IEI Integration Corp.

MODEL:

PUZZLE-IN005

2U Network Appliance with LGA-4189 Intel® Xeon® Scalable Processor, DDR4 up to 1280GB, PCIe 4.0 x8, GbE with NCSI, IEI Networking Module Slots, M.2, U.2 SSD, Console, Redundant PSU, Rack Mount, and RoHS Compliant

User Manual

Rev. 1.00 – January 13, 2021

RoHS Lead Free

Revision

Date	Version	Changes
January 13, 2021	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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Introduction

1.1 Overview

Figure 1-1: PUZZLE-IN005 Series

The PUZZLE-IN005 is a 2U network appliance series powered by the LGA-4189 Intel® Xeon® Scalable processors (codenamed Ice Lake). It supports up to 1280 GB DDR4 ECC RDIMM/LRDIMM via 20 memory slots.

The PUZZLE-IN005 supports two copper 1GbE ports for high-speed network applications, and it is equipped with eight front-facing PCIe slots for upgrading with IEI networking modules. Multiple storage interfaces for fast and stable data transmission are offered through four U.2 SSD bays that also support SATA SSD.

1.2 Features

The PUZZLE-IN005 features are listed below:

- Powered by LGA-4189 Intel® Xeon® Scalable processor
- Support twenty 288-pin 3200 MHz DDR4 ECC RDIMM/LRDIMMs (system max. 1280 GB)
- Support four U.2 SSD compatible with SATA
- Support two 1GbE connections, one with NCSI support
- Upgradable with future expansion cards by eight PCIe slots for IEI networking module, one PCIe 4.0 x8 slot and two M.2 M-key slot
- Two console ports via RJ-45 and USB Type-C
- Supports two USB 3.2 Gen 1 (5Gb/s) ports

- 2U chassis for rack mounting
- CE, FCC and RoHS compliant

1.3 Front Panel

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

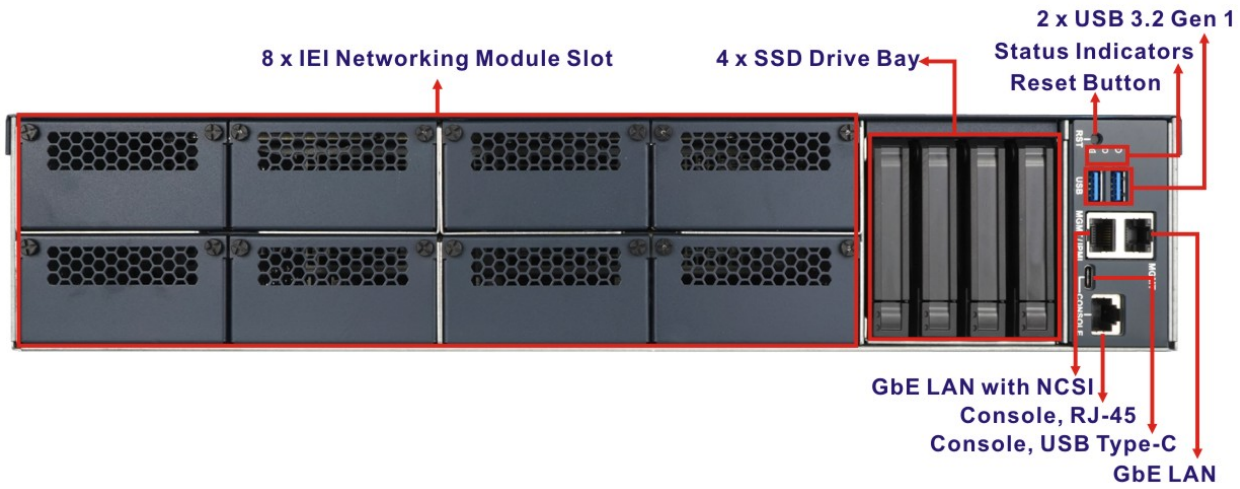


Figure 1-2: PUZZLE-IN005 Front Panel

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 Green	HDD activity
Alert LED	Off	No alert
	Red	Alert message

1.4 Rear Panel

An overview of the PUZZLE-IN005 rear panel is shown in **Figure 1-3** below.

Figure 1-3: PUZZLE-IN005 Rear Panel

1.5 Technical Specifications

The PUZZLE-IN005 technical specifications are listed in **Table 1-1**.

System	
Form Factor	2U
Processor	LGA-4189 Intel® Xeon® Scalable processor (codenamed Ice Lake)
Chipset	Intel® C627A
Memory	20 x 288-pin 3200 MHz DDR4 ECC RDIMM/LRDIMM slots (system max. 1280 GB)
Networking	1 x 1GbE LAN port with NCSI support via Intel® I210-AT 1 x 1GbE LAN port via Intel® I211 8 x PCIe slot for IEI networking module (each slot can support up to 30W power consumption.)
Network Acceleration and Security	Intel® AES New Instructions Intel® QuickAssist Technology (Intel® QAT) Intel® Virtualization Technology (Intel® VT) Intel® Trusted Execution Technology
Storage	4 x U.2 SSD bay compatible to SATA

Expansion	
PCIe	1 x PCIe 4.0 x8 slot (HHHL, single width)
M.2	2 x M.2 M-key 2280 slot (supporting PCIe 3.0 x4 NVMe)
I/O and Indicators	
Console	1 x RJ-45 1 x USB Type C
USB	2 x USB 3.2 Gen 1 (5Gb/s) port (external) 1 x USB 2.0 internal pin-header (8-pin, p=2.54)
VGA	1 x IPMI VGA display
Indicator	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)
IPMI	iRIS-2400 module pre-installed
Power	
Power Input	100 V ~ 240 V
Type/Watt	1200 W redundant power, 90 V ~ 264 V AC
Thermal Solution	5 x Smart fan 2 x Active CPU cooler
Environmental and Mechanical	
Mounting	2U 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	23 kg
Physical Dimensions	442 mm x 652 mm x 88.5 mm (W x D x H)
Operating System	Linux 18.04 (CentOS, Red Hat, Ubuntu, etc.) Microsoft Windows 10

Table 1-1: Technical Specifications

1.6 Dimensions

The physical dimensions are shown below:

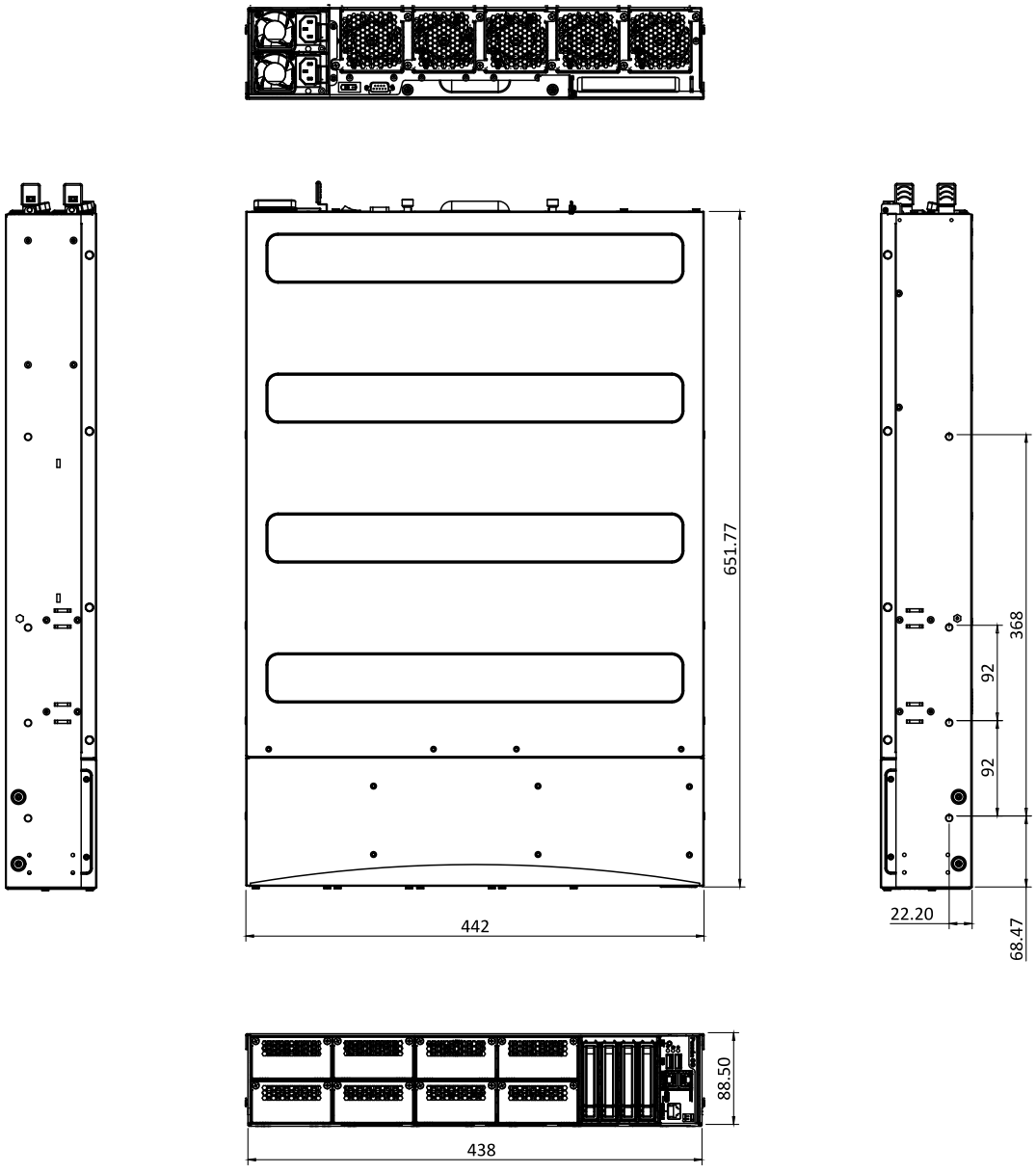


Figure 1-4: Physical Dimensions (millimeters)

Chapter

2

Unpacking

2.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during installation may result in permanent damage to the PUZZLE-IN005 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PUZZLE-IN005. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PUZZLE-IN005 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-IN005, place it on an anti-static pad. This reduces the possibility of ESD damaging the PUZZLE-IN005.

2.2 Unpacking Precautions

When the PUZZLE-IN005 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-IN005 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-IN005 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@ieiworld.com.

The PUZZLE-IN005 is shipped with the following components:

Quantity	Item	Image
1	PUZZLE-IN005	
2	Power cord	
2	Rack mount brackets (*Note: The brackets must be used with sliding rails.*)	
2	Handle	
16	Screws (M3*4) for SSD installation	
8	Screws (M4*5) for mounting brackets installation	

Quantity	Item	Image
4	Screws (#6-32*6) for handle installation	
1	USB to console cable	

2.4 Optional Items

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

Optional Item	Image
Sliding rails for rack mount (**P/N**: RAIL-A03-57)	
USB to console cable (**P/N**: 32013-004000-100-RS)	
20-pin Infineon TPM 2.0 module, software management tool, firmware v7.63 (**P/N**: TPM-IN03-R10)	

Chapter

3

Installation

3.1 Installation Precautions

CAUTION!

The PUZZLE-IN005 series has more than one power supply connection point.

To reduce the risk of electric shock, disconnect all power sources before installing or servicing the PUZZLE-IN005 series.

During installation, be aware of the precautions below:

- **Read the user manual**: The user manual provides a complete description of the PUZZLE-IN005, installation instructions and configuration options.
- **DANGER! Disconnect Power**: Power to the PUZZLE-IN005 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-IN005 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-IN005. The PUZZLE-IN005's cooling vents must not be obstructed by any objects. Blocking the vents can cause overheating of the PUZZLE-IN005. Leave at least 5 cm of clearance around the PUZZLE-IN005 to prevent overheating.
- **Grounding**: The PUZZLE-IN005 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-IN005.

3.2 Top Cover Removal

WARNING:

Never open the equipment. For safety reasons, the equipment should be opened only by qualified skilled person.

Before installing or maintaining the internal components, the top cover must be removed from the PUZZLE-IN005. Follow the steps below to complete the task.

Step 1: Remove the four retention screws on the top panel (see **Figure 3-1**).

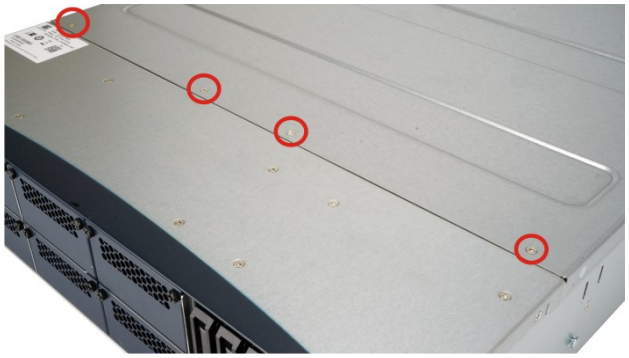


Figure 3-1: Top Cover Retention Screws

Step 2: Loosen the two captive screws on the rear panel. Slide the top cover towards the rear side and gently lift the top cover (**Figure 3-2**).

Figure 3-2: Top Cover Removal

3.3 DIMM Installation

CAUTION:

For multiple channel configurations, always install 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-IN005. Please follow the instruction described in **Section 3.2**.

Step 2: Locate the DIMM slots on the motherboard.

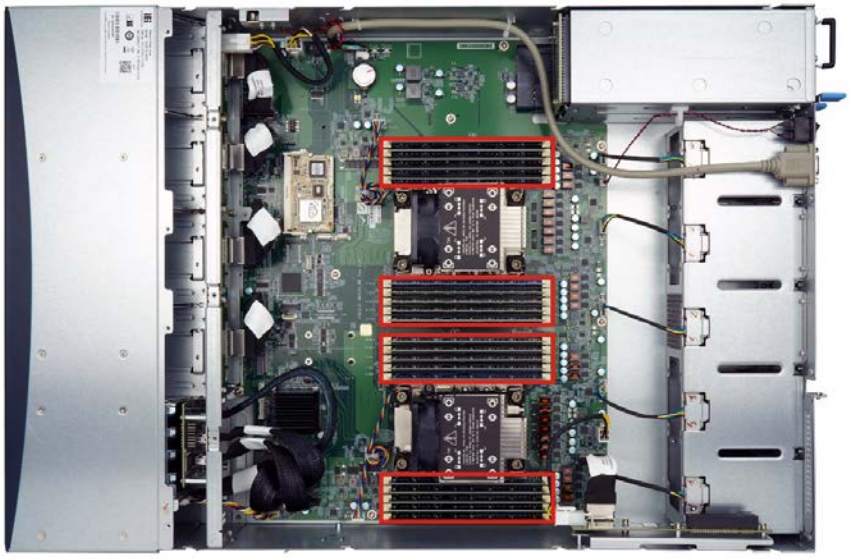


Figure 3-3: DIMM Slot Locations

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.

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

3.4 PCIe Expansion Card Installation

The PUZZLE-IN005 allows installation of one PCIe x8 card. To install a PCIe expansion card, please follow the steps below.

Step 1: Remove the top cover from the PUZZLE-IN005 (refer to **Section 3.2**).

Step 2: Remove the blank bracket panel from the rear panel. Save the bracket screw.

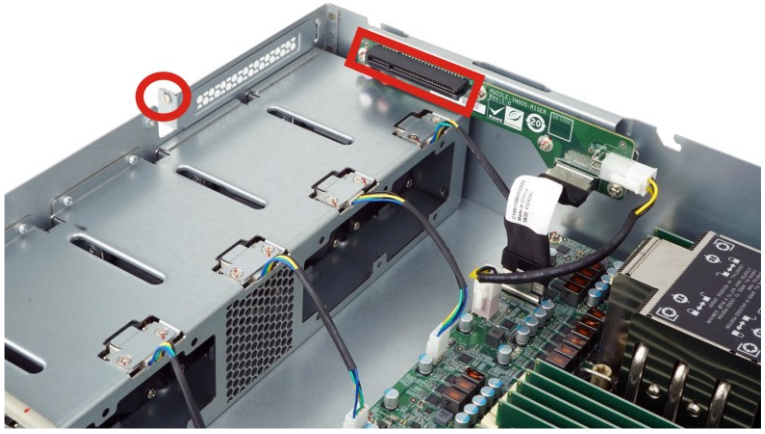


Figure 3-4: Blank Bracket Screw

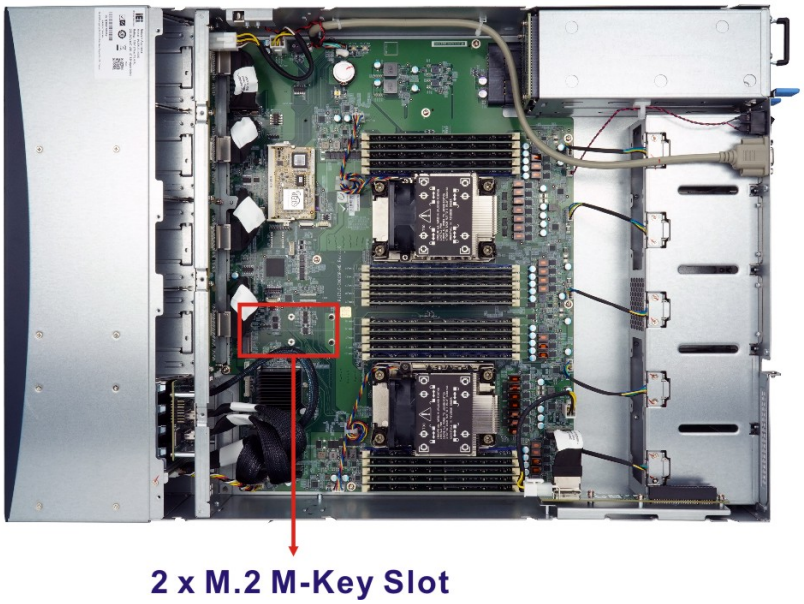
Step 3: Align the expansion card to the PCIe slot. Press gently, but firmly, to seat the expansion card correctly in the slot. Install the bracket screw to secure the card to the expansion slot module.

3.5 M.2 Module Installation

The M.2 slots are keyed in the M position and provide mounting screw position for 2280-size M.2 modules. To install an M.2 module, please follow the steps below.

Step 1: Remove the top cover from the PUZZLE-IN005. 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.

3.6 SSD Installation

Four 2.5" U.2 SSD can be installed in the PUZZLE-IN005. The SSDs are installed into the removable hard drive trays on the front panel. To install the SSD into the system, please follow the steps below.

Step 1: Press the button to release the handle.

Figure 3-5: Press to Release the Handle

Step 2: Grab the handle and gently pull the drive tray out (**Figure 3-6**).

Figure 3-6: Drive Tray Removal

Step 3: Place an SSD onto the drive tray and secure the SSD with the bracket by inserting four retention screws (M3*4) into the bottom of the SSD (**Figure 3-7**).

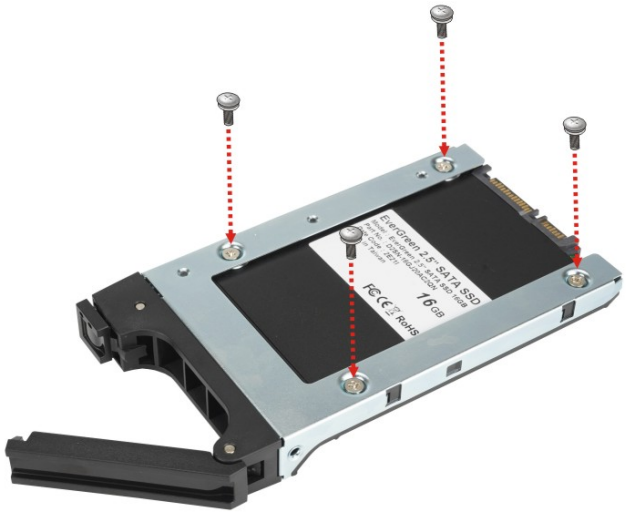


Figure 3-7: SSD Retention Screws

Step 4: Carefully insert the SSD into the slot on the front panel. Make sure the SATA connector on the SSD is securely connected to the SATA connector inside the chassis.

Figure 3-8: SSD Installation

Step 5: Push the handle to secure the drive tray.

Step 6: Repeat **Step 1 ~ Step 5** described above to install another SSD.

3.7 IEI Networking Module Installation

The PUZZLE-IN005 allows installation of eight IEI PulM networking modules. To install a networking module, please follow the steps below.

Step 1: Disconnect all power sources from the system. **NOTE:** To install or replace the networking module, the power supply must be fully disconnected before installation.

Step 2: Loosen the two screws indicated below. Grab the screws and pull the slot cover all the way out to remove it.

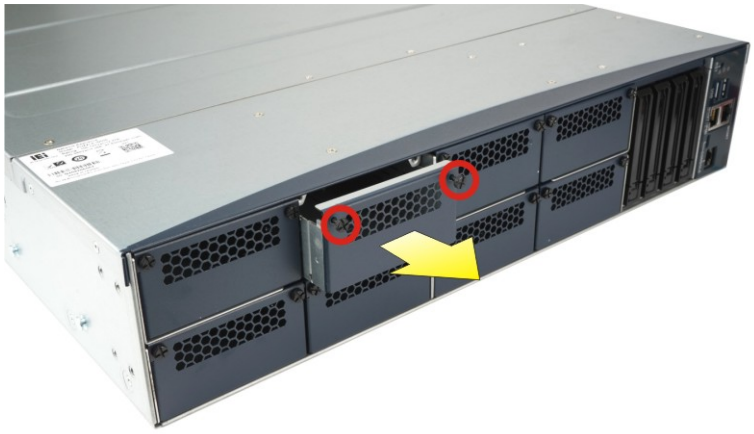


Figure 3-9: Networking Module Slot Cover Screws

Step 3: Slide an IEI networking module into the slot until the module is seated in the slot correctly and securely. Fasten the two screws on the networking module to secure the module to the chassis.

CAUTION:

When inserting the module, the bottom of the networking module must be as close to the slot base as possible so that the module can be slid into the guide rails.

When removing the module, slide the module horizontally all the way until it is completely out of the system. Lifting up the module before completely sliding out may cause the components on the module to be damaged.

Figure 3-10: Networking Module Installation

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

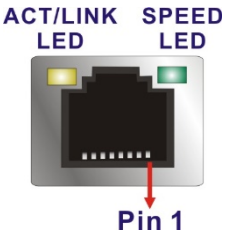


Figure 3-11: RJ-45 Ethernet Connector

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 RJ-45 Console Connection

The PUZZLE-IN005 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 console port (RJ-45) connects to a cable with a USB connector at the other end.

3.9.1 Enable Console Port When Booting

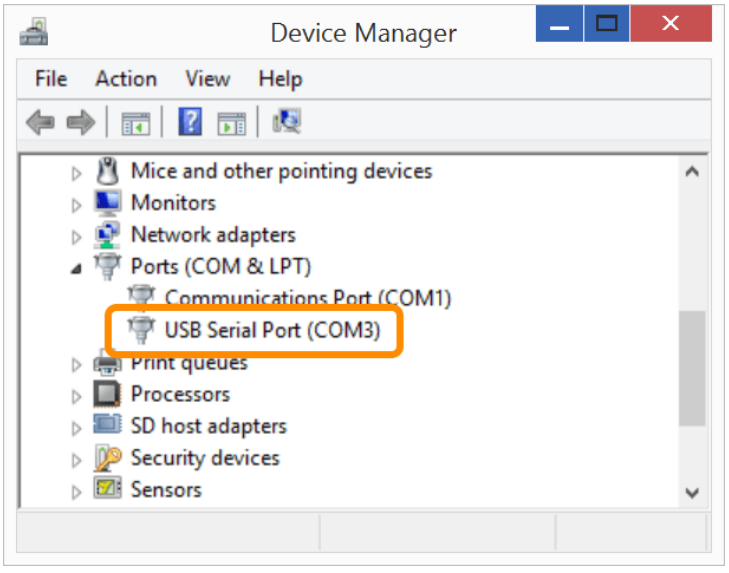
To configure the PUZZLE-IN005 to make it auto enable the console port when booting, follow the steps below.

NOTE:

This method only works in Linux Ubuntu, the default operating system.

Step 1: Use the console cable shipped with the product to connect the RJ-45 console port of the PUZZLE-IN005 with your PC.

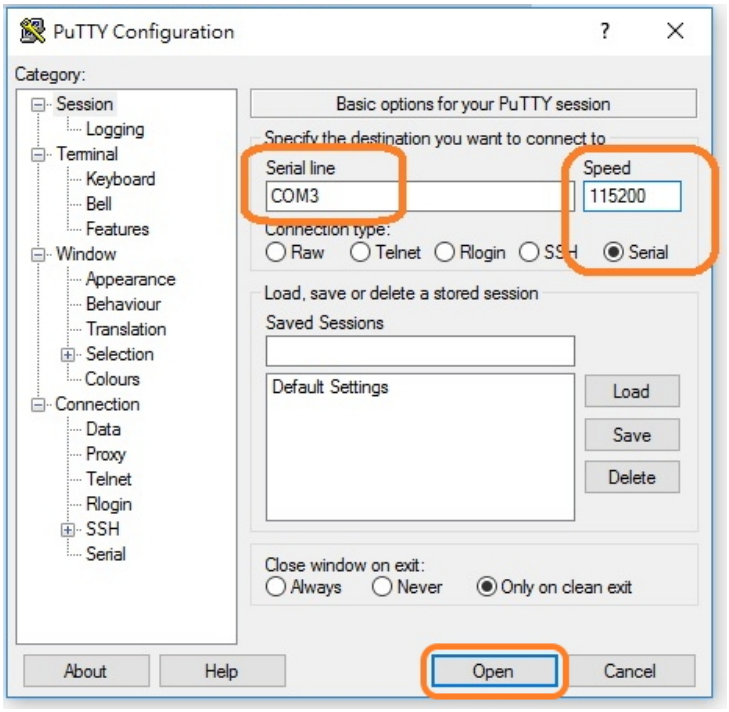
Step 2: In your PC, go to Windows **Device Manager** and check for the serial line of the connected USB serial port. In this case, it is COM3.



Step 3: Open a serial console application, PuTTY, as an example.

Step 4: Set the speed of the serial connection to “115200”, and choose “Serial” for Connection Type.

Step 5: Click “Open” on PuTTY.



Step 6: Enter the following command:

```
sudo vi /lib/systemd/system/ttyS0.service
```

Step 7: Ensure the information shown match the followings:

```
[Unit]
Description=Serial Console Service

[Service]
ExecStart=/sbin/getty -L 115200 ttyS0 vt102
Restart=always

[Install]
WantedBy=multi-user.target
```

Step 8: Run the following commands one by one:

```
sudo systemctl daemon-reload
sudo systemctl enable ttyS0
sudo systemctl start ttyS0
```

3.10 Rack Mount

The PUZZLE-IN005 is shipped with two rack mount brackets that could be used to secure the system to the rack after mounting it with the optional sliding rails. To install the PUZZLE-IN005 into a rack, please follow the steps below.

WARNING:

The provided rack mount brackets must be used with sliding rails. Using only the rack mount brackets to mount the system on a rack may cause damage to the system.

Step 1: Install the rack mount brackets to the sides of the PUZZLE-IN005 by inserting four provided retention screws into each bracket (**Figure 3-12**). Make sure the screws are tight and on the right positions.

Figure 3-12: Rack Mount Bracket Installation

Step 2: Install a handle on each rack mount bracket. To do this, align the end of the handle with the screw hole on the rack mount bracket, and secure it with two retention screws as shown below.

Figure 3-13: Handle Installation

Step 3: Install the sliding rails according to the instruction came with the sliding rails.

Note: The sliding rails must be purchased separately.

Step 4: Slide the PUZZLE-IN005 all the way into the rack enclosure.

Step 5: Secure the front of the rack mount brackets that are attached to the sides of the PUZZLE-IN005 to the front of the rack.

3.11 Power-On Procedure

WARNING:

1. 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.

2. Ensure to connect the power cord to a socket-outlet with earthing connection.

To power-on the PUZZLE-IN005 please follow the steps below:

Step 1: Connect the power source to the power inlets 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 blue.

Step 4: Use the following information when prompted for the username and password for login to the system.

Username: puzzle

Password: admin

Figure 3-14: Power-on

3.12 Available Drivers

All the drivers for the PUZZLE-IN005 are available on IEI Resource Download Center (https://download.ieiworld.com). Type PUZZLE-IN005 and press Enter to find all the relevant software, utilities, and documentation.

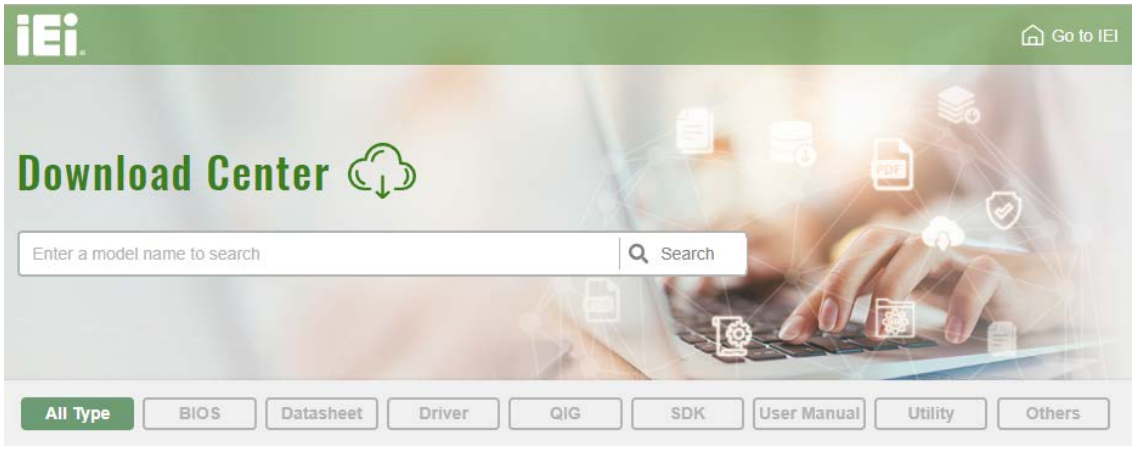


Figure 3-15: IEI Resource Download Center

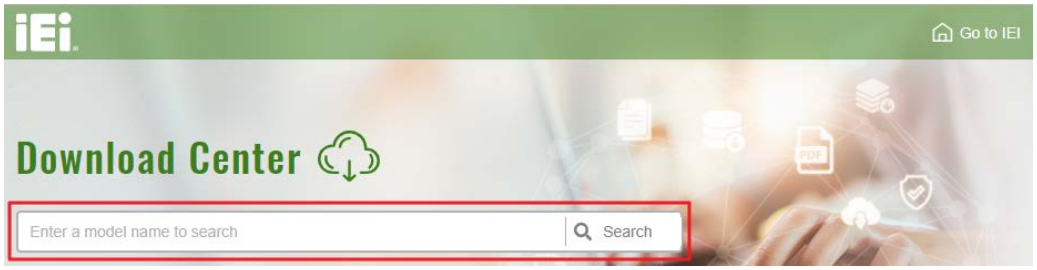
NOTE:

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.

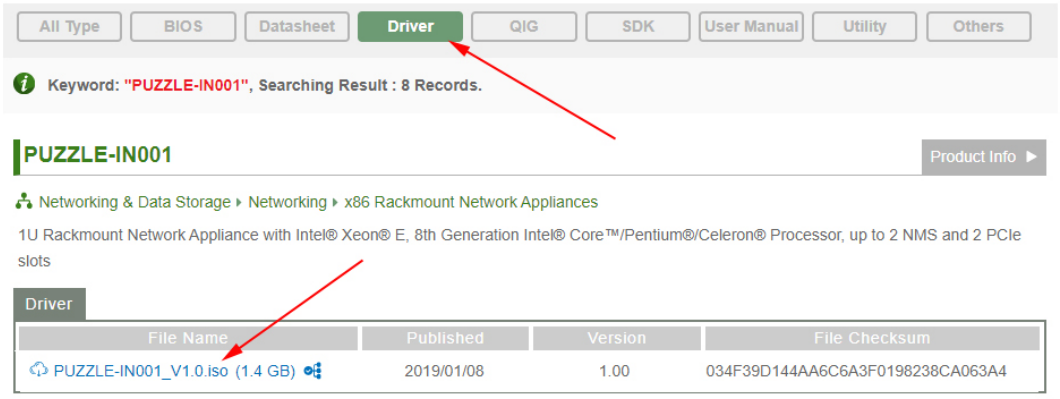
3.12.1 Driver Download

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

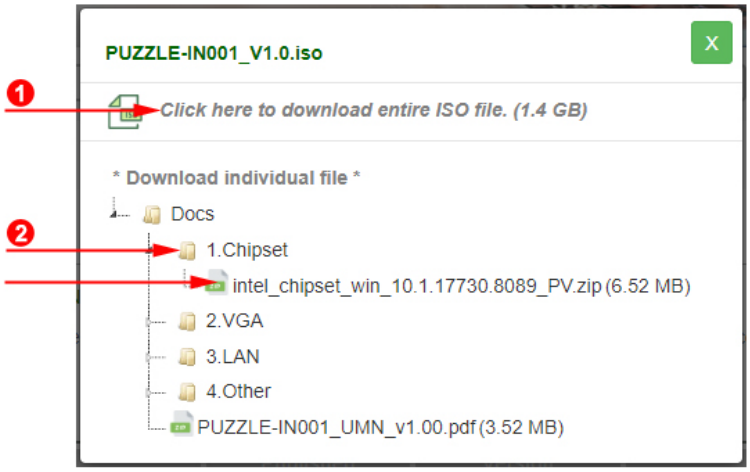
Step 1: Go to https://download.ieiworld.com. Type PUZZLE-IN005 and press Enter.



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 double click an individual item to find its driver file and click the file name to download (❷).



3.13 IPMI Setup Procedure

The PUZZLE-IN005 features Intelligent Platform Management Interface (IPMI) that helps lower the overall costs of server management by enabling users to maximize IT resources, save time and manage multiple systems. The PUZZLE-IN005 supports IPMI 2.0 through the pre-installed iRIS-2400 module. Follow the steps below to setup IPMI.

3.13.1 Managed System Hardware Setup

The hardware configuration of the managed system (PUZZLE-IN005) is described below.

Step 1: Make sure at least one DDR3 DIMM is installed in one of the DIMM sockets. If multiple DIMMs are installed, all of the DIMMs must be same size, same speed and same brand to get the best performance.

Step 2: Connect an Ethernet cable to the RJ-45 GbE connector labeled **MGMT/IPMI** on the front panel.

3.13.2 Using the IEI iMAN Web GUI

To manage a client system from a remote console using IEI iMAN Web GUI, follow the steps below.

Step 1: Obtain the IP address of the managed system. It is recommended to use the IPMI Tool on the managed system to obtain the IP address. To use IPMI Tool to obtain IP address, follow the steps below:

a. Copy the **Ipmitool.exe** file to a bootable USB flash drive.

b. Insert the USB flash drive to the PUZZLE-IN005

c. The PUZZLE-IN005 boots from the USB flash drive

d. Enter the following command: **ipmitool 20 30 02 01 03 00 00**

(there is a space between each two-digit number)

e. A serial of number shows. The last four two-digit hexadecimal numbers are the IP address. Convert the hexadecimal numbers to decimal numbers.

Step 2: On the remote management console, open a web browser. Enter the managed system IP address in the web browser (**Figure 3-16**).

Figure 3-16: IEI iMAN Web Address

Step 3: The login page appears in the web browser.

Step 4: Enter the user name and password to login the system. The default login username and password are:

-Username: **admin**

-Password: **admin**

Step 5: Press the login button to login the system.

Step 6: The IEI iMAN Web GUI appears (**Figure 3-17**).

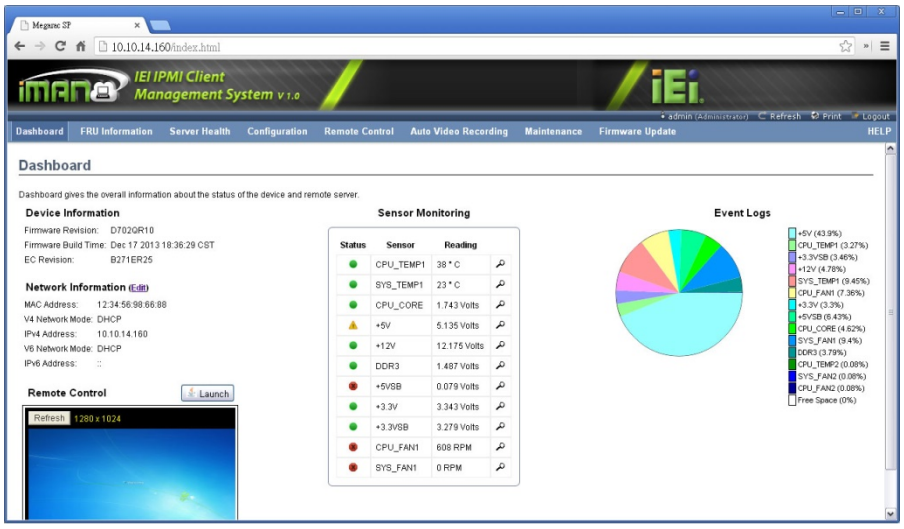


Figure 3-17: IEI iMAN Web GUI

NOTE:

To understand how to use the IEI iMAN Web GUI, please refer to the iRIS-2400 Web GUI user manual which can be downloaded from https://download.ieiworld.com/. The user manual describes each function in detail.

3.14 Maintenance

WARNING:

The following instructions should only be performed by an authorized and trained technician.

Before starting, please ensure that you turn off the PUZZLE-IN005, disconnect the power cords, network cable(s), and also remove any other device/cable that is attached to the server.

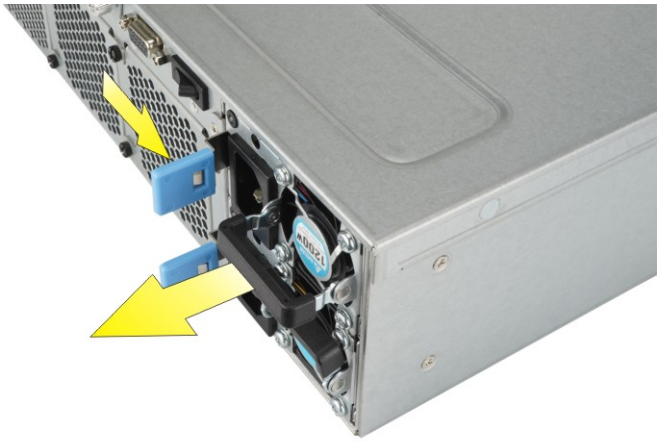
Take Anti-Static precautions whenever maintenance is being carried out on the system components. Failure to take anti-static precautions can cause permanent system damage. For more details on anti-static precautions, please refer to **Section 2.1**.

3.14.1 Power Supply Unit Replacement

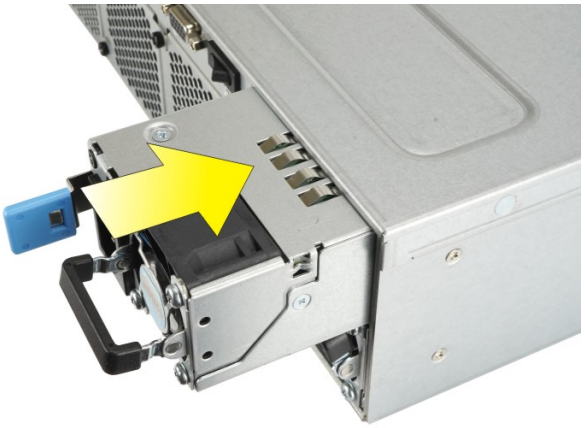
To replace a failed power supply unit, please follow the steps below.

Step 1: Turn off the PUZZLE-IN005. Disconnect the power cords, network cable(s), and any other connectors or cables from the PUZZLE-IN005.

Step 2: Firmly press and hold the blue button on back of PSU inwards. Pull out power supply by pulling the black handle.



Step 3: Insert new power supply into the PUZZLE-IN005.



Step 4: Connect the power cord to the PUZZLE-IN005.

Step 5: Power on the system.

3.14.2 Jumper Settings

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.

3.14.2.1 Clear CMOS

If the PUZZLE-IN005 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 3-18** below.

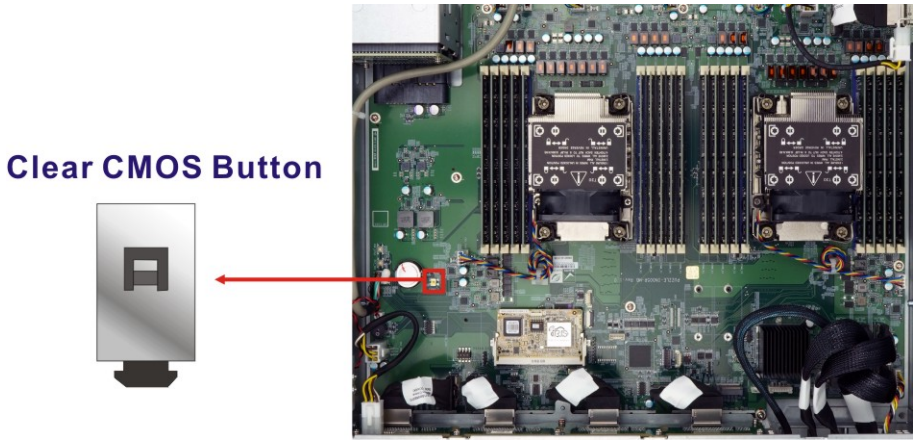


Figure 3-18: Clear CMOS Button Location

3.14.2.2 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 3-19** 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

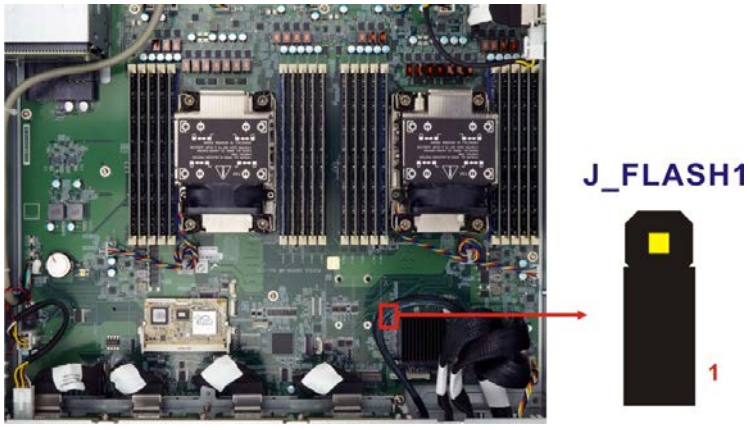


Figure 3-19: Flash Descriptor Security Override Jumper Location

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

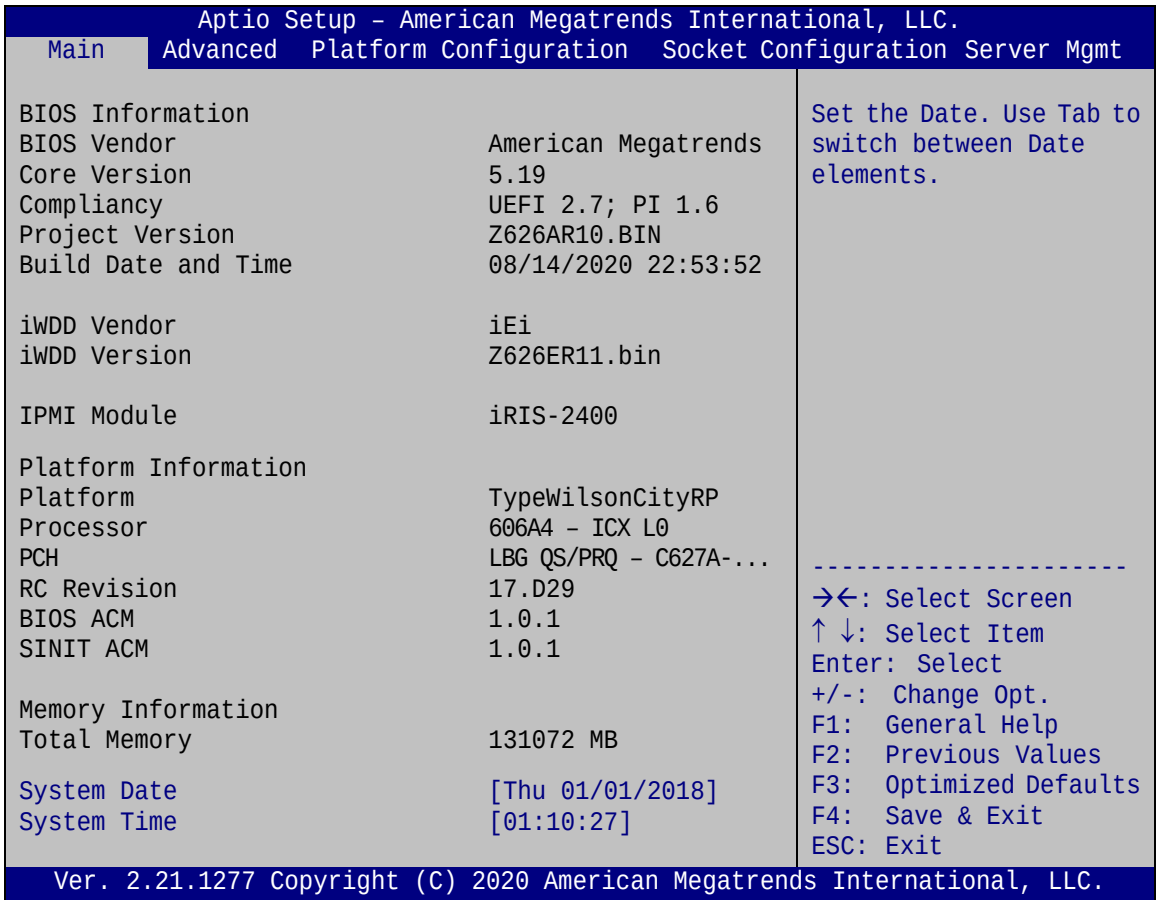
The **menu bar** on top of the BIOS screen has the following main items:

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Platform Configuration – Configure PCH settings.
- Socket Configuration – Configures CPU and Intel VT/VMD parameters
- Server Mgmt – Configures system event log and BMC network parameters
- Security – Sets User and Supervisor Passwords.
- Boot – Changes the system boot configuration.
- Save & Exit – Selects exit options and loads default settings

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

4.2 Main

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



BIOS Menu 1: Main

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

➔ **System Date [xx/xx/xx]**

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

➔ **System Time [xx:xx:xx]**

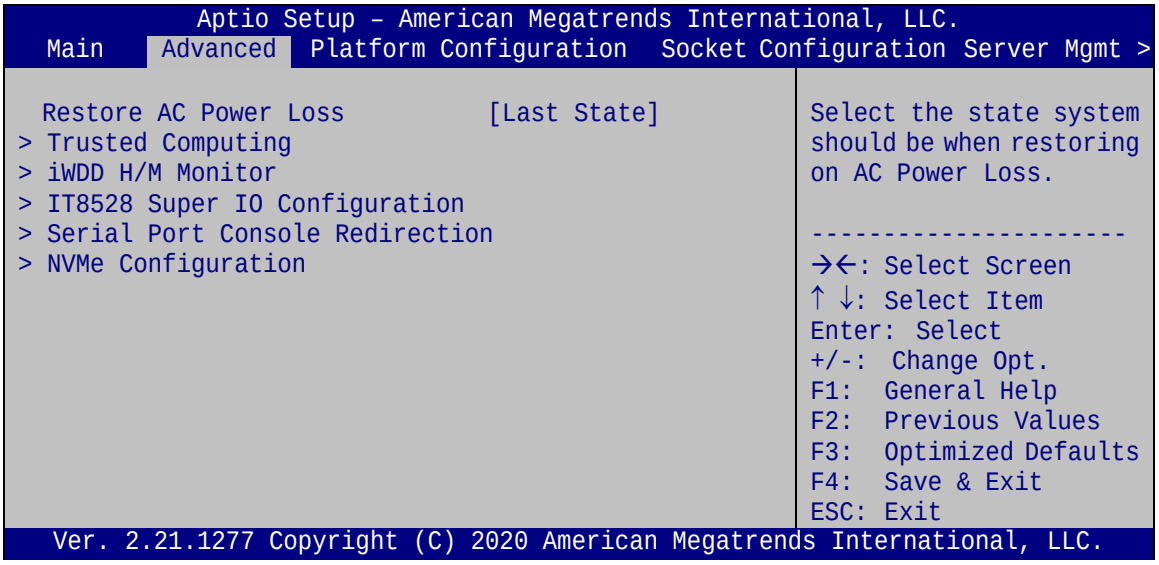
Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

4.3 Advanced

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

WARNING!

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



BIOS Menu 2: Advanced

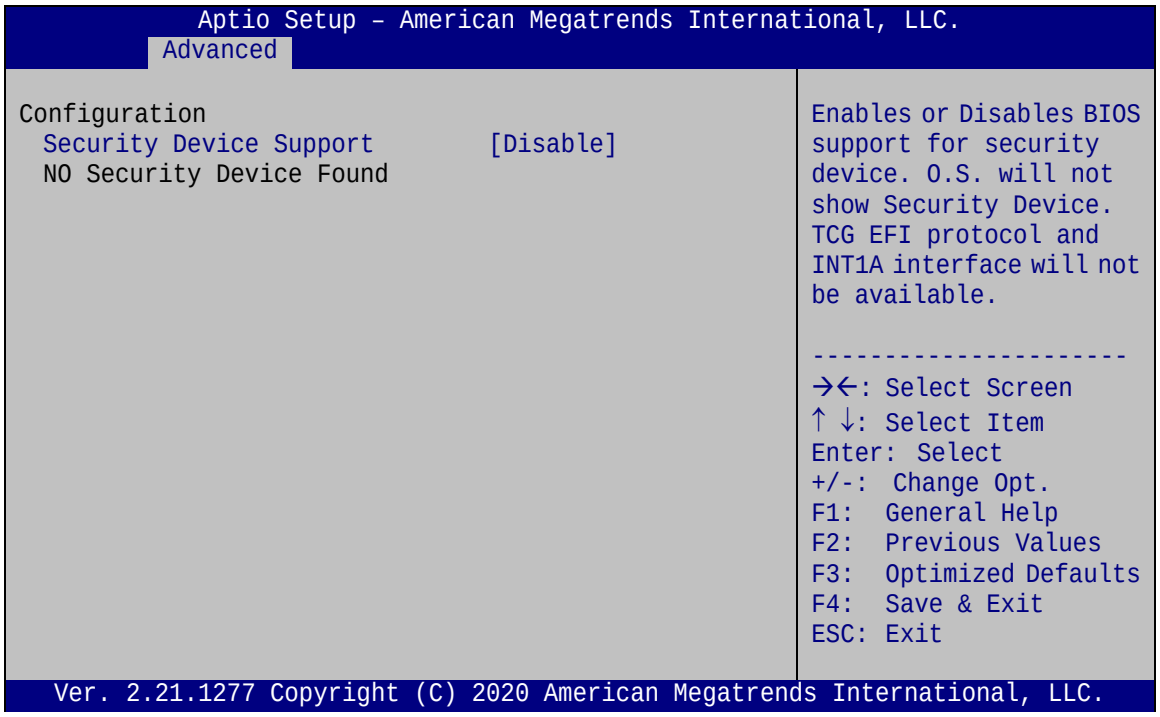
➔ **Restore AC Power Loss [Last State]**

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.

4.3.1 Trusted Computing

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



BIOS Menu 3: Trusted Computing

➔ **Security Device Support [Disable]**

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

➔ **Disable** **DEFAULT** TPM support is disabled.

➔ **Enable** TPM support is enabled.

4.3.2 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 4**) contains the fan configuration submenu, and displays the system temperature and CPU fan speed.

```
          Aptio Setup – American Megatrends International, LLC.
          Advanced
PC Health Status                                  Smart Fan Mode Select

CPU temperature1                :+51 °C
CPU temperature2                :+50 °C
System temperature1             :+44 °C
System temperature2             :+39 °C
System temperature3             :+41 °C
Environment temperature         :+38 °C
Environment temperature         :+33 °C

CPU_FAN1 Speed                  :4702 RPM
CPU_FAN2 Speed                  :4885 RPM
SYS_FAN1 Speed                  :9021 RPM
SYS_FAN2 Speed                  :8910 RPM
SYS_FAN3 Speed                  :8947 RPM
SYS_FAN4 Speed                  :8947 RPM
SYS_FAN5 Speed                  :10204 RPM

CPU_CORE                        :+1.815 V          ---------------------
+5V                             :+5.005 V          →←: Select Screen
+12V                            :+12.096 V         ↑ ↓: Select Item
+3.3V                           :+3.234 V          Enter:  Select
+3.3VSB                         :+3.375 V          +/-:  Change Opt.
CPU_CORE2                       :+1.812 V          F1:  General Help
                                                   F2:  Previous Values
> Smart Fan Mode Configuration                     F3:  Optimized Defaults
                                                   F4:  Save & Exit
                                                   ESC:  Exit
   Ver. 2.21.1277 Copyright (C) 2020 American Megatrends International, LLC.
```

BIOS Menu 4: iWDD H/W Monitor

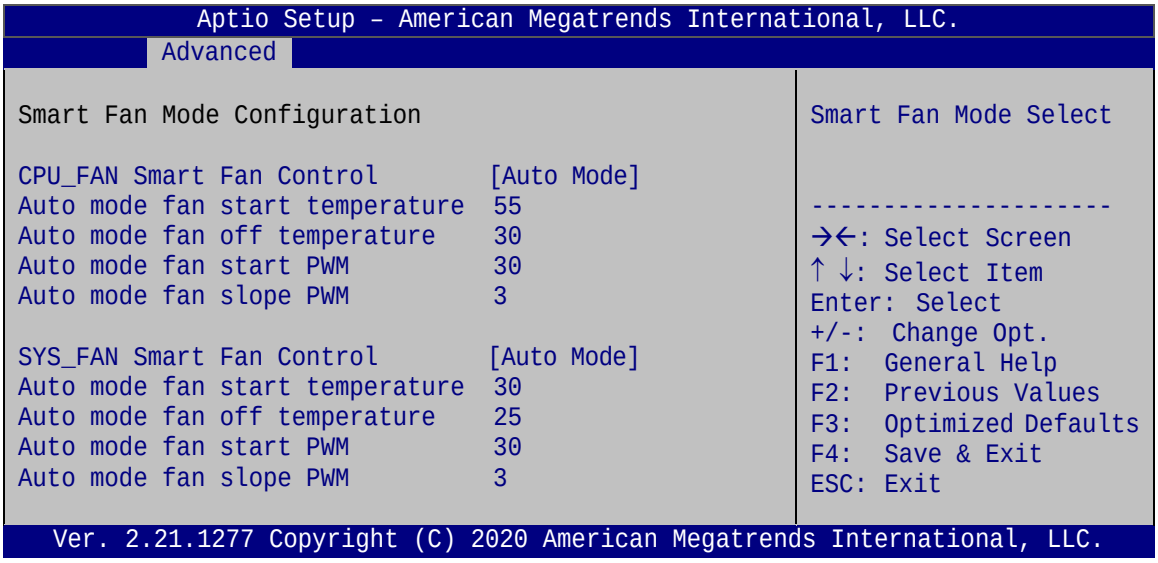
➔ **PC Health Status**

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

- System Temperatures:
  - CPU Temperature
  - System Temperature
  - Environment Temperature
- Fan Speeds:
  - CPU Fan Speed
  - System Fan Speed
- Voltages:
  - CPU_CORE
  - +5V
  - +12V
  - +3.3V
  - +3.3VSB
  - CPU_CORE2

4.3.2.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 5**) to configure the CPU/system fan temperature and speed settings.



BIOS Menu 5: 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**

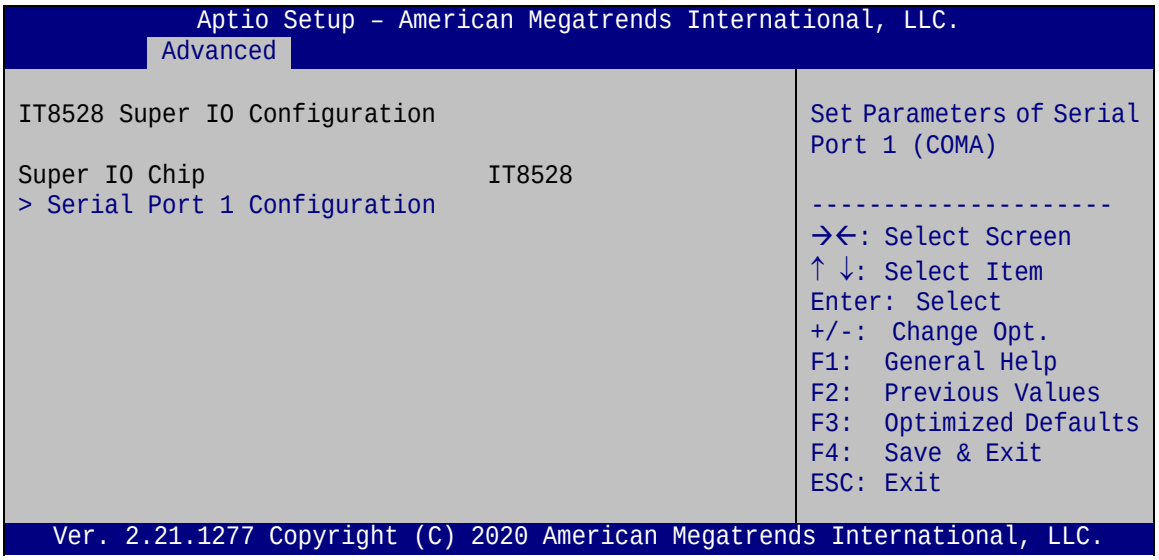
Use the **Auto mode fan start PWM** option to set the PWM start value. Use the + or – key to change the value or enter a decimal number between 1 and 100.

➔ **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.

4.3.3 IT8528 Super IO Configuration

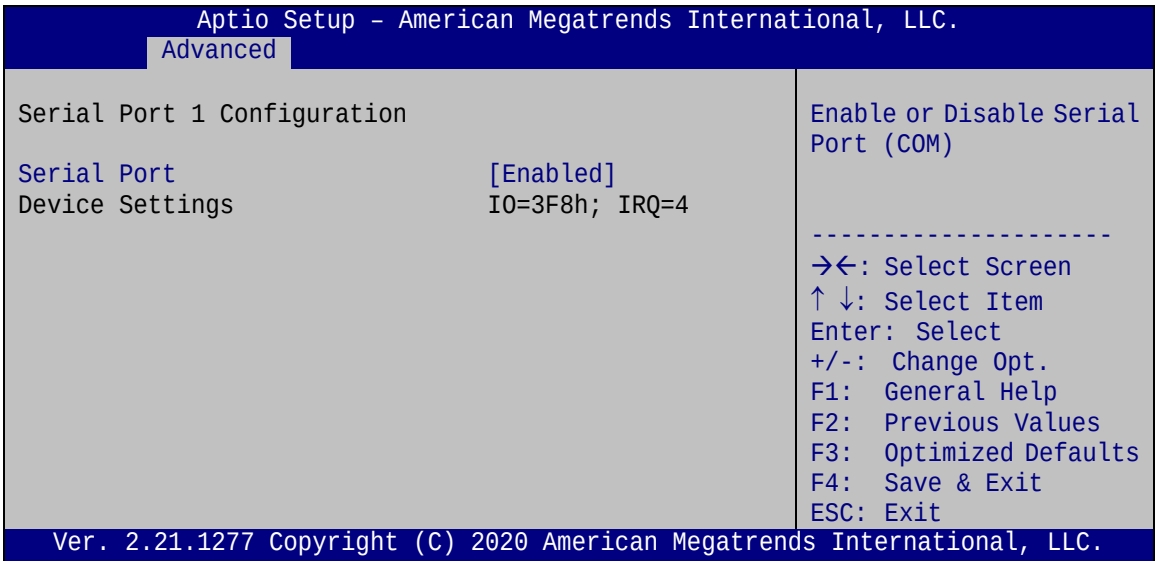
Use the **IT8528 Super IO Configuration** menu (**BIOS Menu 6**) to set or change the configurations for the parallel ports and serial ports.



BIOS Menu 6: IT8528 Super IO Configuration

4.3.3.1 Serial Port 1 Configuration

Use the **Serial Port 1 Configuration** menu (**BIOS Menu 7**) to configure the serial port 1.



BIOS Menu 7: Serial Port 1 Configuration Menu

➔ **Serial Port [Enabled]**

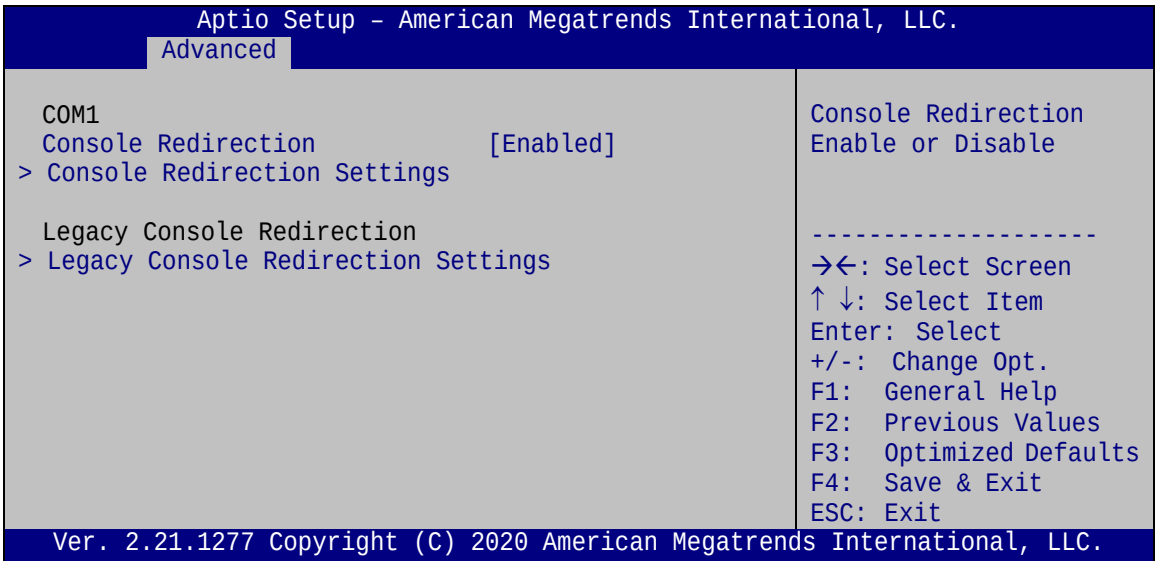
Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled** Disable the serial port

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

4.3.4 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 8**) 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 8: 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.

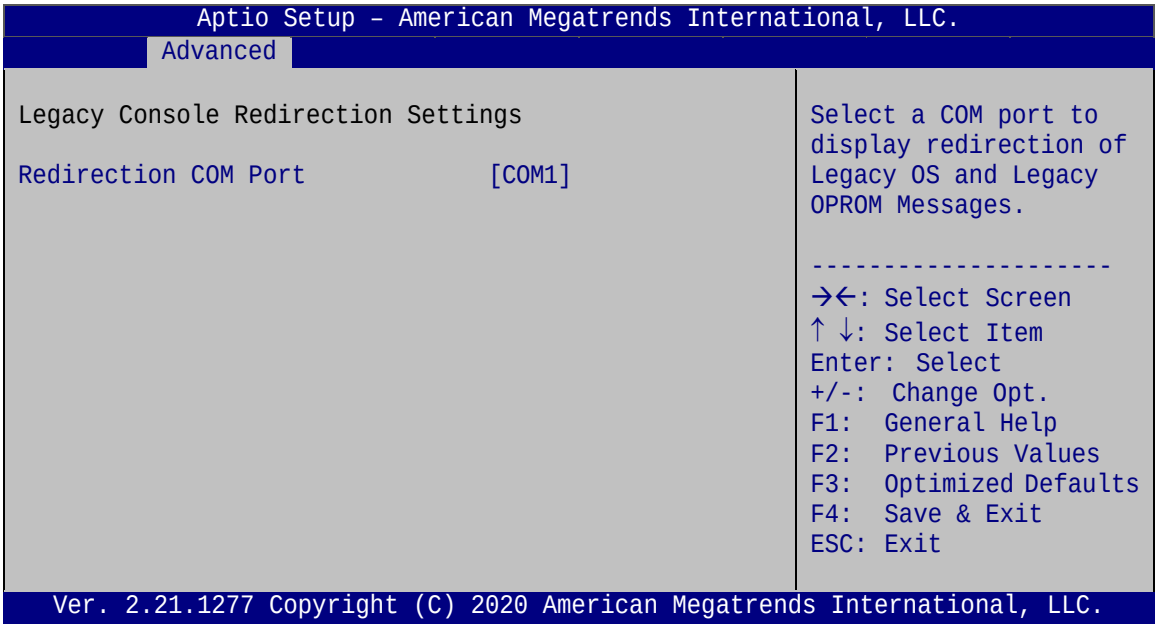
➔	**None**	**DEFAULT**	No parity bit is sent with the data bits.
➔	**Even**		The parity bit is 0 if the number of ones in the data bits is even.
➔	**Odd**		The parity bit is 0 if the number of ones in the data bits is odd.
➔	**Mark**		The parity bit is always 1. This option does not provide error detection.
➔	**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.

4.3.4.1 Legacy Console Redirection Settings



BIOS Menu 9: Legacy Console Redirection Settings

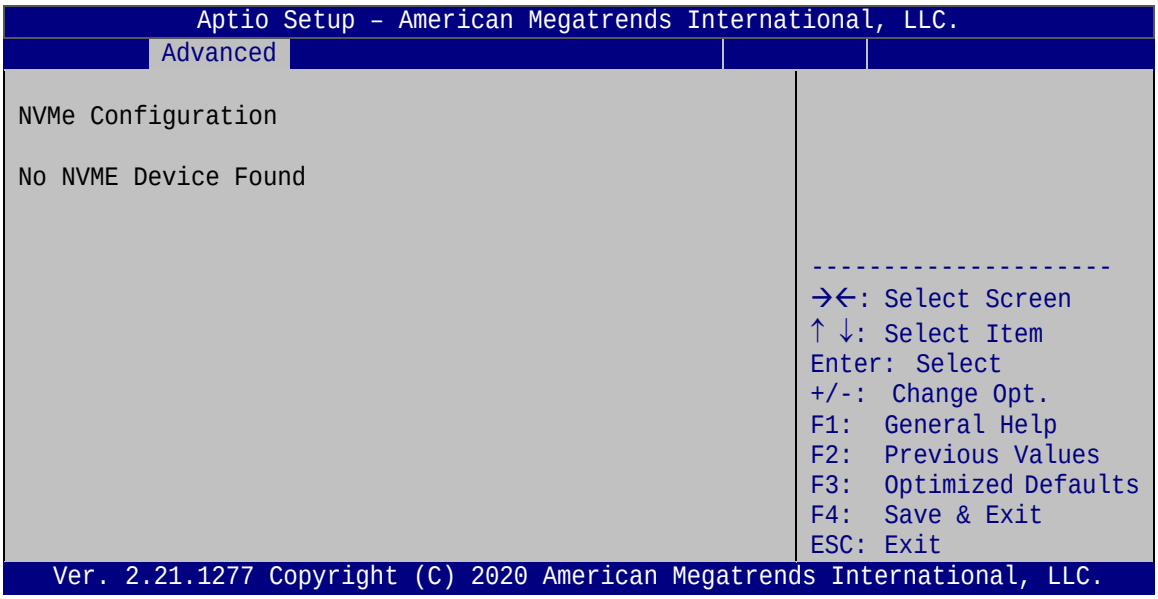
➔ **Redirection COM Port [COM1]**

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

- COM1 **Default**

4.3.5 NVMe Configuration

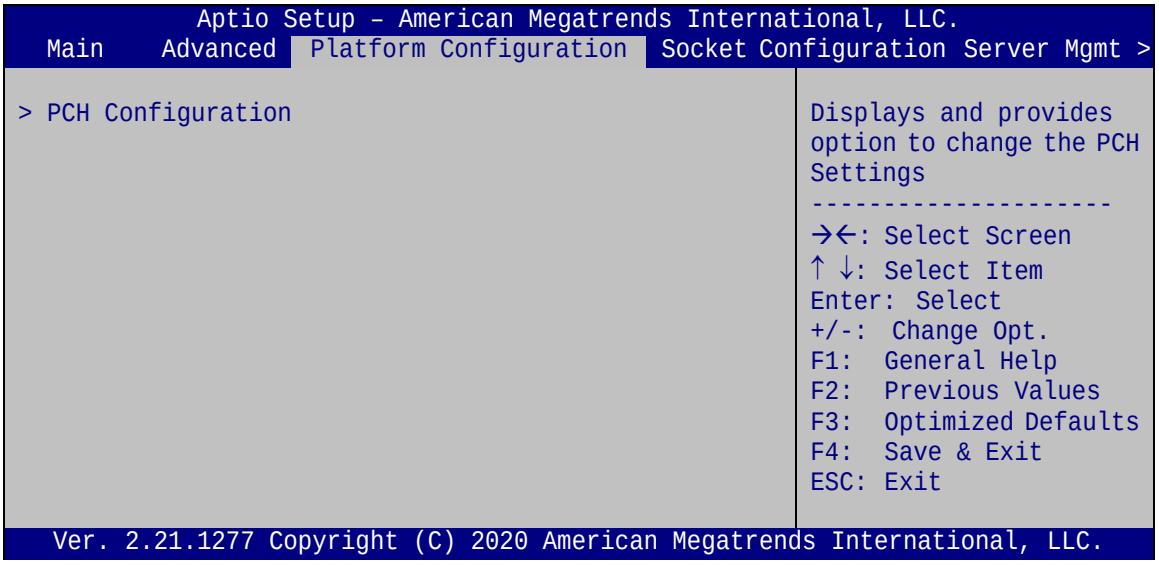
Use the **NVMe Configuration** (**BIOS Menu 10**) menu to display the NVMe controller and device information.



BIOS Menu 10: NVMe Configuration

4.4 Platform Configuration

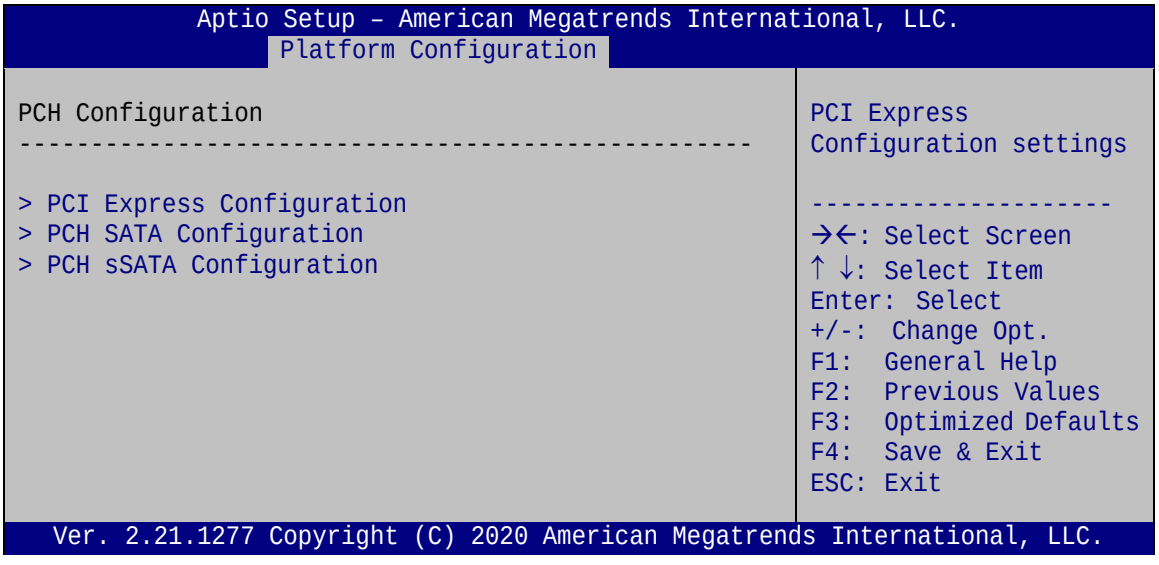
Use the **Platform Configuration** menu (**BIOS Menu 11**) to configure the platform parameters.



BIOS Menu 11: Platform Configuration

4.4.1 PCH Configuration

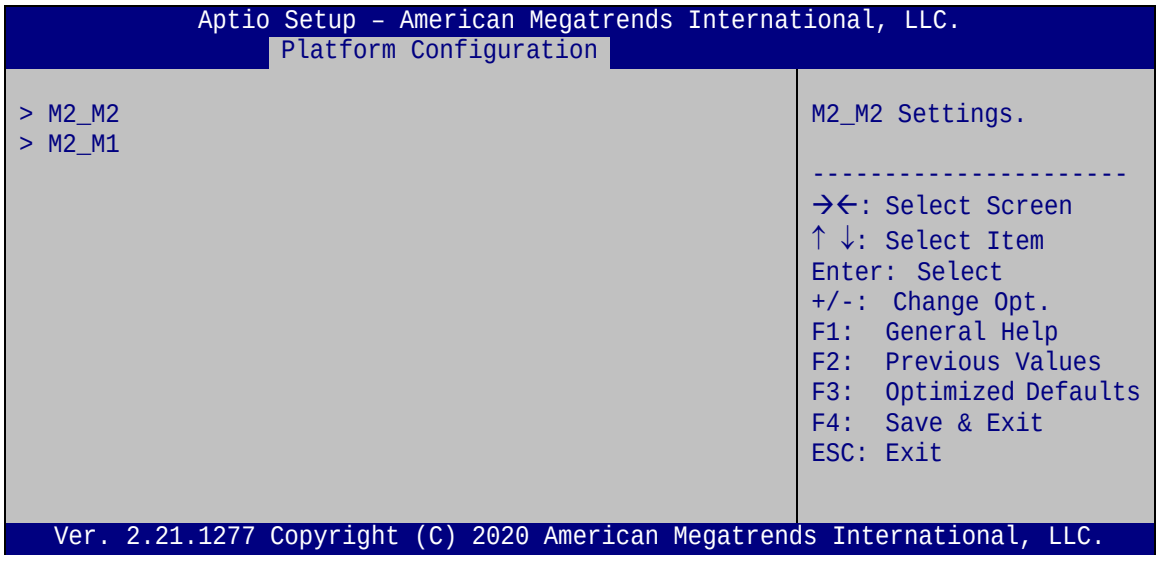
Use the **PCH Configuration** menu (**BIOS Menu 12**) to change and/or set the PCH settings.



BIOS Menu 12: PCH Configuration

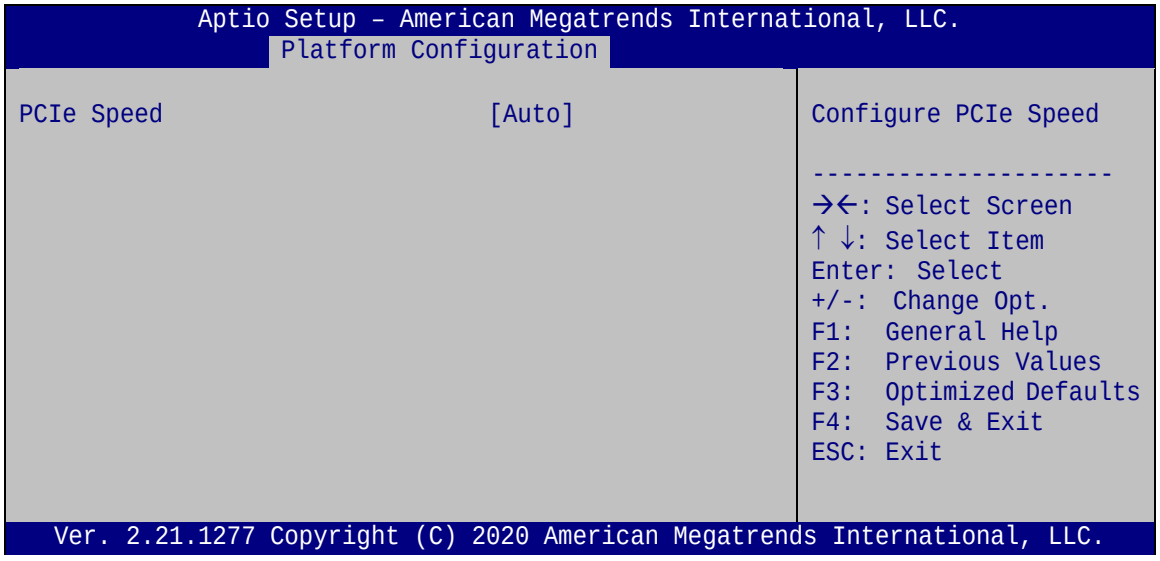
4.4.1.1 PCI Express Configuration

Use the **PCI Express Configuration** menu (**BIOS Menu 13**) to configure the PCI Express slot.



BIOS Menu 13: PCI Express Configuration

4.4.1.1.1 M2_M2/M2_M1



BIOS Menu 14: M2_M2/M2_M1

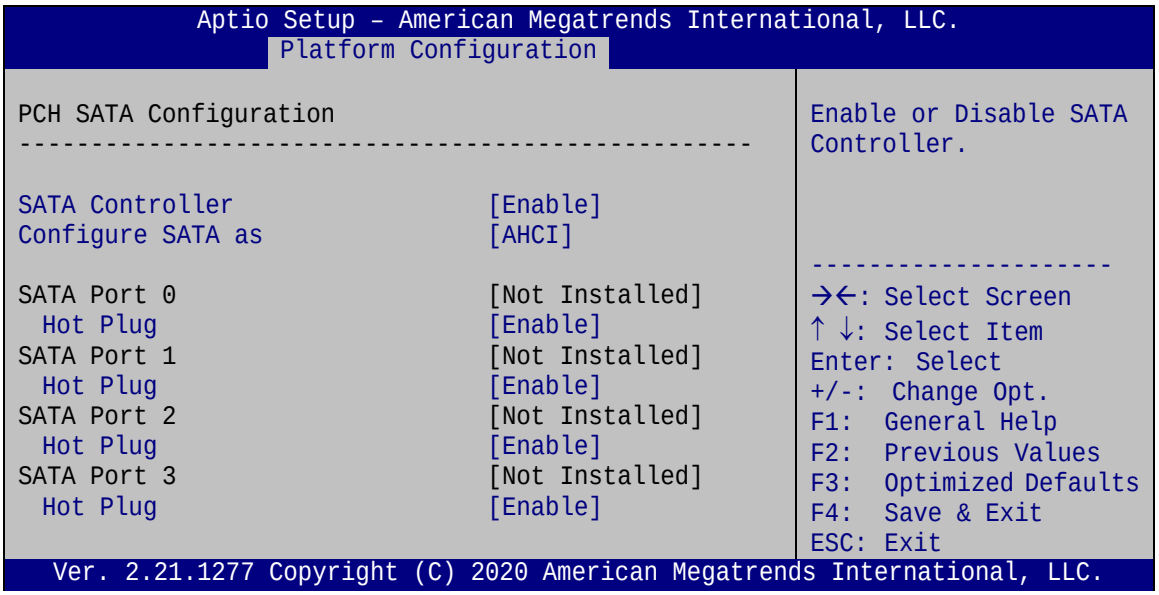
➔ **PCIe Speed [Auto]**

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

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

4.4.1.2 PCH SATA Configuration

Use the **PCH SATA Configuration** menu (**BIOS Menu 15**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 15: PCH SATA Configuration

➔ **SATA Controller [Enable]**

Use the **SATA Controller** option to configure the SATA controller.

➔ **Disable**		Disables the on-board SATA controller.
➔ **Enable**	**DEFAULT**	Enables the on-board SATA controller.

➔ **Configure SATA as [AHCI]**

Use the **Configure SATA as** 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 [Enable]**

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

➔ **Disable**		Disables the hot plug function.
➔ **Enable**	**DEFAULT**	Enables the hot plug function.

4.4.1.3 PCH sSATA Configuration

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

```
          Aptio Setup – American Megatrends International, LLC.
                Platform Configuration

PCH sSATA Configuration                          Enable or Disable SATA
--------------------------------------------------Controller

sSATA Controller                 [Enable]        ---------------------
Configure sSATA as               [AHCI]          →←: Select Screen
                                                 ↑ ↓: Select Item
M2_M2                            [Not Installed] Enter:  Select
  Hot Plug                       [Enable]        +/-:  Change Opt.
M2_M1                            [Not Installed] F1:  General Help
  Hot Plug                       [Enable]        F2:  Previous Values
                                                 F3:  Optimized Defaults
                                                 F4:  Save & Exit
                                                 ESC:  Exit

   Ver. 2.21.1277 Copyright (C) 2020 American Megatrends International, LLC.
```

BIOS Menu 16: PCH sSATA Configuration

➔ **SATA Controller [Enable]**

Use the **SATA Controller** option to enable or disable the SATA device.

➔ **Enable**	**DEFAULT**	Enables the SATA device.
➔ **Disable**		Disables the SATA device.

➔ **Configure sSATA as [AHCI]**

Use the **Configure sSATA as** option to configure how the SATA controller(s) operate.

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

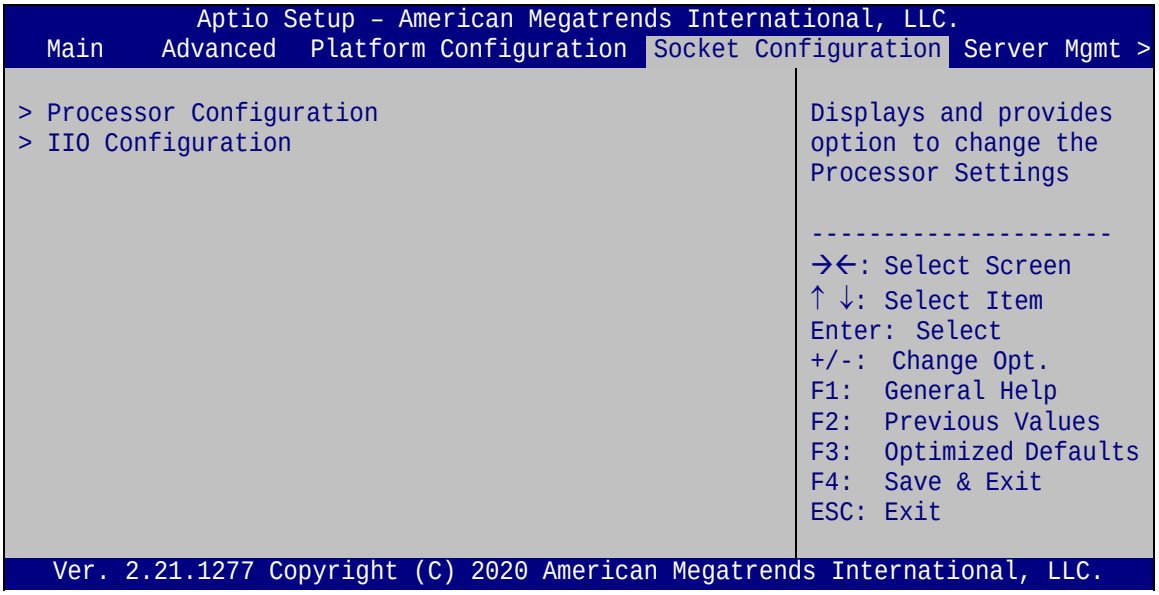
➔ **Hot Plug [Enable]**

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

➔ **Disable**		Disables the hot plug function.
➔ **Enable**	**DEFAULT**	Enables the hot plug function.

4.5 Socket Configuration

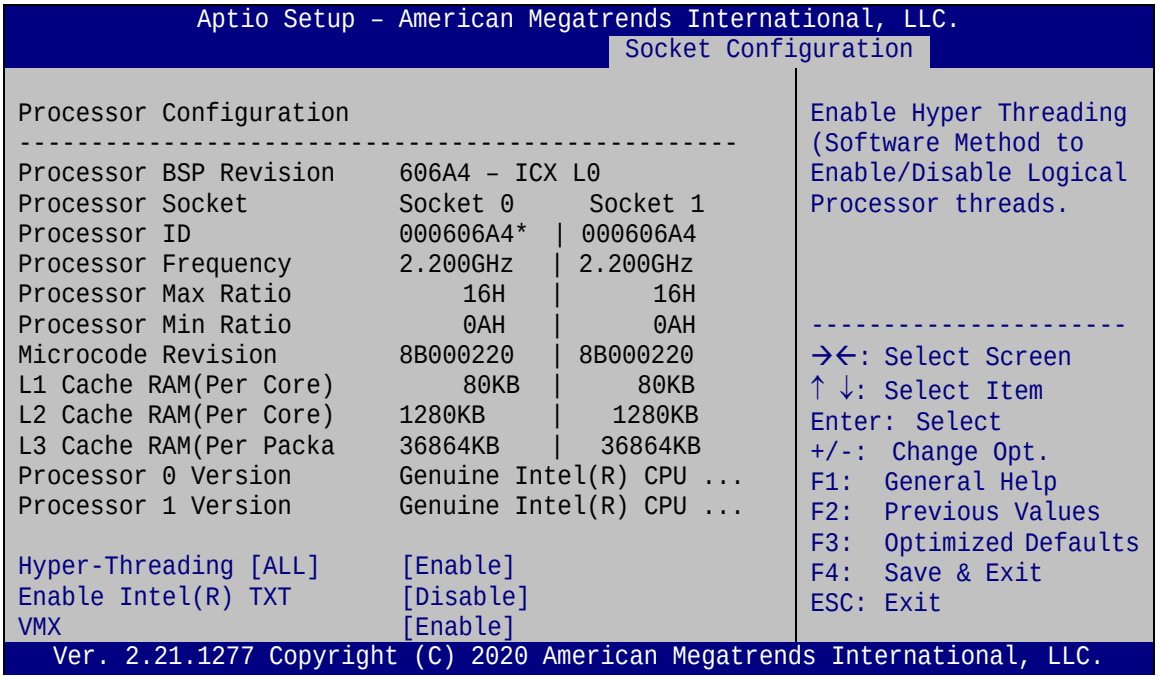
Use the **Socket Configuration** menu (**BIOS Menu 17**) to configure the socket parameters.



BIOS Menu 17: Socket Configuration

4.5.1 Processor Configuration

Use the **Processor Configuration** menu (**BIOS Menu 18**) to view detailed CPU specifications or enable the Intel Virtualization Technology.



BIOS Menu 18: Processor Configuration

➔ **Hyper-Threading [Enable]**

Use the **Hyper-Threading [ALL]** BIOS option to enable or disable the Intel Hyper-Threading Technology.

➔ **Disable** Disables the Intel Hyper-Threading Technology.

➔ **Enable** **DEFAULT** Enables the Intel Hyper-Threading Technology.

➔ **Enable Intel TXT [Disable]**

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

➔ **Disable** **DEFAULT** Disable Intel® Trusted Execution Technology

➔ **Enable** Enable Intel® Trusted Execution Technology

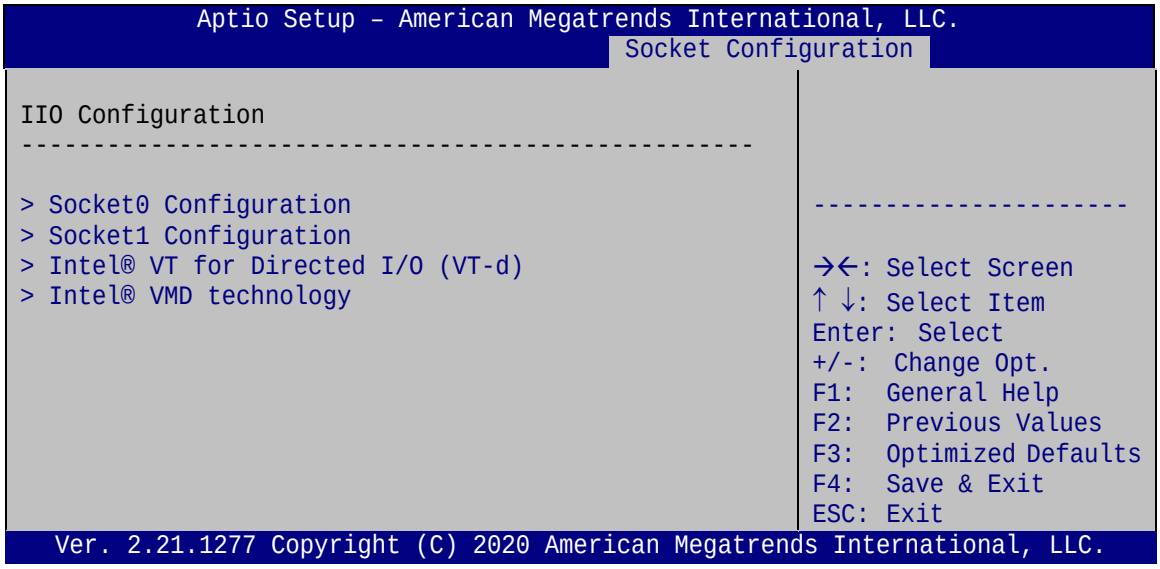
➔ **VMX [Enable]**

Use the **VMX** 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.

4.5.2 IIO Configuration

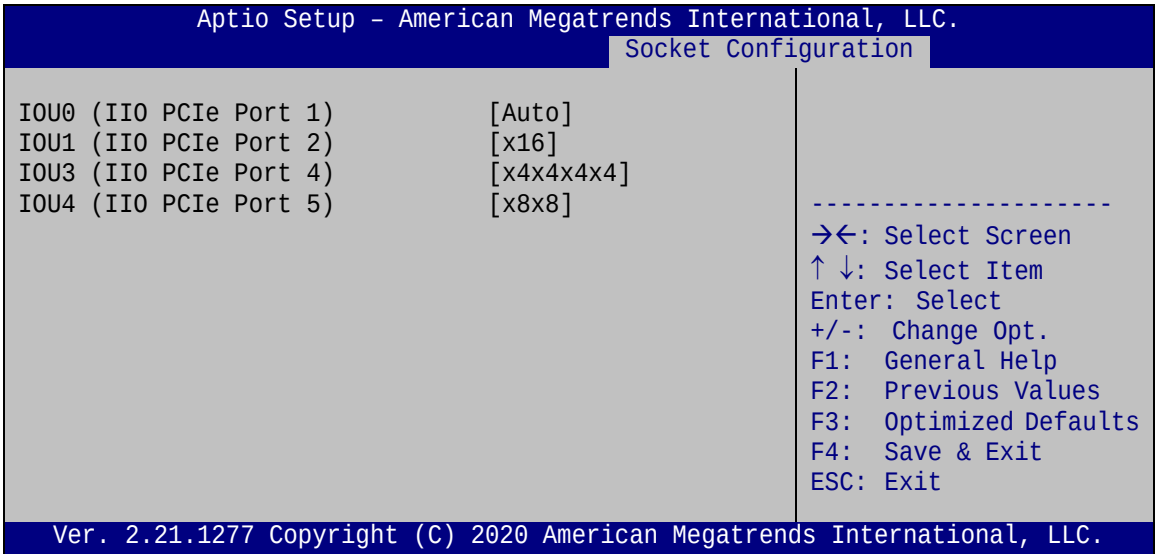
The **IIO Configuration** menu (**BIOS Menu 19**) configures Intel® Virtualization Technology functions.



BIOS Menu 19: IIO Configuration

4.5.2.1 Socket0 Configuration

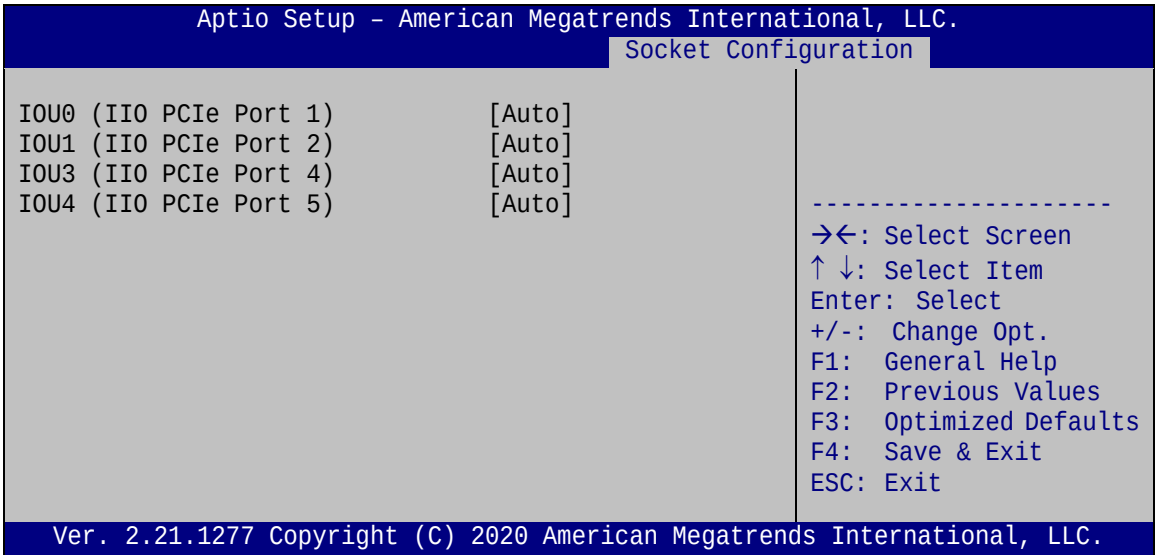
Use the **Socket0 Configuration** menu (**BIOS Menu 20**) to view the PCIe socket 0 information.



BIOS Menu 20: Socket0 Configuration

4.5.2.1 Socket1 Configuration

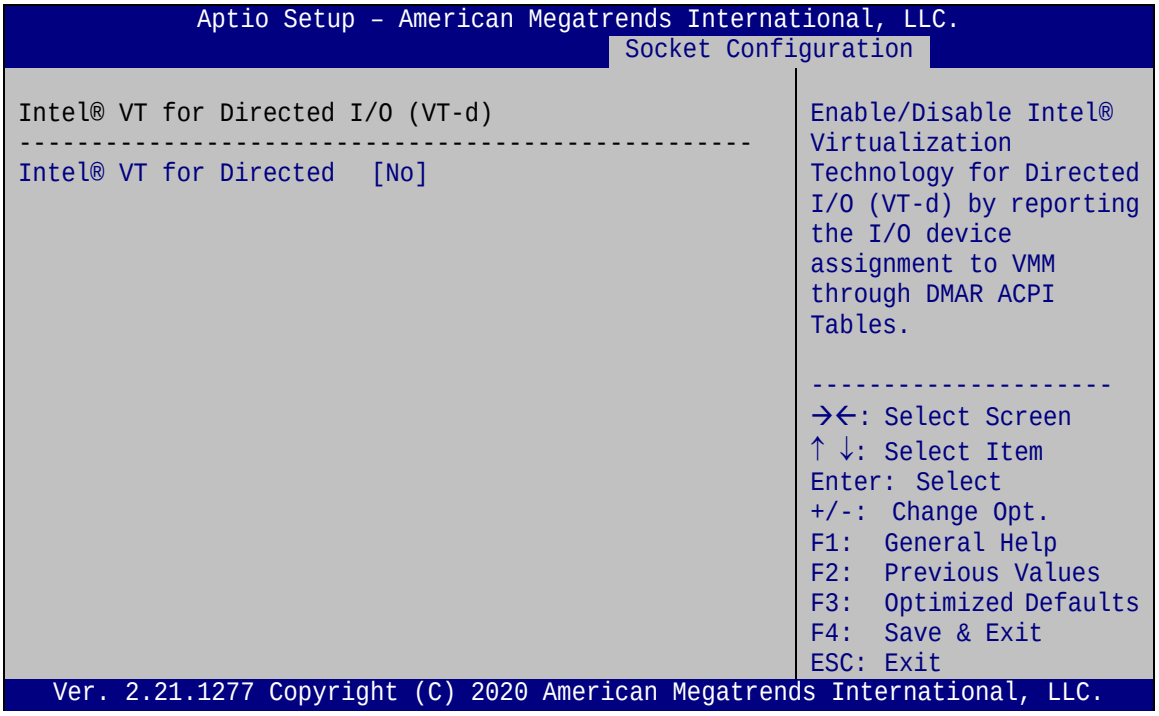
Use the **Socket1 Configuration** menu (**BIOS Menu 21**) to view the PCIe socket 1 information.



BIOS Menu 21: Socket1 Configuration

4.5.2.1 Intel® VT for Directed I/O (VT-d)

Use the **Intel® VT for Directed I/O (VT-d)** submenu (**BIOS Menu 22**) to disable or enable Intel® Virtualization Technology for directed I/O (VT-d).



BIOS Menu 22: Intel® VT for Directed I/O (VT-d)

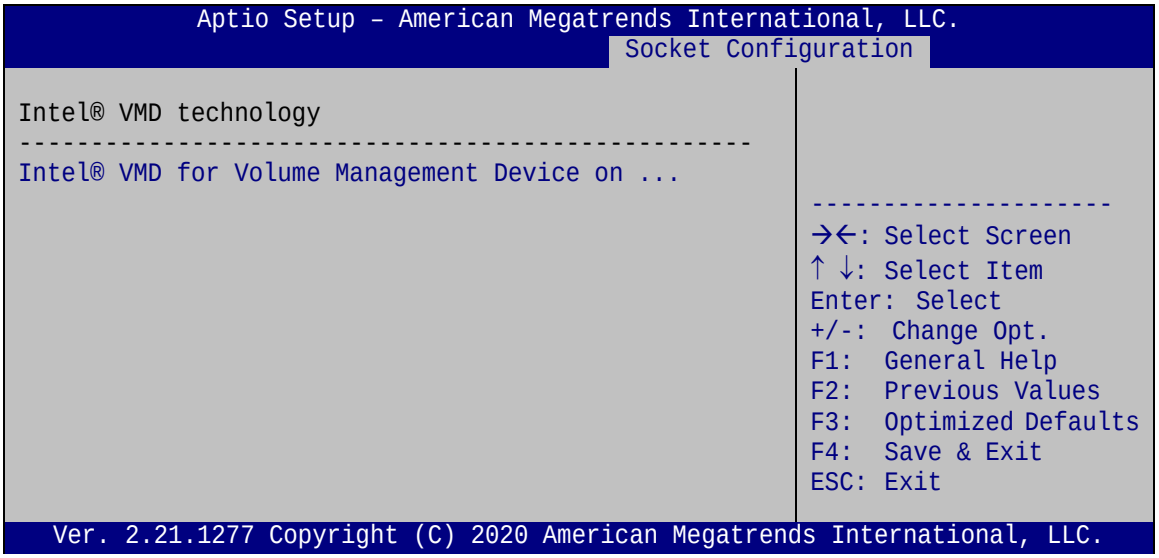
➔ **Intel® VT for Directed [No]**

Use the **Intel® VT for Directed** option to enable or disable VT-d capability.

➔	**Yes**		Enables VT-d capability.
➔	**No**	**DEFAULT**	Disables VT-d capability.

4.5.2.2 Intel® VMD Technology

Use the **Intel® VMD Technology** submenu (**BIOS Menu 23**) to configure Intel® VMD (Volume Management Device) settings.



BIOS Menu 23: Intel® VMD Technology

➔ **Enable/Disable VMD [Disable]**

Use the **Enable/Disable VMD** option in the sub-menu to enable or disable Intel® VMD in certain socket.

➔ **Disable** **DEFAULT** Disables Intel® VMD.

➔ **Enable** Enables Intel® VMD.

4.6 Server Management

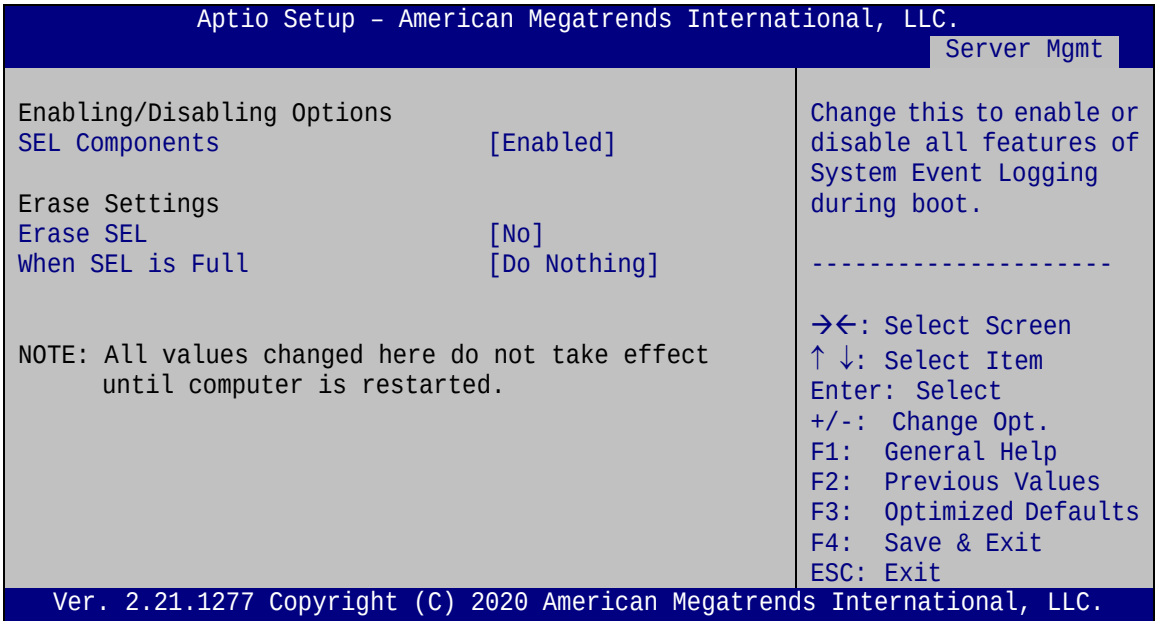
Use the **Server Management** menu (**BIOS Menu 24**) to display the server management status and change the settings.

```
            Aptio Setup – American Megatrends International, LLC.
  Main    Advanced  Platform Configuration  Socket Configuration Server Mgmt >

BMC Self Test Status            FAILED      Press <Enter> to change
BMC Firmware Revision           Unknown     the SEL event log
                                            configuration.
> System Event Log
> BMC network configuration                 ---------------------

                                            →←: Select Screen
                                            ↑ ↓: Select Item
                                            Enter:  Select
                                            +/-:  Change Opt.
                                            F1:   General Help
                                            F2:   Previous Values
                                            F3:   Optimized Defaults
                                            F4:   Save & Exit
                                            ESC:  Exit
   Ver. 2.21.1277 Copyright (C) 2020 American Megatrends International, LLC.
```

BIOS Menu 24: Server Management

4.6.1 System Event Log

Use the **System Event Log** menu (**BIOS Menu 25**) to configure the System Event Log (SEL) options.



BIOS Menu 25: System Event Log

➔ **SEL Components [Enabled]**

Use the **SEL Components** option to enable or disable all features of System Event Log.

- ➔ **Disabled** Disables SEL
- ➔ **Enabled** **DEFAULT** Enables SEL

➔ **Erase SEL [No]**

Use the **Erase SEL** option to determine whether to erase SEL or not. The following options are available:

- No **Default**
- Yes, On next reset
- Yes, On every reset

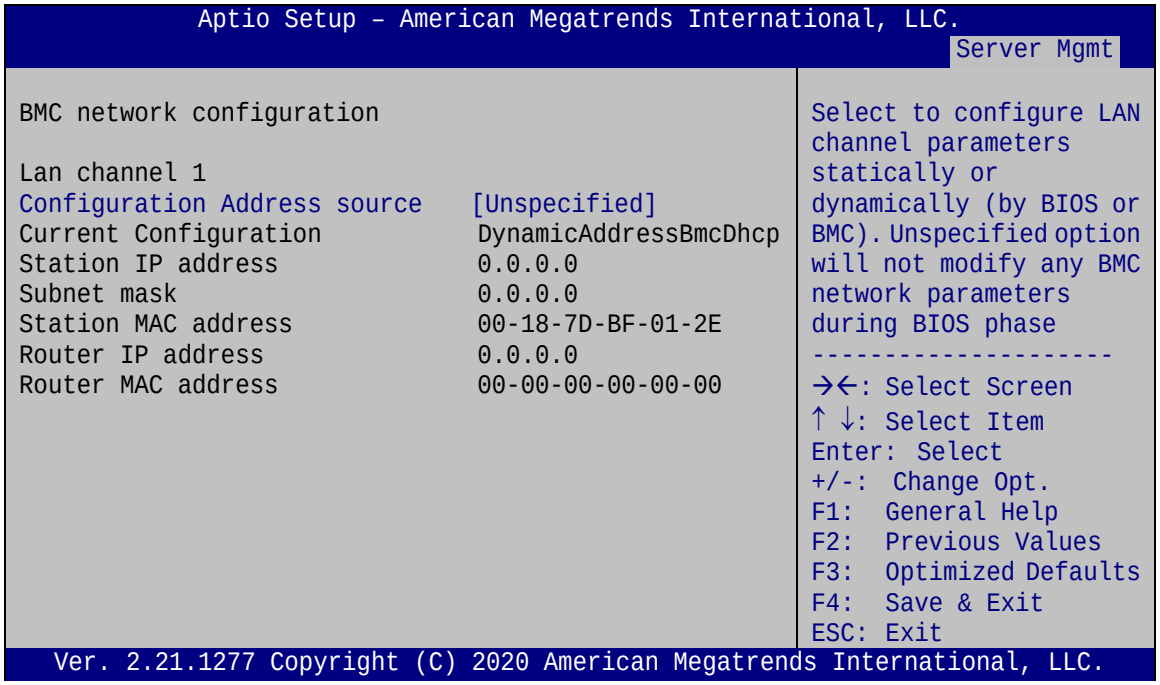
➔ **When SEL is full [Do Nothing]**

Use the **When SEL is Full** option to determine the action to be taken when SEL is full. The following options are available:

- Do Nothing **Default**
- Erase Immediately
- Delete Oldest Record

4.6.2 BMC Network Configuration

Use the **BMC Network Configuration** menu (**BIOS Menu 26**) to configure the BMC network parameters.



BIOS Menu 26: BMC Network Configuration

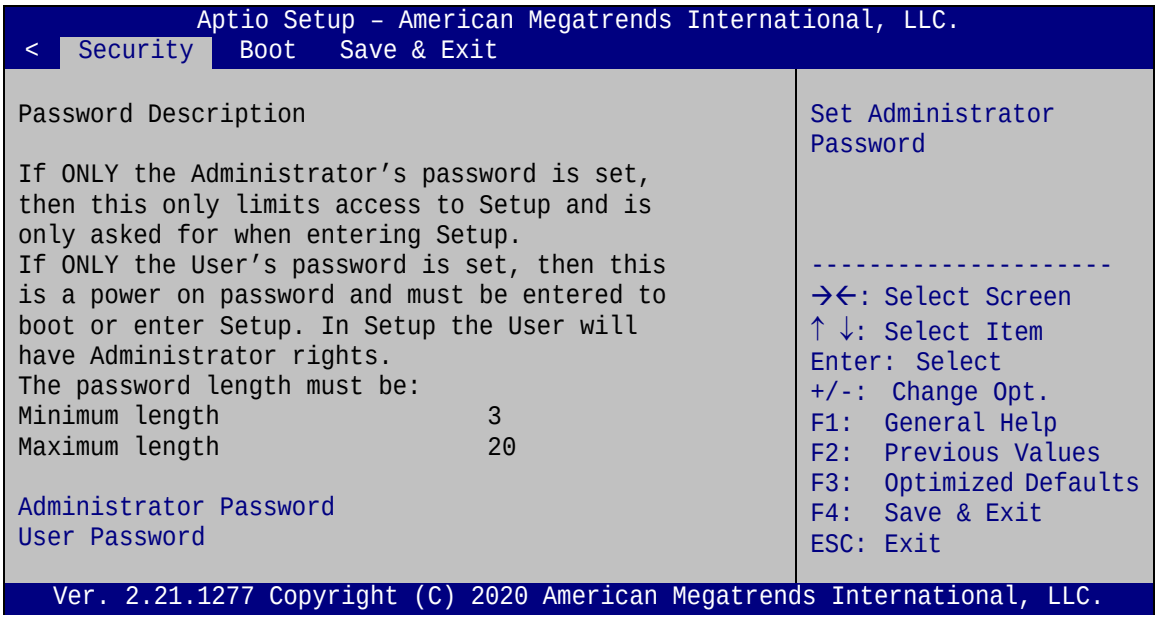
➔ **Configuration Address Source [Unspecified]**

Use the **Configuration Address Source** option to select the BMC network address source.

➔ **Unspecified**	**DEFAULT**	Does not modify any BMC network parameters during BIOS phase
➔ **Static**		Manually sets the BMC network parameters. If this option is selected, the following items will be configurable: *Station IP address *Subnet mask *Station MAC address *Router IP address *Router MAC address
➔ **DynamicBmcDhcp**		Obtains BMC network parameters by BMC dynamically.
➔ **DynamicBmcNonDhcp**		Loads BMC network parameters by BIOS.

4.7 Security

Use the **Security** menu (**BIOS Menu 27**) to set system and user passwords.



BIOS Menu 27: Security

➔ **Administrator Password**

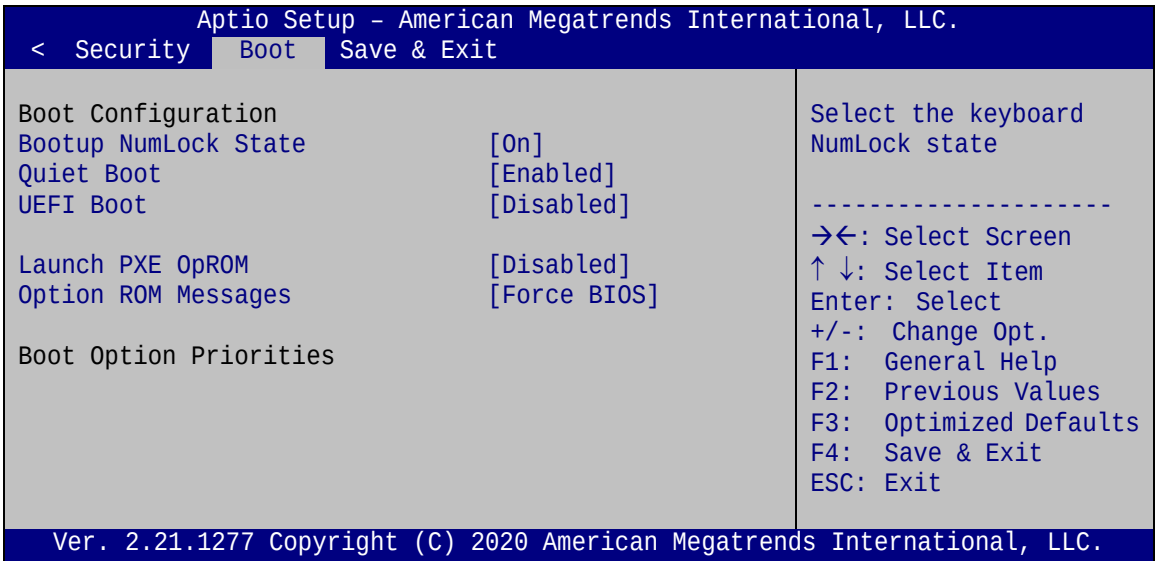
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

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

4.8 Boot

Use the **Boot** menu (**BIOS Menu 28**) to configure system boot options.



BIOS Menu 28: 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.

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

➔ **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.

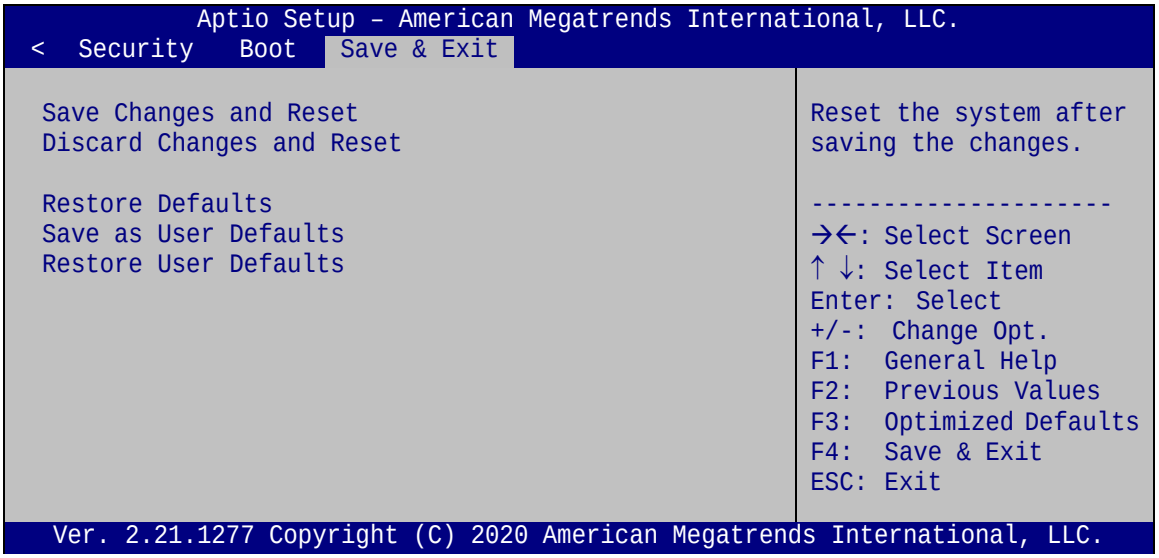
➔ **Option ROM Messages [Force BIOS]**

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.

4.9 Save & Exit

Use the **Safe & Exit** menu (**BIOS Menu 29**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 29: 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.

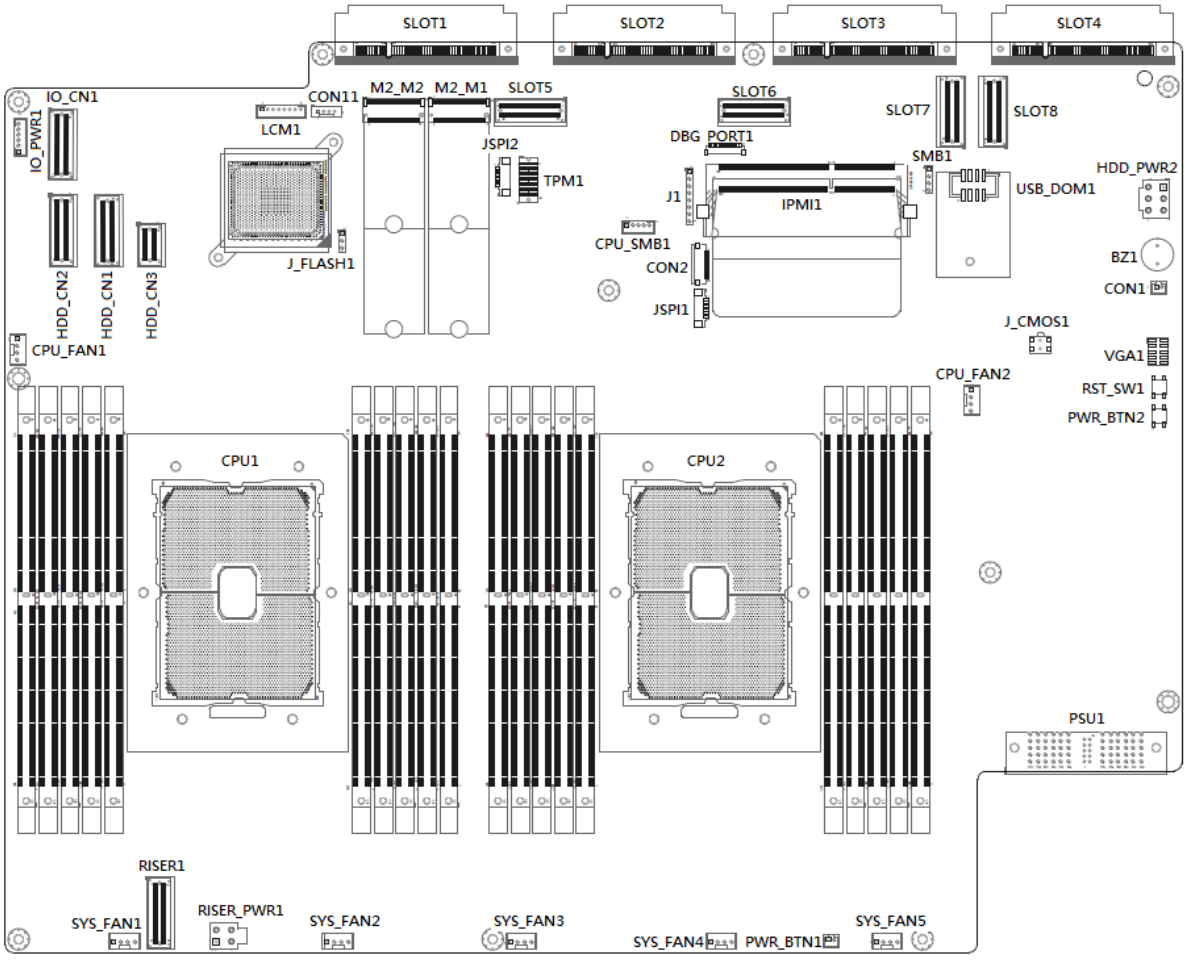
Chapter

5

Interface Connectors

5.1 Peripheral Interface Connectors

The connector locations of the PUZZLE-IN005's motherboard are shown below. The connector pinouts for these connectors are listed in the following sections.



5.2 Internal Peripheral Connectors

Internal peripheral connectors on the motherboard are only accessible when the motherboard is outside of the chassis. 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
Chassis intrusion connector	2-pin header	CON1
CPLD programmer connector	8-pin header	J1

Connector	Type	Label
Debug port connector	12-pin wafer	DBG_PORT1
EC debug connector	20-pin FPC	CON2
Fan connectors, CPU	4-pin wafer	CPU_FAN1, CPU_FAN2
Fan connectors, system	4-pin wafer	SYS_FAN1, SYS_FAN2, SYS_FAN3, SYS_FAN4, SYS_FAN5
LCM connector	8-pin wafer	LCM1
M.2 M-key slot	M.2 M-key 2280	M2_M1, M2_M2
PCIe x8 riser card connector	74-pin connector	RISER1
Power button connector	2-pin wafer	PWR_BTN1
Power connector, I/O card	6-pin wafer	IO_PWR1
Power connector, networking card	6-pin connector	HDD_PWR2
Power connector, riser card	4-pin connector	RISER_PWR1
SATA RAID key connector	4-pin wafer	CON11
SMBus connector	4-pin header	SMB1
SMBus connector, CPU	5-pin wafer	CPU_SMB1
SPI flash connector	6-pin wafer	JSPI1
SPI flash connector, EC	6-pin wafer	JSPI2
TPM connector	20-pin header	TPM1
USB DOM connector	8-pin header	USB_DOM1
VGA connector	10-pin header	VGA1

Table 5-1: Peripheral Interface Connectors

5.2.1 Chassis Intrusion Connector (CON1)

PIN NO.	DESCRIPTION
1	CHASSIS OPEN_N
2	GND

Table 5-2: Chassis Intrusion Connector (CON1) Pinouts

5.2.2 CPLD Programmer Connector (J1)

PIN NO.	DESCRIPTION
1	+3.3V_SB
2	CPLD_TDO
3	CPLD_TDI
4	NC
5	NC
6	CPLD_TMS
7	GND
8	CPLD_TCK

Table 5-3: CPLD Programmer Connector (J1) Pinouts

5.2.3 Debug Port Connector (DBG_PORT1)

Pin	Description	Pin	Description
1	NA	2	3V
3	GND	4	SERIRQ
5	LAD3	6	LAD2
7	LAD1	8	LAD0
9	FRAME#	10	RESET#
11	CLOCK	12	GND

Table 5-4: Debug Port Connector (DBG_PORT1) Pinouts

5.2.4 EC Debug Connector (CON2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	KSI0	2	KSO0
3	KSO1	4	KSO2
5	KSO3	6	KSO4
7	KSO5	8	KSO6
9	KSO7	10	KSO8
11	KSO9	12	KSO10
13	KS12	14	KSI1
15	KSO11	16	KSI2
17	KSI3	18	GND
19	GND	20	GND

Table 5-5: EC Debug Connector (CON2) Pinouts

5.2.5 CPU Fan Connectors (CPU_FAN1/2)

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

Table 5-6: CPU Fan Connectors (CPU_FAN1/2) Pinouts

5.2.6 System Fan Connectors (SYS_FAN1/2/3/4/5)

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

Table 5-7: System Fan Connectors (SYS_FAN1/2/3/4/5) Pinouts

5.2.7 LCM Connector (LCM1)

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 5-8: LCM Connector (LCM1) Pinouts

5.2.8 M.2 M-key Slot (M2_M1/M2_M2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+3.3V
3	GND	4	+3.3V
5	PCIE_RXN3	6	N/C
7	PCIE_RXP3	8	N/C
9	GND	10	DAS/DSS#
11	PCIE_TXN3	12	+3.3V
13	PCIE_TXP3	14	+3.3V
15	GND	16	+3.3V
17	PCIE_RXN2	18	+3.3V
19	PCIE_RXP2	20	N/C
21	GND	22	N/C
23	PCIE_TXN2	24	N/C
25	PCIE_TXP2	26	N/C
27	GND	28	N/C
29	PCIE_RXN1	30	N/C
31	PCIE_RXP1	32	N/C
33	GND	34	N/C

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
35	PCIE_TXN1	36	N/C
37	PCIE_TXP1	38	DEVSLP
39	GND	40	N/C
41	PCIE_RXN0	42	N/C
43	PCIE_RXP0	44	N/C
45	GND	46	N/C
47	PCIE_TXN0	48	N/C
49	PCIE_TXP0	50	PERST#
51	GND	52	CLKREQ#
53	REFCLKN	54	PEWAKE
55	REFCLKP	56	N/C
57	GND	58	N/C
59	Module Key	60	Module Key
61	Module Key	62	Module Key
63	Module Key	64	Module Key
65	Module Key	66	Module Key
67	N/C	68	SUSCLK
69	PEDET	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		

Table 5-9: M.2 M-key Slot (M2_M1/M2_M2) Pinouts

5.2.9 Power Button Connector (PWR_BTN1)

PIN NO.	DESCRIPTION
1	PWR_BTN+
2	PWR_BTN-

Table 5-10: Power Button Connector (PWR_BTN1) Pinouts

5.2.10 Power Connector, I/O Card (IO_PWR1)

PIN NO.	DESCRIPTION
1	3.3V
2	3.3V
3	5V
4	5V
5	GND
6	GND

Table 5-11: Power Connector, I/O Card (IO_PWR1) Pinouts

5.2.11 Power Connector, Networking Card (HDD_PWR2)

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

Table 5-12: Power Connector, Networking Card (HDD_PWR2) Pinouts

5.2.12 Power Connector, Riser Card (RISER_PWR1)

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

Table 5-13: Power Connector, Riser Card (RISER_PWR1) Pinouts

5.2.13 SATA RAID Key Connector (CON11)

PIN NO.	DESCRIPTION
1	GND
2	N/A
3	GND
4	RAID KEY

Table 5-14: SATA RAID Key Connector (CON11) Pinouts

5.2.14 SMBus Connector (SMB1)

PIN NO.	DESCRIPTION
1	GND
2	SMBUS (I2C) CLK
3	SMBUS (I2C) DATA
4	+5V

Table 5-15: SMBus Connector (SMB1) Pinouts

5.2.15 CPU SMBus Connector (CPU_SMB1)

PIN NO.	DESCRIPTION
1	CPU1_SMBUS (I2C) CLK
2	CPU1_SMBUS (I2C) DATA
3	GND
4	CPU2_SMBUS (I2C) CLK
5	CPU2_SMBUS (I2C) DATA

Table 5-16: CPU SMBus Connector (CPU_SMB1) Pinouts

5.2.16 SPI Flash Connector (JSPI1)

PIN NO.	DESCRIPTION
1	+3.3V
2	SPI_CS
3	SPI_SO
4	SPI_CLK
5	SPI_SI
6	GND

Table 5-17: SPI Flash Connector (JSPI1) Pinouts

5.2.17 SPI Flash Connector - EC (JSPI2)

PIN NO.	DESCRIPTION
1	+3.3V
2	SPI_CS#0_CN_EC
3	SPI_SO_SW_EC
4	SPI_CLK_SW_EC
5	SPI_SI_SW_EC
6	GND

Table 5-18: SPI Flash Connector - EC (JSPI2) Pinouts

5.2.18 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

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
15	SB3V	16	SERIRQ
17	GND	18	GLKRUN#
19	LPCPD#	20	LDRQ#

Table 5-19: TPM Connector (TPM1) Pinouts

5.2.19 USB DOM Connector (USB_DOM1)

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

Table 5-20: USB DOM Connector (USB_DOM1) Pinouts

5.2.20 VGA Connector (VGA1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RED	2	DDCDA
3	GREEN	4	DDCCLK
5	BLUE	6	GND
7	HSYNC	8	GND
9	VSYNC	10	GND

Table 5-21: VGA Connector (VGA1) 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 □ntegration 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 □irektiivin 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-IN005.

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.
- ***This equipment is not suitable for use in locations where children are likely to be present***.
- **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-IN005 may result in permanent damage to the PUZZLE-IN005 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PUZZLE-IN005. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PUZZLE-IN005 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;

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

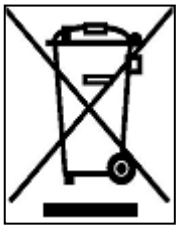
Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, that can result in an explosion;

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 PUZZLE-IN005, please follow the guidelines below.

B.2.1 Maintenance and Cleaning

Prior to cleaning any part or component of the PUZZLE-IN005, please read the details below.

- The interior of the PUZZLE-IN005 does not require cleaning. Keep fluids away from the PUZZLE-IN005 interior.
- Be cautious of all small removable components when vacuuming the PUZZLE-IN005.
- Turn the PUZZLE-IN005 off before cleaning the PUZZLE-IN005.
- Never drop any objects or liquids through the openings of the PUZZLE-IN005.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the PUZZLE-IN005.
- Avoid eating, drinking and smoking within vicinity of the PUZZLE-IN005.

B.2.2 Cleaning Tools

Some components in the PUZZLE-IN005 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-IN005.

- ***Cloth*** – Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the PUZZLE-IN005.
- ***Water or rubbing alcohol*** – A cloth moistened with water or rubbing alcohol can be used to clean the PUZZLE-IN005.
- ***Using solvents*** – The use of solvents is not recommended when cleaning the PUZZLE-IN005 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-IN005. Dust and dirt can restrict the airflow in the PUZZLE-IN005 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

Error Beep Code

C.1 PEI Beep Codes

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

C.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

D

Hazardous Materials Disclosure

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

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

Please refer to the following table.

Part Name	Toxic or Hazardous Substances and Elements									
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)	Bis(2-ethylhexyl) phthalate (DEHP)	Butyl benzyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)
Housing	O	O	O	O	O	O	O	O	O	O
Display	O	O	O	O	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O	O	O	O	O
Battery	O	O	O	O	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in Directive (EU) 2015/863.

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in Directive (EU) 2015/863.

D.2 China RoHS

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

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

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	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/T11364-2014與GB/T26572-2011标准规定的限量要求以下。

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