IEi

IEI Integration Corp.

MODEL:

PUZZLE-5030

1U Rackmount Network Appliance Supports LGA1200 Intel® Xeon® E Processor (Codenamed: Rocket Lake), Intel® C256 Chipset, Four DDR4 Slots, Eight 2.5GbE, Two PuIM Slots, Two PCIe Expansions, Redundant Power, RoHS

User Manual

Rev. 1.00 – November 10, 2022

RoHS Lead Free

Revision

Date	Version	Changes
November 10, 2022	1.00	Initial release

Copyright

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-5030 Series

The PUZZLE-5030 is a 1 U network appliance series powered by the 8th generation Intel® Xeon® E Processor (codenamed: Rocket Lake). It is optimized to host VNFs (Virtual Network Functions) and is ideal for SD-WAN.

The PUZZLE-5030 supports 8 copper GbE ports for high-speed network applications, and it is equipped with a PCIe Gen4 x8 slot and a PCIe Gen4 x4 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 SATA 6Gb/s connectors and M.2 M-key slot.

![warning] **WARNING:**

This equipment is not suitable for use in locations where children are likely to be present.

1.2 Model Variations

The model variations of the PUZZLE-5030 are listed below.

PUZZLE-5030	CPU
-R*	N/A
- XE/R	Intel® Xeon® E-2378G
- XE2/R	Intel® Xeon® E-2378
*A CPU heatsink must be purchased separately for the PUZZLE-5030-R. Refer to Section 2.4.	

Table 1-1: PUZZLE-5030 Model Variations

1.3 Features

The PUZZLE-5030 features are listed below:

- Powered by 8th gen Intel® Xeon® E Processor (Codename: Rocket Lake) and Intel® C256 chipset
- Support four 3200 MHz DDR4 ECC/ non-ECC UDIMMs (up to 128 GB)
- Support two 2.5" SATA SSD/HDD
- Support up to eight 2.5 GbE connections via Intel® C256 controllers
- 2-pair bypass
- Upgradable with future expansion cards by one PCIe Gen4 x8 slot, one PCIe Gen4 x4 slot, one M.2 M-key 2260/2280 slot and one PCIe Mini card slot
- One RJ-45 console port
- Supports two external USB 3.0 ports (on front panel) and two internal USB 2.0 ports (by pin header)
- 1U chassis for rack mounting
- CE, FCC and RoHS compliant

1.4 Front Panel

The overview of the front panel is shown in **Figure 1-2**.
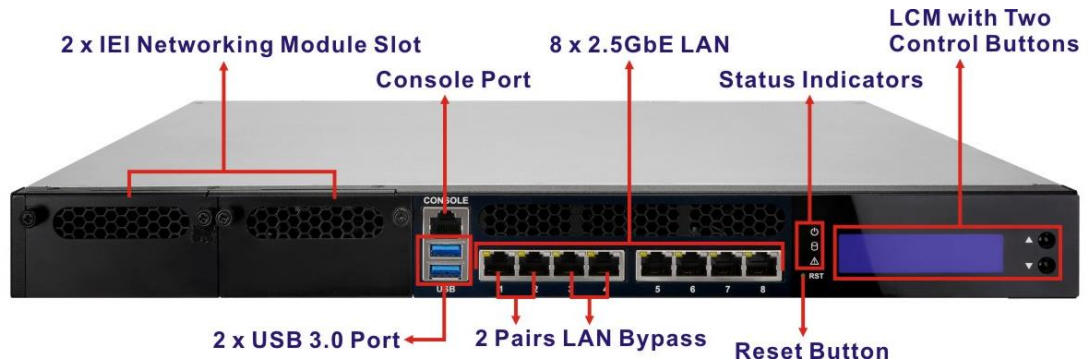
Figure 1-2: PUZZLE-5030 Front Panel

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

1.5 Rear Panel

An overview of the PUZZLE-5030 rear panel is shown in **Figure 1-3** below.
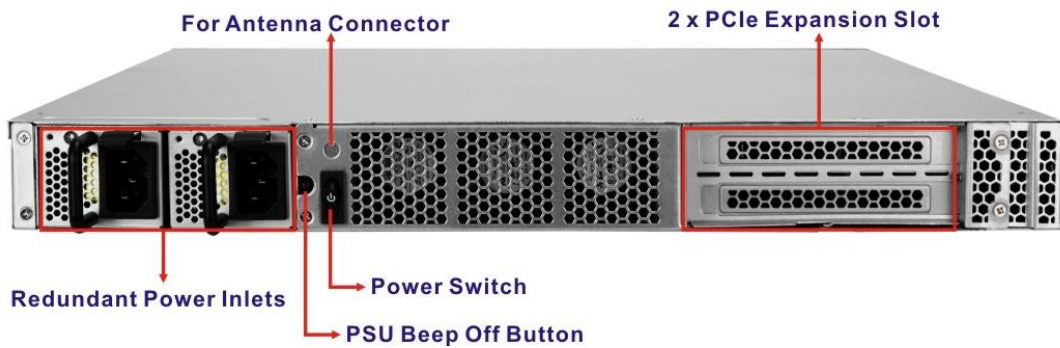
Figure 1-3: PUZZLE-5030 Rear Panel

1.6 Technical Specifications

The PUZZLE-5030 technical specifications are listed in **Table 1-2**.

Form Factor	1U
CPU (SoC)	Intel® Xeon® E Processor (Codename: Rocket Lake)
Chipset	Intel® C256
Memory	DDR4 3200 MHz ECC/non-ECC UDIMM Up to 128 GB 4 x 288-pin DIMM
Networking	Intel® I225V-AT Ethernet controller 8 x 2.5 GbE LAN port 2 x IEI network module slot
LAN Bypass	2 pairs
Network Module	Site A: PCIe x8 or two PCIe x4 Site B: two PCIe x4 or four PCIe x2
Storage	2 x 2.5" SATA HDD/SSD bay support SATA 3.0 (6 Gbps)
Expansion Slot	1 x M.2 M key 2260/2280 support PCIe Gen3 x4 or SATA 6Gb/s 1 x PCIe Mini with SIM card slot (PCIe Gen3 x1) 2 x Standard PCIe slot (PCIe Gen4 x4, PCIe Gen4 x8)
Indicators	LCM (16x2 character with 2 control buttons) 1 x Power LED 1 x Storage LED 1 x Alert LED (programmable)
Display	Internal HDMI 2.0a connector
Console	1 x RJ-45
USB	2 x USB 3.0 (external, on front panel) 2 x USB 2.0 (internal, by pin header)
Switch/Button	Power switch (rear panel) Reset button (front panel)

TPM	TPM 2.0 pin header
Antenna Connector	1 x Knockout hole for antenna connector
Power Input	100 V ~ 240 V, 5 A ~ 2.5 A, 60 Hz ~ 50 Hz
Type/Watt	300 W AC, redundant
Thermal Solution	3 x Cooling fans with smart fan function 1 x System fan
Mounting	1U rack mount
Operating Temperature	0°C~40°C (32°F~104°F)
Storage Temperature	-10°C ~ 50°C
Operating Humidity	5%~90%, non-condensing
Safety	CE, FCC, RoHS
Weight	10 kg
Physical Dimensions	430 mm x 44.2 mm x 426 mm
Operating System	Linux (CentOS, Red Hat, Ubuntu, etc.) Microsoft Windows 10

Table 1-2: Technical Specifications

1.6.1 Expansion Slot Block Diagram

The block diagram of the expansion slots is shown below:
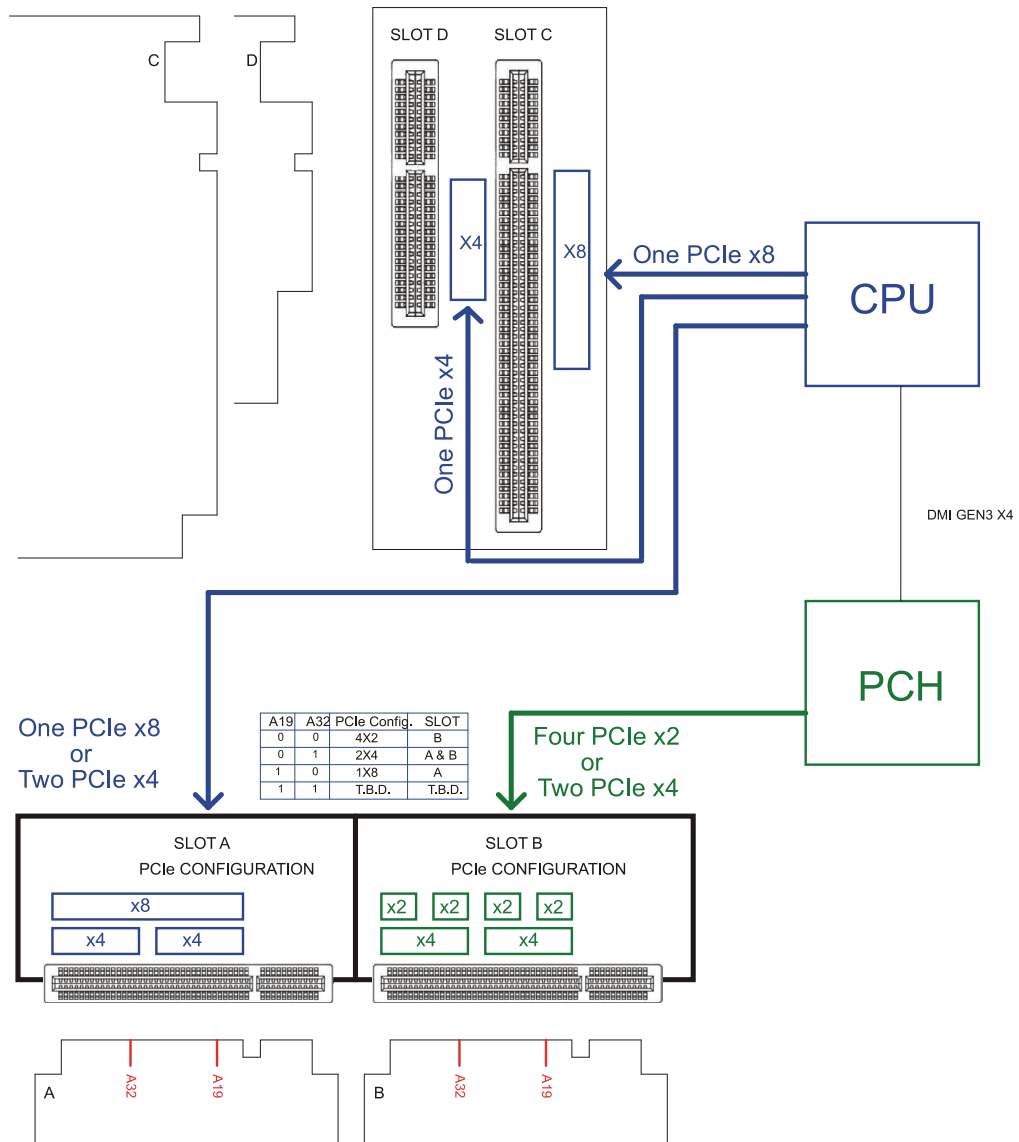
Figure 1-4: Expansion Slot Block Diagram

1.7 Dimensions

The physical dimensions are shown below:
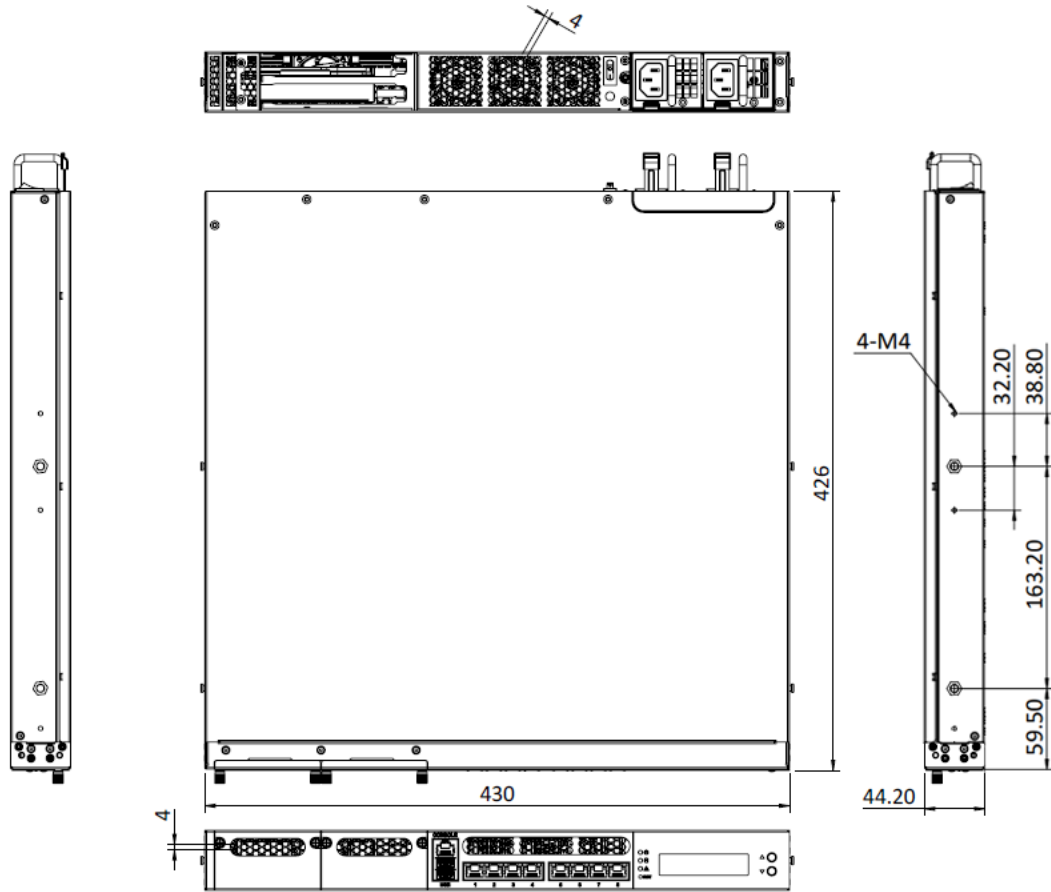
Figure 1-5: Physical Dimensions (millimeters)

Chapter

2

Unpacking

2.1 Anti-static Precautions

![warning icon] **WARNING:**

Failure to take ESD precautions during installation may result in permanent damage to the PUZZLE-5030 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PUZZLE-5030. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PUZZLE-5030 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-5030, place it on an anti-static pad. This reduces the possibility of ESD damaging the PUZZLE-5030.

2.2 Unpacking Precautions

When the PUZZLE-5030 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-5030 does not fall out of the box.
- Make sure all the components shown in **Section 2.3** are present.

2.3 Packing List

![NOTE icon] **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-5030 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@ieiworld.com.

The PUZZLE-5030 is shipped with the following components:

Quantity	Item	Image
1	PUZZLE-5030	
2	Power cord	
2	Rack mount brackets (*Note: The brackets must be used with sliding rails.*)	
6	Mounting bracket screw (M4*6)	

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-B02)	
USB to console cable (**P/N**: 32013-004000-100-RS)	
RS-232 to console cable (**P/N**: 32005-005100-100-RS)	
HDMI cable (**P/N**: 19B00-000403-00-RS)	
CPU heatsink (**P/N**: 34000-000722-RS)	

Chapter

3

Installation

3.1 Installation Precautions

⚡ **CAUTION!**

The PUZZLE-5030 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-5030 series.

During installation, be aware of the precautions below:

- **Read the user manual**: The user manual provides a complete description of the PUZZLE-5030, installation instructions and configuration options.
- **DANGER! Disconnect Power**: Power to the PUZZLE-5030 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-5030 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-5030. The PUZZLE-5030's cooling vents must not be obstructed by any objects. Blocking the vents can cause overheating of the PUZZLE-5030. Leave at least 5 cm of clearance around the PUZZLE-5030 to prevent overheating.
- **Grounding**: The PUZZLE-5030 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-5030.

3.2 Top Cover Removal

![Warning icon] **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-5030. Follow the steps below to complete the task.

Step 1: Remove the five 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 UDIMM Installation

> ⚠️ **CAUTION:**
>
> For quad channel configuration, always install four identical memory modules that feature the same capacity, timings, voltage, number of ranks and the same brand.

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

Step 1: Remove the top cover from the PUZZLE-5030. Please follow the instruction described in **Section 3.2**.

Step 2: Locate the UDIMM slots on the motherboard.
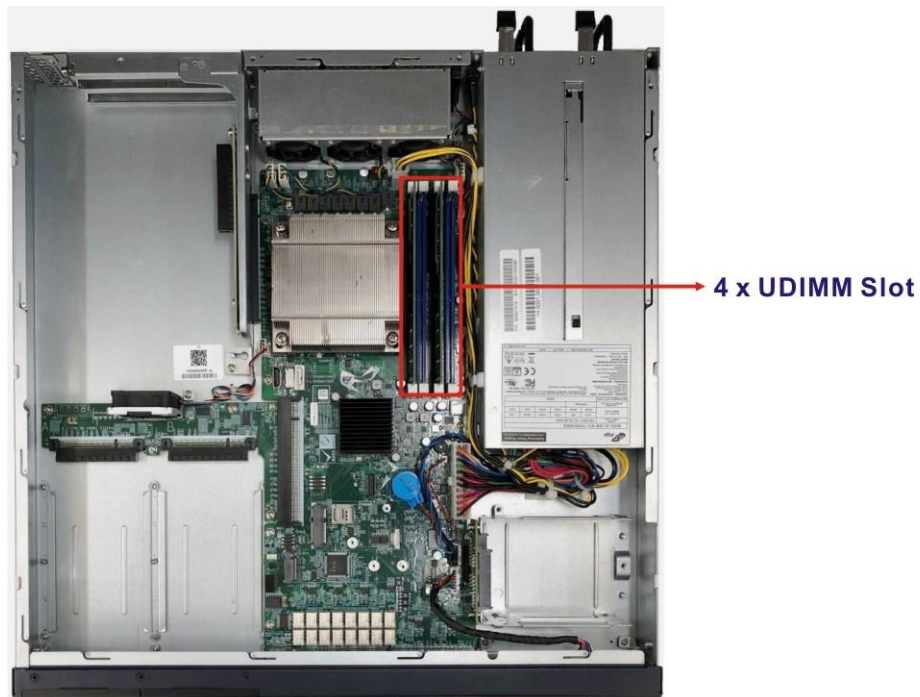
Figure 3-2: UDIMM Slot Locations

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

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

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

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

3.4 CPU Installation (PUZZLE-5030-R Only)

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure the correct cooling kit is properly installed.

DO NOT touch the pins at the bottom of the CPU. When handling the CPU, only hold it on the sides.

To install the CPU, follow the steps below.

Step 1: **Disengage the load lever** by pressing the lever down and slightly outward to clear the retention tab. Fully open the lever. See **Figure 3-3**.
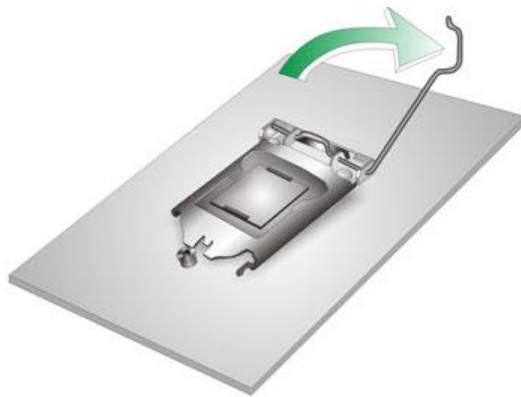
Figure 3-3: Disengage the CPU Socket Load Lever

Step 2: **Open the socket and remove the protective cover.** The black protective cover can be removed by pulling up on the tab labeled "Remove". See **Figure 3-4**.
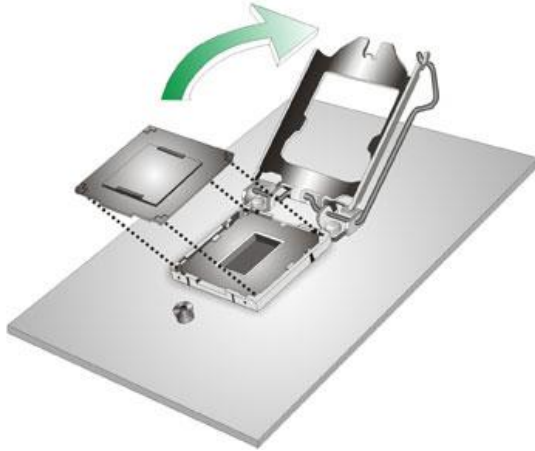
Figure 3-4: Remove Protective Cover

Step 3: **Inspect the CPU socket.** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

Step 4: **Orientate the CPU properly.** The contact array should be facing the CPU socket.

Step 5: **Correctly position the CPU.** Match the Pin 1 mark with the cut edge on the CPU socket.

Step 6: **Align the CPU pins.** Locate pin 1 and the two orientation notches on the CPU. Carefully match the two orientation notches on the CPU with the socket alignment keys.

Step 7: **Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly. See **Figure 3-5**.
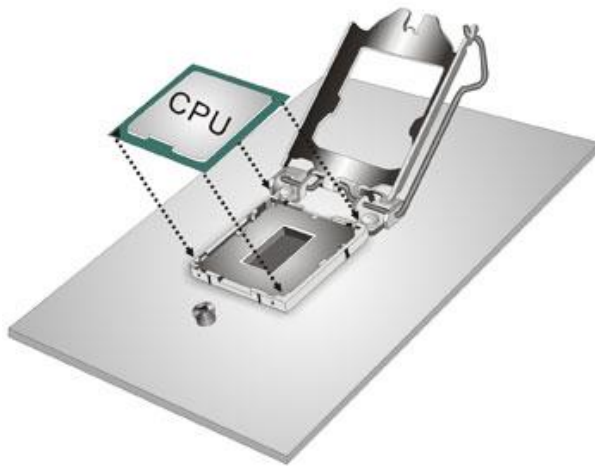
Figure 3-5: Insert the Socket LGA1155 CPU

Step 8: **Close the CPU socket.** Close the load plate and pull the load lever back a little to have the load plate be able to secure to the knob. Engage the load lever by pushing it back to its original position (**Figure 3-6**). There will be some resistance, but will not require extreme pressure.
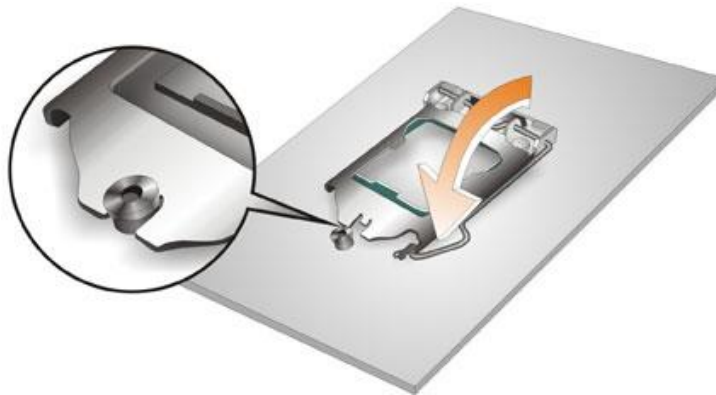
Figure 3-6: Close the Socket LGA1155

3.4.1 CPU Heatsink Installation (PUZZLE-5030-R Only)

![WARNING] **WARNING:**

Do not wipe off (accidentally or otherwise) the pre-sprayed layer of thermal paste on the bottom of the heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

A CPU heatsink must be installed in the PUZZLE-5030-R after the CPU installation. The CPU heatsink can be bought from IEI. To install the heatsink, follow the instructions below.

Step 1: A heatsink bracket is pre-installed on the rear of the motherboard

Step 2: **Properly orient the CPU heatsink**. The CPU heatsink must be oriented as shown in **Figure 3-7** so that thermal convection currents can carry the heat away from the heatsink.

Step 3: **Place the CPU heatsink onto the CPU**. Push down the heatsink with some pressure to secure the heatsink with the support bracket.

Step 4: **Tighten the screws**. Use a screwdriver to tighten the four screws. In a diagonal pattern, tighten each screw a few turns then move to the next one, until they are all secured. Do not overtighten the screws.
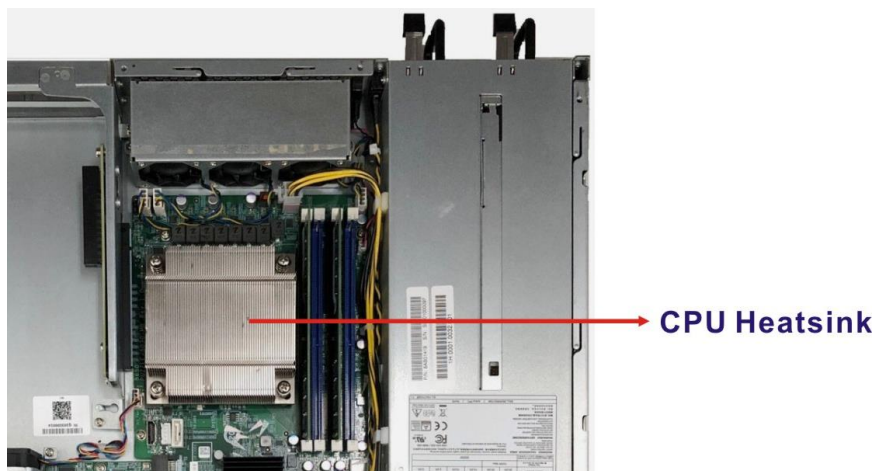
Figure 3-7: CPU Heatsink Installation

3.5 HDD Installation

The PUZZLE-5030 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-5030. 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.
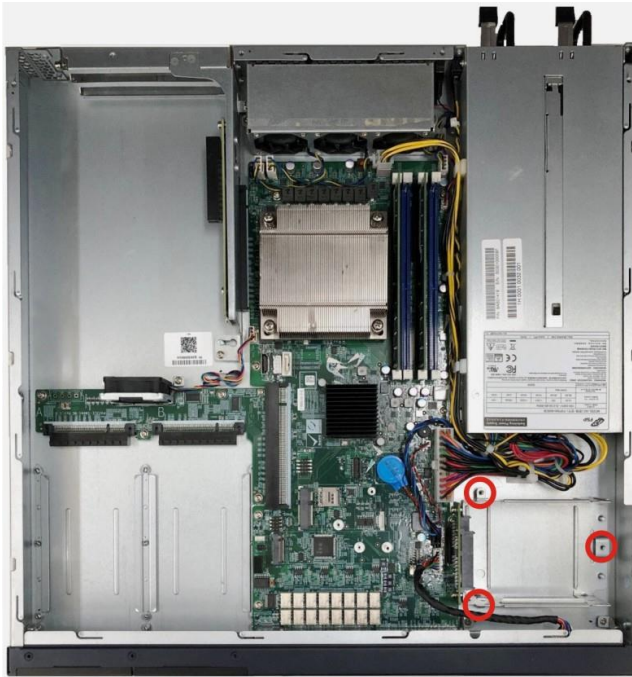
Figure 3-8: HDD Bracket Retention Screws

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 3-10**.

Figure 3-9: Secure HDD to the Bracket

Step 4: Re-connect the SATA connector module to the motherboard. Make sure the two positioning studs on the chassis go through the two small holes on the HDD bracket (**Figure 3-10**). Secure the bracket to the chassis with three screws removed previously.

Figure 3-10: HDD Installation

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

3.6 PCIe Expansion Card Installation

The PUZZLE-5030 allows installation of one PCIe x4 card and one PCIe x8 card. To install a PCIe expansion card, please follow the steps below.

Step 1: Remove the top cover from the PUZZLE-5030 (refer to **Section 3.2**).

Step 2: Remove the four expansion slot module retention screws indicated below.
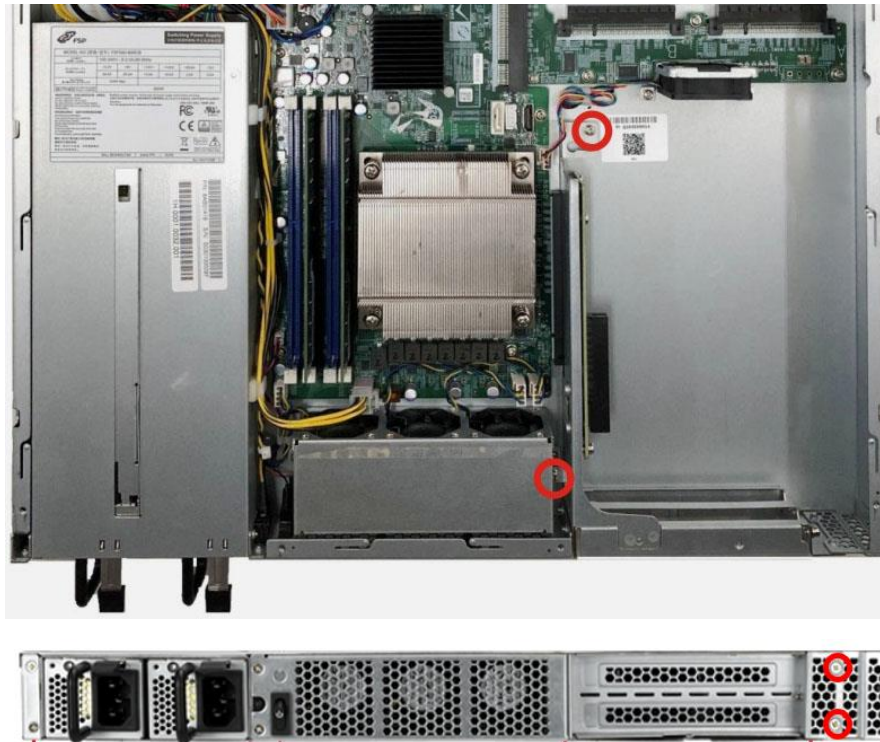
Figure 3-11: Expansion Slot Module Retention Screws

Step 3: Push the expansion slot module with strength to disconnect the module from the edge connector of the motherboard.
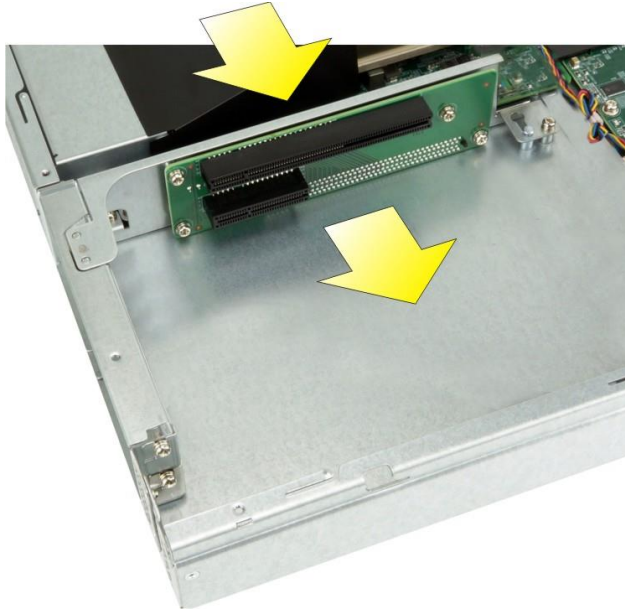
Figure 3-12: Disconnect the Expansion Slot Module

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

Figure 3-13: 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 3-14: 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 3-15 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.
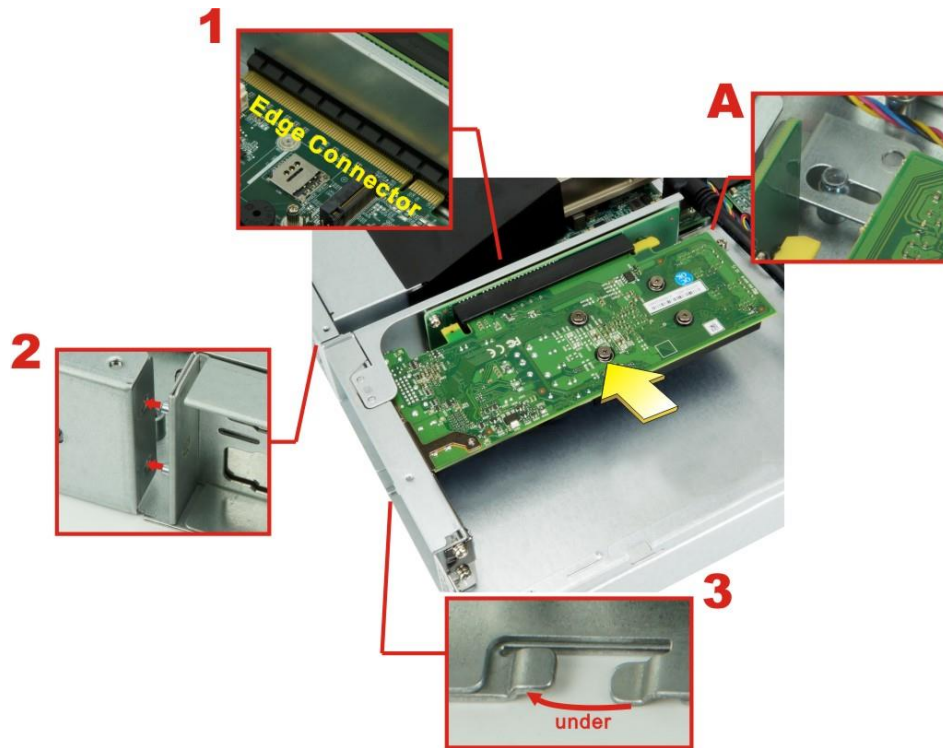
Figure 3-15: Expansion Slot Module Installation

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

removed.

3.7 IEI Networking Module Installation

The PUZZLE-5030 allows installation of two IEI PulM networking modules. To install a networking module, please follow the steps below.

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

Step 2: Remove the two thumbscrews indicated below to remove the slot cover. The Slot A supports 8 lanes from CPU (1 PCIe x8 or 2 PCIe x4); the Slot B supports 8 lanes from PCH (2 PCIe x4 or 4 PCIe x2). For pinouts of the Slot A/B, refer to **Section 5.2.21** and **Section 5.2.22**.

Figure 3-16: 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 thumbscrews on the 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 system 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 by the chassis structure.

Figure 3-17: Networking Module Installation

Step 4: Re-install the top cover.

3.8 M.2 Module Installation

The M.2 slot is keyed in the M position and provides mounting screw position for 2260-size/2280-size M.2 module. To install an M.2 module, please follow the steps below.

Step 1: Remove the top cover from the PUZZLE-5030. See **Section 3.2**.

Step 2: Locate the M.2 slot on the motherboard.
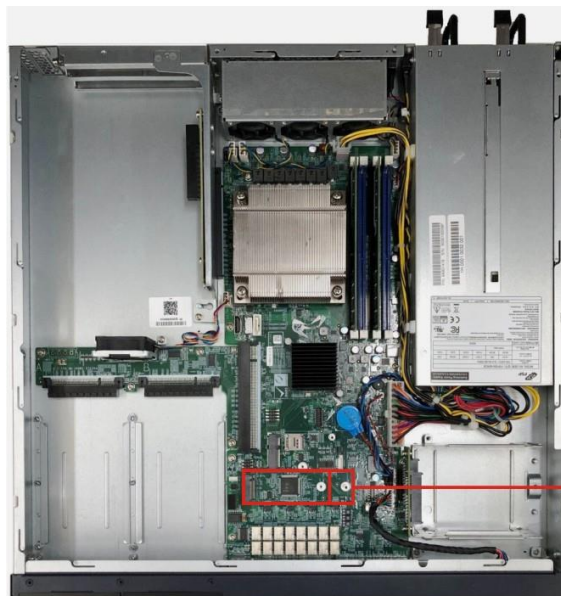
Step 3: Remove the on-board retention screw. **NOTE:** To install 2260-size module, remove both the screw and the standoff, and install the standoff into the screw hole for 2260-size module installation.

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.

3.9 PCIe Mini Card Installation

The PUZZLE-5030 has one full-size/half-size PCIe Mini slot on the motherboard. To install a full-size module, follow the instructions below.

Step 1: Remove the top cover from the PUZZLE-5030. See **Section 3.2**.

Step 2: Locate the PCIe Mini slot on the motherboard (Figure 3-18).

PCIe Mini Slot (Full-size or Half-size)
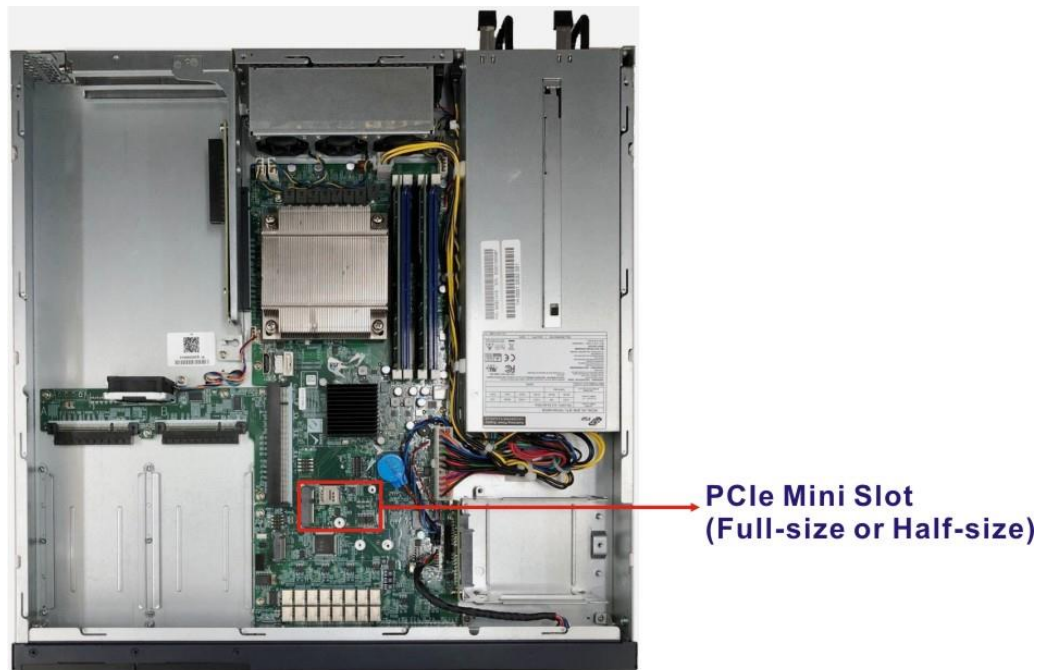
Figure 3-18: PCIe Mini Slot Location

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 PCIe Mini card into the socket at an angle of about 20º.

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

3.9.1 Half-size PCIe Mini Card Installation

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

Step 1: Remove the 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 PCIe Mini card.

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

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

3.10 2.5GbE LAN Connections

The 2.5GbE 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
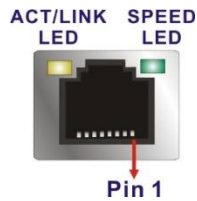
Figure 3-19: RJ-45 Ethernet Connector

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
On	Linked	Green	Maximum speed
Blinking	data is being sent/received	Orange	Lower speed

Table 3-2: RJ-45 Ethernet Connector LEDs

3.11 Bypass Configuration in BIOS

The PUZZLE-5030 has two pairs of LAN ports supporting bypass function, and some of IEI PuIM modules also support bypass. To enable/disable bypass function, configure the BIOS menu of the PUZZLE-5030 as described below.

Step 1: Go to **Advanced → NETWORK Configuration (Bypass Setting)**.

```
                          Aptio Setup - AMI
    Main   Advanced  Chipset   Security    Boot   Save & Exit

> CPU Configuration                               CPU Configuration
> Trusted Computing                               Parameters
> IT5571 H/M Monitor
> IT5571 Super IO Configuration                   ----------------------
> NETWROK Configuration(ByPass Setting)           →←: Select Screen
> Serial Port Console Redirection                 ↑↓: Select Item
> Network Stack Configuration                     Enter: Select
> NVMe Configuration                              +/-:  Change Opt.
                                                  F1:   General Help
                                                  F2:   Previous Values
                                                  F3:   Optimized
                                                  Defaults
                                                  F4:   Save & Exit
                                                  ESC: Exit

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```

Step 2: The **Network ByPass Setting** menu appears. The included three sections allow you to configure the bypass function of the LAN ports or the optional PuIM modules installed:

- Slot A section: setup the PuIM module installed in Slot A (optional)
- Slot B section: setup the PuIM module installed in Slot B (optional)
- Onboard LAN chip section: setup the 2 pairs of LAN ports on front panel

```
                          Aptio Setup - AMI
                   Chipset

NETWORK ByPass setting                               ByPass Mode Control by
                                                     Software
Slot_A Model Name              Not Installed
Power_ON ByPass Status         [Disabled]
Power_OFF ByPass Status        [Disabled]
Software Bypass Mode Control   [by BIOS]
Power_ON ByPass Mode           [Disabled]            ----------------------
Power_OFF ByPass Mode          [Disabled]
                                                     →←: Select Screen
                                                     ↑↓: Select Item
Slot_B Model Name              031F690-04-100-R      Enter: Select
Power_ON ByPass Status         [Disabled]            +/-:  Change Opt.
Power_OFF ByPass Status        [Disabled]            F1:   General Help
Software Bypass Mode Control   [by BIOS]             F2:   Previous Values
Power_ON ByPass Mode           [Disabled]            F3:   Optimized Defaults
Power_OFF ByPass Mode          [Disabled]            F4:   Save & Exit
                                                     ESC: Exit
Onboard LAN Chip               I225V
Power_ON ByPass Status         [Disabled]
Power_OFF ByPass Status        [Disabled]
Software Bypass Mode Control   [by BIOS]
Power_ON ByPass Mode           [Disabled]
Power_OFF ByPass Mode          [Disabled]

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```

Step 3: Configure the **Power_ON ByPass Mode** and the **Power_OFF ByPass Mode**

BIOS options to enable/disable bypass function of the 2-pair LAN ports and the

installed PulM modules.

PUZZLE	Power_ON ByPass Mode		Power_OFF ByPass Mode	
BIOS Setting	Disabled	Enabled	Disabled	Enabled
Bypass Function	Disable bypass when system on	Enable bypass when system on	Disable bypass when system off	Enable bypass when system off

Step 4: Press **F4** to save and exit the BIOS menu. The PUZZLE-5030 will reboot with

the new settings.

3.12 Console Connection

The PUZZLE-5030 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 standard D-sub 9 connector or a USB connector (varied from SKU) at the other end.

3.12.1 Enable Console Port When Booting

To configure the PUZZLE-5030 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-5030 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.
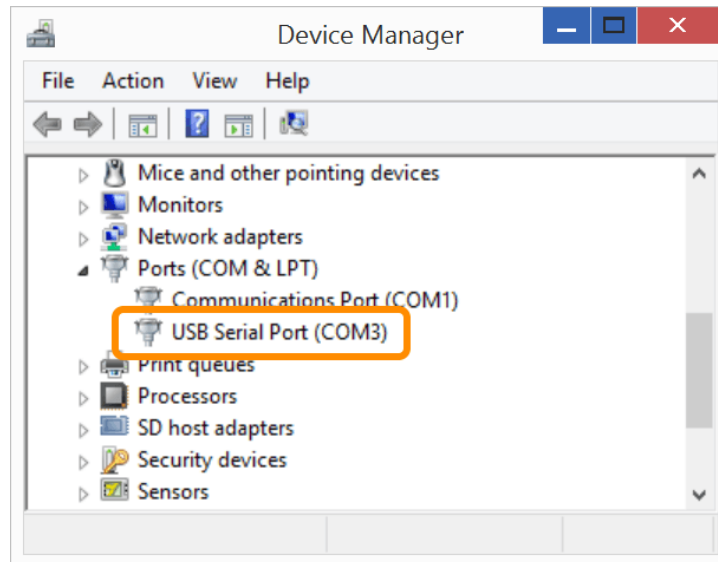
Step 3: Open a serial console application, PuTTY, as an example.

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

Step 5: Click "Open" on PuTTY.
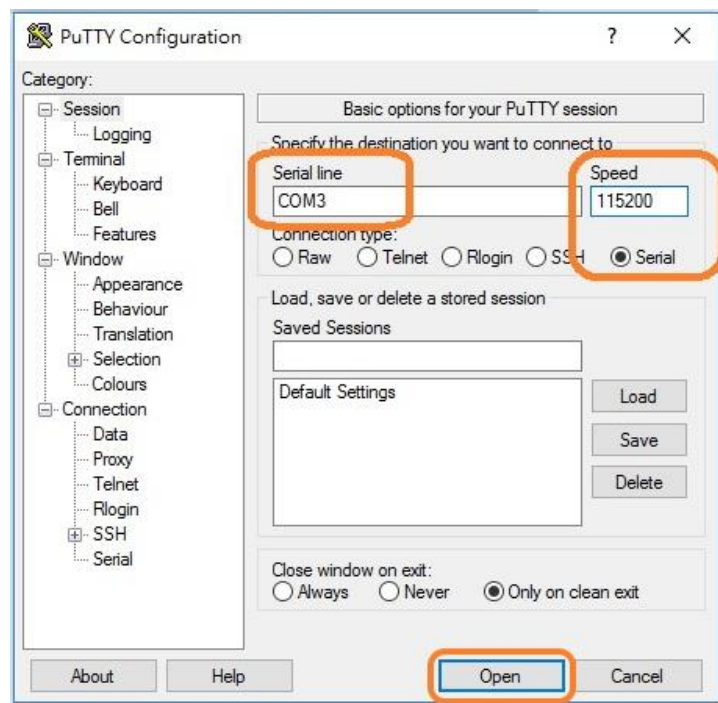
Step 6: Enter the following command:

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

3.13 Rack Mount

The PUZZLE-5030 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-5030 into a rack, please follow the steps below.

![WARNING icon] **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-5030 by inserting three retention screws (M4*6) into each bracket (**Figure 3-20**). Make sure the screws are tight and on the right positions.
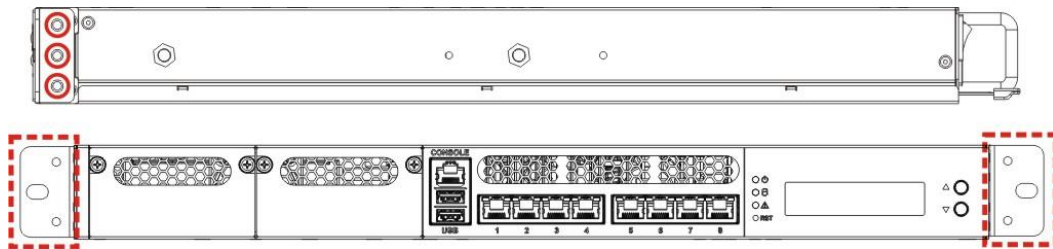
Figure 3-20: Rack Mount Bracket Installation

Step 2: Install the sliding rails according to the instruction came with the sliding rails.

Note: The sliding rails must be purchased separately.

Step 3: Slide the PUZZLE-5030 all the way into the rack enclosure.

Step 4: Secure the front of the rack mount brackets that are attached to the sides of the PUZZLE-5030 to the front of the rack.

3.14 Power-On Procedure

![warning icon] **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-5030 please follow the steps below:

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

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

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.

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

Username: puzzle

Password: admin

Figure 3-21: Power-on

3.15 Available Drivers

All the drivers for the PUZZLE-5030 are available on IEI Resource Download Center (https://download.ieiworld.com). Type PUZZLE-5030 and press Enter to find all the relevant software, utilities, and documentation.
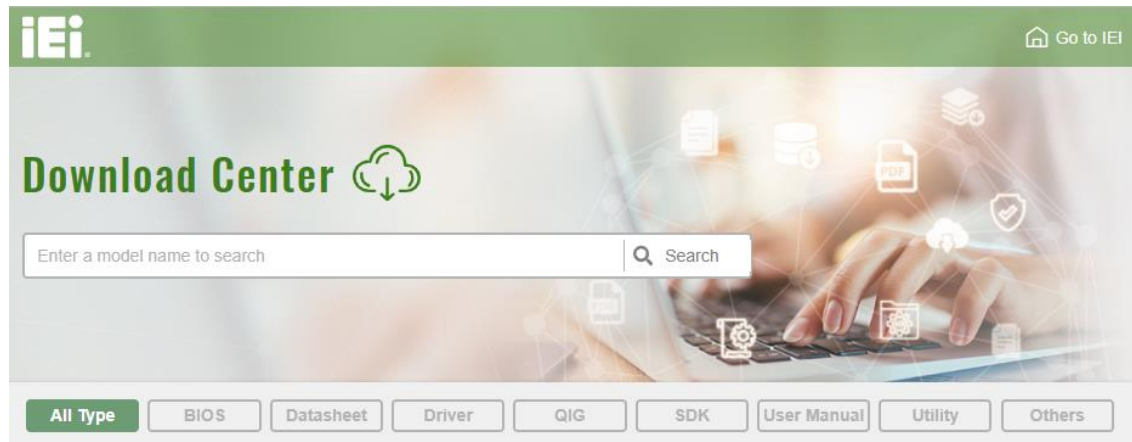
Figure 3-22: IEI Resource Download Center

![NOTE icon] **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.

3.15.1 Driver Download

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

Step 1:   Go to https://download.ieiworld.com. Type PUZZLE-5030 and press Enter.
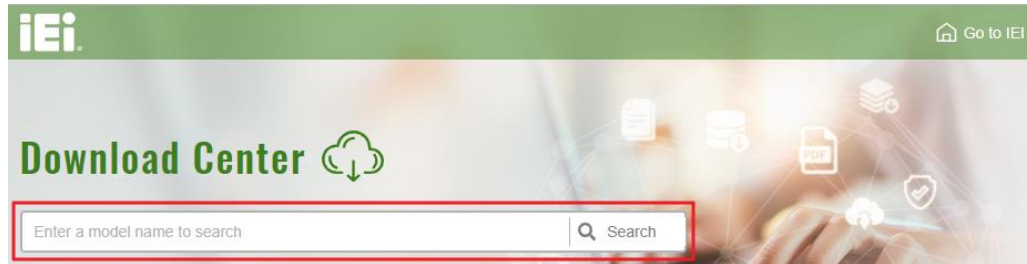
Step 2:   All product-related software, utilities, and documentation will be listed. You can choose **Driver** to filter the result.
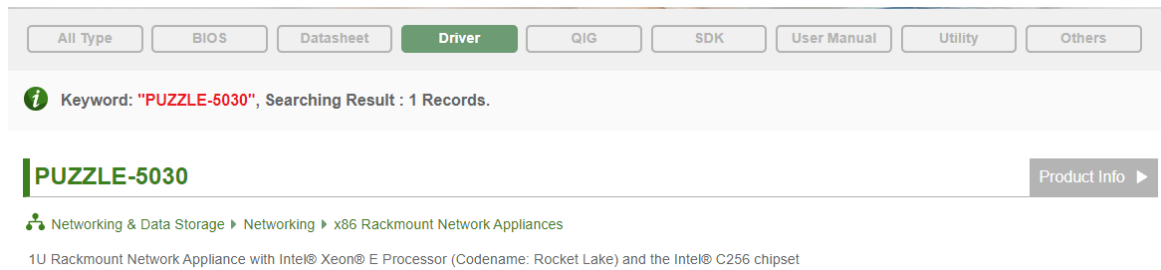
Step 3:   Click the driver file name on the page and you will be prompted with the following window. You can download the entire ISO file (❶), or double click an individual item to find its driver file and click the file name to download (❷).
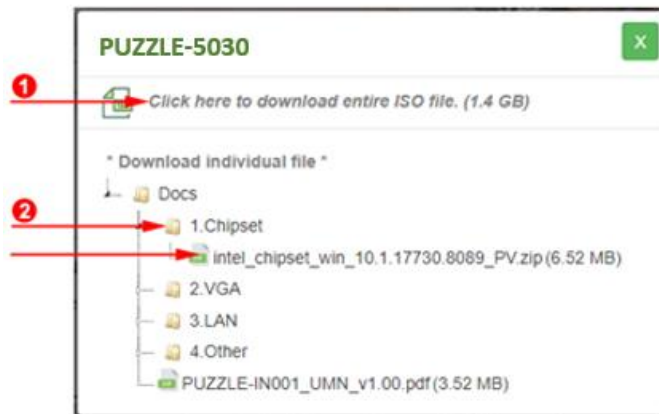
3.16 Maintenance

![WARNING icon] **WARNING:**

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

Before starting, please ensure that you turn off the PUZZLE-5030, 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**.

3.16.1 Power Supply Unit Replacement

The two power supply unites (PSU) of the PUZZLE-5030 series are hot-swappable, which means users can replace the PSU when the system is up and running. To replace a failed power supply unit, please follow the steps below.

Step 1: Firmly press and hold the black button on back of PSU downwards. Pull out power supply by pulling the black handle.
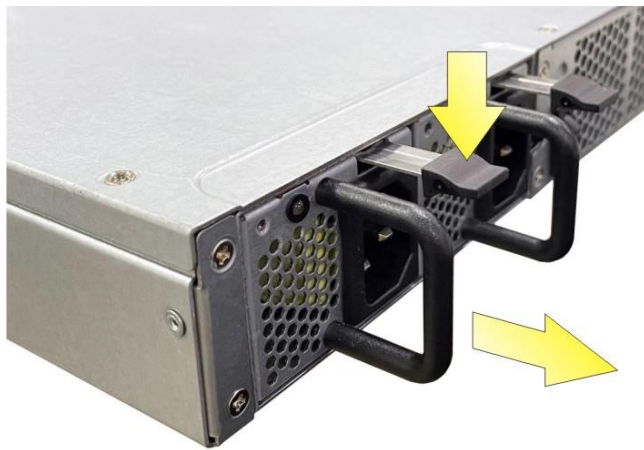
Step 2: Insert new power supply into the PUZZLE-5030.
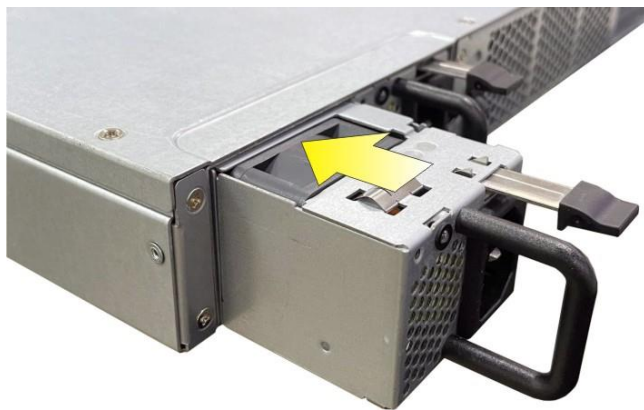
Step 3: Connect the power cord to the PUZZLE-5030.

Step 4: Power on the system.

3.16.2 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.

3.16.2.1 AT/ATX Mode Selection

AT and ATX power modes can both be used on the PUZZLE-5030. The selection is made through an AT/ATX switch on the motherboard. The system is set to ATX mode by default. The switch location is shown in **Figure 3-23** below.

Setting	Description
Short A-B	ATX power mode (default)
Short B-C	AT power mode

Table 3-4: AT/ATX Mode Switch Settings
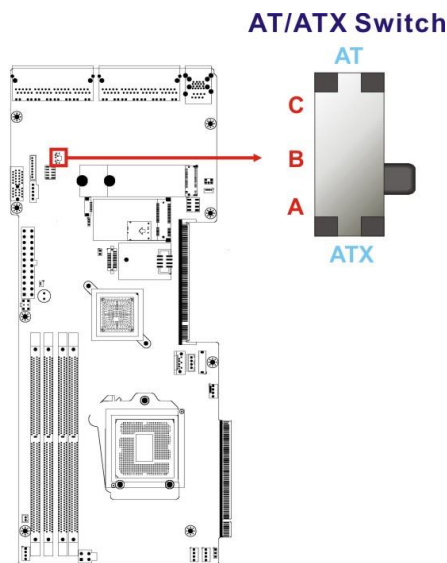
Figure 3-23: AT/ATX Mode Switch Location

3.16.2.2 Clear CMOS

If the PUZZLE-5030 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 3-24** below.
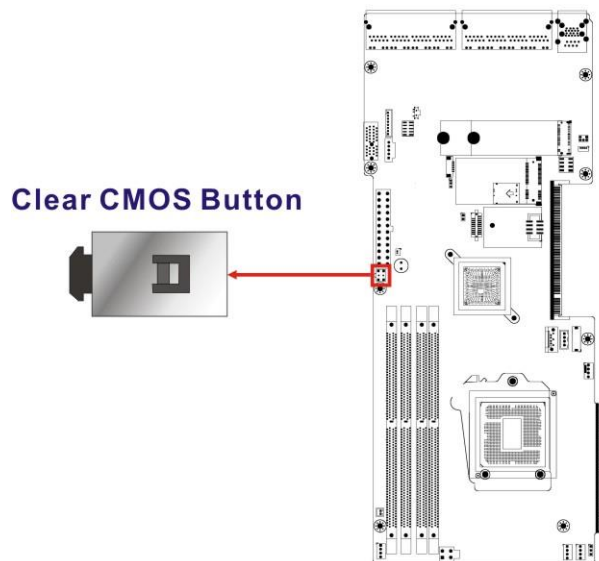
Figure 3-24: Clear CMOS Button Location

3.16.2.3 BIOS Update Selection

The PUZZLE-5030 equips with dual SPI ROM. The BIOS Update Selection jumper (J_BIOS1) allows users to select a SPI ROM to update BIOS with external programmer via SPI flash connector (JSPI1). Refer to **Figure 3-25** and **Table 3-5** for the jumper location and settings.

Setting	Description
Short 1-2	Update BIOS1: Z736ARXX.R01 (default)
Short 2-3	Update BIOS2: Z736ARXX.R02

Table 3-5: BIOS Update Selection Jumper Settings
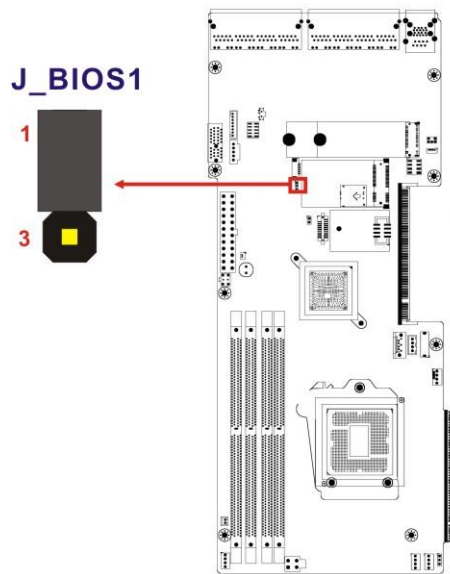
Figure 3-25: BIOS Update Selection Jumper Location

3.16.2.4 Flash Descriptor Security Override Jumper

The Flash Descriptor Security Override jumper (ME_FLASH1) allows users to enable or disable the ME firmware update. Refer to **Figure 3-26** and **Table 3-6** for the jumper location and settings.

Setting	Description
Open	Disabled (default)
Short	Enabled

Table 3-6: Flash Descriptor Security Override Jumper Settings
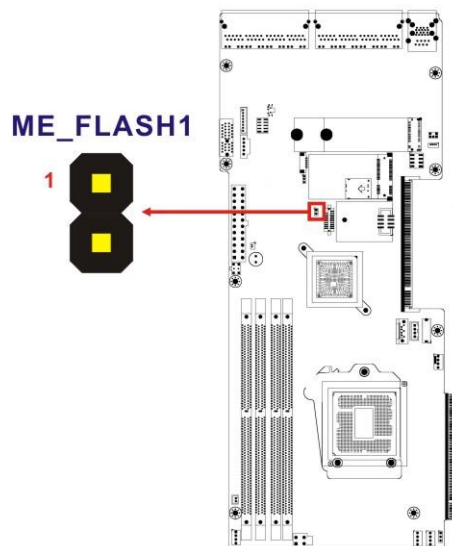
Figure 3-26: Flash Descriptor Security Override Jumper Location

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 – AMI
    Main    Advanced   Chipset   Security    Boot   Save & Exit

 BIOS Information                                          Set the Date. Use Tab
 BIOS Vendor                      American Megatrends      to switch between
 Core Version                     5.22                     Date elements.
 Compliancy                       UEFI 2.8; PI 1.7
 Project Version                  Z736AR10.R02
 Build Date and Time              07/13/2022 16:11:05

 EC Version                       Z736R10a.bin

 Processor Information
 Name                             RocketLake DT
 Type                             Intel(R) Xeon(R)
                                  E-2378G CPU @ 2.80GHz
 Speed                            2800 MHz
 ID                               0xA0671
 Stepping                         B0
 Number of Processors             8Core(s)/16Thread(s)
 Microcode Revision               54
 GT Info                          0x4c9A

 Memory RC Version                0.4.97.128
 Total Memory                     16384 MB
 Memory Frequency                 3200 MHz

 PCH Information                                           ---------------------
 Name                             TGL PCH-H
 PCH SKU                          H C256                   →←: Select Screen
 Stepping                         B1                       ↑↓: Select Item
                                                           Enter: Select
 Dual Output Fast Read            Supported                +/-:  Change Opt.
 Support                                                   F1:  General Help
 Read ID/Status Clock Freq        25 MHz                   F2:  Previous Values
 Write and Erase Clock Freq       25 MHz                   F3:  Optimized
 Fast Read Clock Freq             25 MHz                   Defaults
                                                           F4:  Save & Exit
 ME FW Version                    6.0.3.39                 ESC: Exit

 System Date                      [Thu 01/01/2018]
 System Time                      [01:10:27]

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```

BIOS Menu 1: Main

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

➔ **System Date [xx/xx/xx]**

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

➔ **System Time [xx:xx:xx]**

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

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 – AMI
   Main    Advanced  Chipset  Security   Boot   Save & Exit

 > CPU Configuration                              CPU Configuration
 > Trusted Computing                              Parameters
 > IT5571 H/M Monitor
 > IT5571 Super IO Configuration                  ----------------------
 > NETWROK Configuration(ByPass Setting)          →←: Select Screen
 > Serial Port Console Redirection                ↑↓: Select Item
 > Network Stack Configuration                    Enter: Select
 > NVMe Configuration                             +/-:  Change Opt.
                                                  F1:  General Help
                                                  F2:  Previous Values
                                                  F3:  Optimized
                                                  Defaults
                                                  F4:  Save & Exit
                                                  ESC: Exit
              Version 2.22.1282 Copyright (C) 2022 AMI
```

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.

```
                           Aptio Setup - AMI
       Advanced

CPU Configuration                                    When enabled, a VMM
                                                     can utilize the
Type                           Intel(R) Xeon(R)      additional hardware
                               E-2378G CPU @ 2.80GHz capabilities provided
ID                             0xA0671               by Vanderpool
Speed                          2800 MHz              Technology.
L1 Data Cache                  48 KB x 8
L1 Instruction Cache           32 KB x 8
L2 Cache                       512 KB x 8
L3 Cache                       16 MB
L4 Cache                       N/A                   ----------------------
VMX                            Supported             →←: Select Screen
SMX/TXT                        Supported             ↑ ↓: Select Item
                                                     Enter: Select
Intel (VMX) Virtualization     [Enabled]            +/-: Change Opt.
Technology                                           F1:  General Help
Active Processor Cores         [All]                 F2:  Previous Values
Intel Trusted Execution        [Disabled]            F3:  Optimized
Technology                                           Defaults
                                                     F4:  Save & Exit
                                                     ESC: Exit
             Version 2.22.1282 Copyright (C) 2022 AMI
```

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**   D**EFAULT**   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**   Enable four cores in the processor package.

➔ **5**   Enable five cores in the processor package.

➔ **6**   Enable six cores in the processor package.

➔ **7**   Enable seven cores in the processor package.

➔ **Intel Trusted Execution Technology [Disabled]**

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

➔ **Disabled**   D**EFAULT**   Disable Intel® Trusted Execution Technology

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

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 – AMI
        Advanced

Configuration                                          Enables or Disables
  Security Device Support        [Disable]             BIOS support for
  NO Security Device Found                             security 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 2.22.1282 Copyright (C) 2022 AMI
```
      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 IT5571 H/W Monitor

The **IT5571 H/W Monitor** menu (**BIOS Menu 5**) contains the fan configuration submenu, and displays the system temperature and CPU fan speed.

```
                         Aptio Setup – AMI
       Advanced

PC Health Status                                    Smart Fan Mode Select

CPU temperature                 :+78 °C
                                                    --------------------
SYS_FAN1 Speed                  :4558 RPM           →←: Select Screen
SYS_FAN2 Speed                  :8229 RPM           ↑↓: Select Item
SYS_FAN3 Speed                  :8229 RPM           Enter: Select
SYS_FAN4 Speed                  :7927 RPM           +/-:  Change Opt.
                                                    F1:  General Help
+5V                             :+4.868 V           F2:  Previous Values
+12V                            :+11.838 V          F3:  Optimized
+5VSB                           :+4.853 V           Defaults
+3.3V                           :+3.187 V           F4:  Save & Exit
+3.3VSB                         :+3.248 V           ESC: Exit

> Smart Fan Mode Configuration

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```

BIOS Menu 5: IT5571 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

- Fan Speeds:
    - System Fan Speed

- Voltages:
    - +5V
    - +12V
    - +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 system fan temperature and speed settings.

```
                           Aptio Setup - AMI
        Advanced

Smart Fan Mode Configuration                      Smart Fan Mode Select

SYS_FAN1 Smart Fan Control        [Auto Mode]
Auto mode fan start temperature   60              --------------------
Auto mode fan off temperature     40              →←: Select Screen
Auto mode fan start PWM           30              ↑ ↓: Select Item
Auto mode fan slope PWM           2               Enter: Select
                                                  +/-:  Change Opt.
SYS_FAN2 Smart Fan Control        [Auto Mode]     F1:   General Help
Auto mode fan start temperature   65              F2:   Previous Values
Auto mode fan off temperature     50              F3:   Optimized
Auto mode fan start PWM           40              Defaults
Auto mode fan slope PWM           2               F4:   Save & Exit
                                                  ESC: Exit
                Version 2.22.1282 Copyright (C) 2022 AMI
```

BIOS Menu 6: Smart Fan Mode Configuration

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

Use the **SYS_FAN Smart Fan Control** options to configure the System 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 SYS_FAN Smart Fan Control option is set to Auto Mode.

➔ **Auto mode fan start temperature**

If the system 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 system 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 IT5571 Super IO Configuration

Use the **IT5571 Super IO Configuration** menu (**BIOS Menu 7**) to set or change the configurations for the serial port.

```
                          Aptio Setup – AMI
        Advanced

Super IO Configuration                              Set Parameters of
                                                    Serial Port 1 (COMA)
Super IO Chip                    IT5571
> Serial Port 1 Configuration                       ---------------------
                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-:  Change Opt.
                                                    F1:  General Help
                                                    F2:  Previous Values
                                                    F3:  Optimized
                                                    Defaults
                                                    F4:  Save & Exit
                                                    ESC: Exit
              Version 2.22.1282 Copyright (C) 2022 AMI
```
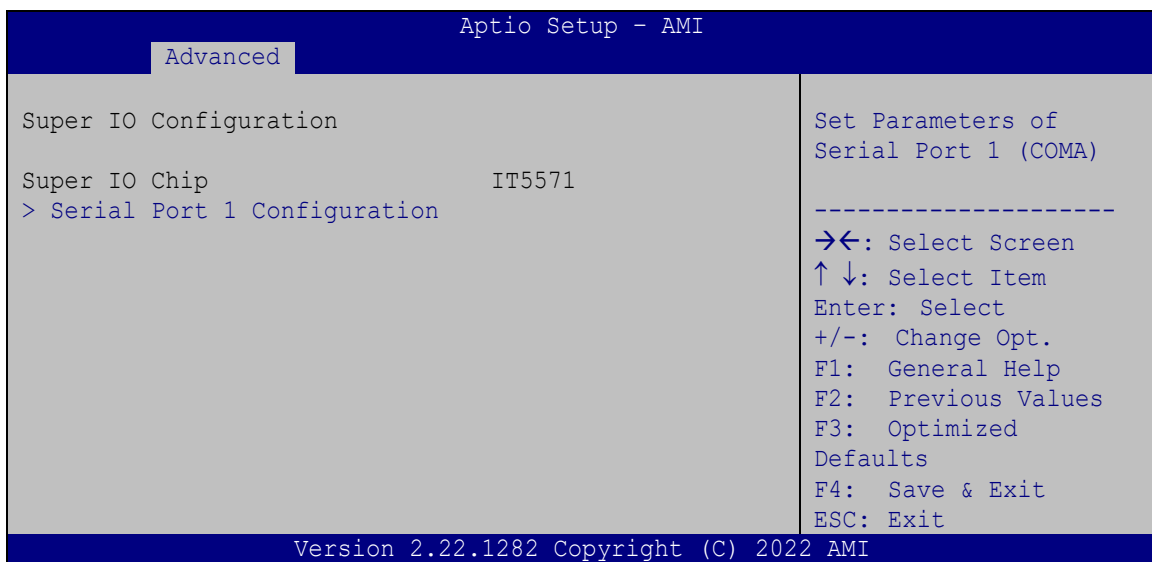
BIOS Menu 7: IT5571 Super IO Configuration

4.3.4.1 Serial Port 1 Configuration

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

```
                            Aptio Setup – AMI
        Advanced

Serial Port n Configuration                         Enable or Disable
                                                    Serial Port (COM)
Serial Port                     [Enabled]
Device Settings                 IO=3F8h; IRQ=4
                                                    ---------------------
                                                    →←: Select Screen
                                                    ↑ ↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1:  General Help
                                                    F2:  Previous Values
                                                    F3:  Optimized
                                                    Defaults
                                                    F4:  Save & Exit
                                                    ESC: Exit
                    Version 2.22.1282 Copyright (C) 2022 AMI
```
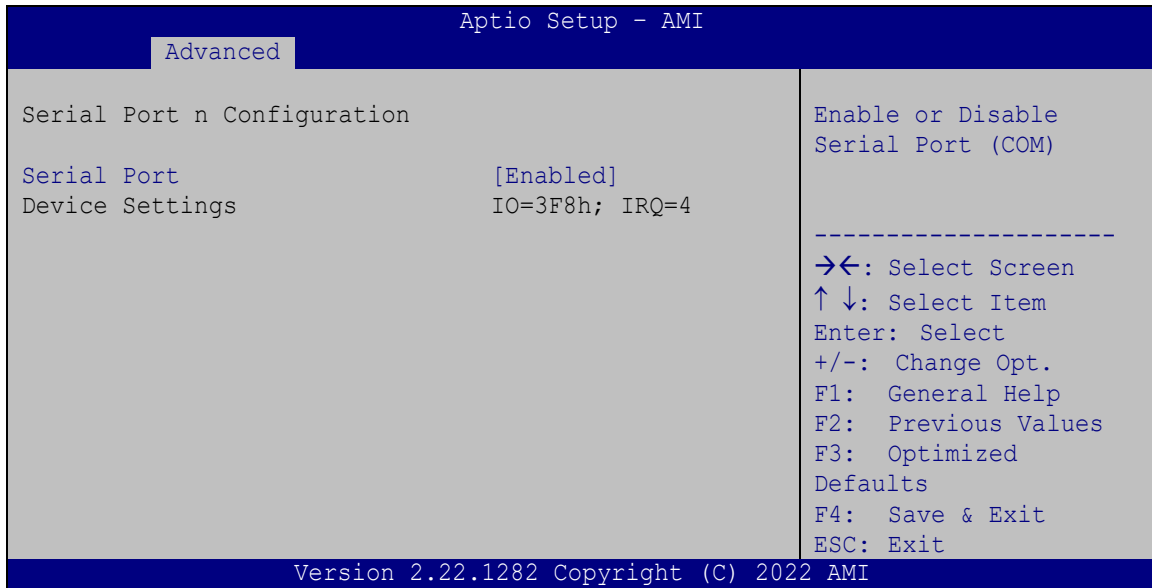
BIOS Menu 8: Serial Port 1 Configuration Menu

➔ **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 NETWROK Configuration(ByPass Setting)

Use the **Network Configuration (Bypass Setting)** menu (**BIOS Menu 9**) to configure the bypass settings of the IEI networking module slots.

```
                              Aptio Setup - AMI
                 Chipset

 NETWORK ByPass setting                                    ByPass Mode Control by
                                                           Software
 Slot_A Model Name                 Not Installed
 Power_ON ByPass Status             [Disabled]
 Power_OFF ByPass Status            [Disabled]
 Software Bypass Mode Control       [by BIOS]
 Power_ON ByPass Mode               [Disabled]             ----------------------
 Power_OFF ByPass Mode              [Disabled]             →←: Select Screen
                                                           ↑ ↓: Select Item
 Slot_B Model Name                 031F690-04-100-R        Enter: Select
 Power ON ByPass Status             [Disabled]             +/-:  Change Opt.
 Power_OFF ByPass Status            [Disabled]             F1:  General Help
 Software Bypass Mode Control       [by BIOS]              F2:  Previous Values
 Power_ON ByPass Mode               [Disabled]             F3:  Optimized Defaults
 Power_OFF ByPass Mode              [Disabled]             F4:  Save & Exit
                                                           ESC: Exit
 Onboard LAN Chip                  I225V
 Power_ON ByPass Status             [Disabled]
 Power_OFF ByPass Status            [Disabled]
 Software Bypass Mode Control       [by BIOS]
 Power_ON ByPass Mode               [Disabled]
 Power_OFF ByPass Mode              [Disabled]

                  Version 2.22.1282 Copyright (C) 2022 AMI
```

BIOS Menu 9: Network Configuration (Bypass Setting)

➔ **Software Bypass Mode Control [by BIOS]**

Use the **Software Bypass Mode Control** option to configure how to control bypass function of the installed PulM module.

➔ **by Software**   Configure bypass function by software.

➔ **by BIOS**   DEFAULT   Configure bypass function by BIOS options.

➔ **Power_ON ByPass Mode [Disabled]**

Use the **Power_ON ByPass Mode** option to enable or disable bypass function of the installed PulM module when the PUZZLE-5030 is on.

➔ **Disabled** DEFAULT Bypass is disabled when the system is on.

➔ **Enabled** Bypass is enabled when the system is on.

➔ **Power_OFF ByPass Mode [Disabled]**

Use the **Power_OFF ByPass Mode** option to enable or disable bypass function of the installed PulM module when the PUZZLE-5030 is off.

➔ **Disabled** DEFAULT Bypass is disabled when the system is off.

➔ **Enabled** Bypass is enabled when the system is off.

4.3.6 Serial Port Console Redirection

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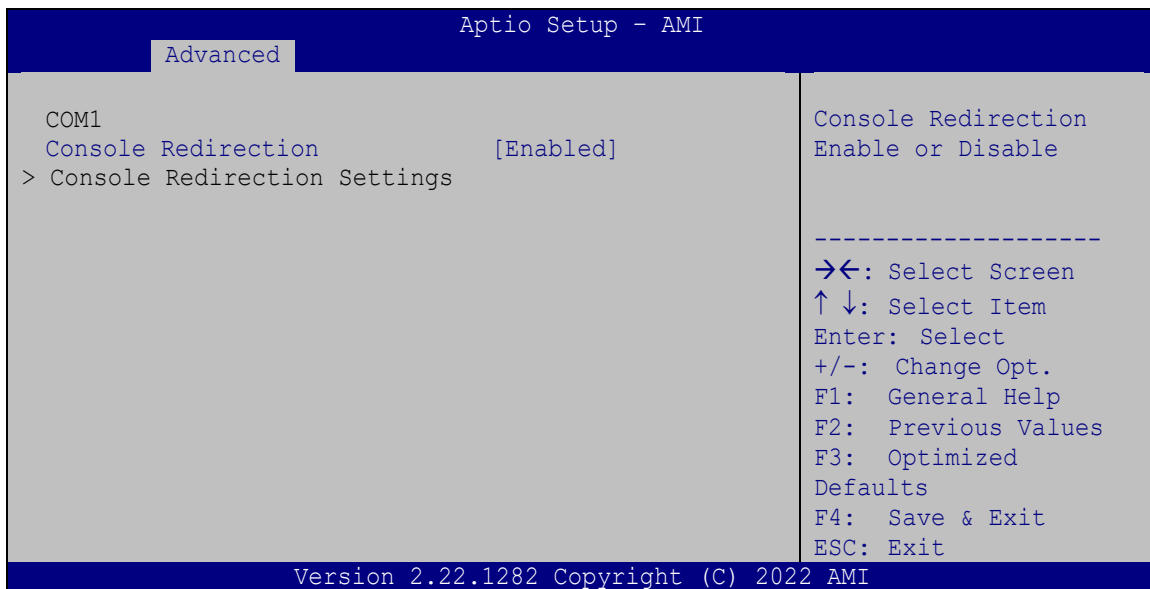
```
                        Aptio Setup – AMI
        Advanced

 COM1                                         Console Redirection
 Console Redirection          [Enabled]       Enable or Disable
> Console Redirection Settings

                                              --------------------
                                              →←: Select Screen
                                              ↑ ↓: Select Item
                                              Enter: Select
                                              +/-:  Change Opt.
                                              F1:  General Help
                                              F2:  Previous Values
                                              F3:  Optimized
                                              Defaults
                                              F4:  Save & Exit
                                              ESC: Exit
            Version 2.22.1282 Copyright (C) 2022 AMI
```
BIOS Menu 10: 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.

4.3.7 Network Stack Configuration

Use the **Network Stack Configuration** menu (**BIOS Menu 11**) to enable or disable UEFI network stack.

```
                         Aptio Setup – AMI
         Advanced

Network Stack                      [Disabled]         Enable/Disable UEFI
                                                      Network Stack

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

                 Version 2.22.1282 Copyright (C) 2022 AMI
```
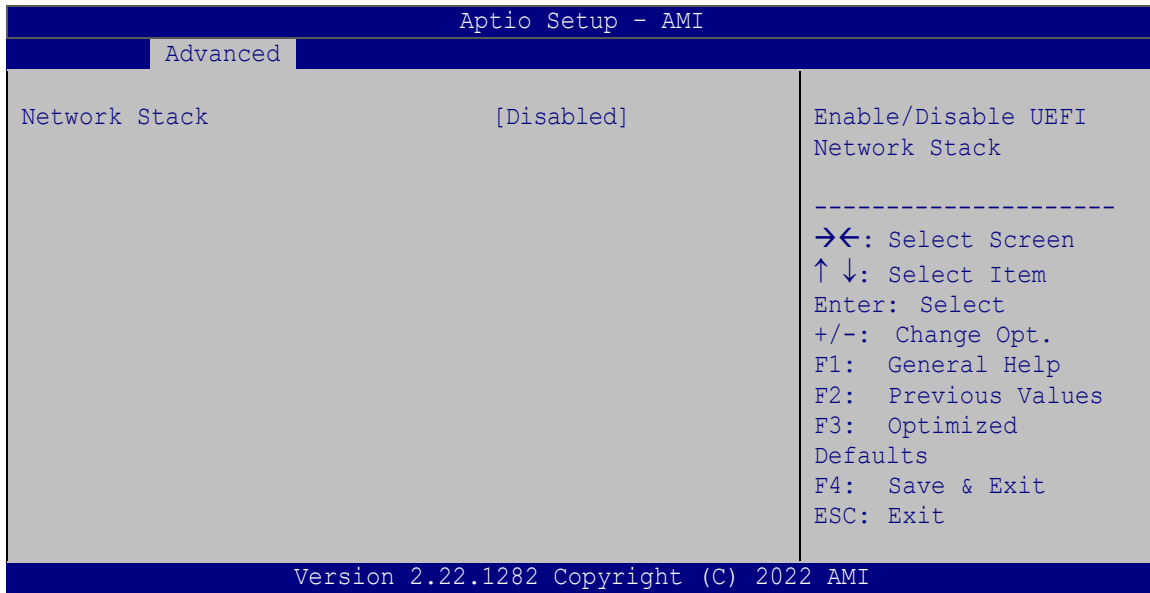
BIOS Menu 11: Network Stack Configuration

➔ **Network Stack [Disabled]**

Use the **Network Stack** option to enable or disable UEFI network stack.

➔ **Disabled** DEFAULT UEFI network stack is disabled.

➔ **Enabled** UEFI network stack is enabled.

4.3.8 NVMe Configuration

Use the **NVMe Configuration** (**BIOS Menu 12**) menu to display the NVMe controller and device information.

```
                            Aptio Setup - AMI
        Advanced

NVMe Configuration

No NVMe Device Found


                                              ---------------------
                                              →←: Select Screen
                                              ↑↓: Select Item
                                              Enter: Select
                                              +/-:  Change Opt.
                                              F1:   General Help
                                              F2:   Previous Values
                                              F3:   Optimized
                                              Defaults
                                              F4:   Save & Exit
                                              ESC: Exit
                      Version 2.22.1282 Copyright (C) 2022 AMI
```
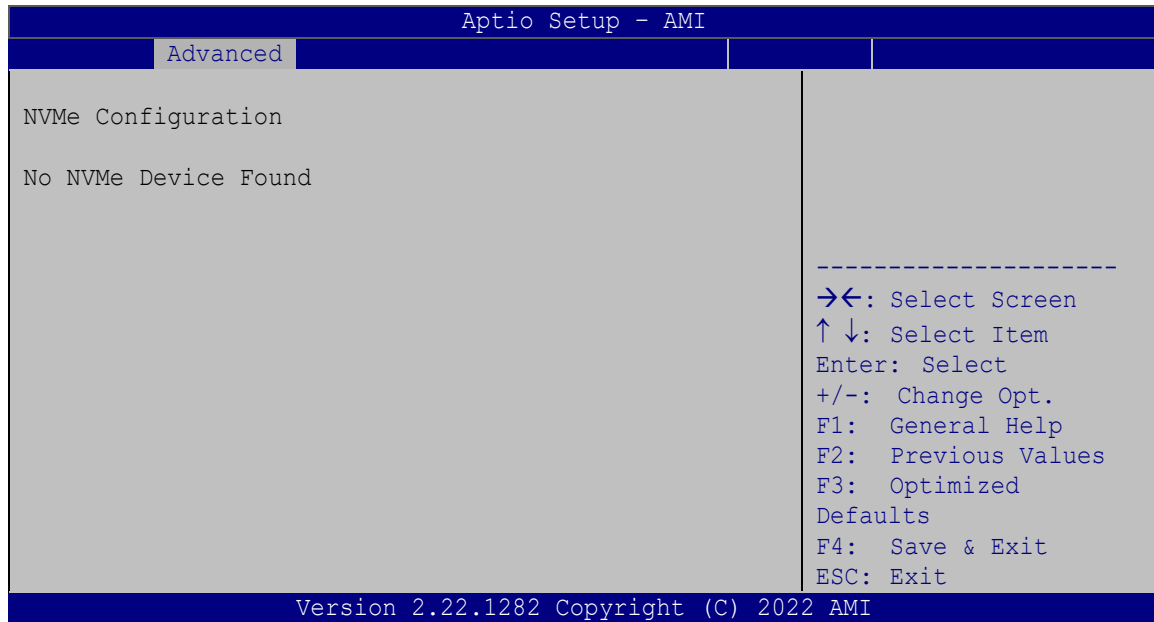
BIOS Menu 12: NVMe Configuration

4.4 Chipset

Use the **Chipset** menu (**BIOS Menu 13**) 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 – AMI
    Main    Advanced   Chipset   Security    Boot   Save & Exit

 > System Agent (SA) Configuration                 System Agent (SA)
 > PCH-IO Configuration                            Parameters

                                                   --------------------
                                                   →←: Select Screen
                                                   ↑ ↓: Select Item
                                                   Enter: Select
                                                   +/-:  Change Opt.
                                                   F1:   General Help
                                                   F2:   Previous Values
                                                   F3:   Optimized
                                                   Defaults
                                                   F4:   Save & Exit
                                                   ESC: Exit
                 Version 2.22.1282 Copyright (C) 2022 AMI
```
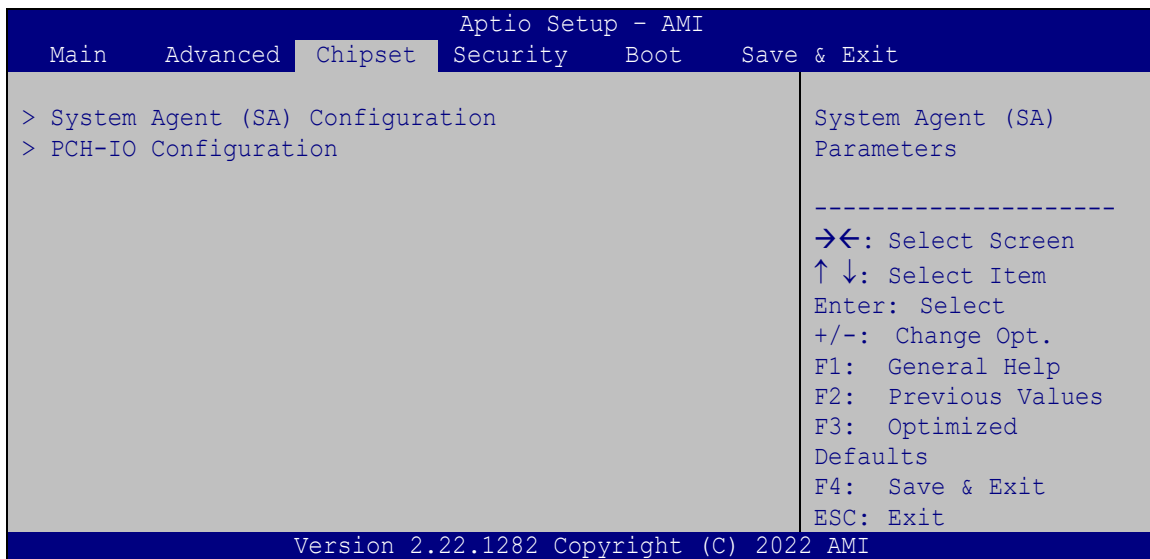
BIOS Menu 13: Chipset

4.4.1 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 14**) to configure the System Agent (SA) parameters.

```
                        Aptio Setup - AMI
          Chipset

System Agent (SA) Configuration                     VT-d capability

VT-d                            Supported
VT-d                            [Enabled]           --------------------
                                                    →←: Select Screen
> Memory Configuration                              ↑ ↓: Select Item
> Graphics Configuration                            Enter: Select
                                                    +/-:  Change Opt.
                                                    F1:  General Help
                                                    F2:  Previous Values
                                                    F3:  Optimized
                                                    Defaults
                                                    F4:  Save & Exit
                                                    ESC: Exit
               Version 2.22.1282 Copyright (C) 2022 AMI
```
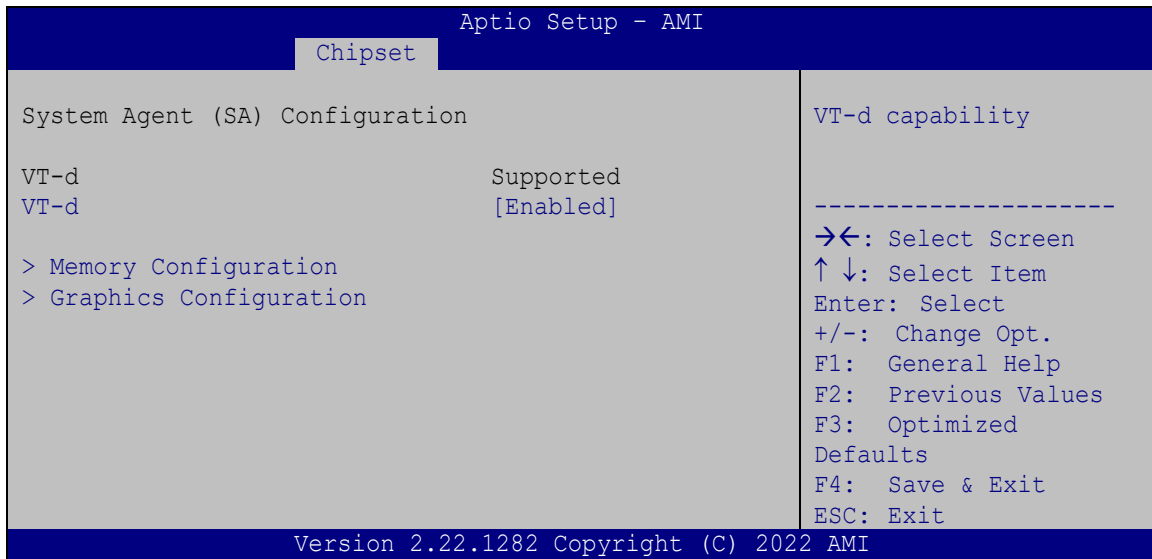
BIOS Menu 14: System Agent (SA) Configuration

➔ **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 15**) to view memory information.

```
                        Aptio Setup – AMI
           Chipset

Memory Configuration

DIMM_A1                        Populated & Enabled
   Size                        8192 MB (DDR4)      --------------------
   Number of Ranks             1                   →←: Select Screen
   Manufacturer                Transcend           ↑↓: Select Item
DIMM_A2                        Not Populated/Disabled  Enter: Select
DIMM_B1                        Populated & Enabled  +/-: Change Opt.
   Size                        8192 MB (DDR4)      F1: General Help
   Number of Ranks             1                   F2: Previous Values
   Manufacturer                Transcend           F3: Optimized
DIMM_B2                        Not Populated/Disabled  Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit

              Version 2.22.1282 Copyright (C) 2022 AMI
```

BIOS Menu 15: Memory Configuration

4.4.1.2 Graphics Configuration

Use the **Graphics Configuration** (**BIOS Menu 16**) menu to configure the video device connected to the system.

```
                        Aptio Setup – AMI
           Chipset

Graphics Configuration                             Select DVMT 5.0 Pre-
                                                   Allocated (Fixed)
DVMT Pre-Allocated            [64M]                Graphics Memory Size
DVMT Total Gfx Mem            [MAX]                used by the Internal
                                                   Graphics Device.
                                                   --------------------
                                                   →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized
                                                   Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit

              Version 2.22.1282 Copyright (C) 2022 AMI
```
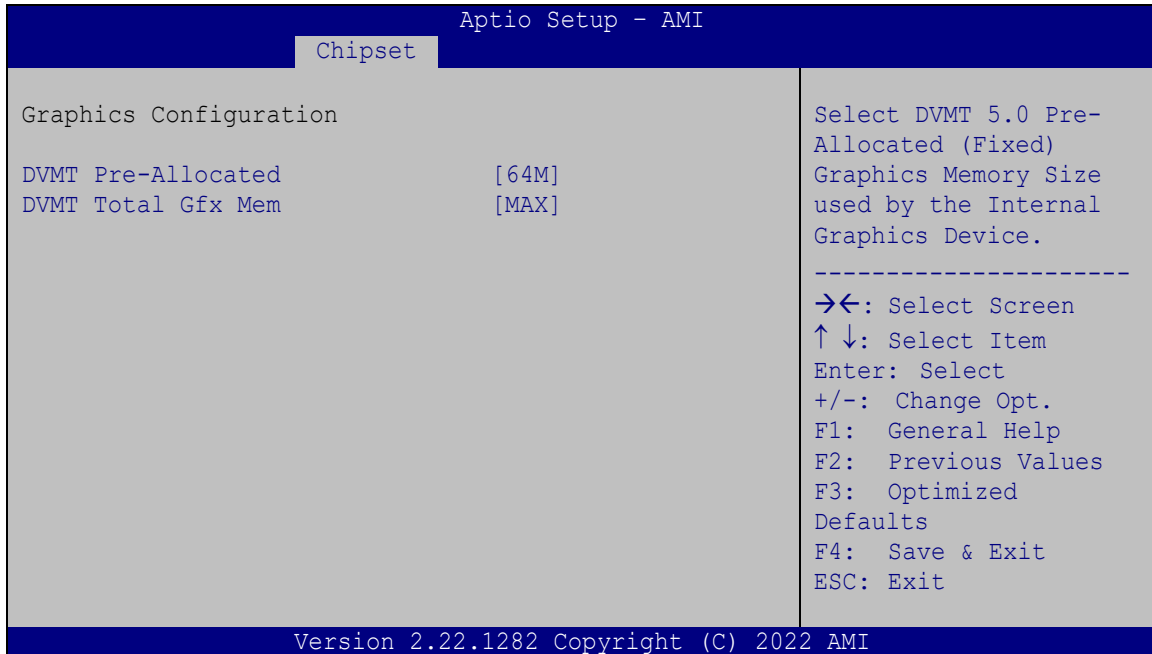
BIOS Menu 16: Graphics Configuration

➔ **DVMT Pre-Allocated [64M]**

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**

4.4.2 PCH-IO Configuration

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

```
                          Aptio Setup – AMI
           Chipset

PCH-IO Configuration                                     Select AC power state
                                                         when power is re-
Auto Power Button Status          [Enable (AT)]          applied after a power
Restore AC Power Loss             [Last State]           failure.

> PCI Express Configuration                              --------------------
> SATA And RST Configuration                             →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-:  Change Opt.
                                                         F1:  General Help
                                                         F2:  Previous Values
                                                         F3:  Optimized
                                                         Defaults
                                                         F4:  Save & Exit
                                                         ESC: Exit

                Version 2.22.1282 Copyright (C) 2022 AMI
```

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 PCI Express Configuration

Use the **PCI Express Configuration** menu (**BIOS Menu 18**) to configure the PCI Express slot.

```
                        Aptio Setup – AMI
        Chipset

PCI Express Configuration                        PCI Express Root Port
                                                 Settings.
> M2_SSD1
> MPCIE1                                         ---------------------
                                                 →←: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-:  Change Opt.
                                                 F1:   General Help
                                                 F2:   Previous Values
                                                 F3:   Optimized
                                                 Defaults
                                                 F4:   Save & Exit
                                                 ESC: Exit

            Version 2.22.1282 Copyright (C) 2022 AMI
```
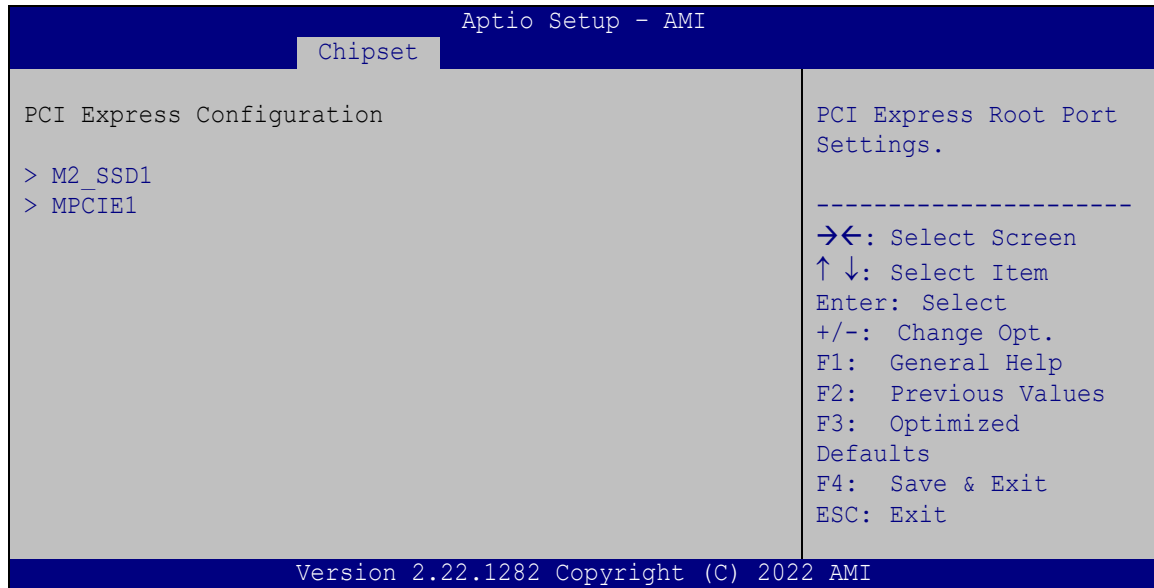
BIOS Menu 18: PCI Express Configuration

4.4.2.1.1 M2_SSD1 / MPCIE1

```
                              Aptio Setup – AMI
            Chipset

PCIe Speed                      [Auto]                    Control the PCI
Detect Non-Compliance Device    [Disabled]                Express Root Port.

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

            Version 2.22.1282 Copyright (C) 2022 AMI
```
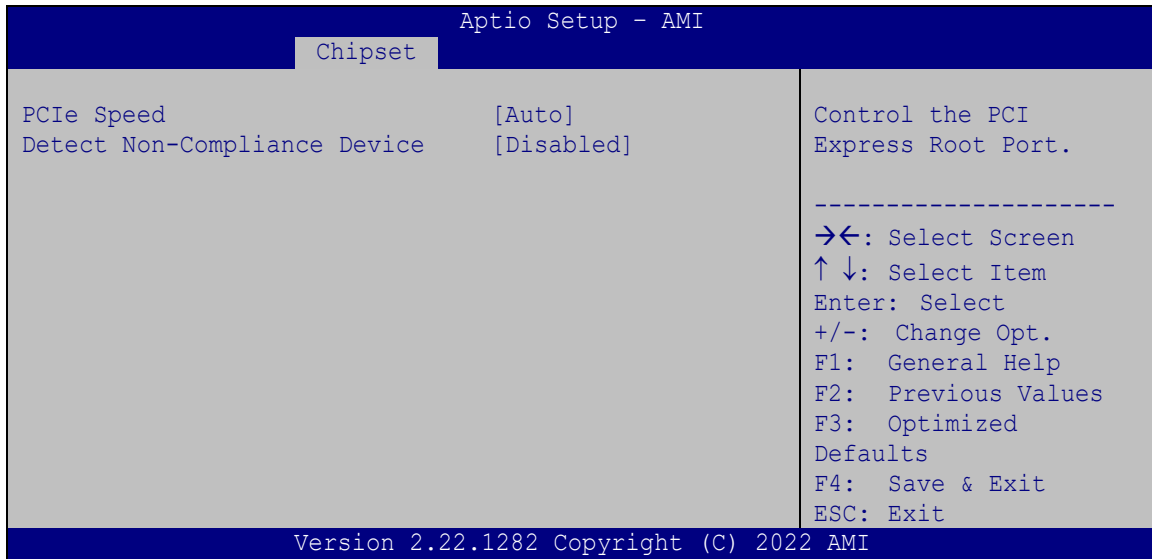
BIOS Menu 19: M2_SSD1 / MPCIE1

➔ **PCIe Speed [Auto]**

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

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

➔ **Detect Non-Compliance Device [Disabled]**

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

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

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

4.4.2.2 SATA and RST Configuration

Use the **SATA and RST Configuration** menu (**BIOS Menu 20**) to change and/or set the configuration of the SATA devices installed in the system.
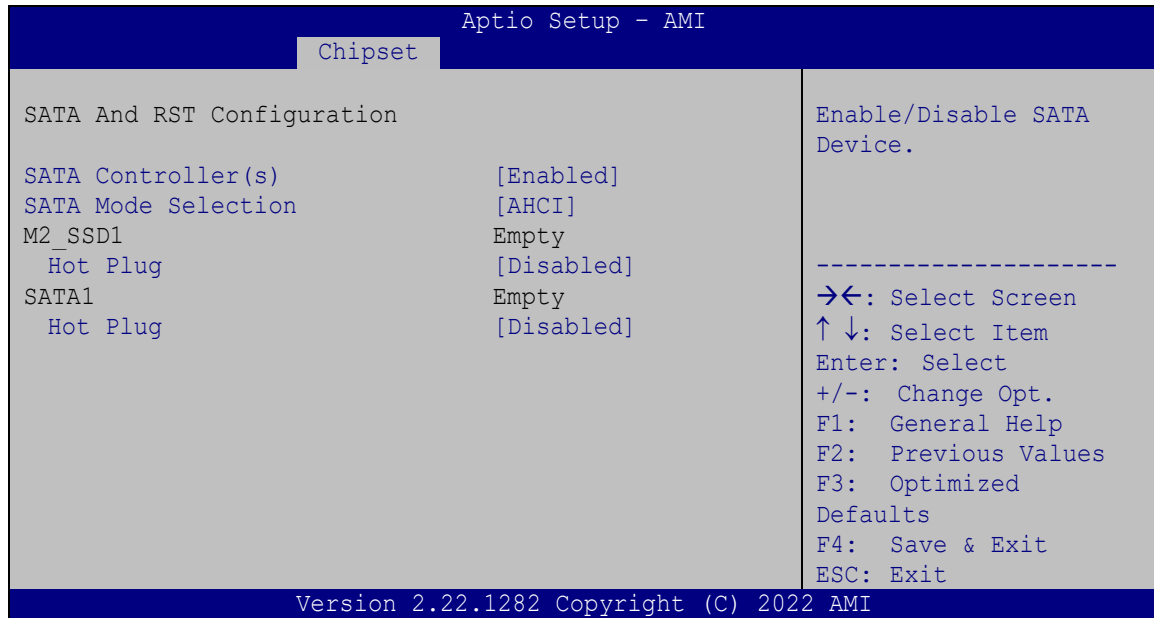
```
                        Aptio Setup – AMI
           Chipset

SATA And RST Configuration                          Enable/Disable SATA
                                                    Device.
SATA Controller(s)              [Enabled]
SATA Mode Selection             [AHCI]
M2_SSD1                         Empty
  Hot Plug                      [Disabled]          --------------------
SATA1                           Empty               →←: Select Screen
  Hot Plug                      [Disabled]          ↑↓: Select Item
                                                    Enter: Select
                                                    +/-:  Change Opt.
                                                    F1:  General Help
                                                    F2:  Previous Values
                                                    F3:  Optimized
                                                    Defaults
                                                    F4:  Save & Exit
                                                    ESC: Exit
              Version 2.22.1282 Copyright (C) 2022 AMI
```
BIOS Menu 20: 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.

➔ **Intel   RST**   Configures SATA devices to the Intel RST Premium
   Premium   With   With Intel Optane System Acceleration mode.
   Intel   Optane
   System
   Acceleration

➔ **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.

4.5 Security

Use the **Security** menu (**BIOS Menu 21**) to set system and user passwords.

```
                          Aptio Setup – AMI
   Main    Advanced   Chipset   Security    Boot    Save & Exit

 Password Description                              Set Administrator
                                                   Password
 If ONLY the Administrator's password is set,
 then this only limits access to Setup and is
 only asked for when entering Setup.
 If ONLY the User's password is set, then this     --------------------
 is a power on password and must be entered to    →←: Select Screen
 boot or enter Setup. In Setup the User will       ↑↓: Select Item
 have Administrator rights.                        Enter: Select
 The password length must be:                      +/-:  Change Opt.
 Minimum length                 3                  F1:  General Help
 Maximum length                20                  F2:  Previous Values
                                                   F3:  Optimized
 Administrator Password                            Defaults
 User Password                                     F4:  Save & Exit
                                                   ESC: Exit
              Version 2.22.1282 Copyright (C) 2022 AMI
```

BIOS Menu 21: 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 22**) to configure system boot options.

```
                         Aptio Setup - AMI
   Main    Advanced  Chipset  Security   Boot   Save & Exit

  Boot Configuration                                    Select the keyboard
  Bootup NumLock State            [On]                  NumLock state
  Quiet Boot                      [Enabled]
                                                        --------------------
  Option ROM Messages             [Force BIOS]          →←: Select Screen
                                                        ↑↓: Select Item
  Boot Option Priorities                                Enter: Select
  Boot Option #1                  [Windows Boot Manager +/-:  Change Opt.
                                  (P6: 256GB SATA Flash F1:  General Help
                                  Drive]                F2:  Previous Values
  Boot Option #2                  [UEFI: Built-in EFI   F3:  Optimized
                                  Shell]                Defaults
                                                        F4:  Save & Exit
                                                        ESC: Exit

               Version 2.22.1282 Copyright (C) 2022 AMI
```
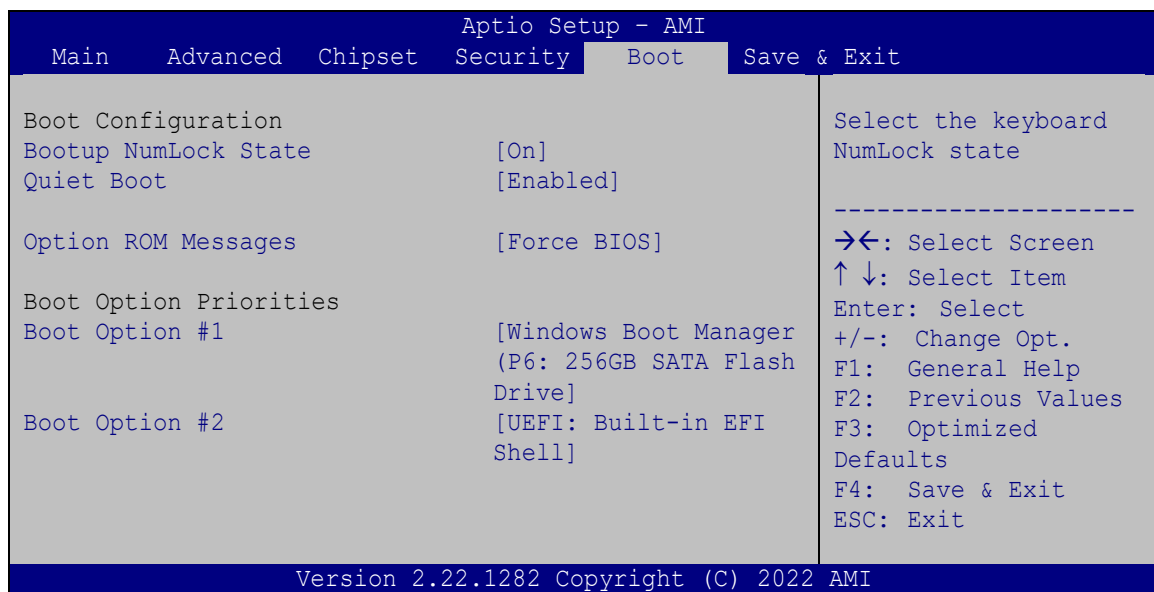
BIOS Menu 22: Boot

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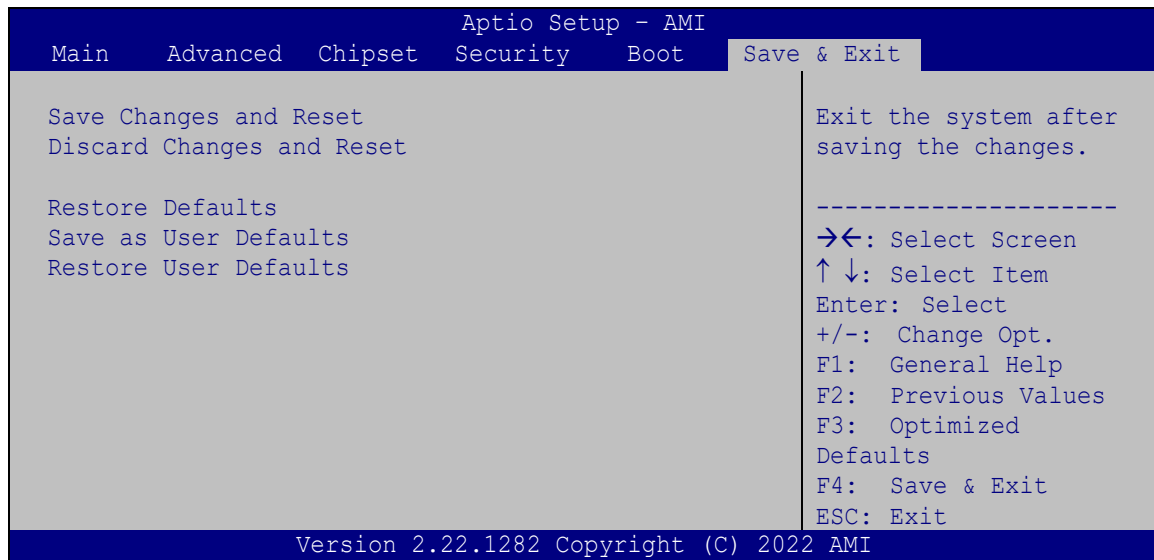
➔ **Option ROM Messages [Force BIOS]**

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 23**) to load default BIOS values, optimal failsafe values and to save configuration changes.

```
                          Aptio Setup - AMI
  Main    Advanced   Chipset   Security    Boot   Save & Exit

Save Changes and Reset                           Exit the system after
Discard Changes and Reset                        saving the changes.

Restore Defaults                                 ---------------------
Save as User Defaults                            →←: Select Screen
Restore User Defaults                            ↑ ↓: Select Item
                                                 Enter: Select
                                                 +/-:  Change Opt.
                                                 F1:   General Help
                                                 F2:   Previous Values
                                                 F3:   Optimized
                                                 Defaults
                                                 F4:   Save & Exit
                                                 ESC: Exit
               Version 2.22.1282 Copyright (C) 2022 AMI
```
BIOS Menu 23: 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**

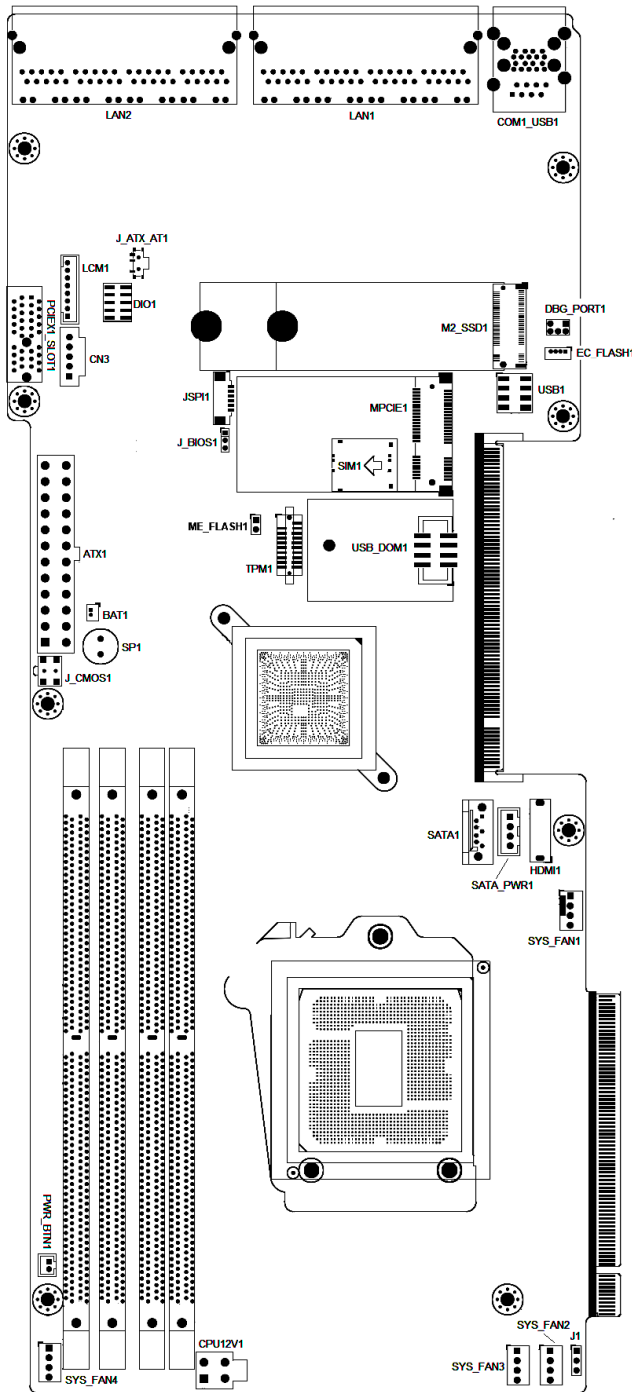Use the **Restore User Defaults** option to restore the user defaults to all the setup options.

Chapter

5

Interface Connectors

5.1 Peripheral Interface Connectors

The connector locations of the PUZZLE-5030'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 and 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
ATX power connector	24-pin connector	ATX1
ATX PSU SMBus connector	5-pin wafer	CN3
CPU power connector	4-pin connector	CPU12V1
Debug port connector	5-pin header	DBG_PORT1
Digital I/O connector	10-pin header	DIO1
Fan connectors	4-pin wafer	SYS_FAN1, SYS_FAN2, SYS_FAN3, SYS_FAN4
HDMI connector	Type A, 180°	HDMI1
LCM connector	8-pin wafer	LCM1
M.2 M-key slot	M.2 M-key 2260/2280	M2_SSD1
Memory slots	DDR4 DIMM slot	DIMM_A1, DIMM_A2, DIMM_B1, DIMM_B2
PCIe Mini slot	Full/Half-size PCIe Mini	MPCIE1
Power button connector	2-pin wafer	PWR_BTN1
SATA 6Gb/s bay socket	36-pin socket	PCIEX1_SLOT1
SATA connector	7-pin connector	SATA1
SATA power connector	4-pin wafer	SATA_PWR1
SIM card slot	Micro SIM slot	SIM1
SPI flash connector	6-pin wafer	JSPI1
SPI flash connector (EC)	4-pin wafer	EC_FLASH1
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 ATX PSU SMBus Connector (CN3)

PIN NO.	DESCRIPTION
1	SMB_CLK
2	SMB_DATA
3	NC
4	GND
5	NC

Table 5-3: ATX PSU SMBus Connector (CN3) Pinouts

5.2.3 CPU Power Connector (CPU12V1)

Pin	Description
1	GND
2	GND
3	+12 V
4	+12 V
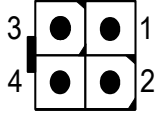
Table 5-4: CPU Power Connector (CPU12V1) Pinouts

5.2.4 Debug Port Connector (DBG_PORT1)

PIN NO.	DESCRIPTION
1	+5V_DUAL
2	EC_SMCLK
3	NC
4	EC_SMDAT
5	GND
6	PLTRST_N

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

5.2.5 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
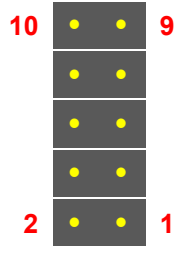
Table 5-6: DIO Connector (DIO1) Pinouts

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

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

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

5.2.7 HDMI Connector (HDMI1)

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

Table 5-8: HDMI Connector (HDMI1) Pinouts

5.2.8 LCM Connector (LCM1)

PIN NO.	DESCRIPTION
1	+5V
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 (LCM1) Pinouts

5.2.9 M.2 M-key Slot (M2_SSD1)

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 5-10: M.2 M-key Slot (M2_SSD1) Pinouts

5.2.10 PCIe Mini Card Slot (MPCIE1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5V
7	N/C	8	UIM_PWR
9	GND	10	UIM_DATA
11	PCIE_CLK#	12	UIM_CLK

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
13	PCIE_CLK	14	UIM_RST
15	GND	16	UIM_VPP
17	N/C	18	GND
19	N/C	20	N/C
21	GND	22	PCIRST#
23	PCIE_RXN	24	N/C
25	PCIE_RXP	26	GND
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PCIE_TXN	32	SMBDATA
33	PCIE_TXP	34	GND
35	GND	36	USBD-
37	GND	38	USBD+
39	VCC3	40	GND
41	VCC3	42	N/C
43	GND	44	N/C
45	N/C	46	N/C
47	N/C	48	1.5V
49	N/C	50	GND
51	N/C	52	VCC3

Table 5-11: PCIe Mini Card Slot (MPCIE1) Pinouts

5.2.11 Power Button Connector (PWR_BTN1)

PIN NO.	DESCRIPTION
1	PWR_BTN+
2	PWR_BTN-

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

5.2.12 SATA Connector (PCIEX1_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
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 (PCIEX1_SLOT1) Pinouts

5.2.13 SATA Connector (SATA1)

PIN NO.	DESCRIPTION
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	STAT_RX+
7	GND

Table 5-14: SATA Connector (SATA1) Pinouts

5.2.14 SATA Power Connector (SATA_PWR1)

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

Table 5-15: SATA Power Connector (SATA_PWR1) Pinouts

5.2.15 SIM Card Slot (SIM1)

PIN NO.	DESCRIPTION
1	SIM_VCC
2	SIM_RST
3	SIM_Clock
5	GND
6	SIM_VPP
7	SIM_DATA

Table 5-16: SIM Card Slot (SIM1) Pinouts

5.2.16 SPI Flash Connector (JSPI1)

NOTE: Use J_BIOS1 (3.16.2.3) to select the SPI ROM before using JSPI1 to update BIOS.

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 (EC_FLASH1)

PIN NO.	DESCRIPTION
1	GND
2	EC_FLASH_CLK
3	EC_FLASH_DAT
4	NC

Table 5-18: SPI Flash Connector - EC (EC_FLASH1) Pinouts

5.2.18 TPM Connector (TPM1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NA	2	NA
3	TPM_GPIO	4	NA
5	GND	6	+3.3V
7	TPM_CLK	8	NA
9	NA	10	TPM_SO
11	TPM_HOLD#	12	TPM_SI
13	TPM_CS	14	GND
15	TPM_WP	16	NA
17	TPM_INT	18	+3.3V
19	TPM_RST#	20	NA

Table 5-19: TPM Connector (TPM1) Pinouts

5.2.19 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
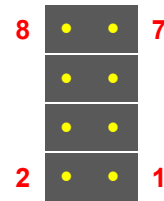
Table 5-20: USB 2.0 Connector (USB1) Pinouts

5.2.20 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
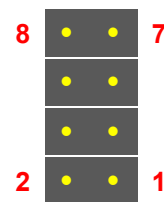
Table 5-21: USB DOM Connector (USB_DOM1) Pinouts

5.2.21 IEI Networking Module Slot A

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
B1	+12v	A1	NC
B2	+12v	A2	+12v
B3	+12v	A3	+12v
B4	GND	A4	GND
B5	SMCLK	A5	NC
B6	SMDAT	A6	NC
B7	GND	A7	NC
B8	+3.3v	A8	NC
B9	NC	A9	+3.3v
B10	3.3Vaux	A10	+3.3v

B11	WAKE#	A11	PWRGD
B12	NC	A12	GND
B13	GND	A13	REFCLK+
B14	HSOp(0)	A14	REFCLK-
B15	HSOn(0)	A15	GND
B16	GND	A16	HSIp(0)
B17	RLYCTL1*	A17	HSIn(0)
B18	GND	A18	GND
B19	HSOp(1)	A19	LANID1**
B20	HSOn(1)	A20	GND
B21	GND	A21	HSIp(1)
B22	GND	A22	HSIn(1)
B23	HSOp(2)	A23	GND
B24	HSOn(2)	A24	GND
B25	GND	A25	HSIp(2)
B26	GND	A26	HSIn(2)
B27	HSOp(3)	A27	GND
B28	HSOn(3)	A28	GND
B29	GND	A29	HSIp(3)
B30	RLYCTL2*	A30	HSIn(3)
B31	NC	A31	GND
B32	GND	A32	LANID2**
B33	HSOp(4)	A33	NC
B34	HSOn(4)	A34	GND
B35	GND	A35	HSIp(4)
B36	GND	A36	HSIn(4)
B37	HSOp(5)	A37	GND
B38	HSOn(5)	A38	GND
B39	GND	A39	HSIp(5)
B40	GND	A40	HSIn(5)
B41	HSOp(6)	A41	GND
B42	HSOn(6)	A42	GND
B43	GND	A43	HSIp(6)

B44	GND	A44	HSIn(6)
B45	HSOp(7)	A45	GND
B46	HSOn(7)	A46	GND
B47	GND	A47	HSIp(7)
B48	NC	A48	HSIn(7)
B49	GND	A49	GND
*PIN B17 & B30 is assigned to Relay control signal; it is only active when inserting a specific LAN module that supports LAN bypass function. **PIN A19 & A32 is identification of PCIe Link configuration. See **Table 5-24** for PCIe Link configuration.			

Table 5-22: IEI Networking Module Slot A Pinouts

5.2.22 IEI Networking Module Slot B

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
B1	+12v	A1	NC
B2	+12v	A2	+12v
B3	+12v	A3	+12v
B4	GND	A4	GND
B5	SMCLK	A5	NC
B6	SMDAT	A6	NC
B7	GND	A7	NC
B8	+3.3v	A8	NC
B9	NC	A9	+3.3v
B10	3.3Vaux	A10	+3.3v
B11	WAKE#	A11	PWRGD
B12	NC	A12	GND
B13	GND	A13	REFCLK+
B14	HSOp(0)	A14	REFCLK-
B15	HSOn(0)	A15	GND
B16	GND	A16	HSIp(0)
B17	RLYCTL1*	A17	HSIn(0)
B18	GND	A18	GND
B19	HSOp(1)	A19	LANID1**
B20	HSOn(1)	A20	GND
B21	GND	A21	HSIp(1)
B22	GND	A22	HSIn(1)
B23	HSOp(2)	A23	GND
B24	HSOn(2)	A24	GND
B25	GND	A25	HSIp(2)
B26	GND	A26	HSIn(2)
B27	HSOp(3)	A27	GND
B28	HSOn(3)	A28	GND
B29	GND	A29	HSIp(3)
B30	RLYCTL2*	A30	HSIn(3)

B31	NC	A31	GND
B32	GND	A32	LANID2**
B33	HSOp(4)	A33	NC
B34	HSOn(4)	A34	GND
B35	GND	A35	HSIp(4)
B36	GND	A36	HSIn(4)
B37	HSOp(5)	A37	GND
B38	HSOn(5)	A38	GND
B39	GND	A39	HSIp(5)
B40	GND	A40	HSIn(5)
B41	HSOp(6)	A41	GND
B42	HSOn(6)	A42	GND
B43	GND	A43	HSIp(6)
B44	GND	A44	HSIn(6)
B45	HSOp(7)	A45	GND
B46	HSOn(7)	A46	GND
B47	GND	A47	HSIp(7)
B48	NC	A48	HSIn(7)
B49	GND	A49	GND

*PIN B17 & B30 is assigned to Relay control signal; it is only active when inserting a specific LAN module that supports LAN bypass function.

PIN A19 & A32 is identification of PCIe Link configuration. See **Table 5-24 for PCIe Link configuration.

Table 5-23: IEI Networking Module Slot B Pinouts

A19	A32	PCIe Config.
0	0	Four x2
0	1	Two x4
1	0	One x8

Table 5-24: PCIe Link Configuration

Appendix

A

Regulatory Compliance

DECLARATION OF CONFORMITY

ϵ

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/ЕС.
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 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-5030.

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-5030 may result in permanent damage to the PUZZLE-5030 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PUZZLE-5030. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PUZZLE-5030 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:
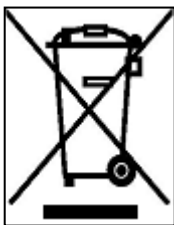
EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need 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-5030, please follow the guidelines below.

B.2.1 Maintenance and Cleaning

Prior to cleaning any part or component of the PUZZLE-5030, please read the details below.

- The interior of the PUZZLE-5030 does not require cleaning. Keep fluids away from the PUZZLE-5030 interior.
- Be cautious of all small removable components when vacuuming the PUZZLE-5030.
- Turn the PUZZLE-5030 off before cleaning the PUZZLE-5030.
- Never drop any objects or liquids through the openings of the PUZZLE-5030.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the PUZZLE-5030.
- Avoid eating, drinking and smoking within vicinity of the PUZZLE-5030.

B.2.2 Cleaning Tools

Some components in the PUZZLE-5030 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-5030.

- *Cloth* – Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the PUZZLE-5030.
- *Water or rubbing alcohol* – A cloth moistened with water or rubbing alcohol can be used to clean the PUZZLE-5030.
- *Using solvents* – The use of solvents is not recommended when cleaning the PUZZLE-5030 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-5030. Dust and dirt can restrict the airflow in the PUZZLE-5030 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。						