IEI Integration Corp.

MODEL:

PUZZLE-IN002

1U Network Appliance with 8th Gen. Intel® Core™ i7/i5/i3, Pentium® or Celeron® Processor, DDR4, Six GbE Ports, PCIe x16 Slot, M.2, Mini-SATA, Rack Mount, and RoHS

User Manual

Rev. 1.01 – February 19, 2019

RoHS Lead Free

Revision

Date	Version	Changes
February 19, 2019	1.01	Updated internal system images
November 23, 2018	1.00	Initial release

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Manual Conventions

WARNING

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

CAUTION

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

NOTE

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

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1

Introduction

1.1 Overview

Figure 1-1: PUZZLE-IN002 Series

The PUZZLE-IN002 is a 1 U network appliance series powered by the 8th generation Intel® Core™ i7/i5/i3, Pentium® or Celeron® processor. It is optimized to host VNFs (Virtual Network Functions) and is ideal for SD-WAN.

The PUZZLE-IN002 supports six copper GbE ports for high-speed network applications, and it is equipped with a PCIe 3.0 x16 slot for upgrading with expansion cards, such as NIC cards or accelerator cards.

Multiple storage interfaces for fast and stable data transmission are offered through two SATA 6Gb/s connectors and one Mini-SATA slot that supports mSATA module.

1.2 Model Variations

The model variations of the PUZZLE-IN002 are listed below.

Model No.	CPU	Memory	SSD
PUZZLE-IN002-PGT	Intel® Pentium® Gold G5400T preinstalled	N/A	N/A
PUZZLE-IN002-PGT/8GB	Intel® Pentium® Gold G5400T preinstalled	8 GB	256 GB
PUZZLE-IN002-i3T	Intel® Core™ i3-8100T preinstalled	N/A	N/A
PUZZLE-IN002-i3T/8GB	Intel® Core™ i3-8100T preinstalled	8 GB	256 GB

Table 1-1: PUZZLE-IN002 Model Variations

1.3 Features

The PUZZLE-IN002 features are listed below:

- Powered by 8th gen Intel® Core™ i7/i5/i3, Pentium® or Celeron® processor
- Support two 2400 MHz DDR4 non-ECC RDIMMs (system max. 32 GB)
- Support two 2.5” SATA SSD/HDD
- Support up to six GbE connections via Intel® I211 controllers
- Upgradable with future expansion cards by one PCIe 3.0 x16 slot, one M.2 slot and one Mini-SATA card slot
- One RJ-45 RS-232 serial port
- Supports two USB 3.1 Gen 1 (5 Gb/s) ports
- 1U chassis for rack mounting
- RoHS compliant

1.4 Front Panel

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

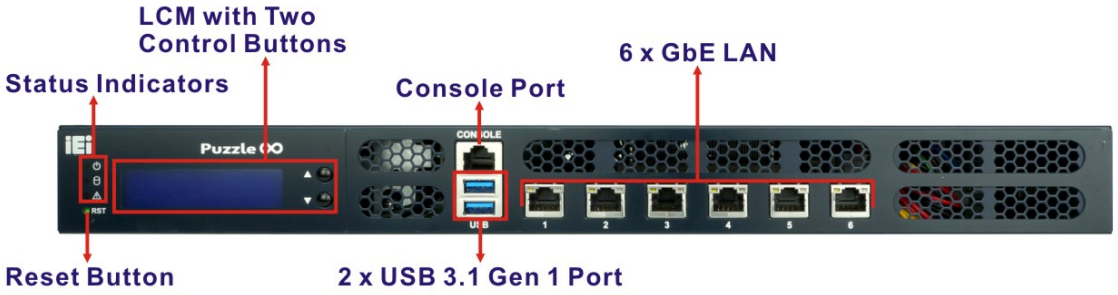


Figure 1-2: PUZZLE-IN002 Front Panel

The states of the LED indicators located on the front panel are listed below.

Power LED	Off	The system is turned off.
	Blue	The system is turned on.
HDD Status LED	Off	No HDD activity
	Blinking Blue	HDD activity
Alert LED	Off	No alert
	Red	Alert message

1.5 Rear Panel

An overview of the PUZZLE-IN002 rear panel is shown in **Figure 1-3** below.

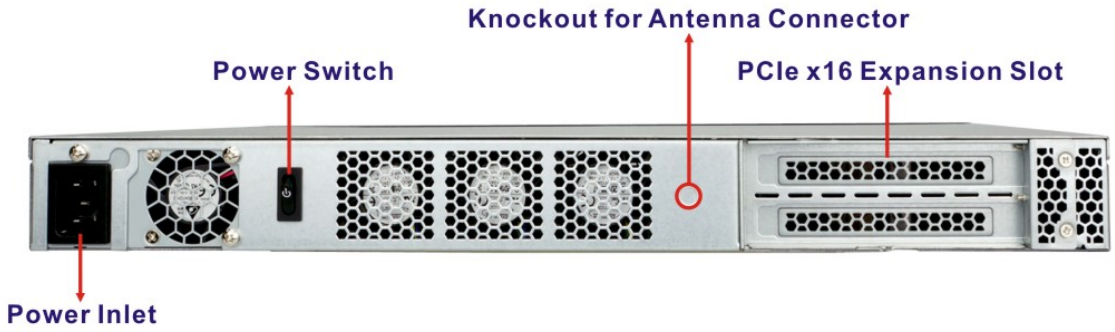


Figure 1-3: PUZZLE-IN002 Rear Panel

1.6 Technical Specifications

The PUZZLE-IN002 technical specifications are listed below.

System	
Form Factor	1U
CPU (SoC)	8th gen Intel® Core™ i7, i5, i3, Pentium® or Celeron® processor **PGT SKU:** 8th gen Intel® Pentium® Gold G5400T processor **i3T SKU:** 8th gen Intel® Core™ i3-8100T processor
Chipset	Intel® H310
Memory	Two 288-pin 2400 MHz DDR4 non-ECC RDIMM slots (system max. 32 GB) (8G SKUs are pre-installed with two 4 GB memory modules)
Networking	Intel® I211-AT Ethernet controller 6 x Copper 1GbE LAN port
Network Acceleration and Security	Intel® AES New Instructions Intel® Software Guard Extensions (Intel® SGX) Intel® Memory Protection Extensions (Intel® MPX) Intel® Trusted Execution Technology
Storage	2 x 2.5" SATA 6Gb/s HDD/SSD bay

USB DOM	1 x USB DOM (internal)
QTS	QTS Gateway security
Expansion	
PCIe	1 x PCIe 3.0 x16 slot
Mini-SATA	1 x Mini-SATA slot (reserved for WWAN module, supports SATA and USB 2.0 signals)
M.2	1 x M.2 A-key 2230 slot (reserved for Wi-Fi module, supports PCIe and USB 2.0 signals)
I/O and Indicators	
Console	1 x RJ-45 RS-232
USB	2 x USB 3.1 Gen 1 (5 Gb/s) port (external) 2 x USB 2.0 internal pin-header (8-pin, p=2.54)
Indicator	LCM (with two control buttons) Power status (blue) HDD status (green) Alert LED (programmable, red)
Switch/Button	Power switch (rear panel) Reset button (front panel)
TPM	1 x TPM 2.0 (2x10 pin header)
Antenna Connector	1 x Knockout hole for antenna connector
Power	
Power Input	100 V ~ 240 V ATX power, 240 W
Thermal Solution	1 x Passive heatsink for CPU 3 x Smart fan for CPU 1 x Smart fan for system
Environmental and Mechanical	
Mounting	1U rack mount
Operating Temperature	0°C~40°C (32°F~104°F)

Storage Temperature	-10°C~50°C (14°F~122°F)
Operating Humidity	5%~90%, non-condensing
Safety	CE, FCC
Weight	5 kg
Physical Dimensions	430 mm x 320 mm x 44.2 mm (W x D x H)
Operating System	Linux Ubuntu 16.04

Table 1-2: Technical Specifications

1.7 Dimensions

The physical dimensions are shown below:

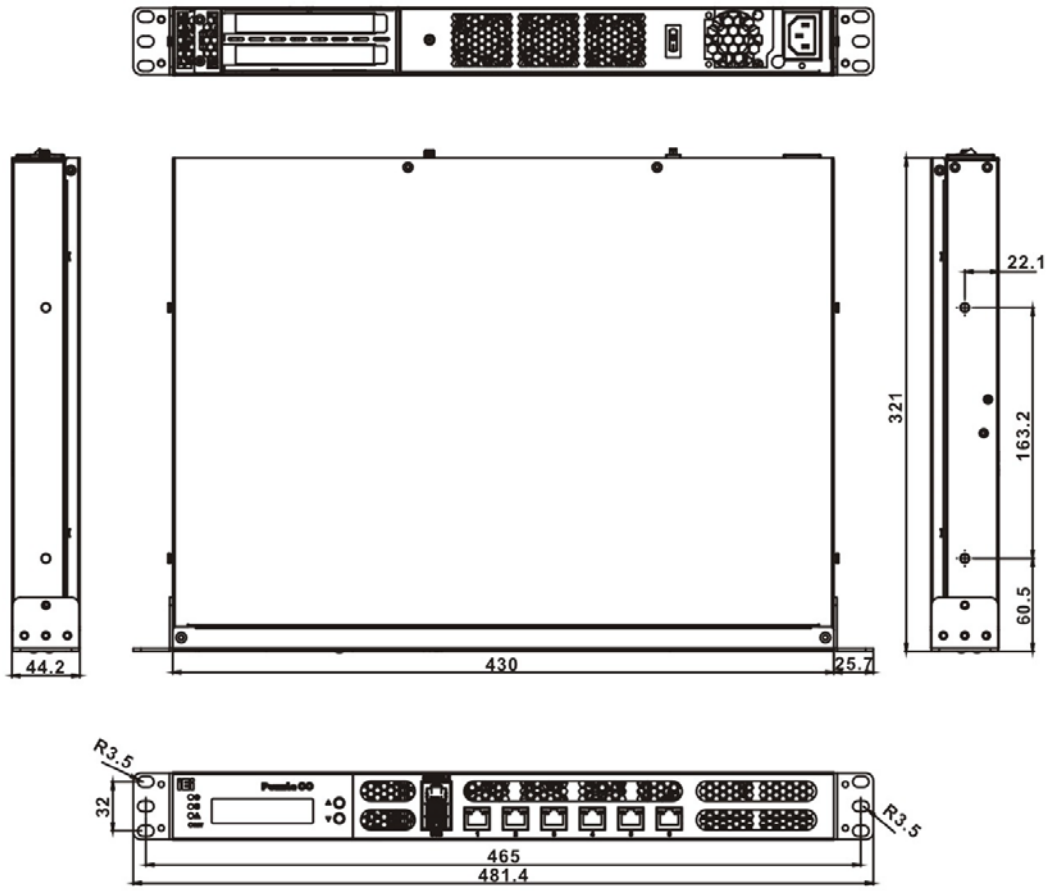


Figure 1-4: Physical Dimensions (millimeters)

Chapter

2

Unpacking

2.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during installation may result in permanent damage to the PUZZLE-IN002 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PUZZLE-IN002. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PUZZLE-IN002 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 PUZZLE-IN002, place it on an anti-static pad. This reduces the possibility of ESD damaging the PUZZLE-IN002.

2.2 Unpacking Precautions

When the PUZZLE-IN002 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 PUZZLE-IN002 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 PUZZLE-IN002 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@ieiworld.com.

The PUZZLE-IN002 is shipped with the following components:

Quantity	Item	Image
1	PUZZLE-IN002	
1	Power cord	
2	Rack mounting bracket	
6	Mounting bracket screw (M4*6)	
10	Screw for securing HDD (M3*4)	
1	USB to console cable (only for SKUs with memory)	

Quantity	Item	Image
1	RS-232 to console cable (only for SKUs without memory)	

2.4 Optional Items

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

Optional Item	Image
Slide rail (**P/N**: RAIL-B02)	
USB to console cable (**P/N**: 32013-004000-100-RS)	
RS-232 to console cable (**P/N**: 32005-005100-100-RS)	
20-pin Infineon TPM 2.0 module, software management tool, firmware v5.5 (**P/N**: TPM-IN02-R20)	

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 PUZZLE-IN002, installation instructions and configuration options.
- **DANGER! Disconnect Power**: Power to the PUZZLE-IN002 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 PUZZLE-IN002 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 PUZZLE-IN002. The PUZZLE-IN002's cooling vents must not be obstructed by any objects. Blocking the vents can cause overheating of the PUZZLE-IN002. Leave at least 5 cm of clearance around the PUZZLE-IN002 to prevent overheating.
- **Grounding**: The PUZZLE-IN002 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 PUZZLE-IN002.

3.2 Top Cover Removal

Before installing or maintaining the internal components, the top cover must be removed from the PUZZLE-IN002. Follow the steps below to complete the task.

Step 1: Remove the four retention screws indicated in **Figure 3-1**.

Step 2: Slide the top cover towards the rear side and gently lift the top cover (**Figure 3-1**).

Figure 3-1: Top Cover Removal

3.3 DIMM Installation

CAUTION:

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

To install the DIMM module, please follow the steps below.

Step 1: Remove the top cover from the PUZZLE-IN002. Please follow the instruction described in **Section 3.2**.

Step 2: Locate the DIMM slots on the motherboard.

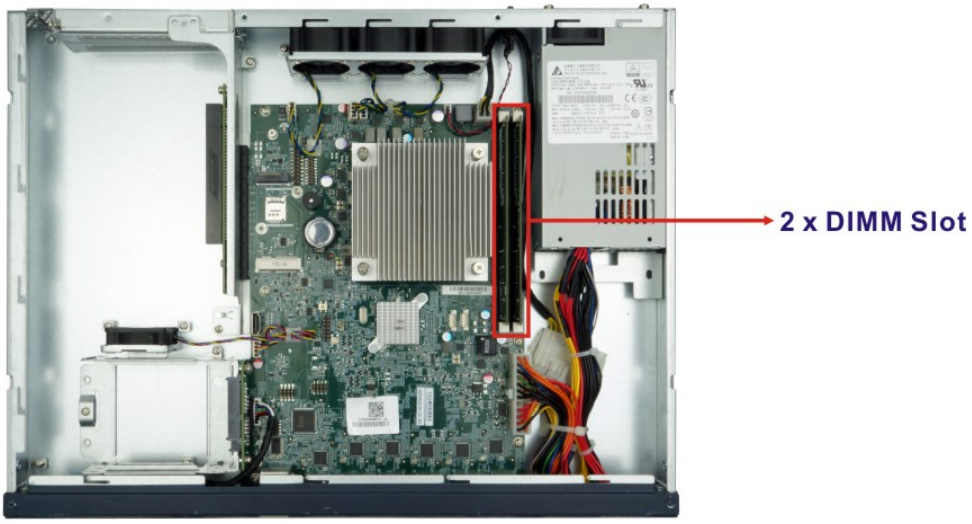


Figure 3-2: DIMM Slot Locations

Step 3: Open the DIMM socket handles. Open the two handles outwards as far as they can.

Step 4: Align the DIMM so the notch on the memory lines up with the notch on the memory socket.

Step 5: Once aligned, press down until the DIMM is properly seated. Clip the two handles into place.

Step 6: To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

3.4 HDD Installation

The PUZZLE-IN002 allows installation of two 2.5” SATA HDD/SSD. To install HDDs into the system, please follow the steps below.

Step 1: Remove the top cover from the PUZZLE-IN002. Please follow the instruction described in **Section 3.2**.

Step 2: Remove the HDD bracket from the system. To do this, remove the three retention screws indicated below and disconnect the SATA connector module from the motherboard.

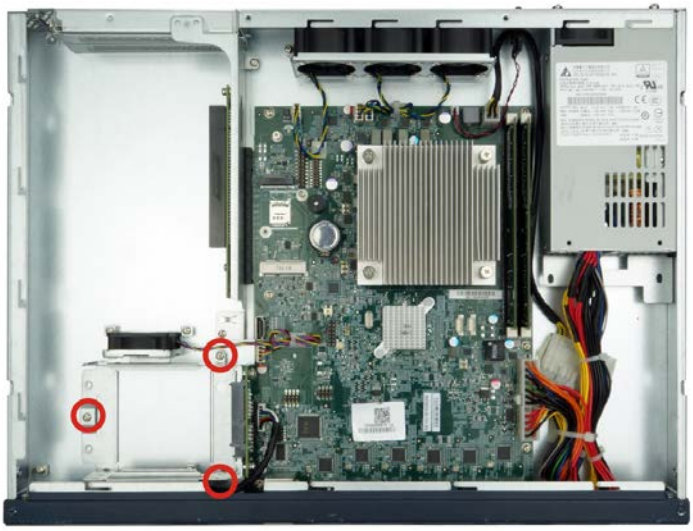


Figure 3-3: HDD Bracket Retention Screws

Step 3: Insert an HDD into the bracket until the HDD is properly connected to the SATA connector. Secure the HDD with four retention screws (M3*4). See **Figure 3-5**.

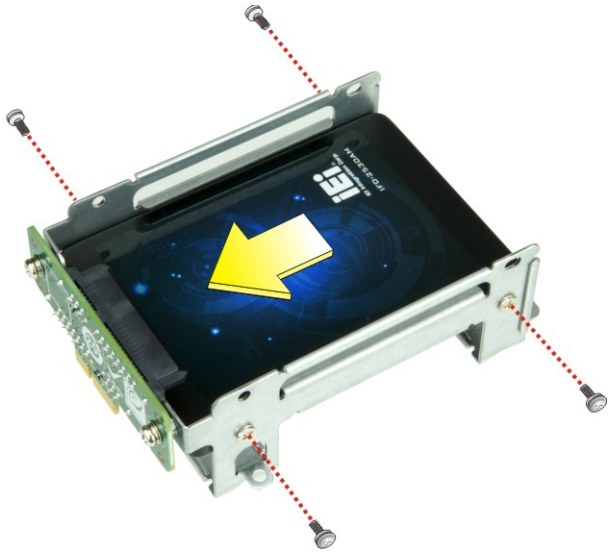


Figure 3-4: Secure HDD to the Bracket

Step 4: Re-connect the SATA connector module to the motherboard. Secure the bracket to the chassis with three screws removed previously (**Figure 3-5**).

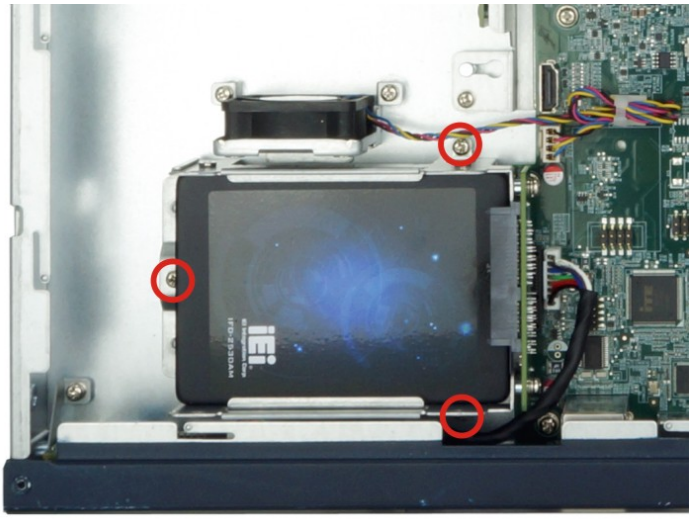


Figure 3-5: HDD Installation

Step 5: Re-install and secure the top cover to the system.

3.5 PCIe Expansion Card Installation

The PUZZLE-IN002 allows installation of one PCIe x16 card. To install a PCIe expansion card, please follow the steps below.

Step 1: Remove the top cover from the PUZZLE-IN002 (refer to **Section 3.2**).

Step 2: Remove the four expansion slot module retention screws indicated below.

Figure 3-6: Expansion Slot Module Retention Screws

Step 3: Push the expansion slot module with strength to disconnect the module from the edge connector of the motherboard.

Figure 3-7: Disconnect the Expansion Slot Module

Step 4: Remove the blank bracket panel that aligns with the PCIe slot for installing the expansion card. Save the bracket screw.

Figure 3-8: Blank Bracket Screw

Step 5: Align the expansion card to the PCIe slot. Press gently, but firmly, to seat the expansion card correctly in the slot. Install the bracket screw to secure the card to the expansion slot module.

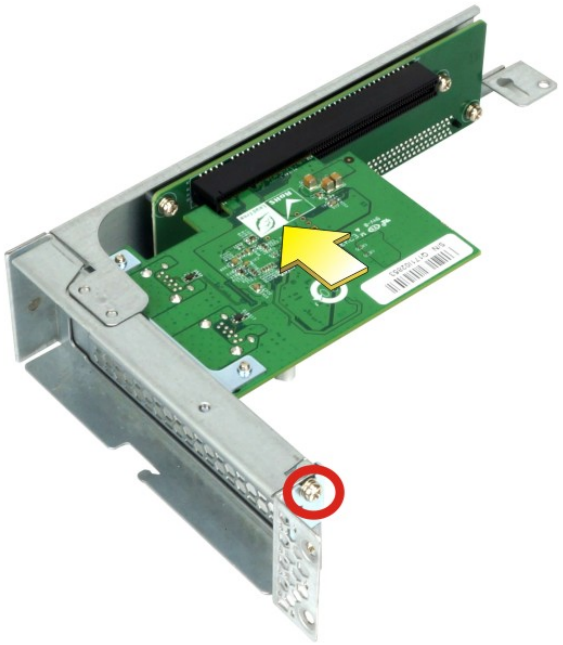


Figure 3-9: PCIe Expansion Card Installation

Step 6: Place the expansion slot module back to the original position by hooking the slotted hole into the positioning stud in the chassis (**Figure 3-10 A**). Push the connector of the expansion slot module into the edge connector to install it. During installation, ensure that

1. the connector on the slot module is properly aligned and connected to the edge connector;
2. the two studs on the side is going through the two holes in the chassis;
3. the slot module tab is going under the chassis tab.

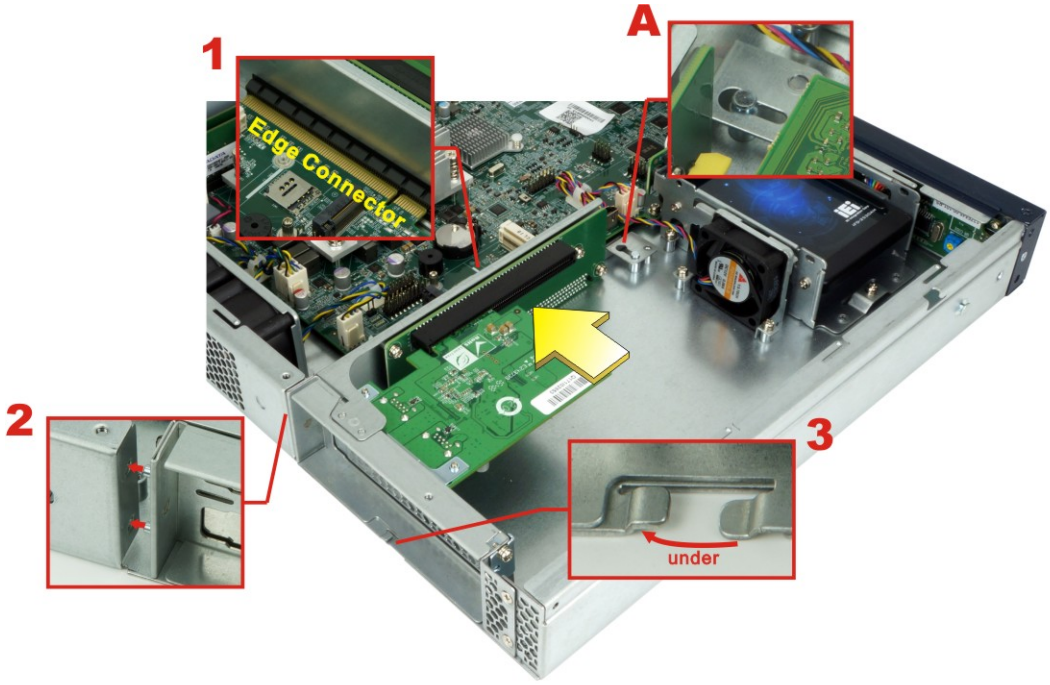


Figure 3-10: Expansion Slot Module Installation

Step 7: Secure the expansion slot module with the four retention screws previously removed.

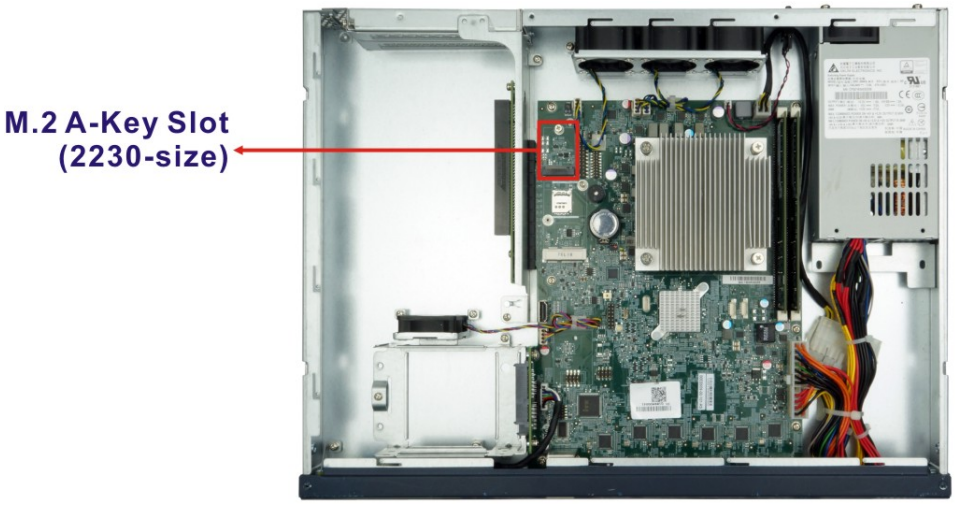
Step 8: Re-install the top cover.

3.6 M.2 Module Installation

The M.2 slot is keyed in the A position and provides mounting screw position for 2230-size M.2 module. To install an M.2 module, please follow the steps below.

Step 1: Remove the top cover from the PUZZLE-IN002. See **Section 3.2**.

Step 2: Locate the M.2 slot on the motherboard.



Step 3: Remove the on-board retention screw.

Step 4: Line up the notch on the module with the notch on the slot. Slide the M.2 module into the socket at an angle of about 20º.

Step 5: Push the M.2 module down and secure it with the previously removed retention screw.

3.7 Mini-SATA Card Installation

The PUZZLE-IN002 has one full-size/half-size Mini-SATA slot on the motherboard. To install a full-size module, follow the instructions below.

Step 1: Remove the top cover from the PUZZLE-IN002. See **Section 3.2**.

Step 2: Locate the Mini-SATA slot on the motherboard (Figure 3-11).

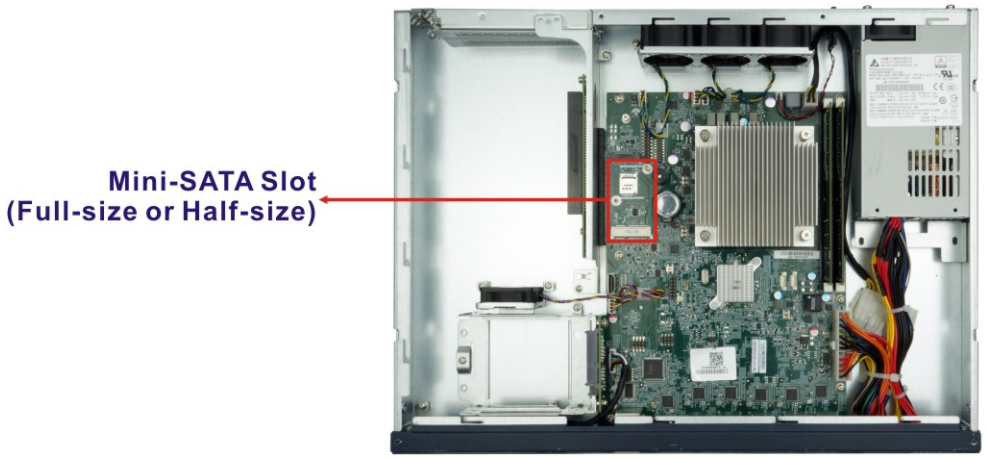


Figure 3-11: Mini-SATA Slot Location

Step 3: Remove the pre-installed retention screw from the standoff.

Step 4: Line up the notch on the card with the notch on the slot. Slide the card into the socket at an angle of about 20º.

Step 5: Secure the full-size card with the retention screw previously removed.

3.7.1 Half-size Card Installation

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

Step 1: Remove the pre-installed retention screw and the standoff from the motherboard.

Step 2: Install the previously removed standoff to the screw hole for the half-size Mini-SATA card.

Step 3: Line up the notch on the card with the notch on the slot. Slide the card into the socket at an angle of about 20º.

Step 4: Secure the half-size card with the retention screw previously removed.

3.8 LAN Connection

The LAN connectors on the front panel allow connection to an external network. The pinouts of the LAN connectors are listed below.

Pin	Description	Pin	Description
1	TRD0+	5	TRD2-
2	TRD0-	6	TRD1-
3	TRD1+	7	TRD3+
4	TRD2+	8	TRD3-

Table 3-1: LAN Pinouts

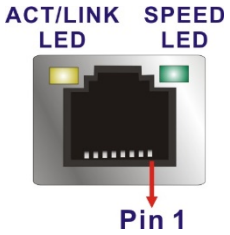


Figure 3-12: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one yellow and one green/orange. The yellow LED indicates activity on the port and the green/orange LED indicates the speed. See **Table 3-2**.

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 3-2: RJ-45 Ethernet Connector LEDs

3.9 Console Connection

The PUZZLE-IN002 has one RJ-45 serial device connector on the front panel. The RJ-45 connector for the serial port can be identified easily as the RJ-45 for the network has two LEDs on the port, while the connectors for the serial cables don't. The pinouts of the serial port are listed below.

Pin	Description	Pin	Description
1	-NRTS1	5	GND
2	-NDTR1	6	NSIN1
3	NSOUT1	7	-NDSR1
4	GND	8	-NCTS1

Table 3-3: RJ-45 Serial Port Pinouts

The serial device slot (RJ-45) connects to a cable with a standard D-sub 9 connector or a USB connector (varied from SKU) at the other end.

3.10 Mounting the System

The PUZZLE-IN002 is shipped with two mounting brackets that support 1U rack mount. To install the mounting brackets, please follow the steps below.

Step 1: Align the three retention screw holes in each bracket with the corresponding retention screw holes on the sides of the PUZZLE-IN002.

Step 2: Secure the brackets to the system by inserting three retention screws (M4*6) into each bracket (**Figure 3-13**). Make sure the screws are tight and on the right positions.

Figure 3-13: Rack Mounting Bracket Installation

3.11 Power-On Procedure

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 PUZZLE-IN002 please follow the steps below:

Step 1: Connect the power source to the power inlet on the rear panel.

Step 2: Turn on the power switch to power up the system.

Step 3: The power LED indicator on the front panel turns to green.

Figure 3-14: Power-on

3.12 Available Drivers

All the drivers for the PUZZLE-IN002 are available on IEI Resource Download Center (https://download.ieiworld.com). Type PUZZLE-IN002 and press Enter to find all the relevant software, utilities, and documentation.

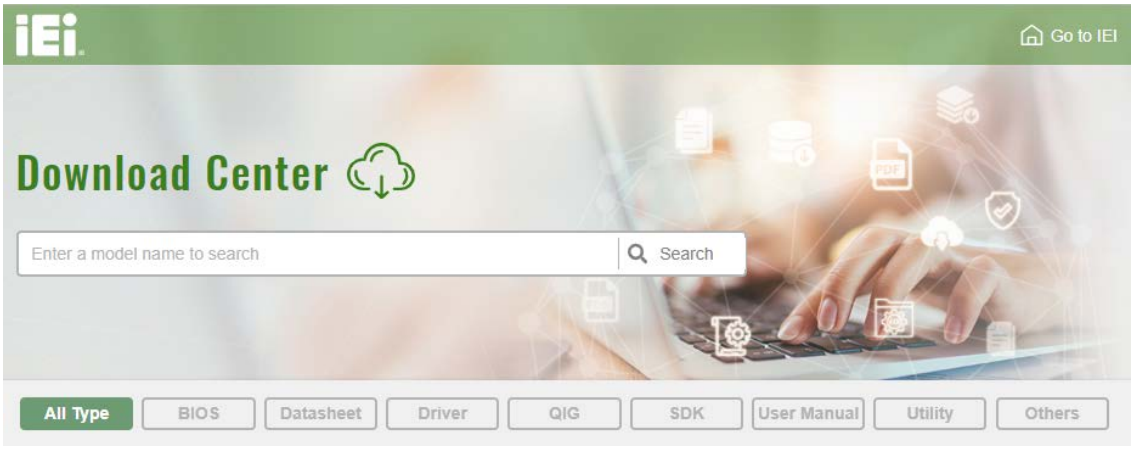


Figure 3-15: IEI Resource Download Center

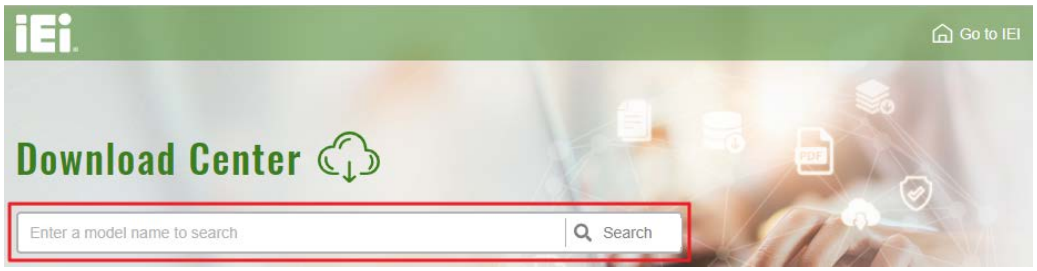
NOTE:

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

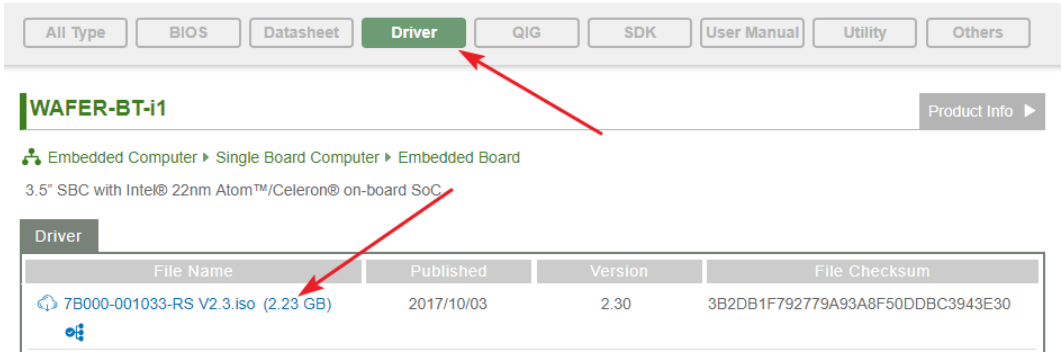
3.12.1 Driver Download

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

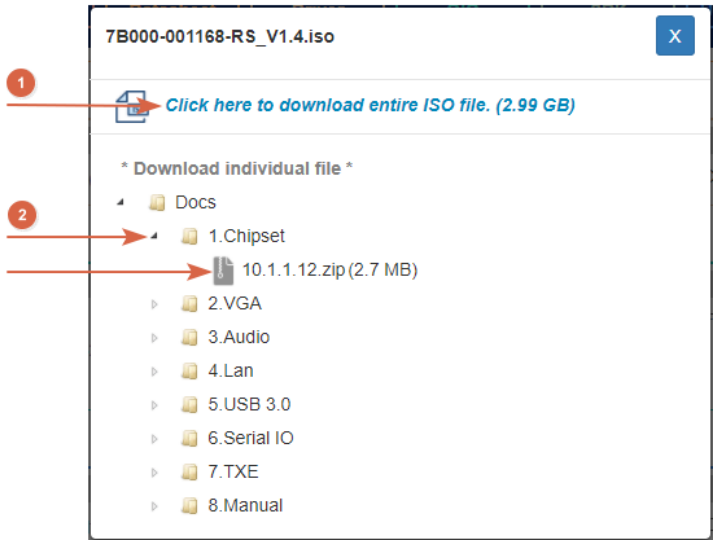
Step 1: Go to https://download.ieiworld.com. Type PUZZLE-IN002 and press Enter.



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).



3.13 Maintenance

To configure the jumper settings, please follow the steps below.

Step 1: Remove the top cover. See **Section 3.2**.

Step 2: Locate the jumper/button on the embedded motherboard.

Step 3: Make the jumper settings in accordance with the settings described and defined in the following sections.

3.13.1 Clear CMOS

If the PUZZLE-IN002 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 3-16** below.

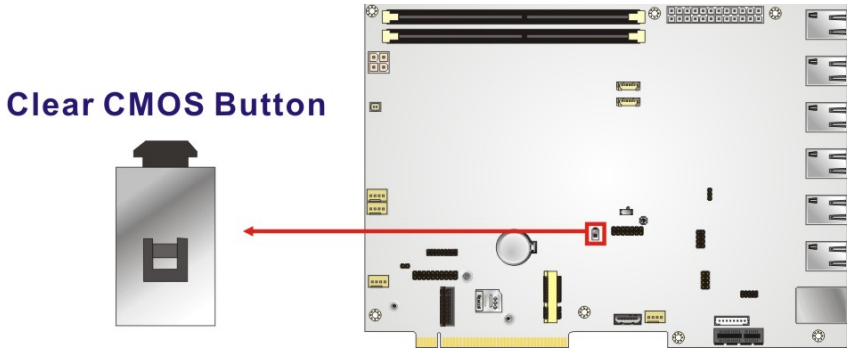


Figure 3-16: Clear CMOS Button Location

3.13.2 Flash Descriptor Security Override Jumper

The Flash Descriptor Security Override jumper (J_FLASH1) allows users to enable or disable the ME firmware update. Refer to **Figure 3-17** and **Table 3-4** for the jumper location and settings.

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

Table 3-4: Flash Descriptor Security Override Jumper Settings

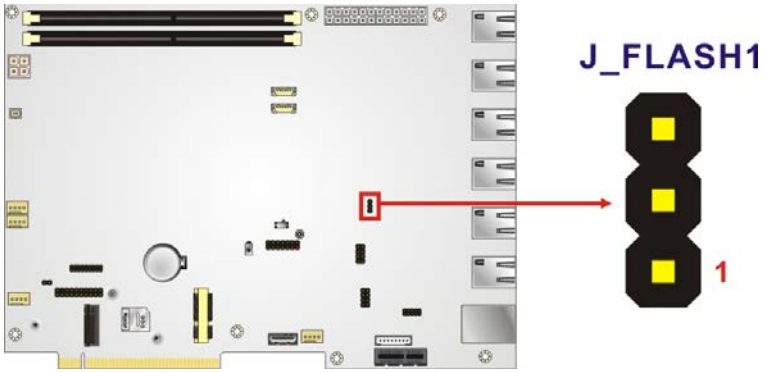


Figure 3-17: Flash Descriptor Security Override Jumper Location

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

Step 1: Before turning on the system power, short pin 2-3 of the jumper.

Step 2: Update the BIOS and ME firmware, and then turn off the system power.

Step 3: Remove the metal clip on the 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

4

BIOS

4.1 Introduction

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

NOTE:

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

4.1.1 Starting Setup

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

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

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

4.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in **Table 4-1**.

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

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

Table 4-1: BIOS Navigation Keys

4.1.3 Getting Help

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

4.1.4 Unable to Reboot after Configuration Changes

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

4.1.5 BIOS Menu Bar

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

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

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

4.2 Main

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

```
      Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
  Main   Advanced   Chipset   Security    Boot    Save & Exit

BIOS Information                                  Set the Date. Use Tab to
BIOS Vendor                    American Megatrends switch between Date
Core Version                   5.13                elements.
Compliancy                     UEFI 2.6; PI 1.4
Project Version                Z533AR12.BIN
Build Date and Time            09/12/2018 15:44:24

iWDD Vendor                    iEi
iWDD Version                   Z533ER11.bin


Processor Information
Name                           CoffeeLake DT
Brand String                   Intel(R) Core(TM)
                               i3-8100T CPU @ 3.10GHz
Frequency                      3100 MHz
ID                             0x906EB             ----------------------
Stepping                       B0                  →←: Select Screen
Number of Processors           4Core(s) / 4Thread(s) ↑ ↓: Select Item
Microcode Revision             8E                  Enter:  Select
GT Info                        GT2 (0x3E91)        +/-:  Change Opt.
                                                   F1:   General Help
IGFX VBIOS Version             1010                F2:   Previous Values
Memory RC Version              0.7.1.58            F3:   Optimized Defaults
Total Memory                   8192 MB             F4:   Save & Exit
Memory Frequency               2400 MHz            ESC:  Exit

PCH Information
Name                           CNL PCH-H
PCH SKU                        H310
Stepping                       B0

ME FW Version                  12.0.0.1069
ME Firmware SKU                Consumer SKU


Access Level                   Administrator

System Date                    [Thu 10/15/2018]
System Time                    [06:10:27]

        Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Menu 1: Main

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

➔ **System Date [xx/xx/xx]**

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

➔ **System Time [xx:xx:xx]**

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

4.3 Advanced

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

WARNING!

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

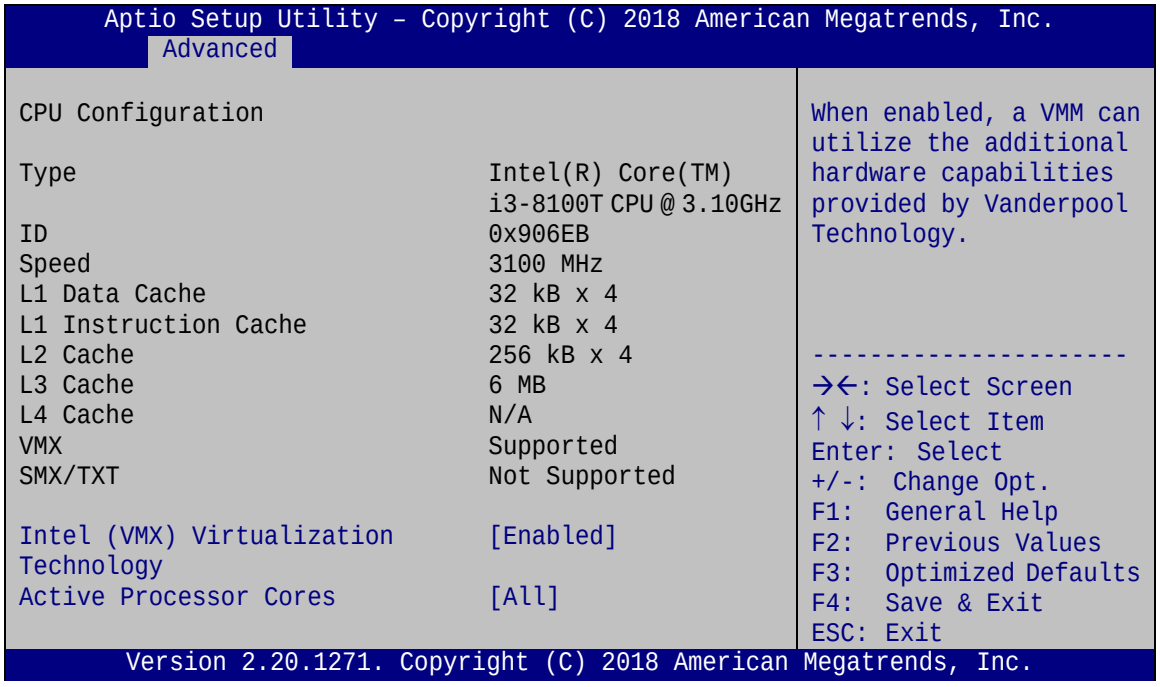
```
      Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
  Main    Advanced   Chipset   Security    Boot    Save & Exit

> CPU Configuration                          Trusted Computing
> Trusted Computing                          Settings
> iWDD H/M Monitor
> IT8528 Super IO Configuration              ----------------------
> Serial Port Console Redirection            →←: Select Screen
> NVMe Configuration                         ↑ ↓: Select Item
                                             Enter:  Select
                                             +/-:  Change Opt.
                                             F1:   General Help
                                             F2:   Previous Values
                                             F3:   Optimized Defaults
                                             F4:   Save & Exit
                                             ESC:  Exit
       Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Menu 2: Advanced

4.3.1 CPU Configuration

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



BIOS Menu 3: CPU Configuration

➔ **Intel (VMX) Virtualization Technology [Enabled]**

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

➔ **Disabled** Disables Intel Virtualization Technology.

➔ **Enabled** **DEFAULT** Enables Intel Virtualization Technology.

➔ **Active Processor Cores [All]**

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

➔ **All** **DEFAULT** Enable all cores in the processor package.

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

4.3.2 Trusted Computing

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

```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
        Advanced
Configuration                                  | Enables or Disables BIOS
  Security Device Support        [Disable]     | support for security
  NO Security Device Found                     | device. O.S. will not
                                               | show Security Device.
                                               | TCG EFI protocol and
                                               | INT1A interface will not
                                               | be available.
                                               |
                                               | ----------------------
                                               | →←: Select Screen
                                               | ↑ ↓: Select Item
                                               | Enter: Select
                                               | +/-: Change Opt.
                                               | F1: General Help
                                               | F2: Previous Values
                                               | F3: Optimized Defaults
                                               | F4: Save & Exit
                                               | ESC: Exit
Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Menu 4: Trusted Computing

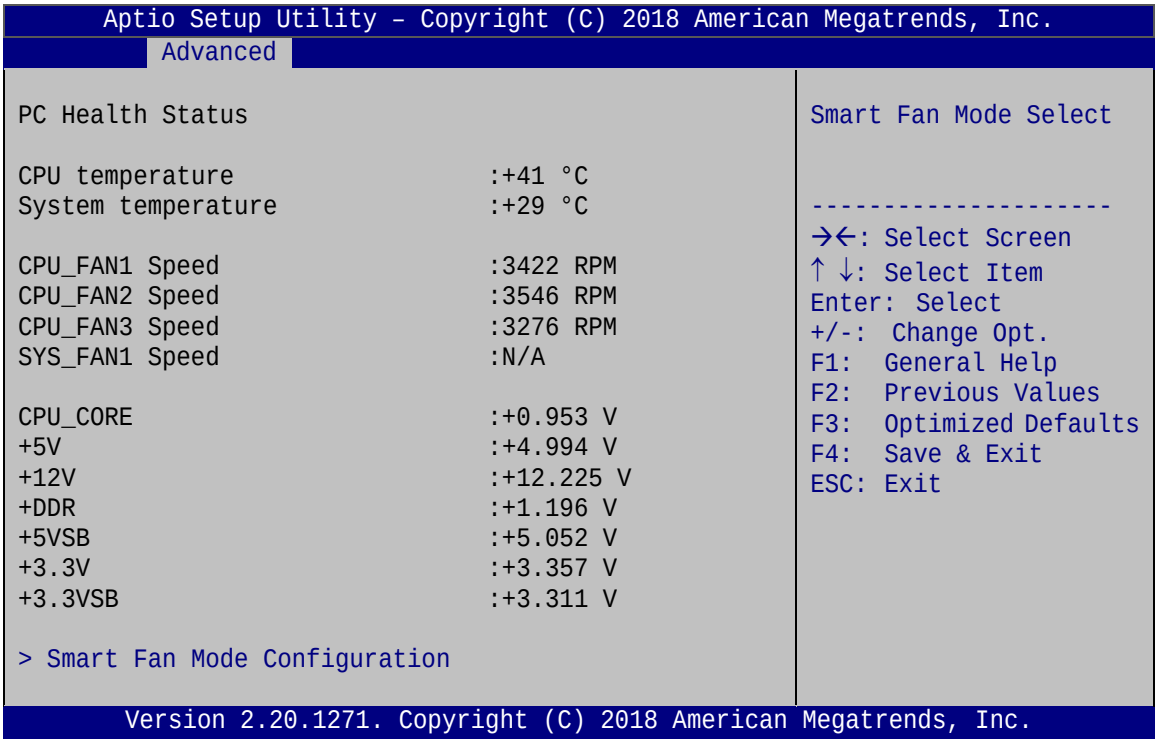
➔ **Security Device Support [Disable]**

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

- ➔ **Disable** **DEFAULT** TPM support is disabled.
- ➔ **Enable** TPM support is enabled.

4.3.3 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 5**) contains the fan configuration submenu, and displays the system temperature and CPU fan speed.



BIOS Menu 5: 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 Speeds:
  - CPU fan speed
  - System fan speed
- Voltages:
  - CPU_CORE

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

4.3.3.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 6**) to configure the CPU/system fan temperature and speed settings.

```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
        Advanced
Smart Fan Mode Configuration                    Smart Fan Mode Select

CPU_FAN1 Smart Fan Control       [Auto Mode]
Auto mode fan start temperature  65
Auto mode fan off temperature    50
Auto mode fan start PWM          30
Auto mode fan slope PWM          2

CPU_FAN2 Smart Fan Control       [Auto Mode]
Auto mode fan start temperature  65
Auto mode fan off temperature    50
Auto mode fan start PWM          30
Auto mode fan slope PWM          2

                                 ----------------------
                                 →←: Select Screen
                                 ↑ ↓: Select Item
                                 Enter:  Select
                                 +/-:  Change Opt.
                                 F1:   General Help
                                 F2:   Previous Values
                                 F3:   Optimized Defaults
                                 F4:   Save & Exit
                                 ESC:  Exit
Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Menu 6: Smart Fan Mode Configuration

➔ **CPU_FAN Smart Fan Control [Auto Mode]**

Use the **CPU_FAN Smart Fan Control** options to configure the CPU Smart Fans.

➔ **Manual Mode** The fan spins at the speed set in Manual Mode settings.

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

The following options can only be set if the CPU Smart Fan Control option is set to Auto Mode.

➔ **Auto mode fan start temperature**

If the CPU temperature is between **fan off** and **fan start**, the fan speed change to **fan start PWM**. To set a value, Use the + or – key to change the value or enter a decimal number between 1 and 100.

➔ **Auto mode fan off temperature**

If the CPU temperature is lower than the value set this option, the fan speed change to be lowest. To set a value, Use the + or – key to change the value or enter a decimal number between 1 and 100.

➔ **Auto mode fan start PWM**

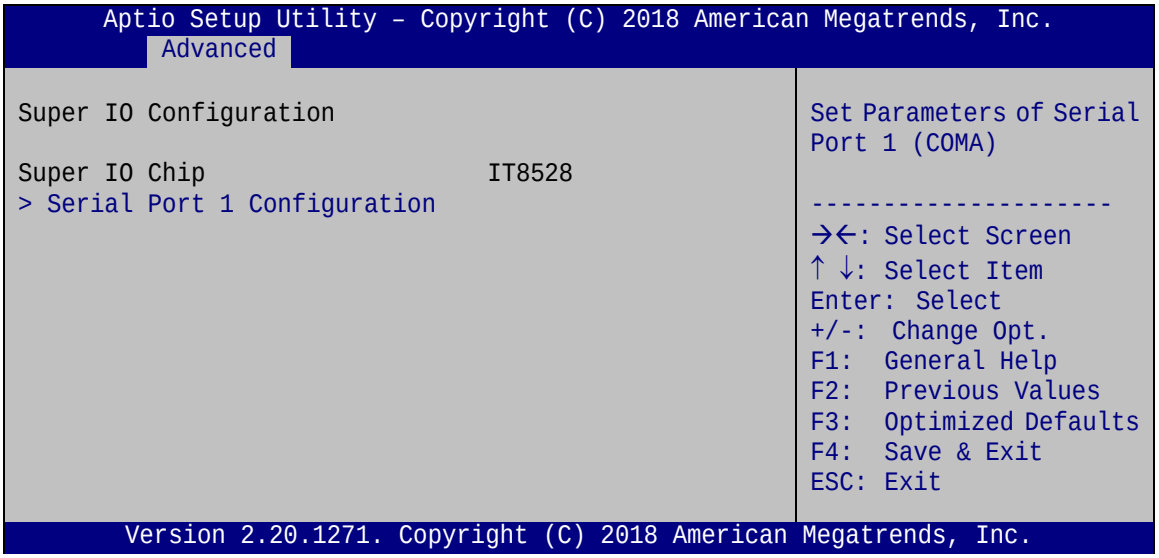
Use the **Auto mode fan start PWM** option to set the PWM start value. Use the + or – key to change the value or enter a decimal number between 1 and 100.

➔ **Auto mode fan slope PWM**

Use the **Auto mode fan slope PWM** option to select the linear rate at which the PWM mode increases with respect to an increase in temperature. Use the + or – key to change the value or enter a decimal number between 1 and 8.

4.3.4 IT8528 Super IO Configuration

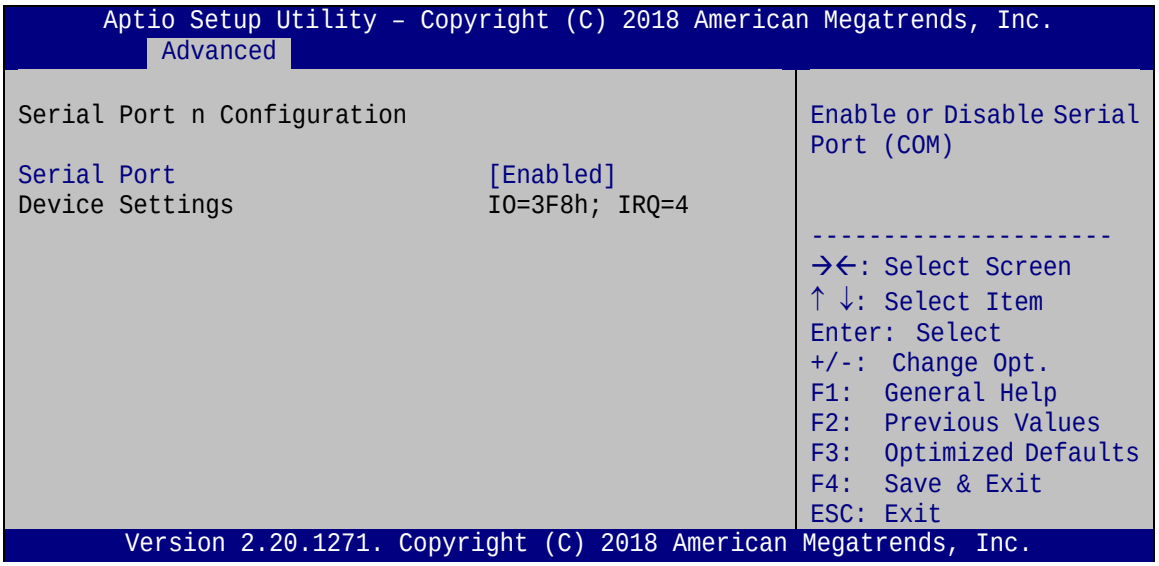
Use the **IT8528 Super IO Configuration** menu (**BIOS Menu 7**) to set or change the configurations for the parallel ports and serial ports.



BIOS Menu 7: IT8528 Super IO Configuration

4.3.4.1 Serial Port 1 Configuration

Use the **Serial Port 1 Configuration** menu (**BIOS Menu 8**) to configure the serial port n.



BIOS Menu 8: Serial Port 1 Configuration Menu

➔ **Serial Port [Enabled]**

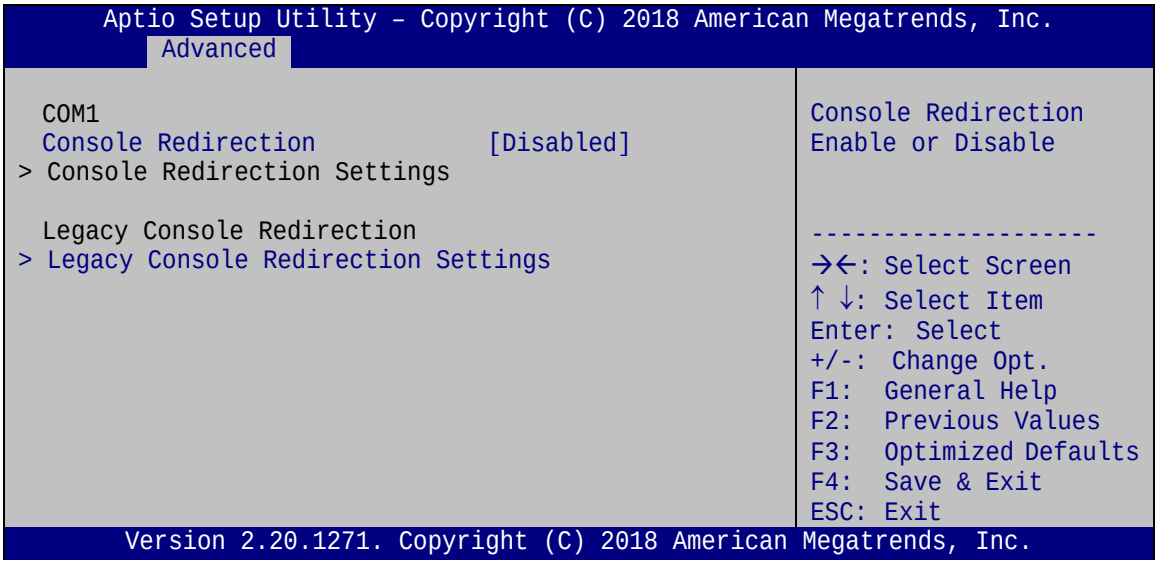
Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled** Disable the serial port

➔ **Enabled** **DEFAULT** Enable the serial port

4.3.5 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 9**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.



BIOS Menu 9: Serial Port Console Redirection

➔ **Console Redirection [Enabled]**

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

➔ **Disabled** Disabled the console redirection function

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

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

➔ **Terminal Type [ANSI]**

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

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

➔ **Bits per second [115200]**

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

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

➔ **Data Bits [8]**

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

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

➔ **Parity [None]**

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

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

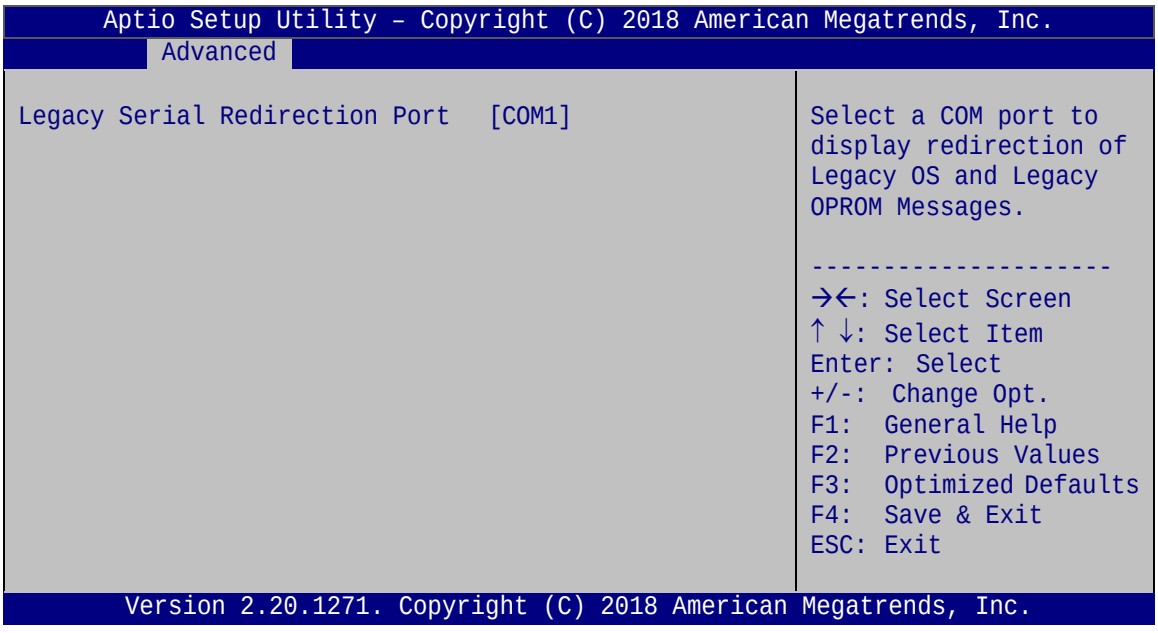
- **Odd** The parity bit is 0 if the number of ones in the data bits is odd.
- **Mark** The parity bit is always 1. This option does not provide error detection.
- **Space** The parity bit is always 0. This option does not provide error detection.

➔ **Stop Bits [1]**

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

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

4.3.5.1 Legacy Console Redirection Settings



BIOS Menu 10: Legacy Console Redirection Settings

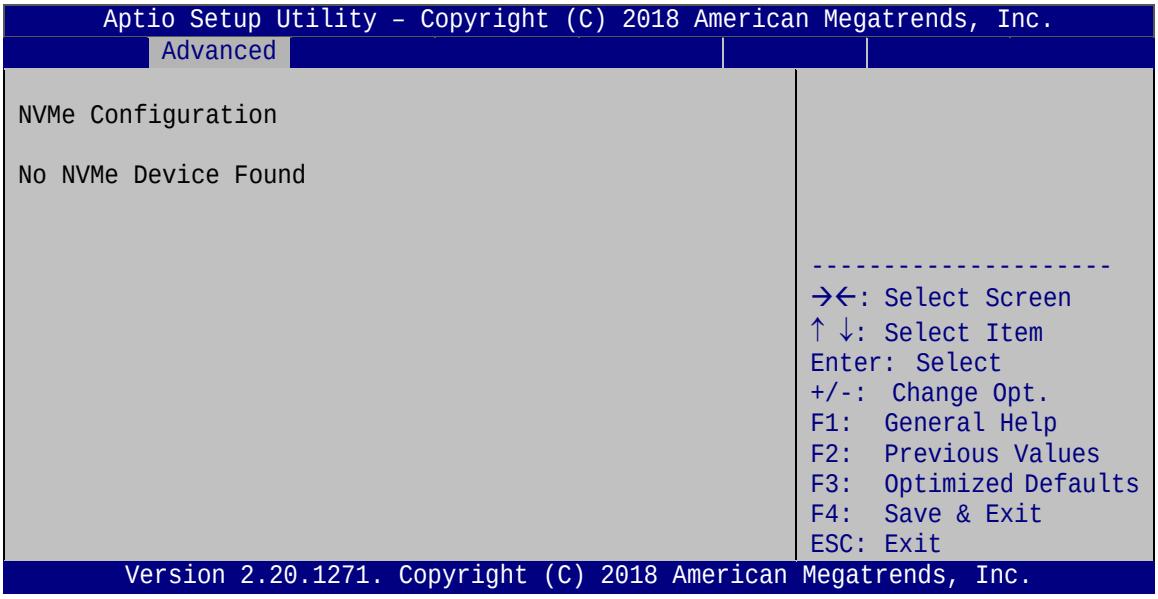
➔ **Legacy Serial Redirection Port [COM1]**

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

- COM1 **Default**

4.3.6 NVMe Configuration

Use the **NVMe Configuration** (**BIOS Menu 11**) menu to display the NVMe controller and device information.



BIOS Menu 11: NVMe Configuration

4.4 Chipset

Use the **Chipset** menu (**BIOS Menu 12**) 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

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```
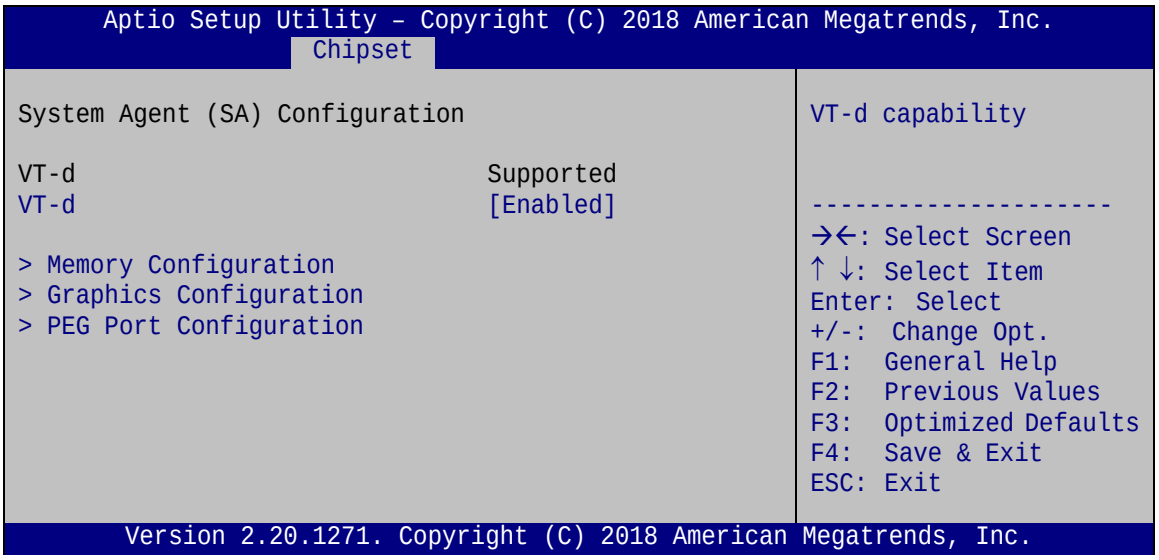

BIOS Menu 12: Chipset

4.4.1 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 13**) to configure the System Agent (SA) parameters.



BIOS Menu 13: System Agent (SA) Configuration

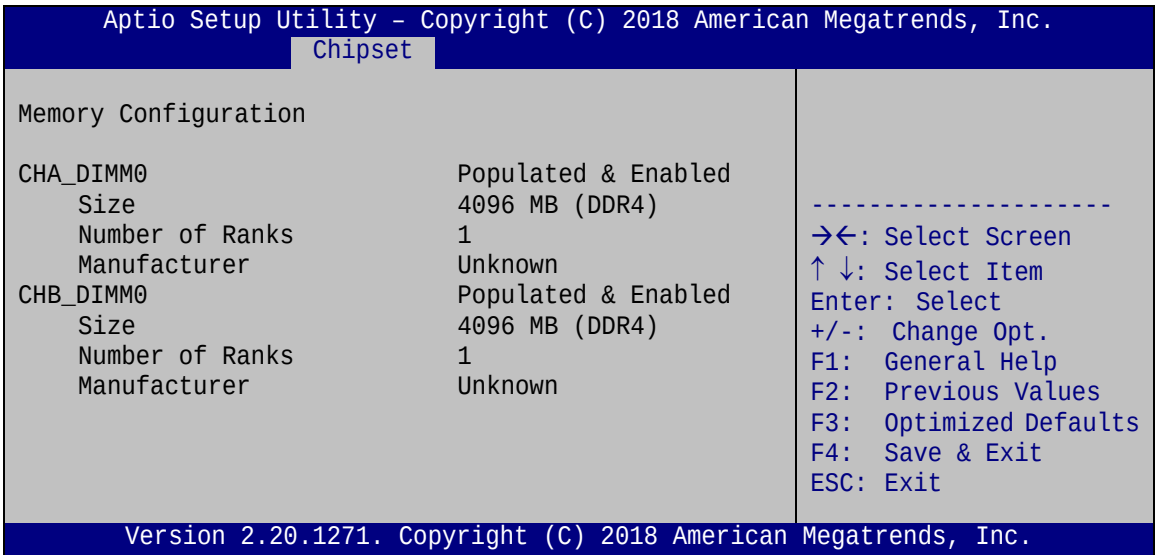
➔ **VT-d [Enabled]**

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

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

4.4.1.1 Memory Configuration

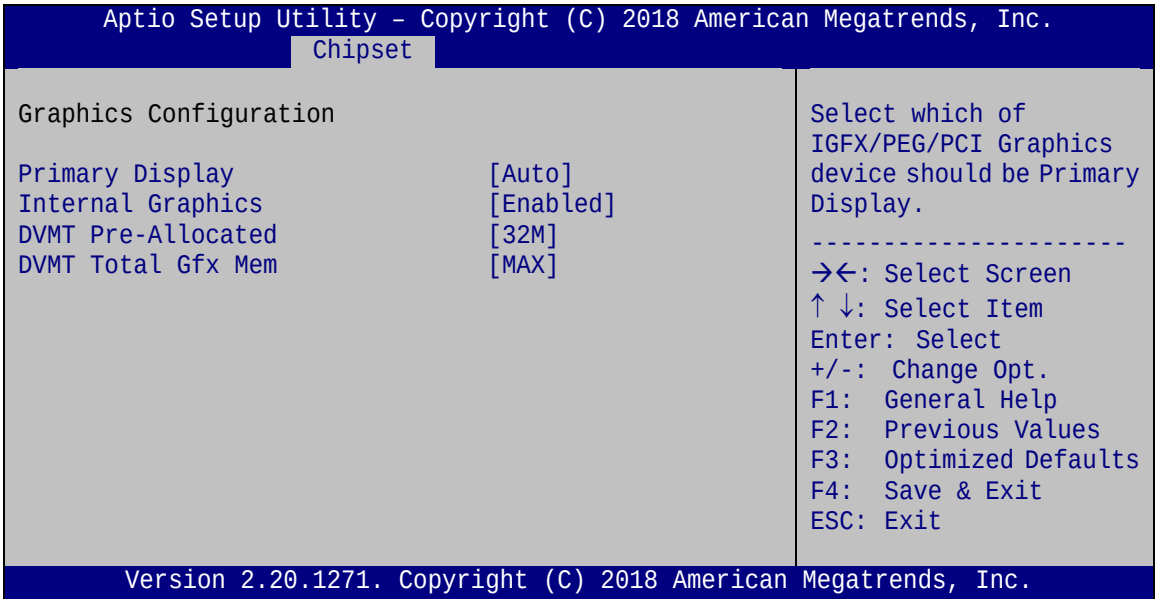
Use the **Memory Configuration** submenu (**BIOS Menu 14**) to view memory information.



BIOS Menu 14: Memory Configuration

4.4.1.2 Graphics Configuration

Use the **Graphics Configuration** (**BIOS Menu 15**) menu to configure the video device connected to the system.



BIOS Menu 15: Graphics Configuration

➔ **Primary Display [Auto]**

Use the **Primary Display** option to select the primary graphics controller the system uses. The following options are available:

- Auto **Default**
- IGFX
- PEG
- PCIe

➔ **Internal Graphics [Enabled]**

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

- Auto
- Disabled
- Enabled **Default**

➔ **DVMT Pre-Allocated [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:

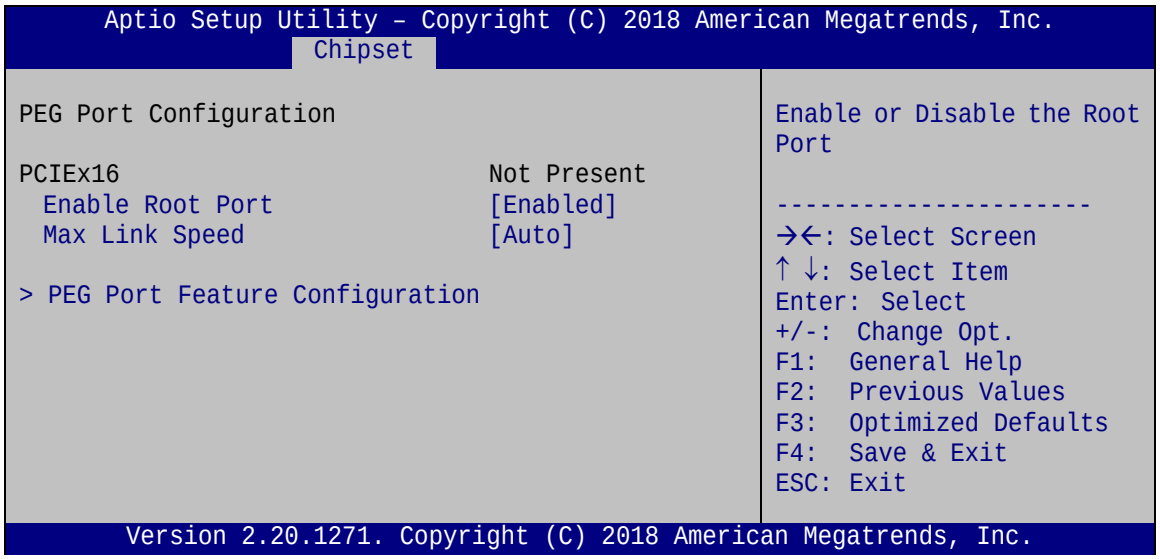
- 32M **Default**
- 64M

➔ **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**

4.4.1.3 PEG Port Configuration



BIOS Menu 16: PEG Port Configuration

➔ **Enable Root Port [Enabled]**

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

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

➔ **Max Link Speed [Auto]**

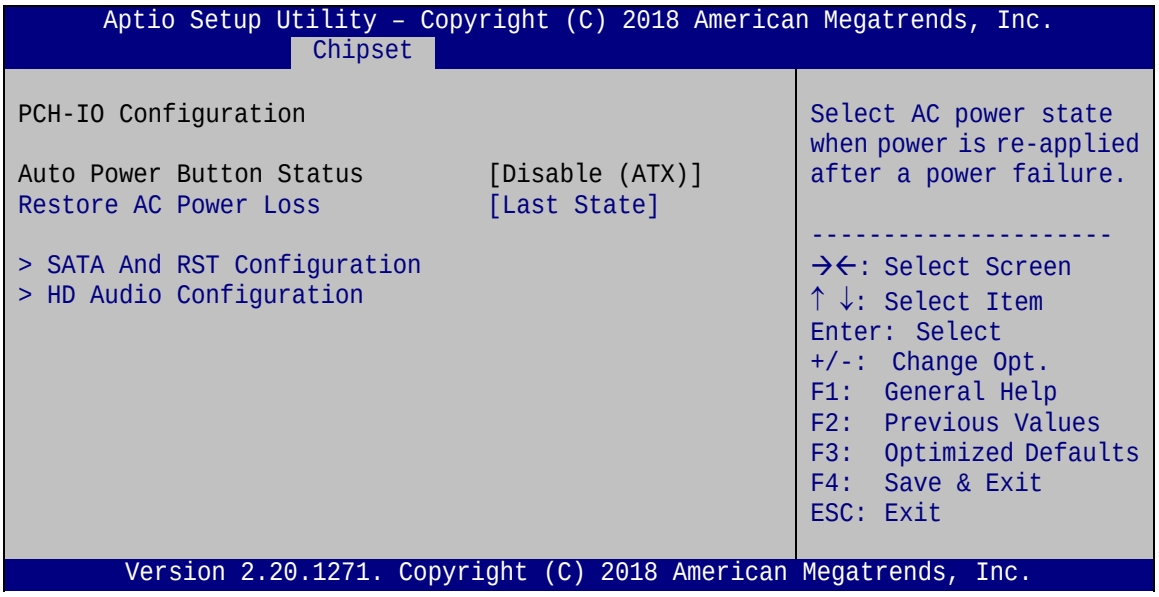
Use the **Max Link Speed** option to select the maximum link speed of the PCI Express slot.

The following options are available:

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

4.4.2 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 17**) to configure the PCH parameters.



BIOS Menu 17: 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.

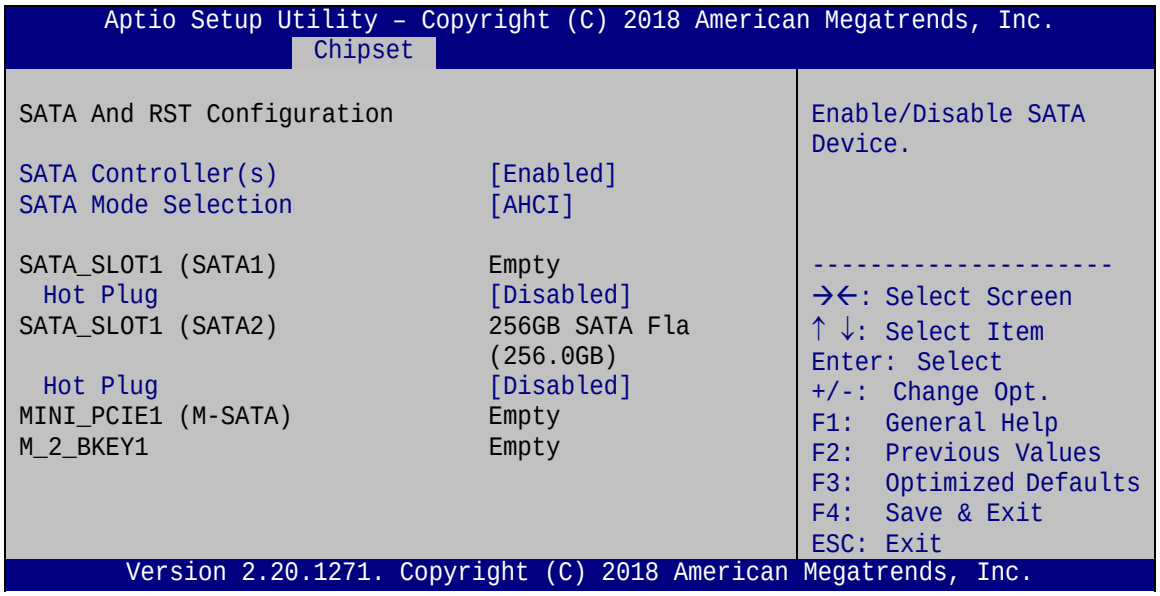
➔ **Power Off** The system remains turned off

➔ **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.

4.4.2.1 SATA and RST Configuration

Use the **SATA and RST Configuration** menu (**BIOS Menu 18**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 18: SATA and RST Configuration

➔ **SATA Controller(s) [Enabled]**

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

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

➔ **Disabled** Disables the on-board SATA controller(s).

➔ **SATA Mode Selection [AHCI]**

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

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

➔ **Hot Plug**

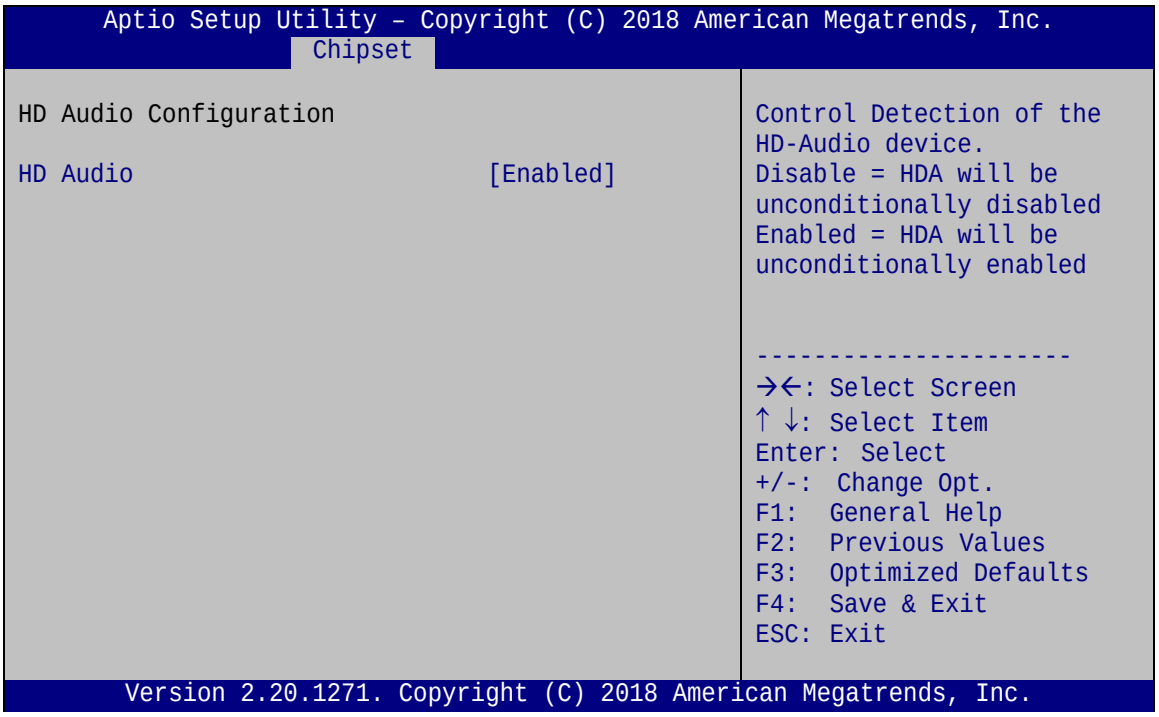
Use the **Hot Plug** option to enable or disable the hot plug function.

➔ **Disabled** **DEFAULT** Disables the hot plug function.

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

4.4.2.2 HD Audio Configuration

Use the **HD Audio Configuration** menu (**BIOS Menu 19**) to configure the PCH Azalia settings.



BIOS Menu 19: HD Audio Configuration

➔ **HD Audio [Enabled]**

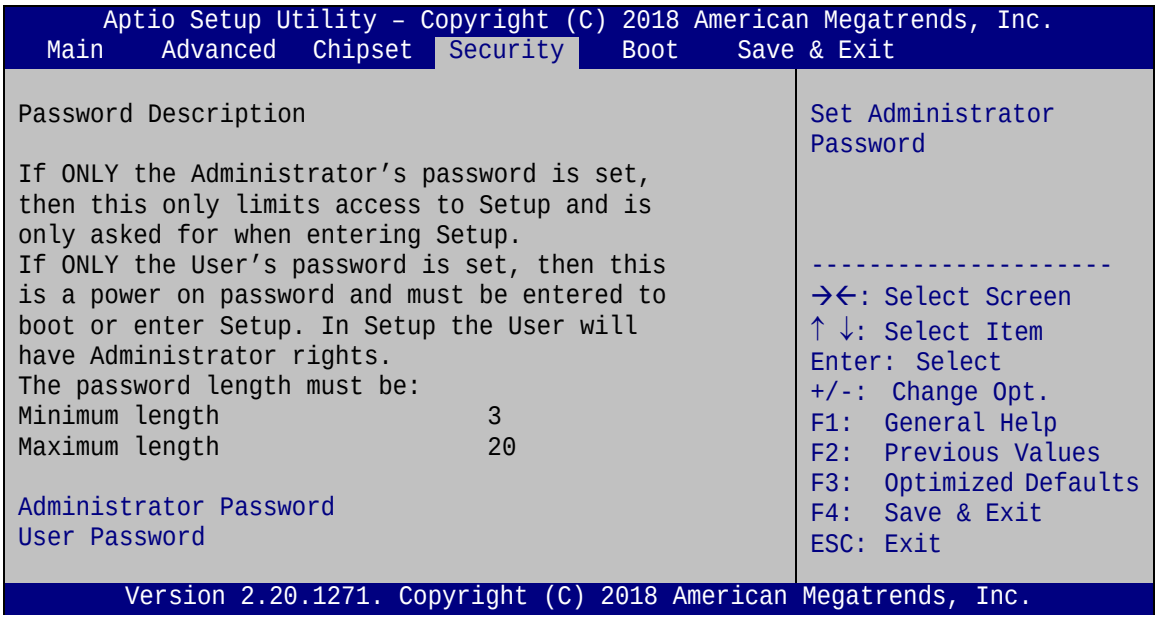
Use the **HD Audio** option to enable or disable the High Definition Audio controller.

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

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

4.5 Security

Use the **Security** menu (**BIOS Menu 20**) to set system and user passwords.



BIOS Menu 20: Security

➔ **Administrator Password**

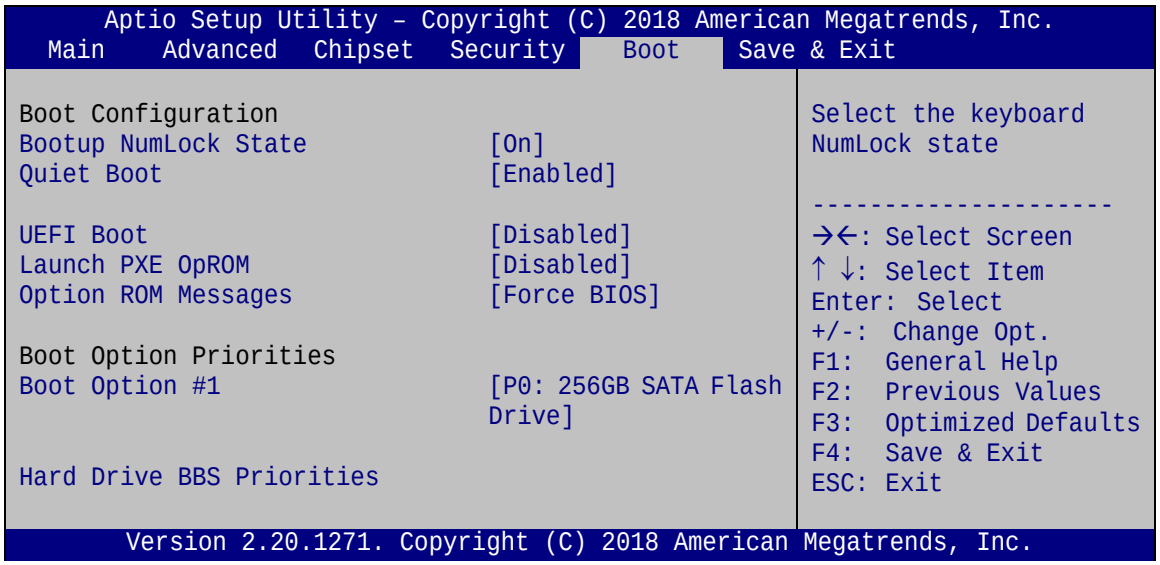
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

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

4.6 Boot

Use the **Boot** menu (**BIOS Menu 21**) to configure system boot options.



BIOS Menu 21: Boot

➔ **Bootup NumLock State [On]**

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

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

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

➔ **Quiet Boot [Enabled]**

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

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

➔ **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.

➔ **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.

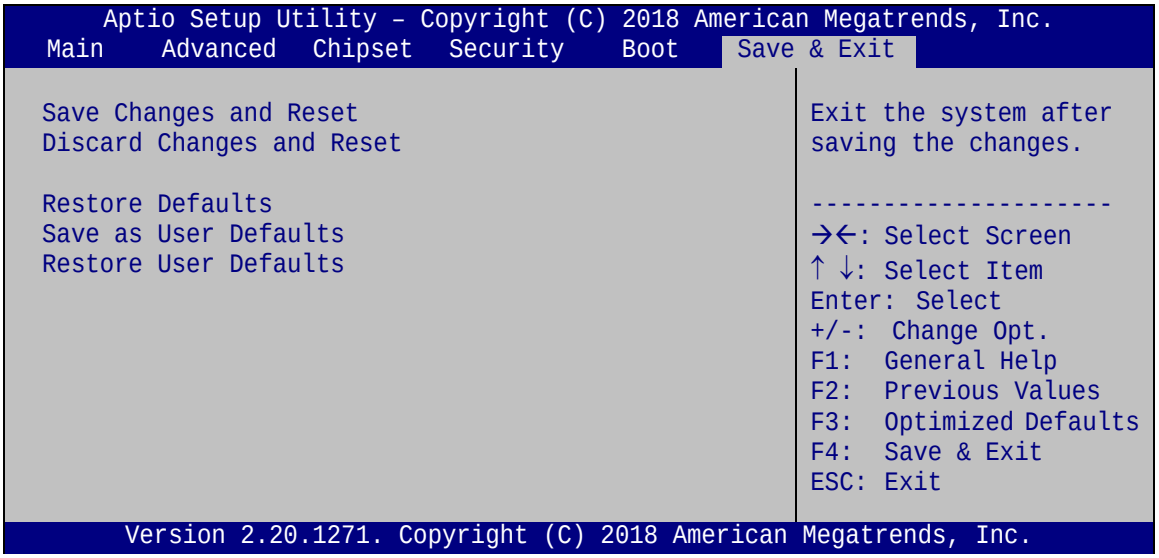
➔ **Option ROM Messages [Force BIOS]**

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.

4.7 Save & Exit

Use the **Safe & Exit** menu (**BIOS Menu 22**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 22: Save & Exit

➔ **Save Changes and Reset**

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

➔ **Discard Changes and Reset**

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

➔ **Restore Defaults**

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

➔ **Save as User Defaults**

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

➔ **Restore User Defaults**

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

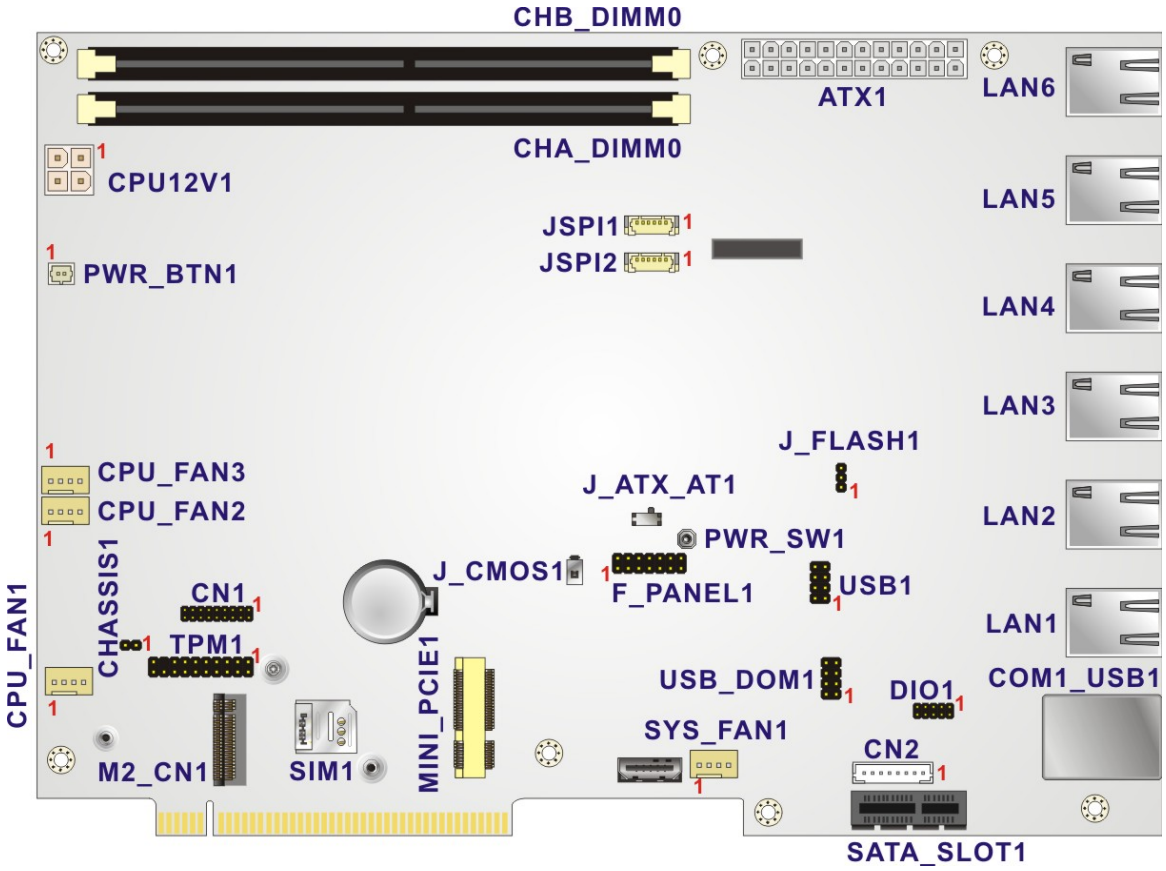
Chapter

5

Interface Connectors

5.1 Peripheral Interface Connectors

The connector locations of the PUZZLE-IN002's motherboard are shown below. The connector pinouts for these connectors are listed in the following sections.



5.2 Internal Peripheral Connectors

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

Connector	Type	Label
ATX power connector	24-pin connector	ATX1
CPU power connector	4-pin connector	CPU12V1
Chassis intrusion connector	2-pin header	CHASSIS1
Digital I/O connector	10-pin header	DIO1
EC debug connector	18-pin header	CN1
Fan connectors	4-pin wafer	CPU_FAN1, CPU_FAN2, CPU_FAN3, SYS_FAN1
Front panel connector	14-pin header	F_PANEL1
LCM connector	8-pin wafer	CN2
M.2 slot	M.2 A-key slot	M2_CN1
Memory slots	DDR4 DIMM slot	CHA_DIMM0, CHB_DIMM0
Mini-SATA slot (full-/half-size)	Mini-SATA slot	MINI_PCIE1
Power switch connector	2-pin wafer	PWR_BTN1
Power button (on-board)	Push button	PWR_SW1
SATA 6Gb/s socket	36-pin socket	SATA_SLOT1
SIM card slot	SIM card slot	SIM1
SPI flash connector	6-pin wafer	JSPI1
SPI flash connector (EC)	6-pin wafer	JSPI2
TPM connector	20-pin header	TPM1
USB 2.0 connector	8-pin header	USB1
USB DOM connector	8-pin header	USB_DOM1

Table 5-1: Peripheral Interface Connectors

5.2.1 ATX Power Connector (ATX1)

Pin	Description	Pin	Description
1	+3.3 V	13	+3.3 V
2	+3.3 V	14	-12 V
3	GND	15	GND
4	+5 V	16	PS-ON
5	GND	17	GND
6	+5 V	18	GND
7	GND	19	GND
8	PW-OK	20	N/C
9	+5VSB	21	+5 V
10	+12V	22	+5 V
11	+12V	23	+5 V
12	+3.3 V	24	GND

Table 5-2: ATX Power Connector Pinouts

5.2.2 CPU Power Connector (CPU12V1)

Pin	Description
1	GND
2	GND
3	+12 V
4	+12 V

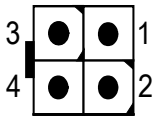


Table 5-3: CPU Power Connector (CPU12V1) Pinouts

5.2.3 Chassis Intrusion Connector (CHASSIS1)

PIN NO.	DESCRIPTION
1	+3.3VSB
2	CHASSIS OPEN

Table 5-4: Chassis Intrusion Connector (CHASSIS1) Pinouts

5.2.4 DIO Connector (DIO1)

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

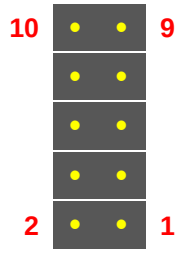


Table 5-5: DIO Connector (DIO1) Pinouts

5.2.5 EC Debug Connector (CN1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	EC_EPP_STB#	2	EC_EPP_AFD#
3	EC_EPP_PD0	4	NC
5	EC_EPP_PD1	6	EC_EPP_INIT#
7	EC_EPP_PD2	8	EC_EPP_SLIN#
9	EC_EPP_PD3	10	GND
11	EC_EPP_PD4	12	NC
13	EC_EPP_PD5	14	EC_EPP_BUSY
15	EC_EPP_PD6	16	EC_EPP_KSI5
17	EC_EPP_PD7	18	EC_EPP_KSI4

Table 5-6: EC Debug Connector (CN1) Pinouts

5.2.6 Fan Connectors (CPU_FAN1/2/3, SYS_FAN1)

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

Table 5-7: Fan Connectors (CPU_FAN1/2/3, SYS_FAN1) Pinouts

5.2.7 Front Panel Connector (F_PANEL1)

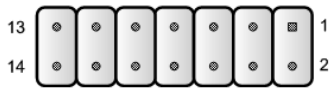
FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	PWR_LED+	Speaker	2	Speaker+
	3	N/C		4	N/C
	5	PWR_LED-		6	N/C
Power Button	7	PWR_BTN+		8	Speaker-
	9	PWR_BTN-	Reset	10	N/C
HDD LED	11	HDD LED+		12	Reset+
	13	HDD LED-		14	Reset-
					

Table 5-8: Front Panel Connector (F_PANEL1) Pinouts

5.2.8 LCM Connector (CN2)

PIN NO.	DESCRIPTION
1	VCC5V
2	Power button
3	LCM RX
4	LCM TX
5	HDD LED
6	Alert LED
7	Reset button
8	GND

Table 5-9: LCM Connector (CN2) Pinouts

5.2.1 M.2 Slot (M2_CN1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+3.3V
3	USB_D+	4	+3.3V
5	USB_D-	6	N/C
7	GND	8	N/C
9	N/C	10	N/C
11	N/C	12	N/C
13	N/C	14	N/C
15	N/C	16	N/C
17	N/C	18	GND
19	N/C	20	N/C
21	N/C	22	N/C
23	N/C	24	N/C
25	N/C	26	N/C
27	N/C	28	N/C
29	N/C	30	N/C
31	N/C	32	N/C
33	GND	34	N/C
35	PCIe_TX+	36	N/C
37	PCIe_TX-	38	N/C
39	GND	40	N/C
41	PCIe_RX+	42	N/C
43	PCIe_RX-	44	N/C
45	GND	46	N/C
47	REFCLK+	48	N/C
49	REFCLK-	50	PCH_SUSCLK
51	GND	52	RST
53	CLKREQ	54	BT_RF_KILL-
55	PCH_WAKE-	56	WIFI_RF_KILL-
57	GND	58	I2C_DATA
59	N/C	60	I2C_CLK

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
61	N/C	62	INT-
63	GND	64	N/C
65	N/C	66	RESET-
67	N/C	68	CLKREQ
69	GND	70	PEWAKE-
71	N/C	72	+3.3V
73	N/C	74	+3.3V
75	GND		

Table 5-10: M.2 Slot (M2_CN1) Pinouts

5.2.2 Mini-SATA Card Slot (MINI_PCIE1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	PCH_WAKE-	2	+3.3V
3	N/C	4	GND
5	N/C	6	1.5V
7	N/C	8	SIM_VCC
9	GND	10	SIM_IO
11	MSATA_CLK-	12	SIM_CLK
13	MSATA _CLK+	14	SIM_RST
15	GND	16	SIM_VPP
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
31	SATA_TX-	32	SMB_DATA
33	SATA_TX+	34	GND
35	GND	36	USB_DATA-

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
37	GND	38	USB_DATA+
39	+3.3V	40	GND
41	+3.3V	42	N/C
43	GND	44	RF_LINK#
45	N/C	46	BLUELED#
47	N/C	48	1.5V
49	N/C	50	GND
51	N/C	52	+3.3V

Table 5-11: Mini-SATA Card Slot (MINI_PCIE1) Pinouts

5.2.1 Power Switch Connector (PWR_BTN1)

PIN NO.	DESCRIPTION
1	PWRBTN_SW+
2	PWRBTN_SW-

Table 5-12: Power Switch Connector (PWR_BTN1) Pinouts

5.2.2 SATA Connector (SATA_SLOT1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
B1	+V12S	A1	N/C
B2	+V12S	A2	+V12S
B3	+V12S	A3	+V12S
B4	GND	A4	GND
B5	SATA_TX2-	A5	+V5S
B6	SATA_TX2+	A6	+V5S
B7	GND	A7	SATA_RX2-
B8	+V3.3S	A8	SATA RX2+
B9	+V5S	A9	+V3.3S
B10	N/C	A10	+V3.3S
B11	+V5S	A11	+V5S
B12	+V5S	A12	GND

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
B13	GND	A13	N/C
B14	SATA_TX1-	A14	N/C
B15	SATA_TX1+	A15	GND
B16	GND	A16	SATA_RX1-
B17	+V5S	A17	SATA RX1+
B18	GND	A18	GND

Table 5-13: SATA 6Gb/s Connector (SATA_SLOT1) Pinouts

5.2.3 SPI Flash Connector (JSPI1)

PIN NO.	DESCRIPTION
1	+1.8V
2	SPI_CS
3	SPI_SO
4	SPI_CLK
5	SPI_SI
6	GND

Table 5-14: SPI Flash Connector (JSPI1) Pinouts

5.2.4 SPI Flash Connector - EC (JSPI2)

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

Table 5-15: SPI Flash Connector - EC (JSPI2) Pinouts

5.2.5 TPM Connector (TPM1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LCLK	2	GND
3	LFRAME#	4	KEY
5	LRERST#	6	+5V
7	LAD3	8	LAD2
9	+3.3V	10	LAD1
11	LAD0	12	GND
13	SCL	14	SDA
15	SB3V	16	SERIRQ
17	GND	18	GLKRUN#
19	LPCPD#	20	LDRQ#

Table 5-16: TPM Connector (TPM1) Pinouts

5.2.6 USB 2.0 Connector (USB1)

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

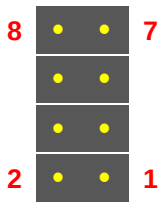


Table 5-17: USB 2.0 Connector (USB1) Pinouts

5.2.7 USB DOM Connector (USB_DOM1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC5V	2	N/A
3	USB-	4	N/A
5	USB+	6	N/A
7	GND	8	N/A

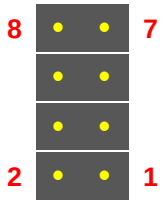


Table 5-18: USB DOM Connector (USB_DOM1) Pinouts

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

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 zařízení je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
Dansk [Danish] IEI Integration Corp erklærer herved, at følgende udstyr overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Deutsch [German] IEI Integration Corp, erklärt dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 1999/5/EU.
Eesti [Estonian] IEI Integration Corp deklareerib seadme seadme vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

Español [Spanish] IEI Integration Corp declara que el equipo cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
Ελληνική [Greek] IEI Integration Corp ΔΗΛΩΝΕΙ ΟΤΙ ΕΞΟΠΛΙΣΜΟΣ ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.
Français [French] IEI Integration Corp déclare que l'appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.
Italiano [Italian] IEI Integration Corp dichiara che questo apparecchio è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latviski [Latvian] IEI Integration Corp deklarē, ka iekārta atbilst būtiskajām prasībām un citiem ar to saistītajiem noteikumiem Direktīvas 1999/5/EK.
Lietuvių [Lithuanian] IEI Integration Corp deklaruoja, kad šis įranga atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
Nederlands [Dutch] IEI Integration Corp dat het toestel toestel in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.
Malti [Maltese] IEI Integration Corp jiddikjara li dan prodott jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
Magyar [Hungarian] IEI Integration Corp nyilatkozom, hogy a berendezés megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.
Polski [Polish] IEI Integration Corp oświadcza, że wyrobu jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
Português [Portuguese] IEI Integration Corp declara que este equipamento está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.

Româna [Romanian] IEI Integration Corp declară că acest echipament este in conformitate cu cerinţele esenţiale şi cu celelalte prevederi relevante ale Directivei 1999/5/CE.
Slovensko [Slovenian] IEI Integration Corp izjavlja, da je ta opreme v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.
Slovensky [Slovak] IEI Integration Corp týmto vyhlasuje, že zariadenia spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Suomi [Finnish] IEI Integration Corp vakuuttaa täten että laitteet on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Svenska [Swedish] IEI Integration Corp förklarar att denna utrustningstyp står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

FCC WARNING

This equipment complies with Part 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

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 PUZZLE-IN002.

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.
  - 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 PUZZLE-IN002 may result in permanent damage to the PUZZLE-IN002 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PUZZLE-IN002. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PUZZLE-IN002 is opened and any of the electrical components are handled, the following anti-static precautions are strictly adhered to.

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

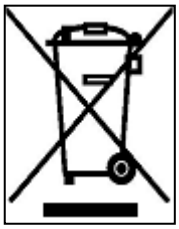
B.1.3 Product Disposal

CAUTION:

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

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 PUZZLE-IN002, please follow the guidelines below.

B.2.1 Maintenance and Cleaning

Prior to cleaning any part or component of the PUZZLE-IN002, please read the details below.

- The interior of the PUZZLE-IN002 does not require cleaning. Keep fluids away from the PUZZLE-IN002 interior.
- Be cautious of all small removable components when vacuuming the PUZZLE-IN002.
- Turn the PUZZLE-IN002 off before cleaning the PUZZLE-IN002.
- Never drop any objects or liquids through the openings of the PUZZLE-IN002.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the PUZZLE-IN002.
- Avoid eating, drinking and smoking within vicinity of the PUZZLE-IN002.

B.2.2 Cleaning Tools

Some components in the PUZZLE-IN002 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 PUZZLE-IN002.

- ***Cloth*** – Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the PUZZLE-IN002.
- ***Water or rubbing alcohol*** – A cloth moistened with water or rubbing alcohol can be used to clean the PUZZLE-IN002.
- ***Using solvents*** – The use of solvents is not recommended when cleaning the PUZZLE-IN002 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 PUZZLE-IN002. Dust and dirt can restrict the airflow in the PUZZLE-IN002 and cause its circuitry to corrode.
- ***Swabs*** - Swaps 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

Hazardous Materials Disclosure

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

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

Please refer to the following table.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
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 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	O	O	O	O	O	O
显示	O	O	O	O	O	O
印刷电路板	O	O	O	O	O	O
金属螺帽	O	O	O	O	O	O
电缆组装	O	O	O	O	O	O
风扇组装	O	O	O	O	O	O
电力供应组装	O	O	O	O	O	O
电池	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T 11363-2006 (现由 GB/T 26572-2011 取代) 标准规定的限量要求以下。

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