



MODEL:  
**PAC-400AI-C236**

AI System with Intel® Xeon® E3-1275 v5 CPU,  
Intel® C236, DDR4 Memory, Dual GbE, USB 3.2 Gen 1, VGA,  
PCIe Mini, PCIe x16, PCIe x4, 250W Power Supply, RoHS

## User Manual

# Revision

---

| Date              | Version | Changes         |
|-------------------|---------|-----------------|
| November 26, 2019 | 1.00    | Initial release |

# Copyright

---

## **COPYRIGHT NOTICE**

The information in this document is subject to change without prior notice in order to improve reliability, design and function and does not represent a commitment on the part of the manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

This document contains proprietary information protected by copyright. All rights are reserved. No part of this manual may be reproduced by any mechanical, electronic, or other means in any form without prior written permission of the manufacturer.

## **TRADEMARKS**

All registered trademarks and product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective owners.

# 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.

# Table of Contents

|  |           |
|--|-----------|
| <b>1 INTRODUCTION.....</b>   | <b>1</b>  |
| 1.1 OVERVIEW.....  | 2         |
| 1.2 MODEL VARIATIONS.....  | 2         |
| 1.3 FEATURES.....  | 3         |
| 1.4 FRONT PANEL.....   | 3         |
| 1.5 REAR PANEL.....  | 4         |
| 1.6 TECHNICAL SPECIFICATIONS.....  | 5         |
| 1.7 DIMENSIONS.....  | 7         |
| <b>2 UNPACKING.....</b>  | <b>8</b>  |
| 2.1 ANTI-STATIC PRECAUTIONS.....   | 9         |
| 2.2 UNPACKING PRECAUTIONS.....   | 9         |
| 2.3 PACKING LIST.....  | 10        |
| 2.4 OPTIONAL ITEMS.....  | 11        |
| <b>3 INSTALLATION.....</b>   | <b>13</b> |
| 3.1 INSTALLATION PRECAUTIONS.....  | 14        |
| 3.1.1 <i>High Surface Temperature</i> .....                              | 14        |
| 3.2 TOP COVER REMOVAL.....   | 15        |
| 3.3 HDD INSTALLATION.....  | 15        |
| 3.4 PCIe MINI CARD INSTALLATION (MSATA).....                             | 17        |
| 3.4.1 <i>Half-size PCIe Mini Card Installation</i> .....                 | 20        |
| 3.4.1 <i>PCIe Mini Card Slot Pinouts – Full/Half Size (MSATA1)</i> ..... | 22        |
| 3.5 LAN CONNECTION.....  | 23        |
| 3.6 MOUNTING THE SYSTEM.....   | 24        |
| 3.7 POWER-ON PROCEDURE.....  | 26        |
| 3.7.1 <i>Installation Checklist</i> .....                                | 26        |
| 3.7.2 <i>Power-on Procedure</i> .....                                    | 26        |
| 3.8 AVAILABLE DRIVERS.....   | 27        |
| 3.8.1 <i>Driver Download</i> .....                                       | 28        |
| <b>4 TROUBLESHOOTING AND MAINTENANCE.....</b>                            | <b>30</b> |

|   |           |
|---|-----------|
| 4.1 SYSTEM MAINTENANCE OVERVIEW .....                           | 31        |
| 4.2 SYSTEM TROUBLESHOOTING.....                                 | 31        |
| 4.2.1 <i>The System Doesn't Turn On</i> .....                   | 31        |
| 4.2.2 <i>The System Doesn't Boot Up</i> .....                   | 32        |
| 4.2.3 <i>More Troubleshooting</i> .....                         | 32        |
| 4.3 MAINTENANCE.....  | 33        |
| 4.3.1 <i>Fan Replacement</i> .....                              | 33        |
| 4.3.2 <i>Fan Filter Replacement</i> .....                       | 34        |
| 4.3.3 <i>Clear CMOS</i> .....                                   | 34        |
| 4.3.4 <i>Flash Descriptor Security Override Jumper</i> .....    | 35        |
| <b>5 BIOS.....</b>  | <b>37</b> |
| 5.1 INTRODUCTION.....   | 38        |
| 5.1.1 <i>Starting Setup</i> .....                               | 38        |
| 5.1.2 <i>Using Setup</i> .....                                  | 38        |
| 5.1.3 <i>Getting Help</i> .....                                 | 39        |
| 5.1.4 <i>Unable to Reboot after Configuration Changes</i> ..... | 39        |
| 5.1.5 <i>BIOS Menu Bar</i> .....                                | 39        |
| 5.2 MAIN.....   | 40        |
| 5.3 ADVANCED.....   | 41        |
| 5.3.1 <i>CPU Configuration</i> .....                            | 42        |
| 5.3.2 <i>PCH-FW Configuration</i> .....                         | 44        |
| 5.3.3 <i>ACPI Settings</i> .....                                | 45        |
| 5.3.4 <i>F81866 Super IO Configuration</i> .....                | 46        |
| 5.3.4.1 <i>Serial Port n Configuration</i> .....                | 47        |
| 5.3.5 <i>iWDD H/W Monitor</i> .....                             | 49        |
| 5.3.5.1 <i>Smart Fan Mode Configuration</i> .....               | 50        |
| 5.3.6 <i>RTC Wake Settings</i> .....                            | 51        |
| 5.3.7 <i>Serial Port Console Redirection</i> .....              | 52        |
| 5.3.7.1 <i>Legacy Console Redirection Settings</i> .....        | 55        |
| 5.3.8 <i>NVMe Configuration</i> .....                           | 56        |
| 5.3.9 <i>USB Configuration</i> .....                            | 57        |
| 5.3.10 <i>iEi Feature</i> .....                                 | 58        |
| 5.4 CHIPSET .....   | 59        |
| 5.4.1 <i>System Agent (SA) Configuration</i> .....              | 60        |

## PAC-400AI-C236 Embedded System

|  |           |
|--|-----------|
| 5.4.1.1 Memory Configuration .....                 | 61        |
| 5.4.1.2 Graphics Configuration.....                | 62        |
| 5.4.1.3 PEG Port Configuration.....                | 64        |
| 5.4.2 PCH-IO Configuration .....                   | 66        |
| 5.4.2.1 PCI Express Configuration .....            | 67        |
| 5.4.2.2 SATA Configuration.....                    | 69        |
| 5.4.2.3 HD Audio Configuration.....                | 70        |
| 5.5 SECURITY.....                                  | 71        |
| 5.6 BOOT.....                                      | 72        |
| 5.7 SAVE & EXIT .....                              | 74        |
| <b>6 INTERFACE CONNECTORS .....</b>                | <b>75</b> |
| 6.1 PERIPHERAL INTERFACE CONNECTORS.....           | 76        |
| 6.2 INTERNAL PERIPHERAL CONNECTORS .....           | 77        |
| 6.3 EXTERNAL INTERFACE PANEL CONNECTORS .....      | 78        |
| <b>A REGULATORY COMPLIANCE .....</b>               | <b>79</b> |
| <b>B SAFETY PRECAUTIONS .....</b>                  | <b>84</b> |
| B.1 SAFETY PRECAUTIONS.....                        | 85        |
| <i>B.1.1 General Safety Precautions .....</i>      | <i>85</i> |
| <i>B.1.2 Anti-static Precautions .....</i>         | <i>86</i> |
| <i>B.1.3 Explanation of Graphical Symbols.....</i> | <i>86</i> |
| <i>B.1.4 Product Disposal .....</i>                | <i>87</i> |
| B.2 MAINTENANCE AND CLEANING PRECAUTIONS .....     | 88        |
| <i>B.2.1 Maintenance and Cleaning.....</i>         | <i>88</i> |
| <i>B.2.2 Cleaning Tools.....</i>                   | <i>88</i> |
| <b>C DIGITAL I/O INTERFACE.....</b>                | <b>90</b> |
| <b>D WATCHDOG TIMER .....</b>                      | <b>93</b> |
| <b>E ERROR BEEP CODE.....</b>                      | <b>96</b> |
| E.1 PEI BEEP CODES.....                            | 97        |
| E.2 DXE BEEP CODES .....                           | 97        |
| <b>F HAZARDOUS MATERIALS DISCLOSURE.....</b>       | <b>98</b> |

# List of Figures

---

|  |    |
|--|----|
| Figure 1-1: PAC-400AI-C236 Series .....  | 2  |
| Figure 1-2: Front Panel .....  | 3  |
| Figure 1-3: Rear Panel.....  | 4  |
| Figure 1-4: Physical Dimensions (millimeters).....                                 | 7  |
| Figure 3-1: Top Cover Removal .....  | 15 |
| Figure 3-2: Upper Compartment Retention Screws .....                               | 16 |
| Figure 3-3: 3.5" HDD Bracket Retention Screws .....                                | 16 |
| Figure 3-4: 3.5" HDD Retention Screws .....  | 17 |
| Figure 3-5: PCIe Mini Slot Location .....  | 18 |
| Figure 3-6: Removing the Retention Screw .....                                     | 18 |
| Figure 3-7: Inserting the Full-size PCIe Mini Card into the Slot at an Angle ..... | 19 |
| Figure 3-8: Securing the Full-size PCIe Mini Card .....                            | 19 |
| Figure 3-9: Removing the Standoff.....   | 20 |
| Figure 3-10: Installing the Standoff .....   | 21 |
| Figure 3-11: Inserting the Half-size PCIe Mini Card into the Slot at an Angle..... | 21 |
| Figure 3-12: Securing the Half-size PCIe Mini Card .....                           | 22 |
| Figure 3-13: RJ-45 Ethernet Connector.....   | 23 |
| Figure 3-14: Mounting Bracket Retention Screws .....                               | 25 |
| Figure 3-15: Power-on.....   | 27 |
| Figure 3-16: IEL Resource Download Center.....                                     | 27 |
| Figure 4-1: Fan Filter Bracket Thumbscrews .....                                   | 33 |
| Figure 4-2: System Fan Removal .....   | 33 |
| Figure 4-3: Clear CMOS Button Location.....  | 35 |
| Figure 4-4: Flash Descriptor Security Override Jumper Location .....               | 35 |
| Figure 6-1: Main Board Layout Diagram (Front Side).....                            | 76 |



# List of Tables

---

|  |    |
|--|----|
| Table 1-1: PAC-400AI-C236 Model Variations.....                    | 2  |
| Table 1-2: Technical Specifications.....                           | 6  |
| Table 3-1: PCIe Mini Card Slot – Full Size (MSATA1) Pinouts .....  | 23 |
| Table 3-2: LAN1/LAN2 Pinouts.....                                  | 23 |
| Table 3-3: RJ-45 Ethernet Connector LEDs .....                     | 24 |
| Table 4-1: Flash Descriptor Security Override Jumper Settings..... | 35 |
| Table 5-1: BIOS Navigation Keys .....                              | 39 |
| Table 6-1: Peripheral Interface Connectors .....                   | 78 |
| Table 6-2: External Peripheral Connectors .....                    | 78 |



Chapter

1

# Introduction

---

## 1.1 Overview



**Figure 1-1: PAC-400AI-C236 Series**

The PAC-400AI-C236 embedded system is powered by the Intel® Xeon® E3-1275 v5 processor. It is designed for harsh environment applications, and supports wall mounting method.

The PAC-400AI-C236 provides one PCIe x16 slot and one PCIe x4 slot for building AI applications by installing IEI Mustang accelerator cards. Its I/O interfaces include two USB 3.2 Gen 1 ports, two USB 2.0 ports, two GbE, and one VGA.

## 1.2 Model Variations

The model variations of the PAC-400AI-C236 series are listed below.

| Model No.                | CPU                     | Pre-installed Memory |
|--------------------------|-------------------------|----------------------|
| PAC-400AI-C236-25        | N/A                     | N/A                  |
| PAC-400AI-C236-XE/16G/25 | Intel® Xeon® E3-1275 v5 | 16 GB DDR4           |

**Table 1-1: PAC-400AI-C236 Model Variations**

## PAC-400AI-C236 Embedded System

### 1.3 Features

The PAC-400AI-C236 features are listed below:

- Intel® Xeon® E3-1275 v5 CPU (3.60 GHz, quad core, TDP 80W)
- Supports DDR4 SO-DIMM (system max. 32 GB)
- Supports one mSATA and one 3.5" SATA HDD
- One 8 cm easy-access fan
- Great flexibility hardware expansions by one PCIe 3.0 x16 slot and one PCIe 3.0 x4 slot
- Supports two GbE, four USB and one VGA
- RoHS compliant

### 1.4 Front Panel

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

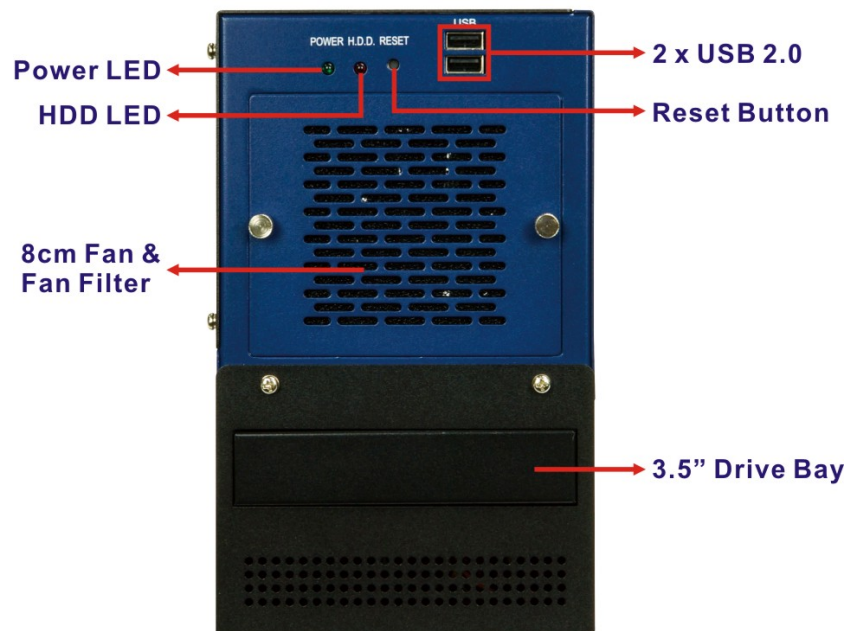
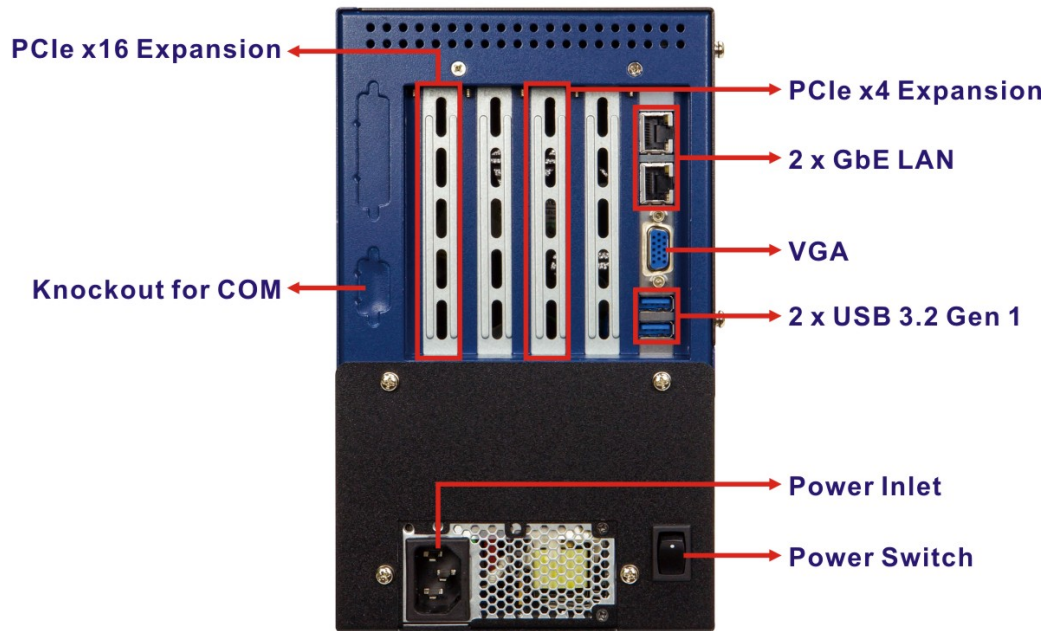


Figure 1-2: Front Panel

## 1.5 Rear Panel

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



**Figure 1-3: Rear Panel**

## PAC-400AI-C236 Embedded System

### 1.6 Technical Specifications

The PAC-400AI-C236 technical specifications are listed in **Table 1-2**.

| System                      |  |
|-----------------------------|--|
| <b>CPU</b>                  | Intel® Xeon® E3-1275 v5 CPU<br>(3.60 GHz, quad core, TDP 80W)  |
| <b>Chipset</b>              | Intel® C236  |
| <b>Memory</b>               | Two 260-pin 1600/2133 MHz dual-channel DDR4 ECC and non-ECC unbuffered SO-DIMM slots (system max. 32 GB)<br>Pre-installed with 16 GB (two 8 GB) memory |
| <b>Display Output</b>       | 1 x VGA (up to 1920x1200 @ 60 Hz)<br>1 x iDP interface for HDMI, LVDS, VGA, DVI, DP (up to 3840x2160 @ 60 Hz)  |
| Storage                     |  |
| <b>HDD</b>                  | One 3.5" SATA 6Gb/s HDD/SSD bay (hot-swappable)  |
| <b>mSATA</b>                | One full-size/half-size PCIe Mini card slot supports mSATA and USB 2.0   |
| I/O Interfaces              |  |
| <b>Ethernet</b>             | LAN1: Intel® I219LM Clarkville-V with Intel® AMT 11.0 support<br>LAN2: Intel® I211 PCIe controller   |
| <b>USB</b>                  | 2 x USB 3.2 Gen 1 (5Gb/s) ports (rear)<br>2 x USB 2.0 pin-header (front)   |
| <b>Keyboard &amp; Mouse</b> | One internal 6-pin connector   |
| <b>Digital I/O</b>          | 8-bit (via internal 10-pin header)   |
| <b>Expansions</b>           | 1 x PCIe 3.0 x16 slot<br>1 x PCIe 3.0 x4 slot<br>*PCIe half-size card length: support up to 169 mm   |
| <b>LED Indicators</b>       | 1 x HDD LED (red)<br>1 x Power LED (green)   |

|                                     |  |
|-------------------------------------|--|
| <b>Buttons</b>                      | Power switch<br>Reset button               |
| <b>Power</b>                        |  |
| <b>Power Input</b>                  | 100 V ~ 240 V AC, 250 W ATX power supply   |
| <b>Environmental and Mechanical</b> |  |
| <b>Mounting</b>                     | Wall mount                                 |
| <b>Thermal</b>                      | 8 cm system fan, CPU fan                   |
| <b>Operating Temperature</b>        | 0°C~50°C                                   |
| <b>Storage Temperature</b>          | 0°C~60°C                                   |
| <b>Operating Humidity</b>           | 10%~95%, non-condensing                    |
| <b>Storage Humidity</b>             | 10%~90%, non-condensing                    |
| <b>Chassis Construction</b>         | Heavy duty metal                           |
| <b>Weight (Net/Gross)</b>           | 6 kg / 7.8 kg                              |
| <b>Physical Dimensions</b>          | 268.7 mm x 140.0 mm x 230.3 mm (D x W x H) |
| <b>OS</b>                           |  |
| <b>Supported OS</b>                 | Microsoft® Windows® 10, Linux              |

**Table 1-2: Technical Specifications**



PAC-400AI-C236 Embedded System

1.7 Dimensions

The physical dimensions are shown below:

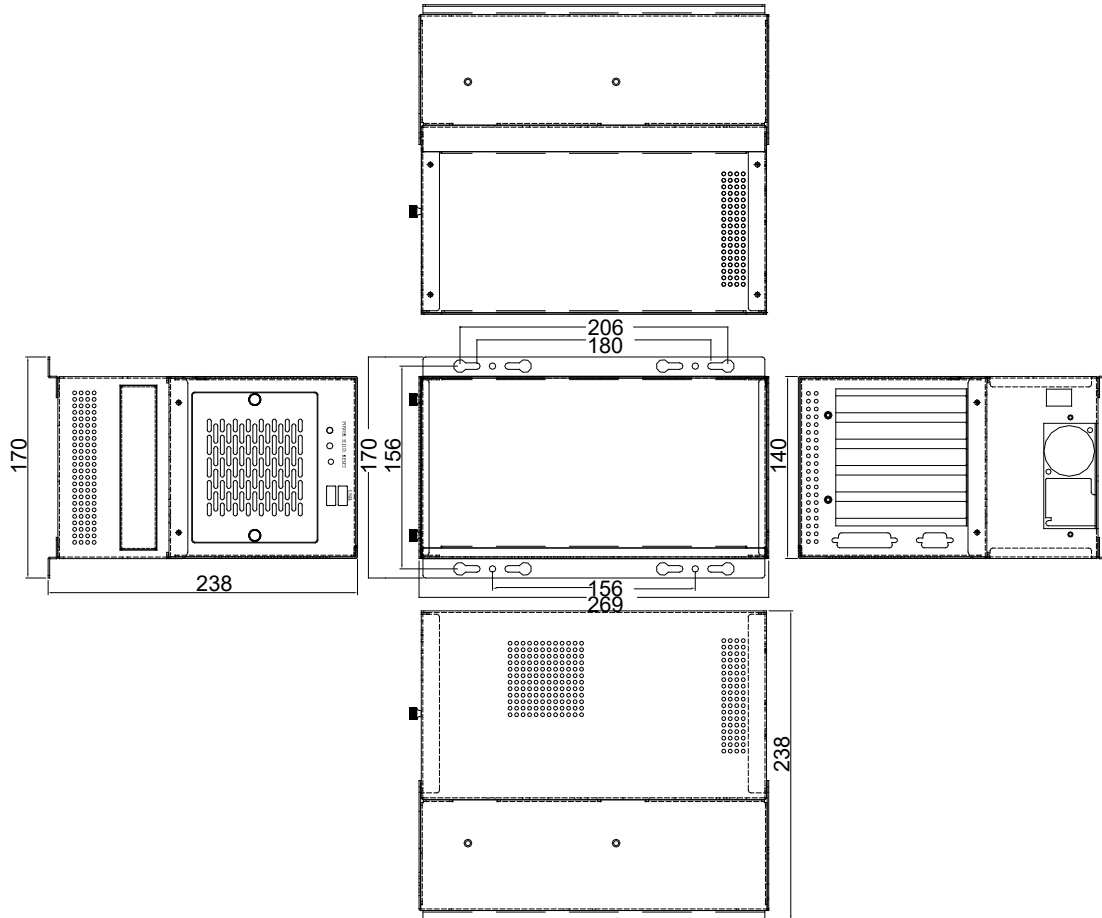


Figure 1-4: Physical Dimensions (millimeters)

Chapter

**2**

# Unpacking

---

## PAC-400AI-C236 Embedded System

### 2.1 Anti-static Precautions

---



#### WARNING:

Failure to take ESD precautions during installation may result in permanent damage to the PAC-400AI-C236 and severe injury to the user.

---

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PAC-400AI-C236. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PAC-400AI-C236 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 PAC-400AI-C236, place it on an anti-static pad. This reduces the possibility of ESD damaging the PAC-400AI-C236.

### 2.2 Unpacking Precautions

When the PAC-400AI-C236 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 PAC-400AI-C236 does not fall out of the box.
- Make sure all the components shown in **Section 2.3** are present.

## 2.3 Packing List



**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 PAC-400AI-C236 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to [sales@ieiworld.com](mailto:sales@ieiworld.com).




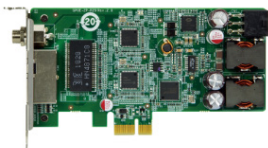
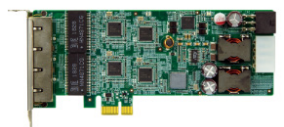


The PAC-400AI-C236 is shipped with the following components:


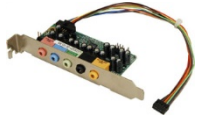
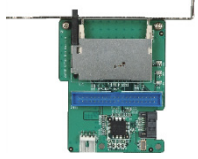



| Quantity        | Item and Part Number      | Image  |
|-----------------|---------------------------|--|
| <b>Standard</b> |                           |  |
| 1               | PAC-400AI-C236            |   |
| 1               | SATA cable                |  |
| 1               | Power cord                |  |
| 2               | Mounting brackets         |  |
| 6               | Mounting bracket screws   |  |
| 4               | Screws (for securing HDD) |  |

## PAC-400AI-C236 Embedded System

### 2.4 Optional Items

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

| Optional   |  |
|--|--|
| Accelerator card with four Intel® Movidius™ Myriad™ X MA2485 VPUs<br>(P/N: Mustang-V100-MX4-R10) |    |
| Accelerator card with eight Movidius Myriad X MA2485 VPUs<br>(P/N: Mustang-V100-MX8-R11)         |    |
| PCIe FPGA accelerator card with Arria 10 1150GX<br>(P/N: Mustang-F100-A10-R10)                   |    |
| PCIe Power over Ethernet card, 2-port 1000 Base(T), 802.3at<br>(P/N: GPOE-2P-R20)                |  |
| PCIe Power over Ethernet card, 4-port 1000 Base(T), 802.3at/af<br>(P/N: GPOE-4P-R20)             |  |
| PCIe Power over Ethernet card, 4-port 1000 Base(T), 802.3af<br>(P/N: IPCIE-4POE-R10)             |  |
| KB/MS cable<br>(P/N: 19800-000075-RS)  |  |

| Optional  |  |
|---|--|
| SATA power cable<br>(P/N: 32102-000100-200-RS)                      |    |
| Audio kit (7.1 Channel)<br>(P/N: AC-KIT-892HD-R10)                  |    |
| SATA to IDE/CompactFlash® converter board<br>(P/N: SAIDE-KIT01-R10) |    |
| Power cable, 100 mm<br>(P/N: 32102-044900-100-RS)                   |    |
| Power cable, 150 mm<br>(P/N: 32102-011500-100-RS)                   |   |
| CPU cooler<br>(P/N: 19100-000238-00-RS)                             |  |

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 PAC-400AI-C236, installation instructions and configuration options.
- **DANGER! Disconnect Power:** Power to the PAC-400AI-C236 must be disconnected during the installation process. Failing to disconnect the power may cause severe injury to the body and/or damage to the system.
- **Qualified Personnel:** The PAC-400AI-C236 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 PAC-400AI-C236. The PAC-400AI-C236's cooling vents must not be obstructed by any objects. Blocking the vents can cause overheating of the PAC-400AI-C236. Leave at least 5 cm of clearance around the PAC-400AI-C236 to prevent overheating.
- **Grounding:** The PAC-400AI-C236 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 PAC-400AI-C236.

### 3.1.1 High Surface Temperature



#### **WARNING:**

Some surfaces of the equipment may become hot during operation.

The surface temperature may be up to several tens of degrees hotter than the ambient temperature. Under these circumstances, the equipment needs to be protected against accidental contact.

---

The equipment is intended for installation in a RESTRICTED ACCESS LOCATION.



## PAC-400AI-C236 Embedded System

- Access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken.
- Access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location.

### 3.2 Top Cover Removal

Before installing or maintaining the internal components, the top cover must be removed from the PAC-400AI-C236. Follow the steps below to complete the task.

**Step 1:** Remove all four top cover retention screws from the left side of the chassis.

**Step 2:** Slide the cover leftwards and then lift the cover up gently.

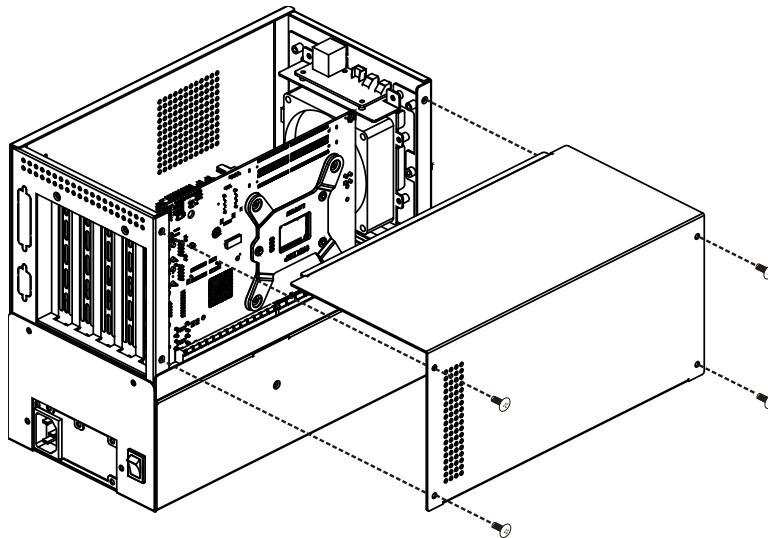


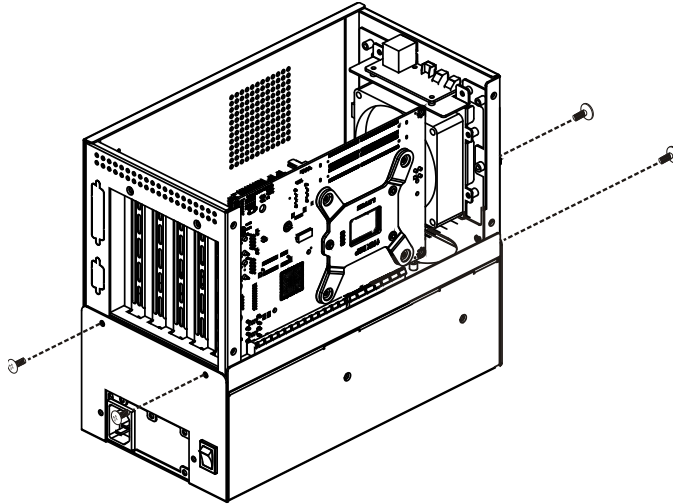
Figure 3-1: Top Cover Removal

### 3.3 HDD Installation

The PAC-400AI-C236 allows installation of one 3.5" HDD/SSD. To install a HDD into the system, please follow the steps below.

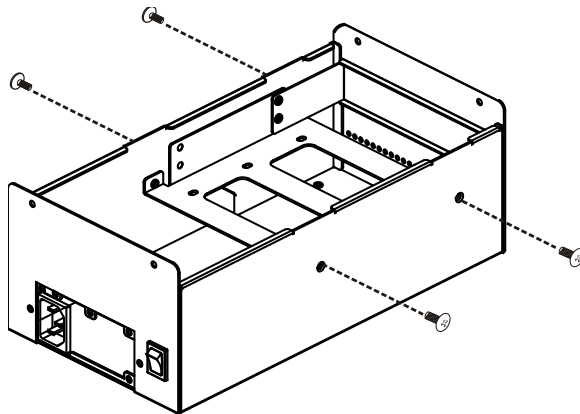
**Step 1:** Remove the top cover from the PAC-400AI-C236. Please follow the instruction described in **Section 3.2**.

**Step 2:** Remove the upper compartment by removing the four upper compartment retention screws, two from the front and two from the rear of the chassis (Figure 3-3).



**Figure 3-2: Upper Compartment Retention Screws**

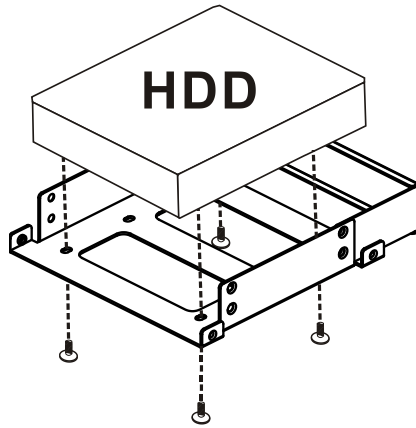
**Step 3:** Remove the 3.5" drive bracket by removing the four retention screws from both sides of the drive bracket, two from each side.



**Figure 3-3: 3.5" HDD Bracket Retention Screws**

## PAC-400AI-C236 Embedded System

**Step 4:** Mount a 3.5" HDD onto the 3.5" drive bracket. To secure the HDD to the HDD bracket, insert four retention screws from the bottom surface of the HDD bracket.



**Figure 3-4: 3.5" HDD Retention Screws**

**Step 5:** Reinstall the drive bracket and reinsert the four previously removed retention screws.

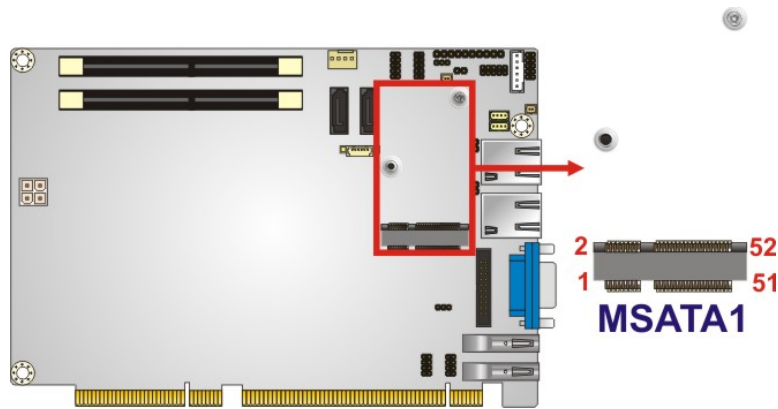
**Step 6:** Connect the HDD power connector and SATA connector.

### 3.4 PCIe Mini Card Installation (mSATA)

The PAC-400AI-C236 has one full-size/half-size PCIe Mini slot on the motherboard. To install a full-size module, follow the instructions below.

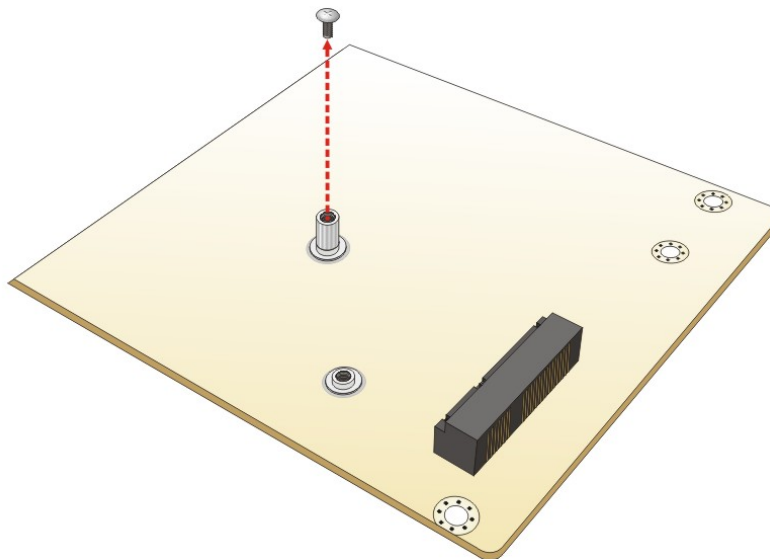
**Step 1:** Remove the internal access panel from the PAC-400AI-C236. See **Section 3.2**.

**Step 2:** Locate the PCIe Mini slot on the motherboard (Figure 3-5).



**Figure 3-5: PCIe Mini Slot Location**

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



**Figure 3-6: Removing the Retention Screw**

**Step 4:** Line up the notch on the card with the notch on the slot. Slide the PCIe Mini card into the socket at an angle of about 20° (**Figure 3-7**).

## PAC-400AI-C236 Embedded System

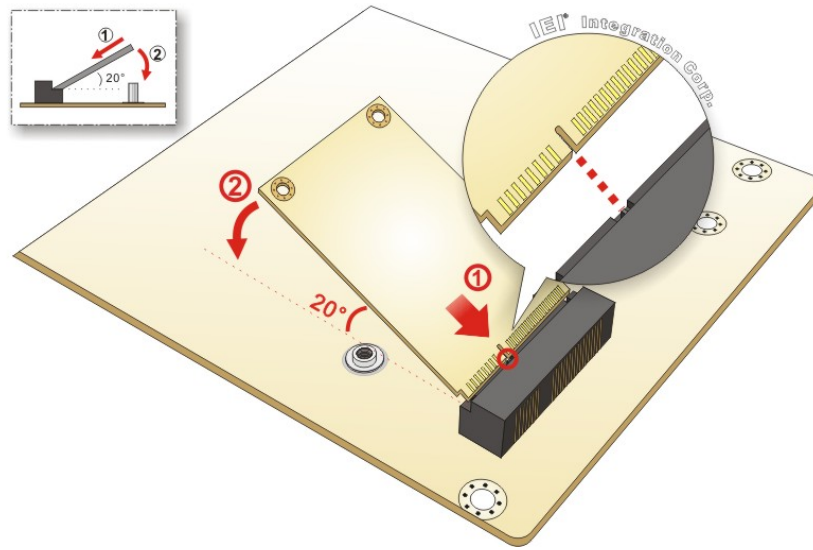


Figure 3-7: Inserting the Full-size PCIe Mini Card into the Slot at an Angle

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

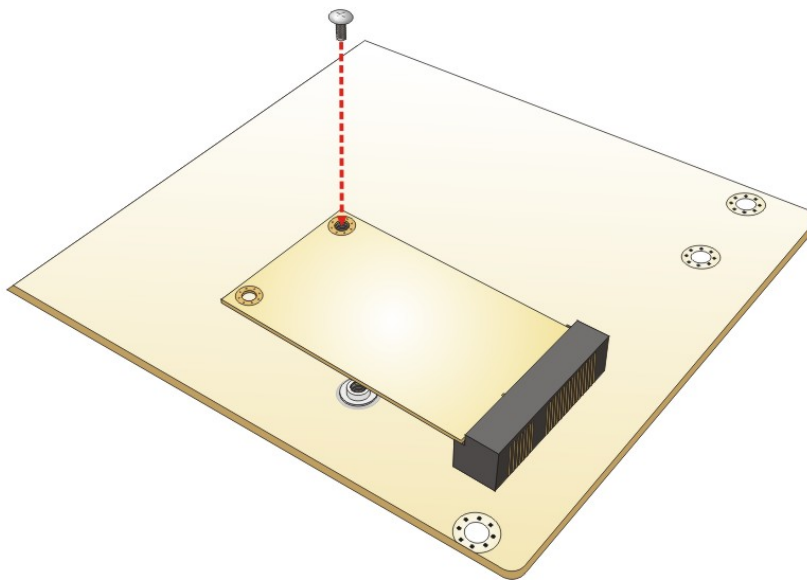


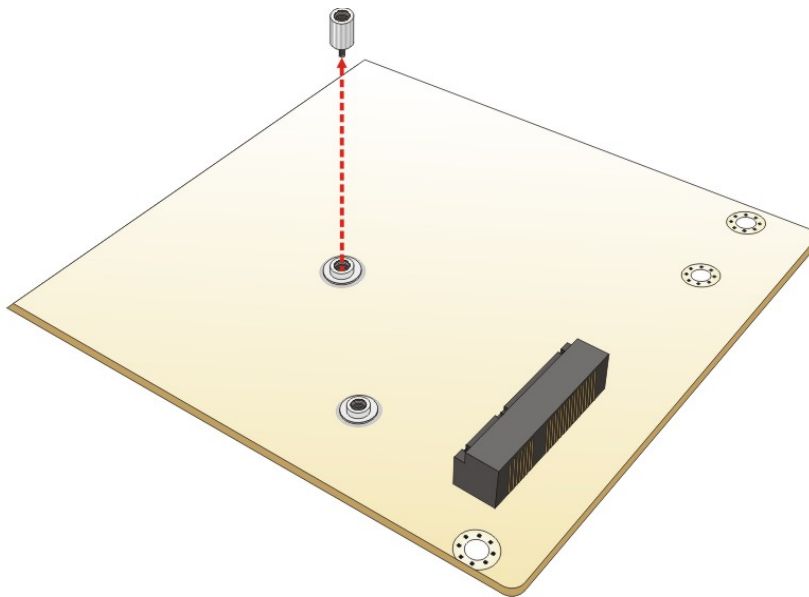
Figure 3-8: Securing the Full-size PCIe Mini Card

### 3.4.1 Half-size PCIe Mini Card Installation

The PCIe Mini slot (MPCIE1) also allows installation of a half-size PCIe Mini card. To install a half-size PCIe Mini card, please follow the steps below.

**Step 1:** Remove the retention screw as shown in **Figure 3-6**.

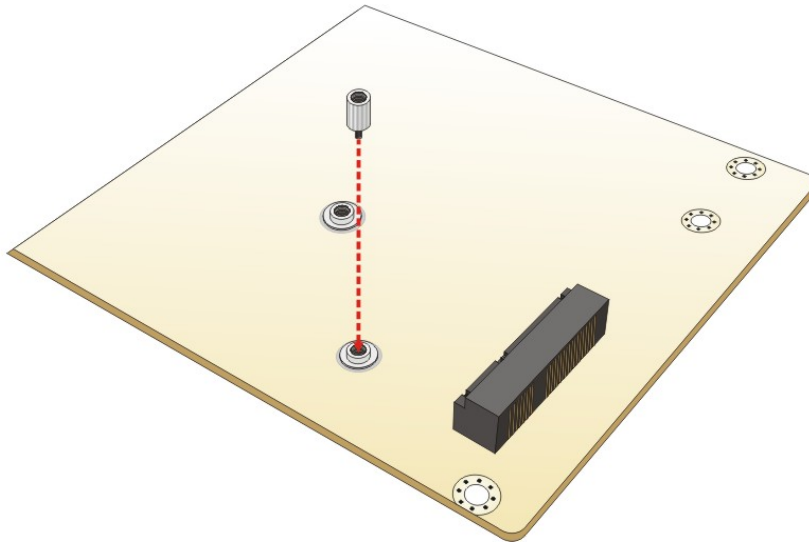
**Step 2:** Unscrew and remove the standoff secured on the motherboard as shown in **Figure 3-9**.



**Figure 3-9: Removing the Standoff**

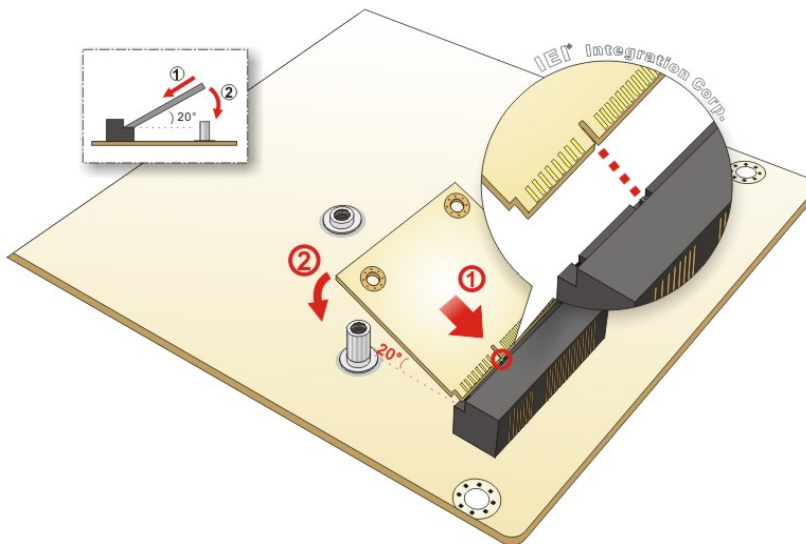
**Step 3:** Install the previously removed standoff to the screw hole for the half-size PCIe Mini card (**Figure 3-10**).

## PAC-400AI-C236 Embedded System



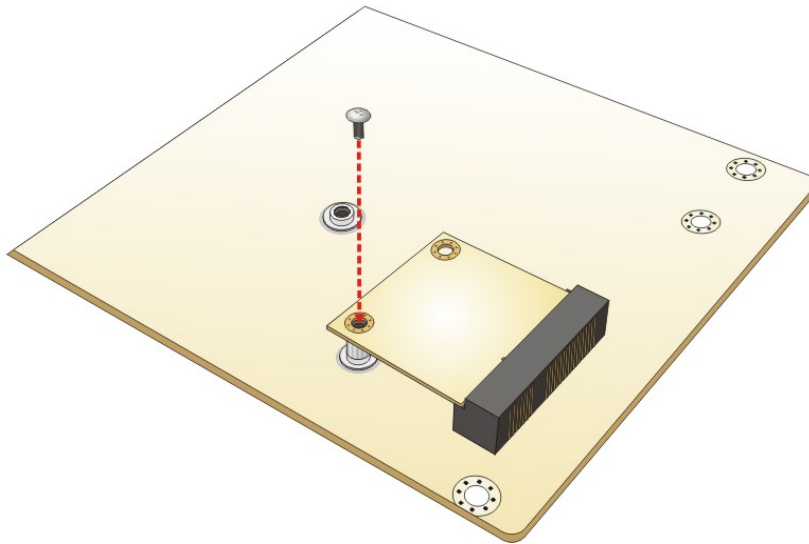
**Figure 3-10: Installing the Standoff**

**Step 4:** Line up the notch on the card with the notch on the slot. Slide the PCIe Mini card into the slot at an angle of about 20° (**Figure 3-11**).



**Figure 3-11: Inserting the Half-size PCIe Mini Card into the Slot at an Angle**

**Step 5:** Secure the half-size PCIe Mini card with the retention screw previously removed (**Figure 3-12**).



**Figure 3-12: Securing the Half-size PCIe Mini Card**

### 3.4.1 PCIe Mini Card Slot Pinouts – Full/Half Size (MSATA1)

The MSATA1 slot supports USB 2.0 and mSATA signal for installing mSATA modules.

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1       | PCIE_WAKE#  | 2       | +3.3V       |
| 3       | N/C         | 4       | GND         |
| 5       | N/C         | 6       | 1.5V        |
| 7       | N/C         | 8       | N/C         |
| 9       | GND         | 10      | N/C         |
| 11      | MSATA_CLK#  | 12      | N/C         |
| 13      | MSATA_CLK   | 14      | N/C         |
| 15      | GND         | 16      | N/C         |
| 17      | PLTRST_N    | 18      | GND         |
| 19      | N/C         | 20      | +3.3V       |
| 21      | GND         | 22      | PLTRST_N    |
| 23      | SATA_RX+    | 24      | +3.3V       |
| 25      | SATA_RX-    | 26      | GND         |
| 27      | GND         | 28      | 1.5V        |
| 29      | GND         | 30      | SMB_CLK     |



## PAC-400AI-C236 Embedded System

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 31      | SATA_TX-    | 32      | SMB_DATA    |
| 33      | SATA_TX+    | 34      | GND         |
| 35      | GND         | 36      | USB_DATA-   |
| 37      | GND         | 38      | USB_DATA+   |
| 39      | +3.3V       | 40      | GND         |
| 41      | +3.3V       | 42      | N/C         |
| 43      | +3.3V       | 44      | N/C         |
| 45      | CLINK_CLK   | 46      | N/C         |
| 47      | CLINK_DATA  | 48      | 1.5V        |
| 49      | CLINK_RST#  | 50      | GND         |
| 51      | MSATA_DET   | 52      | +3.3V       |

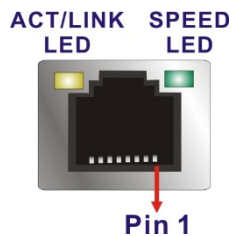
**Table 3-1: PCIe Mini Card Slot – Full Size (MSATA1) Pinouts**

### 3.5 LAN Connection

The LAN connectors allow connection to an external network.

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | LAN_MDI0P   | 5   | LAN_MDI2P   |
| 2   | LAN_MDI0N   | 6   | LAN_MDI2N   |
| 3   | LAN_MDI1P   | 7   | LAN_MDI3P   |
| 4   | LAN_MDI1N   | 8   | LAN_MDI3N   |

**Table 3-2: LAN1/LAN2 Pinouts**



**Figure 3-13: 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 3-3**.

| 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   |

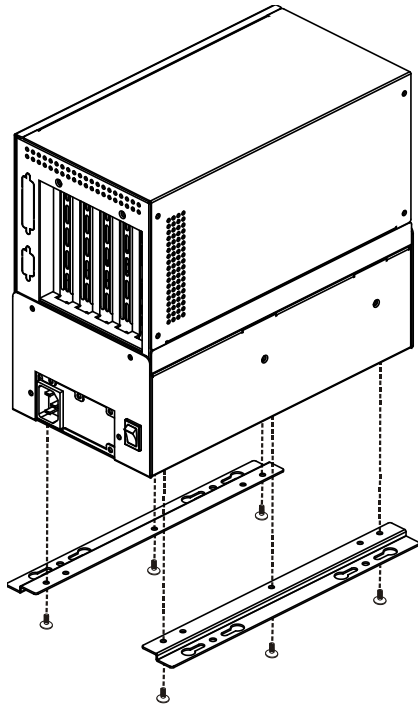
**Table 3-3: RJ-45 Ethernet Connector LEDs**

### 3.6 Mounting the System

Two wall-mount plates are shipped with the PAC-400AI-C236. The wall-mount plates are installed on the sides, at the bottom of the chassis. Each plate is secured to the chassis with three retention screws. To install the wall-mount plates, please follow the steps below:

- Step 1:** Align the retention screw holes on the side of the chassis with the retention screw holes in the wall-mount plate.
- Step 2:** Insert three retention screws into each wall-mount plate (**Figure 3-14**).

## PAC-400AI-C236 Embedded System



**Figure 3-14: Mounting Bracket Retention Screws**

- Step 3:** Drill holes in the intended installation surface.
- Step 4:** Align the mounting holes in the sides of the mounting brackets with the predrilled holes in the mounting surface.
- Step 5:** Insert retention screws to secure the system to the mounting surface.

## 3.7 Power-On Procedure

### 3.7.1 Installation Checklist

---

**WARNING:**

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

---

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

- The rear surface panel is installed
- All peripheral devices (monitor, serial communications devices etc.) are connected
- The system is securely mounted

### 3.7.2 Power-on Procedure

To power-on the PAC-400AI-C236 please follow the steps below:

**Step 1:** Connect the power source to the power inlet of the PAC-400AI-C236 through the included power cord.

**Step 2:** Press the power button to turn on the system. The power LED on the front panel will turn on in green.

## PAC-400AI-C236 Embedded System



Figure 3-15: Power-on

### 3.8 Available Drivers

All the drivers for the PAC-400AI-C236 are available on IEI Resource Download Center (<https://download.ieiworld.com>). Type PAC-400AI-C236 and press Enter to find all the relevant software, utilities, and documentation.

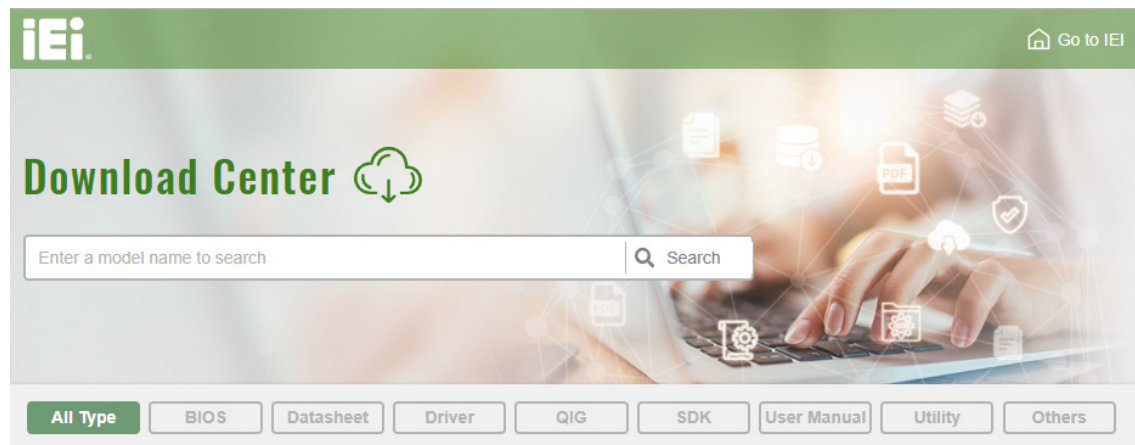
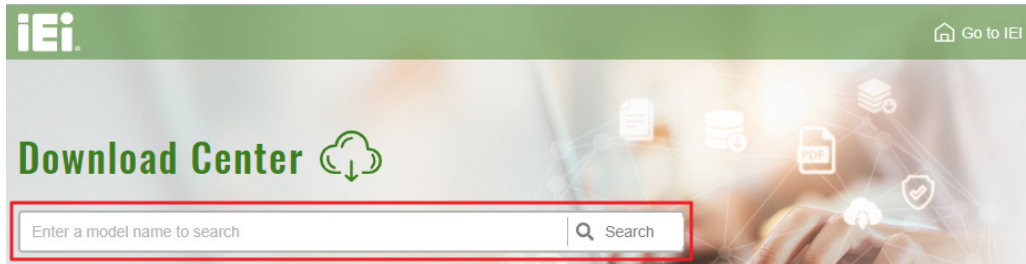


Figure 3-16: IEI Resource Download Center

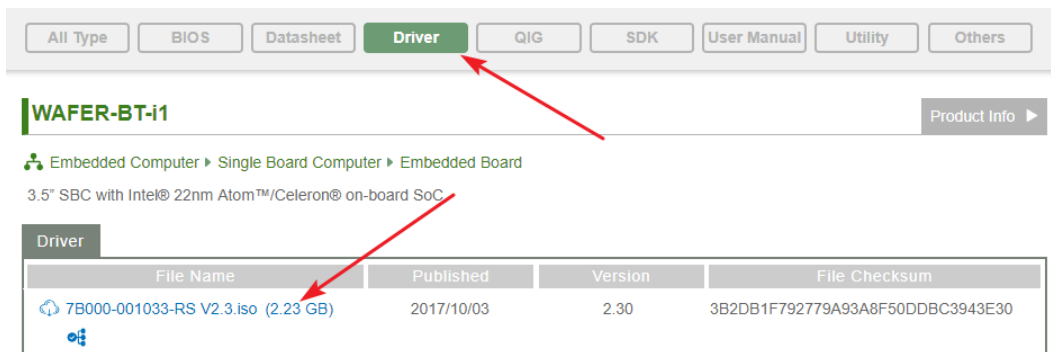
## 3.8.1 Driver Download

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

**Step 1:** Go to <https://download.ieiworld.com>. Type PAC-400AI-C236 and press Enter.

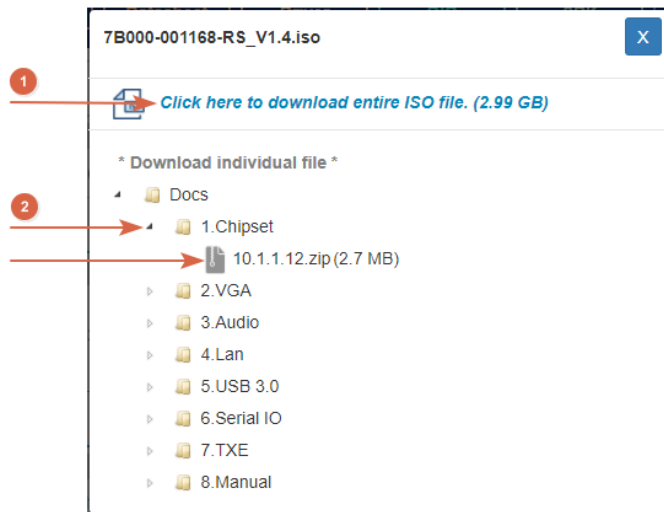


**Step 2:** All product-related software, utilities, and documentation will be listed. You can choose **Driver** to filter the result.



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

## PAC-400AI-C236 Embedded System

**NOTE:**

To install software from the downloaded ISO image file in Windows 8, 8.1 or 10, double-click the ISO file to mount it as a virtual drive to view its content. On Windows 7 system, an additional tool (such as Virtual CD-ROM Control Panel from Microsoft) is needed to mount the file.

Chapter

**4**

# Troubleshooting and Maintenance

---



## PAC-400AI-C236 Embedded System

---



### WARNING:

Take Anti-Static precautions whenever maintenance is being carried out on the system components. Failure to take anti-static precautions can cause permanent system damage. For more details on anti-static precautions, please refer to **Section 2.1**.

---

## 4.1 System Maintenance Overview

---



### NOTE:

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

---

To preserve the working integrity of the PAC-400AI-C236 embedded system, the system must be properly maintained. If embedded system components need replacement, the proper maintenance procedures must be followed to ensure the system can continue to operate normally.

## 4.2 System Troubleshooting

This section provides some simple troubleshooting suggestions.

### 4.2.1 The System Doesn't Turn On

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

- Step 1:** Check that the power cable connector is properly connected to the system rear panel.
- Step 2:** Check that the power cable connector is properly plugged into the power source.

**Step 3:** Make sure the power switch is turned on.

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

#### 4.2.2 The System Doesn't Boot Up

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

**Step 1:** Check the power is turned on. See **Section 4.2.1** above.

**Step 2:** Make sure the SO-DIMM modules are properly installed.

#### 4.2.3 More Troubleshooting

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



**WARNING:**

If all troubleshooting measures have been taken and the system still fails to start, contact the IEI reseller or vendor you purchased the PAC-400AI-C236 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to [sales@ieiworld.com](mailto:sales@ieiworld.com).

---

## PAC-400AI-C236 Embedded System

### 4.3 Maintenance

#### 4.3.1 Fan Replacement

There is one 8 cm cooling fan inside the PAC-400AI chassis. To replace a fan, please follow the steps below:

**Step 1:** Loosen the two fan filter bracket thumbscrews.

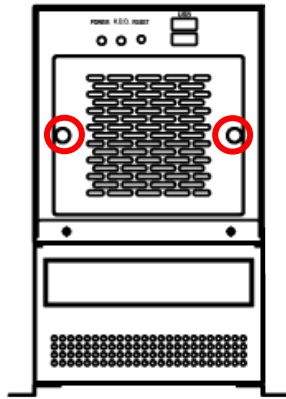


Figure 4-1: Fan Filter Bracket Thumbscrews

**Step 2:** Unplug the power cable connected to the fan.

**Step 3:** Remove the fan filter bracket by removing the four screws that secure the lattice plate with the fan filter bracket (A).

**Step 4:** Remove the four fan retention screws that secure the fan to the lattice plate (B).

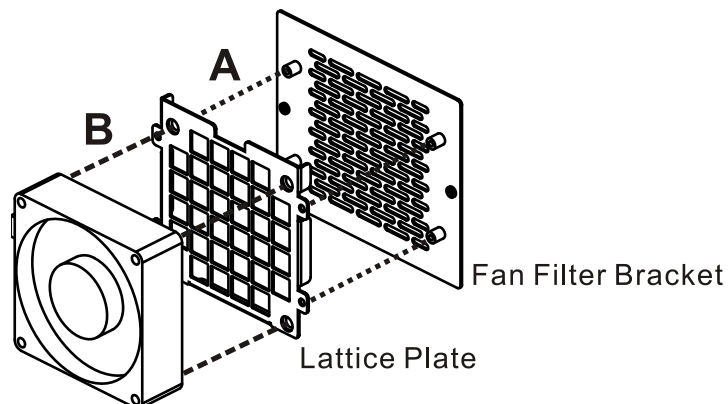


Figure 4-2: System Fan Removal

**Step 5:** Install a new fan and reinsert the four previously removed fan filter plate retention screws.

**Step 6:** Reinstall the fan filter plate with the fan.

**Step 7:** Reinstall the fan filter bracket and tighten the two fan filter bracket thumbscrews.

### 4.3.2 Fan Filter Replacement

To replace the fan filter, please follow the steps below:

**Step 1:** Loosen the two fan filter bracket thumbscrews.

**Step 2:** Pull the fan filter pad out of the space between the lattice plate and the fan filter bracket.

**Step 3:** Insert a new fan filter pad.

**Step 4:** Reinstall the fan filter bracket and fasten the two fan filter bracket thumbscrews.

### 4.3.3 Clear CMOS

If the PAC-400AI-C236 fails to boot due to improper BIOS settings, the clear CMOS button clears the CMOS data and resets the system BIOS information. To do this, push the clear CMOS button for a few seconds.

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

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

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

The clear CMOS button location is shown in **Figure 4-3** below.

PAC-400AI-C236 Embedded System

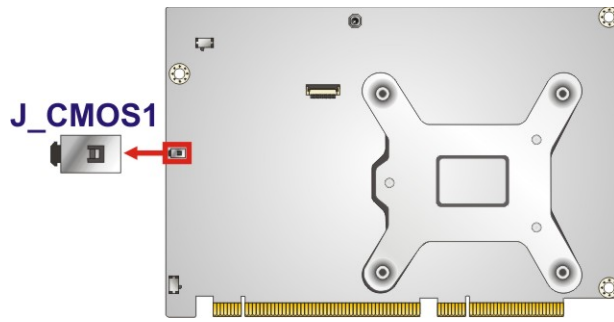


Figure 4-3: Clear CMOS Button Location

### 4.3.4 Flash Descriptor Security Override Jumper

The flash descriptor security override jumper (J\_FLASH1) allows to enable or disable the ME firmware update. Refer to **Table 4-1** and **Figure 4-4** for the jumper location and settings.

| Setting   | Description        |
|-----------|--------------------|
| Short 1-2 | Disabled (default) |
| Short 2-3 | Enabled            |

Table 4-1: Flash Descriptor Security Override Jumper Settings

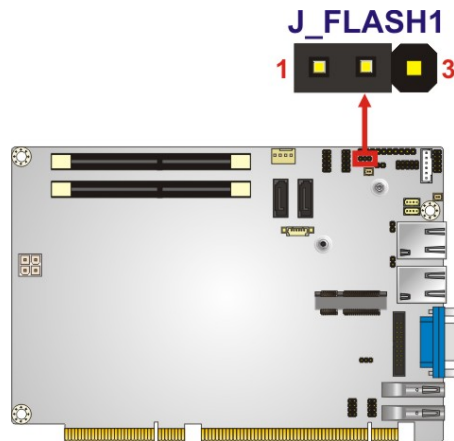


Figure 4-4: Flash Descriptor Security Override Jumper Location

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

- Step 1:** Before turning on the system power, short pin 2-3 of the flash descriptor security override jumper.
- Step 2:** Update the BIOS and ME firmware, and then turn off the system power.
- Step 3:** Remove the metal clip on the flash descriptor security override jumper or return to its default setting (short pin 1-2).
- Step 4:** Restart the system. The system will reboot 2 ~ 3 times to complete the ME firmware update.

Chapter

**5**

# **BIOS**

---

## 5.1 Introduction

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



### NOTE:

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

---

### 5.1.1 Starting Setup

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

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

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

### 5.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in **Table 5-1**.

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



## PAC-400AI-C236 Embedded System

| Key     | Function   |
|---------|--|
| Esc key | Main Menu – Quit and not save changes into CMOS<br>Status Page Setup Menu and Option Page Setup Menu --<br>Exit current page and return to Main Menu |
| F1 key  | General help, only for Status Page Setup Menu and Option<br>Page Setup Menu  |
| F2 key  | Load previous values   |
| F3 key  | Load optimized defaults  |
| F4 key  | 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 clear CMOS button described in **Section 4.3.3**.

### 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.
- Security – Sets User and Supervisor Passwords.
- Boot – Changes the system boot configuration.
- Save & Exit – Selects exit options and loads default settings

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

## 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) 2018 American Megatrends, Inc.
Main  Advanced  Chipset  Security  Boot  Save & Exit

BIOS Information
BIOS Vendor                American Megatrends
Core Version                5.12
Compliance                 UEFI 2.5; PI 1.4
Project Version             B408AR36.ROM
Build Date and Time        03/01/2018 11:53:20

BIOS Number                BIOS No.2

iWDD Vendor                 iEi
iWDD Version                B375ER11.bin

Processor Information
Name                       SkyLake DT
Brand String                Intel(R) Xeon(R) CPU
                             E3-1268L v5 @ 2.40GHz
Frequency                   2400 MHz
Processor ID                506E3
Stepping                    R0/S0/N0
Number of Processors        4Core(s) / 8Thread(s)
Microcode Revision          7C
GT Info                      GT2

Memory RC Version           1.5.0.0
Total Memory                 4096 MB
Memory Frequency             2133 MHz

PCH Information
Name                         SKL PCH-H
PCH SKU                      C236
Stepping                     D1
LAN PHY Revision             A6 (B2 Stepping)

ME FW Version                11.8.50.3425
ME Firmware SKU              Corporate SKU

SPI Clock Frequency
Dual Output Fast Read support  Not supported
Read Status Clock Frequency    17 MHz
Write Status Clock Frequency    48 MHz
Fast Read Status Clock Frequency 48 MHz

Access Level                  Administrator

System Date                  [Thu 05/19/2018]
System Time                   [15:10:27]

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

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

Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
    
```

**BIOS Menu 1: Main**

## PAC-400AI-C236 Embedded System

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) 2018 American Megatrends, Inc.
Main  Advanced  Chipset  Security  Boot  Save & Exit
-----
> CPU Configuration
> PCH-FW Configuration
> ACPI Settings
> F81866 Super IO Configuration
> iWDD H/M Monitor
> RTC Wake Settings
> Serial Port Console Redirection
> NVMe Configuration
> USB Configuration
> iEi Feature

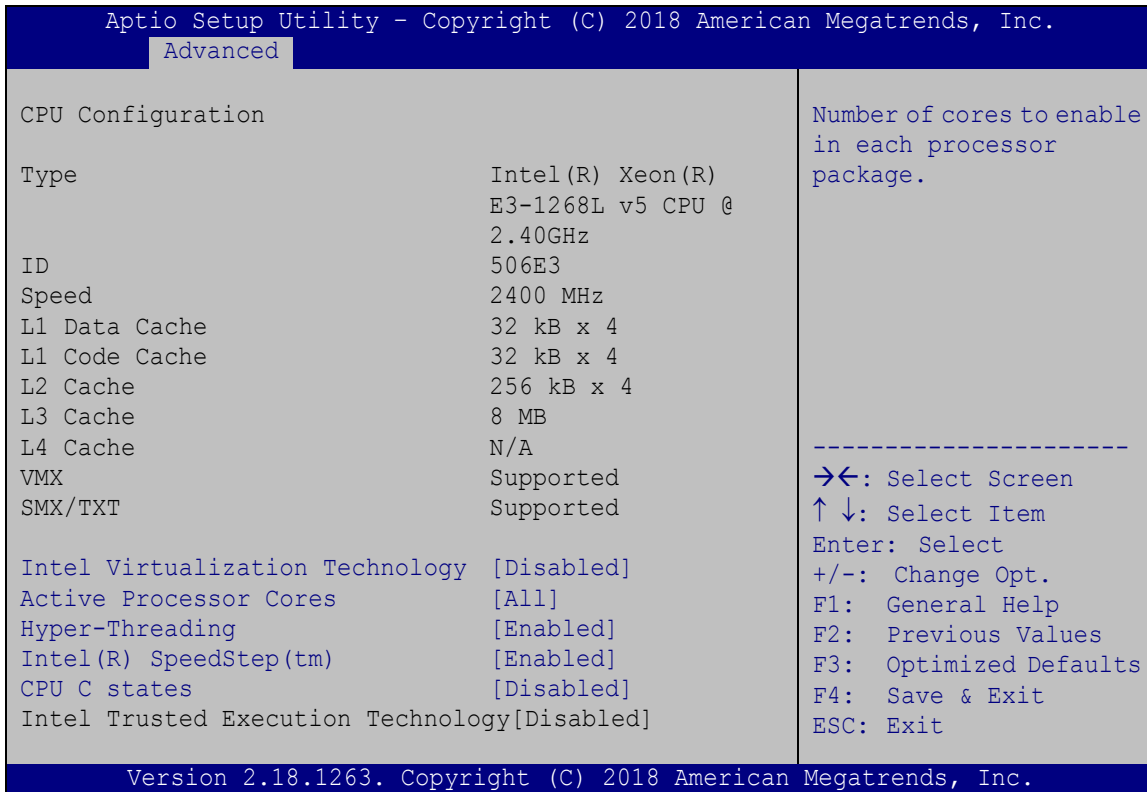
Configure Active Management Technology Parameters
-----
→←: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
  
```

**BIOS Menu 2: Advanced**

### 5.3.1 CPU Configuration

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



#### BIOS Menu 3: CPU Configuration

##### → Intel Virtualization Technology [Disabled]

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

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

##### → Active Processor Cores [All]

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

## PAC-400AI-C236 Embedded System

- **All**            **DEFAULT**    Enable all cores in the processor package.
- **1**                    Enable one core in the processor package.
- **2**                    Enable two cores in the processor package.
- **3**                    Enable three cores in the processor package.

### → **Hyper-threading [Enabled]**

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

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

### → **Intel(R) SpeedStep(tm) [Enabled]**

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

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

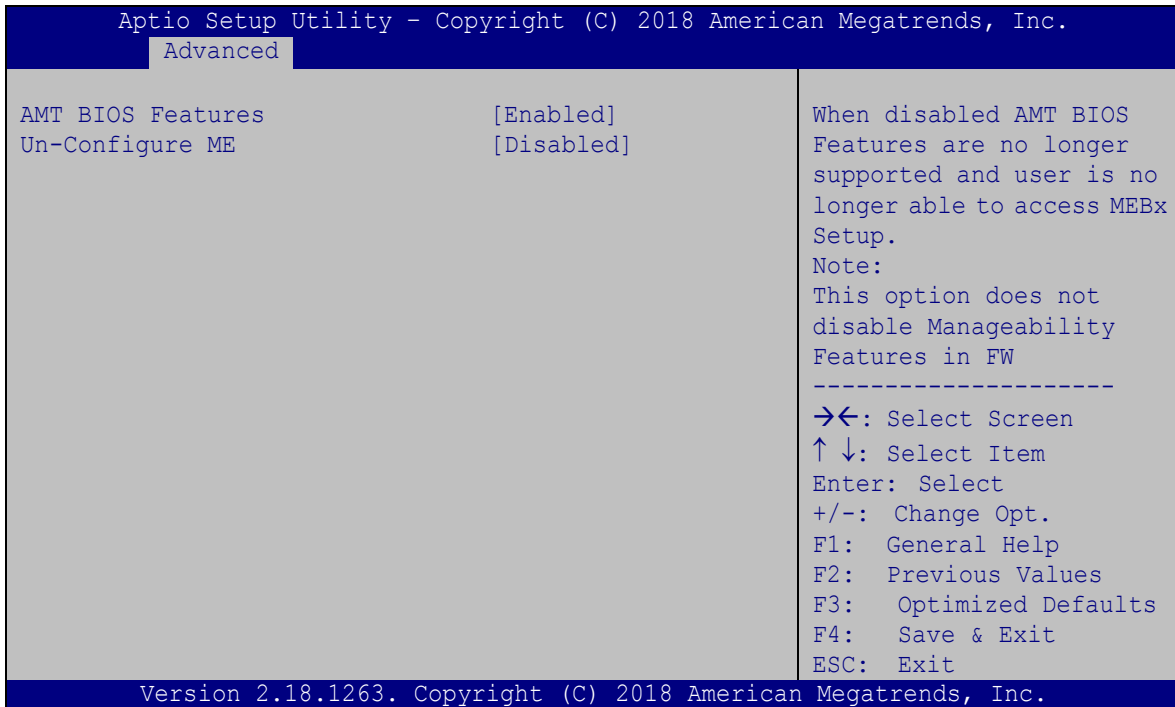
### → **CPU C states [Disabled]**

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

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

### 5.3.2 PCH-FW Configuration

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



#### BIOS Menu 4: PCH-FW Configuration

##### → AMT BIOS Features [Enabled]

Use **AMT BIOS Features** option to enable or disable the Intel® AMT function.

- **Disabled** Intel® AMT is disabled
- **Enabled** **DEFAULT** Intel® AMT is enabled

##### → Un-Configure ME [Disabled]

Use the **Un-Configure ME** option to perform ME unconfigure without password operation.

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

## PAC-400AI-C236 Embedded System

### 5.3.3 ACPI Settings

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

```

Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
Advanced
ACPI Settings
ACPI Sleep State          [S3 (Suspend to RAM)]
                                                                    Select the highest ACPI
                                                                    sleep state the system
                                                                    will enter when the
                                                                    SUSPEND button is
                                                                    pressed.
                                                                    -----
                                                                    →←: 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) 2018 American Megatrends, Inc.
    
```

#### BIOS Menu 5: ACPI Configuration

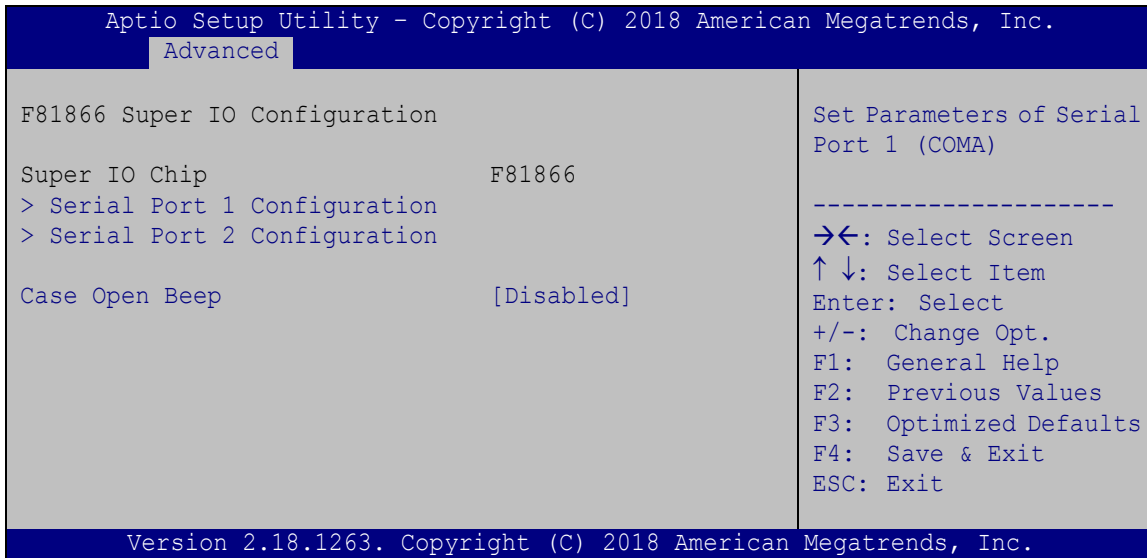
##### → ACPI Sleep State [S3 (Suspend to RAM)]

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

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

### 5.3.4 F81866 Super IO Configuration

Use the **F81866 Super IO Configuration** menu (**BIOS Menu 6**) to set or change the configurations for the serial ports and parallel port.



#### BIOS Menu 6: F81866 Super IO Configuration

##### → Case Open Beep [Disabled]

Use the **Case Open Beep** option to enable or disable the case open beep function.

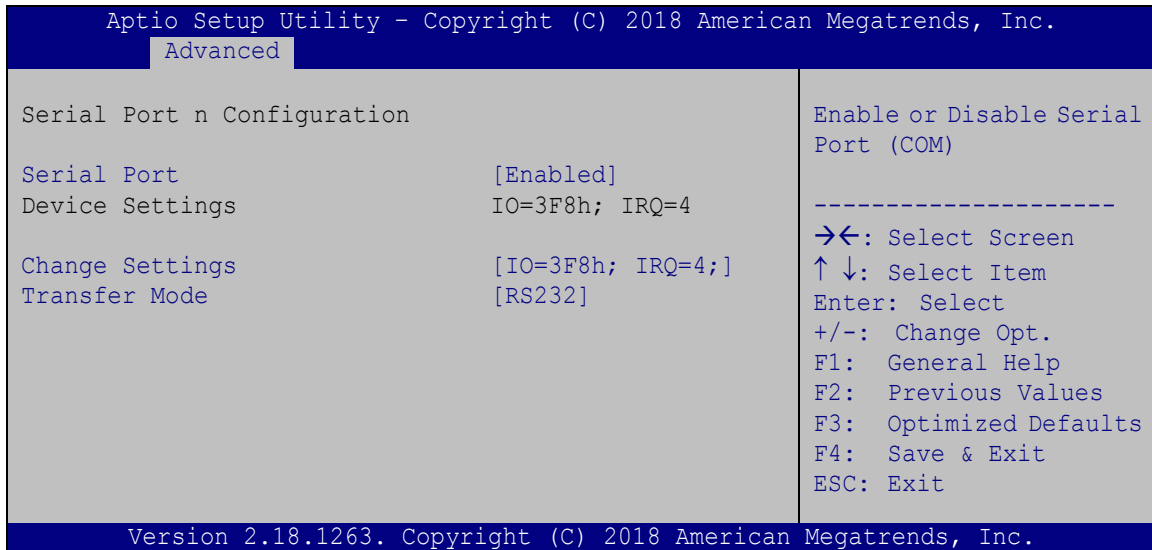
- **Disabled**      **DEFAULT**      Disable the case open beep function
- **Enabled**                      Enable the case open beep function



## PAC-400AI-C236 Embedded System

### 5.3.4.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 7**) to configure the serial port n.



#### BIOS Menu 7: Serial Port n Configuration Menu

#### 5.3.4.1.1 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.

- **IO=3F8h;      DEFAULT**      Serial Port I/O port address is 3F8h and the interrupt address is IRQ4  
**IRQ=4**
- **IO=3F8h;**                      Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 11  
**IRQ=3, 4, 11**

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

### ➔ Transfer Mode [RS232]

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

#### 5.3.4.1.2 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.

- ➔ **IO=2F8h;      DEFAULT**  
**IRQ=3**      Serial Port I/O port address is 2F8h and the interrupt address is IRQ3
- ➔ **IO=3F8h;**  
**IRQ=3, 4, 11**      Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 11
- ➔ **IO=2F8h;**  
**IRQ=3, 4, 11**      Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 11
- ➔ **IO=3E8h;**  
**IRQ=3, 4, 11**      Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 11

## PAC-400AI-C236 Embedded System

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

### ➔ Transfer Mode [RS232]

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

### 5.3.5 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 8**) contains the fan configuration submenu, and displays operating temperature, fan speeds and system voltages.

```

Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
Advanced
PC Health Status
CPU temperature           : +55°C
SYS temperature          : +41°C

CPU_FAN1 Speed           : 1212 RPM

CPU_CORE                  : +1.114 V
+5V                       : +5.005 V
+12V                      : +11.645 V
DDR                       : +1.196 V
+5VSB                     : +4.961 V
+3.3V                     : +3.296 V
+3.3VSB                   : +3.311 V

> Smart Fan Mode Configuration

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) 2018 American Megatrends, Inc.

```

### BIOS Menu 8: iWDD H/W Monitor

#### ➔ PC Health Status

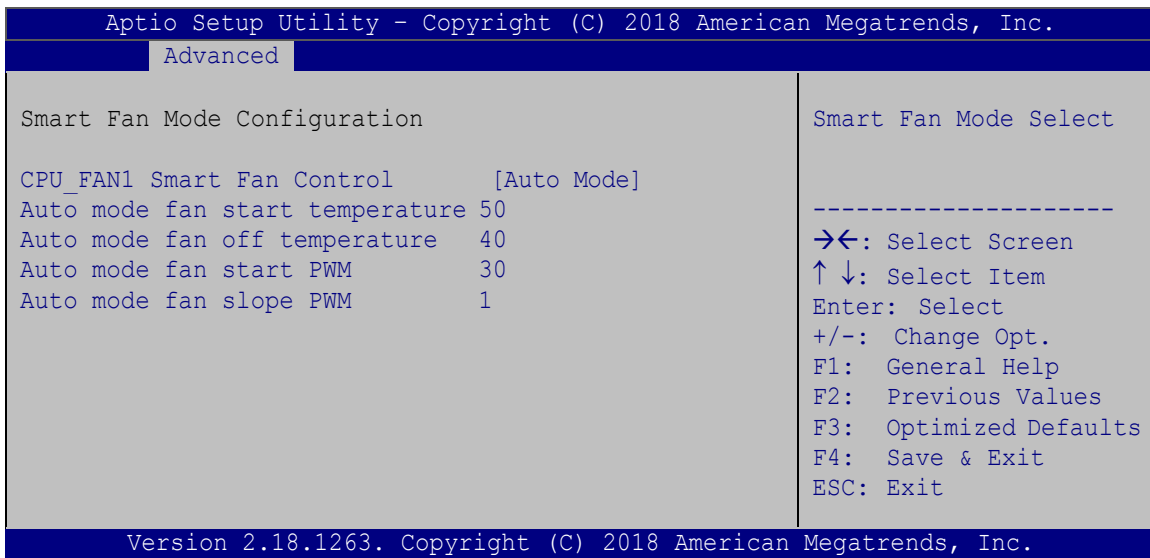
The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speed:
  - CPU Fan Speed
- Voltages:

- CPU\_CORE
- +5V
- +12V
- DDR
- +5VSB
- +3.3V
- +3.3VSB

### 5.3.5.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration submenu (BIOS Menu 9)** to configure fan speed settings.



#### BIOS Menu 9: Smart Fan Mode Configuration

##### → CPU\_FAN1 Smart Fan Control [Auto Mode]

Use the **CPU\_FAN1 Smart Fan Control** option to configure the CPU fan.

- **Auto Mode**      **DEFAULT**      The fan adjusts its speed using Auto Mode settings.
- **Manual Mode**      The fan spins at the speed set in Manual Mode settings.

## PAC-400AI-C236 Embedded System

### → Auto mode fan start/off temperature

Use the + or – key to change the **Auto mode fan start/off temperature** value. Enter a decimal number between 1 and 100.

### → Auto mode fan start PWM

Use the + or – key to change the **Auto mode fan start PWM** value. Enter a decimal number between 1 and 100.

### → Auto mode fan slope PWM

Use the + or – key to change the **Auto mode fan slope PWM** value. Enter a decimal number between 1 and 8.

## 5.3.6 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 10**) enables the system to wake at the specified time.

```

Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
  Advanced
Wake system with Fixed Time      [Disabled]
Enable or disable System
wake on alarm event. When
enabled, System will
wake on the
date::hr::min::sec
specified
-----
-><: 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) 2018 American Megatrends, Inc.
  
```

### BIOS Menu 10: RTC Wake Settings

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

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

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

→ **Enabled**      If selected, the **Wake up every day** option appears allowing you to enable to disable the system to wake every day at the specified time. Besides, the following options appear with values that can be selected:

Wake up date

Wake up hour

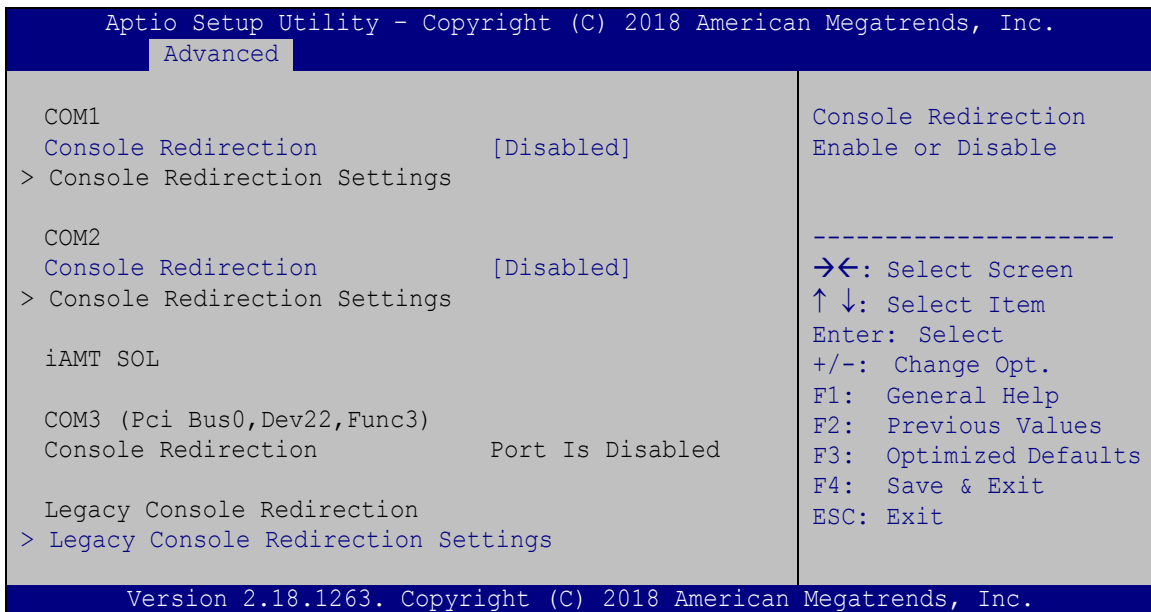
Wake up minute

Wake up second

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

### 5.3.7 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 11**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.



**BIOS Menu 11: Serial Port Console Redirection**

## PAC-400AI-C236 Embedded System

### → Console Redirection [Disabled]

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

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

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

### → Terminal Type [ANSI]

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

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

### → Bits per second [115200]

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

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

### → Data Bits [8]

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

- **7**                      Sets the data bits at 7.
- **8**                      **DEFAULT**      Sets the data bits at 8.

**→ Parity [None]**

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

- |                |                |   |
|----------------|----------------|---|
| <b>→ None</b>  | <b>DEFAULT</b> | No parity bit is sent with the data bits.                                 |
| <b>→ Even</b>  |                | The parity bit is 0 if the number of ones in the data bits is even.       |
| <b>→ Odd</b>   |                | The parity bit is 0 if the number of ones in the data bits is odd.        |
| <b>→ Mark</b>  |                | The parity bit is always 1. This option does not provide error detection. |
| <b>→ Space</b> |                | The parity bit is always 0. This option does not provide error detection. |

**→ Stop Bits [1]**

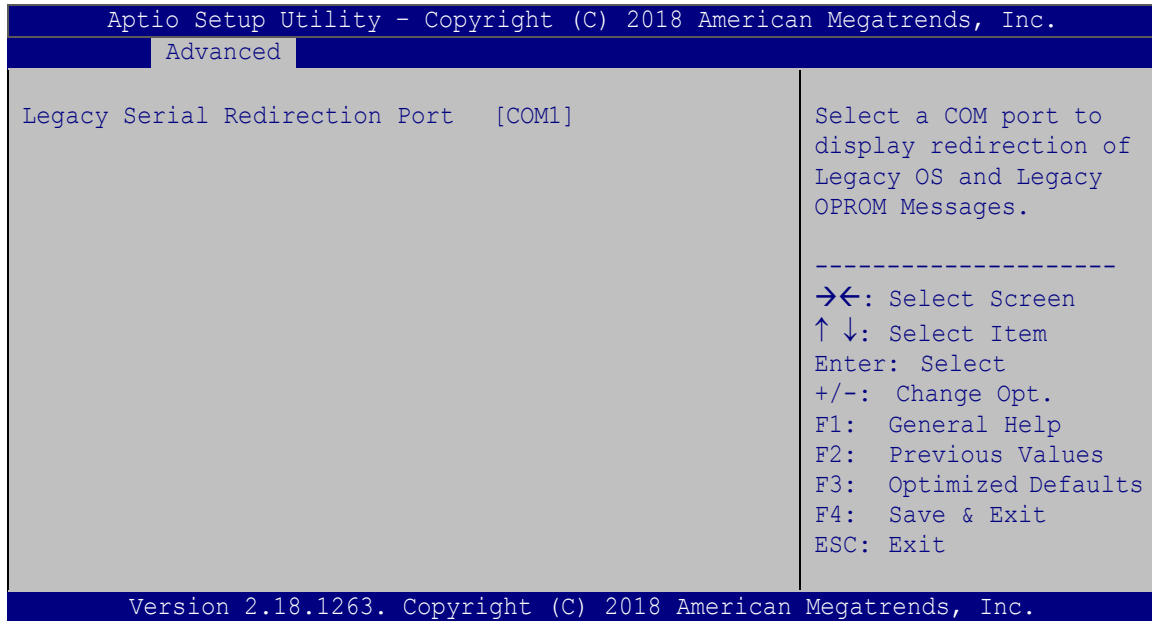
Use the **Stop Bits** option to specify the number of stop bits used to indicate the end of a serial data packet. Communication with slow devices may require more than 1 stop bit.

- |            |                |                                    |
|------------|----------------|------------------------------------|
| <b>→ 1</b> | <b>DEFAULT</b> | Sets the number of stop bits at 1. |
| <b>→ 2</b> |                | Sets the number of stop bits at 2. |



## PAC-400AI-C236 Embedded System

### 5.3.7.1 Legacy Console Redirection Settings



#### BIOS Menu 12: Legacy Console Redirection Settings

##### → Legacy Serial Redirection Port [COM1]

Use the **Legacy Serial Redirection Port** option to select a COM port to display redirection of legacy OS and legacy OPRM messages. Configuration options are listed below.

- COM1 **Default**
- COM2
- COM3 (Pci Bus0,Dev0,Func0) (Disabled)

### 5.3.8 NVMe Configuration

Use the **NVMe Configuration (BIOS Menu 13)** menu to display the NVMe controller and device information.

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
Advanced
NVMe controller and Drive information
No NVMe Device Found
-----
-><: 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) 2018 American Megatrends, Inc.
```

#### BIOS Menu 13: NVMe Configuration

## PAC-400AI-C236 Embedded System

### 5.3.9 USB Configuration

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

```

Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
  Advanced
USB Configuration
USB Controllers:
  1 XHCI
USB Devices:
  1 Keyboard
Legacy USB Support          [Enabled]
-----
-><: 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) 2018 American Megatrends, Inc.
  
```

#### BIOS Menu 14: USB Configuration

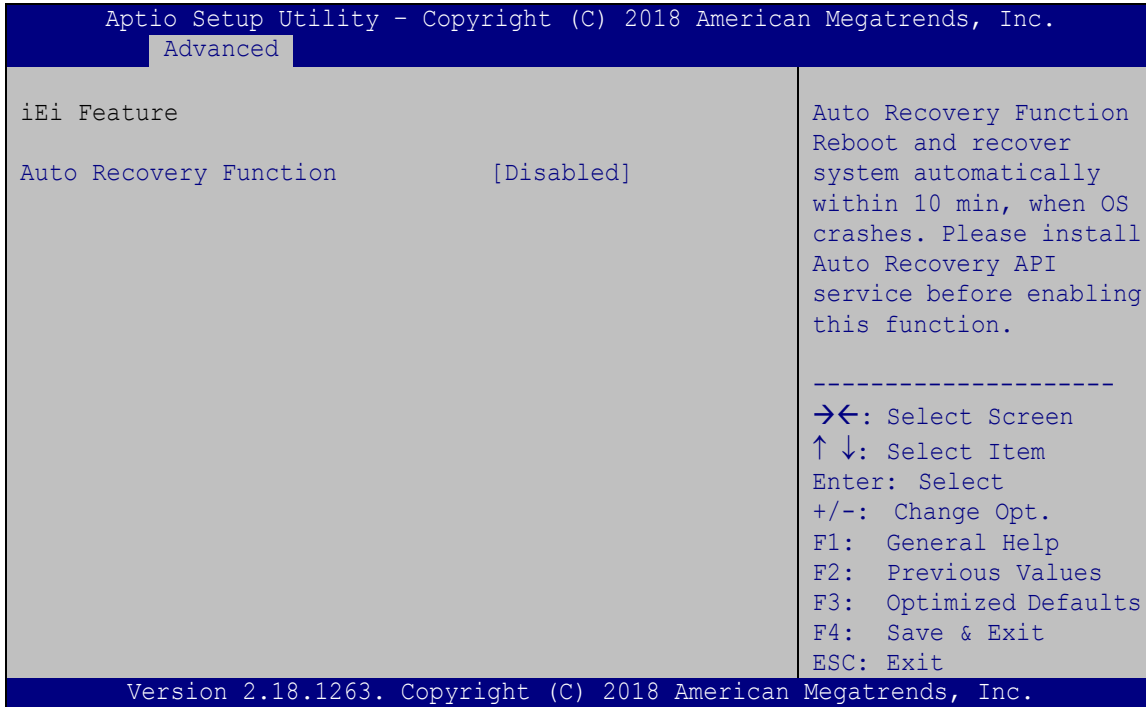
##### ➔ Legacy USB Support [Enabled]

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

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

### 5.3.10 iEi Feature

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



#### BIOS Menu 15: iEi Feature

##### → Auto Recovery Function [Disabled]

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

- **Disabled**     **DEFAULT**     Auto recovery function disabled
- **Enabled**     Auto recovery function enabled

## PAC-400AI-C236 Embedded System

### 5.4 Chipset

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



#### **WARNING!**

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

```

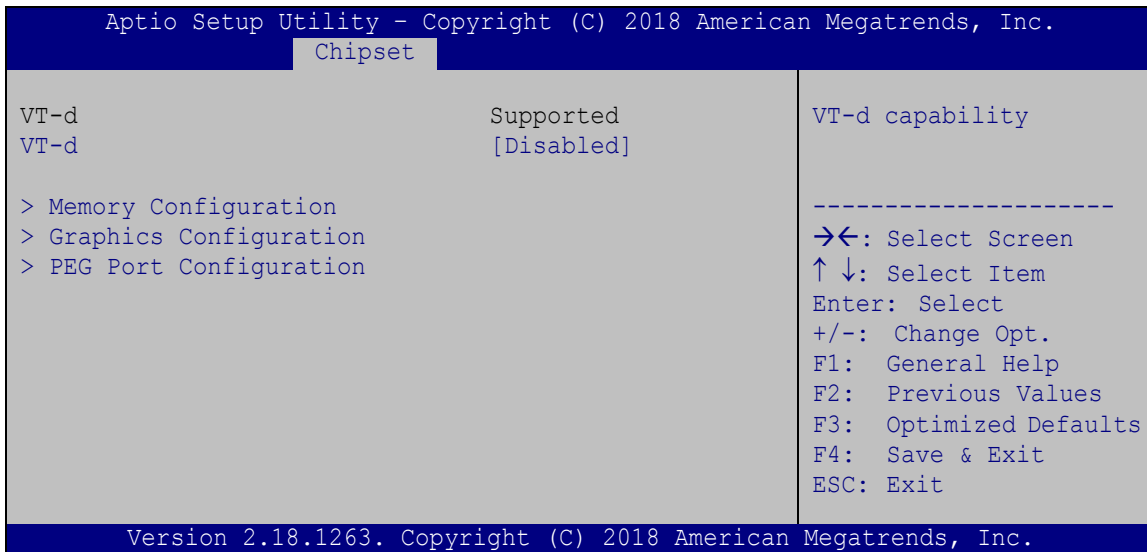
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
Main   Advanced  Chipset  Security  Boot   Save & Exit
-----
> System Agent (SA) Configuration      System Agent (SA)
> PCH-IO Configuration                Parameters
-----
-><: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
    
```

**BIOS Menu 16: Chipset**

### 5.4.1 System Agent (SA) Configuration

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



#### BIOS Menu 17: System Agent (SA) Configuration

##### → VT-d [Disabled]

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

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

## PAC-400AI-C236 Embedded System

### 5.4.1.1 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 18**) to view memory information.

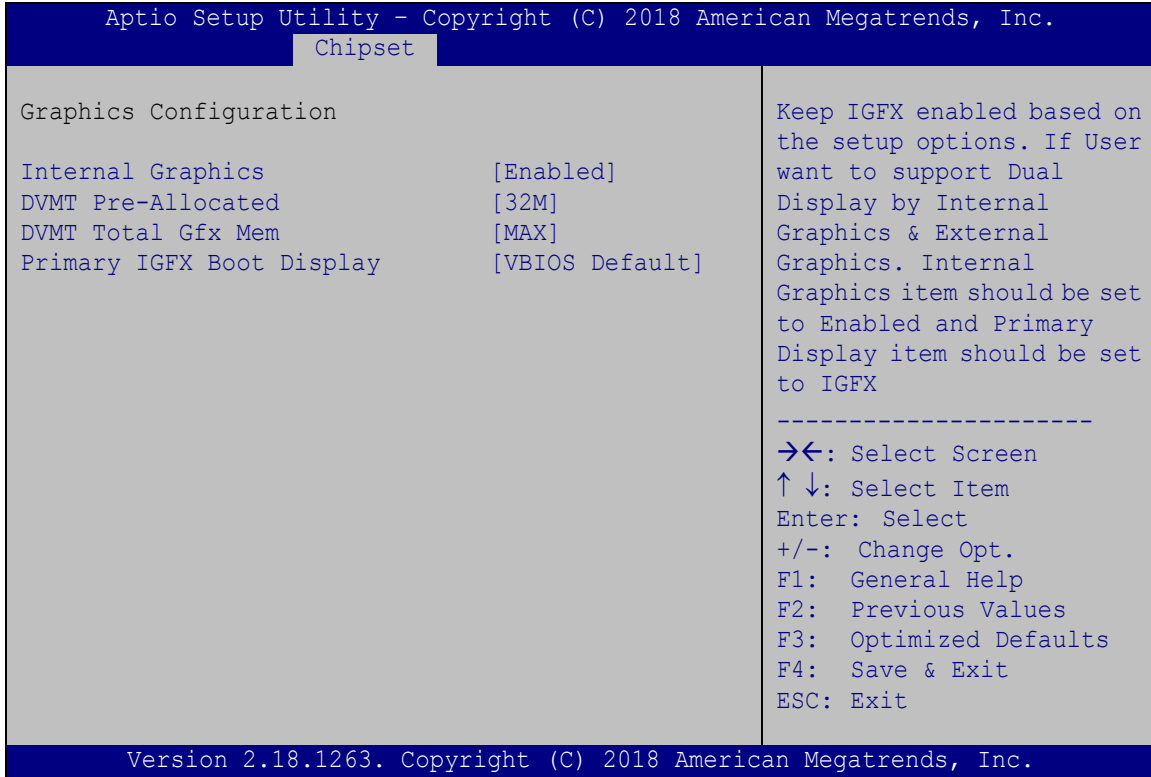
```

Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
Chipset
Memory Configuration
CHA_DIMM0#           Populated & Enabled
  Size               4096 MB (DDR4)
  Number of Ranks    1
  Manufacturer       Kingston
CHB_DIMM0#           Not Populated /Disabled
-----
-><: 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) 2018 American Megatrends, Inc.
  
```

**BIOS Menu 18: Memory Configuration**

### 5.4.1.2 Graphics Configuration

Use the **Graphics Configuration (BIOS Menu 19)** menu to configure the video device connected to the system.



#### BIOS Menu 19: Graphics Configuration

##### → Internal Graphics [Enabled]

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

- Auto
- Disabled
- Enabled      **Default**

##### → DVMT Pre-Allocated [32M]

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:



## PAC-400AI-C236 Embedded System

- 32M                      **Default**
- 64M

### → DVMT Total Gfx Mem [MAX]

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

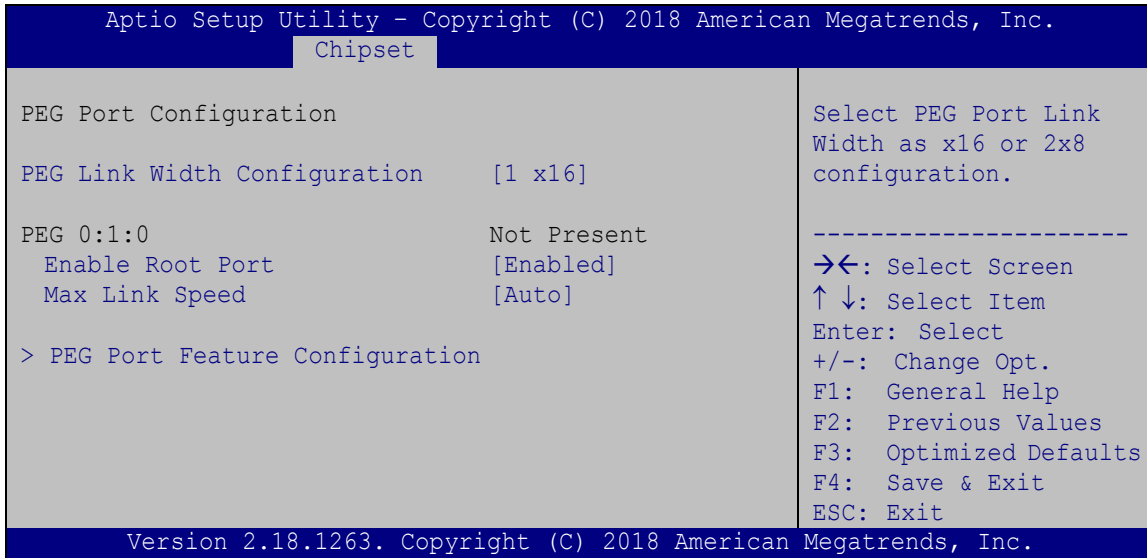
- 128M
- 256M
- MAX                      **Default**

### → 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**
- CRT
- IDP

### 5.4.1.3 PEG Port Configuration



#### BIOS Menu 20: PEG Port Configuration

##### → PEG Link Width Configuration [1x16]

Use the **PEG Link Width Configuration** option to configure the PCIe x16 channel mode on the backplane.

- **1 x16**                      **DEFAULT**      Sets the PCIe x16 link width as one PCIe x16 slot
- **2 x8**                                      Sets the PCIe x16 link width as two PCIe x8 slots

##### → Enable Root Port [Enabled]

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

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

## PAC-400AI-C236 Embedded System

### → Max Link Speed [Auto]

Use the **Max Link Speed** option to select the maximum link speed of the PCI Express slot.

The following options are available:

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

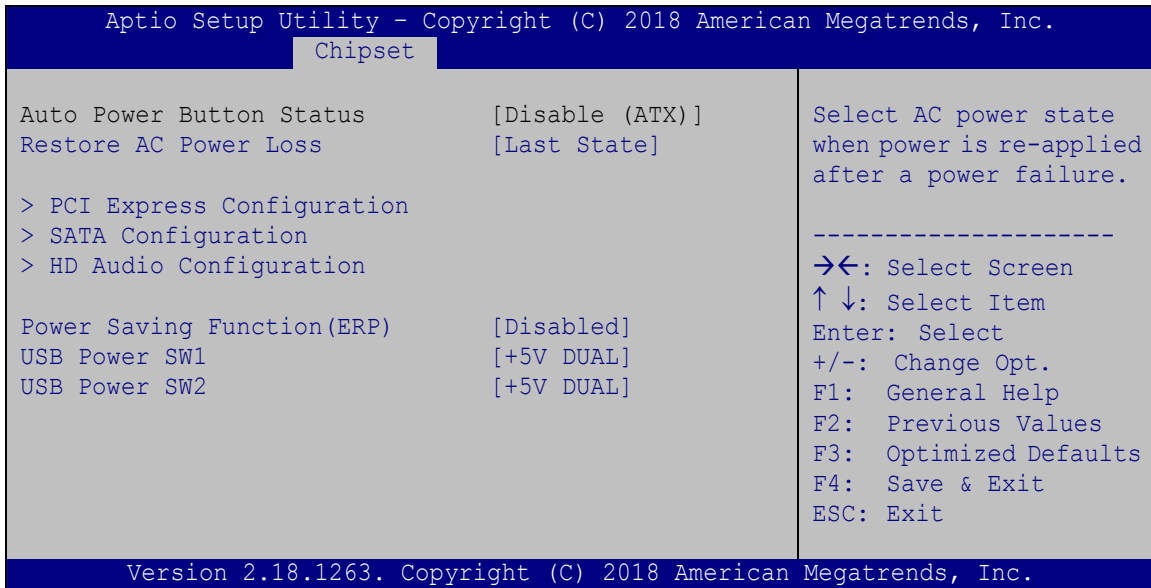
### → Detect Non-Compliance Device [Disabled]

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

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

### 5.4.2 PCH-IO Configuration

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



#### BIOS Menu 21: PCH-IO Configuration

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

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

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

##### → Power Saving Function(ERP) [Disabled]

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

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

## PAC-400AI-C236 Embedded System

### → USB Power SW1 [+5V DUAL]

Use the **USB Power SW1** BIOS option to configure whether to provide power to the two external USB 3.0 connectors when the system is in S3/S4 sleep state. This option is valid only when the above **Power Saving Function (ERP)** BIOS option is disabled.

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

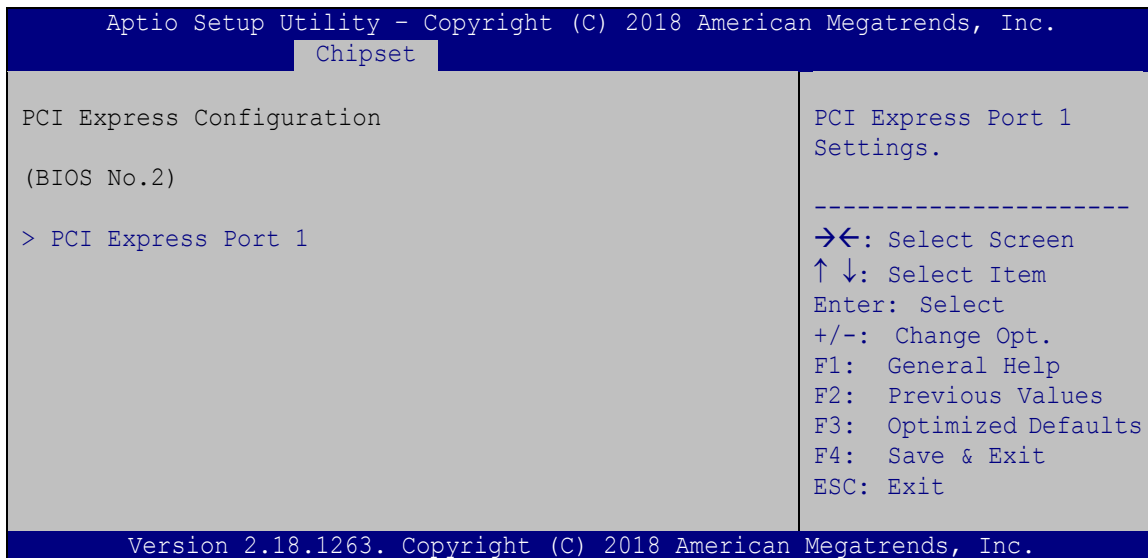
### → USB Power SW2 [+5V DUAL]

Use the **USB Power SW2** BIOS option to configure whether to provide power to the two external USB 2.0 connectors when the system is in S3/S4 sleep state. This option is valid only when the above **Power Saving Function (ERP)** BIOS option is disabled.

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

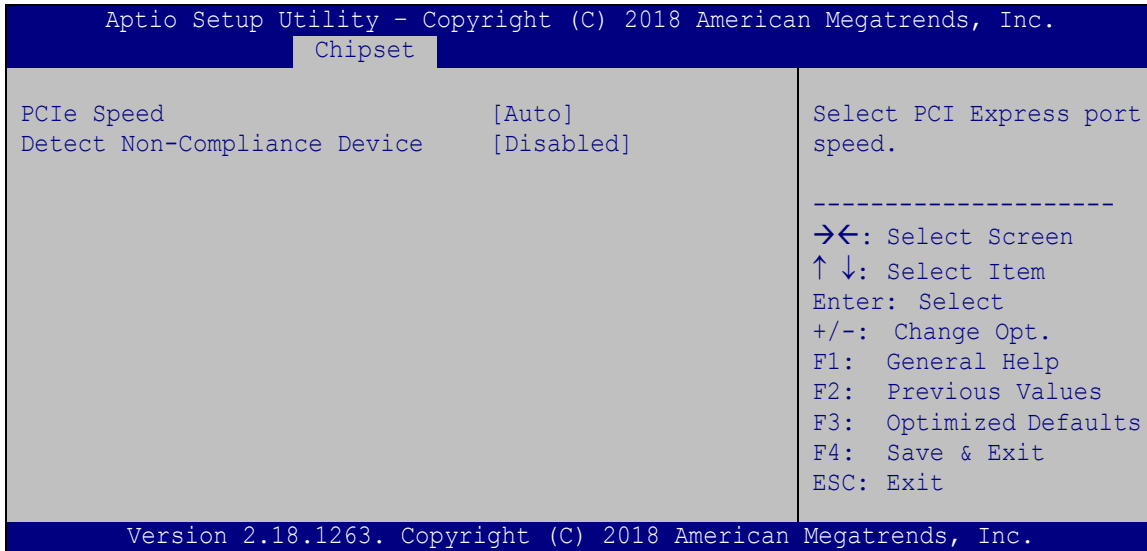
## 5.4.2.1 PCI Express Configuration

Use the **PCI Express Configuration** menu to configure the PCI Express interfaces.



**BIOS Menu 22: PCI Express Configuration**

### 5.4.2.1.1 PCI Express Port 1



#### BIOS Menu 23: PCI Express Port 1

##### → PCIe Speed [Auto]

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

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

##### → Detect Non-Compliance Device [Disabled]

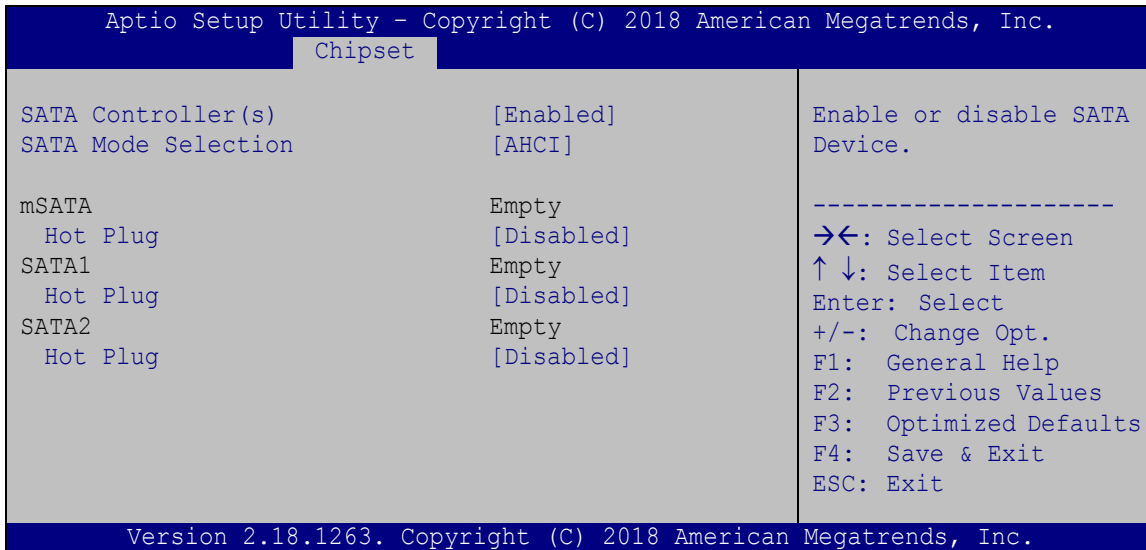
Use the **Detect Non-Compliance Device** option to enable or disable detecting if a non-compliance PCI Express device is connected to the PCI Express slot.

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

## PAC-400AI-C236 Embedded System

### 5.4.2.2 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 24**) to change and/or set the configuration of the SATA devices installed in the system.



#### BIOS Menu 24: SATA Configuration

##### → SATA Controller(s) [Enabled]

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

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

##### → SATA Mode Selection [AHCI]

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

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

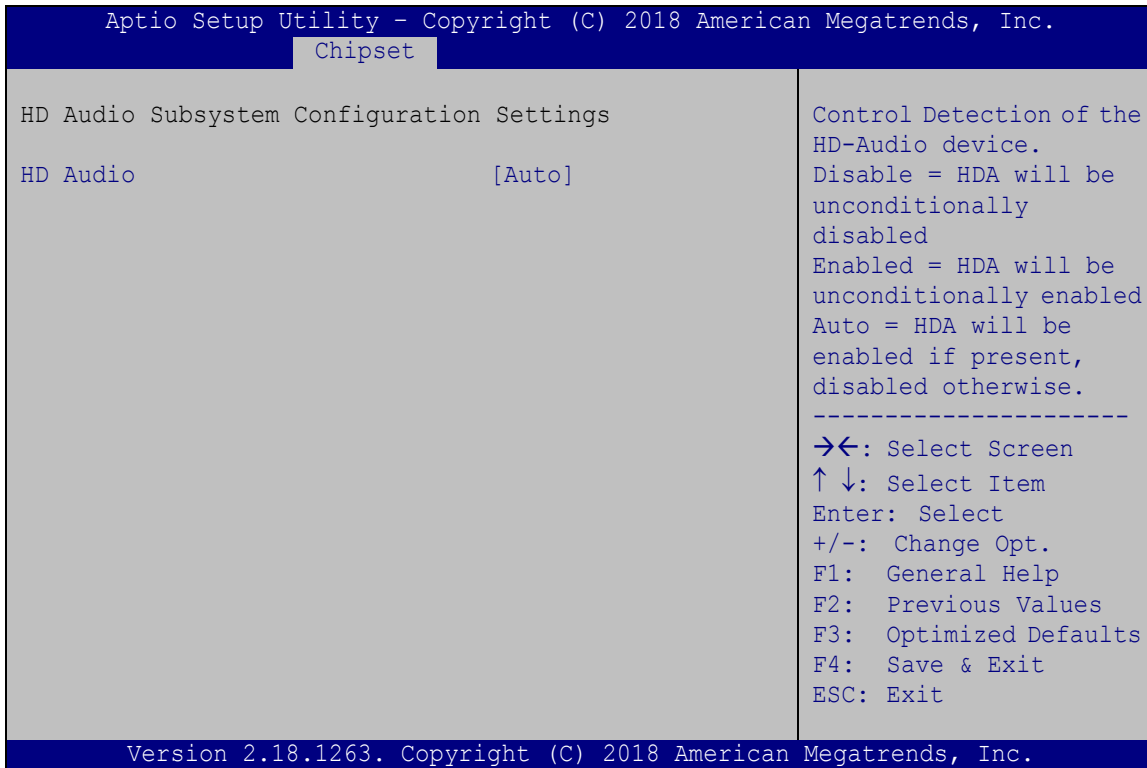
➔ **Hot Plug [Disabled]**

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

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

**5.4.2.3 HD Audio Configuration**

Use the **HD Audio Configuration** menu (**BIOS Menu 25**) to configure the PCH Azalia settings.



**BIOS Menu 25: HD Audio Configuration**

➔ **HD Audio [Auto]**

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

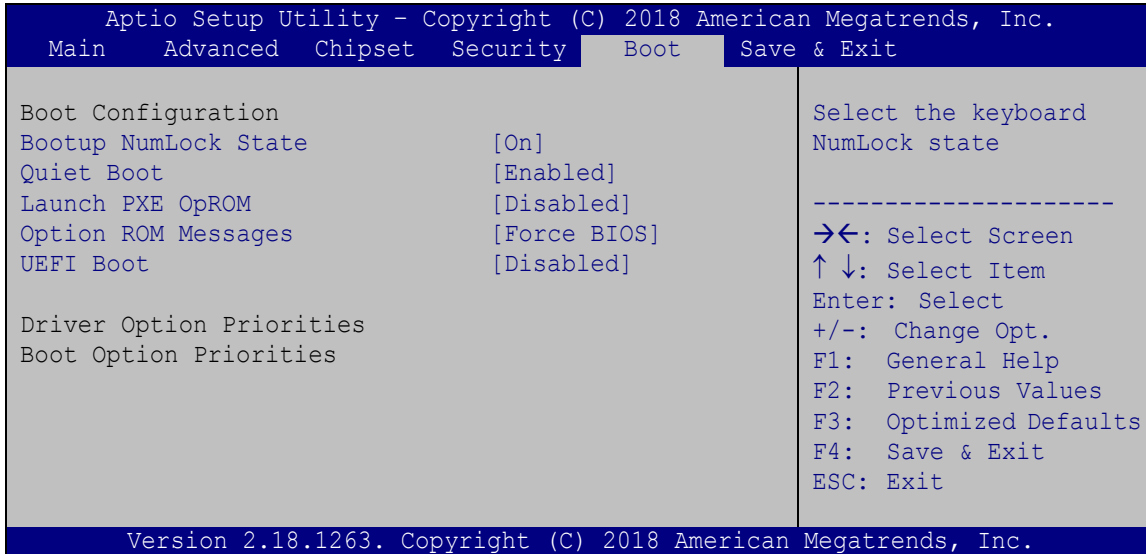
- ➔ **Disabled**                              The onboard High Definition Audio controller is disabled.
- ➔ **Enabled**                                The onboard High Definition Audio controller is enabled.





## 5.6 Boot

Use the **Boot** menu (**BIOS Menu 27**) to configure system boot options.



### BIOS Menu 27: 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.

## PAC-400AI-C236 Embedded System

### → Quiet Boot [Enabled]

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

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

### → Launch PXE OpROM [Disabled]

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

- **Disabled** **DEFAULT** Ignore all PXE Option ROMs
- **Enabled** Load PXE Option ROMs.

### → Option ROM Messages [Force BIOS]

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

- **Force BIOS** **DEFAULT** Sets display mode to force BIOS.
- **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.

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

## 5.7 Save & Exit

Use the **Safe & Exit** menu (**BIOS Menu 28**) to load default BIOS values, optimal failsafe values and to save configuration changes.

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
Main   Advanced  Chipset  Security  Boot   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
↑↓: 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) 2018 American Megatrends, Inc.
```

### BIOS Menu 28: Save & Exit

#### → Save Changes and Reset

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

#### → Discard Changes and Reset

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

#### → Restore Defaults

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

#### → Save as User Defaults

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

#### → Restore User Defaults

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

Chapter

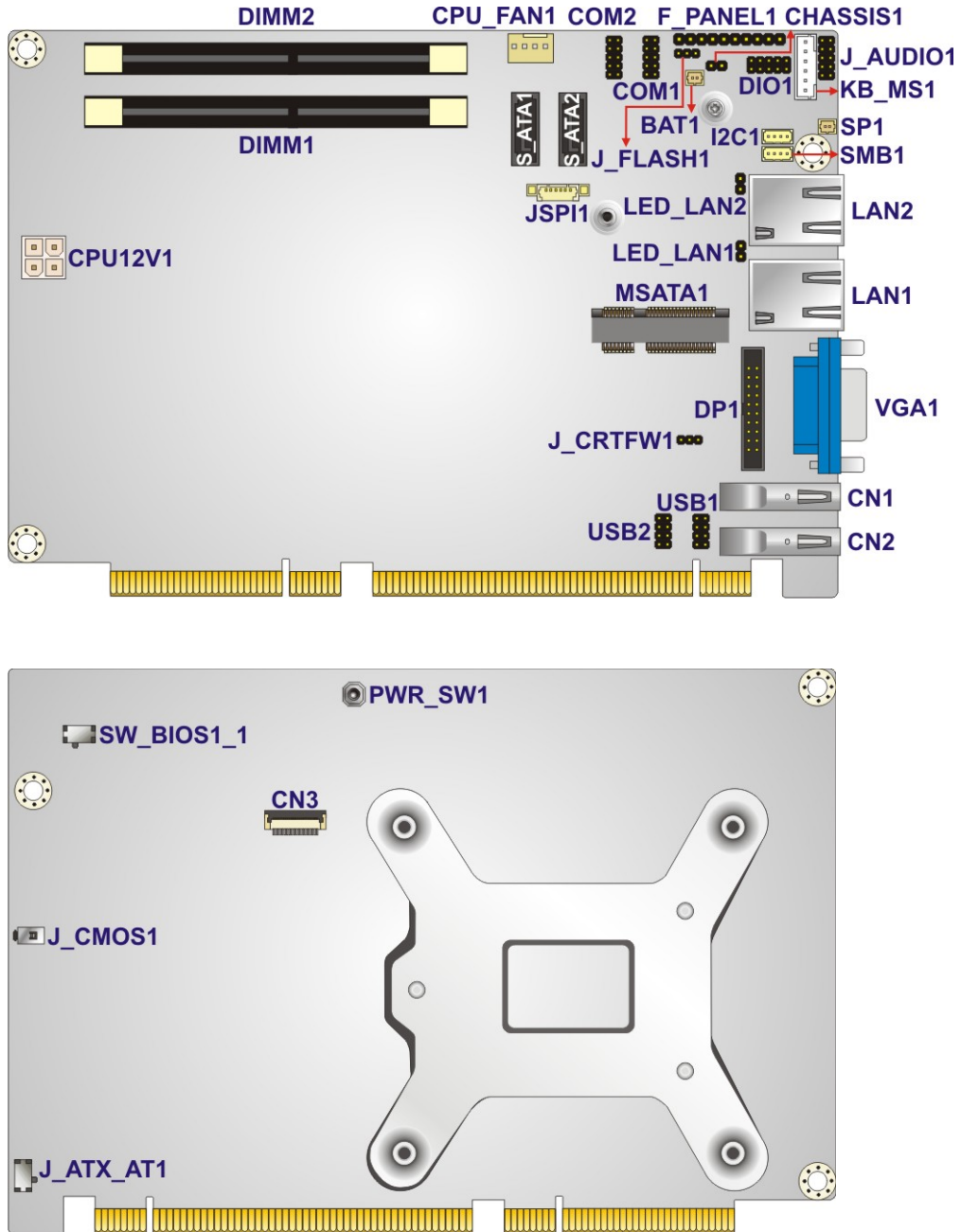
**6**

# Interface Connectors

---

## 6.1 Peripheral Interface Connectors

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



**Figure 6-1: Main Board Layout Diagram (Front Side)**

## PAC-400AI-C236 Embedded System

## 6.2 Internal Peripheral Connectors

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

| Connector                       | Type                        | Label              |
|---------------------------------|-----------------------------|--------------------|
| +12V ATX power supply connector | 4-pin Molex power connector | CPU12V1            |
| Audio kit connector             | 10-pin header               | J_AUDIO1           |
| Battery connector               | 2-pin wafer                 | BAT1               |
| Buzzer connector                | 2-pin wafer                 | SP1                |
| Chassis intrusion connector     | 2-pin header                | CHASSIS1           |
| CRT FW update                   | 3-pin header                | J_CRTFW1           |
| DDR4 SO-DIMM slots              | 260-pin DDR4 SO-DIMM slot   | DIMM1, DIMM2       |
| Digital I/O connector           | 10-pin header               | DIO1               |
| EC debug connector              | 20-pin wafer                | CN3                |
| Fan connector (CPU)             | 4-pin wafer                 | CPU_FAN1           |
| Front panel connector           | 10-pin header               | F_PANEL1           |
| I <sup>2</sup> C connector      | 4-pin wafer                 | I2C1               |
| Internal DisplayPort connector  | 20-pin box header           | DP1                |
| Keyboard and mouse connector    | 6-pin wafer                 | KB_MS1             |
| LAN LED connectors              | 2-pin header                | LED_LAN1, LED_LAN2 |
| PCIe Mini slot                  | PCIe Mini slot              | MSATA1             |
| Power button                    | Push button                 | PWR_SW1            |
| RS-232/422/485 serial ports     | 10-pin header               | COM1, COM2         |
| SATA 6Gb/s drive connector      | 7-pin SATA connector        | S_ATA1, S_ATA2     |
| SMBus connector                 | 4-pin wafer                 | SMB1               |
| SPI flash connector             | 6-pin wafer                 | JSPI1              |

| Connector          | Type         | Label      |
|--------------------|--------------|------------|
| USB 2.0 connectors | 8-pin header | USB1, USB2 |

**Table 6-1: Peripheral Interface Connectors**

### 6.3 External Interface Panel Connectors

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

| Connector      | Type          | Label      |
|----------------|---------------|------------|
| Ethernet ports | RJ-45         | LAN1, LAN2 |
| USB 3.0 ports  | USB 3.0       | CN1, CN2   |
| VGA connector  | 15-pin female | VGA1       |

**Table 6-2: External Peripheral Connectors**



**NOTE:**

Refer to the user manual of the HPCI-E-C236 for the pinouts of these connectors.

The user manual can be downloaded from IEI Resource Download Center (<https://download.ieiworld.com>).



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 R&TTE Directive 1999/5/EC.

---

English

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

---

Български [Bulgarian]

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

---

Česky [Czech]

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

---

Dansk [Danish]

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

---

Deutsch [German]

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

---

Eesti [Estonian]

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

---

## PAC-400AI-C236 Embedded System

---

### Español [Spanish]

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

---

### Ελληνική [Greek]

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

---

### Français [French]

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

---

### Italiano [Italian]

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

---

### Latviski [Latvian]

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

---

### Lietuvių [Lithuanian]

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

---

### Nederlands [Dutch]

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

---

### Malti [Maltese]

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

---

### Magyar [Hungarian]

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

---

### Polski [Polish]

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

---

### Português [Portuguese]

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

---

---

### Româna [Romanian]

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

---

### Slovensko [Slovenian]

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

---

### Slovensky [Slovak]

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

---

### Suomi [Finnish]

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

---

### Svenska [Swedish]

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

---

## PAC-400AI-C236 Embedded System

### 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.

### ROHS STATEMENT



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

### CHINA ROHS



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

Appendix

**B**

# Safety Precautions

---

## PAC-400AI-C236 Embedded System

### B.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 PAC-400AI-C236.

---

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

#### B.1.1 General Safety Precautions

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

- ***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.
  - Strike or exert excessive force onto the LCD panel.
  - Touch any of the LCD panels with a sharp object
  - In a site where the ambient temperature exceeds the rated temperature

### B.1.2 Anti-static Precautions

---



#### WARNING:

Failure to take ESD precautions during the installation of the PAC-400AI-C236 may result in permanent damage to the PAC-400AI-C236 and severe injury to the user.

---

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PAC-400AI-C236. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PAC-400AI-C236 is opened and any of the electrical components are handled, the following anti-static precautions are strictly adhered to.

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

### B.1.3 Explanation of Graphical Symbols



This symbol warns the user that the part has this symbol is hot. Therefore, it is dangerous to make any kind of contact with this part.



This symbol alerts the user that important information concerning the operation and maintenance of this unit has been included. Therefore, the information should be read carefully in order to avoid any problems.



## PAC-400AI-C236 Embedded System

### B.1.4 Product Disposal

---



#### CAUTION:

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

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

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

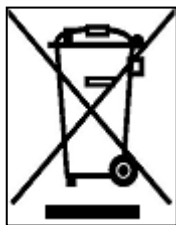
Leaving a battery in an extremely high temperature surrounding environment that can result in an explosion or the leakage of flammable liquid or gas;

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

Dispose of used batteries according to instructions and local regulations.

---

- Outside the European Union - If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union:



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.

## B.2 Maintenance and Cleaning Precautions

When maintaining or cleaning the PAC-400AI-C236, please follow the guidelines below.

### B.2.1 Maintenance and Cleaning

Prior to cleaning any part or component of the PAC-400AI-C236, please read the details below.

- The interior of the PAC-400AI-C236 does not require cleaning. Keep fluids away from the PAC-400AI-C236 interior.
- Be cautious of all small removable components when vacuuming the PAC-400AI-C236.
- Turn the PAC-400AI-C236 off before cleaning the PAC-400AI-C236.
- Never drop any objects or liquids through the openings of the PAC-400AI-C236.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the PAC-400AI-C236.
- Avoid eating, drinking and smoking within vicinity of the PAC-400AI-C236.

### B.2.2 Cleaning Tools

Some components in the PAC-400AI-C236 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 PAC-400AI-C236.

- **Cloth** – Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the PAC-400AI-C236.
- **Water or rubbing alcohol** – A cloth moistened with water or rubbing alcohol can be used to clean the PAC-400AI-C236.
- **Using solvents** – The use of solvents is not recommended when cleaning the PAC-400AI-C236 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 PAC-400AI-C236. Dust and dirt can restrict the airflow in the PAC-400AI-C236 and cause its circuitry to corrode.

## PAC-400AI-C236 Embedded System

- **Swabs** - Swabs moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas. Whenever possible, it is best to use lint free swabs such as foam swabs for cleaning.

Appendix

C

# Digital I/O Interface

---

## PAC-400AI-C236 Embedded System

The DIO connector on the PAC-400AI-C236 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 8-bit digital inputs and 8-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.



### NOTE:

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

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

### INT 15H:

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

### Assembly Language Sample 1

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

**AL low byte = value**

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

### Assembly Language Sample 2

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

**Digital Output is 1001b**

Appendix

**D**

# Watchdog Timer

---



**NOTE:**

The following discussion applies to DOS. Contact IEI support or visit the IEI website for drivers for other operating systems.

The Watchdog Timer is a hardware-based timer that attempts to restart the system when it stops working. The system may stop working because of external EMI or software bugs. The Watchdog Timer ensures that standalone systems like ATMs will automatically attempt to restart in the case of system problems.

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

INT 15H:

| <b>AH – 6FH Sub-function:</b> |   |
|-------------------------------|---|
| AL – 2:                       | Sets the Watchdog Timer’s period.   |
| BL:                           | Time-out value (Its unit-second is dependent on the item “Watchdog Timer unit select” in CMOS setup). |

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

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

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



## PAC-400AI-C236 Embedded System

**NOTE:**

The Watchdog Timer is activated through software. The software application that activates the Watchdog Timer must also deactivate it when closed. If the Watchdog Timer is not deactivated, the system will automatically restart after the Timer has finished its countdown.

**EXAMPLE PROGRAM:**

**; INITIAL TIMER PERIOD COUNTER**

;

**W\_LOOP:**

;

```

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

```

;

**; ADD THE APPLICATION PROGRAM HERE**

;

```

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

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

```

;

**; EXIT ;**

Appendix

**E**

# Error Beep Code

---

## PAC-400AI-C236 Embedded System

## E.1 PEI Beep Codes

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

## E.2 DXE Beep Codes

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

**NOTE:**

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

Appendix

**F**

# Hazardous Materials Disclosure

---

## PAC-400AI-C236 Embedded System

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

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

Please refer to the following table.

| Part Name               | Toxic or Hazardous Substances and Elements |              |              |                              |                                |                                       |
|-------------------------|--|--------------|--------------|------------------------------|--------------------------------|---------------------------------------|
|                         | Lead (Pb)                                  | Mercury (Hg) | Cadmium (Cd) | Hexavalent Chromium (CR(VI)) | Polybrominated Biphenyls (PBB) | Polybrominated Diphenyl Ethers (PBDE) |
| Housing                 | O  | O            | O            | O                            | O                              | O                                     |
| Display                 | O  | O            | O            | O                            | O                              | O                                     |
| Printed Circuit Board   | O  | O            | O            | O                            | O                              | O                                     |
| Metal Fasteners         | O  | O            | O            | O                            | O                              | O                                     |
| Cable Assembly          | O  | O            | O            | O                            | O                              | O                                     |
| Fan Assembly            | O  | O            | O            | O                            | O                              | O                                     |
| Power Supply Assemblies | O  | O            | O            | O                            | O                              | O                                     |
| Battery                 | O  | O            | O            | O                            | O                              | O                                     |

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006 (now replaced by GB/T 26572-2011).

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006 (now replaced by GB/T 26572-2011).

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<br>(Pb) | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(CR(VI)) | 多溴联苯<br>(PBB) | 多溴二苯<br>醚<br>(PBDE) |
| 壳体     | ○         | ○         | ○         | ○               | ○             | ○                   |
| 显示     | ○         | ○         | ○         | ○               | ○             | ○                   |
| 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/T 11363-2006 (现由 GB/T 26572-2011 取代) 标准规定的限量要求以下。

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