_N	U11	DATA3_N
U3	DATA4_P	U12	DATA3_P
U4	GND	U13	GND
U5	USB3_RX4_N	U14	USB3_RX3_N
U6	USB3_RX4_P	U15	USB3_RX3_P
U7	GND	U16	GND
U8	USB3_TX4_N_R	U17	USB3_TX3_N_R
U9	USB3_TX4_P_R	U18	USB3_TX3_P_R

Table 4-21: USB 3.0 Port Pinouts (USB2)

PIN	DESCRIPTION	PIN	DESCRIPTION
R1	GND	R2	MDI0+_LAN2
R3	MDI0-_LAN2	R4	MDI1+_LAN2
R5	MDI1-_LAN2	R6	MDI2+_LAN2
R7	MDI2-_LAN2	R8	MDI3+_LAN2
R9	MDI3-_LAN2	R10	GND
L1	LINK100_LAN2	L2	LINK1000_LAN2
L3	LED_LNK#_ACT_LAN2	L4	LAN2_LINK_PWR

**Table 4-22: LAN Pinouts (LAN2)**

4.3.4 HDMI Connector (HDMI1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDMI_DATA2-1_L	2	GND
3	HDMI_DATA2#-1_L	4	HDMI_DATA1-1_L
5	GND	6	HDMI_DATA1#-1_L
7	HDMI_DATA0-1_L	8	GND
9	HDMI_DATA0#-1_L	10	HDMI_CLK-1_L
11	GND	12	HDMI_CLK#-1_L
13	NC	14	NC
15	HDMI_SCL-1	16	HDMI_SDA-1
17	GND	18	+V5S
19	HDMI_HPD-1		

**Table 4-23: HDMI Connector Pinouts (HDMI1)**

4.3.5 Power Connector (PWR2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DC_IN	2	GND
3	DC_IN	4	GND
5	GND		

**Table 4-24: Power Connector Pinouts (PWR2)**



## 4.3.6 Power Connector (PWR1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	DC_IN	4	DC_IN

**Table 4-25: Power Connector Pinouts (PWR1)**

## 4.3.7 RS-232/422/485 Serial Port Connector (COM1\_1)

PIN NO.	RS-232	RS-422	RS-485
1(10)	DCD	TXD422#	TXD485#
2(11)	RX	TXD422+	TXD485+
3(12)	TX	RXD422+	--
4(13)	DTR	RXD422#	--
5(14)	GND	--	--
6(15)	DSR	--	--
7(16)	RTS	--	--
8(17)	CTS	--	--
9(18)	RI	--	--

**Table 4-26: RS-232/422/485 Serial Port Connector Pinout (COM5\_6)**

## 4.3.8 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	CRT_VCC	10	CRT_PLUG#
11	NC	12	5VDDCDA
13	5HSYNC	14	5VSYNC
15	5VDDCLK		

**Table 4-27: VGA Connector Pinouts (VGA1)**

### 4.4 Jumper Settings

The jumpers on the system motherboard are listed in **Table 4-28**.

Connector	Type	Label
AT/ATX Mode Select	switch	J_AT_ATX1
Clear CMOS setup	button	J_CMOS1
M-SATA Switch Auto-Detect	2-pin header	MSATA_SW1
Power Switch Button	button	SW1
System Reset Button	button	RST1

**Table 4-28: Jumper**

#### 4.4.1 AT/ATX Mode Select (J\_AT\_ATX1)

Pin	Description
A-B	ATX mode (Default)
B-C	AT mode

**Table 4-29: AT/ATX Mode Select Jumper Settings (J\_AT\_ATX1)**

#### 4.4.2 Clear CMOS Setup (J\_CMOS1)

Pin	Description
Open	Keep CMOS Setup (Default)
Press	Clear CMOS Setup

**Table 4-30: Clear CMOS Setup Jumper Settings (J\_CMOS1)**

#### 4.4.3 M-SATA Switch Auto-Detect (MSATA\_SW1)

Pin	Description
Open	Auto Detect
Short	M-SATA select

**Table 4-31: M-SATA Switch Auto-Detect Jumper Settings (MSATA\_SW1)**

## TANK-870e-H110 Embedded System

## 4.4.4 Power Switch Button (SW1)

Pin	Description
Open	Normal Operation (Default)
Press	Power on

**Table 4-32: Power Switch Button Jumper Settings (SW1)**

## 4.4.5 System Reset Button (RST1)

Pin	Description
Open	Normal Operation (Default)
Press	System Reset

**Table 4-33: System Reset Button Jumper Settings (RST1)**

Chapter

5

# BIOS

---

## 5.1 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.

---

### 5.1.1 Starting Setup

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

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

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

### 5.1.2 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 previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+	Increase the numeric value or make changes



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

**Table 5-1: BIOS Navigation Keys**

### 5.1.3 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.

### 5.1.4 Unable to Reboot after Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in Chapter 2.

### 5.1.5 BIOS Menu Bar

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

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Boot – Changes the system boot configuration.
- Security – Sets User and Supervisor Passwords.

## TANK-870e-H110 Embedded System

- 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.



## 5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.

The **Main** menu gives an overview of the basic system information.

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.

MainAdvancedChipsetSecurityBootSave & Exit

BIOS Information

BIOS VendorAmerican Megatrends

Core Version5.12

CompliancyUEFI 2.6; PI 1.4

Project VersionSEU6AR31.bin

Build Date06/07/2017 14:31:23

Access LevelAdministrator

iWDD VendoriEi

iWDD VersionSEU6ER10.bin

IEI QTS/IPC StatusIPC

Board Information

Board IDSAG7

Fab ID V1.02

LAN PHY RevisionN/A

Processor Information

NameSkylake DT

TypeIntel(R) Core(TM)  
i5-6500TE CPU @ 2.30GHz

Speed2300 MHz

ID0x506E3

SteppingR0/S0/N0

PackageNot Implemented Yet

Number of Processors4Core(s) / 4Thread(s)

Microcode RevisionBA

GT Info GT2 (0x1912)

IGFX VBIOS Version1049

IGFX GOP VersionN/A

Memory RC Version2.0.0.6

Total Memory4096 MB

Memory Frequency2133 MHz

PCH Information

NameSKL PCH-H

PCH SKU H110

SteppingD1

Hsio Revision52

PackageNot Implemented Yet

TXT Capability of Platform/PCHSupported

Production TypeProduction

Dual Output Fast Read supportNot supported

Read ID/Status Clock Freq17 MHz

Write and Erase Clock Freq48 MHz

Fast Read Clock Freq48 MHz

Fast Read supportSupported

Read Clock Freq17 MHz

Number of Components1 Component

SPI Component 0 Density16 MHz

ME FW Version11.7.0.1261

ME Firmware SKUCorporate SKU

System Date[Mon 11/28/2016]

System Time[15:43:27]

Set the Date. Use Tab to switch between Data elements.

-----

←→: 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.



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**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.

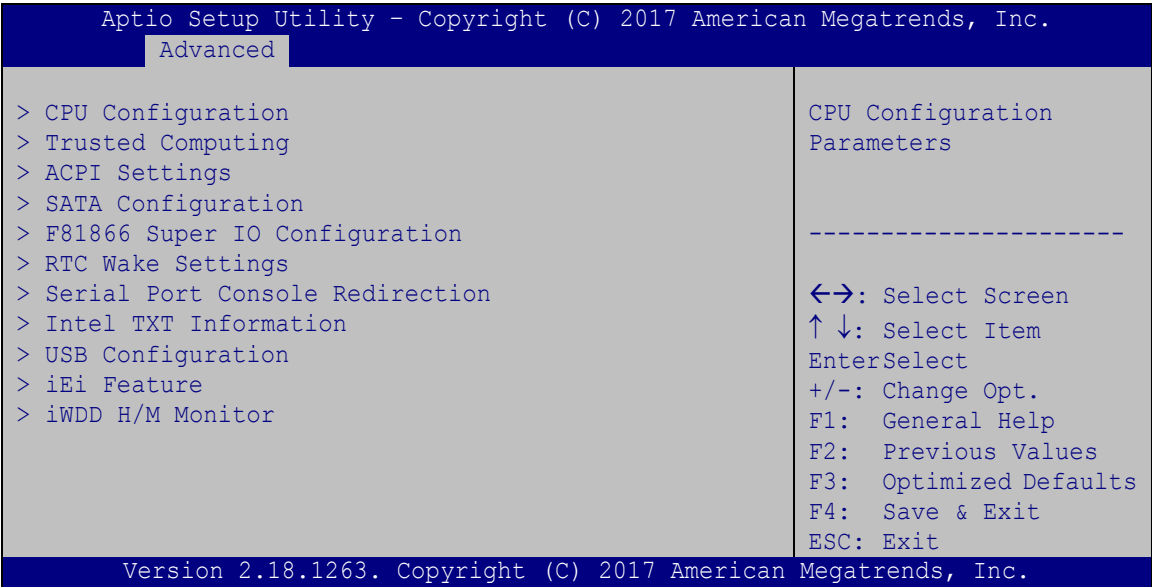
### 5.3 Advanced

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

**WARNING!**

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

---



**BIOS Menu 2: Advanced**

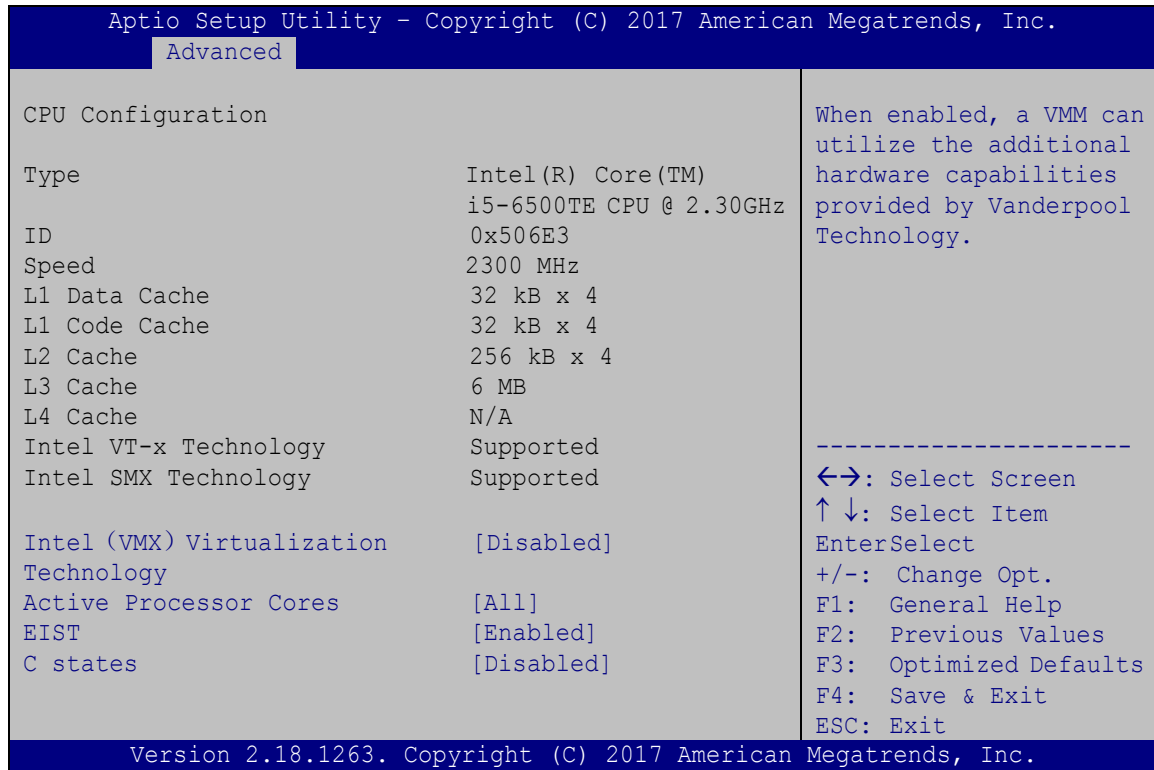
**5.3.1 CPU Configuration**

Use the **CPU Configuration** menu (**BIOS Menu 3**) to enter the **CPU Information** submenu or enable Intel Virtualization Technology.





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**BIOS Menu 3: CPU Configuration**

The CPU Configuration menu (**BIOS Menu 3**) lists the following CPU details:

- Type: Lists the brand name of the CPU being used
- ID: Lists the CPU ID.
- Speed: Lists the CPU processing speed.
- L1 Data Cache: Lists the amount of data storage space on the L1 cache.
- L1 Instruction Cache: Lists the amount of instruction 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.
- L4 Cache: Lists the amount of storage space on the L4 cache.
- VMX: Indicates if Intel Virtualization Technology is supported by the CPU.
- SMX/TXT: Indicates if Intel SMX/TXT Technology is supported by the CPU.



➔ Intel (VMX) Virtualization Technology [Disabled]

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

- |   |                 |                |   |
|---|-----------------|----------------|---|
| ➔ | <b>Disabled</b> | <b>DEFAULT</b> | Disables Intel Virtualization Technology. |
| ➔ | <b>Enabled</b>  |                | Enables Intel Virtualization Technology.  |

➔ Active Processor Cores [All]

Use the **Active Processor Cores** option to configure the number of the active processor cores.

- |   |            |                |                                     |
|---|------------|----------------|-------------------------------------|
| ➔ | <b>All</b> | <b>DEFAULT</b> | Active all of the processor cores   |
| ➔ | <b>1</b>   |                | Active one of the processor cores   |
| ➔ | <b>2</b>   |                | Active two of the processor cores   |
| ➔ | <b>3</b>   |                | Active three of the processor cores |

➔ EIST [Enabled]

Use the **EIST** option to enable or disable the Intel Speed Step Technology.

- |   |                 |                |   |
|---|-----------------|----------------|---|
| ➔ | <b>Disabled</b> |                | Disables the Intel Speed Step Technology. |
| ➔ | <b>Enabled</b>  | <b>DEFAULT</b> | Enables the Intel Speed Step Technology.  |

➔ C states [Disabled]

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

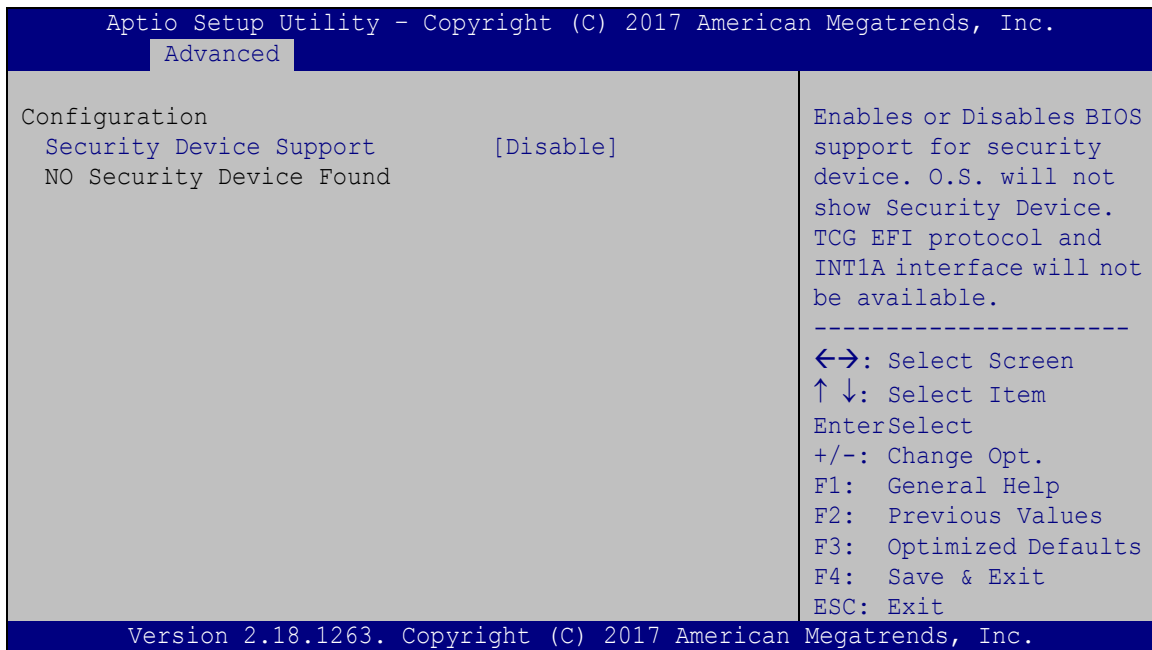
- |   |                 |                |                    |
|---|-----------------|----------------|--------------------|
| ➔ | <b>Disabled</b> | <b>DEFAULT</b> | Disables C states. |
| ➔ | <b>Enabled</b>  |                | Enables C states.  |



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## 5.3.2 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 4**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).

**BIOS Menu 4: Trusted Computing**

## ➔ Security Device Support [Disable]

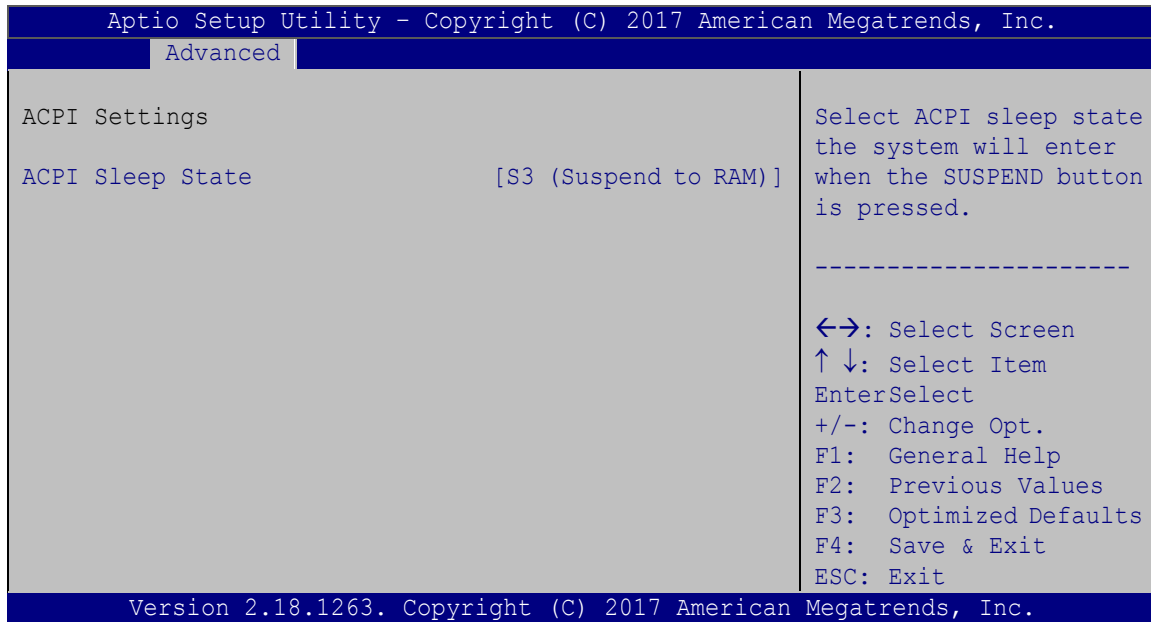
Use the **Security Device Support** option to configure support for the security device.

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

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

## 5.3.3 ACPI Settings

The **ACPI Settings** menu (**BIOS Menu 5**) configures the Advanced Configuration and Power Interface (ACPI) options.



## BIOS Menu 5: ACPI Configuration

### → ACPI Sleep State [S3 (Suspend to RAM)]

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

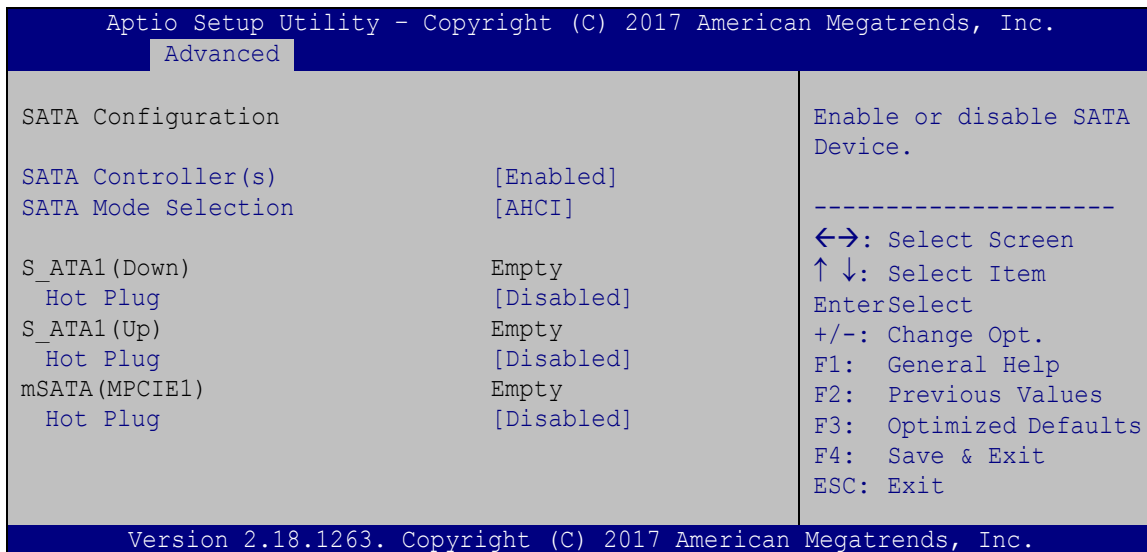
### → **S3 (Suspend to RAM)**

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.

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## 5.3.4 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 6**) to change and/or set the configuration of the SATA devices installed in the system.

**BIOS Menu 6: SATA Configuration**

## ➔ SATA Controller(s) [Enabled]

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

- ➔ **Enabled**      **DEFAULT**      Enables the on-board SATA controller.
- ➔ **Disabled**                      Disables the on-board SATA controller.

## ➔ SATA Mode Selection [AHCI]

Use the **SATA Selection Mode** option to configure SATA devices.

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

## ➔ Hot Plug [Disabled]

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

- ➔ **Enabled**                      Enables hot plug function.

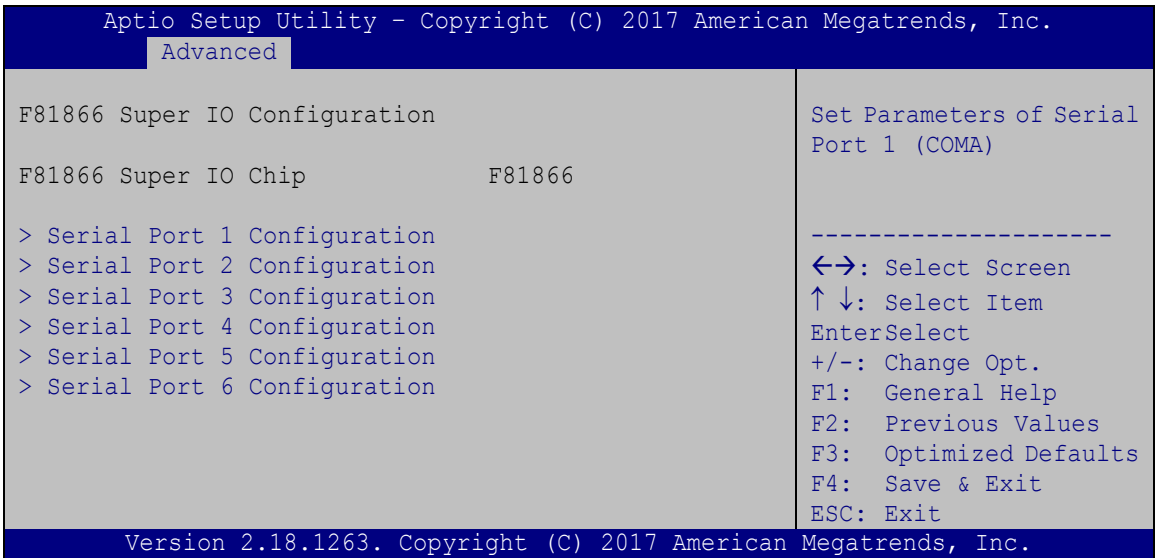




➔ Disabled      DEFAULT      Disables hot plug function.

### 5.3.5 F81866 Super IO Configuration

Use the **F81866 Super IO Configuration** menu (**BIOS Menu 7**) to set or change the configurations for the serial ports.



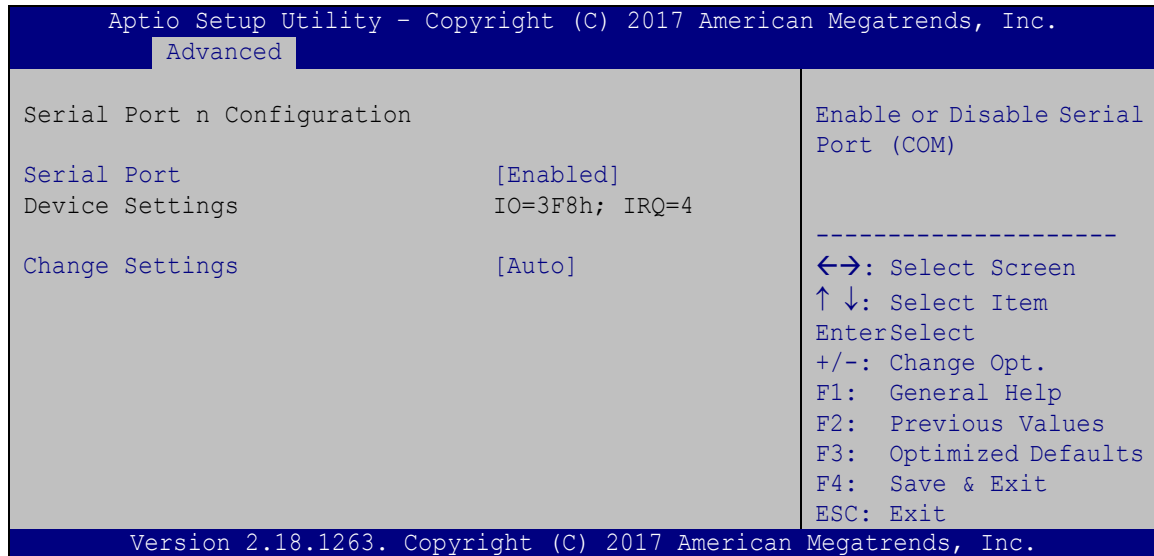
**BIOS Menu 7: F81866 Super IO Configuration**



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## 5.3.5.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 8**) to configure the serial port n.

**BIOS Menu 8: Serial Port n Configuration Menu**

## 5.3.5.1.1 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, 5, 6, 7, 9, 10, 11,12 | Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |
| ➔ IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12 | Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |
| ➔ IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12 | Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |
| ➔ IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12 | Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |

### ➔ Device Mode [RS232]

Use the **Device Mode** option to select the serial port mode.

- |         |         |                                     |
|---------|---------|-------------------------------------|
| ➔ RS232 | DEFAULT | Enables serial port RS-232 support. |
| ➔ RS422 |         | Enables serial port RS-422 support. |
| ➔ RS485 |         | Enables serial port RS-485 support. |

### 5.3.5.1.2 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. |
|--------|---------|---|

## TANK-870e-H110 Embedded System

- ➔ **IO=2F8h; IRQ=3**      Serial Port I/O port address is 2F8h and the interrupt address is IRQ3
- ➔ **IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12**      Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12
- ➔ **IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12**      Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12
- ➔ **IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12**      Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12
- ➔ **IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12**      Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12

➔ **Device Mode [RS 232]**

Use the **Device Mode** option to select the serial port mode.

- ➔ **RS232      DEFAULT**      Enables serial port RS-232 support.
- ➔ **RS422**      Enables serial port RS-422 support.
- ➔ **RS485**      Enables serial port RS-485 support.

## 5.3.5.1.3 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.

- |   |   |                |  |
|---|---|----------------|--|
| ➔ | <b>Auto</b>                                     | <b>DEFAULT</b> | The serial port IO port address and interrupt address are automatically detected.                |
| ➔ | <b>IO=3E8h; IRQ=7</b>                           |                | Serial Port I/O port address is 3E8h and the interrupt address is IRQ7                           |
| ➔ | <b>IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12</b> |                | Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |
| ➔ | <b>IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12</b> |                | Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |
| ➔ | <b>IO=2F0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12</b> |                | Serial Port I/O port address is 2F0h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |
| ➔ | <b>IO=2E0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12</b> |                | Serial Port I/O port address is 2E0h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |

### 5.3.5.1.4 Serial Port 4 Configuration

#### ➔ Serial Port [Enabled]

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

- |   |                 |                |                         |
|---|-----------------|----------------|-------------------------|
| ➔ | <b>Disabled</b> |                | Disable the serial port |
| ➔ | <b>Enabled</b>  | <b>DEFAULT</b> | Enable the serial port  |

#### ➔ Change Settings [Auto]

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

- |   |   |                |  |
|---|---|----------------|--|
| ➔ | <b>Auto</b>                                     | <b>DEFAULT</b> | The serial port IO port address and interrupt address are automatically detected.                |
| ➔ | <b>IO=2E8h; IRQ=7</b>                           |                | Serial Port I/O port address is 2E8h and the interrupt address is IRQ7                           |
| ➔ | <b>IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12</b> |                | Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |



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- |  |  |
|--|--|
| ➔ IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12 | Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |
| ➔ IO=2F0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12 | Serial Port I/O port address is 2F0h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |
| ➔ IO=2E0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12 | Serial Port I/O port address is 2E0h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |

### 5.3.5.1.5 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 <b>DEFAULT</b> | Enable the serial port  |

#### ➔ Change Settings [Auto]

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

- |  |  |
|--|--|
| ➔ Auto <b>DEFAULT</b>                      | The serial port IO port address and interrupt address are automatically detected.                |
| ➔ IO=2E0h; IRQ=7                           | Serial Port I/O port address is 2E0h and the interrupt address is IRQ7                           |
| ➔ IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12 | Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |
| ➔ IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12 | Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |
| ➔ IO=2F0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12 | Serial Port I/O port address is 2F0h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |
| ➔ IO=2E0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12 | Serial Port I/O port address is 2E0h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12 |



5.3.5.1.6 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.

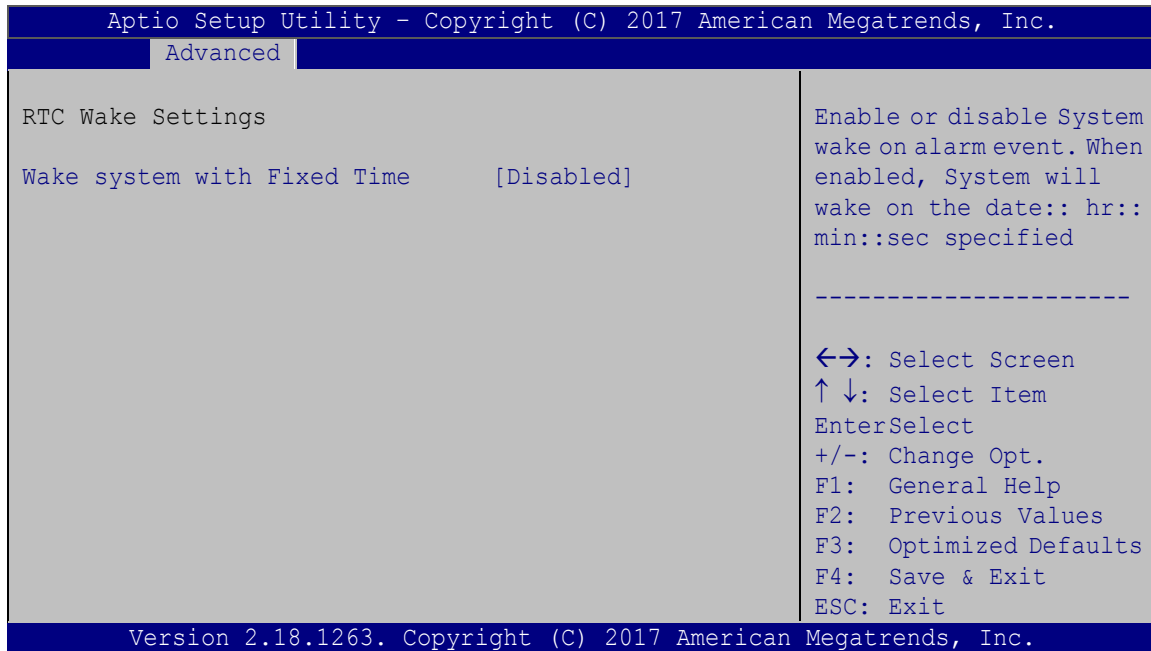
- ➔ **Auto      DEFAULT** The serial port IO port address and interrupt address are automatically detected.
- ➔ **IO=2F0h; IRQ=7** Serial Port I/O port address is 2F0h and the interrupt address is IRQ7
- ➔ **IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12** Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12
- ➔ **IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12** Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12
- ➔ **IO=2F0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12** Serial Port I/O port address is 2F0h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12
- ➔ **IO=2E0h; IRQ=3, 4, 5, 6, 7, 9, 10, 11,12** Serial Port I/O port address is 2E0h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11,12

5.3.6 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 9**) configures RTC wake event.



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**BIOS Menu 9: RTC Wake Settings**

## → Wake System with Fixed Time [Disabled]

Use the **Wake System with Fixed Time** option to specify the time the system should be roused from a suspended state.

→ **Disabled**      **DEFAULT**      The real time clock (RTC) cannot generate a wake event

→ **Enabled**      If selected, the following appears with values that can be selected:

\*Wake up every day

\*Wake up date

\*Wake up hour

\*Wake up minute

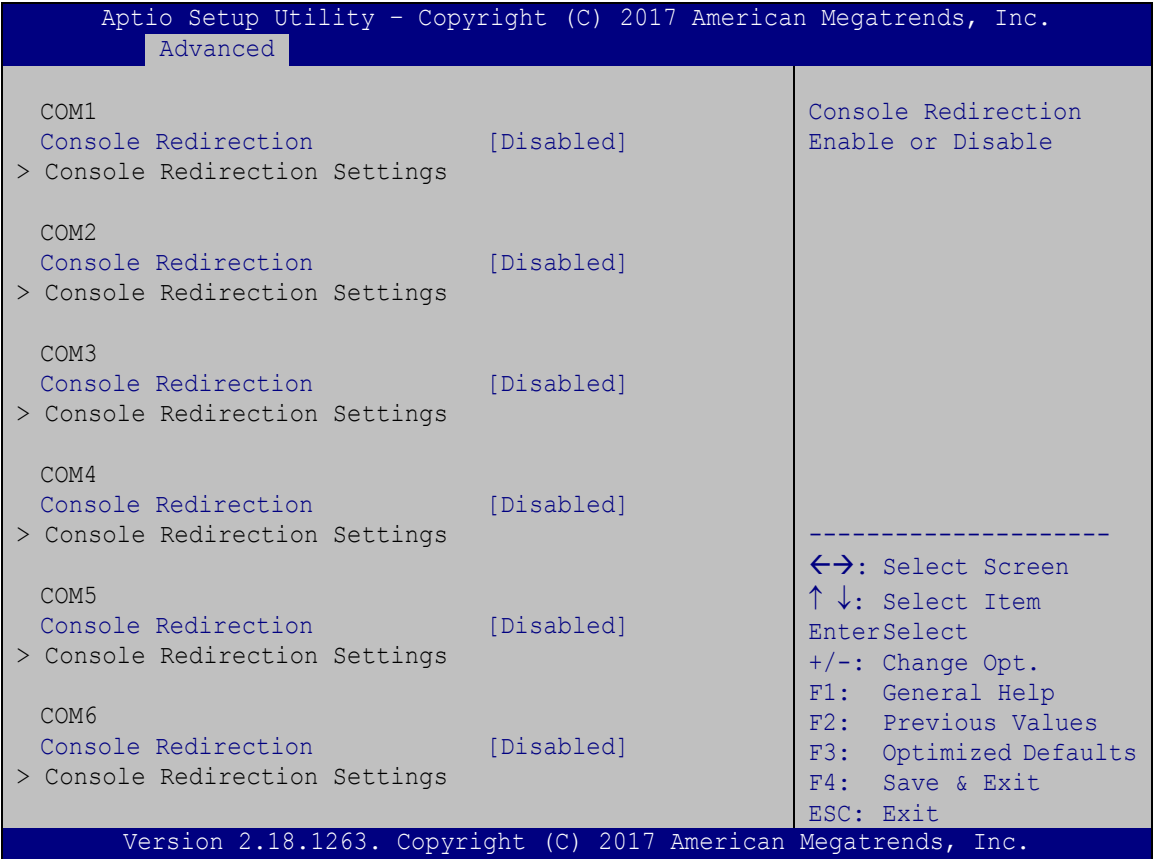
\*Wake up second

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



5.3.7 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 10**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.



**BIOS Menu 10: Serial Port Console Redirection**

➔ Console Redirection [Disabled]

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

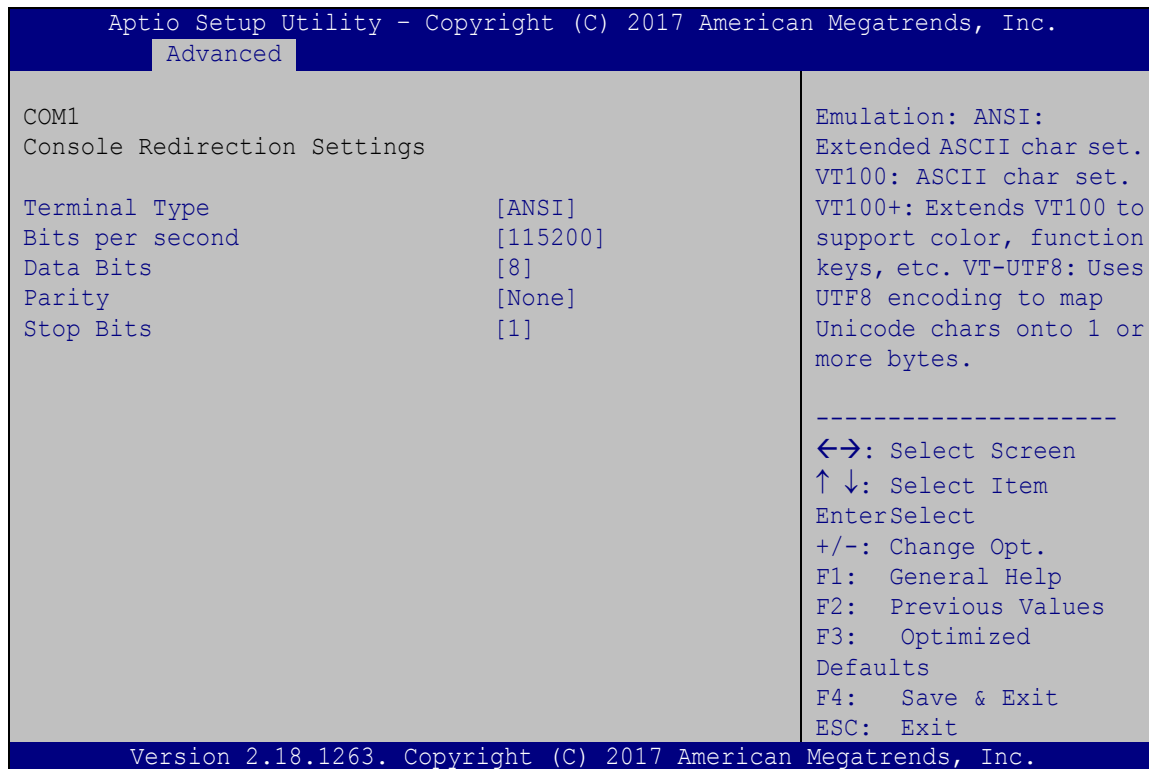
- ➔ **Disabled**      **DEFAULT**      Disabled the console redirection function
- ➔ **Enabled**                      Enabled the console redirection function



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### 5.3.7.1 Console Redirection Settings

The **Console Redirection Settings** menu (**BIOS Menu 11**) allows the console redirection options to be configured. The option is active when Console Redirection option is enabled.



#### BIOS Menu 11: 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 transmission speed of the serial port.



- ➔ **9600**                      The transmission speed is 9600
- ➔ **19200**                    The transmission speed is 19200
- ➔ **38400**                    The transmission speed is 38400
- ➔ **57600**                    The transmission speed is 57600
- ➔ **115200**            **DEFAULT**      The transmission speed is 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]

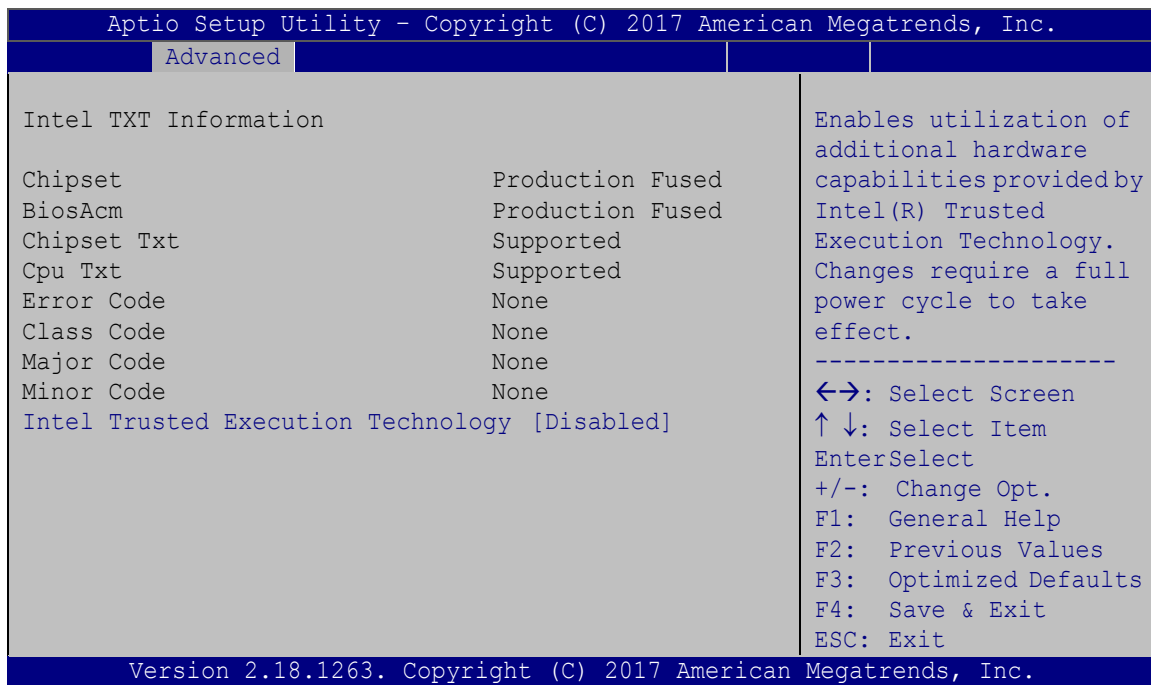
Use the **Stop Bits** option to specify the number of stop bits used to indicate the end of a serial data packet. Communication with slow devices may require more than 1 stop bit.

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

### 5.3.8 Intel TXT(LT) Configuration

Use the **Intel TXT(LT) Configuration** menu (**BIOS Menu 12**) to configure Intel Trusted Execution Technology support.



#### BIOS Menu 12: Intel TXT(LT) Configuration

- ➔ Intel Trusted Execution Technology [Disabled]

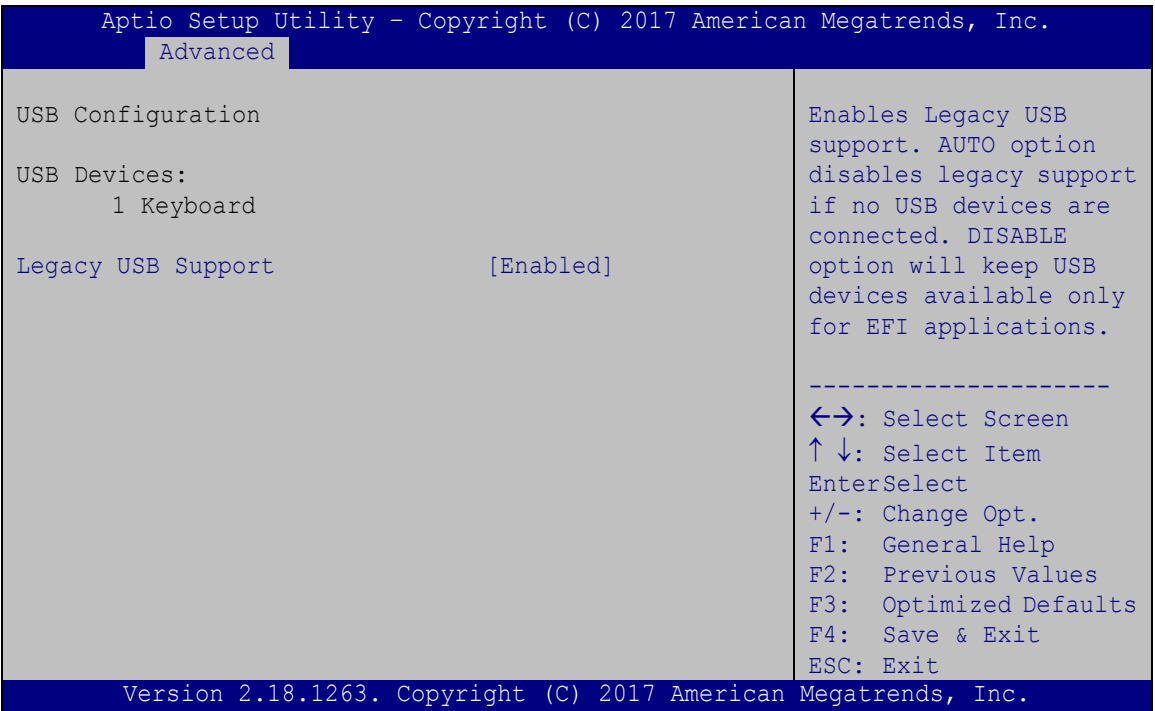
Use the **Intel Trusted Execution Technology** option to enable or disable the Intel® Trusted Execution Technology.

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



5.3.9 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 13**) to read USB configuration information and configure the USB settings.



BIOS Menu 13: USB Configuration

➔ USB Devices

The **USB Devices** field lists the USB devices that are enabled on the system

➔ 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

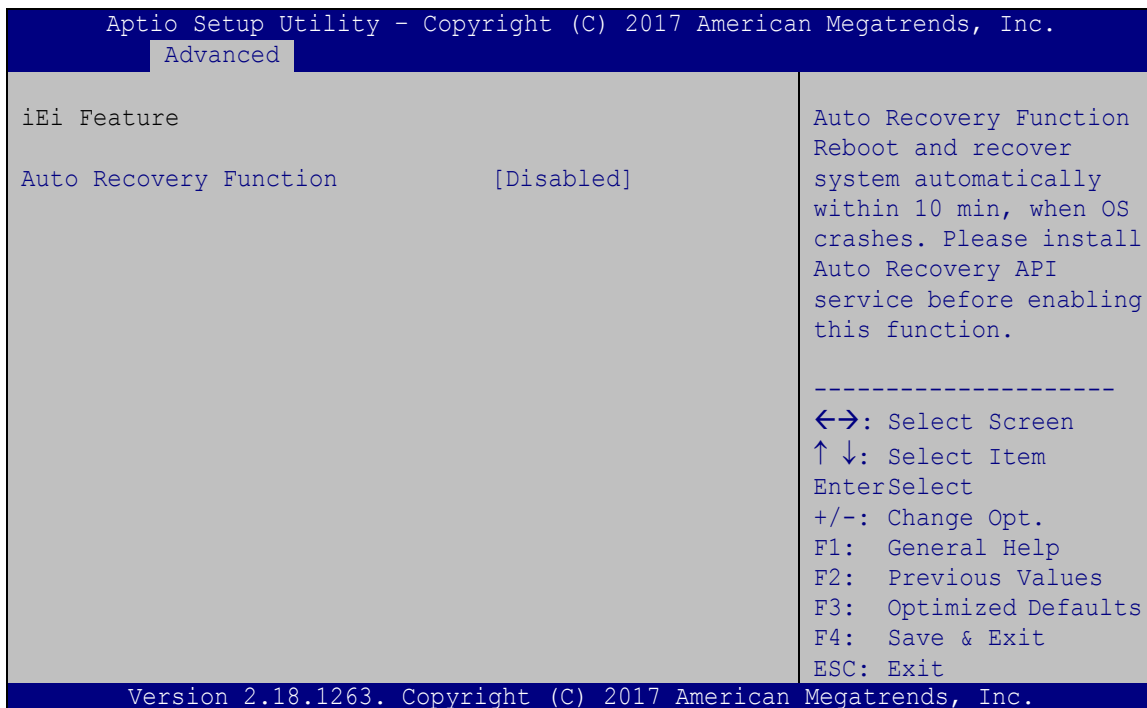


## TANK-870e-H110 Embedded System

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

### 5.3.10 iEi Feature

Use the **iEi Feature** menu (**BIOS Menu 14**) to configure the iEi features.



#### BIOS Menu 14: iEi Feature

- ➔ Auto Recovery Function [Disabled]

Use **Auto Recovery Function** option to enable or disable the auto recovery function.

- ➔ **Disabled** **DEFAULT** Disabled the auto recovery function
- ➔ **Enabled** Enabled the auto recovery function

## 5.3.11 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 15**) shows the operating temperature, fan speeds and system voltages.

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
Advanced
PC Health Status
CPU Temperature      :+50 C
SYS Temperature      :+45 C
CPU_FAN1 Speed       :N/A
+VCCCORE             :+0.984 V
+V5S                  :+5.160 V
+V12S                 :+11.935 V
+VDDQ                 :+1.208 V
Tcc Activation Offset 0
> Smart Fan Mode Configuration

Offset from factory set
Tcc activation
temperature at which
the Thermal Control
Circuit must be
activated. Tcc will be
activated at: Tcc
Activation Temp - Tcc
Activation Offset. Tcc
Activation Offset range
is 0 to 63.
-----
<=>: 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 15: F81866 H/W Monitor

#### ➔ PC Health Status

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

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speeds:
  - CPU\_Fan1 Speed
- Voltages:
  - +VCCCORE
  - +V5S



## TANK-870e-H110 Embedded System

- +V12S
- +VDDQ

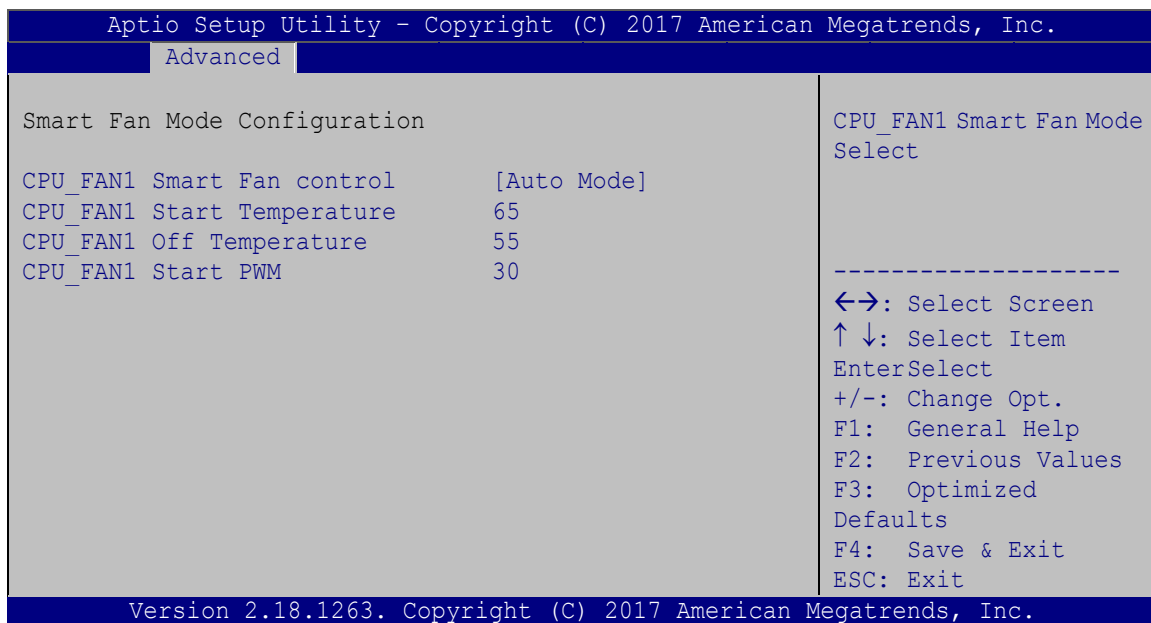
## ➔ Tcc Activation Offset

Use the **Tcc Activation Offset** option to change the **Tcc Activation Offset** value. If CPU Temperature reaches Tcc Activation Offset then reduces CPU Frequency.

- Minimum Value: 0°C
- Maximum Value: 63°C

## 5.3.11.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 16**) to configure the smart fan temperature and speed settings.

**BIOS Menu 16: Smart Fan Mode Configuration**

## ➔ Smart Fan control [Auto Mode]

Use the **Smart Fan control** BIOS option to configure the CPU Smart Fan.

➔ **Auto Mode**      **DEFAULT**      The fan adjusts its speed using these settings:

CPU\_FAN1 Start Temperature

CPU\_FAN1 Off Temperature

CPU\_FAN1 Start PWM

➔ **Manual Mode**      The fan spins at the speed set in the manual setting

➔ CPU\_FAN1 Start/Off Temperature

Use the + or – key to change the **CPU\_FAN1 Start/Off Temperature** value. Enter a decimal number between 1 and 100.

➔ CPU\_FAN1 start PWM

Use the + or – key to change the **CPU\_FAN1 start PWM** value. Enter a decimal number between 1 and 100.

## 5.4 Chipset

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



### WARNING!

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

---

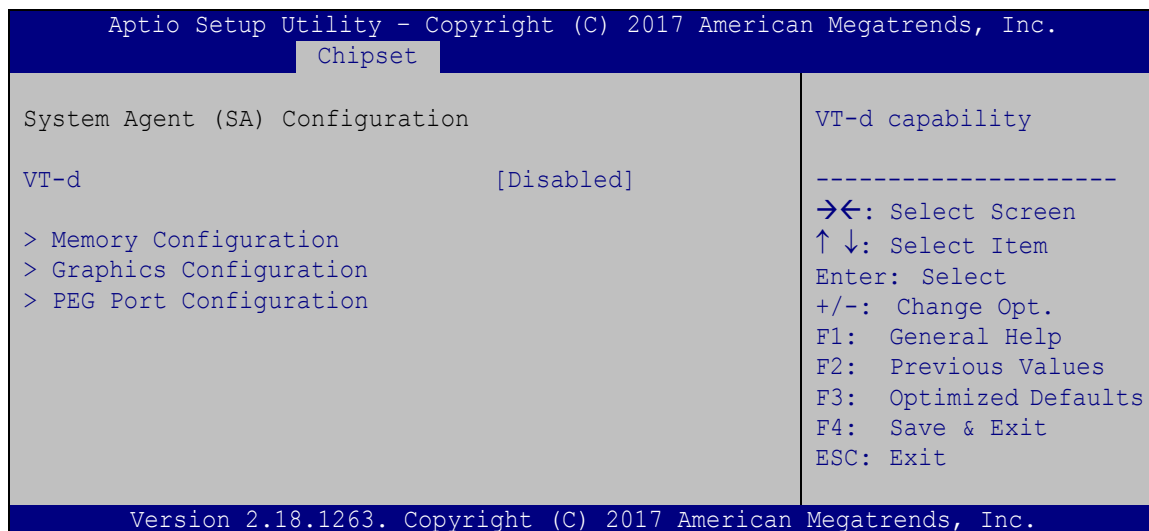
## TANK-870e-H110 Embedded System



**BIOS Menu 17: Chipset**

### 5.4.1 System Agent (SA) Configuration

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



**BIOS Menu 18: System Agent (SA) Configuration**

➔ VT-d [Disabled]

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

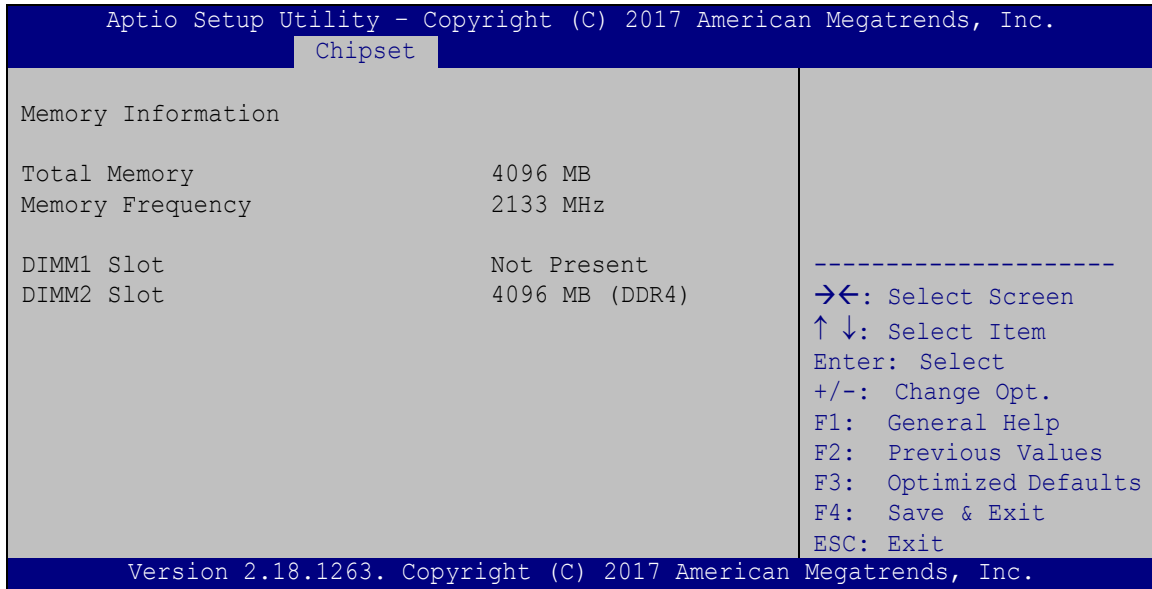
➔ **Disabled** **DEFAULT** Disable VT-d support.

➔ **Enabled**

Enable VT-d support.

#### 5.4.1.1 Memory Configuration

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

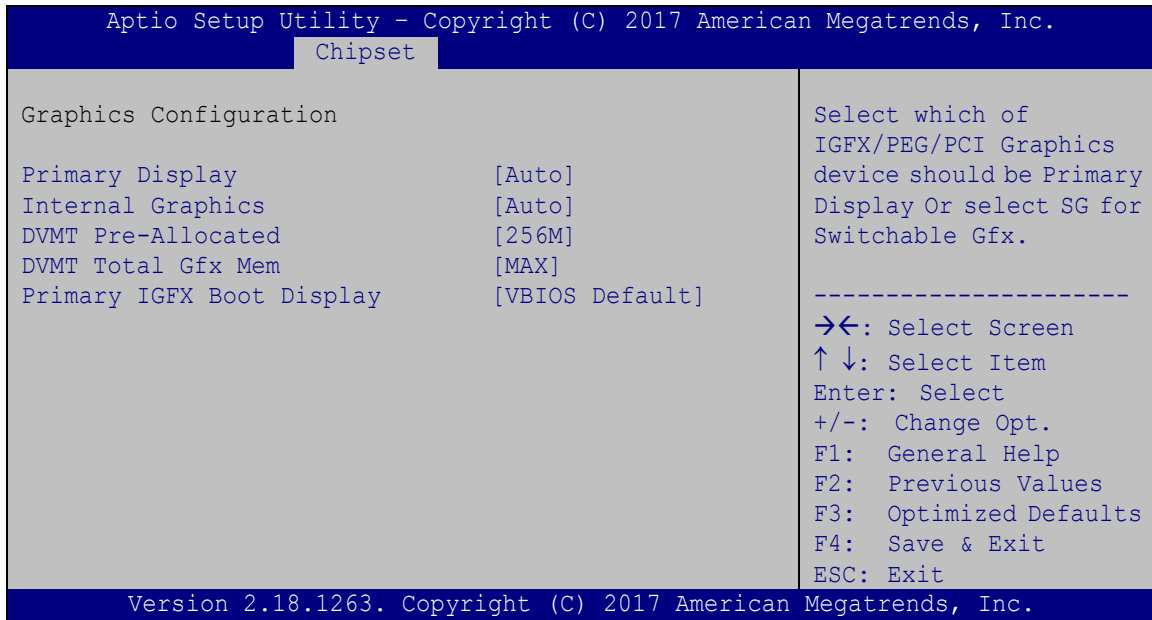


#### BIOS Menu 19: Memory Configuration

#### 5.4.1.2 Graphics Configuration

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

## TANK-870e-H110 Embedded System

**BIOS Menu 20: Graphics Configuration**

## ➔ Primary Display [Auto]

Use the **Primary Display** option to select the primary graphics controller the system uses.

The following options are available:

- Auto **Default**
- IGFX
- PEG
- PCI
- SG

## ➔ Integrated Graphics [Auto]

Use the **Integrated Graphics** option to enable or disable the Integrated Graphics Device (IGD).

- Auto **Default**
- Disabled
- Enabled



➔ DVMT Pre-Allocated [256M]

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

- 128M
- 256M                      **Default**
- 512M

➔ DVMT Total Gfx Mem [MAX]

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

- 256M
- 128M
- MAX                      **Default**

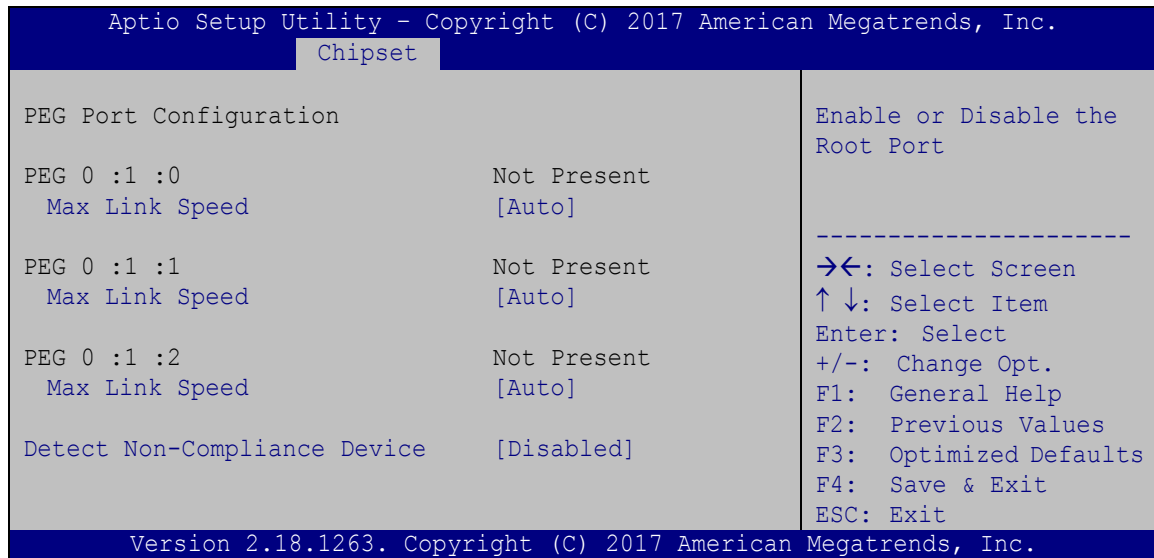
➔ Primary IGFX Boot Display [VBIOS Default]

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**
- VGA
- HDMI

## TANK-870e-H110 Embedded System

## 5.4.1.3 PEG Port Configuration



## BIOS Menu 21: NB PCIe Configuration

## ➔ Max Link Speed [Auto]

Use the **Max Link Speed** option to configure the PEG port max speed. The following options are available:

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

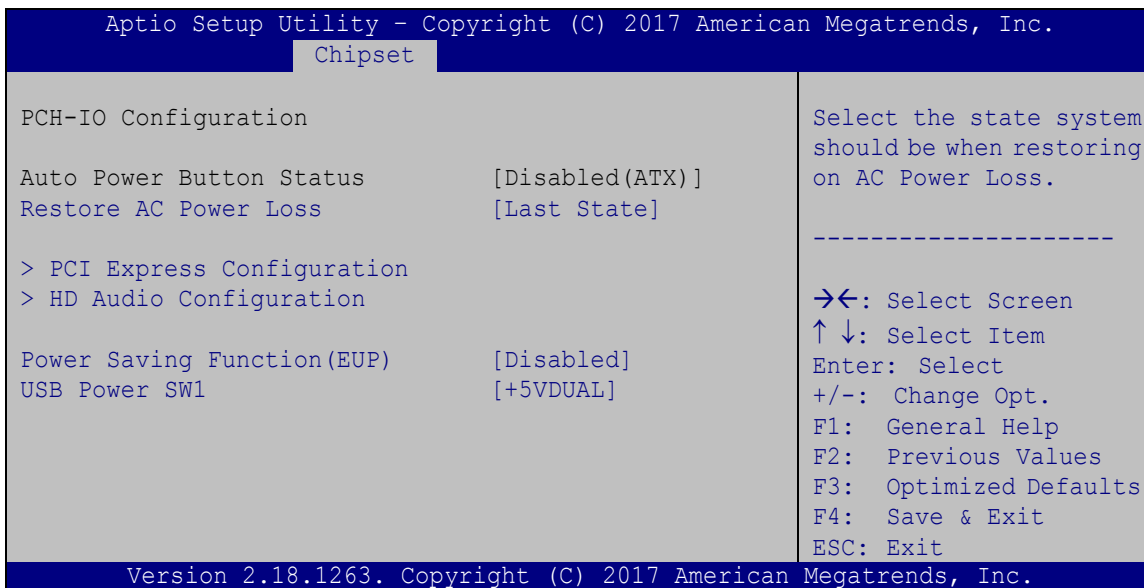
## ➔ Detect Non-Compliance Device [Disabled]

Use the **Detect Non-Compliance Device** option to enable or disable detecting a non-compliance PCI Express device in the PEG. The following options are available:

- Disabled **Default**
- Enabled

## 5.4.2 PCH-IO Configuration

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



### BIOS Menu 22: PCH-IO Configuration

#### → Restore AC Power Loss [Last State]

Use the **Restore on AC Power Loss** 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.

## TANK-870e-H110 Embedded System

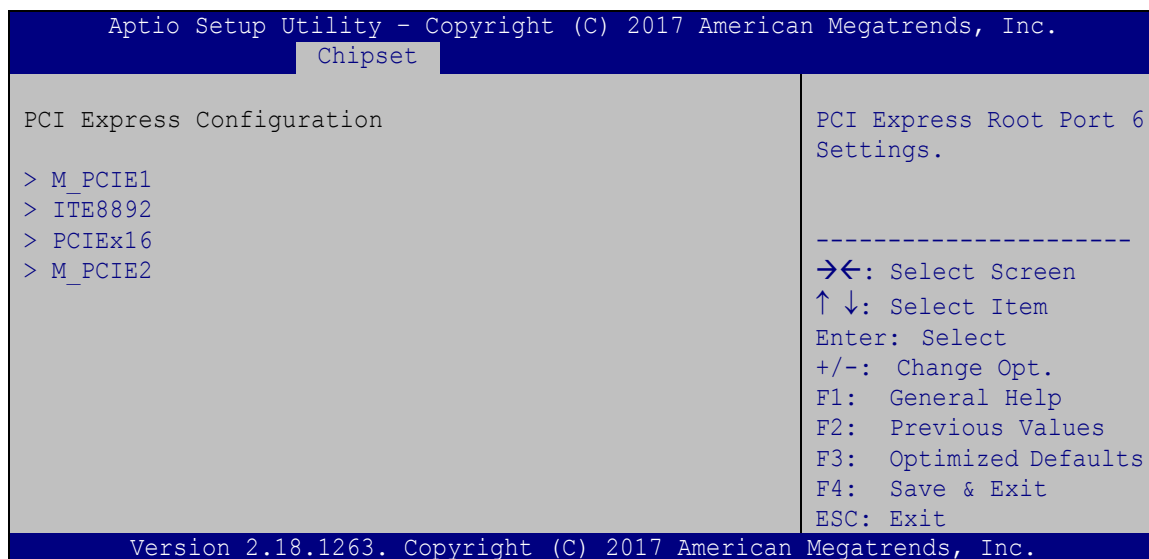
## ➔ USB Power SW1 [+5V DUAL]

Use the **USB Power SW1** BIOS option to configure the USB power source for the corresponding USB connectors.

- ➔ **+5V** Sets the USB power source to +5V
- ➔ **+5VDUAL** **DEFAULT** Sets the USB power source to +5V dual

## 5.4.2.1 PCI Express Configuration

Use the **PCI Express Configuration** menu (**BIOS Menu 23**) to select the support type of the PCIe Mini slot.

**BIOS Menu 23: PCI Express Configuration**

The **M\_PCIE1**, **ITE8892**, **PCIEx16** and **M\_PCIE2** submenus all contain the following options:

## ➔ PCIe Speed

Use PCIe Speed option to select the speed type of the PCIe Mini slot. The following options are available:

- Auto **Default**
- Gen1
- Gen2



- Gen3

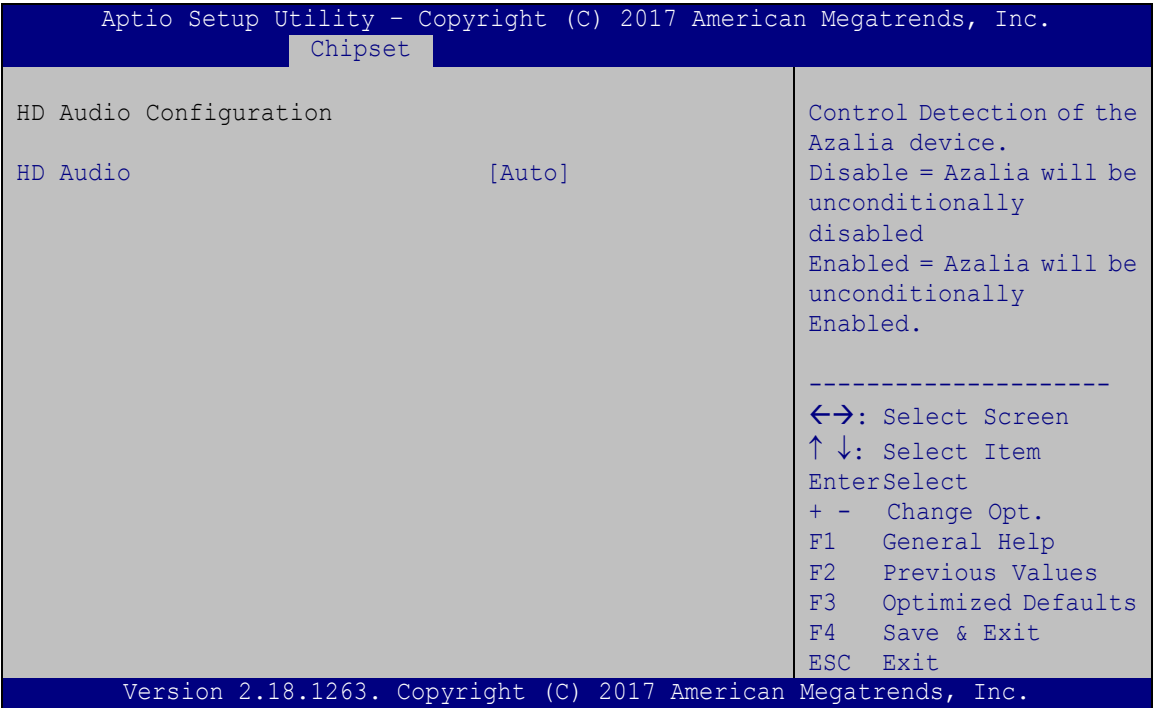
➔ Detect Non-Compliance Device [Disabled]

Use the **Detect Non-Compliance Device** option to enable or disable the “detect no-compliance PCIe device” function.

- ➔ **Disabled**    **DEFAULT**    Detect no-compliance PCIe device function is disabled
- ➔ **Enabled**                      Detect no-compliance PCIe device function is enabled. If will take more time at POST if it is enabled.

5.4.2.2 HD Audio Configuration

Use the **HD Audio Configuration** submenu (**BIOS Menu 24**) to configure the High Definition Audio codec.



**BIOS Menu 24: HD Audio Configuration**

➔ HD Audio [Auto]

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



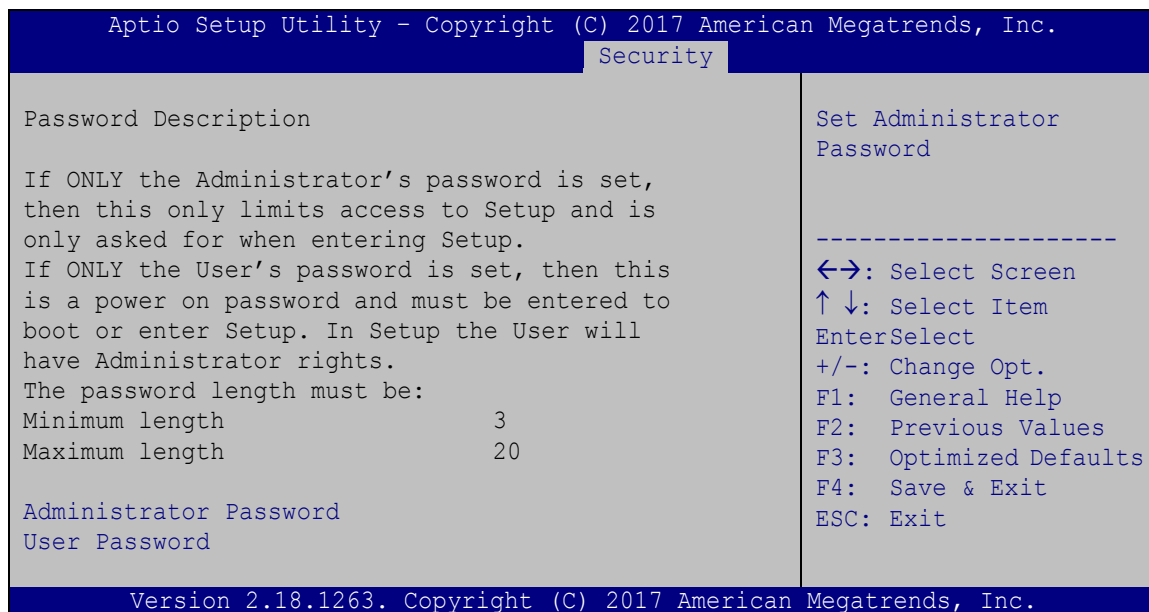


## TANK-870e-H110 Embedded System

- |   |                 |                |  |
|---|-----------------|----------------|--|
| ➔ | <b>Disabled</b> |                | The High Definition Audio controller is disabled.                                |
| ➔ | <b>Enabled</b>  |                | The High Definition Audio controller is enabled.                                 |
| ➔ | <b>Auto</b>     | <b>DEFAULT</b> | The onboard High Definition Audio controller automatically detected and enabled. |

## 5.5 Security

Use the **Security** menu (**BIOS Menu 25**) to set system and user passwords.



### BIOS Menu 25: Security

- ➔ Administrator Password

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

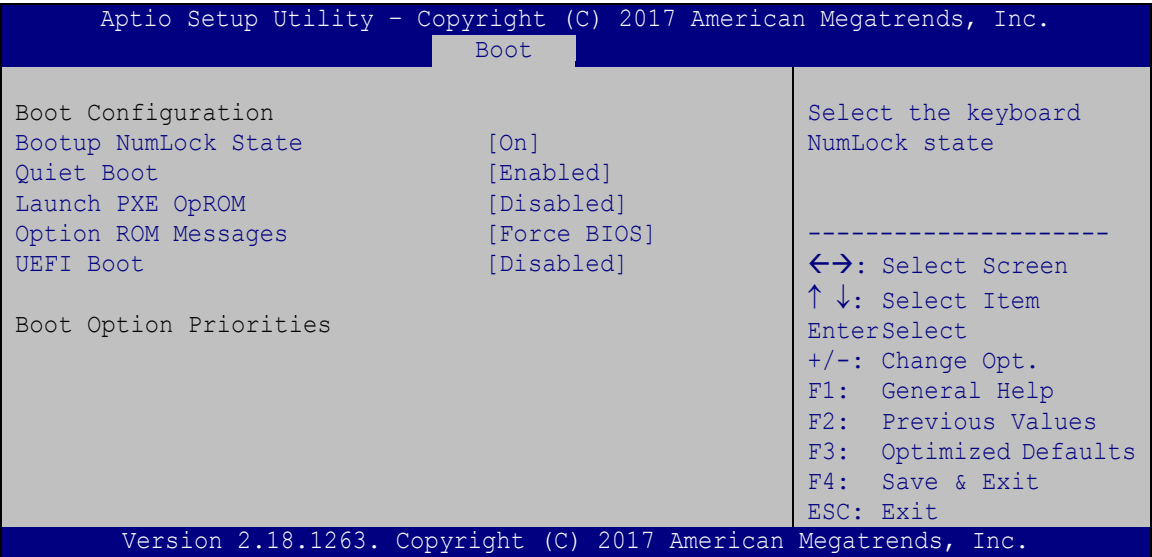
- ➔ User Password

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



## 5.6 Boot

Use the **Boot** menu (**BIOS Menu 26**) to configure system boot options.



### BIOS Menu 26: 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.



## TANK-870e-H110 Embedded System

## → 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.  
T
- **Keep Current** Sets display mode to current.

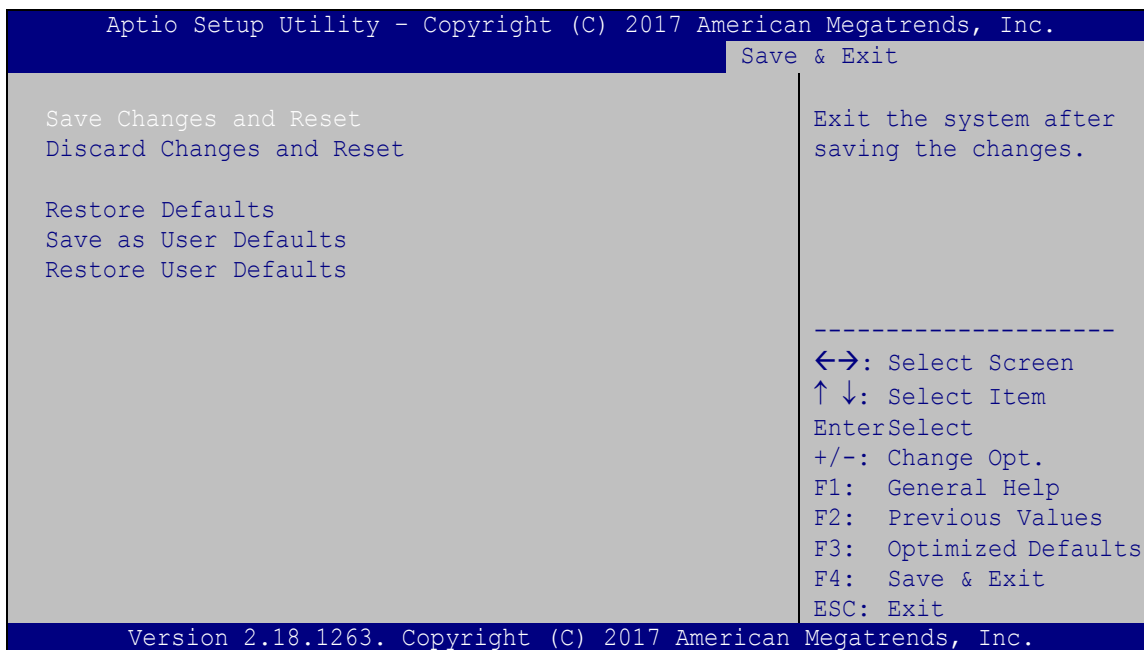
## → UEFI Boot [Disabled]

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.

## 5.7 Save & Exit

Use the **Save & Exit** menu (**BIOS Menu 27**) to load default BIOS values, optimal failsafe values and to save configuration changes.



### BIOS Menu 27: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.**

## TANK-870e-H110 Embedded System

### ➔ 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.





Appendix

A

# Regulatory Compliance

---



## DECLARATION OF CONFORMITY



This equipment is in conformity with the following EU directives:

- EMC Directive (2004/108/EC, 2014/30/EU)
- Low-Voltage Directive (2006/95/EC, 2014/35/EU)
- RoHS II Directive (2011/65/EU, 2015/863/EU)

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

If this equipment has telecommunications functionality, it also complies with the requirements of the Radio Equipment Directive 2014/53/EU.

---

English

IEI Integration Corp declares that this equipment is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

---

Български [Bulgarian]

IEI Integration Corp. декларира, че този оборудване е в съответствие със съществените изисквания и другите приложим правила на Директива 2014/53/EU.

---

Česky [Czech]

IEI Integration Corp tímto prohlašuje, že tento zařízení je ve shodě s základními požadavky a dalšími příslušnými ustanoveními směrnice 2014/53/EU.

---

Dansk [Danish]

IEI Integration Corp erklærer herved, at følgende udstyr overholder de væsentlige krav og øvrige relevante krav i direktiv 2014/53/EU.

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Deutsch [German]

IEI Integration Corp, erklärt dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 2014/53/EU.

---

Eesti [Estonian]

IEI Integration Corp deklareerib seadme seadme vastavust direktiivi 2014/53/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 2014/53/EU.

---

Ελληνική [Greek]

IEI Integration Corp ΔΗΛΩΝΕΙ ΟΤΙ ΕΞΟΠΛΙΣΜΟΣ ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 2014/53/EU.

---

Français [French]

IEI Integration Corp déclare que l'appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 2014/53/EU.

---

Italiano [Italian]

IEI Integration Corp dichiara che questo apparecchio è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 2014/53/EU.

---

Latviski [Latvian]

IEI Integration Corp deklarē, ka iekārta atbilst būtiskajām prasībām un citiem ar to saistītajiem noteikumiem Direktīvas 2014/53/EU.

---



## TANK-870e-H110 Embedded System

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Lietuvių [Lithuanian]

IEI Integration Corp deklaruoja, kad šis įranga atitinka esminius reikalavimus ir kitas 2014/53/EU 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 2014/53/EU.

---

Malti [Maltese]

IEI Integration Corp jiddikjara li dan prodott jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn rilevanti li hemm fid-Dirrettiva 2014/53/EU.

---

Magyar [Hungarian]

IEI Integration Corp nyilatkozom, hogy a berendezés megfelel a vonatkozó alapvető követelményeknek és az 2014/53/EU irányelv egyéb előírásainak.

---

Polski [Polish]

IEI Integration Corp oświadcza, że wyrobu jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 2014/53/EU.

---

Português [Portuguese]

IEI Integration Corp declara que este equipamento está conforme com os requisitos essenciais e outras disposições da Directiva 2014/53/EU.

---

Româna [Romanian]

IEI Integration Corp declară că acest echipament este în conformitate cu cerințele esențiale și cu celelalte prevederi relevante ale Directivei 2014/53/EU.

---

---

Slovensko [Slovenian]

IEI Integration Corp izjavlja, da je ta opreme v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 2014/53/EU.

---

Slovensky [Slovak]

IEI Integration Corp týmto vyhlasuje, že zariadenia spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 2014/53/EU.

---

Suomi [Finnish]

IEI Integration Corp vakuuttaa täten että laitteet on direktiivin 2014/53/EU 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 2014/53/EU.

---

FCC WARNING



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

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

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



### **Federal Communication Commission Interference Statement**

This equipment has been assembled with components that comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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 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.
- Consult the dealer or an experienced radio/TV technician for help.

Appendix

B

# BIOS Options

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## TANK-870e-H110 Embedded System

Below is a list of BIOS configuration options in the BIOS chapter.

➔ System Date [xx/xx/xx] .....	45
➔ System Time [xx:xx:xx] .....	45
➔ Intel (VMX) Virtualization Technology [Disabled] .....	48
➔ Active Processor Cores [All] .....	48
➔ EIST [Enabled] .....	48
➔ C states [Disabled] .....	48
➔ Security Device Support [Disable] .....	49
➔ ACPI Sleep State [S3 (Suspend to RAM)] .....	50
➔ SATA Controller(s) [Enabled] .....	51
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➔ Hot Plug [Disabled] .....	51
➔ Serial Port [Enabled] .....	53
➔ Change Settings [Auto] .....	53
➔ Device Mode [RS232] .....	54
➔ Serial Port [Enabled] .....	54
➔ Change Settings [Auto] .....	54
➔ Device Mode [RS232] .....	55
➔ Serial Port [Enabled] .....	55
➔ Change Settings [Auto] .....	55
➔ Serial Port [Enabled] .....	56
➔ Change Settings [Auto] .....	56
➔ Serial Port [Enabled] .....	57
➔ Change Settings [Auto] .....	57
➔ Serial Port [Enabled] .....	58
➔ Change Settings [Auto] .....	58
➔ Wake System with Fixed Time [Disabled] .....	59
➔ Console Redirection [Disabled] .....	60
➔ Terminal Type [ANSI] .....	61
➔ Bits per second [115200] .....	61
➔ Data Bits [8] .....	62
➔ Parity [None] .....	62
➔ Stop Bits [1] .....	62
➔ Intel Trusted Execution Technology [Disabled] .....	63

➔ USB Devices .....	64
➔ Legacy USB Support [Enabled] .....	64
➔ Auto Recovery Function [Disabled] .....	65
➔ PC Health Status .....	66
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➔ Smart Fan control [Auto Mode] .....	67
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➔ Primary IGFX Boot Display [VBIOS Default] .....	72
➔ Max Link Speed [Auto] .....	73
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➔ Power Saving Function (ERP) [Disabled] .....	74
➔ USB Power SW1 [+5V DUAL] .....	75
➔ PCIe Speed .....	75
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➔ HD Audio [Auto] .....	76
➔ Administrator Password .....	77
➔ User Password .....	77
➔ Bootup NumLock State [On] .....	78
➔ Quiet Boot [Enabled] .....	79
➔ Launch PXE OpROM [Disabled] .....	79
➔ Option ROM Messages [Force BIOS] .....	79
➔ UEFI Boot [Disabled] .....	79
➔ Save Changes and Reset .....	80
➔ Discard Changes and Reset .....	80
➔ Restore Defaults .....	80
➔ Save as User Defaults .....	81
➔ Restore User Defaults .....	81

Appendix

C

# Terminology

---



AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CompactFlash®	CompactFlash® is a solid-state storage device. CompactFlash® devices use flash memory in a standard size enclosure. Type II is thicker than Type I, but a Type II slot can support both types.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male D-sub 9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.

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DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
EIST	Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Output Control Hub (ICH) is an Intel® Southbridge chipset.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.

LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.
LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

D

# Safety Precautions

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## D.1 Safety Precautions

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### WARNING:

The precautions outlined in this appendix should be strictly followed. Failure to follow these precautions may result in permanent damage to the TANK-870e-H110.

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

### D.1.1 General Safety Precautions

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

- ***Make sure the power is turned off and the power cord is disconnected*** when moving, installing or modifying the system.
- ***Do not apply voltage levels that exceed the specified voltage range.*** Doing so may cause fire and/or an electrical shock.
- ***Electric shocks can occur*** if opened while still powered on.
- ***Do not drop or insert any objects*** into the ventilation openings.
- ***If considerable amounts of dust, water, or fluids enter the system***, turn off the power supply immediately, unplug the power cord, and contact the system vendor.
- **DO NOT:**
  - Drop the system against a hard surface.
  - In a site where the ambient temperature exceeds the rated temperature



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## D.1.2 Anti-static Precautions

**WARNING:**

Failure to take ESD precautions during the installation of the TANK-870e-H110 may result in permanent damage to the TANK-870e-H110 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the TANK-870e-H110. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the TANK-870e-H110 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.

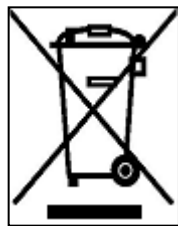
### D.1.3 Product Disposal

**CAUTION:**

Risk of explosion if battery is replaced by and 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 display 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.

## D.2 Maintenance and Cleaning Precautions

When maintaining or cleaning the TANK-870e-H110, please follow the guidelines below.

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### D.2.1 Maintenance and Cleaning

Prior to cleaning any part or component of the TANK-870e-H110, please read the details below.

- The interior of the TANK-870e-H110 does not require cleaning. Keep fluids away from the TANK-870e-H110 interior.
- Be cautious of all small removable components when vacuuming the TANK-870e-H110.
- Turn the TANK-870e-H110 off before cleaning the TANK-870e-H110.
- Never drop any objects or liquids through the openings of the TANK-870e-H110.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the TANK-870e-H110.
- Avoid eating, drinking and smoking within vicinity of the TANK-870e-H110.

### D.2.2 Cleaning Tools

Some components in the TANK-870e-H110 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 TANK-870e-H110.

- **Cloth** – Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the TANK-870e-H110.
- **Water or rubbing alcohol** – A cloth moistened with water or rubbing alcohol can be used to clean the TANK-870e-H110.
- **Using solvents** – The use of solvents is not recommended when cleaning the TANK-870e-H110 as they may damage the plastic parts.
- **Vacuum cleaner** – Using a vacuum specifically designed for computers is one of the best methods of cleaning the TANK-870e-H110. Dust and dirt can restrict the airflow in the TANK-870e-H110 and cause its circuitry to corrode.
- **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

E

# Digital I/O Interface

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## E.1 Introduction

The DIO connector on the TANK-870e-H110 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.



### NOTE:

For further information, please refer to the datasheet for the Super I/O chipset.

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The BIOS interrupt call **INT 15H** controls the digital I/O.

### INT 15H:

AH – 6FH
<u>Sub-function:</u>
AL – 8 :Set the digital port as INPUT
AL :Digital I/O input value





## E.2 Assembly Language Sample 1

```
MOV    AX, 6F08H      ;setting the digital port as input  
INT    15H            ;
```

**AL low byte = value**

AH – 6FH
<u>Sub-function:</u> AL – 9 :Set the digital port as OUTPUT BL :Digital I/O input value

## E.3 Assembly Language Sample 2

```
MOV    AX, 6F09H      ;setting the digital port as output  
MOV    BL, 09H        ;digital value is 09H  
INT    15H            ;
```

**Digital Output is 1001b**



Appendix

F

# Hazardous Materials Disclosure

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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
Display	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
Fan 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).						



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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
显示	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
风扇组装	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
<p>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。</p> <p>X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 (现由 GB/T 26572-2011 取代) 标准规定的限量要求。</p>						