IEI Integration Corp.

MODEL:

PUZZLE-9040

2U Network Appliance with Intel® Xeon® Scalable Processor, 16 DDR5, Two 1GbE Ports, Two 10GbE SFP+, PCIe x16, OCP 3.0, M.2, USB 3.0, Console Ports, Redundant PSU, Rack Mount, and RoHS Compliant

User Manual

Rev. 1.01 – March 11, 2024

RoHS Lead Free

Revision

Date	Version	Changes
March 11, 2024	1.01	Updated Section 2.3: Packing List Updated Section 3.9: Rack Mount
October 2, 2023	1.00	Initial release

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Manual Conventions

WARNING

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

CAUTION

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

NOTE

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

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1

Introduction

1.1 Overview

Figure 1-1: PUZZLE-9040 Series

The PUZZLE-9040 is a 2 U network appliance series powered by Intel® Xeon® Scalable Processor series. It is optimized to host VNFs (Virtual Network Functions) and is ideal for SD-WAN.

The PUZZLE-9040 supports two copper GbE ports for high-speed network applications, and two 10GbE SFP+ connections. It is equipped with PCIe slots and OCP 3.0 slots for upgrading with expansion cards, such as NIC cards or accelerator cards. It also supports IPMI via an optional IEI module that allows remote management of the system.

Multiple storage interfaces for fast and stable data transmission are offered through two U.2 slots and one M.2 slot that supports NVMe SSD modules.

1.2 Features

The PUZZLE-9040 features are listed below:

- Dual 4th Gen Intel® Xeon® Scalable processors (code name: Sapphire Rapids)
- 4800 MHz DDR5 ECC RDIMM (up to 4 TB)
- 1 x PCIe Gen4 x16 FHFL
- 8 x OCP 3.0 slots (6 x PCIe Gen5 x16, 2 x PCIe Gen4 x16)
- 2 x 10GbE SFP+ (via Intel® X710-BM2)
- 2 x 1GbE RJ45 (via Intel® I350-AM2)
- 1 x GbE RJ45 IPMI management port
- 2 x U.2 slots with removable tray (PCIe Gen4 x4)
- 1 x M.2 2280 M-Key (PCIe Gen4 x4)
- Redundant CRPS power supply
- 2U rackmount chassis
- RoHS compliant

1.3 Front Panel

The overview of the front panel is shown in **Figure 1-2**.
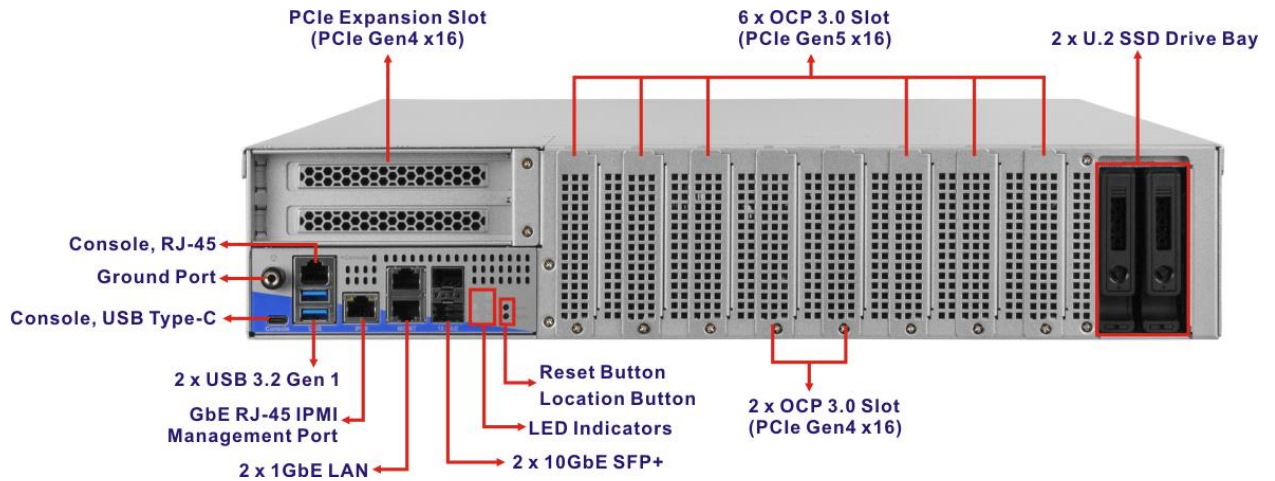
Figure 1-2: PUZZLE-9040 Front Panel

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

Power LED	Off	System off
	Blue	System on
HDD Status LED	Off	No HDD activity
	Blinking Green	HDD activity
Alert LED	Off	No system fault
	Blinking Red	System fault detected
PSU Status LED	Off	No power / No status
	Green	Both power supplies function correctly
	Amber	Power supply fault detected
Location LED	Off	Default
	Blinking Blue	Location beacon is turned on via software and the location button

1.4 Rear Panel

An overview of the PUZZLE-9040 rear panel is shown in **Figure 1-3** below.
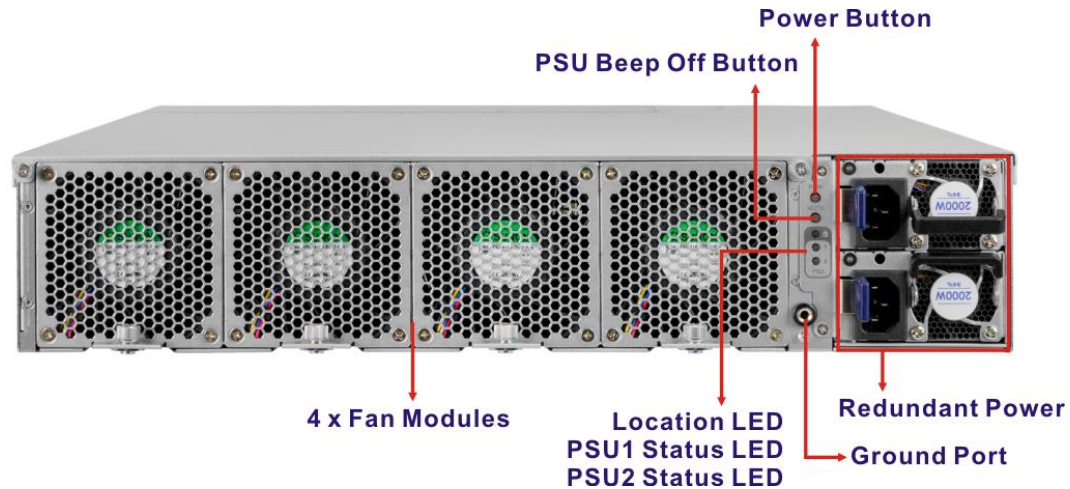
Figure 1-3: PUZZLE-9040 Rear Panel

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

- **Location LED**: Blink blue when location beacon is turned on via software and the location button on the front panel. Off by default.
- **PSU1/PSU2 Status LED**:
  - ○ **Off**: not connected
  - ○ **Amber**: PSU inserted but not on
  - ○ **Green**: PSU function properly
  - ○ **Red**: Alarm (malfunction/overheating)

1.5 Technical Specifications

The PUZZLE-9040 technical specifications are listed in **Table 1-1**.

System	
Form Factor	2U rackmount
CPU	2 x 4th Gen Intel® Xeon® Scalable processors (code name: Sapphire Rapids) supporting TDP 350W
Chipset	Intel® C741
Memory	16 x 288-pin 4800 MHz DDR5 ECC RDIMM slot
Network and Security	Next-gen Intel® Quick Assist Technology, DLB, AMX/TMUL, DSA, 5G ISA, BFloat16 SGX with Integrity, MKTME - 128 Keys, Platform Firmware Resilience (PFR) with Peripheral Device Attestation Hardware Enforced Execution Controls: Hypervisor-Managed Linear Address Translation (HLAT), Control Flow Enforcement Technology (CET), VM Denial of Service Prevention
TPM	1 x TPM 2.0 (2x10 pin header)
IPMI	1 x IEI iRIS2 IPMI module slot 1 x 1GbE RJ45 port for IPMI
Networking	2 x Copper 1GbE LAN port (by Intel® I350-AM2) 2 x 10GbE SFP+ (by Intel® X710-BM2)
Storage	2 x External 2.5" removable trays (supporting 2.5" U.2 PCIe x4 NVMe) 1 x M.2 M key 2280 (PCIe Gen4 x4)
Expansion	
OCP 3.0	Up to 8 standard OCP 3.0 slots for network modules: Two via PCIe Gen4 x16 Six via PCIe Gen5 x16
PCIe	1 x PCIe Gen4 x16 (FHFL)

I/O and Indicators	
Console	1 x RJ-45 auto-switching console port
	1 x USB Type-C
USB	2 x USB 3.2 Gen 1 (5 Gb/s) port (Type-A)
Indicator	Front:
	1 x Power LED, 1 x HDD Activity LED, 1 x Alert LED,
	1 x PSU status LED, 1 x Location LED
	Rear:
	2 x PSU status LED
	1 x Location LED
Switch/Button	Power button (rear panel)
	PSU beep off button (rear panel)
	Reset button (front panel)
	Location button (front panel)
Grounding	2 x Ground port
Power	
Type/Watt	2000 W CRPS redundant power
Thermal Solution	2 x Passive heat sink for CPU
	4 x System fan
Environmental and Mechanical	
Operating Temperature	0°C~40°C (32°F~104°F)
Storage Temperature	-10°C~50°C (14°F~122°F)
Operating Humidity	5%~90%, non-condensing
Weight	<25 kg
Physical Dimensions	438 mm x 614.3 mm x 88 mm (W x D x H)
Operating System	Ubuntu, Linux based OS

Table 1-1: Technical Specifications

1.6 Dimensions

The physical dimensions are shown below:
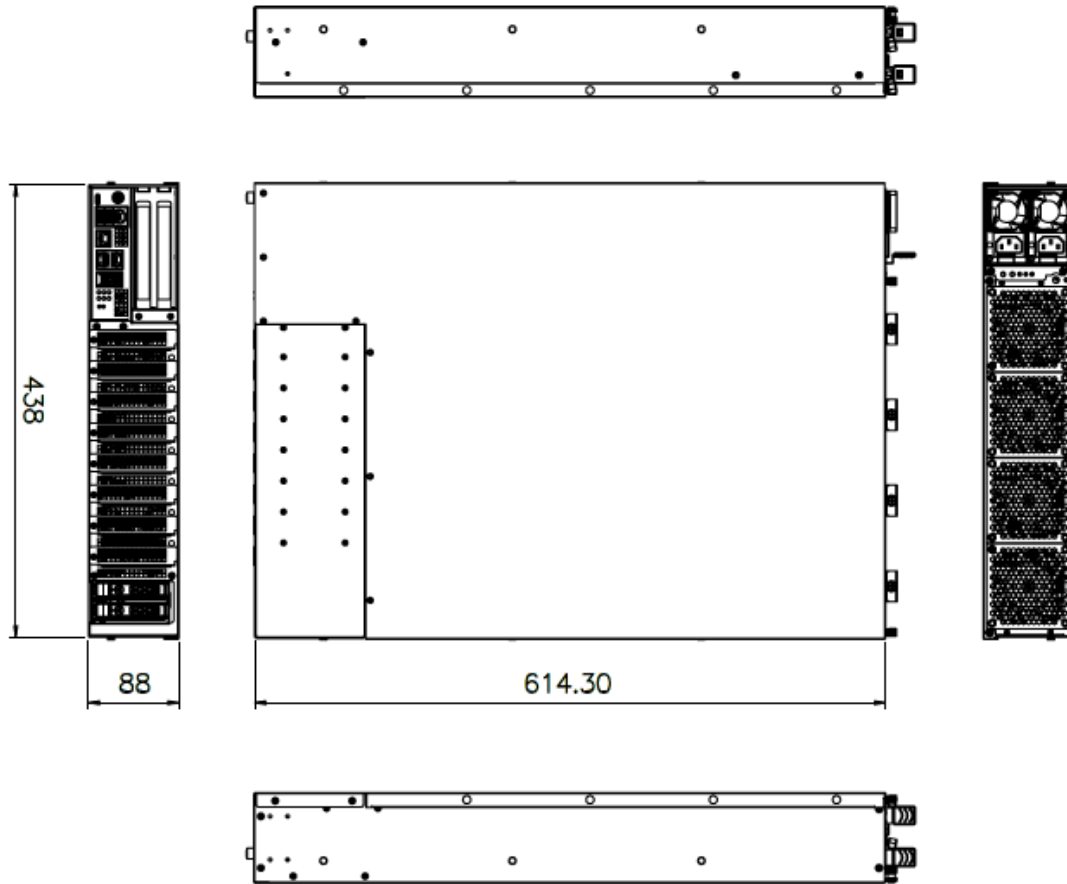
Figure 1-4: Physical Dimensions (millimeters)

Chapter

2

Unpacking

2.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during installation may result in permanent damage to the PUZZLE-9040 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PUZZLE-9040. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PUZZLE-9040 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-9040, place it on an anti-static pad. This reduces the possibility of ESD damaging the PUZZLE-9040.

2.2 Unpacking Precautions

When the PUZZLE-9040 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-9040 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-9040 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@ieiworld.com.

The PUZZLE-9040 is shipped with the following components:

Quantity	Item	Image
1	PUZZLE-9040	
2	Power cord	
2	Rack mount brackets (*Note: The brackets must be used with sliding rails.*)	
6	Screws (M4*5) for mounting brackets installation	

2.4 Optional Items

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

Optional Item	Image
Sliding rails (**P/N**: 45009-0018C0-00-RS)	
Console cable (USB to RJ-45) (**P/N**: 32013-004000-100-RS)	
Console cable (RS-232 DB-9 to RJ-45) (**P/N**: 32005-005100-100-RS)	

Chapter

3

Installation

3.1 Installation Precautions

⚡ **CAUTION!**

The PUZZLE-9040 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-9040 series.
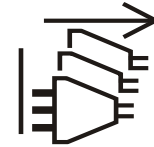
During installation, be aware of the precautions below:

- **Read the user manual**: The user manual provides a complete description of the PUZZLE-9040, installation instructions and configuration options.

- **DANGER! Disconnect Power**: Power to the PUZZLE-9040 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-9040 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-9040. The PUZZLE-9040's cooling vents must not be obstructed by any objects. Blocking the vents can cause overheating of the PUZZLE-9040. Leave at least 5 cm of clearance around the PUZZLE-9040 to prevent overheating.

- **Grounding**: The PUZZLE-9040 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-9040.

3.2 Top Cover Removal

⚠️ **WARNING:**

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

Disconnect all power sources from the system before opening the top cover.

Before installing or maintaining the internal components, the top cover must be removed from the PUZZLE-9040. Follow the steps below to complete the task.

Step 1: Remove the 7 retention screws on the top panel.

Step 2: Loosen the two captive screws on the rear panel by turning the screw counterclockwise.

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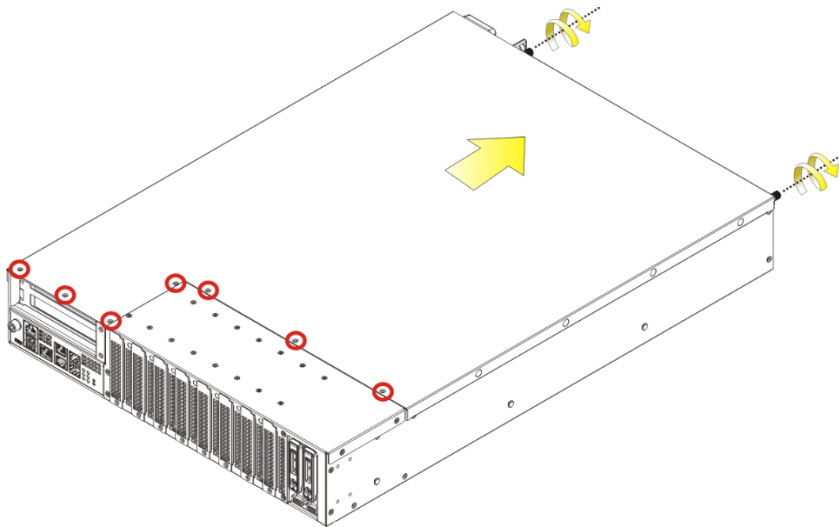
Figure 3-1: Top Cover Removal

3.3 DIMM Installation

⚠️ **CAUTION:**

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

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

Step 1: Remove the top cover from the PUZZLE-9040. Please follow the instruction described in **Section 3.2**.

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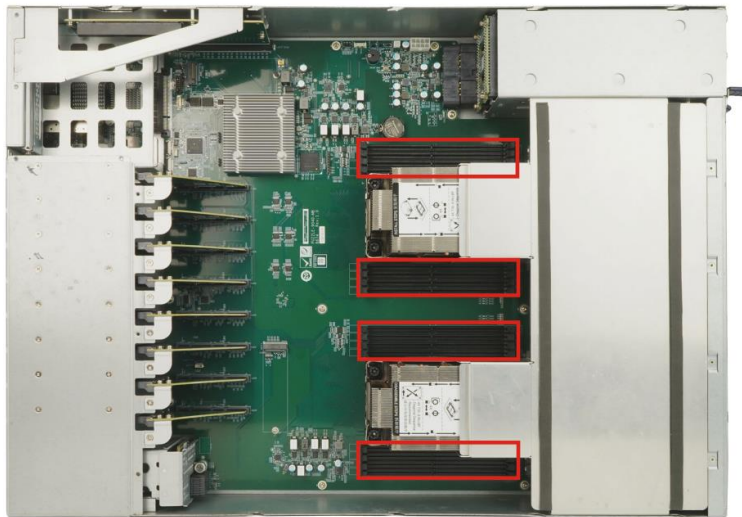
Figure 3-2: DIMM Slot Locations

Step 4: Open the DIMM socket handles. Open the two handles outwards as far as they can.

Step 5: Align the DIMM so the notch on the memory lines up with the notch on the memory socket.

Step 6: Once aligned, press down until the DIMM is properly seated. Clip the two handles into place.

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

3.4 PCIe Expansion Card Installation

The PUZZLE-9040 allows installation of one PCIe x16 card. To install a PCIe expansion card, please follow the steps below.

Step 1: Remove the top cover from the PUZZLE-9040 (refer to **Section 3.2**).

Step 2: Remove the two screws on the front panel (see Figure 3-3).

Figure 3-3: Riser Card Assembly Retention Screws

Step 3: Lift the riser card assembly to remove it from the system (see Figure 3-4).
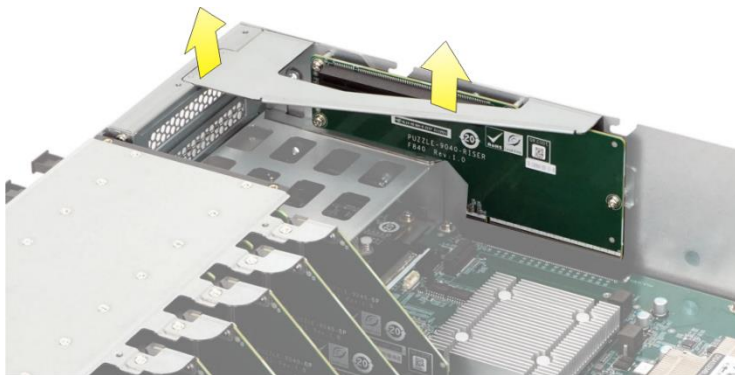
Figure 3-4: Riser Card Assembly Removal

Step 4: Remove the blank bracket(s) panel from the riser card assembly. Save the bracket screw(s).

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(s) to secure the card to the riser card assembly.

Step 6: Re-install the riser card assembly into the PCIe slot, and secure it with the two screws removed previously.

3.5 OCP 3.0 Card Installation

The PUZZLE-9040 has eight OCP 3.0 slots that allow installation of OCP 3.0 compatible cards. To install OCP 3.0 cards, please follow the steps below.

Step 1: Disconnect all power sources from the system. **NOTE:** To install or replace the OCP 3.0 card, the power supply must be fully disconnected before installation.

Step 2: Each OCP 3.0 slot is protected by a slot cover. Remove the screw of the corresponding slot cover to remove the cover.
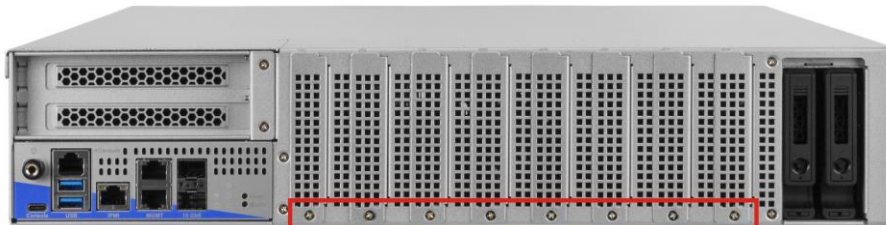
Figure 3-5: OCP 3.0 Slot Cover Screws

Step 3: Slide OCP 3.0 cards into the slot until the cards are seated in the slot correctly and securely.

Figure 3-6: OCP 3.0 Card Installation

Step 4: Turn the captive screw on the OCP 3.0 card clockwise until firmly locked.

3.6 M.2 Module Installation

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

Step 1: Remove the top cover from the PUZZLE-9040. See **Section 3.2**.

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

M.2 M-Key Slot ◄──
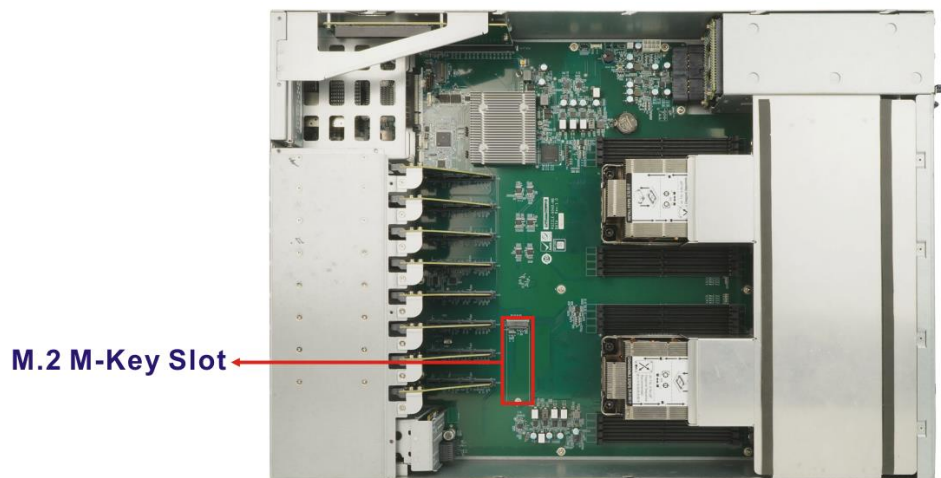
Step 3: Remove the on-board retention screw.

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

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

3.7 U.2 Drive Installation

Two 2.5" U.2 drives can be installed in the PUZZLE-9040. The drives are installed into the removable hard drive trays on the front panel. To install the U.2 drive into the system, follow the steps below.

Step 1: Pull the handle up to release the tray. Gently pull the drive tray out.

Figure 3-7: Drive Tray Removal

Step 2: Align one side of the drive with the drive tray, and press down on the other side until it snaps into place (**Figure 3-8**).
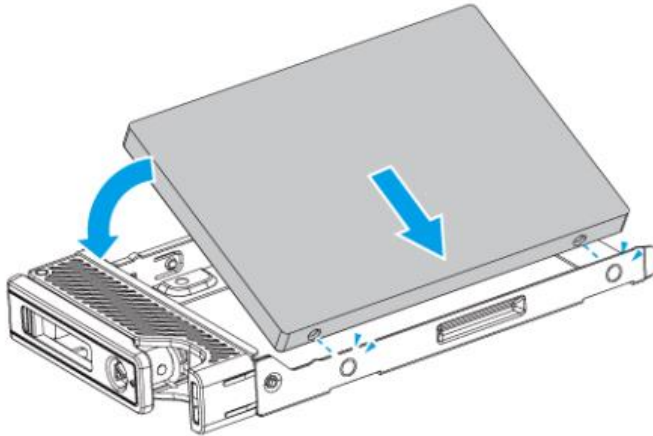
Figure 3-8: Installing U.2 Drive

Step 3: Secure the drive with the bracket by inserting four retention screws (M3*4) into the bottom of the drive (**Figure 3-9**).
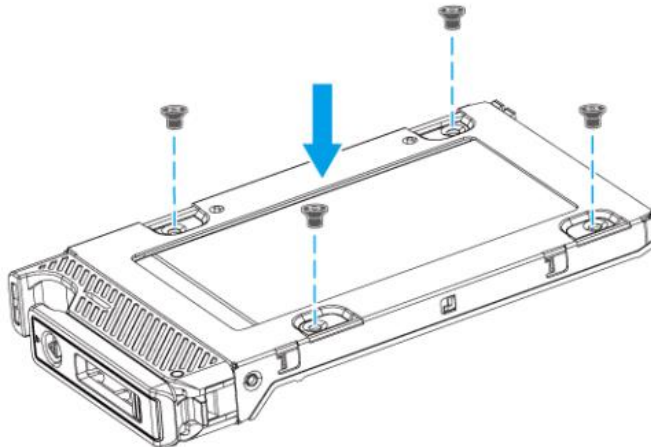
Figure 3-9: U.2 Drive Retention Screws

Step 4: Carefully insert the drive tray into the slot on the front panel. Make sure the U.2 connector on the drive is securely connected to the U.2 connector inside the chassis.

Step 5: Press down the handle to secure the drive tray.

Step 6: Repeat **Step 1 ~ Step 5** described above to install another U.2 drive.

3.8 External Interface Connection

The front panel has several external I/O ports. The pinouts of these I/O ports are listed in the following sections.

3.8.1 LAN Connection - GbE

The 1GbE 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	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+
3	MDIA2-	7	MDIA0-
4	MDIA1-	8	MDIA0+

Table 3-1: GbE Port Pinouts
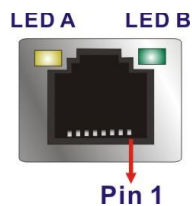
Figure 3-10: RJ-45 GbE Connector

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

LED	Description	LED	Description
A	On (yellow): linked blinking: data is being sent/received	B	off: 10 Mb/s amber: 100 Mb/s green: 1000 Mb/s

Table 3-2: RJ-45 GbE Connector LEDs

3.8.2 LAN Connection - 10GbE SFP+

The 10GbE SFP+ connectors on the front panel allow transfer rate of up to 10 gigabits per second. The pinouts of the 10GbE LAN connectors are listed below.

Pin	Description	Pin	Description
1	GND	11	GND
2	SFP+_TX_FAULT	12	SFP+_RX-
3	SFP+_TX_DISABLE	13	SFP+_RX+
4	SFP+_SDA	14	GND
5	SFP+_SCL	15	SFP+_VCCR
6	SFP+_MOD_ABS	16	SFP+_VCCT
7	SFP+_RS0	17	GND
8	SFP+_LOS	18	SFP+_TX+
9	SFP+_RS1	19	SFP+_TX-
10	GND	20	GND

Table 3-3: 10GbE Port Pinouts

Figure 3-11: 10GbE SFP+ Connector

Each 10GbE SFP+ connector has two status LEDs. See **Table 3-4**.

LED	Description	LED	Description
Left	Off: not connected Blue: non-10G network Green: 10G	Right	Yellow: linked Blinking: data is being sent/received

Table 3-4: 10GbE SFP+ Connector LEDs

3.8.3 IPMI Connection

Use the IPMI LAN connector on the front panel to connect an external network when an IPMI module is installed on the motherboard. The pinouts of the IPMI LAN connector are listed below.

Pin	Description	Pin	Description
1	LOM_P0	5	LOM_P2
2	LOM_N0	6	LOM_N2
3	LOM_P1	7	LOM_P3
4	LOM_N1	8	LOM_N3

Table 3-5: IPMI LAN Port Pinouts
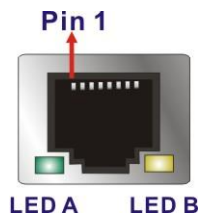
Figure 3-12: IPMI LAN Connector

The IPMI LAN connector has two status LEDs, one yellow and one green/amber. The yellow LED indicates activity on the port and the green/amber LED indicates the speed. See **Table 3-6**.

LED	Description	LED	Description
A	off: 10 Mb/s amber: 100 Mb/s green: 1000 Mb/s	B	On (yellow): linked blinking: data is being sent/received

Table 3-6: IPMI LAN Connector LEDs

3.8.4 Console Connection

The PUZZLE-9040 has one RJ-45 console port on the front panel. The RJ-45 connector for the console port can be identified easily as the RJ-45 for the network has two LEDs on the port, while the connectors for the console port cables don't. The pinouts of the console port are listed below.

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

Table 3-7: RJ-45 Console Port Pinouts

The PUZZLE-9040 also has one USB Type-C console port on the front panel. The pinouts of the USB Type-C console port are listed below.

Pin	Description	Pin	Description	
A1	GND	B12	GND	
A2	N/C	B11	N/C	
A3	N/C	B10	N/C	
A4	USB_C_5V	B9	USB_C_5V	
A5	USB_CC1	B8	N/C	
A6	USB_C_DP	B7	USB_C_DN	
A7	USB_C_DN	B6	USB_C_DP	
A8	N/C	B5	USB_CC2	
A9	USB_C_5V	B4	USB_C_5V	
A10	N/C	B3	N/C	
A11	N/C	B2	N/C	
A12	GND	B1	GND	
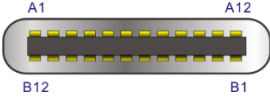
Table 3-8: USB Type-C Console Port Pinouts

3.8.4.1 Enable Console Port When Booting

To configure the PUZZLE-9040 to make it auto enable the console port when booting, follow the steps below.

![NOTE icon] **NOTE:**

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

Step 1: Use a console cable to connect to one of the console port of the PUZZLE-9040 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.
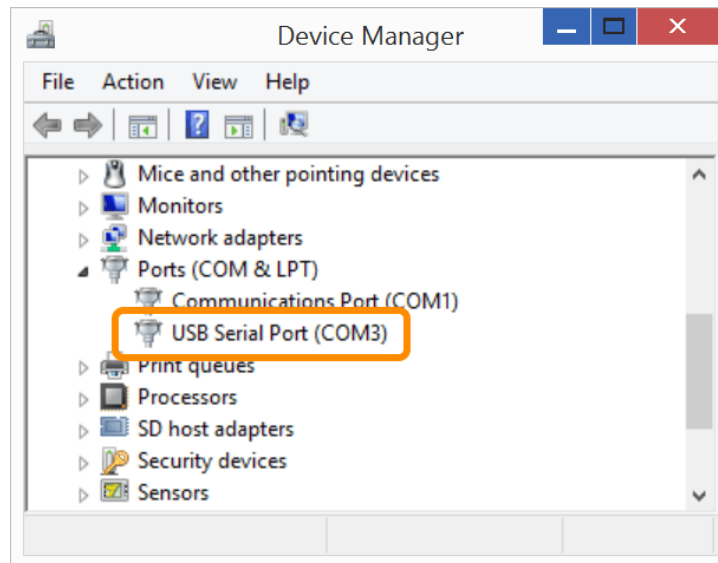
Step 3: Open a serial console application, PuTTY, as an example.

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

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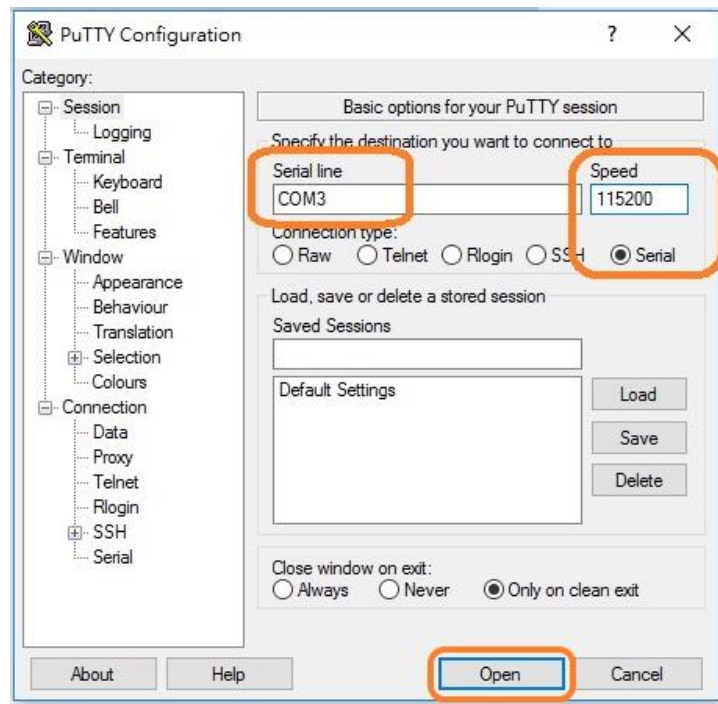
Step 6:   Enter the following command:

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

3.9 Rack Mount

The PUZZLE-9040 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-9040 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-9040 by inserting three provided retention screws into each bracket (Figure 3-13). Make sure the screws are tight and on the right positions.

Figure 3-13: 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-9040 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-9040 to the front of the rack.

3.10 Power-On Procedure

WARNING:

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

To power-on the PUZZLE-9040 please follow the steps below:

Step 1: Connect the power source to both of the power inlets on the rear panel. **Ensure to connect the power cord to a socket-outlet with earthing connection.**

Step 2: Push the power button on the rear panel to power up the system.

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

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

Username: puzzle

Password: admin
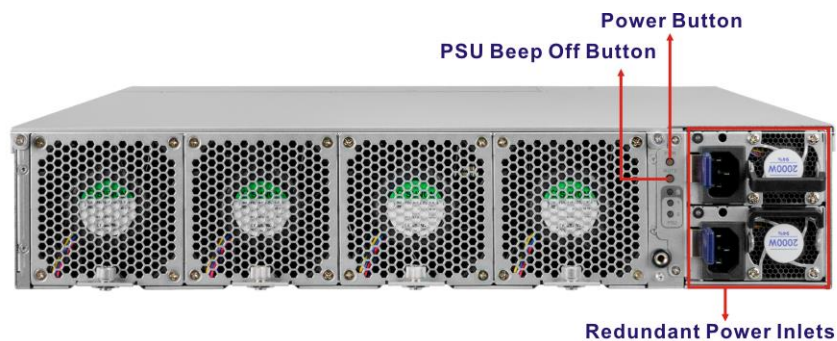
NOTE:

Connecting only one power supply will trigger the beep sound. If redundant power usage is not necessary for the application, press the PSU beep off button to disable the beep sound.

3.11 Resource Download

All the resources for the PUZZLE-9040 are available on IEI Resource Download Center (https://download.ieiworld.com). Type PUZZLE-9040 and press Enter to find all the relevant software, utilities, and documentation.
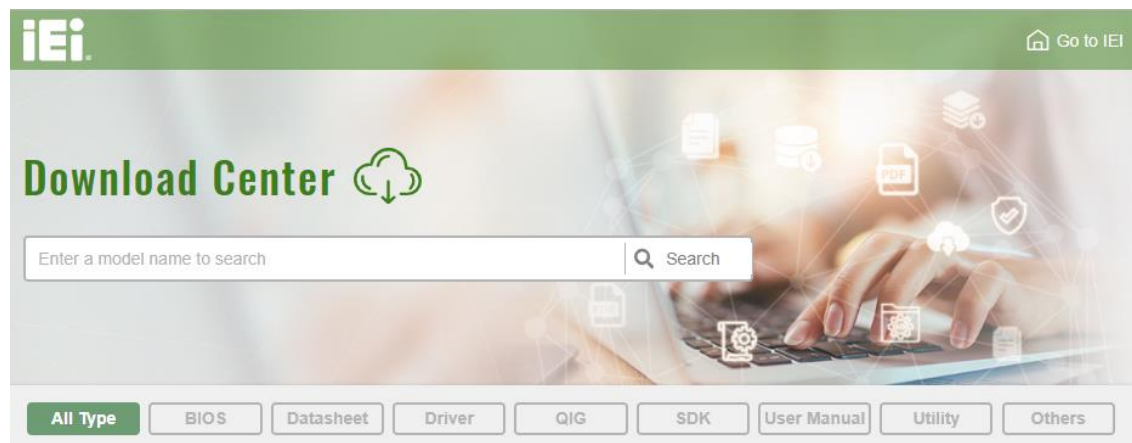
Figure 3-14: IEI Resource Download Center

3.12 Maintenance

WARNING:

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

Before starting, please ensure that you turn off the PUZZLE-9040, 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**.

3.12.1 Power Supply Unit Replacement

The power supplies have a hot-swappable feature that allows you to swap out a failed one with a new one during operation. To replace a failed power supply unit, please follow the steps below.

Step 1: Unplug the power cord connected to the failed power supply.

Step 2: Firmly press and hold the side button on back of PSU inwards. Pull out power supply by pulling the black handle.
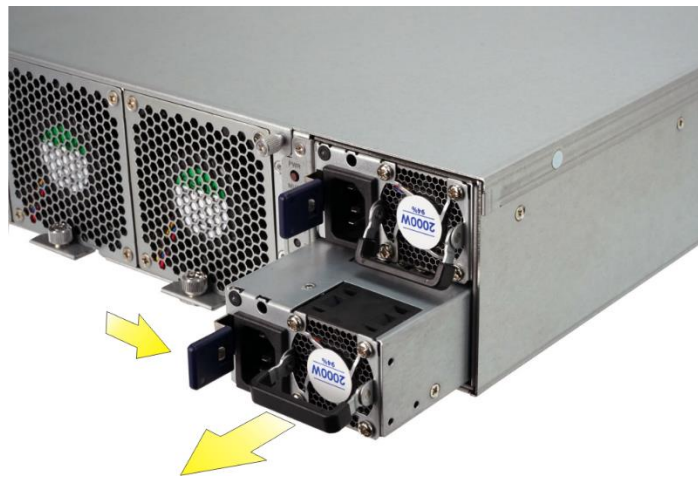
Step 3: Insert new power supply into the PUZZLE-9040.

Step 4: Connect the power cord to the PUZZLE-9040.

3.12.2 Fan Module Replacement

The fan modules on the rear panel have a hot-swappable feature that allows you to swap out a failed one with a new one during operation. To replace a failed fan module, please follow the steps below.

Step 1: Loosen the captive screw of the failed fan module by turning the screw counterclockwise.

Step 2: Gently pull the fan module out of the slot until it is completely detached.
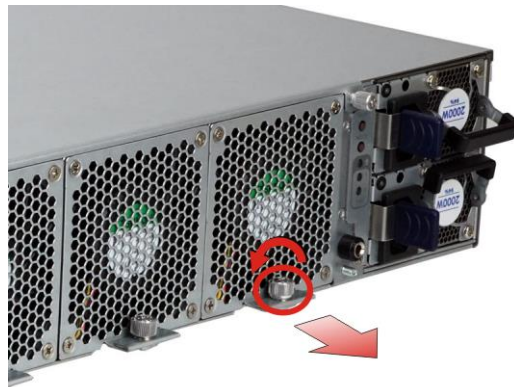
Step 3: Insert a new fan module into the PUZZLE-9040.

Step 4: Turn the captive screw clockwise until firmly locked.

3.12.3 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.

3.12.3.1 Clear CMOS

If the PUZZLE-9040 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 3-15** below.
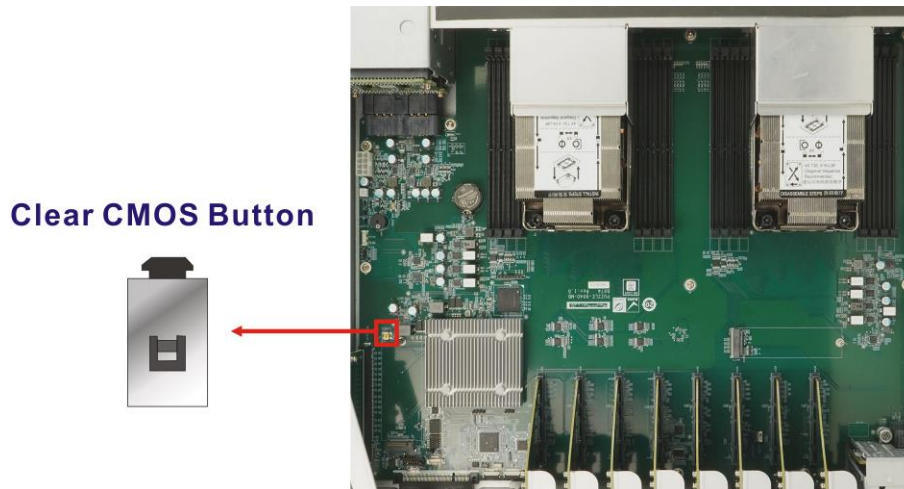
Figure 3-15: Clear CMOS Button Location

3.12.3.2 Flash Descriptor Security Override Jumper

The Flash Descriptor Security Override jumpers (ME_CLEAR1 and ME_CLEAR2) allow users to enable or disable the ME firmware update. Refer to **Figure 3-16** and **Table 3-9** for the jumper location and settings.

ME_CLEAR1	Description
Short 1-2	Disabled (default)
Short 2-3	Enabled
ME_CLEAR2	**Description**
Short 1-2	Disabled (default)
Short 2-3	Enabled

Table 3-9: Flash Descriptor Security Override Jumper Settings
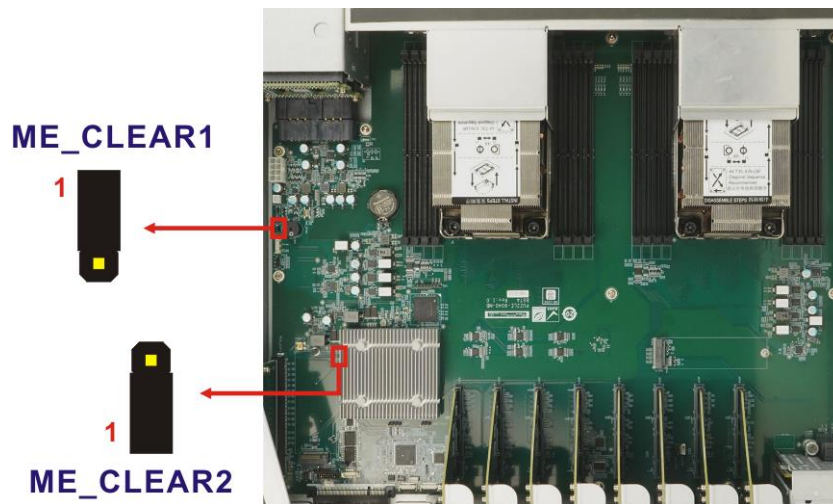
Figure 3-16: Flash Descriptor Security Override Jumper Locations

Chapter

4

Interface Connectors

4.1 Peripheral Interface Connectors

The connector locations of the PUZZLE-9040's motherboard are shown below. The connector pinouts for these connectors are listed in the following sections.
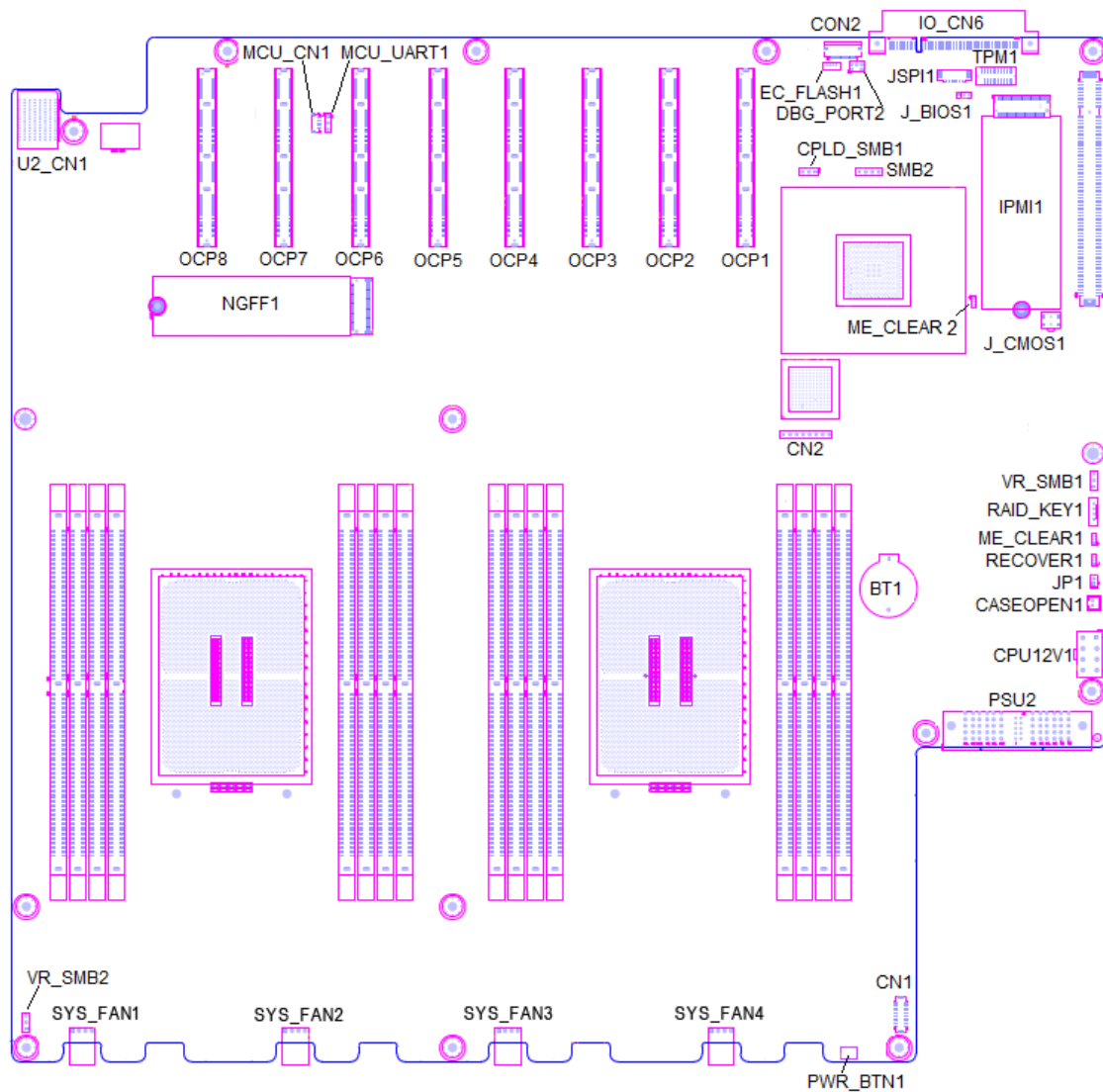
4.2 Internal Peripheral Connectors

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
Watchdog timer jumper	3-pin header	JP1
Button & indicator connector	20-pin wafer	CN1
Chassis intrusion connector	2-pin header	CASEOPEN1
Debug port connector	5-pin header	DBG_PORT2
EC debug port connector	20-pin FPC	CON2
Flash SPI ROM connector	6-pin wafer	JSPI1
Flash EC ROM connector	4-pin wafer	EC_FLASH1
Flash CPLD connector	8-pin header	CN2
Fan connectors	4-pin wafer	SYS_FAN1, SYS_FAN2, SYS_FAN3, SYS_FAN4
IRIS2 IPMI module slot	75-pin IEI IRIS2 slot	IPMI1
Power button connector	2-pin wafer	PWR_BTN1
Power connector, riser card	8-pin connector	CPU12V1
SATA RAID key connector	4-pin wafer	RAID_KEY1
SMBus connector	4-pin header	SMB2
TPM connector	20-pin header	TPM1
M.2 M-key slot	M.2 M-key 2280	NGFF1

4.2.1 Watchdog Timer Jumper (JP1)

Setting	Description
Open	Enable Watchdog Timer
Short	Disable Watchdog Timer

Table 4-1: Watchdog Timer Jumper Settings

4.2.2 Button & Indicator Connector, Rear Panel (CN1)

Pin	Description	Pin	Description
1	+3.3V_EC	2	+5V
3	N/A	4	N/A
5	GND	6	PSU1_RED_LED
7	N/A	8	PSU2_RED_LED
9	HAL_SENSOR1	10	PSU1_GREEN_LED
11	HAL_SENSOR2	12	PSU2_GREEN_LED
13	EC_BEEP	14	PSU1_AMBER_LED
15	MUTE_BUTTON_N	16	PSU2_AMBER_LED
17	SW_PWR_BTN_N	18	R_LOCATION_LED
19	GND	20	GND

Table 4-2: Rear Panel Button & Indicator Connector (CN1) Pinouts

4.2.3 Chassis Intrusion Connector (CASEOPEN1)

PIN NO.	DESCRIPTION
1	GND
2	CASEOPEN_N

Table 4-3: Chassis Intrusion Connector (CASEOPEN1) Pinouts

4.2.4 Debug Port Connector (DBG_PORT2)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	5V	2	EC_CLK
		4	EC_DAT
5	GND	6	RESET_N

Table 4-4: Debug Port Connector (DBG_PORT2) Pinouts

4.2.5 EC Debug Port Connector (CON2)

Pin	Description	Pin	Description
1	KSI0	2	KSO0
3	KSO1	4	KSO2
5	KSO3	6	KSO4
7	KSO5	8	KSO6
9	KSO7	10	KSO8
11	KSO9	12	KSO10
13	KS12	14	KSI1
15	KSO11	16	KSI2
17	KSI3	18	GND
19	GND	20	GND

Table 4-5: EC Debug Port Connector (CON2) Pinouts

4.2.6 Flash SPI ROM Connector (JSPI1)

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

Table 4-6: Flash SPI ROM Connector (JSPI1) Pinouts

4.2.7 Flash EC ROM Connector (EC_FLASH1)

PIN NO.	DESCRIPTION
1	GND
2	SMB_DAT
3	SMB_CLK
4	NC

Table 4-7: Flash EC ROM Connector (EC_FLASH1) Pinouts

4.2.8 Flash CPLD Connector (CN2)

PIN NO.	DESCRIPTION
1	+3.3V
2	CPLD_TDO
3	CPLD_TDI
4	N/A
5	N/A
6	CPLD_TMS
7	GND
8	CPLD_TCK

Table 4-8: Flash CPLD Connector (CN2) Pinouts

4.2.9 System Fan Connectors (SYS_FAN1/2/3/4)

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

Table 4-9: System Fan Connectors (SYS_FAN1/2/3/4) Pinouts

4.2.10 Power Button Connector (PWR_BTN1)

PIN NO.	DESCRIPTION
1	PWR_BTN+
2	PWR_BTN-

Table 4-10: Power Button Connector (PWR_BTN1) Pinouts

4.2.11 Power Connector, Riser Card (CPU12V1)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V

Table 4-11: Riser Card Power Connector (CPU12V1) Pinouts

4.2.12 SATA RAID Key Connector (RAID_KEY1)

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

Table 4-12: SATA RAID Key Connector (RAID_KEY1) Pinouts

4.2.13 SMBus Connector (SMB2)

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

Table 4-13: SMBus Connector (SMB2) Pinouts

4.2.14 TPM Connector (TPM1)

Pin	Description	Pin	Description
1	NA	2	NA
3	TPM_GPIO	4	NA
5	GND	6	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	3V
19	TPM_RST#	20	NA

Table 4-14: TPM Connector (TPM1) Pinouts

4.2.15 M.2 M-key Slot (NGFF1)

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	NGFF1_ACT_N
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
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	PCIE_CLKN	54	PEWAKE
55	PCIE_CLKP	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 4-15: M.2 M-key Slot (NGFF1) Pinouts

Appendix

A

Regulatory Compliance

DECLARATION OF CONFORMITY

CE

This equipment is in conformity with the following EU directives:

- EMC Directive 2014/30/EU
- Low-Voltage Directive 2014/35/EU
- RoHS II Directive 2015/863/EU

If the user modifies and/or install other devices in the equipment, the CE conformity declaration may no longer apply.

If this equipment has telecommunications functionality, it also complies with the requirements of the R&TTE Directive 1999/5/EC.

English
IEI Integration Corp declares that this equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Български [Bulgarian]
IEI Integration Corp. декларира че този оборудване е в съответствие със съществените изисквания и другите приложими правила на Директива 1999/5/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 Integration C☐rp, erklärt dieses Gerät entspricht☐de☐ 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-9040.

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

B.1.1 General Safety Precautions

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

- *Make sure the power is turned off and the power cord is disconnected* when moving, installing or modifying the system.
- *Do not apply voltage levels that exceed the specified voltage range*. Doing so may cause fire and/or an electrical shock.
- *Electric shocks can occur* if opened while still powered on.
- *Do not drop or insert any objects* into the ventilation openings.
- *If considerable amounts of dust, water, or fluids enter the system*, turn off the power supply immediately, unplug the power cord, and contact the system vendor.
- This equipment is not suitable for use in locations where children are likely to be present.
- **DO NOT**:
  - Drop the system against a hard surface.
  - In a site where the ambient temperature exceeds the rated temperature

B.1.2 Anti-static Precautions

⚠️ **WARNING:**

Failure to take ESD precautions during the installation of the PUZZLE-9040 may result in permanent damage to the PUZZLE-9040 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PUZZLE-9040. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PUZZLE-9040 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:
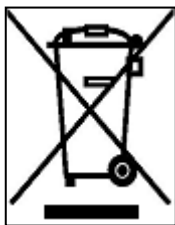
EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need 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-9040, please follow the guidelines below.

B.2.1 Maintenance and Cleaning

Prior to cleaning any part or component of the PUZZLE-9040, please read the details below.

- The interior of the PUZZLE-9040 does not require cleaning. Keep fluids away from the PUZZLE-9040 interior.
- Be cautious of all small removable components when vacuuming the PUZZLE-9040.
- Turn the PUZZLE-9040 off before cleaning the PUZZLE-9040.
- Never drop any objects or liquids through the openings of the PUZZLE-9040.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the PUZZLE-9040.
- Avoid eating, drinking and smoking within vicinity of the PUZZLE-9040.

B.2.2 Cleaning Tools

Some components in the PUZZLE-9040 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-9040.

- *Cloth* – Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the PUZZLE-9040.
- *Water or rubbing alcohol* – A cloth moistened with water or rubbing alcohol can be used to clean the PUZZLE-9040.
- *Using solvents* – The use of solvents is not recommended when cleaning the PUZZLE-9040 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-9040. Dust and dirt can restrict the airflow in the PUZZLE-9040 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。						