



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

Date	Version	Changes
November 4, 2020	1.03	Modified Section 1.4 Technical Specifications
July 6, 2020	1.02	Modified Section 1.8 Physical Dimensions
February 24, 2018	1.01	Add Section 3.3: System Fan Installation (Optional) Update Section 1.2: Model Variations
August 15, 2017	1.00	Initial release

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Manual Conventions

**WARNING**

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

**CAUTION**

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

**NOTE**

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

**HOT SURFACE**

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

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Chapter

1

Introduction

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 3.2 Gen 1 (5Gb/s) 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

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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	7th Gen. Intel 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	2 x 2.5" SATA 6Gb/s HDD/SSD bay
I/O Interfaces	
USB 3.2 Gen 1 (5Gb/s)	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 4096x2304@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):

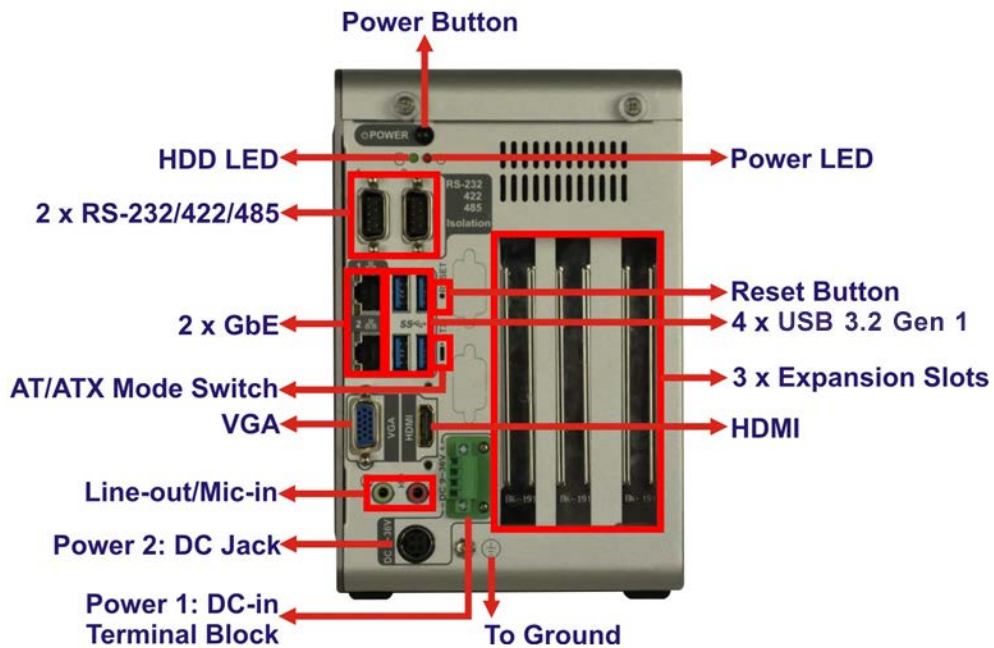


Figure 1-2: TANK-870e-H110 Front Panel

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 3.2 Gen 1 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

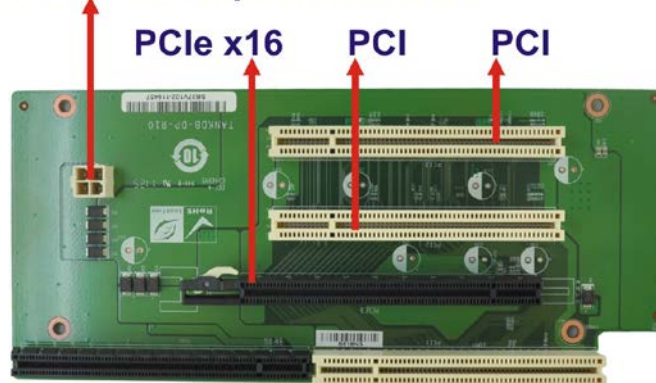


Figure 1-4: HPE-3S6

12V Power Input Connector

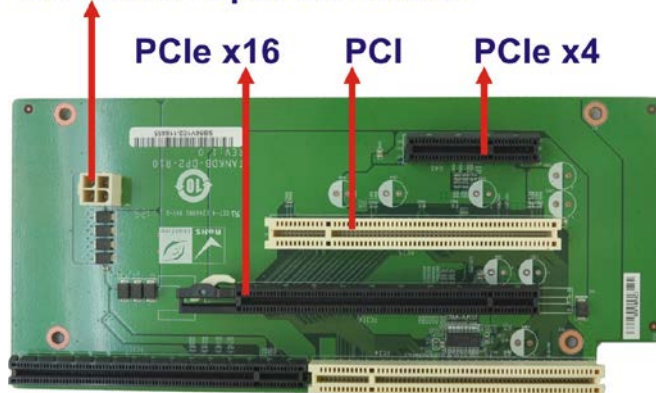


Figure 1-5: HPE-3S7

12V Power Input Connector

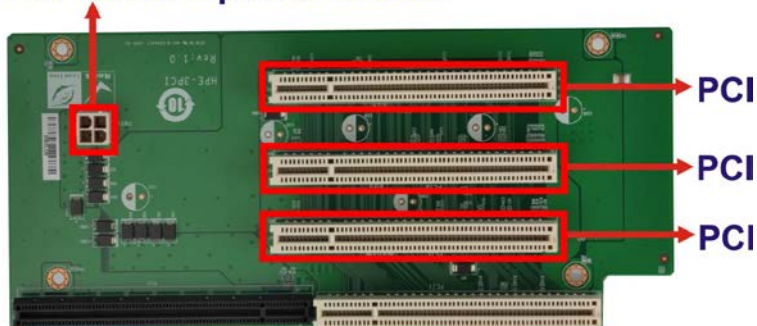


Figure 1-6: HPE-3PCI

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.

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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**.

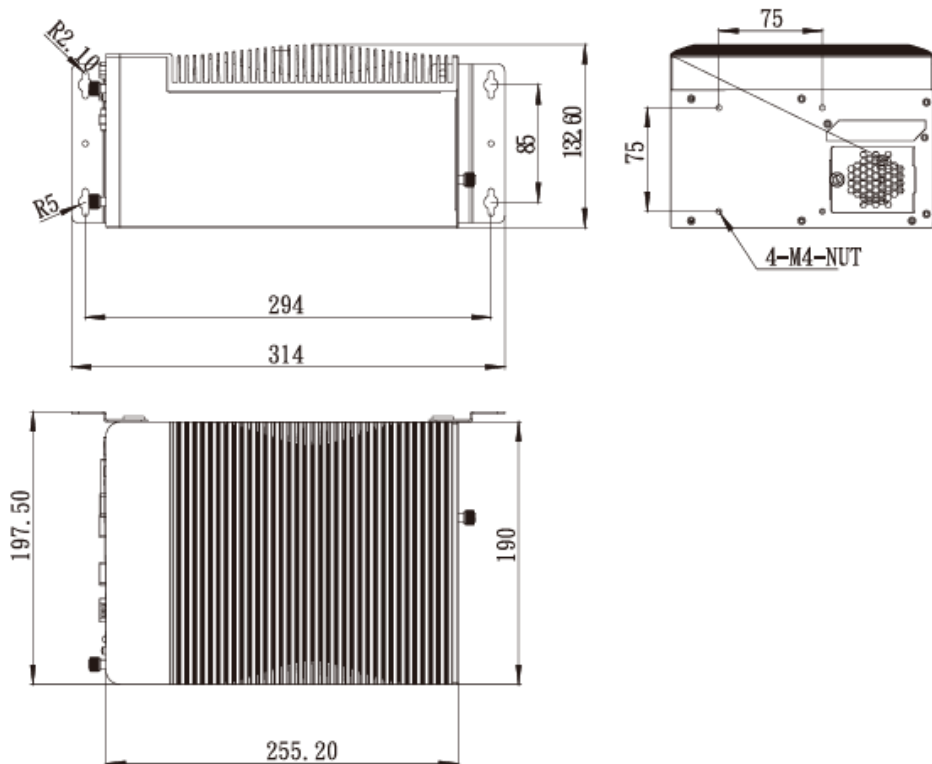


Figure 1-7: TANK-870e-H110 Physical Dimensions (millimeters)

Chapter

2

Unpacking

TANK-870e-H110 Embedded System

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.

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	

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-AHAN3, 9NA1206708, Active PFC, Vin:90~264VAC, 120W, plug=6.5mm, cable=1500mm, Erp (no load 0.15W), Vout:12VDC, 4-pin DIN with lock, CCL, RoHS</i> (P/N: 63040-010120-300-RS)	
Fan, +12V DC, 4-pin, 40 mm x 40 mm x15 mm, RoHS (P/N: EMB-FAN-KIT02-R10)	
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)	

Optional	
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

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:** The TANK-870e-H110 has more than one power supply connection point. To reduce the risk of electric shock, disconnect all power sources 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**).

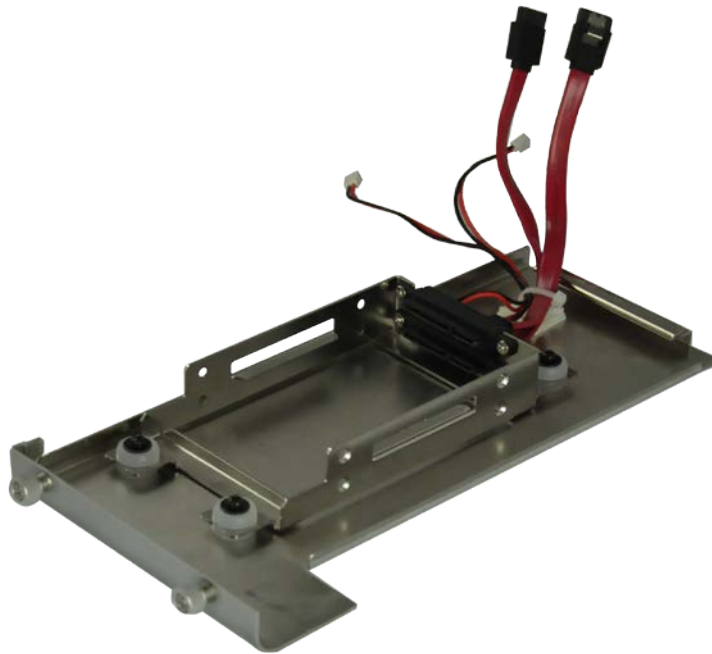


Figure 3-2: Remove the Cover from TANK-870e-H110

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

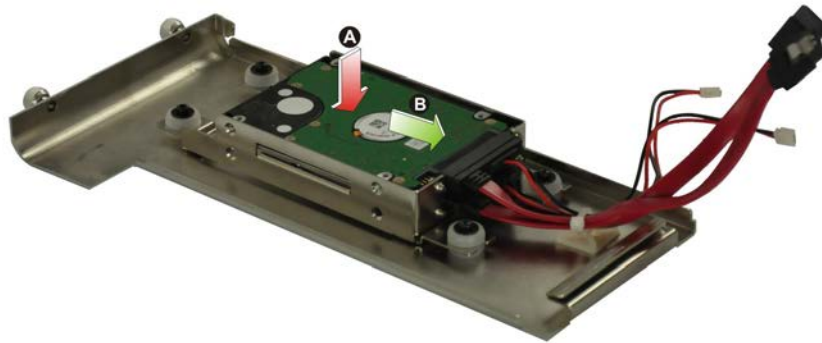


Figure 3-3: HDD Installation

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

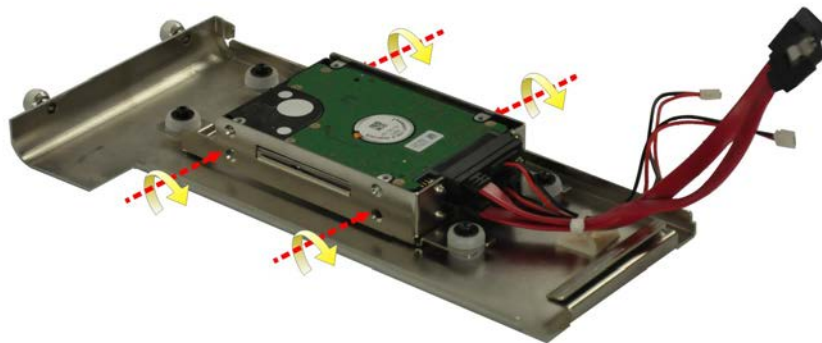


Figure 3-4: HDD Retention Screws

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

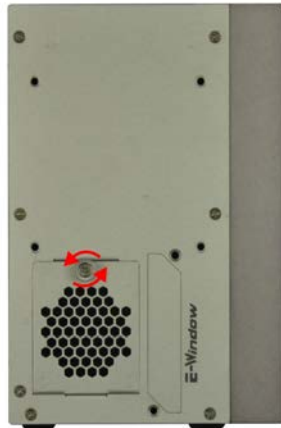


Figure 3-5: Remove the Fan Bracket Cover from the System

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.

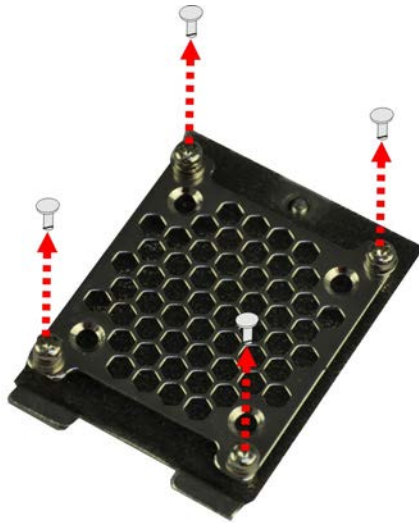


Figure 3-6: Remove the Fan Bracket from the Cover

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

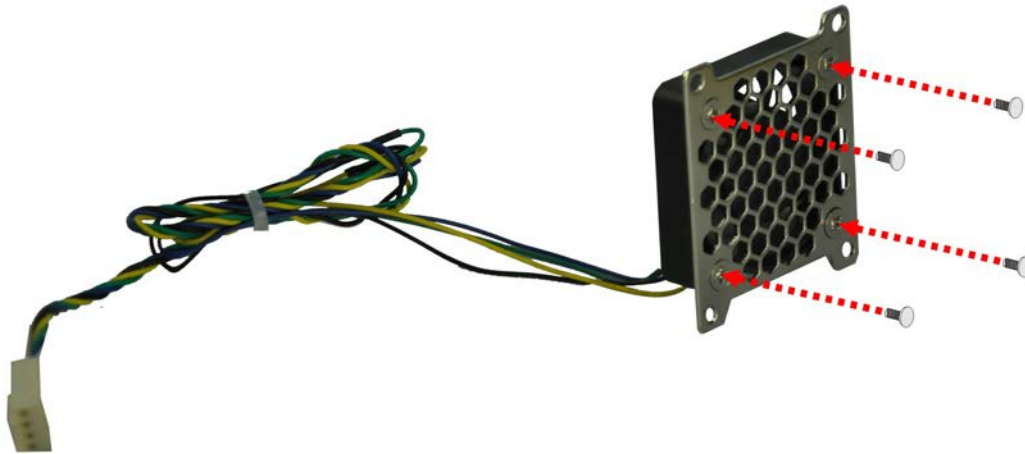


Figure 3-7: Secure the System Fan to the Fan Bracket

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

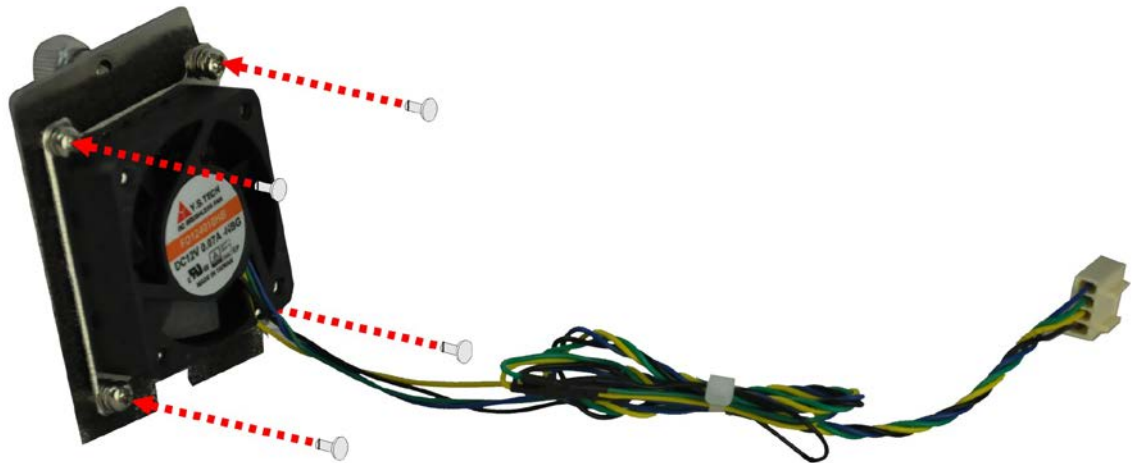


Figure 3-8: Reinstall the Fan Bracket to the Cover

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.

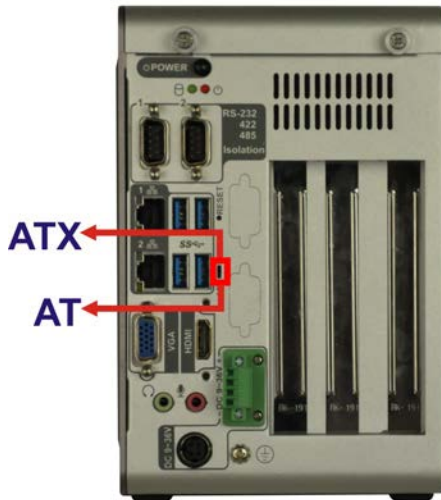


Figure 3-10: AT/ATX Power Mode Switch

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.

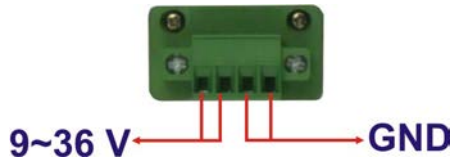


Figure 3-13: 4-pin Terminal Block

3.5.6 Power Input, 4-pin DIN Connector

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

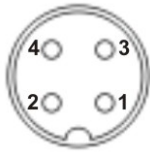


Figure 3-14: Power Input Connector

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 3.2 Gen 1 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

TANK-870e-H110 Embedded System

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

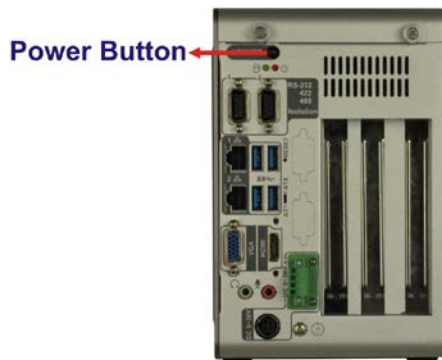


Figure 3-15: Power Button

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

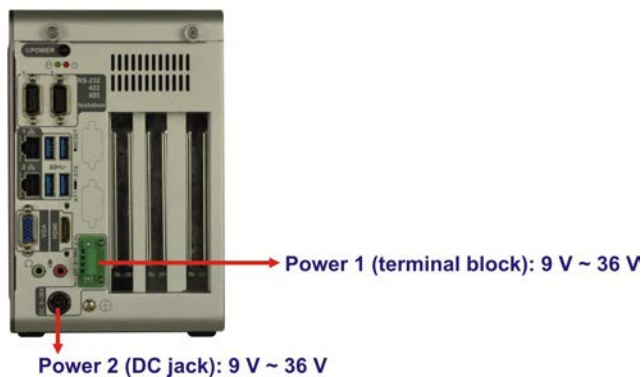


Figure 3-16: Power Connectors



WARNING:

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

Chapter

4

System Motherboard

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.

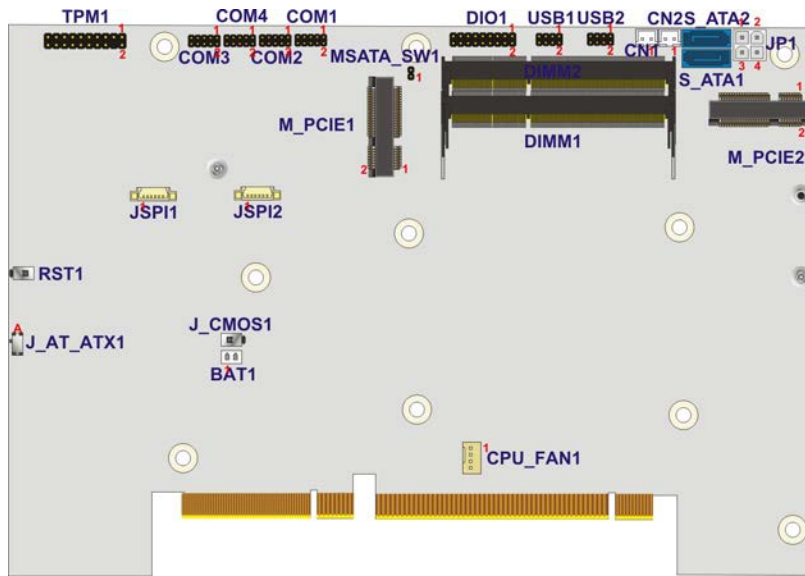


Figure 4-1: System Motherboard (Front)

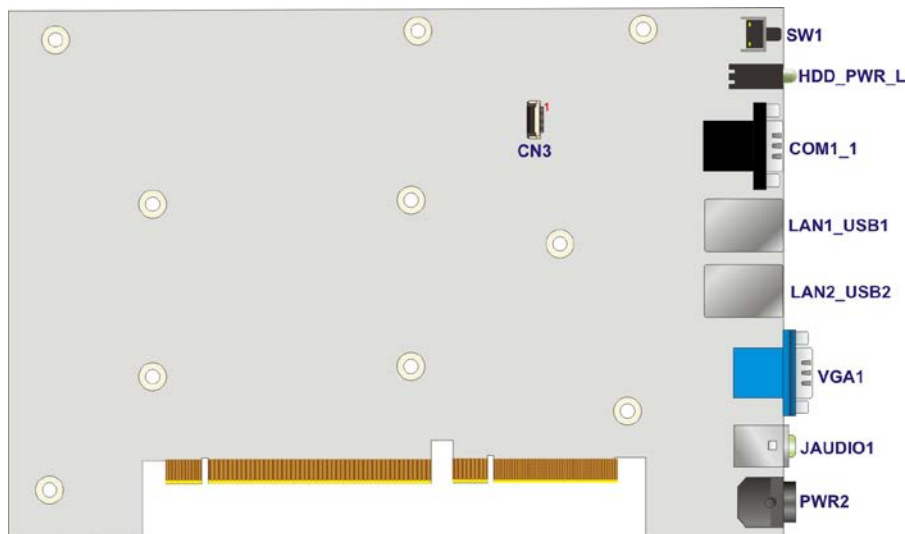


Figure 4-2: System Motherboard (Rear)

TANK-870e-H110 Embedded System

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 (JSPI1)

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 (JSPI1)

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)

4.2.12 SATA Power Connectors (CN1, CN2)

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

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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_DRO#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 USB 3.2 Gen 1 connectors	RJ-45, USB 3.2 Gen 1 Type A	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 3.2 Gen 1 Connectors (LAN1_USB1)

PIN	DESCRIPTION	PIN	DESCRIPTION
U1	USBVOL	U10	USBVOL

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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 3.2 Gen 1 Port Pinouts (USB1)

PIN	DESCRIPTION	PIN	DESCRIPTION
R1	GND	R2	MDIO+
R3	MDIO-	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 3.2 Gen 1 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 3.2 Gen 1 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)

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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

TANK-870e-H110 Embedded System

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.

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- 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.
Main  Advanced  Chipset  Security  Boot  Save & Exit
BIOS Information
BIOS Vendor                American Megatrends
Core Version                5.12
Compliancy                 UEFI 2.6; PI 1.4
Project Version             SEU6AR31.bin
Build Date                  06/07/2017 14:31:23
Access Level                Administrator
iWDD Vendor                 iEi
iWDD Version                SEU6ER10.bin

IEI QTS/IPC Status         IPC

Board Information
Board ID                    SAG7
Fab ID V1.02
LAN PHY Revision           N/A

Processor Information
Name                        Skylake DT
Type                        Intel(R) Core(TM)
                           i5-6500TE CPU @ 2.30GHz
Speed                       2300 MHz
ID                           0x506E3
Stepping                    R0/S0/N0
Package                     Not Implemented Yet
Number of Processors        4Core(s) / 4Thread(s)
Microcode Revision          BA
GT Info GT2(0x1912)

IGFX VBIOS Version          1049
IGFX GOP Version            N/A
Memory RC Version           2.0.0.6
Total Memory                4096 MB
Memory Frequency            2133 MHz

PCH Information
Name                        SKL PCH-H
PCH SKU H110
Stepping                    D1
Hsio Revision                52
Package Not Implemented Yet
TXT Capability of Platform/PCH Supported
Production Type              Production

Dual Output Fast Read support Not supported
Read ID/Status Clock Freq   17 MHz
Write and Erase Clock Freq  48 MHz
Fast Read Clock Freq        48 MHz
Fast Read support           Supported
Read Clock Freq             17 MHz
Number of Components        1 Component
SPI Component 0 Density     16 MHz
ME FW Version                11.7.0.1261
ME Firmware SKU              Corporate SKU
System Date                  [Mon 11/28/2016]
System Time                   [15:43:27]

-----
<->: Select Screen
^v: Select Item
Enter Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

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```


TANK-870e-H110 Embedded System

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.

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Advanced
  > CPU Configuration
  > Trusted Computing
  > ACPI Settings
  > SATA Configuration
  > F81866 Super IO Configuration
  > RTC Wake Settings
  > Serial Port Console Redirection
  > Intel TXT Information
  > USB Configuration
  > iEi Feature
  > iWDD H/M Monitor

CPU Configuration Parameters
-----
<=>: Select Screen
↑↓: Select Item
Enter>Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

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```

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

Advanced

CPU Configuration		When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Type	Intel(R) Core(TM) i5-6500TE CPU @ 2.30GHz	
ID	0x506E3	
Speed	2300 MHz	
L1 Data Cache	32 kB x 4	
L1 Code Cache	32 kB x 4	
L2 Cache	256 kB x 4	
L3 Cache	6 MB	
L4 Cache	N/A	
Intel VT-x Technology	Supported	-----
Intel SMX Technology	Supported	←→: Select Screen
Intel (VMX) Virtualization Technology	[Disabled]	↑ ↓: Select Item
Active Processor Cores	[All]	EnterSelect
EIST	[Enabled]	+/-: Change Opt.
C states	[Disabled]	F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit

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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.

→ **Disabled** **DEFAULT** Disables Intel Virtualization Technology.

→ **Enabled** Enables Intel Virtualization Technology.

→ Active Processor Cores [All]

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

→ **All** **DEFAULT** Active all of the processor cores

→ **1** Active one of the processor cores

→ **2** Active two of the processor cores

→ **3** Active three of the processor cores

→ EIST [Enabled]

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

→ **Disabled** Disables the Intel Speed Step Technology.

→ **Enabled** **DEFAULT** Enables the Intel Speed Step Technology.

→ C states [Disabled]

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

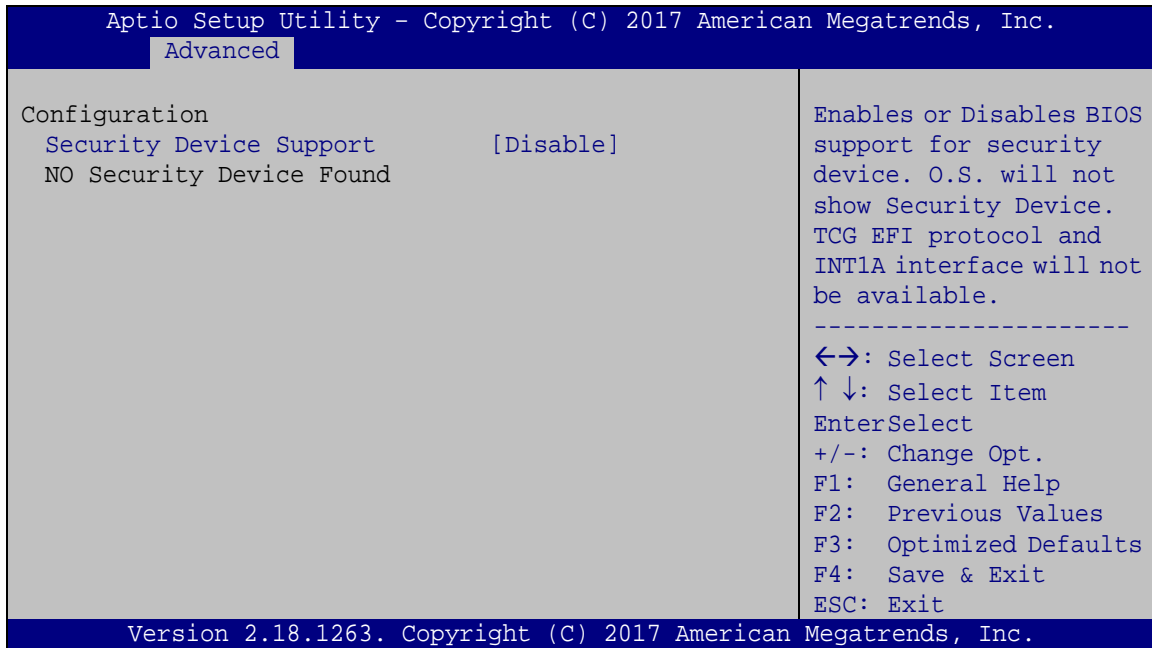
→ **Disabled** **DEFAULT** Disables C states.

→ **Enabled** 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

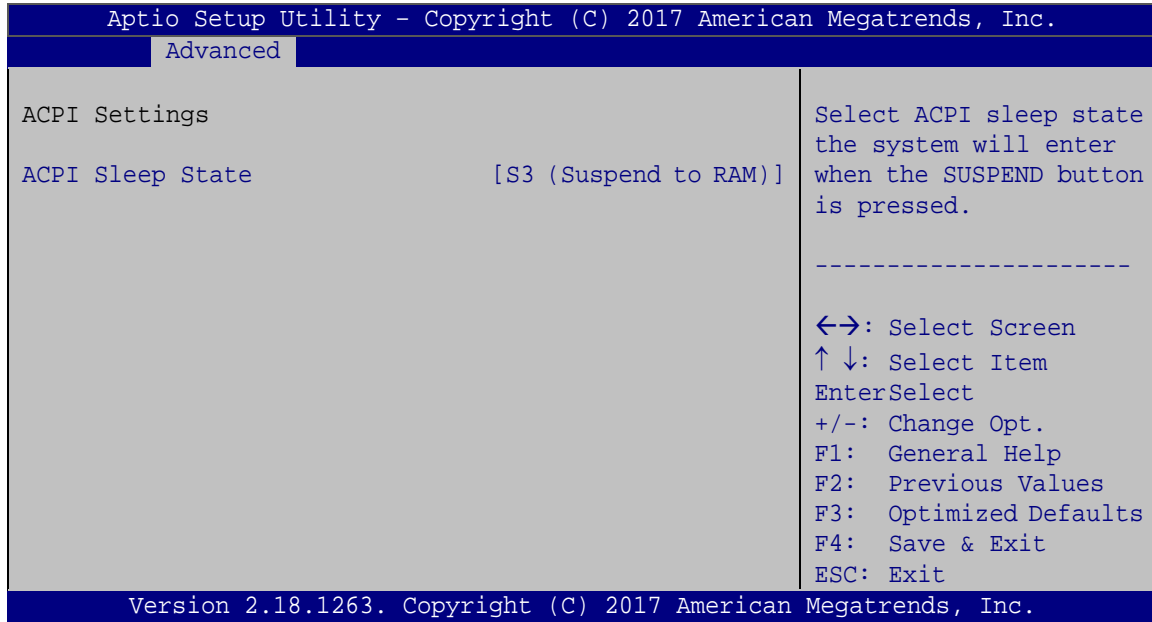
→ Security Device Support [Disable]

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.

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Advanced
SATA Configuration                               Enable or disable SATA
                                                  Device.
SATA Controller(s)                             [Enabled]
SATA Mode Selection                             [AHCI]
-----
S_ATA1(Down)                                   Empty
  Hot Plug                                     [Disabled]
S_ATA1(Up)                                     Empty
  Hot Plug                                     [Disabled]
mSATA(MPCIEx1)                                 Empty
  Hot Plug                                     [Disabled]
<->: Select Screen
^ v: Select Item
EnterSelect
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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```

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.

```

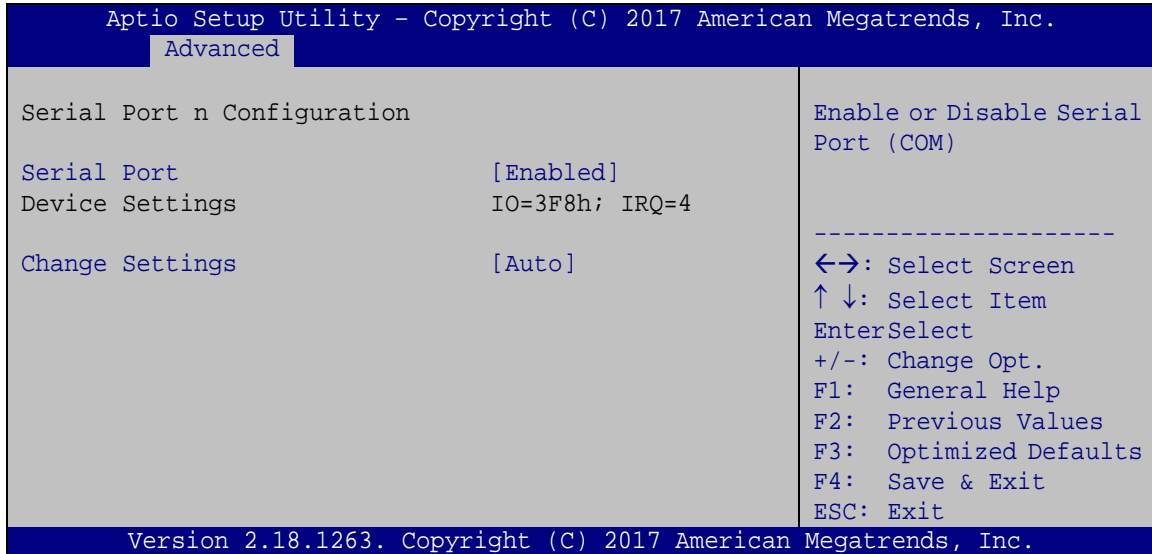
Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Advanced
F81866 Super IO Configuration                               Set Parameters of Serial
                                                           Port 1 (COMA)
F81866 Super IO Chip                                     F81866
> Serial Port 1 Configuration
> Serial Port 2 Configuration
> Serial Port 3 Configuration
> Serial Port 4 Configuration
> Serial Port 5 Configuration
> Serial Port 6 Configuration
-----
←→: Select Screen
↑ ↓: Select Item
EnterSelect
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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```

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

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- ➔ 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.

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- ➔ **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 [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.

5.3.5.1.3 Serial Port 3 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

- **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.
- **IO=3E8h; IRQ=7** Serial Port I/O port address is 3E8h 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

5.3.5.1.4 Serial Port 4 Configuration

→ Serial Port [Enabled]

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

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

→ Change Settings [Auto]

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

- **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.
- **IO=2E8h; IRQ=7** Serial Port I/O port address is 2E8h 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

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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 DEFAULT** Enable the serial port

➔ Change Settings [Auto]

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

- ➔ **Auto DEFAULT** The serial port IO port address and interrupt address are automatically detected.
- ➔ **IO=2E0h; IRQ=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]

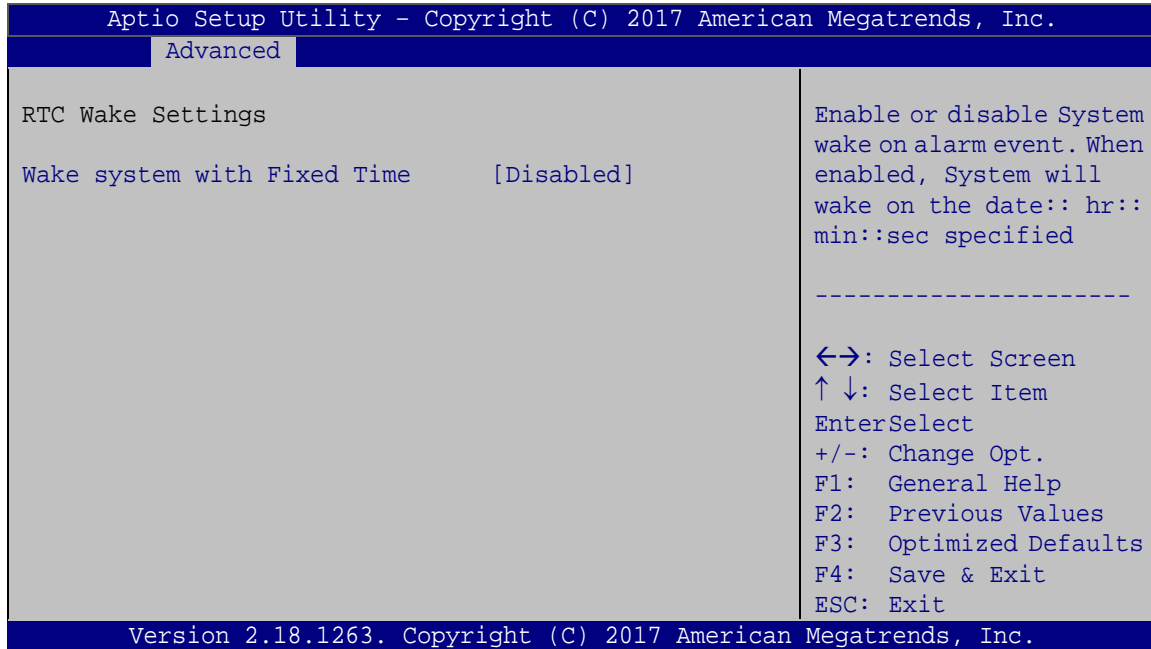
Use the **Change Settings** option to change the serial port IO port address and interrupt address.

- **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.

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Advanced
COM1
  Console Redirection      [Disabled]      Console Redirection
  > Console Redirection Settings      Enable or Disable

COM2
  Console Redirection      [Disabled]
  > Console Redirection Settings

COM3
  Console Redirection      [Disabled]
  > Console Redirection Settings

COM4
  Console Redirection      [Disabled]
  > Console Redirection Settings

COM5
  Console Redirection      [Disabled]
  > Console Redirection Settings

COM6
  Console Redirection      [Disabled]
  > Console Redirection Settings

-----
<->: Select Screen
↑ ↓: Select Item
Enter/Select
+/-: Change Opt.
F1:  General Help
F2:  Previous Values
F3:  Optimized Defaults
F4:  Save & Exit
ESC: Exit

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```

BIOS Menu 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.

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Advanced
COM1
Console Redirection Settings

Terminal Type          [ANSI]
Bits per second       [115200]
Data Bits              [8]
Parity                 [None]
Stop Bits              [1]

Emulation: ANSI:
Extended ASCII char set.
VT100: ASCII char set.
VT100+: Extends VT100 to
support color, function
keys, etc. VT-UTF8: Uses
UTF8 encoding to map
Unicode chars onto 1 or
more bytes.

-----
<->: 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 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.

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
-----
Advanced
-----
Intel TXT Information
Chipset                Production Fused
BiosAcm                Production Fused
Chipset Txt            Supported
Cpu Txt                Supported
Error Code             None
Class Code             None
Major Code             None
Minor Code             None
Intel Trusted Execution Technology [Disabled]

Enables utilization of
additional hardware
capabilities provided by
Intel(R) Trusted
Execution Technology.
Changes require a full
power cycle to take
effect.
-----
<->: Select Screen
^ v: 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 12: Intel TXT(LT) Configuration

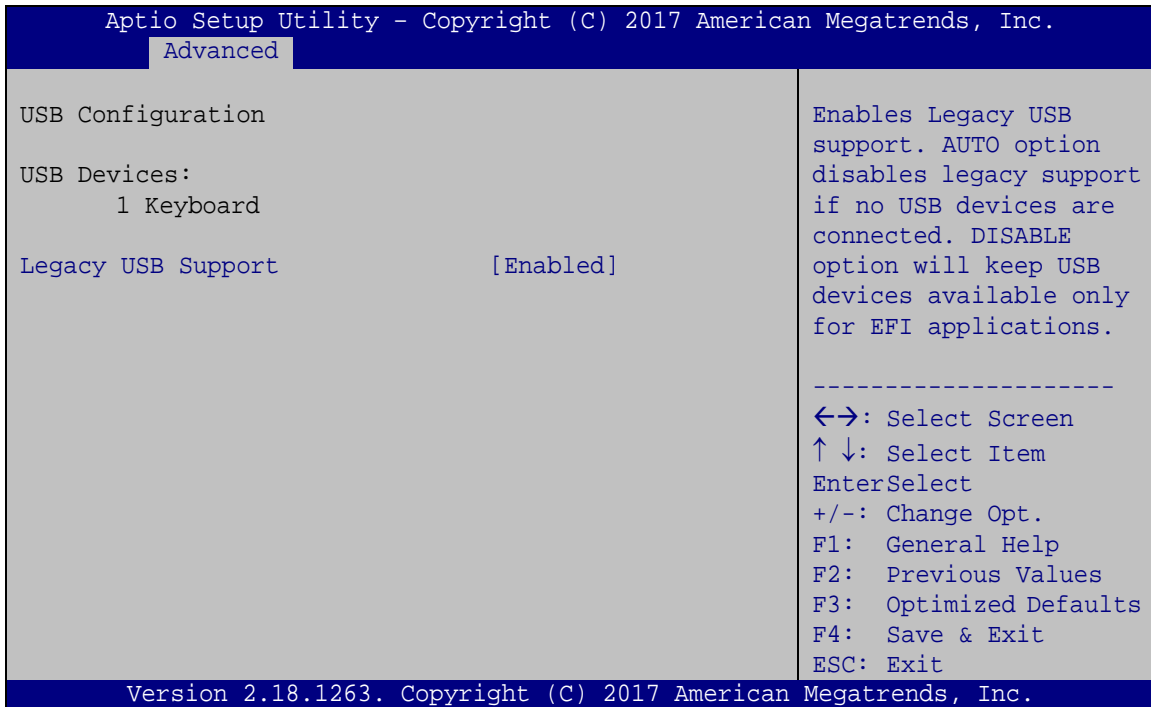
➔ Intel Trusted Execution Technology [Disabled]

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.

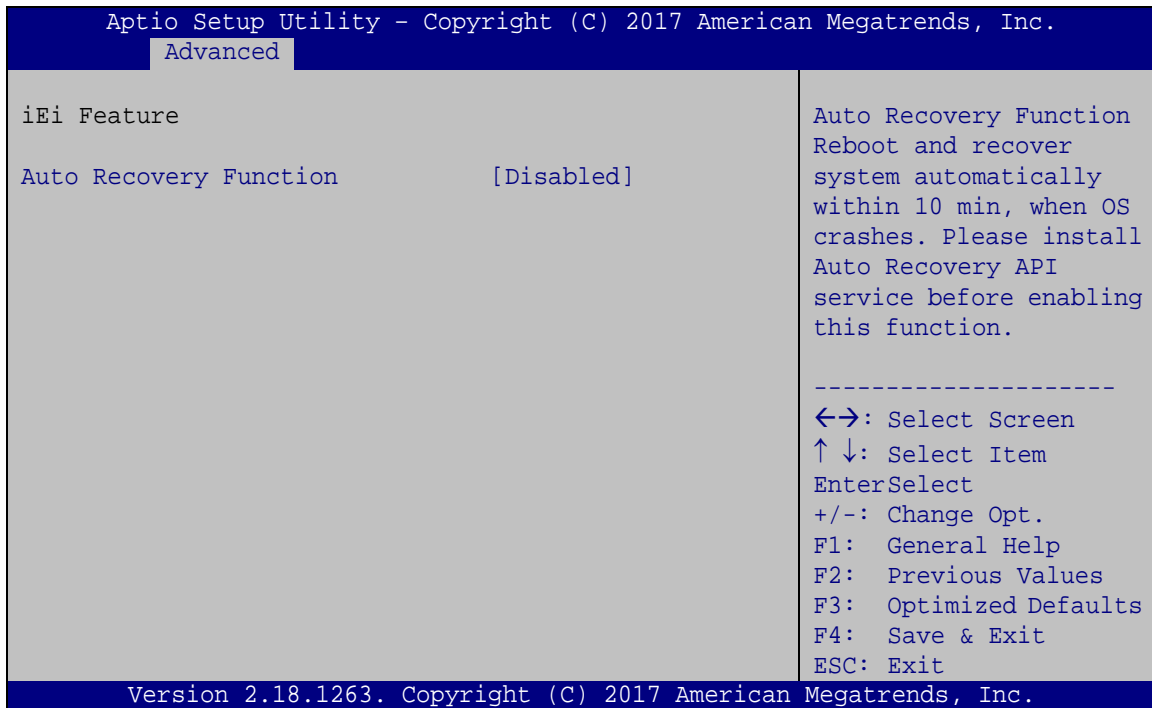
→ **Enabled** **DEFAULT** Legacy USB support enabled

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- ➔ **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

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- +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.

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
Advanced
Smart Fan Mode Configuration
CPU_FAN1 Smart Fan control      [Auto Mode]
CPU_FAN1 Start Temperature      65
CPU_FAN1 Off Temperature        55
CPU_FAN1 Start PWM              30
CPU_FAN1 Smart Fan Mode
Select
-----
<=>: Select Screen
↑↓: Select Item
Enter>Select
+/-: Change Opt.
F1:  General Help
F2:  Previous Values
F3:  Optimized
Defaults
F4:  Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
    
```

BIOS Menu 16: 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.

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```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Chipset
> System Agent (SA) Configuration
> PCH-IO Configuration

System Agent (SA)
Parameters

-----
<=>: Select Screen
↑ ↓: Select Item
Enter>Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

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

BIOS Menu 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.

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Chipset
System Agent (SA) Configuration
VT-d [Disabled]
> Memory Configuration
> Graphics Configuration
> PEG Port Configuration

VT-d capability

-----
-><: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

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

BIOS Menu 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.

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Chipset
-----
Memory Information
Total Memory          4096 MB
Memory Frequency     2133 MHz

DIMM1 Slot           Not Present
DIMM2 Slot           4096 MB (DDR4)

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

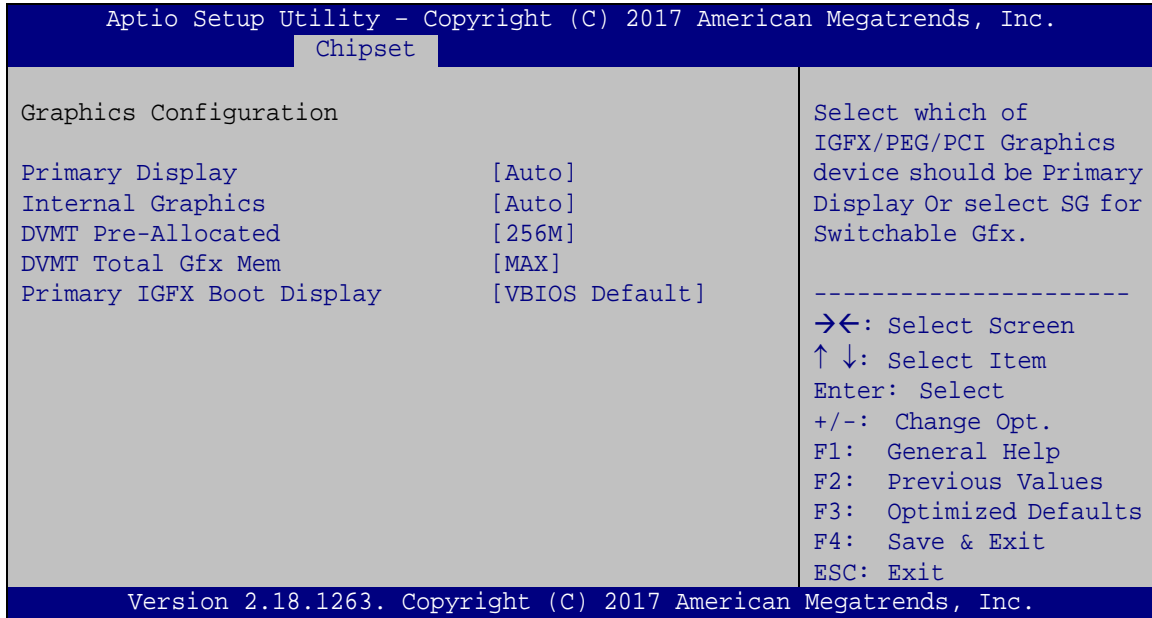
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
  
```

BIOS Menu 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.

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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**

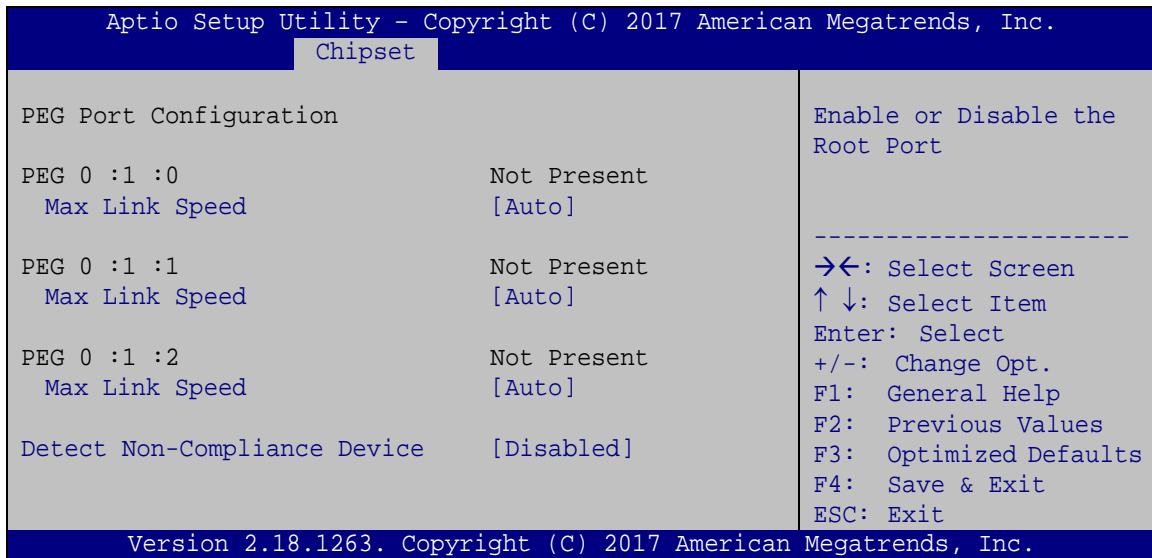
→ Primary IGFX Boot Display [VBIOS Default]

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

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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.

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
Chipset
PCH-IO Configuration
Auto Power Button Status      [Disabled(ATX)]
Restore AC Power Loss         [Last State]

> PCI Express Configuration
> HD Audio Configuration

Power Saving Function(EUP)    [Disabled]
USB Power SW1                 [+5VDUAL]

Select the state system
should be when restoring
on AC Power Loss.

-----
-><: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

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

BIOS Menu 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.

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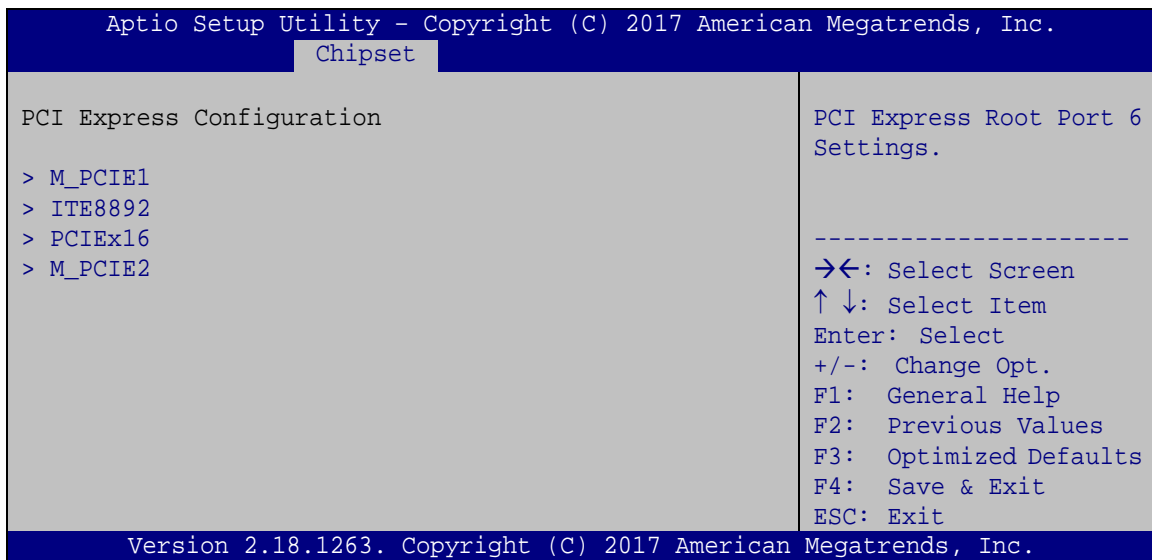
→ USB Power SW1 [+5V DUAL]

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.

```

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
Chipset
HD Audio Configuration
HD Audio [Auto]
Control Detection of the Azalia device.
Disable = Azalia will be unconditionally disabled
Enabled = Azalia will be unconditionally Enabled.
-----
←→: 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 24: HD Audio Configuration

→ HD Audio [Auto]

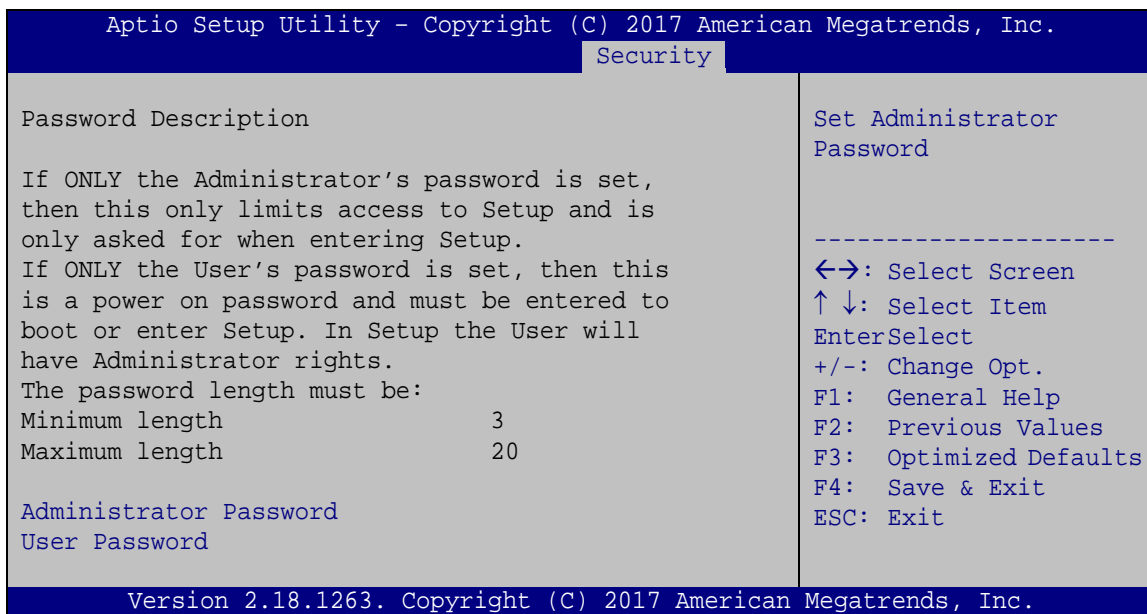
Use the **HD Audio** BIOS option to enable or disable the High Definition Audio controller.

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

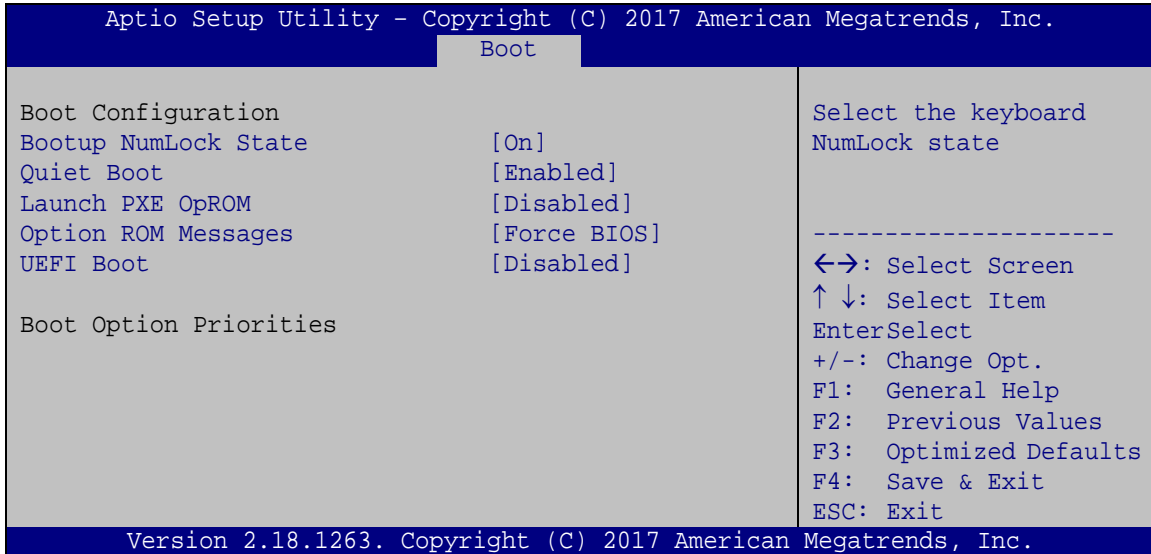
Use the **Administrator Password** to set or change an administrator password.

➔ 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.

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→ Quiet Boot [Enabled]

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

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

→ 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.

```
Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
Save & Exit
Save Changes and Reset
Discard Changes and Reset
Restore Defaults
Save as User Defaults
Restore User Defaults
Exit the system after
saving the changes.
-----
<->: Select Screen
^ v: Select Item
Enter>Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Menu 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.**

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→ 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 (2014/30/EU)
- Low-Voltage Directive (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 приложими правила на Директива 2014/53/EU

Česky [Czech]

IEI Integration Corp tímto prohlašuje, že tento zařzení je ve shodě se 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.

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.

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 relevanti li hemm fid-Dirrettiva 2014/53/EU.

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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.

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

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

CHINA ROHS

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

Appendix

B

BIOS Options

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

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

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<input type="checkbox"/>	USB Devices	64
<input type="checkbox"/>	Legacy USB Support [Enabled].....	64
<input type="checkbox"/>	Auto Recovery Function [Disabled].....	65
<input type="checkbox"/>	PC Health Status	66
<input type="checkbox"/>	Tcc Activation Offset	67
<input type="checkbox"/>	Smart Fan control [Auto Mode].....	67
<input type="checkbox"/>	CPU_FAN1 Start/Off Temperature.....	68
<input type="checkbox"/>	CPU_FAN1 start PWM	68
<input type="checkbox"/>	VT-d [Disabled].....	69
<input type="checkbox"/>	Primary Display [Auto]	71
<input type="checkbox"/>	Integrated Graphics [Auto]	71
<input type="checkbox"/>	DVMT Pre-Allocated [256M]	72
<input type="checkbox"/>	DVMT Total Gfx Mem [MAX].....	72
<input type="checkbox"/>	Primary IGFX Boot Display [VBIOS Default]	72
<input type="checkbox"/>	Max Link Speed [Auto]	73
<input type="checkbox"/>	Detect Non-Compliance Device [Disabled]	73
<input type="checkbox"/>	Restore AC Power Loss [Last State]	74
<input type="checkbox"/>	Power Saving Function (ERP) [Disabled].....	74
<input type="checkbox"/>	USB Power SW1 [+5V DUAL].....	75
<input type="checkbox"/>	PCIe Speed	75
<input type="checkbox"/>	Detect Non-Compliance Device [Disabled]	76
<input type="checkbox"/>	HD Audio [Auto].....	76
<input type="checkbox"/>	Administrator Password	77
<input type="checkbox"/>	User Password	77
<input type="checkbox"/>	Bootup NumLock State [On].....	78
<input type="checkbox"/>	Quiet Boot [Enabled]	79
<input type="checkbox"/>	Launch PXE OpROM [Disabled].....	79
<input type="checkbox"/>	Option ROM Messages [Force BIOS].....	79
<input type="checkbox"/>	UEFI Boot [Disabled]	79
<input type="checkbox"/>	Save Changes and Reset	80
<input type="checkbox"/>	Discard Changes and Reset	80
<input type="checkbox"/>	Restore Defaults	80
<input type="checkbox"/>	Save as User Defaults	81
<input type="checkbox"/>	Restore User Defaults	81

Appendix

C

Safety Precautions

TANK-870e-H110 Embedded System

C.1 Safety Precautions



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.

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

C.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

C.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.

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C.1.3 Product Disposal

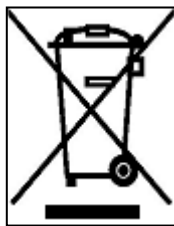


CAUTION:

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.

C.2 Maintenance and Cleaning Precautions

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

C.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.

C.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 swabs 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

D

Error Beep Code

D.1 PEI Beep Codes

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

D.2 DXE Beep Codes

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



NOTE:

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

Appendix

E

Hazardous Materials Disclosure

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

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

Please refer to the following table.

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

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E.2 China RoHS

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

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

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	○	○	○	○	○	○
印刷电路板	○	○	○	○	○	○
金属螺帽	○	○	○	○	○	○
电缆组装	○	○	○	○	○	○
风扇组装	○	○	○	○	○	○
电力供应组装	○	○	○	○	○	○
电池	○	○	○	○	○	○

○: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11364-2014 與 GB/T26572-2011 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11364-2014 與 GB/T26572-2011 标准规定的限量要求。