



RocketAIC 7608AW (RA7608AW)

Gen5 NVMe AIC SSD User Guide



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Table of Contents

1. Overview	3
1.1. Key Features	3
1.1.1. FRU	4
1.1.2. Synthetic Hierarchy	4
1.1.3. Hardware Secure Boot	4
2. RA7608AW Hardware Description	5
2.1. RA7608AW Layout	5
2.2. PCIe Host Interface	9
2.3. Storage Interface	9
2.4. Basic Specifications	9
3. RA7608AW Installation Instructions	10
4. Revision History	11
Version 1.00, July 1, 2024	11

1. Overview

The RA7608AW is the latest member of our PCIe Gen5 AIC SSD product family.

HighPoint's revolutionary RocketAIC 7608AW NVMe AIC SSD is designed for professionals who demand the highest levels of storage performance and reliability. Armed with 32TB of Pro Class NVMe storage, and capable of delivering 64GB/s of sustained transfer speed, the RocketAIC 7608AW represents a new standard for high-density, high-speed data storage solutions.

RocketAIC 7608AW series NVMe AIC SSDs were designed for off-the-shelf Content Creation Workstation and AI servers manufactured by leading system vendors including Dell, HP and Supermicro, and are capable of accommodating a wide-range of high-performance applications, including AI driven workflows, virtual memory solutions, post-production platforms, and high-speed data ingestion and media capture systems. Each AIC SSD is equipped with the Broadcom's state-of-the-art PCIe Gen5 PCIe switch to maximize the density, performance and reliability of NVMe storage media. The robust casing protects the SSDs and sensitive controller hardware from high-stress working environments, and incorporates a purpose-built cooling system designed to maximize the performance potential of PCIe Gen5 NVMe media.

All major Windows operating systems and current distributions of Linux natively support the RA7608AW. You won't need to juggle a series of device drivers, install a complex software suite, or master a specialized management interface. Your NVMe SSDs will be automatically recognized and can be prepped and mounted using the operating system's standard tool set.

1.1. Key Features

- Dedicated PCIe 5.0 x16 host interface
- Support data transfer rate 64GB/s
- Synthetic Hierarchy
- Software Secure Boot
- Hardware Secure Boot
- FRU Inventory support
- Support LED Management
- Support the following Operating Systems:
 - Windows 11,10/ Server 2022,2019,2016/ Microsoft Hyper-V
 - RHEL/Debian/Ubuntu/Fedora/Proxmox/Rocky Linux (Linux kernel 3.10 and later)

1.1.1. FRU

The *Field Replacement Unit (FRU)* ensures smooth operation and efficient maintenance of complex systems. The unit is designed to house and protect vital product data (VPD).

Information fields within a VPD resource type contain a three-byte header and some data. The three-byte header contains a two-byte keyword and a one-byte length. A keyword is a two-character (ASCII) mnemonic that uniquely identifies the information in the field. The last byte of the header is binary and represents the length value (in bytes) of the following data.

In the event of a hardware failure, the *FRU* can be quickly replaced, returning the device to a fully functional state without requiring extensive diagnostics or data recovery. This reduces downtime and minimizes the possibility of data loss, ensuring that critical operations can continue uninterrupted.

The following table describes the details and descriptions of the VPD.

Table 1: Details and Descriptions of the VPD

Key Word	Details	Descriptions
PN	AIC Part Number	This keyword is an extension to the Device ID (or Subsystem ID) in the Configuration Space header.
EC	Engineering Change Level	The characters are alphanumeric and represent the engineering change level for this add-in card.
MN	Manufacture ID	This keyword is provided as an extension to the Vendor ID (or Subsystem Vendor ID) in the Configuration Space header. This allows vendors to identify an additional level of detail regarding the sourcing of this device.
SN	Serial Number	The characters are alphanumeric and represent the unique add-in card Serial Number.
Vx	Vendor Specific	This is a vendor-specific item, and the characters are alphanumeric. The keyword's second character (x) can be 0 through 9 or A through Z. V0 indicates the Vendor Name V1 indicates the Main Chip

1.1.2. Synthetic Hierarchy

A synthetic hierarchy can be created to isolate the host from these physical PCIe topology changes and errors.

1.1.3. Hardware Secure Boot

The secure boot feature permits only authenticated firmware to execute. The switch boots the root of the trusted firmware from the internal boot ROM (IBR) and uses that firmware to authenticate the external firmware stored in the SPI flash and prevent the execution of unauthenticated code.

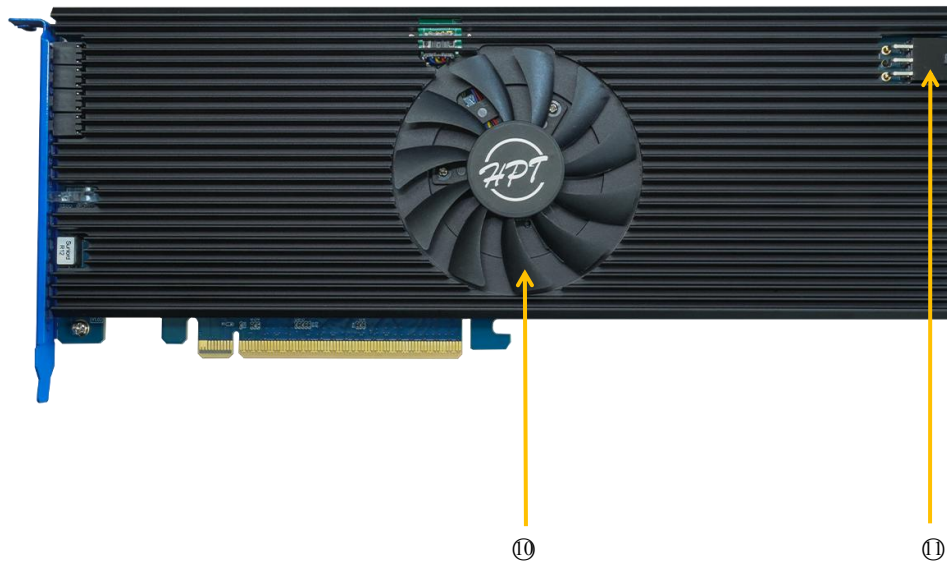
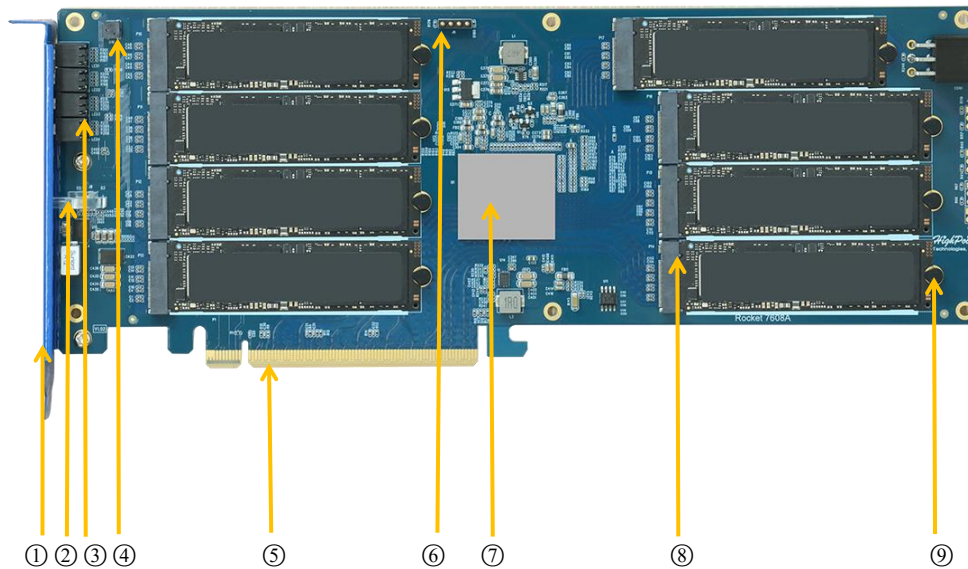
2. RA7608AW Hardware Description

2.1. RA7608AW Layout

The layout of the RA7608AW is presented in two parts.

- **Front View**

The following figure shows the key components of the RA7608AW.



The following table describes the key components of the RA7608AW.

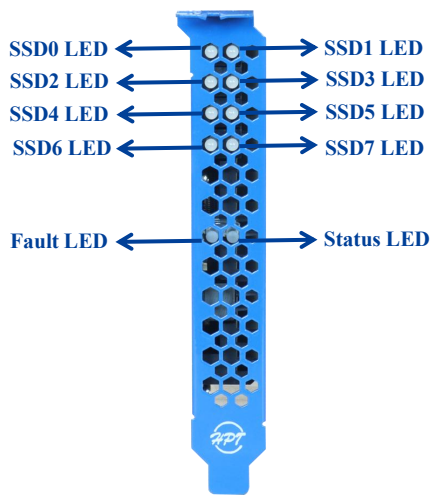
Table 2: Key component of the RA7608AW

Number	Type	Description	
①	Bracket	Full-height bracket. The RA7608AW is secured to the chassis by a bracket.	
②	RGB	Status LED and Fault LED. <ul style="list-style-type: none"> ● Status LED -- The state of RA7608AW PCIe bandwidth. ● Fault LED -- The state of the Broadcom chipset temperature, SSD temperature, and fan speed. 	
③	LED	Eight SSD LED. SSD LED indicates the state of SSD.	
④	Beeper	1-0-1-0-1-0	The SSD has failed.
		1-0-0-1-0-0	The beeper will chirp when any of the following conditions are triggered. <ul style="list-style-type: none"> ● The Broadcom chipset temperature is > 105°C. ● The SSD temperature is ≥ the SSD warning threshold. ● The fan speed is < 600RPM.
		1-1-1-1-1-1	Both “1-0-1-0-1-0” and “1-0-0-1-0-0” above occur simultaneously.
Note: 1 for beeper beeping, 0 for beeper not beeping.			
⑤	PCIe Host Interface	PCIe 5.0 x16 host interface. The interface between the RA7608AW and the host system. With the PCIe interface, this connector provides power to the board.	
⑥	J6	Fan module probe. Used to connect the fan module on the heatsink. Used to power the fan module.	
⑦	Chip	Broadcom PEX 89048 chip.	
⑧	Storage Interface	Eight PCIe 5.0 x4 M.2 connector.	
⑨	Rubber	Eight rubbers. Used to secure the retention hole on the end of the NVMe SSD.	
⑩	Cooling System	Heatsink with a built-in Low-Decibel fan. Used to dissipate heat from electronic components that are prone to heat generation.	
		Smart Fan Control	Low Speed: Situation 1: The SSD temperature is ≤30°C. Situation 2: The Broadcom chipset temperature is ≤40°C.
			Linear Speed: Situation 1: The SSD temperature is between 30°C and 60°C. Situation 2: The Broadcom chipset temperature is between 40°C and 70°C.
			Full Speed: Situation 1: The SSD temperature is ≥60°C. Situation 2: The Broadcom chipset temperature is ≥70°C.

		<p>Note: The fan speed choice depends on the higher temperature of the SSD or Broadcom chipset.</p> <table border="1"> <tr> <td rowspan="5">Manual Fan Control</td> <td>OFF</td> </tr> <tr> <td>Low Speed (ducty cycle: 40%)</td> </tr> <tr> <td>Medium Speed (ducty cycle: 60%)</td> </tr> <tr> <td>High Speed (ducty cycle: 80%)</td> </tr> <tr> <td>Full Speed</td> </tr> </table>	Manual Fan Control	OFF	Low Speed (ducty cycle: 40%)	Medium Speed (ducty cycle: 60%)	High Speed (ducty cycle: 80%)	Full Speed
Manual Fan Control	OFF							
	Low Speed (ducty cycle: 40%)							
	Medium Speed (ducty cycle: 60%)							
	High Speed (ducty cycle: 80%)							
	Full Speed							
①	External power port	The system power supply unit powers the RA7608AW through this port connected to the external 6-pin PCIe power cable.						

● **LED View**










The following figure shows the LED Indicators of the RA7608AW.



The following table describes the SSD LED, Status LED, and Fault LED of the RA7608AW.

Table 3: Description of LED

LED	Color	Status	Description	
SSD LED	○	OFF	The RA7608AW is powered off, or the SSD is not detected.	
		Solid Green	The SSD is detected.	
	●	Fast Flash Green	The LED blinks green at 4 Hz to indicate that the SSD is doing I/O in the PCIe 5.0 x4 status.	
		Interval Flash Green	The LED blinks green twice in the first second, then goes out for one second and continues to cycle this process. This indicates the SSD is doing I/O in the PCIe 5.0 x2 or PCIe 4.0 x4 status.	
		Slow Flash Green	The LED blinks green at 1 Hz to indicate that the SSD is doing I/O at a bandwidth not shown above.	
		●	Solid Red	The SSD has failed.
			Fast Flash Red	The LED blinks red at 4 Hz to indicate that the reinserted disk is in the rebuild state.
	Interval Flash Red		The LED blinks red twice in the first second, then goes	

			out for one second and continues to cycle this process. This indicates the disk is greater than or equal to the SSD warning threshold.
		Slow Flash Red	The LED blinks red at 1 Hz to indicate the disk's location, which can be accessed through the HighPoint RAID Management Software-- Identify LED function. Identify ON means the LED blinks, and Identify OFF means the LED light is restored to its original state.
Status LED		OFF	The RA7608AW is powered off.
		Fast Flash Blue	The LED blinks blue at 4 Hz to indicate that the RA7608AW's bandwidth is PCIe 5.0 x16.
		Fast Flash Green	The LED blinks green at 4 Hz to indicate that the RA7608AW's bandwidth is PCIe 5.0 x8 or PCIe 4.0 x16.
		Fast Flash Yellow	The LED blinks yellow at 4 Hz to indicate that the RA7608AW's bandwidth is PCIe 5.0 x4, PCIe 4.0 x8, or PCIe 3.0 x16.
		Fast Flash Cyan	The LED blinks cyan at 4 Hz to indicate that the RA7608AW's bandwidth is PCIe 4.0 x4 or PCIe 3.0 x8.
		Fast Flash White	The LED blinks white at 4 Hz to indicate that the RA7608AW's bandwidth is PCIe 3.0 x4.
		Fast Flash Red	The LED blinks red at 4 Hz to indicate that the RA7608AW's bandwidth does not appear as above.
Fault LED		OFF	The RA7608AW is powered off or not in error.
		Fast Flash Red	The LED blinks red at 4 Hz to indicate that any of the following have been triggered. <ul style="list-style-type: none"> ● The Broadcom chipset temperature > 105°C. ● The SSD temperature is \geq the SSD warning threshold. ● The fan speed is < 600 RPM.
		Slow Flash Red	The LED blinks red at 1 Hz to indicate that the initialized RAID is not in normal status.
		Solid Red	Both " Fast Flash Red " and " Slow Flash Red " above occur at the same time.

2.2. PCIe Host Interface

The RA7608AW's PCIe 5.0 host interface provides maximum transmission.

Other PCIe host interface features include the following:

- 16-lane PCIe host interface
- Support of x16 link width
- 16-lane aggregate bandwidth of up to 64GB/s

2.3. Storage Interface

The RA7608AW storage interface features include the following:

- Dedicated PCIe 5.0 x4 per port
- Data transfer at 16 GB/s

2.4. Basic Specifications

The following table describes the basic specifications of the RA7608AW.

Table 4: Basic Specifications of RA7608AW

Model		RA7608AW
Form Factor		Full-Height, Single-Width
Card Weight		1.59 lbs
Dimension	Length	11.18"
	Height	4.33"
Power supply		PCIe: 12V($\pm 8\%$), 3.3V ($\pm 8\%$)
Work temperature		+5°C ~ + 55°C
Storage temperature		-20°C ~ +80°C
MTBF (Mean Time Before Failure)		920,585 Hours

3. RA7608AW Installation Instructions

1. Use a wired ESD wrist strap that is properly grounded.
2. Unpack and remove the RA7608AW and check it for damage. If it appears damaged, please get in touch with HighPoint Technical Support.
3. Shut down the system and disconnect the AC power cord.
4. Align the RA7608AW to one of the motherboard's available slots. Press down gently but firmly to seat the RA7608AW correctly in the slot.



5. Connect the 6-pin PCIe power cable to the external power connector on the right side of the RA7608AW. Power up the SSD external power supply.



6. Turn on the power to the system.

4. Revision History

Version 1.00, July 1, 2024

Initial version.