OPEN
Industry Standard, Flexible Architecture

GREEN
Less Heat, Less Power Consumption

STABLE
Robust Design, Quality Parts

Stable and
Reliable Solution

Server/Workstation
Motherboard

Paul

User Manual

English

Version 1.0
Published May 2022
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Chapter 1 Introduction

Thank you for purchasing ASRock Rack ***PAUL***, a reliable IPMI Card produced under ASRock Rack's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock Rack's commitment to quality and endurance.

If you require technical support related to this product, please visit our website for specific information about the model you are using.
http://www.asrockrack.com/support/

1.1 Features

- KVM Mouse
- LAN interface (supports RMCP+)
- Serial Over LAN
- Universal Series Bus(USB)
- IPMI Serial Interface
- Field Replaceable Unit (FRU)
- IPMI Sensor
- IPMI Event Log
- Power control
- FAN Control
- Remote Control
- iKVM
- ADC Device Support (Customizable)
- GPIO Device Support (Customizable)

1.2 System Requirements

Before you install the PAUL Card, please check if the client device meets the following requirements.

- Motherboard that supports PAUL Card
- LAN(RJ-45) port for server management
- Firefox (Windows and Linux), Chrome (Windows and Linux), Edge-Chromium Version (Windows)

1.3 Package Contents

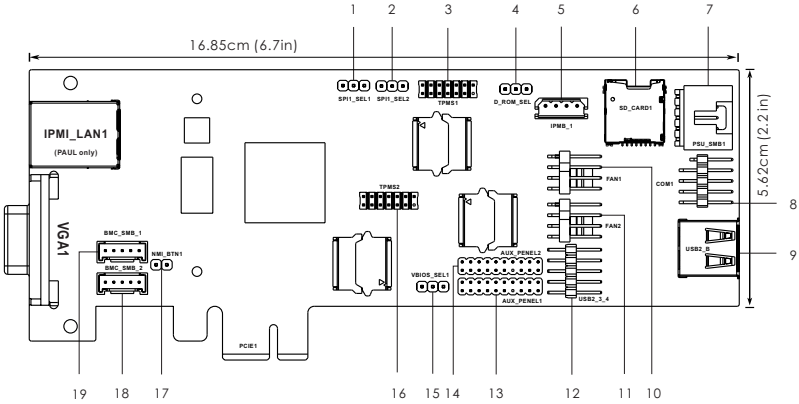
- ASRock Rack PAUL Motherboard
  (Proprietary Form Factor: 6.7-in x 2.2-in, 16.85 cm x 5.62 cm)

1.4 Specifications

PAUL	
Type	Low-Profile PCIe IPMI Card
Chipset	ASPEED VIDEO PROCESSOR AST2500A2-GP
Onboard RAM	System: 384MB
Video	1 (64MB)
Onboard ROM	64MB
Interface	PCIe 3.0 x1 interface
VGA	1 x D-sub support max. resolution 1920 x 1200 @ 60Hz
External connectors	1 x D-sub 1 x USB 2.0 Port
Internal connectors	2x SPI Selection Jumper (SPI1_SEL1 / SPI1_SEL2) 1x TPM Header (TPMS1) 1x ROM Selection Jumper (D_ROM_SEL) 1x Intelligent Platform Management Bus Header (IPMB_1) 1x SD Card Slot (SD_CARD1) 1x PSU SMBus (PSU_SMB1) 1x COM Port Header (COM1) 1x USB 2.0 Type-A Port (USB2_B) 2x System Fan Connector (FAN1 / FAN2) 1x USB 2.0 Header (USB2_3_4) 2x Auxiliary Panel Header (AUX_PANEL1 / AUX_PANEL2) 1x VBIOS Selection Jumper (VBIOS_SEL1) 1x TPM Header (TPMS2) 1x Non Maskable Interrupt Button (NMI_BTN1) 2x BMC SMBus Header (BMC_SMB_1 / BMC_SMB_2)
Watchdog	32-bit Watchdog Timer
Main Features	Compatible and supports IPMI 2.0 and supports KVM Supports Web UI (Remote management) Supports Virtual media Supports Netwot Bonding
Operating System	Windows 10 -64bit Linux OS including Cent OS Redhat Ubuntu
Dimensions	168.45 * 68.9 mm

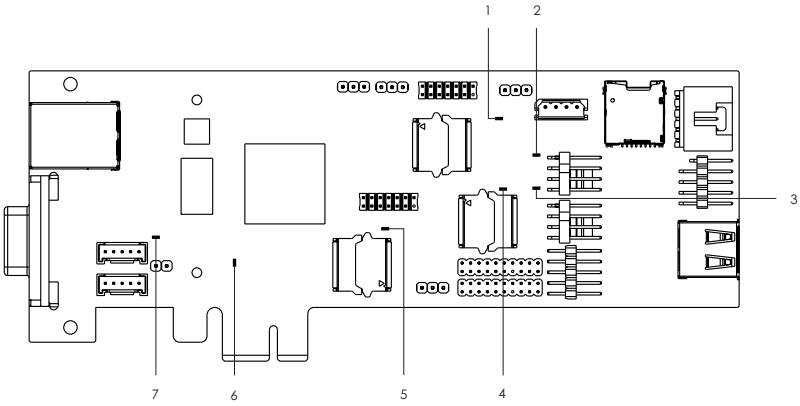
NOTE: Please refer to our website for the latest specifications.

1.5 Motherboard Layout



No.	Description
1	SPI Selection Jumper (SPI_SEL1)
2	SPI Selection Jumper (SPI_SEL2)
3	TPM Header (TPMS1)
4	ROM Selection Jumper (D_ROM_SEL)
5	Intelligent Platform Management Bus Header (IPMB_1)
6	SD Card Slot (SD_CARD1)
7	PSU SMBus (PSU_SMB1)
8	COM Port Header (COM1)
9	USB 2.0 Type-A Port (USB2_B)
10	System Fan Connector (FAN1)
11	System Fan Connector (FAN2)
12	USB 2.0 Header (USB2_3_4)
13	Auxiliary Panel Header (AUX_PANEL1)
14	Auxiliary Panel Header (AUX_PANEL2)
15	VBIOS Selection Jumper (VBIOS_SEL1)
16	TPM Header (TPMS2)
17	Non Maskable Interrupt Button (NMI_BTN1)
18	BMC SMBus Header (BMC_SMB_2)
19	BMC SMBus Header (BMC_SMB_1)

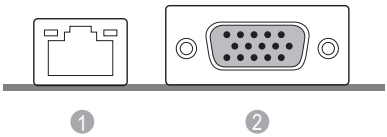
1.6 Onboard LED Indicators



No.	LED	Status	Description
1	BMC_B_LED1	Yellow	Using BMC ROM2
2	LAN1_LED	Red	FAN1 failed
3	FAN2_LED	Red	FAN2 failed
4	BMC_A_LED1	Yellow	Using BMC ROM1
5	BMC_LED1	Green	BMC heartbeat LED
6	SYSTEM_ERR_LED	Red	STB PWR ready
7	SB_PWR1	Green	SYSTEM error

1.7 I/O Panel

Right Side

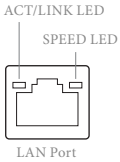


Left Side

No.	Description	
1	LAN RJ-45 Port (IPMI_LAN1)	Connect a LAN cable to this IPMI_LAN1 port for remote management feature.
2	VGA Port (VGA1)	Connect one end of the VGA cable to this VGA port and the other end to the monitor.
3	USB 2.0 Port (USB2_B)	Connect to an USB Type-A device.

LAN Port LED Indications

*There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.



Dedicated IPMI LAN Port LED Indications

Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	100M bps connection or no link
Blinking	Data Activity	Green	1G bps connection
On	Link		

English

Chapter 2 Installation

This is a Proprietary form factor (6.7-in x 2.2-in, 16.85 cm x 5.62 cm) IPMI Card. Before you install the IPMI Card, study the configuration of your chassis to ensure that the card is compatible with your system.

Make sure to unplug the power cord before installing or removing the IPMI card. Failure to do so may cause physical injuries to you and damages to IPMI card components.

2.1 Installing the IPMI Card

Step 1. Before installing an expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.

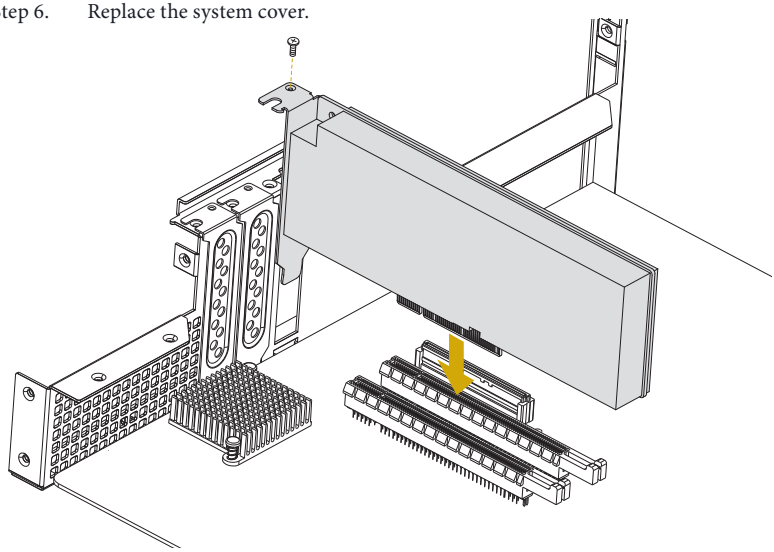
Step 2. Remove the system unit cover (if your motherboard is already installed in a chassis).

Step 3. Remove the bracket facing the slot that you intend to use. Keep the screws for later use.

Step 4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.

Step 5. Fasten the card to the chassis with screws.

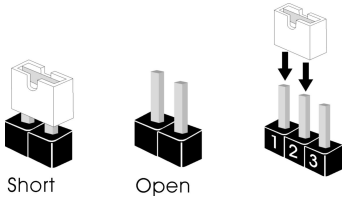
Step 6. Replace the system cover.



**Images shown are for illustrative purposes only and may differ depending on model.*

2.2 Jumper Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on the pins, the jumper is "Short". If no jumper cap is placed on the pins, the jumper is "Open". The illustration shows a 3-pin jumper whose pin1 and pin2 are "Short" when a jumper cap is placed on these 2 pins.

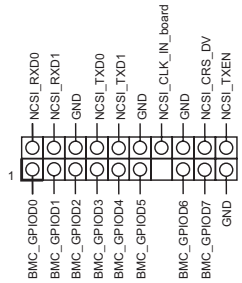


SPI Selection Jumper (3-pin SPI1_SEL1) (see p.3, No. 1) (3-pin SPI1_SEL2) (see p.3, No. 2)	 Disable SPI interface	 Enable SPI Master
SPI Selection Jumper (3-pin SPI1_SEL1) (see p.3, No. 1) (3-pin SPI1_SEL2) (see p.3, No. 2)	 Reserved, enable SPI Master and SPI Slave to AHB Bridge (debug mode)	 Enable SPI Pass-through (Default)
ROM Selection Jumper (3-pin D_ROM_SEL) (see p.3, No. 4)	 SPI_CON option: SPI_CON1	 SPI_CON option: SPI_CON2
VBIOS Enable/Disable Jumper (3-pin VBIOS_SEL1) (see p.3, No. 15)	 No VGA BISO ROM; VGA BIOS is merged in the system BIOS (Default)	 Enable dedicated VGA BIOS ROM

2.3 Onboard Headers and Connectors

Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard.

Auxiliary Panel Headers
(19-pin AUX_PANEL1)
(see p.3, No. 13)



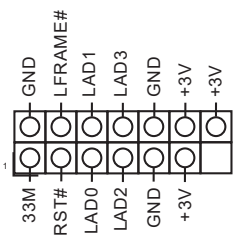
This header supports multiple functions on the front panel, including front panel SMB, internet status indicator.

Connect Pin 3 (GPIOD1) & Pin 7 (GPIOD3) to MB Power On/Off & Reset button. Connects BMC_GPIO from PAUL Card to the Motherboard.

(19-pin AUX_PANEL2)
(see p.3, No. 14)

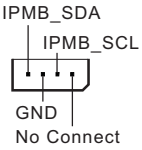
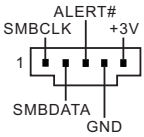
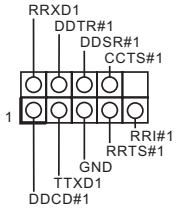
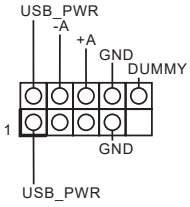
TPM Headers
(13-pin TPMS1) (LPC)
(see p.3, No. 3)

(13-pin TPMS2) (TPM Module)
(see p.3, No. 16)

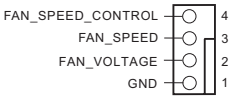


This connector supports Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

English

Intelligent Platform Management Bus Header (4-pin IPMB_1) (see p.3, No. 5)		This 4-pin connector is used to provide a cabled base-board or front panel connection for value added features and 3rd-party add-in cards, such as Emergency Management cards, that provide management features using the IPMB.
PSU SMBus Header (PSU_SMB1) (see p.3, No. 7)		PSU SMBus monitors the status of the power supply, fan and system temperature. Connect a PMBus cable to this connector and to the power supply for PSU detection.
Serial Port Header (9-pin COM1) (see p.3, No. 8)		This COM header supports a serial port module.
USB 2.0 Connector (USB2_B) (see p.3, No. 9)		This card supports a Type-A USB 2.0 port.
USB 2.0 Header (9-pin USB2_3_4) (see p.6, No. 12)		There is an USB 2.0 header on this IPMI card. Connect USB 2.0 2*5P cable to the USB2.0 front header on the motherbaord for data transfer and KVM keyboard/mouse remote control.

System Fan Connectors
(4-pin FAN1)
(see p.3, No. 10)
(4-pin FAN2)
(see p.3, No. 11)

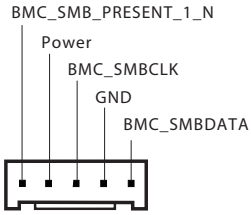


Please connect fan cables to the fan connector and match the black wire to the ground pin. All fans support Fan Control.

Non Maskable Interrupt Button Header
(2-pin NMI_BTN1)
(see p.3, No. 17)

Please connect a NMI device to this header.

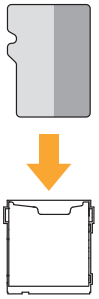
Baseboard Management Controller SMBus Header
(5-pin BMC_SMB_1)
(see p.3, No. 19)
(5-pin BMC_SMB_2)
(see p.3, No. 18)



The header is used for the SM BUS devices.

Connect SMBus cables to these connectors and to the BMC headers on the motherboard for real-time sensor monitoring.

SD Card Slot
(SD_CARD1)
(see p.3, No. 6)



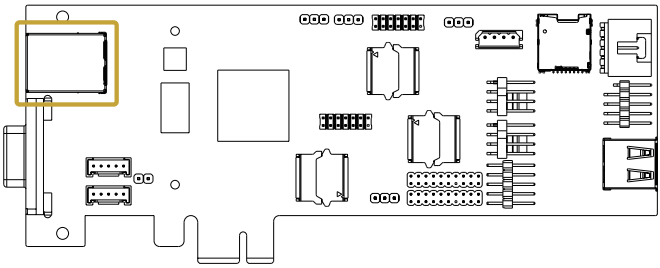
Use an inserted SD Card to read/write data.

Carefully insert the Micro SD Card into the slot until it clicks.

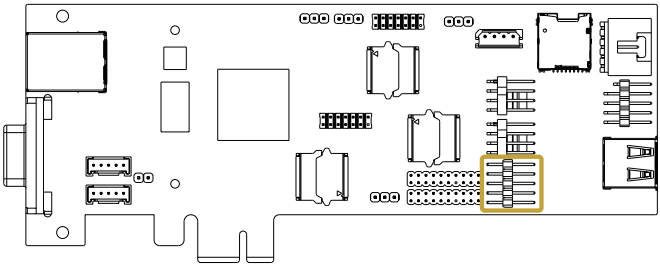
Chapter 3 Connection

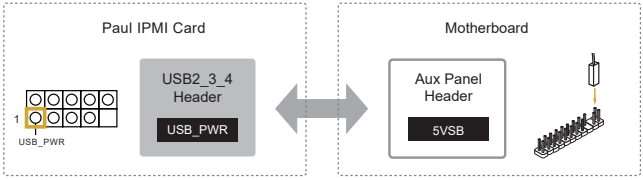
3.1 Connections to MB for Power On/Off & Reboot Features

1. Please first make sure "IPMI_LAN1" on the Paul card is connected to an active network.



2. Connect "USB_PWR" pin to "5VSB" pin of the Aux/System Panel header on your motherboard.

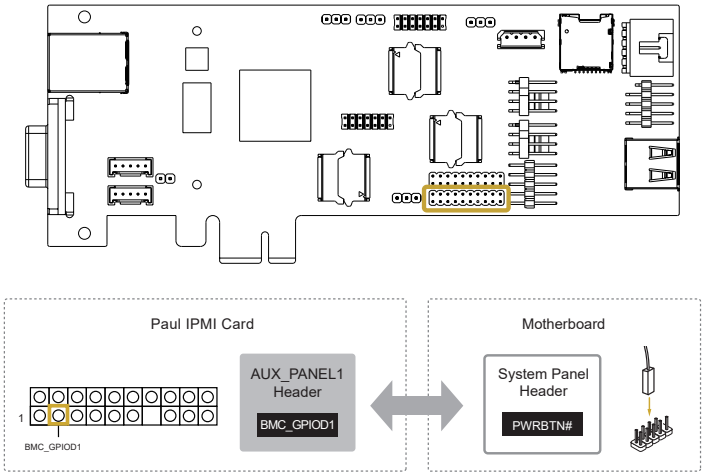




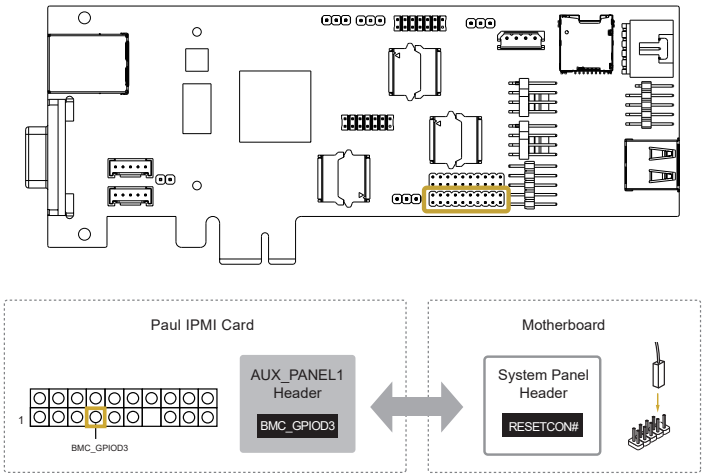
Please note that it is required to connect ALL PINS on the USB header to the Aux Panel header on the motherboard for complete functions of the remote KVM control; meanwhile, you are able to see the Remote KVM Interface shown in the section 4.7.1 (see page 21).

English

3. Connecot "BMC_GPIOD1" pin to "PWRBTN#" pin of the System Panel on your motherboard.



4. Connecot "BMC_GPIOD3" pin to "RESETCON#" pin of the System Panel on your motherboard.



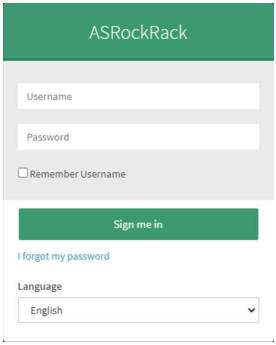
Chapter 4 Management Interface

4.1 Web-based User Interface

The web-based user interface allows you to easily monitor the client device's hardware information including temperatures, fan rotations, voltages, and power. By opening the GUI in a browser you can manage the client device remotely, even when there is no OS installed on the client device. This application also lets you instantly power on/off or reset the remote device.

4.1.1 Logging in the Utility

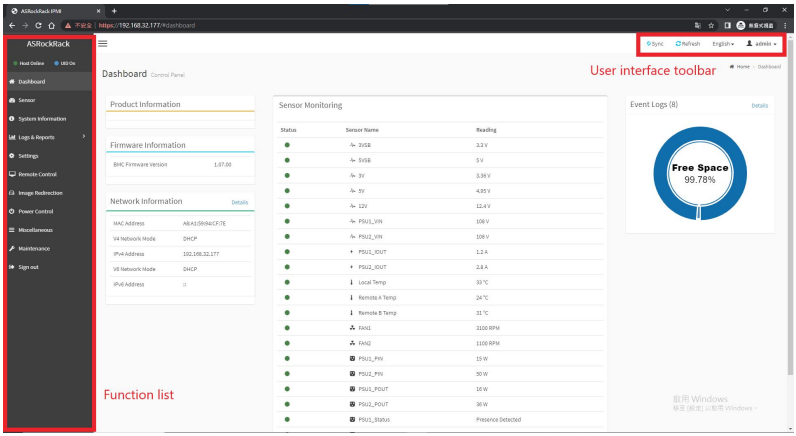
1. Open the web browser and type in the same IP address as the one in the remote device.
2. The below screen appears. If you are logging in for the first time, enter the default user name (admin) and password (admin). Then click Sign me in.



3. You will be prompted to change your password after logging in for the first time. Please ensure that you change the password to a new password.
4. After updating the password, please log in again using the new password.

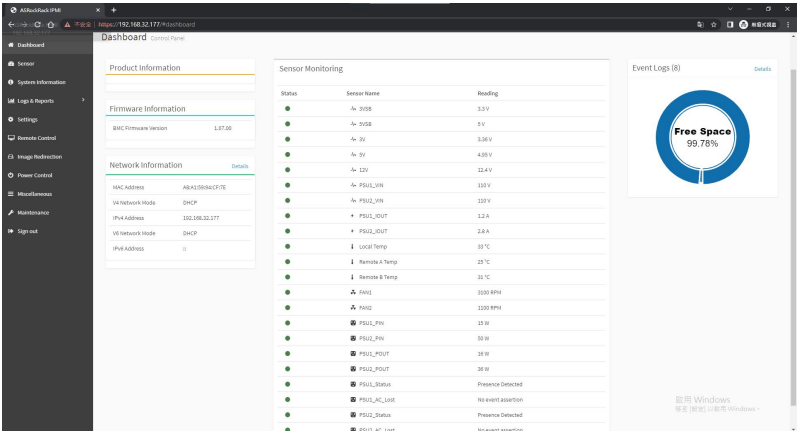
4.1.2 Using the Utility

The web-based graphics user interface displays when you login in the utility successfully. Click on a function from the list on the left hand side to start using its specific functions.



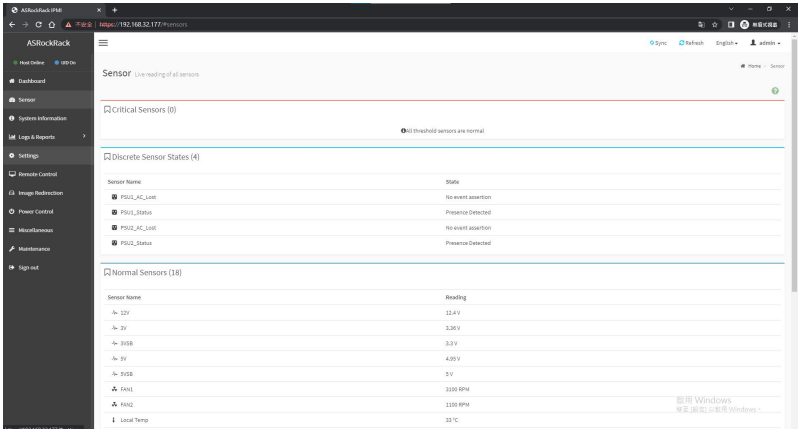
4.2 Dashboard

The dashboard gives you a quick overview of the system status, quick control options, poweron hours, power redundancy, sensors, messages, and logs. Click or hover your mouse over an item to see more details. Scroll down to view more items.



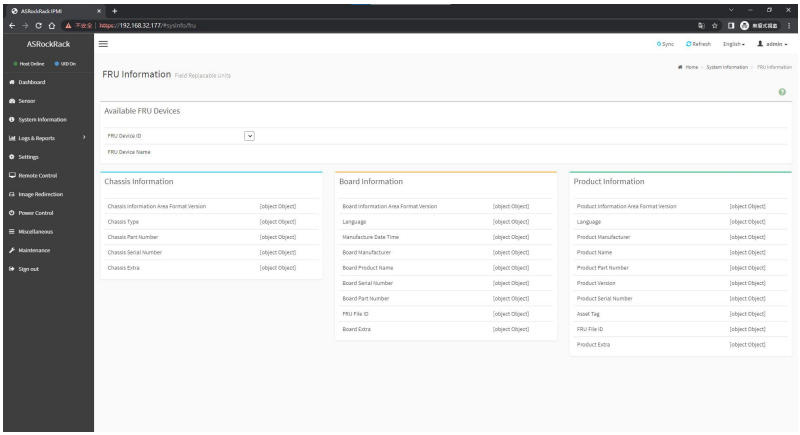
4.3 Sensor

The Sensor Readings page displays live readings for all the available sensors with details like Sensor Name, Status, Current Reading and Behavior. This page will automatically refresh itself with data from the database. Please note that there may be some delay when retrieving live data. Scroll down to view more items.



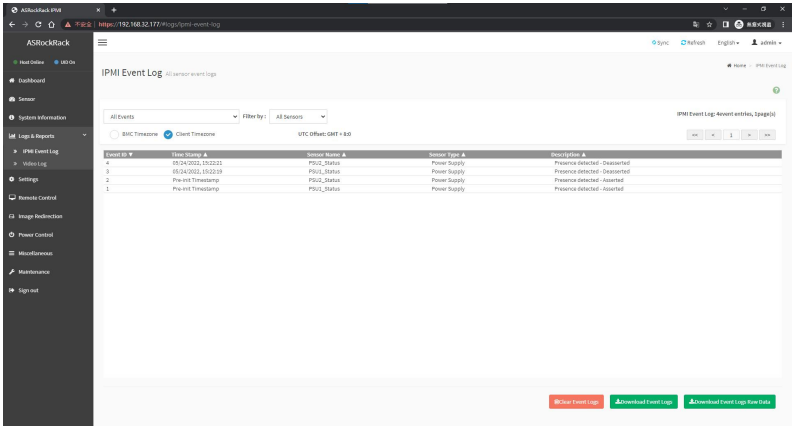
4.4 FRU Information

This Page displays the BMC's FRU (Field Replaceable Units) device information. The FRU page shows Basic Information, Chassis Information, Board Information and Product Information of the FRU device. Scroll down to view more items.



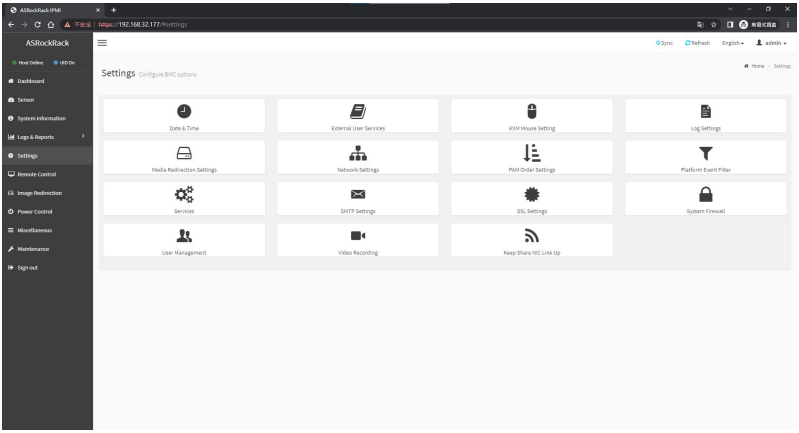
4.5 IPMI Event Log

This page displays the list of events incurred by different sensors on this device. Click on a record to see the details of that entry. Hovering over the graph will allow you to view the number of events by date.



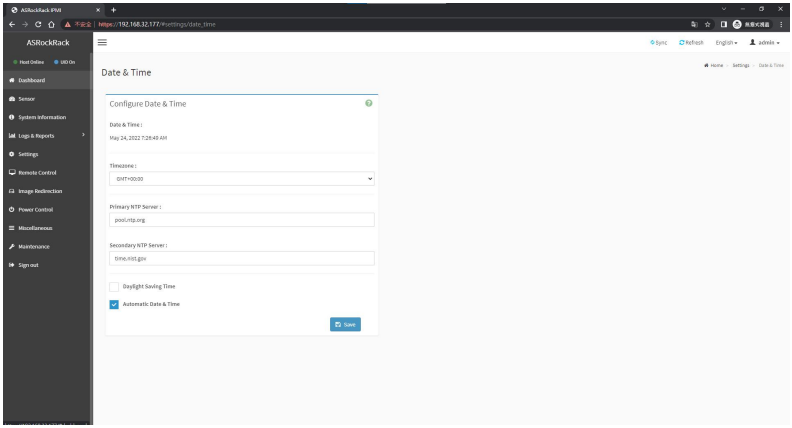
4.6 Setting

This page allows you to configure the BMC settings. Click on an item for more options.



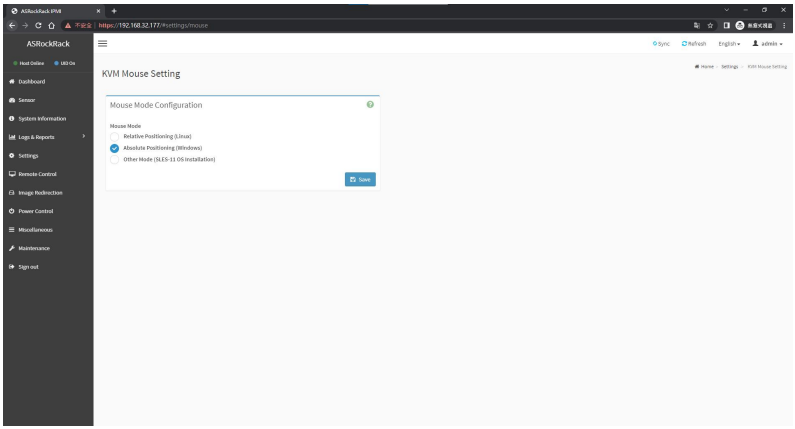
4.6.1 Date & Time

This page allows you to set the date and time on the BMC. You can either select a time zone from the interactive map, or manually set the date and time.



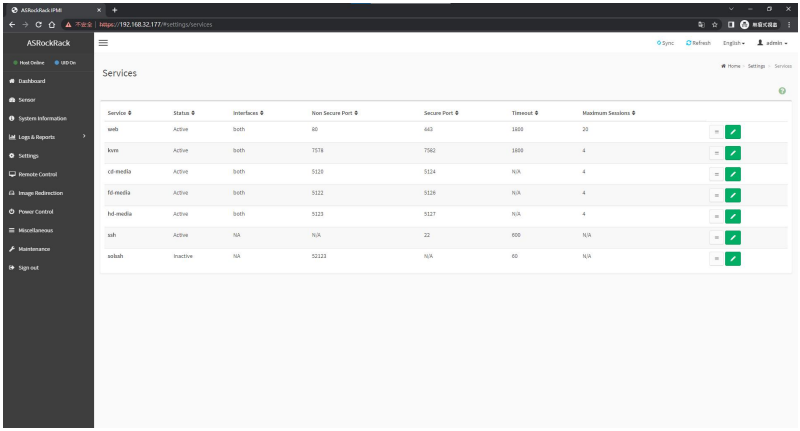
4.6.2 KVM Mouse Setting

This page allows you to set the mouse mode. The Redirection Console handles mouse emulation from local window to remote screen using either of the three methods. Only the Administrator has the permissions to configure this option.



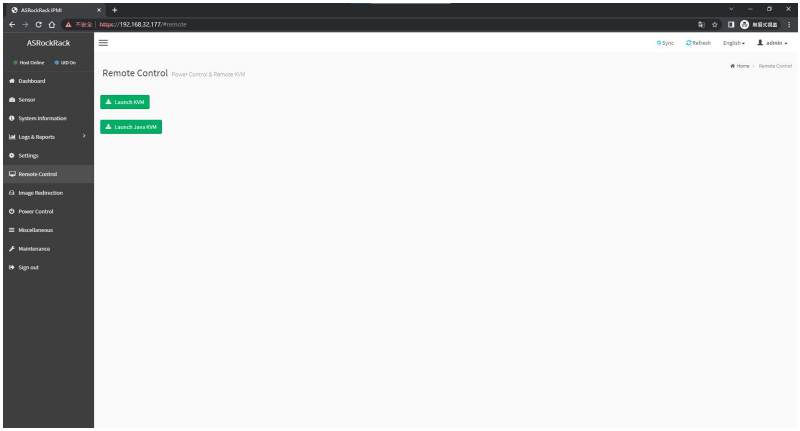
4.6.3 Services

This page lists services running on the BMC. It shows current status and other basic information about the services.



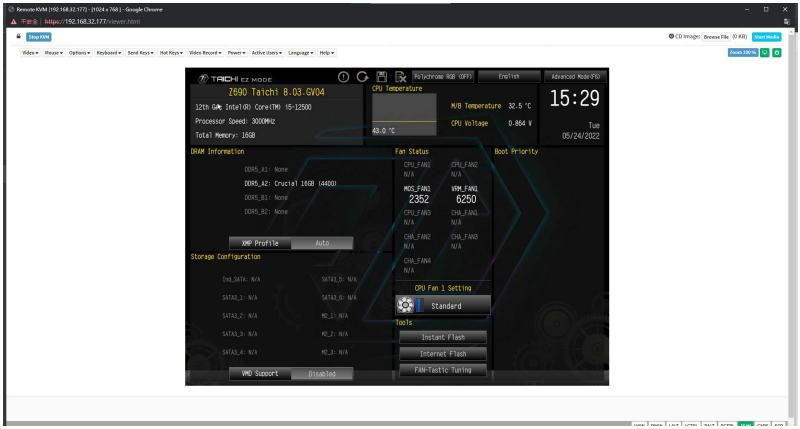
4.7 Remote Control

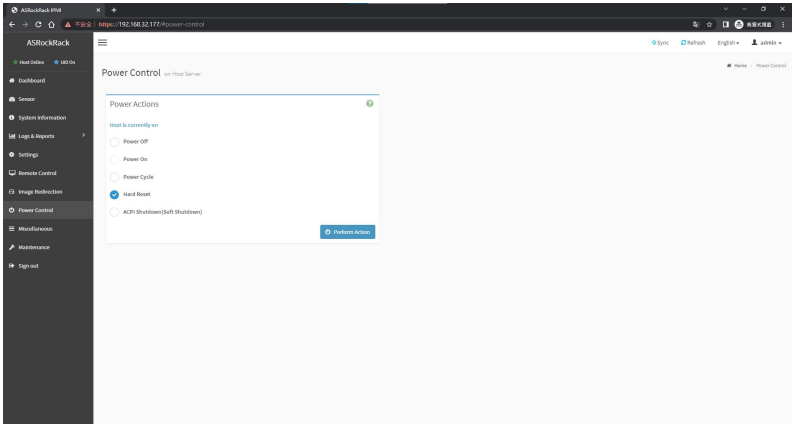
This menu allows you to perform remote operations on the server. Click Launch H5Viewer to start the remote KVM.



4.7.1 Remote KVM Interface

This page lists services running on the BMC. It shows current status and other basic information about the services.



4.8 Power Control

The Power Control displays the current server power status and allows you to change the current settings. Select the desired option, and then click Perform Action to execute the selected action.