SSD7580C Software Guide

V1.01-Feb 20, 2024

1. Overview

This guide describes how to use the HighPoint Web RAID Management Interface (WebGUI), CLI (command line interface) utility, UEFI utility, UEFI HII, and SafeStorage SED Solution.

This section provides an overview of this guide. It documents the utilities configuring, monitoring, and maintaining SSD7580C NVMe RAID AICs with RAID control capabilities and their storage-related devices.

1.1. HighPoint Software

1.1.1. Web RAID Management Interface (WebGUI)

The Web RAID Management Interface (WebGUI) is a simple and intuitive web-based management tool available for Windows /Linux operating systems. It is an ideal interface for customers unfamiliar with RAID technology. The Wizard-like Quick Configuration menu allows even the most novice user to get everything up and running with a few simple clicks. Experienced users can fine tune configurations for specific applications using the Setting Options menu.

1.1.2. CLI (command line interface)

The CLI (command line interface) is a powerful, text-only management interface designed for advanced users and professional administrators. The universal command lines work with any platform and are shared across our entire product line. Comprehensive user guides are available for the CLI and include the most recent product updates from the Software Updates section of the product category webpages.

1.1.3. UEFI Utility

The UEFI (Unified Extensible Firmware Interface) command line utility is provided in a binary format; no separate installation is required.

1.1.4. UEFI HII

The Human Interface Infrastructure (HII) Configuration Application confers controllers and physical and virtual disks and performs other configuration tasks in a preboot environment.

BIOS provides some of the HII graphical user interface (GUI) keys. Independent hardware vendors tightly control HII RAID management screens. Contact your system vendor if the keys shown in the preceding

figure do not work as expected.

1.1.5. SafeStorage

HighPoint's SafeStorage solution was developed to work in conjunction with industry-standard SED (Self-encrypted drive) technology supported by OPAL v2.0 compliant M.2 and U.2/U.3 NVMe media and is based on the OPAL SSC TCG (Trusted Computing Group) specifications. It is designed to protect data assets when physical disks are misplaced or stolen by preventing unauthorized access to stored data.

SafeStorage can be applied to single-disk and RAID configurations and is activated via a service known as Drive Security, which can be administered via our software management.

1.2. Key Features of the SSD7580C

- RAID levels 0, 1, 10, Single

- Fast initialization for quick array setup

- Check Consistency for background data integrity

- Self-monitoring, Analysis, and Reporting Technology (S.M.A.R.T) support

- Storage Health Inspector

- SMTP Email Alert Notification

- Automatic and configurable RAID Rebuilding Priority

- Auto resume incomplete rebuilding after power on or reboot system

- Single-RAID or Multi-RAID Arrays per Controller

- Cross-Sync RAID Solution Across Controllers

- Flash ROM for Upgradeable UEFI

- Bootable RAID Array

- Multiple RAID Partitions supported

- Online Array Roaming

- Global Hot Spare Drive support

- RAID Management software for SafeStorage

1.3. HighPoint RAID Technology

This section discusses HighPoint NVMe RAID Technology and the RAID Levels supported by the SSD7580C AIC.

1.3.1. RAID Technology

RAID is an array or group of multiple independent physical disks that provide high performance and fault tolerance. RAID disk groups improve I/O (input/output) performance and reliability. RAID disk groups appear to the host computer as a single storage unit or multiple virtual units. RAID disk groups appear to the host as one storage unit or multiple virtual units, which speeds up I/O transactions because multiple disks can be accessed simultaneously.

1.3.1.1. NVMe RAID technology

It's no surprise that NVMe media is ideal for RAID applications. NAND flash media is exponentially faster and far more reliable than platter-based storage media, and HighPoint's proven NVMe RAID stack was developed to build on these strengths. Customers can employ our RAID technology to exploit the full potential of their NVMe storage investments and fine-tune RAID configurations to deliver mind-blowing transfer performance!

HighPoint's NVMe RAID technology was engineered to fully leverage the Broadcom PCIe Switch technology employed by our NVMe RAID AICs and Enclosures to maximize the performance and reliability of NVMe storage configurations for x86 Intel/AMD computing platforms. The technology is unique to our SSD7xxx product lines (RAID AICs and Enclosures), requiring a HighPoint RAID Stack solution for the host operating system.

1.3.1.2. Core NVMe RAID Technology

HighPoint's NVMe RAID Stack solution is available for various hardware platforms and operating systems. It comprises our RAID and Storage technology, Product Specific Host & Device driver, and RAID Storage management and monitoring suite.

Our NVMe RAID stack was designed to leverage Broadcom's industry-leading PCIe Switch chipsets to optimize x16 lanes of upstream bandwidth, minimize latency, maximize port density, and allocate dedicated x4 lanes of downstream bandwidth to each device channel at all times. These characteristics are ideal for

industrial and business applications requiring storage solutions that maximize I/O transfer performance.

1.3.2. RAID Levels

The SSD7580C NVMe RAID AIC supports the following RAID levels:

- RAID0
- RAID1
- RAID10

The following table provides an overview of RAID level reference:

Table 1: RAID Level Reference Guide

Type	Description	Min disks	Usable space	Advantage	Disadvantage	Application
RAID0	Disk Striping	1	100%	Offers the highest performance	No fault tolerance - failure of one disk results in complete data loss	Temporary file, performance-driven application
RAID1	Disk Mirroring	2	50%	Provides convenient, low-cost data redundancy for smaller systems and servers	Useable storage space is 50% of the available capacity and can handle 1 disk failure.	Operating system, backup, and transaction database
RAID10	Striping with Mirroring	4	100%	High read performance and medium write performance with data protection for up to 2-disk failures	Useable storage capacity equals the total capacity of all disks in the array minus two.	Fast database and application servers that need performance and data protection

1.3.3. RAID Configuration Strategies

Select the optimal RAID level when you create a system disk. The optimal RAID level for your disk group depends on several factors:

- The number of disks in the RAID group

- The capacity of the disks in the RAID group

- The need for data redundancy

- The disk performance requirements

Please refer here to choose the RAID level that best suits your needs.

1.3.4. Data Redundancy

Data integrity and availability are critical for many data processing and storage systems. Businesses want to avoid data loss and financial loss due to server failures. RAID can help you maintain data integrity and availability by preventing the servers that provide the data from going down.

RAID provides various features, such as spare disks and rebuilds, that can be used to repair any disk problems while keeping the servers running and the data available. These features are described in the following subsections.

1.3.4.1. Spare Disks

You can use spare disks to replace failed or defective disks in a disk group. A replacement disk must be at least as large as its replacement. Spare disks include hot swaps, hot spares, and cold swaps support.

If a disk used in a RAID group fails, the spare disk automatically takes its place, and the data on the failed disk is rebuilt on the spare disk.

Notes:

The backplane and chassis must support the hot-swap feature to work properly.

A cold swap requires powering down the system before replacing a defective disk.

Available for RAID1 and RAID10.

1.3.4.2. Rebuilding

If a disk fails in a RAID group configured as a RAID1/ RAID10, you can recover the lost data by rebuilding the disk. If you have configured spare disks, the NVMe RAID AIC automatically attempts to use them to rebuild failed disks.

If there is no spare disk with sufficient capacity or a spare disk is not configured to rebuild the failed disk, you must rebuild it manually. A disk with sufficient storage must be inserted into the system before the failed disk can be rebuilt manually.

Note: When a disk fails, the NVMe RAID AIC will take the disk offline. Once you have configured spare disks or replaced the disk, the NVMe RAID AIC will not automatically rebuild the array unless this "Enable auto rebuild option" is enabled.

2. Web RAID Management Interface (WebGUI)

This section describes how to use the Web RAID Management Interface.

2.1. Starting the Web RAID Management Interface (WebGUI)

2.1.1. For Windows Users

1. Double-click the Desktop ICON to start the software using the system's default web browser. It will automatically log in to the WebGUI.

2. The password can be set after the first login. To change the password, select **Setting➔Password Setting** from the menu bar.

2.1.2. For Linux Users

1. Enter http://127.0.0.1:7402 or localhost:7402 into the browser to log into the WebGUI; 7402 is the WebGUI's Port Number, which can be modified.

2. The password can be set after the first login. To change the password, select **Setting➔Password Setting** from the menu bar.

2.2. Using the Web RAID Management Interface (WebGUI)

Global View	Physical	Logical	Setting	Event	SHI	Help

In the WebGUI view, if it detects any new events, it checks and updates the controller status, disk counts, disk group counts, virtual disk counts, and so on.

You can hot-plug physical disks in the WebGUI view and monitor these counts. The WebGUI also displays the number of virtual and physical disk operations in progress.

- Select **Global View** to view the status of the SSD7580C NVMe RAID AIC. For more information, see **Global View**.

- Select **Physical** to view the general and extended information about the SSD7580C NVMe RAID AIC you use. The SSD7580C Hardware base information is all located here. Information about the connected disk is also displayed. For more information, see **Physical**.

- Select **Logical** to create, delete, and maintain your RAID configurations and add disks to the spare pool. It also enables the disk or SSD7580C NVMe RAID AIC security. For more information, see **Logical** and **SafeStorage**.

- Select **Setting** to change the port number that the HighPoint HRM listens on, temperature unit, rebuild priority, and whether or not to enable auto-rebuilding, rebuilding on error, restrict to localhost, and collecting system log. For more information, see **Setting**.

- Select **Event** to monitor the activity and performance of all AICs in the workstation and the attached disks. When an event occurs, an event message appears in this window. For more information, see **Event**.

- Select **SHI** to view information about hosted NVMe SSDs via SMART (Self-Monitoring Analysis and Reporting Technology) Technology. The data provided by this tab helps you anticipate any disk failures based on various monitored disk properties. For more information, see **SHI**.

- Select **Help** to access our Online Support Portal and Diagnostic View. The Diagnostics view includes all the necessary hardware and software information. You can compile and save this information and store configuration data as a log file. For more information, see **Help**.

2.3. Global View

The Global view provides an overview of what each AIC connected to your computer detects. It is also the first page you see when logging in.

Note: the picture is only for reference; please make the object the standard.

A drop-down menu on the top left of the page allows you to select which controller you want to manage (if you have multiple HighPoint products connected).

2.3.1. HBA Properties

- **Host Adapter model** — The name of the HighPoint product or solution.
- **Controller Count** — The number of the AICs detected.
- **Enclosure Count** — The number of external enclosures detected.
- **Physical Drives** — The number of disks hosted by the AIC.
- **Legacy Disk** — The number of Legacy disks connected. Legacy disks are physical disksthat have previous partitions stored on them.
- **RAID Count** — The number of RAID arrays.

2.3.2. Storage Properties

- **Total capacity**: the combined capacity of each disk connected to the AIC.
- **Configured capacity**: the amount of space used for creating RAID arrays.
- **Free Capacity**: the total amount of space unused.

2.4. Physical
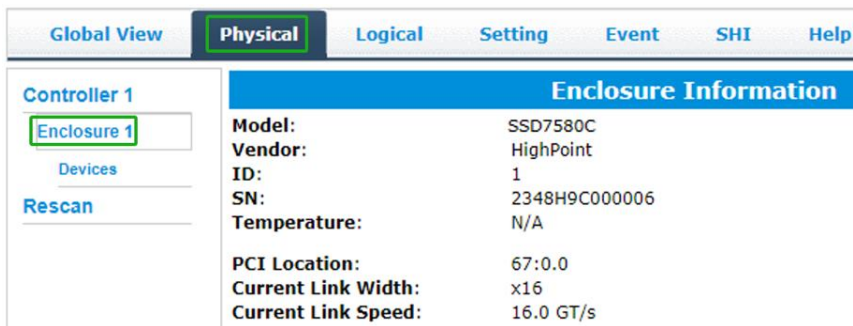
The **Physical** tab shows general and extended information about the SSD7580C and any hosted NVMe SSDs.

2.4.1. Controller Information

- **Model** — The name of the HighPoint AIC.

- **Vendor** — The Manufacturer of the AIC.

- **SN** — The AIC Serial Number

- **Temperature —** Temperature of the controller's sensor

- **PCI Location —** The Location of AIC in the system

- **Current Link Width —** The PCIe width occupied by the current AIC.

- **Current Link Speed —** The Rate of current bandwidth.
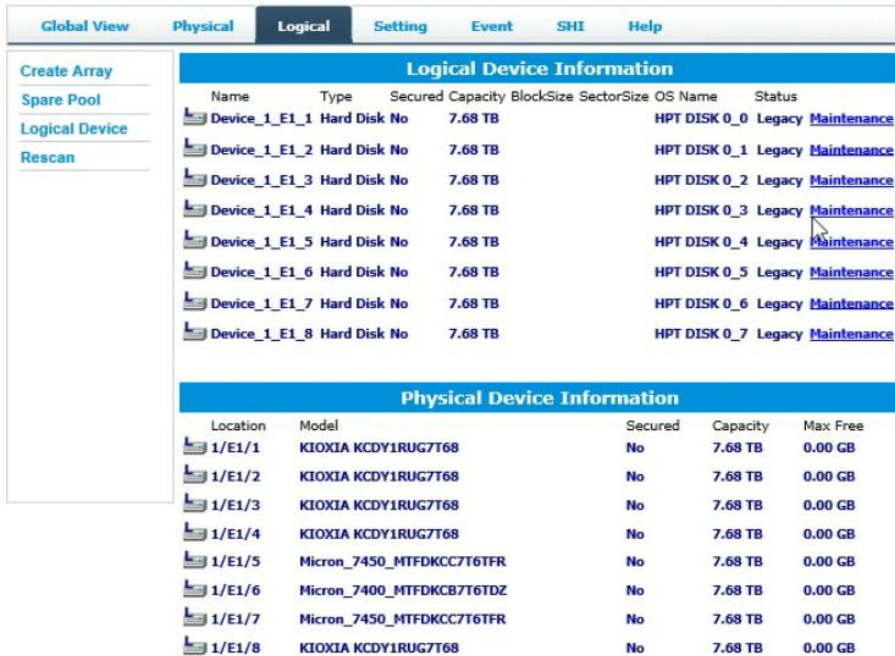
2.4.2. Devices Information

- **Model** – Model number of the physical disk

- **Capacity** – Total capacity of the physical disk

- **Revision** – Disk firmware revision number

- **Location** – Disk location (example: 1/2 states controller 1, slot 2)

- **Max Free** – Space on disk that is not configured in an array

- **Status** – (Normal, disabled, critical) Status of the disk

- **Serial Number** – Serial number of the physical disk

- **Interface** – Interface of the physical disk

- **Type** – Type of the physical disk

- **PCIe Width** – PCIe width of the current disk

- **PCIe Speed** – PCIe speed of the current disk

- **SED Capable** – Whether the disk supports the SED feature

- **SED Type** – SED type of the disk

- **Secured** – Whether the disk is secured

- **Cryptographic Erase Capable** – Whether the disk supports the Cryptographic Erase feature

- **Unplug –** Safely eject the selected disk. Other methods of disk removal will trigger an alarm if enabled.

2.5. Logical

The **Logical** tab is where you can create, delete, and maintain your RAID configurations and add disks to your spare pool.

The logical tab has the following settings:

- Creating an Array

- Adding a Spare Disk

- Removing a Spare Disk

- Logical Device Information

- Physical Device Information

- Rescan

- Deleting an Array

The following sections describe the Logical Tab.

2.5.1. Create an Array

An array is a collection of physical disks that will be one virtual disk by your Operating System (OS). You need to follow the steps below to create an array.

1. Open the **WebGUI**.

2. Select the proper **AIC** from the drop-down on the top left.

3. Click the **Logical** tab.

4. Click **Create Array.**

Example screenshot

2.5.1.1. Array Creation Profile Options

● **Array Type**

This drop-down menu allows you to specify the RAID level.

- **RAID0**

- **RAID1**

- **RAID10**

Note: The newly accessed disks are not used to create a RAID array and are defaulted to single disks.

● **Array Name:**

The name that will be displayed in the Logical Device.

- Information (Default: RAID_<level>_<array number>)

● **Secure:**

Be able to use the disk/array's SED capabilities. (for more information, see [SafeStorage](#)).

● **Initialization Method:**

Initialization of a disk sets all data bits to 0, clearing all the data on the disk. It is important to initialize disks as previous data physically stored on the disk may interfere with new data.

- **Keep Old Data:** This option skips the initialization process, and all data on each physical disk of the array will be untouched.

- **Quick Init:** This option grants immediate access to the RAID array by skipping the initialization process, but it will delete all data. This method is recommended for NVMe storage.

- **Foreground:** The array initialization process will be set at high priority. During this time, the array is not accessible, but the initialization process will complete much faster. (Not Recommended)

Foreground initializing the array will completely zero out the data on the disks, meaning the disk will be completely wiped, and every bit on the disk will be set to 0.

- **Background:** The array initialization process will have a lower priority. During this time, the array will be accessible, but the initialization process will take much longer to complete. (Not Recommended)

Background initialization means the array will still be created, and you can still write new data onto the array. But when your array requires rebuilding, residual data left behind may interfere with the process.

Important Note: The foreground and Background Initialization options were intended for use with hard disk drives and are not recommended for NVMe storage. These options will cause NVMe media to result in TBW degradation and performance loss. Initialization of a disk sets all data bits to 0, clearing all the data on the disk. It is important to initialize disks as previous data physically stored on the disk may interfere with new data.

● **Block Size (default: 512K)**

- **128K**

- **256K**

- **512K**

Adjusting the block size towards your disk usage can result in some performance gain.

In a typical RAID configuration, virtual disk data is striped (or spread across) the physical disks. A smaller array block size will increase the likelihood of accessing all physical disks when processing large I/O requests. Multiple physical disks working in parallel increase the throughput, meaning better performance.

For smaller I/O requests (512 bytes to 4 kilobytes), it is better to have each disk handle its own I/O request,

improving the IOPS (I/O per second), rather than having one tiny I/O request being handled by multiple disks.

- **Capacity (Default: Maximum)**

This section allows you to set the total space you want the RAID array to use. When creating RAID levels, disk capacities are limited by the smallest disk.

An example of how the smallest disk limits disk capacities:

- You have 2 disks connected to the SSD7580C.

- The first disk is 6 TB, the second is 4 TB.

- After creating a RAID level 1 using both disks and maximum capacity, the first disk will have 2 TB, and the second will have 0 TB free capacity.

- The free capacity on the second disk can be used to create a separate array with other disks.

2.5.2. Adding a Spare Disk

You can use spare disks to replace failed or defective disks in a disk group. A replacement disk must be at least as large as its replacement. Spare disks include hot swaps, hot spares, and cold swaps.

If a disk used in a RAID group fails, the spare disk automatically takes its place, and the data on the failed disk is rebuilt on the spare disk.

This feature minimizes the chances of data loss by reducing the time an array is in critical status.

Example screenshot

1. Open the **WebGUI**.

2. Click **Logical**.

3. Click **Spare Pool**.

4. Check the box for the disk you want as a spare under **Available Disks.**

5. Click **Add Spare** and confirm by selecting **OK** from the pop-up window.
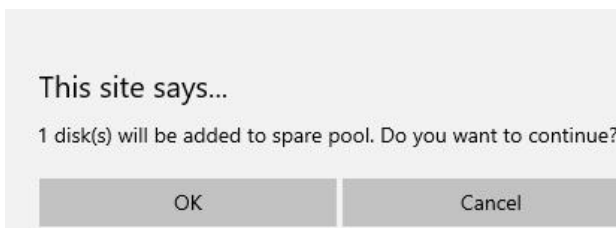
6. The disk has now been assigned as a spare. Click **OK** to confirm.
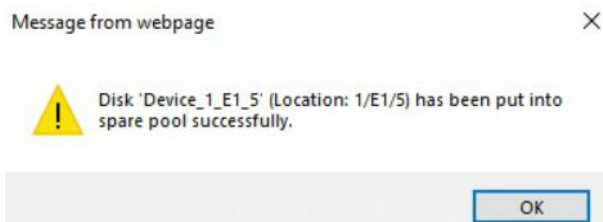
2.5.3. Removing a Spare Disk

Disks added to the spare pool will be displayed under the **Spare Pool**. You can also remove disks from the Spare Pool.
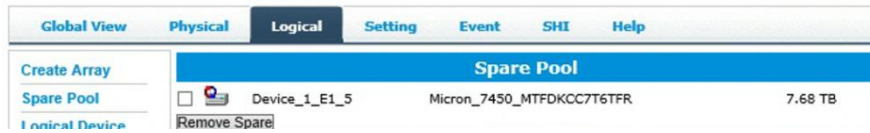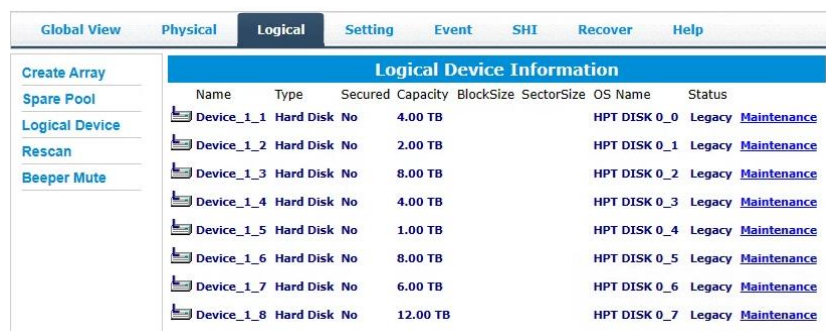
1. Open the **WebGUI**.

2. Click **Logical**.

3. Click **Spare Pool**.

4. Select the spare disk from the Spare Pool.

5. Click **Remove Spare.**

2.5.4. Device Information

Logical device tab is the default page upon clicking the Logical tab of the WebGUI. Thispage contains information about your RAID arrays and individual disks your system detects.

2.5.4.1. Logical Device Information

Arrays you create and the properties associated with them will appear here.

● **Maintenance**
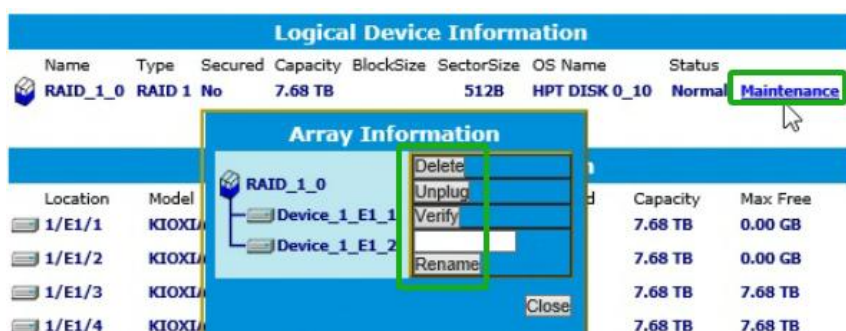
Once an array has been created, click maintenance for options to manage your array.

● **Array Information**

Clicking on the maintenance button will show you the Array information box. Different array statuses (Normal, critical, disabled) will have different maintenance options.

2.5.4.2. Array Information &Maintenance Options

● **Normal Status**

Arrays with the **Normal** status are healthy and functioning properly and have the following options:

- **Delete** – deletes the selected RAID array.

- **Unplug** – to ensure data security, if you want to unplug NVMe while the system works, click unplug first and then unplug NVMe.

- **Verify** – verifies the integrity of the RAID array (**only support RAID1/10**)

- **Rename** – renames the RAID array.

● **Critical Status**
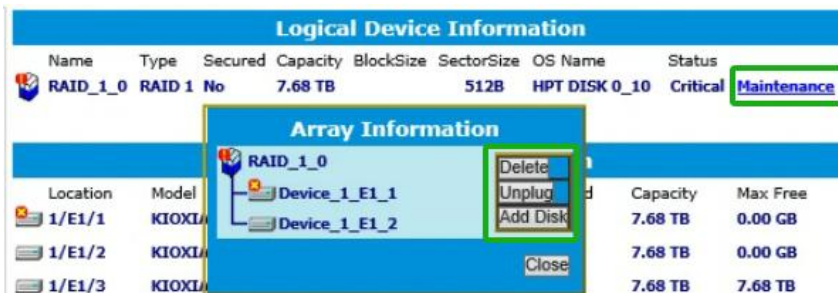
Arrays with the **Critical** status can be accessed and utilized but are no longer fault tolerant. A Critical array should be rebuilt as soon as possible to restore redundancy.

A critical status array has all the normal status options except the following:

- The Array can no longer be renamed

- **Add Disk** replaces the **Verify Disk** option

Once the array status changes to critical, the faulty disk will be taken offline, and you can either:

- Reinsert the same disk

- Insert a new disk

Reinserting the same disk should trigger the rebuilding status since data on the disk would be recognized.

If you insert a new disk, clicking **Add Disk** will allow you to select and add it to the array.

● **Disabled Status**

An array with the **Disabled** status means that the RAID level does not have enough disks to function.

- Your data will be inaccessible.

- Rebuilding will not trigger since the RAID array does not have enough parity data to rebuild.

Your option in Maintenance is:

- **Delete** – will delete the array.

2.5.4.3. Physical Device Information

Location	Model	Secured	Capacity	Max Free
1/E1/1	KIOXIA KCDY1RUG7T68	No	7.68 TB	0.00 GB
1/E1/2	KIOXIA KCDY1RUG7T68	No	7.68 TB	0.00 GB
1/E1/3	KIOXIA KCDY1RUG7T68	No	7.68 TB	0.00 GB
1/E1/4	KIOXIA KCDY1RUG7T68	No	7.68 TB	0.00 GB
1/E1/5	Micron_7450_MTFDKCC7T6TFR	No	7.68 TB	7.68 TB
1/E1/6	Micron_7400_MTFDKCB7T6TDZ	No	7.68 TB	7.68 TB
1/E1/7	Micron_7450_MTFDKCC7T6TFR	No	7.68 TB	7.68 TB
1/E1/8	KIOXIA KCDY1RUG7T68	No	7.68 TB	7.68 TB

The disks hosted by the AIC will appear here.

- **Location** – which AIC and port the disk is located in.

- **Model** – model number of the disk connected.

- **Capacity** – total capacity of the disk.

- **Max Free** – total capacity that is not configured.

2.5.5. Rescan

Clicking **Rescan** will ask the driver to recheck and report the array status.

When **Rescan** is initiated by the WebGUI, the driver will immediately check and see whether the status of any disk has changed. If any changes occur, the disks and RAID array status will be updated to reflect this.

- **Disk Status** – if any disks were added or removed, or if a disk is no longer responding, the status will change.

- **RAID status** – the RAID array's status may change depending on the status of the disks.

2.5.6. Delete an Array

1. Open the **WebGUI**.

2. Click the **Logical → Maintenance**.

3. Click **Delete** to delete the RAID array.
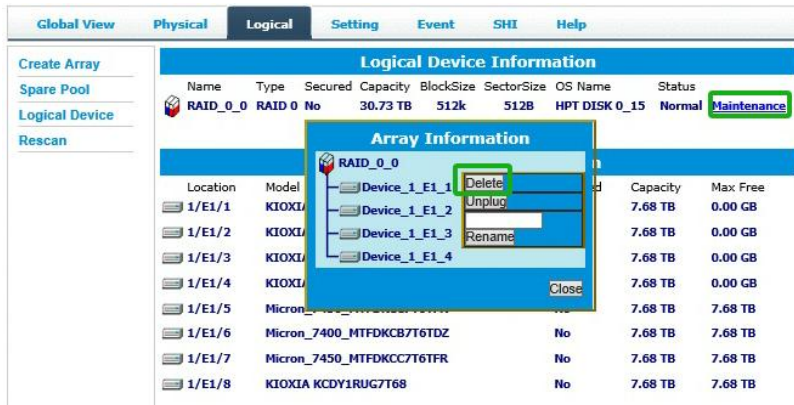
4. A pop-up box on the page.   Click **OK** to confirm the RAID array deletion.

5. There is no deleted RAID array information at Logical Device Information, indicating that the RAID array deletion operation is complete.

Notes:

When the RAID array is in the rebuild, verify foreground/background init status or be mounted; deleting the RAID array will prompt in use.

When the RAID array is rebuilt, verify the foreground and background init status. If you want to delete the RAID array, you can choose to stop the current operation and continue to delete the RAID array.

When the RAID array is mounted, if you want to delete the RAID array, you can unmount the RAID array and continue to delete it.

If you want to use a single disk after deleting the RAID, please restart the system after deleting the RAID. When the single disk status shows the Legacy status in WebGUI, it can be used normally.

2.6. Setting

●**Windows WebGUI Setting Tab:**

●**Linux WebGUI Setting Tab:**

You can change the WebGUI settings in the **Setting** tab according to your preferred behavior and requirements.

Using this tab, you can change the following:

● Enable auto-rebuilding

● Enable rebuilding on error

● Restrict to localhost

● Set rebuild priority

● Set Enclosure Fan Speed[1]

● Change port number

● Collecting system log[1]

● Change Temperature Unit[1]

- Change HRM password

- Adding Recipients to receive notification mail

Note: [1] *This setting is only supported by the Windows HighPoint RAID Management Software.*

2.6.1. System Setting

- **Enable auto rebuild**

(default: Enabled)

When a physical disk fails, the controller will take the disk offline. Once you re-insert or replace the disk, the controller will only automatically rebuild the array if this option is enabled.

- **Enable continue rebuilding on error**

(default: Enabled)

When enabled, the rebuilding process will ignore bad disk sectors and continue rebuilding until completion. When the rebuild is finished, the data may be accessible but also inconsistent due to any bad sectors that were ignored during the procedure. HighPoint recommends checking the event log periodically for bad sector warnings if this option is enabled.

- **Restrict to localhost access**

(default: Enabled)

Remote access to the controller will be restricted when enabled; other users in your network cannot log in to the HRM remotely.

- **Rebuild Priority**

(default: Medium)

You can specify the amount of system resources you want to dedicate to rebuilding the array. There are 5 levels of priority [Lowest, Low, Medium, High, Highest]

- **Set Enclosure Fan Speed**

(default: Auto)

The default fan speed is Auto. You can adjust the speed of the fan. There are 5 levels [Auto, Off, Low, Medium, High]

- **Port Number**

(default: 7402)

The default port that the HighPoint HRM listens on is 7402. You may change it to any open port.

- **Enable collecting system logs**

(default: Disabled)

You can set it to enable the collection of system logs at any time. The collected system logs are stored on the **C:/Windows/hpt_diagdriver.** The maximum capacity of the collected system log is 800MB, and parts exceeding 800MB will be overwritten forward.

- **Temperature Unit**

(default: °F)

The default temperature unit is Fahrenheit. You can change it to Celsius.

Note: The temperature unit function is only supported by windows.

2.6.2. Password Setting

2.6.2.1. Changing your HRM (HighPoint RAID Management) password

Under **Password Setting**, type your new password, confirm it, then click **Submit**.

2.6.2.2. Recovering your HRM (HighPoint RAID Management) password

If you forget your password, you can delete the file hptuser.dat. Then, restart the computer and open the WebGUI to set a new password.

- **For Windows Users:**

1. Open **File Explorer**.

2. Navigate to **C:/Windows/**

3. Delete **hptuser.dat.**

4. Reboot.

- **For Linux Users:**

If you forget your password, you can't recover it; you can only uninstall the HighPoint RAID Management software and then reinstall it.

2.6.3. Email Setting

You can instruct the controller to send an email to the recipients of your choosing when certain events trigger.

2.6.3.1. SMTP Setting

To set up email alerts:

1. Check the **Enable Event Notification** box.

2. Enter the ISP (Internet service provider) **Server Address** name or SMTP name.

3. Type in the **email address** of the **sender.** (email account that is going to **send** thealert)

4. Type in the account **name and password** of the **sender**.

5. Type in the **SMTP port** (default: **25**).

6. Check the **Support SSL** box if SSL is supported by your ISP (port value will change to **465**, refer to your ISP if you have a specific SMTP port.

Note: After you click 'Change Setting' the password box will become blank.

2.6.3.2. Email Precautions

If you want to receive notification mail using a Webmail account, you may need to modify the mailbox's permissions. The following example is for a Yahoo and Outlook webmail account.

- **Yahoo Setting**

To change permission settings, please refer to the following link:

https://help.yahoo.com/kb/account/SLN27791.html?impressions=true

1. Log in to Yahoo email; click "**Sign in**" to log in: https://www,yahoo.com

2. After a successful login, click "**Account Info**" under the user name:
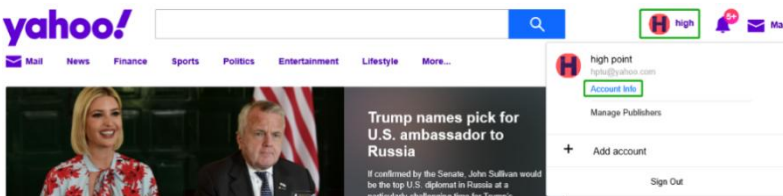
3. Go to the "**Account Info**" page and click "**Account Security**".

   On the "Account Security" page, click the "**Allow apps that use less secure sign-in**" button:
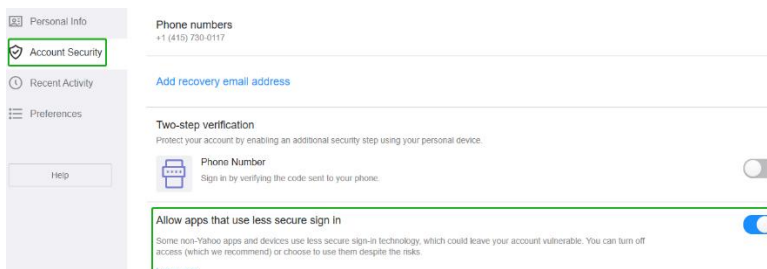
- **Outlook Setting**

1. Sign in to mail and set it up. Login email address link: https://outlook.live.com/mail/inbox
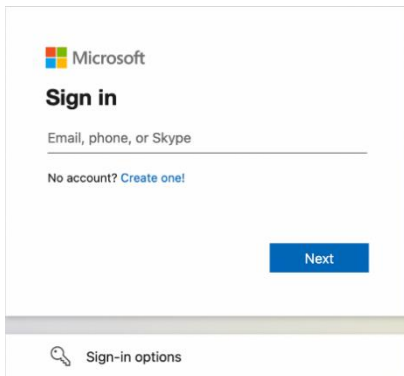
2. Click **Settings** in the upper right corner and select the lower left corner: **View all outlook settings.**
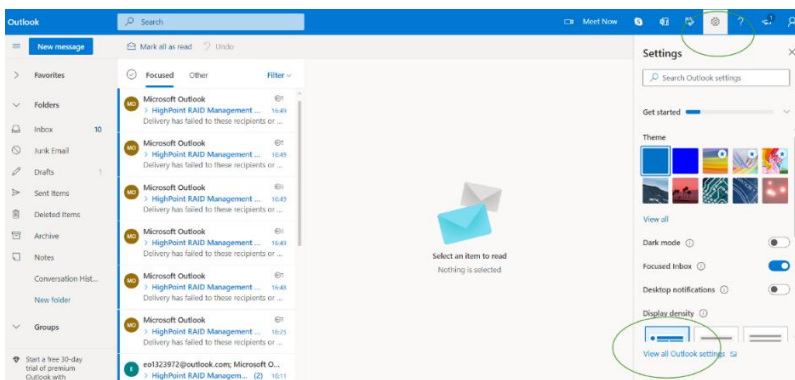
3. Enter the redirect page, select **mail**, then click **Sync email.**
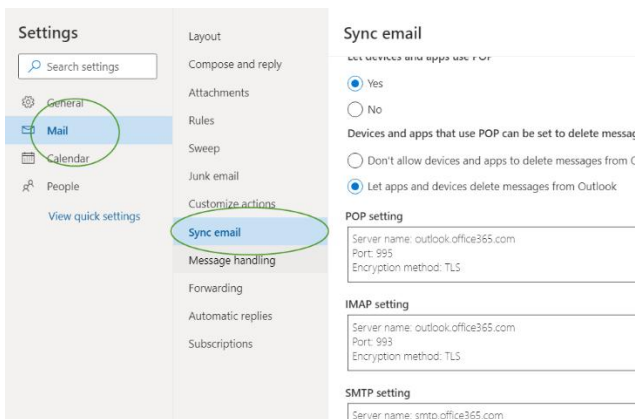
4. Let devices and apps use pop select "**yes**".

5. Choose "**Let app and devices delete messages from Outlook**".
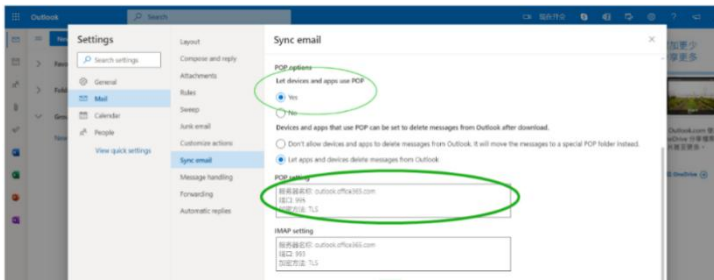
Note: If you are having trouble configuring notifications for your Email account, please contact our Technical Support Department
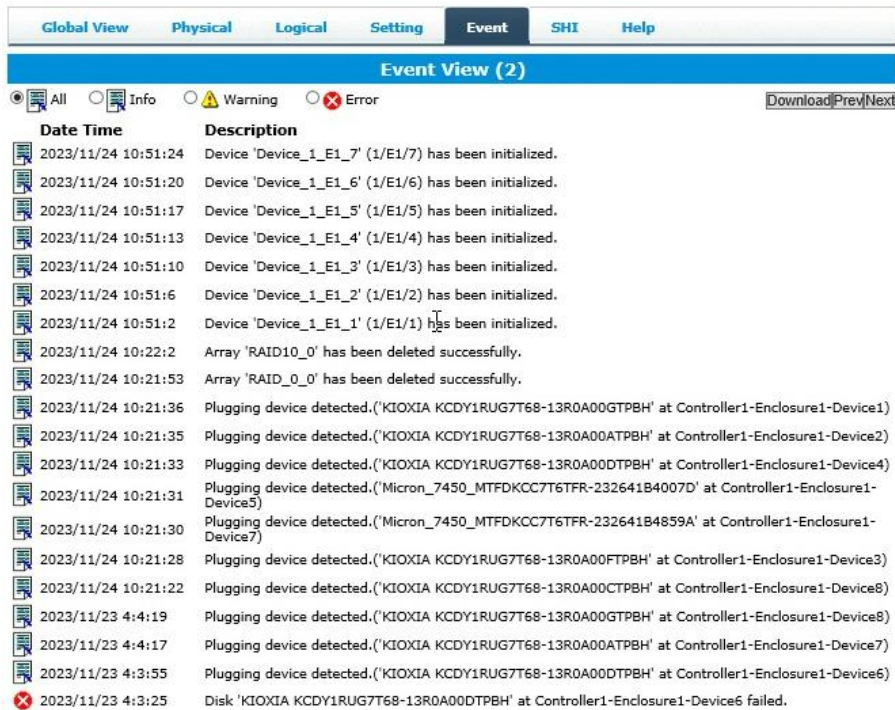
2.6.3.3. Adding Recipients

You can add multiple email addresses as receivers of a notice.

1. Type the email of the recipient in the **E-mail** text box.

2. Type the name of the recipient in the **Name** text box.

3. Check which type(s) of events will trigger an email in the respective **Event Level** check boxes.

4. (**Optional**) Click **test** to confirm settings are correct by sending a test email.

5. Click **add** to add the recipient list.

6. The added recipient will be displayed under **Recipients.**

7. The email will send your recipients the output recorded in the event log.

2.7. Event

The event view is a basic error-logging tool built into the HighPoint WebGUI.

Log entries associated with the HighPoint device are in the event tab. The event log provides useful information when troubleshooting your setup.

2.7.1. View the Event Log

On this page, you can view the event log of RAID creation, RAID deletion, disk drop, disk up, etc..

You can switch between event view by clicking on **Prev** and **Next**.

● **Prev** – View the previous log page

● **Next** – View the next log page

2.7.2. Download the Event Log

You can click **Download** to save the log file on your system**.**

2.7.3. Event Log Icon Guide

The following table describes the Event Log Icon.

Icon	Name	Definition
	Information	Includes general administrative tasks: • Create/delete arrays • Configuring spares • Rebuilding arrays • Configuring event notifications • Configuring maintenance
	Warning	Alerts issued by the HostAdapter: • High temperatures • Sector errors • Communication errors • Verification errors
	Error	Hardware related problems • Disk failure • Broken errors • Memory failure

2.8. SHI

SHI outputs information collected using SMART (Self-Monitoring Analysis and Reporting Technology) Disk Technology. The data provided on this tab helps you anticipate any disk failures based on various monitored disk properties.

Global View	Physical	Logical	Setting	Event	SHI	Help		

Storage Health Inspector(SHI)

Controller ID	Location#	Device Serial Number	RAID	°F	Total Bytes Written	S.M.A.R.T
1	E1_1	13R0A00GTPBH	None	105	210.39 TB	Detail
1	E1_2	13R0A00ATPBH	None	105	240.24 TB	Detail
1	E1_3	13R0A00FTPBH	None	105	251.34 TB	Detail
1	E1_4	13R0A00DTPBH	None	107	131.31 TB	Detail
1	E1_5	232641B4007D	None	95	104.13 TB	Detail
1	E1_6	2316423C35A4	None	105	60.84 TB	Detail
1	E1_7	232641B4859A	None	96	123.61 TB	Detail
1	E1_8	13R0A00CTPBH	None	107	84.15 TB	Detail

HDD Temperature Threshold

Set harddisk temperature threshold : 149 °F Set

2.8.1. Start SMART Monitor

To access the SMART attributes of an individual disk:

1. Log in to the **WebGUI**.

2. Select the proper AIC using the drop-down menu on the top left.

3. Click the **SHI** tab.

4. Click **Detail** on the desired disk.

Note: *The **TBW** (Total Bytes Written) information can be used to monitor the lifespan of the NVMe disks.*

2.8.2. Set Temperature Threshold

Note: 65℃ *is the default. This setting can be adjusted to correspond with the manufacturer's official specifications.*

1. Log in to the **WebGUI**.

2. Select the proper AIC using the drop-down menu on the top left.

3. Click the **SHI** tab.

4. Input temperature value.

HDD Temperature Threshold		
Set harddisk temperature threshold : 149	°F	Set

5. If the temperature exceeds 149°F, it will display "**Red**".

Global View	Physical	Logical	Setting	Event	SHI	Help		
								Schedule

Storage Health Inspector(SHI)							
Controller ID	Location#	Device Serial Number	RAID	°F	Total Bytes Written	S.M.A.R.T	
1	E1_1	S463NF0K409595F	None	150	1023.91 TB	Detail	
1	E1_2	S5JYNS0N602754T	None	111	75.45 TB	Detail	

HDD Temperature Threshold		
Set harddisk temperature threshold : 149	°F	Set

2.8.3. Using Health Inspector Scheduler

The **Health Inspector Scheduler (HIS)** enables you to schedule the disk/ RAID array checkups to ensure the disk/ RAID array functions optimally.

If you want to check the disk status on a daily, weekly, or monthly basis, you can enable this using the **HIS** function.

1. Set the **Task Name** to **t1**, select the schedule as **Weekly,** and set the time to **10:10.**

2. After clicking **Submit**, your task will be shown under the **Task List**.

3. When the operating temperature of the disk exceeds 65°C, a **Warning** event will appear in **Events**.

2.8.4. Create a New Verify Task

The Scheduler enables you to schedule disk/array checkups to ensure arrays are functioning optimally.

All redundant RAID arrays (RAID1/ RAID10) will appear under the New Verify Task.

1. Log into the **WebGUI**.

2. Select the proper controller from the top left drop-down.

3. Click **SHI.**

4. Click **Schedule.**

5. Select the array you want to schedule the verify task.

6. Type the name in the **Task Name** entry box.

7. Choose whether you want to schedule.

8. One-time verify task on a specific date (YYYY-MM-DD) at (HH:MM: SS, 24-hr clock).

9. Or a specific schedule you can adjust based on Daily, Weekly, or Monthly options.

10. Click **Submit.**

11. Your entry will appear under the **Tasks List.**

Note: The New Verify Task box only appears if you have normal status arrays. If you have a critical array, the New Rebuild Task will replace the New Verify Task.

2.9. Help

The **Help** displays help related to the WebGUI. The **Help** displays information about the controller connection to the system and controller and driver status.

You can also collect log information from this screen with a 1-click information collection system for troubleshooting.

The log will gather all necessary hardware, software, and storage configuration data and compile it into a single file, which can be transmitted directly to our FAE Team via our Online Support Portal.

2.9.1. Online Help

Online Help redirects you to the official HighPoint website.

2.9.2. Diagnostic View

1. **1-Click Self-Diagnostic Solution**: Diagnostic View provides a **1-click** information collection system for troubleshooting. It will gather all necessary hardware, software, and storage configuration data and compile it into a single file, which can be transmitted directly to our FAE Team via our Online Support Portal.
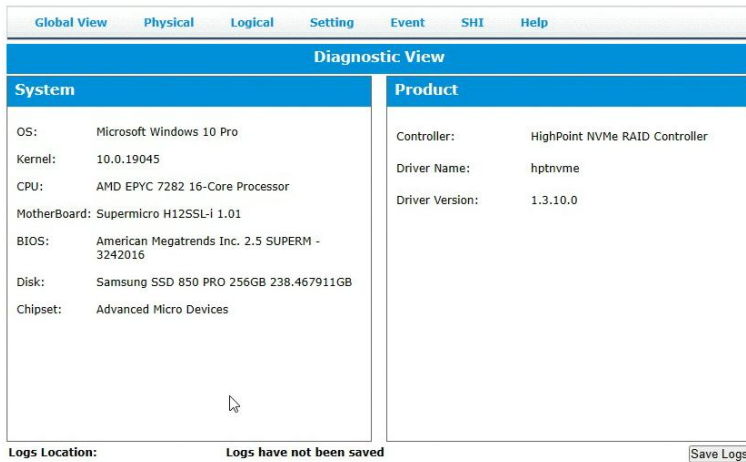
2. You can also click **Help→Diagnostic** to enter the diagnostic view.
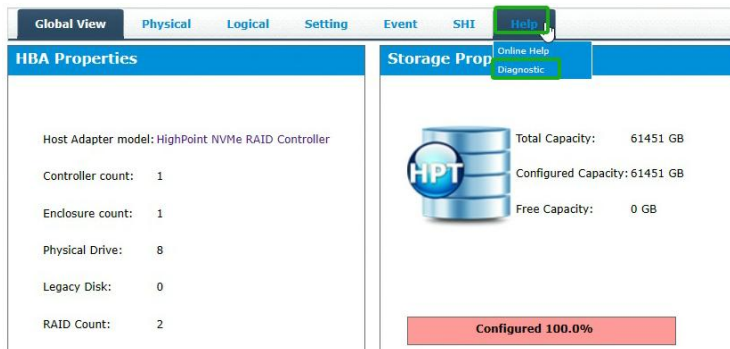
2.9.3. Saving the Log

1. Click the **Save Logs** button to create the diagnostic file.

2. **Logs Location** will display the location of the saving path.

3. CLI (command line interface)

This section describes how to use the CLI.

3.1. Starting the CLI

3.1.1. For Windows Users

●**Method 1**: Run **Command Prompt** as Administrator, enter hptraidconf, and press **Enter**.

●**Method 2:** Click **Start** to find the **HighPoint RAID Management** folder, and click on **hptraidconf**.
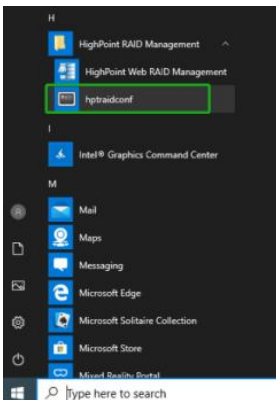
3.1.2. For Linux Users

1. Open the **Terminal** and enter root permissions.

2. Then execute the command **hptraidconf** to enter the CLI.

3.2. Using the CLI

```
help [query|create|delete|OCE/ORLM|rebuild|verify|unplug|switch|lscard
rescan|init|events|mail|task|set|clear|help|exit|diag|secure]
```

- Use the **query** command to view the SSD7580C NVMe RAID AIC status and disks. For more information, see query command.

- Use the **init** command to initialize the legacy disks. For more information, see init command.

- Use the **create** command to create the RAID array. For more information, see create command.

- Use the **delete** command to delete the RAID array. For more information, see delete command.

- Use the **rebuild** command to rebuild a redundant RAID array when it is critical. For more information, see rebuild command.

- Use the **verify** command to rescan all physical disks attached to the RAID AIC. For more information, see verify command.

- Use the **unplug** command to unplug the disk while the system is working. For more information, see unplug command.

- Use the **lscard** command to list multiple NVMe RAID AICs. For more information, see lscard command.

- Use the **events** command to query, save, or clear the logged events. For more information, see events command.

- Use the **mail** command to instruct the AIC to send an email to your chosen recipients when certain events trigger. For more information, see mail command.

- Use the **task** command to automate tasks in the background. For more information, see task command.

- Use the **set** command to change some HRM settings. For more information, see set command.

- Use the **diag** command to collect the diagnostic information. For more information, see diag command.

- Use the **secure** command to secure the disks and RAID arrays. For more information, see secure command.

- Use the **help** command to find the correct commands. For more information, see help command.

- Use the **clear** command to clear the screen. For more information, see clear command.

- Use the **exit** command to quit the CLI. For more information, see exit command.

Warning: using the Create/Delete commands may destroy data stored in the disks, and this lost data can never be recovered. Please be cautious when executing these commands. The CLI utility will not prompt you

before each command is executed.

3.3. Query Command

```
HPT CLI > query
Query Command
        This command allows you to query devices or arrays' informations.
Syntax:
        query controllers
        query enclosures
        query devices
        query devices {device_id}
        query arrays
        query arrays {array_id}
Note:
        The query devices {device_id} has add S.M.A.R.T information in version 2.1.
```

3.3.1. Syntax

query controllers

query enclosures

query devices

query devices {devices_id}

query arrays

query arrays {array_id}

Table2: Properties for Query Command

The following table lists and describes the properties of the query commands.

cmd	Property Name	Description
query	controllers	This command reports AIC information
query	enclosures	This command reports AIC Product ID information.
query	devices	This command will provide the status of each physical device hosted by the AIC.
query	devices{device_id}	This command presents information for the specified device.
query	arrays	This command lists information about each configured array, such as ID, capacity, RAID type, and status.
query	arrays {arrays_id}	This command will present information of each disk of a specified array.

3.3.2. query controller

query controllers

This command reports AIC information.

Example

HPT CLI> query controllers

```
HPT CLI > query controllers
ID                          Channel      Name
1                           0            HighPoint NVMe RAID Controller
---------------------------------------------------------------------
```

3.3.3. query enclosure

query enclosures

This command reports AIC Product ID information.

Example

HPT CLI> query enclosures

```
HPT CLI > query enclosures
ID    Secure     VendorID    ProductID                    NumberOfPYH
---------------------------------------------------------------------
1/E1 No          HPT         SSD7580C NVMe Controller     8
---------------------------------------------------------------------
```

3.3.4. query device

1. query devices

This command will provide the status of each physical disk hosted by the AIC. It lists disk IDs, secured
status, capacity, model numbers, max free capacity, disk status, and array attributes. Each disk's status will be
listed as one of the following: LEGACY, SPARE, DISABLED, and RAID.

Example

HPT CLI> query devices

```
HPT CLI > query devices
ID          Secured    Capacity    MaxFree    Flag      Status    ModelNumber
------------------------------------------------------------------------------------
1/E1/1 No              7681.50     0          SINGLE    LEGACY    KIOXIA KCDY1RUG7T68
1/E1/2 No              7681.50     0          SINGLE    LEGACY    KIOXIA KCDY1RUG7T68
1/E1/3 No              7681.50     0          SINGLE    LEGACY    KIOXIA KCDY1RUG7T68
1/E1/4 No              960.20      0          SINGLE    LEGACY    Samsung SSD 983 DCT 960GB
1/E1/5 No              7681.50     0          SINGLE    LEGACY    Micron_7450_MTFDKCC7T6TFR
1/E1/6 No              7681.50     0          SINGLE    LEGACY    Micron_7400_MTFDKCB7T6TDZ
1/E1/7 No              7681.50     0          SINGLE    LEGACY    Micron_7450_MTFDKCC7T6TFR
1/E1/8 No              7681.50     0          SINGLE    LEGACY    KIOXIA KCDY1RUG7T68
------------------------------------------------------------------------------------
```

Attributes

- **ID**

A disk ID is a string used to represent a disk. It is in the format "AIC/port/ device" for NVMe AICs. e.g. 1/E1/1 represents the disk on AIC 1 port 1.

- **Secured**

Whether the physical disk is secured.

- **Capacity**

The capacity of the disk is GB.

- **MaxFree**

The Maximum sequence free space on the disk can be used by creating the array.

- **Flag**

Shows whether the disk is single or has been created RAID.

- **Status**

This will display the disk status (1 of 4 possible states):

- **LEAGACY:** The disk's status is legacy.

- **DISABLED:** The disk cannot be used. (May be related to disk failure)

- **RAID:** The disk is a member of a RAID array.

- **SPARE:** The disk has been set as a spare disk.

- **ModelNumber**

The disk's model number.

2. query devices {device_id}

This command presents information for the specified device.

Example

HPT CLI> query devices 1/E1/1

```
HPT CLI > query devices 1/E1/1
Mode Number:        KIOXIA KCDY1RUG7T68
Serial Number:      13R0A00GTPBH
Firmware Version:   5101
Capacity(GB):   7681.50          TotalFree(GB):  0
Status:         SINGLE           Flag:           LEGACY
SED Capable:    No               SED Type:       None
Secured:        No               Cryptographic Erase Capable:  No
PCIe Width:     x4               PCIe Speed:     Gen 4
Temperature (F):                            105
Warning Composite Temperature Threshold (F):   170
Critical Composite Temperature Threshold (F):  185
-----------------------------------------------------------------
                    S.M.A.R.T Attributes
S.M.A.R.T Status OK.
Name                              Value
-----------------------------------------------------------------
Critical Warning                    : 0x0
Composite Temperature (C)           : 41
Available Spare                     : 100%
Available Spare Threshold           : 8%
Percentage Used                     : 0%
Data Units Read                     : 0x482ceed1
Data Units Written                  : 0x1aee2d58
Host Read Commands                  : 0x164048460
Host Write Commands                 : 0x68bb6318
Controller Busy Time                : 0x1357
Power Cycles                        : 0x320
Power On Hours                      : 0x22a
Unsafe Shutdowns                    : 0x208
Media and Data Integrity Errors     : 0x0
Number of Error Information Log Entries  : 0x0
Warning Temperature Time            : 0x50
Critical Composite Temperature Time : 0x0
Temperature Sensor 1 (C)            : 0
Temperature Sensor 2 (C)            : 0
Temperature Sensor 3 (C)            : 0
Temperature Sensor 4 (C)            : 0
Temperature Sensor 5 (C)            : 0
Temperature Sensor 6 (C)            : 0
Temperature Sensor 7 (C)            : 0
Temperature Sensor 8 (C)            : 0
```

Attributes

- **Mode Number**

The disk's model number.

- **Serial Number**

The disk's serial number.

- **Firmware Version**

The disk's Firmware version.

- **Capacity**

The disk's capacity.

- **Status**

The disk's status.

- **Flag**

Shows whether the disk is single or has been created RAID.

- **SED Capable**

Whether the disk supports the SED feature.

- **SED Type**

The SED type of the disk.

- **Secured**

Whether the disk is secured.

- **Cryptographic Erase Capable**

Whether the disk supports the Cryptographic Erase feature.

- **PCIe width**

The disk's PCIe width.

- **PCIe speed**

The disk's PCIe speed.

- **Temperature**

The disk's temperature and setting temperature threshold.

- **S.M.A.R.T Attributes**

S.M.A.R.T Attributes detailed information reported by disk.

3.3.5. query array

1. query arrays

This command lists information about each configured array, such as array ID, secured status, capacity, RAID type, status, and array attributes.

Example

HPT CLI> query arrays

```
HPT CLI > query arrays
ID       Secured Capacity(GB)    Type       Status   Block  Sector  Cache             Name
-----------------------------------------------------------------------------
1            No       7681.01   RAID0      NORMAL    512k    512B    NONE          RAID_0_0
```

Attributes

- **ID**

The array's ID. A number generally represents an array ID.

- **Secured**

Whether the array is secured.

- **Capacity**

The capacity of the array is GB.

- **Type**

The array's type. (RAID0, RAID1, RAID10)

- **Status**

- **NORMAL:** Array status is normal.

- **CRITICAL:** Array is degraded (no data redundancy).

- **DISABLED:** Array is disabled.

- **REBUILDING:** Array is being rebuilt.

- **VERIFYING:** Array is verifying.

- **INIT(F):** Initializing an array using Foreground mode.

- **INIT(B):** Initializing an array using Background mode.

- **UNINITIALIZED:** Array is not initialized.

- **Block**

The array's block size.

54

- **Sector**

The array's bytes per sector.

- **Name**

The array's name.

2. query arrays {arrays_id}

This command will present information of each disk of a specified array.

Example

HPT CLI> query arrays 1

```
HPT CLI > query arrays 1
ID:            1              Name:          RAID10_0
Type:          RAID10         Status:        NORMAL
Capacity(GB):  1919.85        BlockSize:     512k
SectorSize:    512B           CachePolicy:   NONE
Progress:      --             Secure:        No
ID       Secured Capacity(GB)   Type       Status   Block  Sector  Cache        Name
--------------------------------------------------------------------------------------
1-1        No       239.98    RAID1       NORMAL     --     512B    NONE      [RAID10_0]
1-2        No       239.98    RAID1       NORMAL     --     512B    NONE      [RAID10_0]
1-3        No       239.98    RAID1       NORMAL     --     512B    NONE      [RAID10_0]
1-4        No       239.98    RAID1       NORMAL     --     512B    NONE      [RAID10_0]
1-5        No       239.98    RAID1       NORMAL     --     512B    NONE      [RAID10_0]
1-6        No       239.98    RAID1       NORMAL     --     512B    NONE      [RAID10_0]
1-7        No       239.98    RAID1       NORMAL     --     512B    NONE      [RAID10_0]
1-8        No       239.98    RAID1       NORMAL     --     512B    NONE      [RAID10_0]
--------------------------------------------------------------------------------------
```

Attributes

- **ID**

The array's ID. A number generally represents an array ID.

- **Secured**

Whether the array is secured.

- **Capacity**

The capacity of the array is GB.

- **Type**

The array's type. (RAID0, RAID1, RAID10)

- **Status**

- **NORMAL:** Array status is normal.

- **CRITICAL:** Array is degraded (no data redundancy).

- **DISABLED:** Array is disabled.

- **REBUILDING:** Array is being rebuilt.

- **VERIFYING:** Array is verifying.

- **INIT(F):** Initializing an array using Foreground mode.

- **INIT(B):** Initializing an array using Background mode.

- **UNINITIALIZED:** Array is not initialized.

- **Block**

The array's block size.

- **Sector**

The array's bytes per sector.

- **Name**

The array's name

3.4. Init Command

You can use init commands to initialize disks or arrays. A disk must be initialized first before being used to create arrays.

```
HPT CLI > init
```

3.4.1. Syntax

init {device_id} | init {array_id} {start|stop}

Table3: Properties for Init Command

The following table lists and describes the properties of the init commands.

cmd	Property Name	Description
init	{device_id}	This command initializes a disk for first use or a legacy disk on the AIC.
init	{array_id} {start|stop}	This command starts/stops the initialization process of a redundant RAID array (RAID1).

3.4.2. init disk

1. init {device_id}

This command initializes a disk for first use or a legacy disk on the AIC.

Example

HPT CLI>init 1/E1/1

After entering the CLI, enter the command: **query devices** to view the current NVMe disk status is **LEGACY**, enter **init 1/E1/1,** NVMe disk status is **NORMAL**.

Note: This command instructs the AIC to initialize the disk on AIC 1 port 1. All data on the disk will be destroyed.

2. init {array_id} {start|stop}

This command starts/stops the initialization process of a redundant RAID array (RAID1).

Example

HPT CLI>init 1 stop   HPT CLI>init 1 start

This command instructs the AIC to stop/start the initialization process on array 1. Take Samsung 970 EVO PLUS as an example; create RAID1 init time is about 10 minutes.

3.5. Create Command

This command allows you to create a new RAID array and add a spare disk.

Note: A legacy disk must be initialized first before being used to create arrays.

```
HPT CLI > create
Create Command
        This command allows you to create a new RAID array or add a spare disk.
Syntax:
        create {RAID0|RAID1|RAID3|RAID5|RAID6|RAID10|RAID50|JBOD|spare} [create-options]

create-option:

        disks=1/2,1/3... or disks=*
                Specify the disks used to create array.
        name=array name
                Specify the name of the array which will be created.
        src=source array ID
                If src argument is specified, OCE/ORLM will be started.
        cp=WB, WT or NONE
                Cache Policy option (WB: write back, WT: write through).
        init={foreground|background|keepdata|quickinit}
                Specifies array initialization option.
                foreground:
                        Zero out all data on the array. The array is not
                        accessible by the operating system until initialization is completed.
                background:
                        Allow instant access to the array. Parity blocks
                        will be generated in background.
                keepdata:
                        Setup array information blocks on the drives only.
                        Use this option for array recovery.
                quickinit:
                        Setup array information blocks and zero out MBR data on the array.
        capacity=array capacity
                Specify the capacity (xxM,xxG) of the target array.
        matrix=n*m
                When create RAID50 to specify the matrix options.
                n : number of subarray's disk, m: number of subarray.
                For example: When create a RAID50 the option matrix
                can be matrix=3*2. That means 2 RAID5s each with 3 disks to form a RAID50
        bs=size
                Specify the block size (16k,32k,64k,128k,256k,512k,1024k)
        sector=size
                Specify the sector size (512B,1k,2k,4k)
        secure={y|n} {force}            Specify if array is secured.
HPT CLI >
```

3.5.1. Syntax

create {RAID0|RAID1|RAID10 spare} [create-options]

Table4: Properties for Create Command

The following table lists and describes the properties of the create command.

cmd	Property Name	Description
create	RAID{RAID0|RAID1|RAID10 spare} [create-options]	This command allows you to create a new RAID array or add a spare disk.

3.5.1.1. Array Creation Profile Options

You can specify one or more create options for this command, separated by a space. The options can be typed in any order.

- **disks**

Specifies member disks that will compose a new array, e.g., disks=1/E1/1,1/E1/2, disks=*. The character * means all available disks.

- **init**

Initialization of a disk sets all data bits to 0, clearing all the data on the disk. It is important to initialize disks as previous data physically stored on the disk may interfere with new data.

- **Keep Old Data:** This option skips the initialization process, and all data on each physical disk of the array will be untouched.

- **Quick Init:** This option grants immediate access to the RAID array by skipping the initialization process, but it will delete all data. This method is recommended for NVMe storage.

- **Foreground:** The array initialization process will be set at high priority. During this time, the array is not accessible, but the initialization process will complete much faster. (Not Recommended)

Foreground initializing the array will completely zero out the data on the disks, meaning the disk will be completely wiped, and every bit on the disk will be set to 0.

- **Background:** The array initialization process will have a lower priority. During this time, the array will be accessible, but the initialization process will take much longer to complete. (Not Recommended)

Background initialization means the array will still be created, and you can still write new data onto the array. But when your array requires rebuilding, residual data left behind may interfere with the process.

Important Note: The foreground and Background Initialization options were intended for use with hard disk drives and are not recommended for NVMe storage. Using these options with NVMe media will result in TBW degradation and performance loss.

- **name**

Specifies the name for the array being created. If the option is omitted, the utility will assign a default name for the array.

- **Src**

Specifies an existing array to be expanded/migrated. All data on the source array will be redistributed online to the target array. If this parameter is omitted, a new array is created.

- **capacity**

Specifies the capacity, in size of MB, for the target array. Maximum capacity is default.

- **bs**

Specifies the block size, in KB, for the target array.

- **sector**

Specifies the target array's logical sector size in B/KB. This option is only valid for stripped RAID levels.

- **Secured**

Specify if the array is secured.

3.5.2. Create an array

create {RAID0|RAID1|RAID10} [create-options]

This command allows you to create a new RAID array.

Example1

HPT CLI>create RAID0 disks=* capacity=* init=quickinit bs=512k

```
HPT CLI > create RAID0 disks=* capacity=* init=quickinit bs=512k
Create array successfully.

HPT CLI > query arrays 1
ID:              1               Name:            RAID0_0
Type:            RAID0           Status:          NORMAL
Capacity(GB):    7681.01         BlockSize:       512k
SectorSize:      512B            CachePolicy:     NONE
Progress:        --              Secure:          No
ID       Secured     Capacity    MaxFree     Flag     Status    ModelNumber
-------------------------------------------------------------------------------
1/E1/1   No          7681.41     6721.29     NORMAL   RAID      KIOXIA KCDY1RUG7T68
1/E1/2   No          7681.41     6721.29     NORMAL   RAID      KIOXIA KCDY1RUG7T68
1/E1/3   No          7681.41     6721.29     NORMAL   RAID      KIOXIA KCDY1RUG7T68
1/E1/4   No          960.13      0           NORMAL   RAID      Samsung SSD 983 DCT 960GB
1/E1/5   No          7681.41     6721.29     NORMAL   RAID      Micron_7450_MTFDKCC7T6TFR
1/E1/6   No          7681.41     6721.29     NORMAL   RAID      Micron_7400_MTFDKCB7T6TDZ
1/E1/7   No          7681.41     6721.29     NORMAL   RAID      Micron_7450_MTFDKCC7T6TFR
1/E1/8   No          7681.41     6721.29     NORMAL   RAID      KIOXIA KCDY1RUG7T68
-------------------------------------------------------------------------------
```

This command instructs the system to create a RAID0 array using the disks attached to AIC 1 ports 1-16, maximum capacity, and Block Size 512KB.

Example2

HPT CLI>create RAID0 disks=* capacity=100000 init=quickinit bs=512k

```
HPT CLI > create RAID0 disks=* capacity=100000 init=quickinit bs=512k
Create array successfully.

HPT CLI > query arrays 1
ID:              1               Name:            RAID0_1
Type:            RAID0           Status:          NORMAL
Capacity(GB):    100.00          BlockSize:       512k
SectorSize:      512B            CachePolicy:     NONE
Progress:        --              Secure:          No
ID       Secured     Capacity    MaxFree     Flag     Status    ModelNumber
-------------------------------------------------------------------------------
1/E1/1   No          7681.41     7668.92     NORMAL   RAID      KIOXIA KCDY1RUG7T68
1/E1/2   No          7681.41     7668.92     NORMAL   RAID      KIOXIA KCDY1RUG7T68
1/E1/3   No          7681.41     7668.92     NORMAL   RAID      KIOXIA KCDY1RUG7T68
1/E1/4   No          960.13      947.63      NORMAL   RAID      Samsung SSD 983 DCT 960GB
1/E1/5   No          7681.41     7668.92     NORMAL   RAID      Micron_7450_MTFDKCC7T6TFR
1/E1/6   No          7681.41     7668.92     NORMAL   RAID      Micron_7400_MTFDKCB7T6TDZ
1/E1/7   No          7681.41     7668.92     NORMAL   RAID      Micron_7450_MTFDKCC7T6TFR
1/E1/8   No          7681.41     7668.92     NORMAL   RAID      KIOXIA KCDY1RUG7T68
-------------------------------------------------------------------------------
```

This command instructs the system to create a RAID0 array using the disks attached to AIC 1 ports 1- 16. The capacity is 100GB, and the Block Size is 512KB.

3.5.3. Add Spare Disks

create spare {device_id}

This command allows you to add a spare disk.

Example

HPT CLI>create spare disks=1/E1/1

This command instructs the system to set the disk on AIC 1 port 1 as a spare disk.

3.6. Delete Command

This command allows you to delete an existing RAID array or remove a spare disk. After deletion, the original array and all data will be lost. All the member disks will be listed as available single disks.

Note: If you want to use a single disk after deleting the RAID, please restart the system after deleting the RAID. When the single disk status shows the Legacy status in CLI, it can be used normally.

```
HPT CLI > delete
Delete Command
        This command allows you to delete an existing RAID array or remove
        a spare disk. After deletion, the original array and all data on it
        will be lost. All the member disks will be listed as available single disks.
Syntax:
        delete {array id | spare id}
```

3.6.1. Syntax

delete {array_or_spare_id}

Table5: Properties for Delete Command

The following table lists and describes the properties of the delete command.

cmd	Property Name	Description
delete	{spare_id}	This command instructs the system to delete the spare disk.
delete	{array_id}	This command instructs the system to delete the array.

3.6.2. Delete an array

delete {array_id}

This command allows you to delete the array.

Example

HPT CLI>delete 1

```
HPT CLI > query arrays
ID      Secured Capacity(GB)    Type        Status  Block Sector  Cache        Name
------------------------------------------------------------------------------------
1            No     100.00     RAID0       NORMAL  512k  512B    NONE        RAID0_3

HPT CLI > delete 1
Delete array(1) successfully!

HPT CLI > query arrays
ID      Secured Capacity(GB)    Type        Status  Block Sector  Cache        Name
------------------------------------------------------------------------------------
```

This command allows you to delete the array whose id is "1". You can query the array ID before the deletion.

3.6.3. Delete Spare Disks

delete {spare_id}

This command allows you to delete the spare disk.

Example

HPT CLI>delete 1/E1/1

```
HPT CLI > query devices
ID        Secured    Capacity    MaxFree      Flag     Status    ModelNumber
                                                                 -------------------
1/E1/1    No         7681.41     7681.41      SINGLE   SPARE     KIOXIA KCDY1RUG7T68
1/E1/2    No         7681.41     7681.41      SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
1/E1/3    No         7681.41     7681.41      SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
1/E1/4    No         960.13      960.13       SINGLE   NORMAL    Samsung SSD 983 DCT 960GB
1/E1/5    No         7681.41     7681.41      SINGLE   NORMAL    Micron_7450_MTFDKCC7T6TFR
1/E1/6    No         7681.41     7681.41      SINGLE   NORMAL    Micron_7400_MTFDKCB7T6TDZ
1/E1/7    No         7681.41     7681.41      SINGLE   NORMAL    Micron_7450_MTFDKCC7T6TFR
1/E1/8    No         7681.41     7681.41      SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
                                                                 -------------------

HPT CLI > delete 1/E1/1
Spare delete '1/E1/1' successfully!

HPT CLI > query devices
ID        Secured    Capacity    MaxFree      Flag     Status    ModelNumber
                                                                 -------------------
1/E1/1    No         7681.41     7681.41      SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
1/E1/2    No         7681.41     7681.41      SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
1/E1/3    No         7681.41     7681.41      SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
1/E1/4    No         960.13      960.13       SINGLE   NORMAL    Samsung SSD 983 DCT 960GB
1/E1/5    No         7681.41     7681.41      SINGLE   NORMAL    Micron_7450_MTFDKCC7T6TFR
1/E1/6    No         7681.41     7681.41      SINGLE   NORMAL    Micron_7400_MTFDKCB7T6TDZ
1/E1/7    No         7681.41     7681.41      SINGLE   NORMAL    Micron_7450_MTFDKCC7T6TFR
1/E1/8    No         7681.41     7681.41      SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
                                                                 -------------------
```

This command is used to remove the spare disk on AIC 1 port 1.

3.7. Unplug Command

To ensure data security, if you want to unplug an existing RAID array or disks while the system works, use the unplug command first and then unplug the disks.

```
HPT CLI > unplug
Unplug Command
        This command allows you to unplug an existing RAID array or device.
        After you have unpluged the array or device, you can hot plug it.
        Also by running the rescan command you can found it back.
        Please refering the rescan command help.
```

3.7.1. Syntax

unplug {array _id or device _id}

Table6: Properties for Unplug Command

The following table lists and describes the properties of the unplug commands.

cmd	Property Name	Description
unplug	{device_id}	This command instructs the system to unplug the disk.
unplug	{array_id}	This command instructs the system to unplug the array.

3.7.2. Unplug disk

unplug {device_id}

This command instructs the system to unplug the disk.

Example

HPT CLI>unplug 1/E1/1

```
HPT CLI > query devices
ID       Secured    Capacity   MaxFree    Flag     Status    ModelNumber
------------------------------------------------------------------------
1/E1/1   No         7681.41    7681.41    SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
1/E1/2   No         7681.41    7681.41    SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
1/E1/3   No         7681.41    7681.41    SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
1/E1/4   No         960.13     960.13     SINGLE   NORMAL    Samsung SSD 983 DCT 960GB
1/E1/5   No         7681.41    7681.41    SINGLE   NORMAL    Micron_7450_MTFDKCC7T6TFR
1/E1/6   No         7681.41    7681.41    SINGLE   NORMAL    Micron_7400_MTFDKCB7T6TDZ
1/E1/7   No         7681.41    7681.41    SINGLE   NORMAL    Micron_7450_MTFDKCC7T6TFR
1/E1/8   No         7681.41    7681.41    SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
------------------------------------------------------------------------

HPT CLI > unplug 1/E1/1
Unplug device(1/E1/1) successfully!

HPT CLI > query devices
ID       Secured    Capacity   MaxFree    Flag     Status    ModelNumber
------------------------------------------------------------------------
1/E1/2   No         7681.41    7681.41    SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
1/E1/3   No         7681.41    7681.41    SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
1/E1/4   No         960.13     960.13     SINGLE   NORMAL    Samsung SSD 983 DCT 960GB
1/E1/5   No         7681.41    7681.41    SINGLE   NORMAL    Micron_7450_MTFDKCC7T6TFR
1/E1/6   No         7681.41    7681.41    SINGLE   NORMAL    Micron_7400_MTFDKCB7T6TDZ
1/E1/7   No         7681.41    7681.41    SINGLE   NORMAL    Micron_7450_MTFDKCC7T6TFR
1/E1/8   No         7681.41    7681.41    SINGLE   NORMAL    KIOXIA KCDY1RUG7T68
------------------------------------------------------------------------
```

This command allows you to remove a disk from a running system without shutting down.

3.7.3. Unplug array

unplug {array_id}

This command instructs the system to unplug the array.

Example

HPT CLI>unplug 1

```
HPT CLI > query arrays
ID      Secured Capacity(GB)    Type        Status  Block  Sector  Cache          Name
----------------------------------------------------------------------------------
1           No       100.00    RAID0       NORMAL   512k    512B    NONE       RAID0_4

HPT CLI > unplug 1
Unplug array(1) successfully!

HPT CLI > query arrays
ID      Secured Capacity(GB)    Type        Status  Block  Sector  Cache          Name
----------------------------------------------------------------------------------
```

This command instructs the controller to disconnect the array "1"; you can then disconnect the disks safely.

3.8. Rebuild Command

You can use rebuild commands to rebuild a RAID1 array when it is critical or broken.

```
HPT CLI > rebuild
Rebuild Commands
        You can use rebuild commands to rebuild a RAID1 RAID5 RAID6,
        when it is critical or broken.
Syntax:
        rebuild {array_id} {device_id}
        rebuild {array_id} {start|stop}
```

3.8.1. Syntax

rebuild {array_id} {device_id}

rebuild {array_id} {start|stop}

Table7: Properties for Rebuild Command

The following table lists and describes the properties of the rebuild commands.

cmd	Property Name	Description
rebuild	{device_id}{array_id}	This command allows you to add the specified disk to a broken array and rebuild it.
rebuild	{array_id} {start|stop}	This command allows you to start or stop the rebuilding process on the specified array.

3.8.2. Rebuild array

1.   rebuild {array_id} {device_id}

This command allows you to add the specified disk to a broken array and rebuild it.

Example

HPT CLI> rebuild 1 1/E1/1

```
HPT CLI > rebuild 1 1/E1/1

HPT CLI > query arrays
ID   Capacity(GB)   Type       Status    Block  Sector  Cache          Name
--------------------------------------------------------------------------------
1        500.03    RAID1     CRITICAL     --     512B    NONE         RAID1_3
```

This command instructs the AIC to add the disk "1/E1/1" to rebuild the array "1". Before the rebuild command, you can use the query command to verify the device ID and the array ID information.

2. rebuild {array_id} {start|stop}

This command allows you to start or stop the rebuilding process on the specified array. After you stop a rebuilding process, you can resume it later with the rebuild start command.

Example1

HPT CLI> rebuild 1 start

```
HPT CLI > rebuild 1 start

HPT CLI > query arrays
ID   Capacity(GB)   Type      Status   Block  Sector   Cache        Name
--------------------------------------------------------------------------
1        500.03    RAID1   REBUILDING    --     512B    NONE      RAID1_3
```

This command starts the rebuilding process on the array "1".

Example2

HPT CLI> rebuild 1 stop

```
HPT CLI > rebuild 1 stop

HPT CLI > query arrays
ID   Capacity(GB)   Type      Status   Block  Sector   Cache        Name
--------------------------------------------------------------------------
1        500.03    RAID1    CRITICAL     --     512B    NONE      RAID1_3
```

This command stops the rebuilding process on the array "1".

3.9. Verify Command

You can use the verify command to rescan all physical disks attached to the RAID AIC.

```
HPT CLI > verify
Verify Command
        This command starts or stops the verifying process on the specified array.
Syntax:
        verify {array_id} {start|stop}
```

3.9.1. Syntax

verify {array_id} {start|stop}

Table8: Properties for Verify Command

The following table lists and describes the properties of the verify command.

cmd	Property Name	Description
verify	{array_id} {start|stop}	This command starts or stops the verifying process on the specified array.

3.9.2. Verify array

verify {array_id} {start|stop}

This command starts or stops the verification process on the specified array.

Example1

HPT CLI> verify 1 start

This command starts the verify process on the array "1".

Example2

HPT CLI> verify 1 stop

This command stops the verify process on the array "1".

```
HPT CLI > verify 1 start
HPT CLI > query arrays
ID   Capacity(GB)    Type      Status   Block  Sector  Cache          Name
-----------------------------------------------------------------------------
1         500.03    RAID1    VERIFYING    --    512B   NONE         RAID1_3
HPT CLI > verify 1 stop
HPT CLI > query arrays
ID   Capacity(GB)    Type      Status   Block  Sector  Cache          Name
-----------------------------------------------------------------------------
1         500.03    RAID1     NORMAL     --    512B   NONE         RAID1_3
HPT CLI >
```

3.10. Rescan Command

This command will rescan all physical devices attached to the RAID AIC.

```
HPT CLI > rescan
```

3.10.1. Syntax

rescan

Table9: Properties for Rescan Command

The following table lists and describes the properties of the rescan command.

cmd	Property Name	Description
rescan	N/A	This command rescans all of the physical devices attached to the RAID AIC.

Example

HPT CLI> rescan

```
HPT CLI > rescan
Rescan successfully.
```

3.11. Lscard Command

The lscard command is used to list multiple RAID AICs.

```
HPT CLI > lscard
```

3.11.1. Syntax

lscard

Table10: Properties for Lscard Command

The following table lists and describes the properties of the lscard command.

cmd	Property Name	Description
lscard	N/A	This command displays the list of multiple RAID AICs.

Example

HPT CLI> lscard

```
HPT CLI > lscard
CARD_ID          NAME                             ACTIVED
--------------------------------------------------------------
0                Controller(1): HighPoint          Active
```

3.12. Events Command

The CLI system will automatically record three types of events: Information (shortened to "Inf"), Warning (shortened to "War"), and Error (shortened to "Err") on the screen output. Events commands allow you to view and save the logged events.

3.12.1.Syntax

events

events save {file_name}

Table11: Properties for Event Command

The following table lists and describes the properties of the events command.

cmd	Property Name	Description
events	N/A	This command will display a list of all the logged events.
events	save	This command will save all the logged events as a plain text file.

3.12.2.View events

events

This command will display a list of all the logged events.

Example

HPT CLI> events

3.12.3.Save events

events save {file_name}

This command will save all the logged events as a plain text file.

Example

HPT CLI> events save C:/raidlog.txt

```
HPT CLI > events save C:/raidlog.txt
The event log C:/raidlog.txt has been saved.
```

This command will save all the events to **C:/raidlog.txt**.

3.13. Mail Command

The mail command instructs the AIC to send an email to your chosen recipients when certain events trigger.

```
HPT CLI > mail
Mail Commands
        Set a mail recipient to get the e-mail from system.
Syntax:
        mail recipient
        mail recipient add {recipient_name} {mail_address} [Inf|War|Err]
        mail recipient delete {recipient_name}
        mail recipient test {recipient_name}
        mail server
        mail server set {server_address} {port} {ssl} {e|d} {from_address} [username] [password]
        mail server set {a|p|s|m|u|t} {value}
```

3.13.1.Syntax

mail recipient

mail recipient add {recipient_name}{mail_address} [Inf|War|Err]

mail recipient delete {recipient_name}

mail recipient test {recipient_name}

mail recipient set {recipient_name}{Inf|War|Err}

mail server

mail server set {server_address}{port} { status } {from_address}   [username] [password]

mail server set {a|p|s|m|u|t} {value}

Table12: Properties for Mail Command

The following table lists and describes the properties of the mail commands.

cmd	Property Name	Description
mail	recipient	Use this command to list all of the mail recipients.
mail	recipient add {recipient_name} {mail_address} [Inf|War|Err]	Use this command to add a new recipient.
mail	recipient delete {recipient_name}	Use this command to delete an existing recipient.
mail	recipient test {recipient_name}	Use this command to send a test email to a specified recipient.
mail	recipient set {recipient_name}{Inf|War|Err}	Use this command to set the notification type for a recipient.

mail	server	Use this command to display the SMTP server information.
mail	server set {server_address}{port} { status } {from_address} [username] [password]	Use this command to configure mail server settings.
mail	server set {a|p|s|m|u|t} {value}	Use this command to set your mail server value.

3.13.2. View mail recipient

mail recipient

This command will list all of the mail recipients.

Example

HPT CLI> mail recipient

3.13.3. Add mail recipient

mail recipient add {recipient_name} {mail_address} [Inf|War|Err]

This command will add a new recipient.

Example

HPT CLI> mail recipient add hpt admin@highpoint-tech.com Inf War Err

This command will set up the RAID system to send mail to admin@highpoint-tech.com for any logged events.

3.13.4.Delete mail recipient

mail recipient delete {recipient_name}

This command will delete an existing mail recipient.

Example

HPT CLI> mail recipient delete hpt

```
HPT CLI > mail recipient delete hpt

HPT CLI > mail recipient
ID   Name      Mail  Address                    Notify Types
--------------------------------------------------------------

HPT CLI >
```

This command deletes recipient hpt.

3.13.5.Set mail recipient

1.   mail recipient test {recipient_name}

This command will send a test email to a specified recipient.

Example

HPT CLI> mail recipient test hpt

```
HPT CLI > mail recipient test hpt

HPT CLI >
```

Mail recipient hpt will receive a test email.

2.   mail recipient set {recipient_name} {Inf|War|Err}

This command will set the notification type for a recipient.

Example

HPT CLI> mail recipient set admin Inf War Err

```
HPT CLI > mail recipient set admin War Err
ID   Name      Mail  Address                    Notify Types
--------------------------------------------------------------
1    admin        g@highpoint-tech.com.cn        Information Warning Error
```

This command sets the recipient to receive emails with information, warnings, and error messages.

3.13.6. View mail server

mail server

This command will display the mail server information.

Example

HPT CLI> mail server

3.13.7. Add mail server

mail server set {server_address} {port} {ssl} {status} {from_address} [username] [password]

This command will configure mail server settings.

- **server_address**

The SMTP server address.

- **port**

The SMTP port is generally 25.

- **ssl**

'**1**' is for enable and port needs 465, and '**0**' is for disabled.

- **status**

Enable Event Notification status, '**e**' for enabled or '**d**' for disabled.

- **from_address**

The mail from address.

- **Username**

The mail username.

- **password**

The mail password.

Example1

HPT CLI> mail server set secure.emailsrvr.com 465 1 e name@somecompany.com name@somecompany.com password

```
HPT CLI > mail server set secure.emailsrvr.com 465  1 e       g@highpoint-tech.com       @highpoint
HPT CLI > mail server
ServerAddress        Port  ssl  Status   Mail From          User Name
-----------------------------------------------------------------------------
secure.emailsrvr.com465    1    Enabled       g@highpoint-tech.com     @highpoint-tech.com
```

This command adds a mail server.

3.13.8. Set mail server

mail server set {a|p|s|m|u|t} {value}

This command will separate and set your mail server value.

- **a** – The SMTP server address.

- **p** – The SMTP port is generally 25.

- **s** – Enable Event Notification status, **e** for enabled or **d** for disabled.

- **m** – The mail from the address.

- **u** – The mail username.

- **t** – The mail password.

Example1

HPT CLI> mail server set p 465   --- Change the SMTP port

```
HPT CLI > mail server set p 465
HPT CLI > mail server
ServerAddress        Port  ssl  Status   Mail From          User Name
-----------------------------------------------------------------------------
smtp.163.com          465    0    Enabled       @highpoint-tech.co     @highpoint-tech.com
```

Example2

HPT CLI> mail server set s d   --- Disable mail notification

```
HPT CLI > mail server set s d
HPT CLI > mail server
ServerAddress        Port  ssl  Status   Mail From          User Name
-----------------------------------------------------------------------------
smtp.163.com          465    0    Disabled      @highpoint-tech.co     @highpoint-tech.com
```

Example3

HPT CLI> mail server set s e   --- Enable mail notification

3.14. Task Command

When an array requires regular verification or rebuilding, you can use the task commands to automate this process in the background. You can add new tasks and modify or delete existing tasks.

```
Task Commands
       Set tasks for the server.
Syntax:
       task
       task {rebuild|verify} {array_id} {name=} {once|daily|monthly|weekly}={day}
       {interval}={interval} start=mm/dd/yyyy end=mm/dd/yyyy time=hh:mm:ss
       task delete {task_id}
```

3.14.1.Syntax

task

task rebuild {array_id} {name=} {once|daily|monthly|weekly}={day} interval={interval} start=mm/dd/yyyy end=mm/dd/yyyy time=hh:mm:ss

task verify {array_id} {name=} {once|daily|monthly|weekly}={day}interval={interval} start=mm/dd/yyyy end=mm/dd/yyyy time=hh:mm:ss

task delete {task_id}

Table13: Properties for Task Command

The following table lists and describes the properties of the task commands.

cmd	Property Name	Description
task	N/A	This command displays detailed information about all scheduled tasks.
task	rebuild {array_id} {name=} {once|daily|monthly|weekly}={day} interval={interval} start=mm/dd/yyyy end=mm/dd/yyyy time=hh:mm:ss	This command allows you to schedule the frequency as once, daily, weekly, or monthly, and the detailed time range to rebuild a specified array.
task	verify {array_id} {name=} {once|daily|monthly|weekly}={day}interval={interval} start=mm/dd/yyyy end=mm/dd/yyyy time=hh:mm:ss	This command allows you to schedule a verification task.
task	delete {task_id}	This command allows you to delete a scheduled task.

3.14.2. View task

task

This command displays detailed information about all scheduled tasks.

Example

HPT CLI> task

```
HPT CLI > task
ID   Name       Start-Date      End-Date       S-F       Description
1    test       11/24/2023      N/A            E-O       Rebuild raid RAID1_1 (created by )
```

This command displays the current scheduled tasks.

3.14.3. Create a New Rebuild task

task rebuild {array_id}{name=}{once|daily|weekly|monthly={day} interval={interval} start=mm/dd/yyyy end=mm/dd/yyyy time=hh:mm:ss

This command allows you to schedule the frequency as once, daily, weekly, or monthly, and the detailed time range to rebuild a specified array. The first mm/dd/yyyy specifies the task start date, while the second mm/dd/yyyy specifies the task end date.

Note: When you add a task to rebuild a selected array once, the parameter {day} should be omitted.

Example

HPT CLI> task rebuild 1 name=test once start=11/24/2023 time=20:00:00

```
HPT CLI > task rebuild 1 name=test once start=11/24/2023 time=20:00:00
Add task(test) successfully!

HPT CLI > task
ID   Name       Start-Date      End-Date       S-F       Description
1    test       11/24/2023      N/A            E-O       Rebuild raid RAID1_1 (created by )
```

This command adds a test task schedule to rebuild the array "1" at 20:00:00 on 11/24/2023. The rebuild frequency is set to once.

3.14.4. Create a New Verify Task

task verify {array_id} {name=} {once|daily|weekly|monthly}={day} interval={interval} start=mm/dd/yyyy end=mm/dd/yyyy time=hh:mm:ss

This command allows you to schedule a verification task. The usage of this command is the same as adding a rebuild task schedule.

Note: Verify Task can only be created if the RAID1 array is in a normal status.

Example

HPT CLI> task verify 1 name=test once start=11/24/2023 time=20:00:00

```
HPT CLI > task verify 1 name=test once start=11/24/2023 time=20:00:00
Add task(test) successfully!

HPT CLI > task
ID   Name      Start-Date      End-Date      S-F        Description
----------------------------------------------------------------------
1    test      11/24/2023      N/A           E-O        Verify raid RAID1_1 (created by )
```

This command adds a task schedule to verify the array "1" at 20:00:00 on 11/24/2023. The verify frequency is set to once.

3.14.5.Delete a task

task delete {task_id}

This command allows you to delete a scheduled task. You can query the task ID by task command.

Example

HPT CLI> task delete 1

```
HPT CLI > task
ID   Name      Start-Date      End-Date      S-F        Description
----------------------------------------------------------------------
1    test      11/24/2023      N/A           E-O        Verify raid RAID1_1 (created by )

HPT CLI > task delete 1
Delete task(test) successfully!

HPT CLI > task
ID   Name      Start-Date      End-Date      S-F        Description
----------------------------------------------------------------------
```

This command will delete the task "1".

3.15. Set Command

You can change the CLI settings by using the setting commands according to your preferred behavior and requirements.

```
HPT CLI > set
-----------------------------------------------------------
              Show the system setable parameters.
-----------------------------------------------------------
[AR] Auto Rebuild                       Enable
[CE] Continue Rebuild On Error          Enable
[AA] Audible Alarm                      Enable
[RP] Rebuild Priority                   Medium
[BP] Beeper                             Enable
[FS] Eclosure Fan Speed                 Medium
[TT] Temperature threshold              100
[TU] Temperature unit                   F
[PS] Password                           --
[CL] Collect system logs                Disable
```

3.15.1. Syntax

set [name]={value}

Table14: Properties for Set Command

The following table lists and describes the properties of the set commands.

cmd	Property Name	Description
set	[name]={value}	This command changes the CLI settings according to your preferred behavior and requirements.

3.15.2. set

Show the system settable parameters.

● **set AR={y|n}**

Set enable or disable to the [Auto Rebuild] parameter.

● **set CE={y|n}**

Set enable or disable to the [Continue Rebuilding On Error] parameter.

● **set RP={0-100}**

Change rebuilding priority. If an AIC is not specified, this command will set the global rebuilding priority.

[0-12]   Lowest

[13-37] Low

[38-67] Medium

[68-87] High

[>88] Highest
- **set BP={y|n}**

Set enable or disable beeper.
- **set FS={Auto|Off|Low|Medium|High}**

Change Enclosure Fan Speed.
- **set TT={value}, default=149F**

Set the temperature threshold.
- **set TU={C|F}**

Set the temperature unit to Celsius equals or Fahrenheit equals.
- **set PS**

Set or change your password and confirm it.
- **set CL**

Set enable or disable collecting system logs.

3.16. Diag Command

This command allows you to collect the diagnostic information.

3.16.1.Syntax

diag

Table15: Properties for Diag Command

The following table lists and describes the properties of the diag command.

cmd	Property Name	Description
diag	N/A	This command collects the diagnostic information.

3.16.2.diag

Example

● **For Linux User**

HPT CLI> diag

```
HPT CLI>diag

The diagnostic information has been saved in /usr/share/hpt/HighPoint_hptnvme_v1.6.14.0_2024.02.01.tar.gz
HPT CLI>
```

● **For Windows User**

HPT CLI> diag

```
HPT CLI > diag
The diagnostic information will be saved in C:\Program Files (x86)\HighPoint Technologies, Inc\HighPoint RAID Management
\Service\webguiroot\HighPoint_hptnvme_1.3.12.0_2024.01.31_16.41.zip.It may take a few minutes to be ready.
HPT CLI >
```

The saving path will be displayed after entering this command.

3.17. Help Command

You will be told that the command is unknown if you input an unknown or error command. You can use help commands to find the correct commands.

```
HPT CLI > HELP
ERROR: Unknown command HELP .
You can input 'help' for more commands.
```

3.17.1.Syntax

help

help {command}

Table16: Properties for Help Command

The following table lists and describes the properties of the help commands.

cmd	Property Name	Description
help	N/A	This command shows generic help about this utility.
help	{command}	This command shows help about a specific command.

3.17.2.help

Show generic help about this utility.

HPT CLI> help

```
HPT CLI > help
help [query|create|delete|OCE/ORLM|rebuild|verify|unplug|switch|lscard
rescan|init|events|mail|task|set|clear|help|exit|diag|secure]
```

3.17.3.help command

Show help about a specific command.

HPT CLI> help delete

```
HPT CLI > help delete
Delete Command
        This command allows you to delete an existing RAID array or remove
        a spare disk. After deletion, the original array and all data on it
        will be lost. All the member disks will be listed as available single disks.
Syntax:
        delete {array id | spare id}
```

This command shows help with the delete command.

3.18. Exit Command

Exit from the interactive mode and close the window.

```
HPT CLI > exit
```

3.18.1.Syntax

exit

Table17: Properties for Exit Command

The following table lists and describes the properties of the exit command.

cmd	Property Name	Description
exit	N/A	This command allows you to exit from the interactive mode and close the window.

3.19. Clear Command

This command is used to clear the screen.

```
HPT CLI > clear
```

3.19.1.Syntax

clear/cls/clr

3.19.1.1.   Table18: Properties for Clear Command

The following table lists and describes the properties of the clear command.

cmd	Property Name	Description
clear	N/A	This command allows clearing the screen.

4. UEFI Command Line Utility

This section describes how to use the UEFI Command Line Utility.

4.1. Starting the UEFI Command Line Utility

4.1.1. Prerequisites

1. A PCIe 3.0/4.0/5.0 slot with x16 lanes. The SSD7580C must be installed into a PCIe 3.0/4.0/5.0 slot with x16 lanes.

2. The motherboard needs to be booted into UEFI mode. Confirm that the motherboard boots in UEFI mode.

3. A USB flash drive in FAT32 format.

4.1.2. Step 1 Prepare UEFI Package

1. Unzip the SSD7580C UEFI package to the root dir (/) of a USB flash drive (e.g. FAT32), and insert the USB flash drive into the motherboard.

    Example screenshot

    📁 efi
    📄 7580uefi.blf
    📄 ArrayCreate.efi
    📄 go.nsh
    📄 load.efi
    📄 LogShow.efi
    📄 README.txt
    📄 rsnvme-x86_64.efi
    📄 startup.nsh
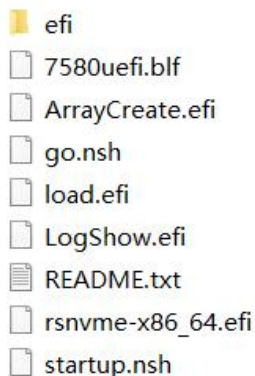
*   **README.txt** -- Readme file for SSD7580C UEFI.

*   **7580uefi.blf** -- UEFI BLF file for SSD7580C.

*   **ArrayCreate.efi** -- EFI utility.

*   **bootx64.efi** -- Booting EFI environment.

*   **go.nsh** -- Batch file for flash loader.

●**load.efi** -- Flash utility for EFI environment.

●**LogShow**.efi -- EFI file for log.

●**rsnvme-x86_64.efi** -- EFI file for debug.

●**startup.nsh** -- Find USB driver.

Note: the picture is only for reference.

4.1.3. Step 2 Adjust System EFI Settings

1. Insert the SSD7580C into the motherboard, power on the system, and enter the BIOS.

2. Adjust the UEFI settings (Example: SuperMicro X11DPi-NT motherboard):

1) Set **Boot Mode Select** to **UEFI.**

2) Set the **Slot** where the SSD7580C is located to **EFI**.
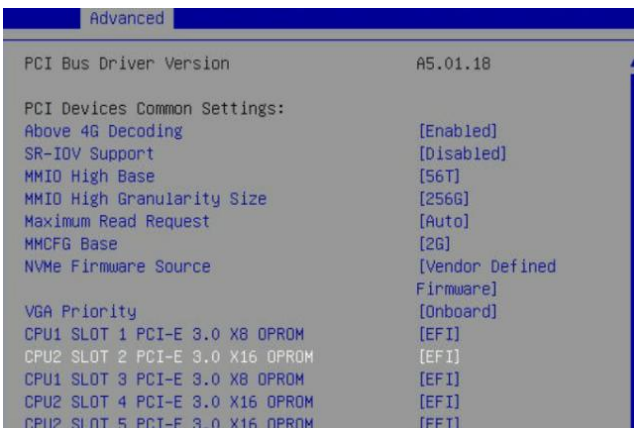
3. Save changes and reboot.

4.1.4. Step 3 Entering the UEFI Command Line Utility

1. Insert the USB flash drive into the motherboard and boot the system.

2. Enter the motherboard's BIOS and select the **UEFI: USB flash drive** in the BIOS startup item.

```
Boot Override
SanDisk
BRCM MBA Slot 4500 v20.14.2
UEFI: SanDisk, Partition 1
```

3. At the prompt, enter the following command to change the resolution:

   mode 100 31

```
FS0:\> mode
Available modes for console output device.
   Col     80 Row     25  *
   Col     80 Row     50
   Col    100 Row     31
   Col    240 Row     56
FS0:\> mode 100 31_
```

   Note: This command is used to adjust the screen resolution; please adjust it according to the actual situation of your motherboard.

4. Enter the following command to enter the UEFI command line:

   ArrayCreate.efi

```
FS0:\> ArrayCreate.efi
Highpoint RAID utility for UEFI (version: 20230322)
Open handles: 1
==== Controller information:
       Vendor: HighPoint Technologies, Inc.
       Product:  SSD7580C NVMe Controller (7580)
```

4.2. Using the UEFI Command Line Utility

`Supported command: help/info/quit/exit/create/delete`

- Use the **help** command to find the correct commands. For more information, see help command.

- Use the **info** command to view the SSD7580C NVMe RAID AIC status and disks. For more information, see info command.

- Use the **quit** command to quit the UEFI Command Line. For more information, see quit command.

- Use the **exit** command to exit the UEFI Command Line. For more information, see exit command.

- Use the **create** command to create the RAID array. For more information, see create command.

- Use the **delete** command to delete the RAID array. For more information, see delete command.

4.3. Help Command

You can use the help command to find the correct commands.

4.3.1. Syntax

H/ h/ help

Table19: Properties for help Command

The following table lists and describes the properties of the help commands.

cmd	Property Name	Description
H	N/A	This command helps you to find the correct commands.
h	N/A	
help	N/A	

4.3.2. help

<<<help

Show correct commands.

Example

4.4. Info Command

```
>>> Please specify command to execute:
<<< info
```

You can use the info command to view the status of the SSD7580C NVMe RAID AIC and disks.

4.4.1. Syntax

info

Table20: Properties for Info Command

The following table lists and describes the properties of the info commands.

cmd	Property Name	Description
info	N/A	This command allows a view of the status of the SSD7580C NVMe RAID AIC and disks.

4.4.2. Physical Device Information

<<<info

Disks hosted by the SSD7580C will appear here.

Example

```
==== Physical device list(count 8):
1/1 KIOXIA KCDY1RUG7T68-13R0A00DTPBH, 7681501MB(MaxFree 0MB), Normal
1/2 KIOXIA KCDY1RUG7T68-13R0A00GTPBH, 7681501MB(MaxFree 0MB), Normal
1/3 KIOXIA KCDY1RUG7T68-13R0A00FTPBH, 7681501MB(MaxFree 0MB), Normal
1/4 KIOXIA KCDY1RUG7T68-13R0A00ATPBH, 7681501MB(MaxFree 0MB), Normal
1/5 Micron_7450_MTFDKCC7T6TFR-232641B4859A, 7681501MB(MaxFree 0MB), Normal
1/6 KIOXIA KCDY1RUG7T68-13R0A00CTPBH, 7681501MB(MaxFree 0MB), Normal
1/7 Micron_7400_MTFDKCB7T6TDZ-2316423C35A4, 7681501MB(MaxFree 0MB), Normal
1/8 Micron_7450_MTFDKCC7T6TFR-232641B4007D, 7681501MB(MaxFree 0MB), Normal
```

- **Location** – Which AIC and port the disk is located in.

- **Model** – Model number of the disk.

- **Capacity** – Total capacity of the disk.

- **Max Free** – Total capacity that is not configured.

- **Status** – (Normal) Status of the disk.

4.4.3. Logical Device Information

Disks and arrays you create and the properties associated with them will appear here.

Example

```
==== Logical device list(count 8):
 1 1/1 KIOXIA KCDY1RUG7T68-13R0A00DTPBH, 7681501MB(MaxFree 0MB), Normal
 2 1/2 KIOXIA KCDY1RUG7T68-13R0A00GTPBH, 7681501MB(MaxFree 0MB), Normal
 3 1/3 KIOXIA KCDY1RUG7T68-13R0A00FTPBH, 7681501MB(MaxFree 0MB), Normal
 4 1/4 KIOXIA KCDY1RUG7T68-13R0A00ATPBH, 7681501MB(MaxFree 0MB), Normal
 5 1/5 Micron_7450_MTFDKCC7T6TFR-232641B4859A, 7681501MB(MaxFree 0MB), Normal
 6 1/6 KIOXIA KCDY1RUG7T68-13R0A00CTPBH, 7681501MB(MaxFree 0MB), Normal
 7 1/7 Micron_7400_MTFDKCB7T6TDZ-2316423C35A4, 7681501MB(MaxFree 0MB), Normal
 8 1/8 Micron_7450_MTFDKCC7T6TFR-232641B4007D, 7681501MB(MaxFree 0MB), Normal
--------------------------------------------------------------------------
```

```
==== Logical device list(count 1):
 1 [VD24-8] RAID0_000041A7 (RAID0), 61451318MB (Stripe 512KB), Normal
    1/1 KIOXIA KCDY1RUG7T68
    1/2 KIOXIA KCDY1RUG7T68
    1/3 KIOXIA KCDY1RUG7T68
    1/4 KIOXIA KCDY1RUG7T68
    1/5 Micron_7450_MTFDKCC7T6TFR
    1/6 KIOXIA KCDY1RUG7T68
    1/7 Micron_7400_MTFDKCB7T6TDZ
    1/8 Micron_7450_MTFDKCC7T6TFR
```

The disks and arrays you create and the properties associated with them will appear here.

- **Name –** The name of the arrays you create.

- **Type –** The RAID level of the arrays you create.

- **Capacity –** Total capacity of the disk.

- **Stripe –** The block size of the arrays you create.

- **Status –** (Normal, critical, disabled) Status of the disk.

- **Member disk–** The member disk of the arrays.

4.5. Quit Command

```
>>> Please specify command to execute:
<<< quit_
```

You can use the quit command to quit the application.

4.5.1. Syntax

Q/ q/ quit

Table21: Properties for Quit Command

The following table lists and describes the properties of the quit command.

cmd	Property Name	Description
Q	N/A	This command allows you to quit the application.
q	N/A	
quit	N/A	

4.5.2. quit

<<<quit

Quit the UEFI Command Line Utility.

4.6. Exit Command

You can use the exit command to exit the application.

4.6.1. Syntax

exit

Table22: Properties for Exit Command

The following table lists and describes the properties of the exit command.

cmd	Property Name	Description
exit	N/A	This command allows you to exit the application.

4.6.2. exit

<<<exit

Exit the UEFI Command Line Utility.

4.7. Create Command

You can use the create command to create the RAID array.

4.7.1. Syntax

create ArrayType (RAID0/RAID1/RAID10) MemberDiskList (1/1,1/2|*) Capacity(100|*)

Table23: Properties for Create Command

The following table lists and describes the properties of the create command.

cmd	Property Name	Description
create	ArrayType (RAID0/RAID1/RAID10) MemberDiskList (1/1,1/2|*) Capacity(100|*)	This command allows you to create a new RAID array. * Indicates creation of RAID array using all MemberDisks and Capacities.

4.7.2. Create an array

Example1

<<<create RAID0

This command creates a RAID0 array with all disks and maximum capacity.

Example2

<<<create RAID1 1/1,1/3 10

```
>>> Please specify command to execute:
<<< create RAID1 1/1,1/3 10
    Creating array: RAID1_10D63AF1.
    Array created successfully.
==============================================================================

==== Physical device list(count 8):
1/1 KIOXIA KCDY1RUG7T68-13R0A00DTPBH, 7681414MB(MaxFree 7671414MB), Normal
1/2 KIOXIA KCDY1RUG7T68-13R0A00GTPBH, 7681414MB(MaxFree 7681414MB), Normal
1/3 KIOXIA KCDY1RUG7T68-13R0A00FTPBH, 7681414MB(MaxFree 7671414MB), Normal
1/4 KIOXIA KCDY1RUG7T68-13R0A00ATPBH, 7681414MB(MaxFree 7681414MB), Normal
1/5 Micron_7450_MTFDKCC7T6TFR-232641B4859A, 7681414MB(MaxFree 7681414MB), Normal
1/6 KIOXIA KCDY1RUG7T68-13R0A00CTPBH, 7681414MB(MaxFree 7681414MB), Normal
1/7 Micron_7400_MTFDKCB7T6TDZ-2316423C35A4, 7681414MB(MaxFree 7681414MB), Normal
1/8 Micron_7450_MTFDKCC7T6TFR-232641B4007D, 7681414MB(MaxFree 7681414MB), Normal

==== Logical device list(count 1):
 1 [VD24-9] RAID1_10D63AF1 (RAID1), 10000MB (Stripe 512KB), Normal
    1/1 KIOXIA KCDY1RUG7T68
    1/3 KIOXIA KCDY1RUG7T68
------------------------------------------------------------------------------
```

This command instructs the system to create a RAID1 array with disk 1/1 and 1/3 and with 10GB capacity.

Note: *For supported RAID types, please* [refer here](#).

4.8. Delete Command

You can use the delete command to delete the array from the logical device list.

4.8.1. Syntax

delete ArrayID

Table24: Properties for Delete Command

The following table lists and describes the properties of the delete command.

cmd	Property Name	Description
delete	ArrayID	This command allows you to delete the array from the logical device list.

4.8.2. Delete an array

Example

<<<delete 1

This command allows you to delete the array 1 from the logical device list.

4.9. Flashing the UEFI ROM

You can flash the UEFI ROM in the UEFI interface. This usually involves loading the latest UEFI package onto the motherboard to get the latest feature updates.

1. Enter the motherboard's BIOS and select the **UEFI: USB flash drive** in the BIOS startup item.

```
Boot Override
SanDisk
BRCM MBA Slot 4500 v20.14.2
UEFI: SanDisk, Partition 1
```

2. Enter the following command to flash the SSD7580C: **go.nsh**.

```
Shell> echo -off
Enter go.nsh to flash the factory rom.
FS0:\> go.nsh
```

3. When the message **'Passed'** appears, the flash is successful.

```
FS0:\> load.efi 7580fact.bin /a /f
Load Utility for Flash EPROM v1.1.5
 (built at Mar 28 2023 17:27:18)

Set flash size to 256K
Found adapter 0x75801103 at PCI 139:0:0
Offset address 0x0
EPROM Vendor: WINBOND W25X40BV
Erasing ........Succeeded
Flashing ....

Flashing Success (total retry 0)

Verifing ....

Passed !
```

4. Reboot to complete the update process.

5. UEFI HII

This section describes how to use the UEFI HII.

5.1. Starting the UEFI HII

5.1.1. Step 1 Adjust System EFI Settings

1. Insert the SSD7749M2 into the motherboard, power on the system, and enter the BIOS.

2. Adjust the UEFI settings (Example: SuperMicro X12DPi-N6 motherboard):

   1) Set **Boot Mode Select** to **UEFI.**
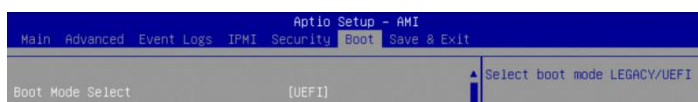
   2) Set the **Slot** where the SSD7749M2 is located to **EFI**.
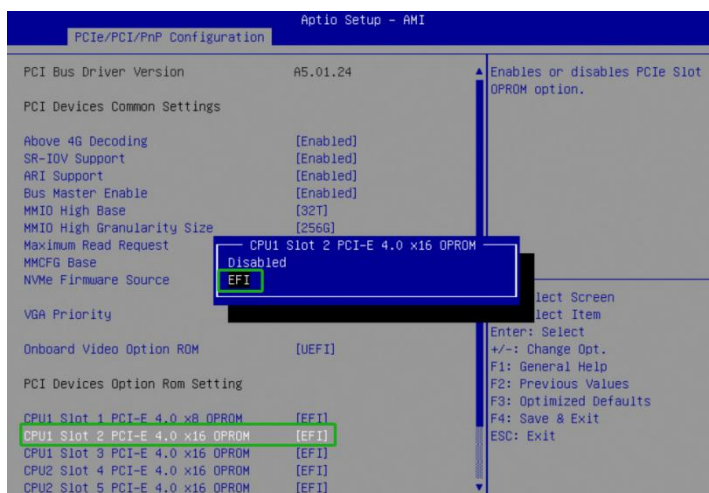
3. Save changes and reboot.

5.1.2. Step 2 Enter the UEFI HII

1. Power up the system.

2. Press **Delete** to enter BIOS.

3. Find **Advanced**→**HighPoint RAID Management Utility** should appear under **Advanced** options.
    (Example: SuperMicro X12DPi-N6 motherboard)

```
                          Aptio Setup - AMI
      Main  Advanced  Event Logs  IPMI  Security  Boot  Save & Exit

    ▶ Boot Feature                                    Utility to manage RAID(s) of
    ▶ CPU Configuration                               HighPoint RAID Controller.
    ▶ Chipset Configuration
    ▶ Server ME Information
    ▶ SATA Configuration
    ▶ sSATA Configuration
    ▶ PCIe/PCI/PnP Configuration
    ▶ Super IO Configuration
    ▶ Serial Port Console Redirection
    ▶ ACPI Settings
    ▶ Trusted Computing
    ▶ Network Configuration
    ▶ HTTP Boot Configuration
                                                      →←: Select Screen
    ▶ TLS Authenticate Configuration                  ↑↓: Select Item
    ▶ Intel(R) I350 Gigabit Network Connection - 3C:EC:EF:B6:CA:08   Enter: Select
    ▶ VLAN Configuration (MAC:3CECEFB6CA08)           +/-: Change Opt.
    ▶ MAC:3CECEFB6CA08-IPv6 Network Configuration     F1: General Help
    ▶ MAC:3CECEFB6CA08-IPv4 Network Configuration     F2: Previous Values
    ▶ Intel(R) I350 Gigabit Network Connection - 3C:EC:EF:B6:CA:09   F3: Optimized Defaults
    ▶ VLAN Configuration (MAC:3CECEFB6CA09)           F4: Save & Exit
    ▶ MAC:3CECEFB6CA09-IPv6 Network Configuration     ESC: Exit
    ▶ MAC:3CECEFB6CA09-IPv4 Network Configuration
    ▶ HighPoint RAID Management Utility
```

4. Select **HighPoint RAID Management Utility**.

5.2. Using the UEFI HII

- The UEFI HII view displays the number of virtual disk and physical disk operations in progress. For more information, see here.

- Select **Create RAID …** to create RAID configurations. For more information, see create RAID ….

- Select **Delete RAID …** to delete RAID configurations. For more information, see delete RAID ….

5.2.1. Keys

The UEFI HII utilizes the following keys:

- **Arrow keys** – Use these to move between different menu items.

- **Enter** – Open the selected toolbar command/execute the selected command.

- **N or Esc** – Return to the previous menu, cancel the selected operation, or exit the BIOS Utility.

5.3. Information

The UEFI HII view allows you to view the Controller Information, Physical Device Information, and Logical Device Information.

5.3.1. Controller Information
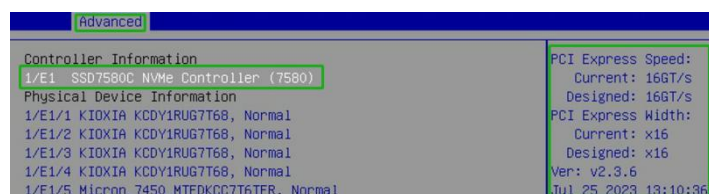
- **Model** — The model name of the controller connected.

- **Location** — Controller location (example: 1/E1).

- **PCI Express Speed** — Rate of current bandwidth and rate of designed bandwidth.

- **PCI Express Width** — PCIe width occupied by the current controller and PCIe width occupied by the designed controller.

- **Version** — UEFI HII version of the controller.

5.3.2. Physical Device Information
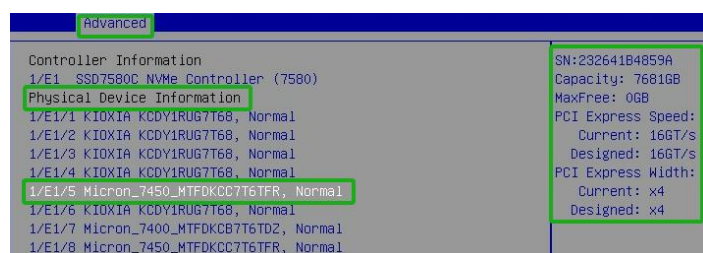
The disks hosted by the AIC will appear here.

- **Location** – Which AIC and port the disk is located in.

- **Model** – Model number of the disk connected.

- **Status** – (Normal) Status of the disk.

- **SN** – Serial number of the physical disk.

- **Capacity** – Total capacity of the disk.

- **Max Free** – Total capacity that is not configured.

- **PCI Express Speed** — Rate of current bandwidth and rate of designed rate.

- **PCI Express Width —** PCIe width occupied by the current disk and PCIe width occupied by the designed disk.

5.3.3. Logical Device Information
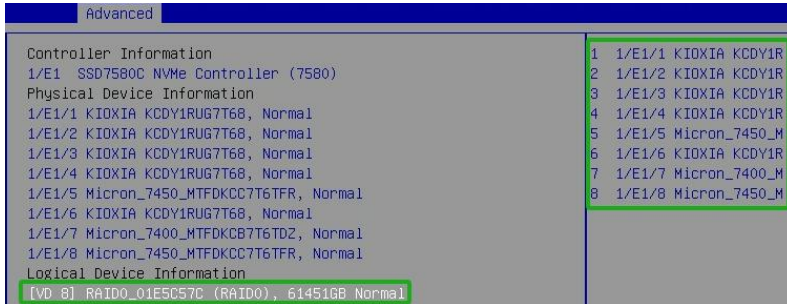
The disks and arrays you create and the properties associated with them will appear here.

- **Name –** The name of the arrays you create.

- **Type –** The RAID level of the arrays you create.

- **Capacity –** Total capacity of the disk.

- **Status –**(Normal, critical, disabled) Status of the disk.

- **Member disk–** The member disk of the arrays.

5.4. Create RAID
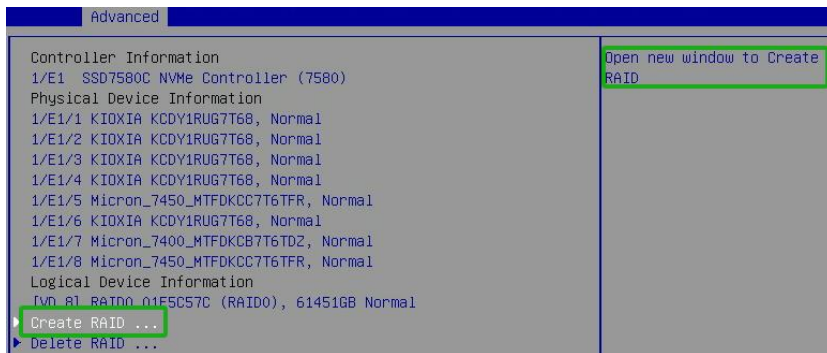
A device list will appear in the Create menu and display all available disks.

5.4.1. Create an array

1. Select **Create RAID...** from the HighPint RAID Management Utility.

2. On the **Create** menu. A disk list will appear and display all available disks.

3. Select **the RAID type from the** dropdown list. Use the up and down keys of the keyboard or the mouse to select the RAID type and press **Enter** key.
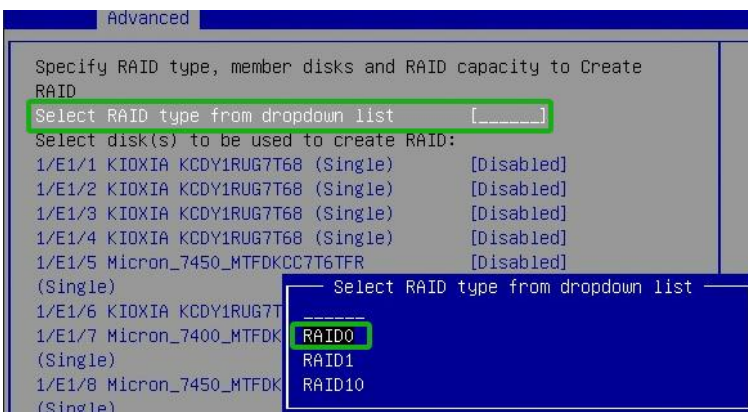
4. Select disks to be used to create a RAID array. Select the disk that needs to create a RAID array, and the status of the disk changes from **Disabled** to **Enabled**, which means that the disk has been selected.
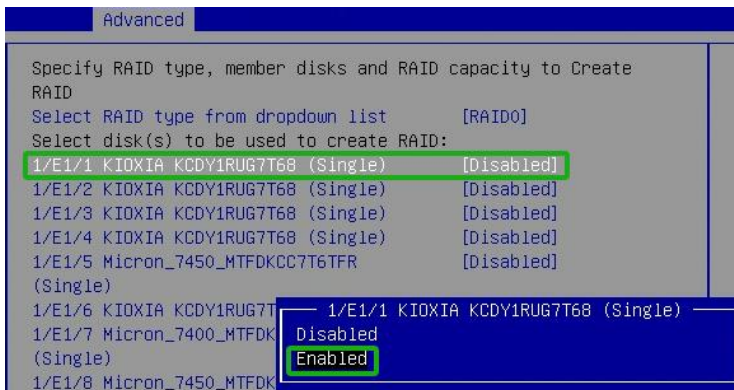
Note: Disks don't need to be initialized before they can be used to create arrays.

5. After selecting all the disks, you can decide how much storage capacity will be assigned to the array. If you wish to reserve disk space for additional arrays/single disks, use the keyboard to input the amount of space (in GB) you wish to set aside for this particular array.
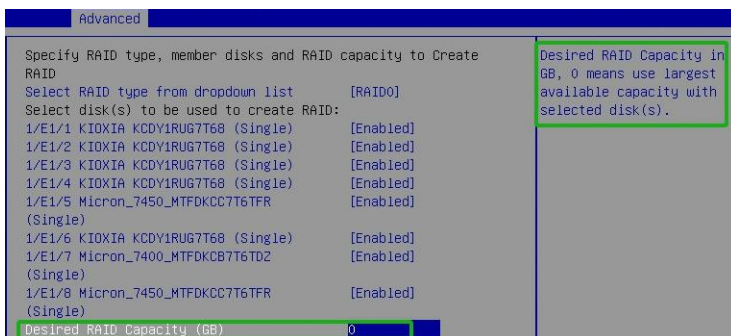
6. Select and **press to create RAID** to complete the RAID Array creation. A pop-up window prompt: **Are you sure to create RAID0 with following disk(s).** Press **Enter** key to confirm.
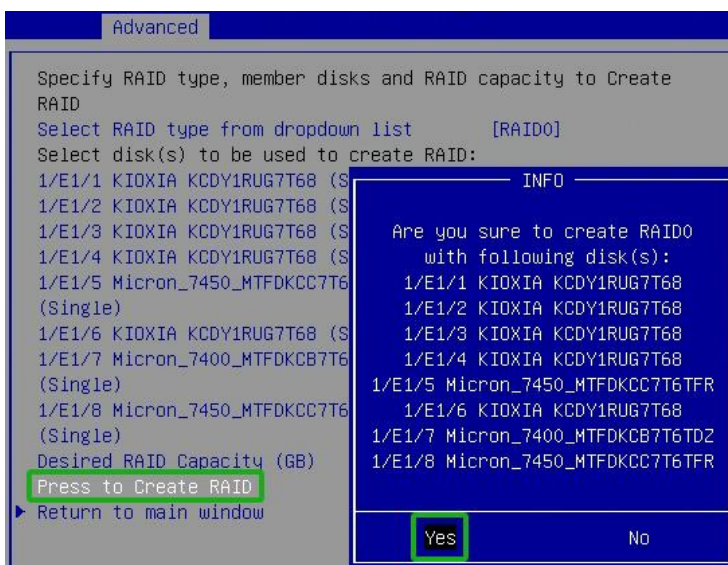
7. A pop-up window will state that **RAID*** creation succeeded. Press any key to continue**. Press **Enter** key to confirm the operation again.
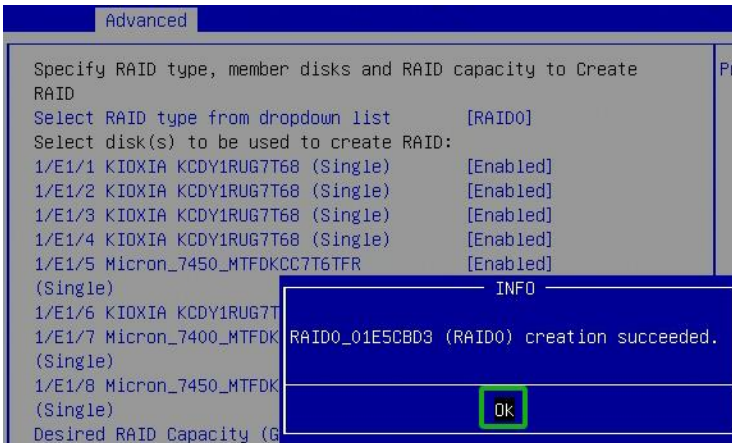
8. The array you create and the properties associated with them will appear under the Logical Device Information.
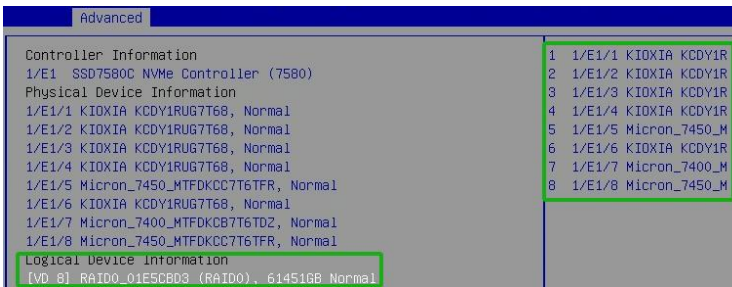
5.5. Delete RAID
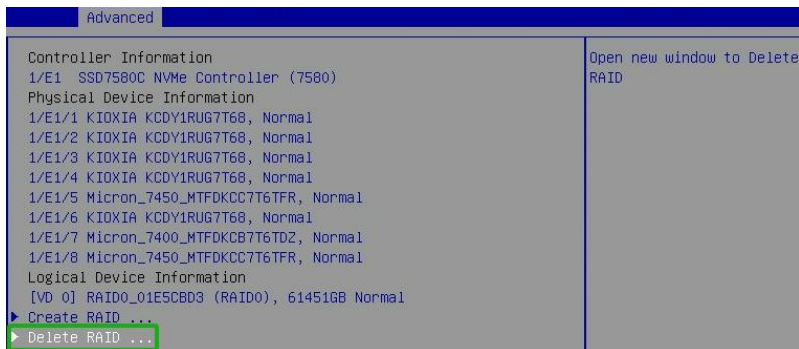
The Delete menu will display a list of available RAID arrays.

5.5.1. Delete an array

1. Select **Delete RAID...** from the HighPint RAID Management Utility.

2. Select the array you wish to delete and press the **Enter** key.

3. The utility will display a warning message. Press **Enter** key to delete the array.

4. Press **Enter** key to confirm the operation again.
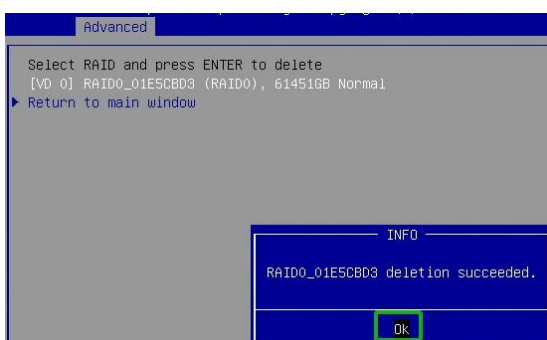
6. SafeStorage

6.1. Overview

HighPoint's SafeStorage solution was developed to work in conjunction with industry-standard SED (Self-encrypted drive) technology supported by OPAL v2.0 compliant M.2 and U.2/U.3 NVMe media and is based on the OPAL SSC TCG (Trusted Computing Group) specifications. It is designed to protect data assets when physical disks are misplaced or stolen by preventing unauthorized access to stored data.

SafeStorage can be applied to single-disk and RAID configurations and is activated via a service known as Disk Security, which can be administered via our software management.

Note: SafeStorage can only be used with storage media that has SED (self-encrypting drive) capability.

Important Security Warning: Enabling password protection for the WebGUI and CLI is highly recommended. By default, this security feature is disabled; administrators are not required to enter a name or password when starting the software. Any user accessing the target platform can enable or disable Disk Security if this feature is not enabled.

6.2. Workflow
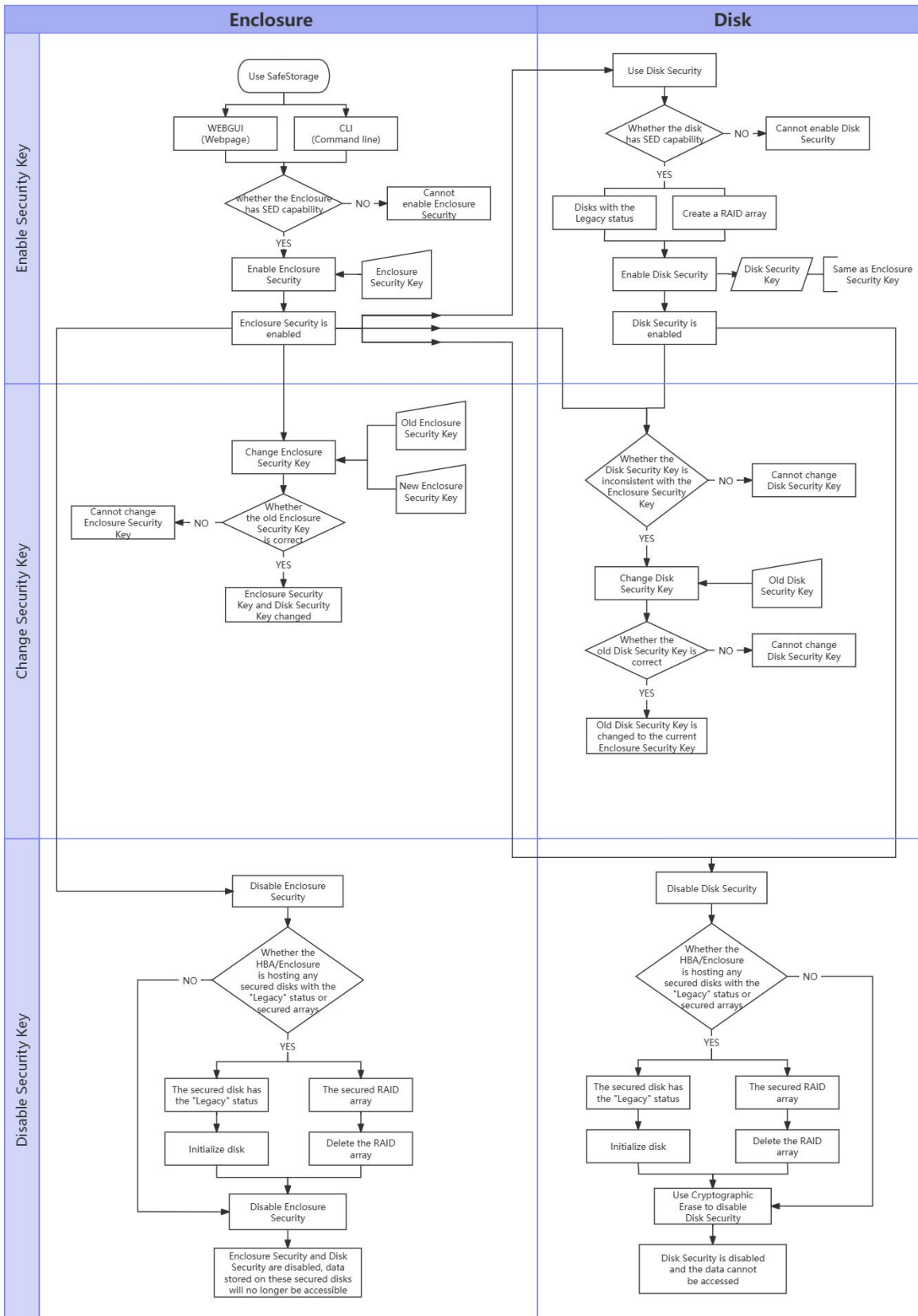
6.2.1. Enable Enclosure Security

To use SafeStorage, you must first enable the Enclosure Security option using the HighPoint RAID Management utility (WebGUI or CLI) and create an Enclosure Security Key.

Note: The Enclosure Security Key you create will also serve as the Disk Security Key, which will be written to the disk/array.

Warning: Be sure to make a record of your Enclosure Security key. If the Security Key is lost or forgotten, you will lose access to any encrypted data stored on the disk or RAID array.

6.2.2. Enable Disk Security

SafeStorage can only be used with storage media that has SED (self-encrypting drive) capability.

Once Enclosure Security has been enabled, you can use the disk/array's SED capabilities. As mentioned, the Disk Enclosure Key is automatically generated when the Enclosure Key is created and will be written to the disk. These keys are identical.

There are two methods to enable Disk Security.

●Method 1: Enabling Disk Security for disks with the Legacy status.

●Method 2: Enabling Disk Security when creating a RAID array.

6.2.3. Change Enclosure Security key

If you want to change the Enclosure Security key, you must provide the old Enclosure Security key. If you don't know the old Enclosure Security key, you won't be able to change Enclosure Security key.

When the Enclosure Security key is changed to the new key, the Disk Security key is also changed to the same new key and written to the secured disk.

6.2.4. Change Disk Security key

If the Enclosure Security Key and Disk Security Key do not match, you cannot access data stored on the disk or array.

This ensures that the disk or array will remain inaccessible when removed from the system.

The administrator must input the original "old" Enclosure Security Key to access data.

To explain, there are two situations in which the Enclosure Security Key and Disk Security Key will not match:

●Situation 1: The disk is from another Enclosure.

●Situation 2: The disk/array was not present when the Enclosure Security Key was changed.

6.2.5. Disable Disk Security

If you do not want to encrypt the disks, you can use Cryptographic Erase to disable Disk Security.

Warning: Cryptographic erase will delete the Security (Encryption) key from the target disk/ array members. Data stored on these devices will no longer be accessible.

6.2.6. Disable Enclosure Security

If you do not want to use the SafeStorage, we provide options to disable Enclosure Security.

The Enclosure Security can only be disabled if the target AIC/ enclosure does not host any secured disks with the "Legacy" status or secured arrays.

Disable Enclosure Security will perform a Cryptographic Erase operation to disable Disk Security for all secured disks on the Enclosure.

Warning: After disabling Enclosure Security, data stored on these secured disks will no longer be accessible.

6.3. Using SafeStorage with the WebGUI
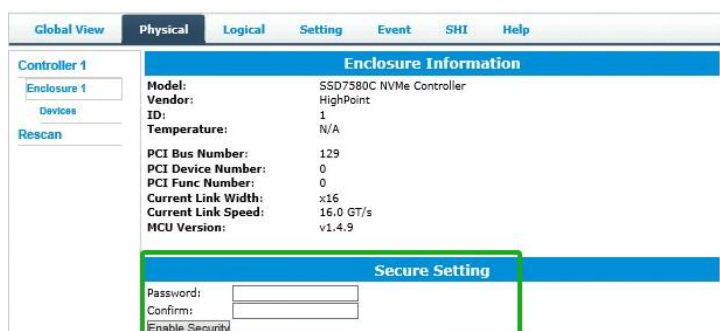
6.3.1. Enable Enclosure Security

1. Click the **Physical** tab, then click the appropriate "Enclosure" on the left-hand side of the interface.

   Note: "Enclosure X" refers to each SSD series RAID AIC or RocketStor enclosure currently installed into the system.

2. Next, create a password under **Secure Setting**. The password must be between 8 and 32 characters in length. Enter the password a second time for the "**Confirm**" field.

3. After setting the password, click **Enable Security** to enable the Secure settings.

   Example 1 (before enable Enclosure Security setting):

   Example 2 (after enable Enclosure Security setting):

   Warning: If you forget the security key, you will lose access to your data.

6.3.2. Enable Disk Security

6.3.2.1. Prerequisites

1. Confirm if your disk supports SED functions. SafeStorage will only work with SED capable storage media.

   Example 1 (The device supports SED functions; **SED Capable** is **Yes**):

   Example 2 (The device does not support SED functions; **SED Capable** is **No**):

2. Disk security can only be enabled only if you have enabled Enclosure Security.

6.3.2.2. Enabling Disk Security

There are two methods to enable Disk Security.

●**Method 1: Enabling Disk Security for disks with the Legacy status**

1. Click the **Logical tab** and check the **Logical Device** section of the page**.**

2. Click the **Maintenance** option displayed on the right-hand side of each disk.

3. Click **Secure** to enable Disk Security.

4. Repeat steps 1) through 3) for the remaining disks.

   Example 1 (before Disk Security has been enabled):

   Example 2 (after Disk Security has been enabled):

●**Method 2: Enabling Disk Security when creating a RAID array**

   Note: This feature is enabled when the array is created. Disk Security cannot be added to an existing array.

1. Click the **Logical** tab.

2. Check the box before the Secure option when creating a RAID array.

Example 1 (before Disk Security has been enabled):

Example 2 (after Disk Security has been enabled):

6.3.3. Change Enclosure Security key

1. Click the **Physical** tab, and click the target **Enclosure** entry on the left side of the interface.

2. Enter the current password under the "**Old Password**" field.

3. Enter a new password under the "**New Password**" field (must contain 8 to 32 characters).

4. After entering a new password, click **Change Security**.

5. Confirm the change by clicking "**OK**" when the pop-up window is displayed.

*Note: Changing the **Enclosure Security ke**y will automatically change the **Disk Security Key.***

6.3.4. Change Disk Security key

Note: When the Enclosure Security Key and Disk Security Key do not match, the ability to change the Disk Security Key will be displayed. The secured disk is now in the Yes (Locked) state.

1. Click the **Physical** tab.

2. Under the **Physical Devices** section, click the name of each disk in blue text to view the Secured setting. Yes (Locked).

   *Note: **Security:** Yes (Locked) indicates that the security of the disk is enabled, but the unlock action failed because the disk's key does not match the key on the controller. This status will prevent access to data stored on the disk.*

3. Click Yes (Locked), a new pop-up window providing a **Change Key** option will be displayed.

4. Enter the disk's **old password** and click **Change Key** to unlock the Disk Security key. The current Enclosure key is automatically written to the disk.
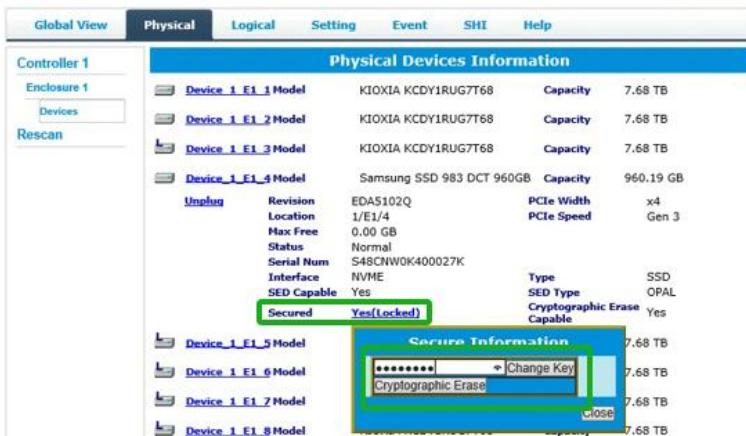
   *Note: There is a limit to the number of times you can change the disk key. If you do not enter the correct disk key **five times,** this function will be locked, and you will need to reboot your system to change the disk key again.*

5. Reboot the operating system.

6. After rebooting the operating system, the secure attribute of the disk should change from Yes (Locked) to Yes, and the disk password is now consistent with the enclosure's password.

6.3.5. Disable Disk Security

We use **Cryptographic Erase** to **disable Disk Security.**

The **Cryptographic Erase** replaces the encryption Key inside each disk, making it impossible to decrypt data stored on these devices. When executed, data is rendered inaccessible and considered cryptographically erased. The disks can then be reset to an unowned state and reused once a new Disk Security key is generated.

Note: Disk Security cannot be disabled if the secured disk has the "Legacy" status. If the disk (or disks) has the "Legacy" status, you can remove this by using the "Init" function (initialize).
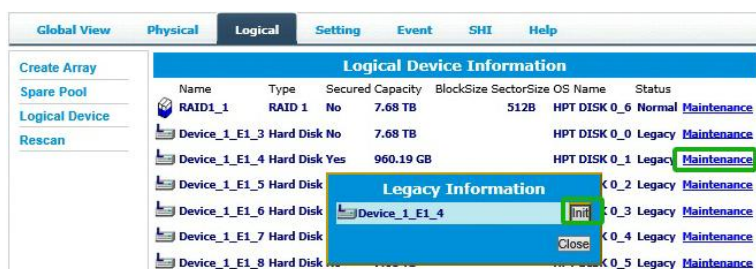
1. Under the **Physical Devices** section of the Physical tab, check the **Secured** status of the target disk. If enabled, this will be displayed as Yes or Yes (Locked);

2. Click the Secured status (blue text); a pop-up window will be displayed, providing a **Cryptographic Erase** button.

3. Click the secure attribute of the **Cryptographic Erase** disk from Yes/Yes (Locked) to **No**.

    Example 1 (click "Yes", popup window, then click "**Cryptographic Erase**"):

Example 2 (click "Yes (Locked)", popup window, then click "**Cryptographic Erase**"):

6.3.6. Disable Enclosure Security

Note: This setting can only be disabled if the target AIC/ enclosure does not host secured disks with the "Legacy" status or secured arrays.

1. Click the **Physical** tab, then click the target Enclosure entry on the left side of the interface.

2. Under **Secure** Setting, click **Disable Security**.

   Example

6.4. Using SafeStorage with the CLI

The **CLI** (command line interface) is a powerful, text-only management interface designed for advanced users and professional administrators.

6.4.1. Secure command reference

```
HPT CLI > help secure
secure Commmand
        This command is used to set device security.
Syntax:
        secure {enclosure id} enable key={password}      Enable device security on the enclosure.
        secure {enclosure id} disable                    Disable device security on the enclosure.
        secure {enclosure id} change oldkey={old password} key={new password}   Change all devices' security key on the enclosure.
        secure {device id} legacy                         Secure legacy device.
        secure {device id} changekey key={old password} Change the device's security key to be consistent with all other devices' key on the enclosure.
        secure {device id} secureerase {force}           Erase the device's security configuration and securely erases data.
```

6.4.2. Enable Enclosure Security

6.4.2.1. Syntax

secure {enclosure id} enable key={password}

The command is used to enable Enclosure Security.

Example

HPT CLI>secure 1/E1 enable key=00000000

```
HPT CLI > query enclosures
ID   Secure       VendorID       ProductID                              NumberOfPYH
---- ------- ------------- --------------------------------------- ------------
1/E1 No           HPT            SSD7580C NVMe Controller               8
HPT CLI > secure 1/E1 enable key=00000000
Enable security successfully.

HPT CLI > query enclosures
ID   Secure       VendorID       ProductID                              NumberOfPYH
---- ------- ------------- --------------------------------------- ------------
1/E1 Yes          HPT            SSD7580C NVMe Controller               8
```

The command is used to enable enclosure security and set key=00000000.

*Note: You can check if enable Enclosure Security is in effect with the command: **query enclosures**. The secure status of enable Enclosure Security is **Yes,** and the secure status of disable Enclosure Security is **No.***

6.4.3. Enable Disk Security

6.4.3.1. Prerequisites

1. Confirm if your disk supports SED functions. SafeStorage will only work with SED capable storage media.

   Example 1 (The device supports SED functions; **SED Capable** is **Yes**):

   Example 2 (The device does not support SED functions; **SED Capable** is **No**):

2. Disk security can only be enabled only if you have enabled Enclosure Security.

6.4.3.2. Enabling Disk Security

There are two methods to enable Disk Security:

●**Method 1:** Enabling Disk Security for disks with the Legacy status.

●**Method 2:** Enabling Disk Security when creating a RAID array.

6.4.3.3. Syntax

● **Method 1:** Enabling Disk Security for disks with the Legacy status.

secure {device id} legacy

The command is used to enable Disk Security for disks with the Legacy status.

Example

HPT CLI>secure 1/E1/1 legacy

The command is used to enable disk security for disk 1/E1/1 with the Legacy status.

● **Method 2:** Enabling Disk Security when creating a RAID array.

create RAID* disks=* init=* secure=y

The command is used to enable Disk Security when creating a RAID array.

Example

HPT CLI>create RAID0 disks=* init=quickinit secure=y

The command is used to enable disk security for RAID0.

Note: You can check if enable Disk Security is in effect with the command: ***query arrays****. The secured status of enable Disk Security is* ***Yes,*** *and the secured status of disable Disk Security is* ***No.***

6.4.4. Change Enclosure Security key

6.4.4.1. Syntax

secure {enclosure id} change oldkey={old password} key={new password}

The command is used to change Enclosure Security key.

Example

HPT CLI>secure 1/E1 change oldkey=0000000 key=11111111

```
HPT CLI > secure 1/E1 change oldkey=00000000 key=11111111
Change security successfully.
```

The command is used to change enclosure security for enclosure 1/E1 and set new key=11111111.

6.4.5. Change Disk Security key

6.4.5.1. Syntax

secure {devices-id} changekey key={old password}

The command is used to Change the Disk Security key to be consistent with the Enclosure Security key.

Example

HPT CLI>secure 1/E1/2 changekey key=00000000

```
HPT CLI > query devices
ID       Secured     Capacity    MaxFree     Flag     St
--------------------------------------------------------
1/E1/1   Yes         1920.25     1820.25     RAID     NO
1/E1/2   Yes(locked) 1920.38     0           SINGLE   NO
1/E1/3   Yes         1920.25     1800.25     RAID     NO
1/E1/4   Yes         1920.25     1900.25     RAID     NO
```

```
HPT CLI > secure 1/E1/2 changekey key=00000000
Change key successfully.Please restart to take effect.
```

```
HPT CLI > query devices
ID       Secured     Capacity    MaxFree     Flag     S
--------------------------------------------------------
1/E1/1   Yes         1920.25     1920.25     SINGLE   N
1/E1/2   Yes         1920.25     1920.25     SINGLE   N
1/E1/3   Yes         1920.25     1920.25     SINGLE   N
1/E1/4   Yes         1920.25     1920.25     SINGLE   N
```

The command is used to change disk security for disk 1/E1/2 and set new key=00000000.

Notes:

You can check if change Disk Security key is in effect with the command: **query devices**. *The secured status of successfully change Disk Security key is* **Yes,** *and the secured status of not successfully change Disk Security is* **Yes(locked).**

There is a limit to the number of times you can change the disk key. If you do not enter the correct disk key **five times***, this function will be locked, and you will need to reboot your system to change the disk key again.*

6.4.6. Disable Disk Security

6.4.6.1. Syntax

secure {devices-id} secureerase force

The command is used to erase the Disk Security configuration and securely erase data.

Note: Disk Security cannot be disabled if the disks have the "Legacy" status. If the disk (or disks) has the "Legacy" status, you can remove this by using the "init" function (initialize).

Example

HPT CLI>init 1/E1/1

HPT CLI>secure 1/E1/1 secureerase force

The command is used to disable disk security for disk 1/E1/1 with legacy status.

Note: You can check if disable Disk Security is in effect with the command: **query devices**. *The secured status of enable Disk Security is* **Yes,** *and the secured status of disable Disk Security is* **No.**

6.4.7. Disable Enclosure Security

Note: This setting can only be disabled if the target AIC/ enclosure does not host secured disks with the "Legacy" status or secured arrays.

6.4.7.1. Syntax

secure {enclosure id} disable

The command is used to disable Enclosure Security.

Example

HPT CLI>secure 1/E1 disable

The command is used to disable enclosure security for enclosure 1/E1.

Note: You can check if disable Enclosure Security is in effect with the command: **query enclosures**. *The secure status of enable Enclosure Security is* **Yes,** *and the secure status of disable Enclosure Security is* **No.**

7. Glossary

This glossary defines the terms that are used in this document.

Glossary	Description
Array	RAID (Redundant Array of Independent Drives) array is a system that combines multiple disks to improve data storage performance and redundancy. The RAID array can provide data redundancy backup, improve read/write speed, increase storage capacity, and other functions.
Background	Background initialization means the array will still be created, and you can still write new data onto the array. But when your array requires rebuilding, residual data left behind may interfere with the process.
BIOS	BIOS is an acronym for Basic Input/Output System, which is a type of firmware that is solidified on a computer's motherboard and is used to initialize hardware devices and boot the operating system. The BIOS connects the communication between computer hardware and the operating system and provides basic input/output functions.
Cache	A cache refers to a cache area in a computer system that stores data temporarily. When a computer accesses data on a disk, that data is temporarily stored in the disk cache to speed up subsequent accesses.
Capacity	A property that indicates the amount of storage space on a disk or virtual disk.
Controller	A chip that controls the transfer of data between the microprocessor and memory or between the microprocessor and a peripheral device.
Diagnostic	A diagnostic view will appear when the driver or HPT card is not in effect. You can see the system information and HPT Product information in this view.
Disk	A disk generally refers to a storage device used to store files and data. This includes solid-state disks (SSDs), which are both used to store data and allow computers to read and write data.
Foreground	Foreground initializing the array will completely zero out the data on the disks, meaning the disk will be completely wiped, and every bit on the disk will be set to 0.
Firmware	Firmware is a class of software in embedded systems that is typically stored in the device's non-volatile memory and is responsible for controlling the device's

	hardware operations. It provides the basic operating system for the device and is usually preinstalled on the device.
HBA	A Host Bus Adapter is a hardware device used to connect a computer host to a storage device. It acts as an interface between the host computer and the storage device, enabling them to communicate directly. It provides high-speed data transfer, which improves the performance and reliability of the storage device.
Host interface	The host interface is through which a computer system or device communicates with other devices outside the system. The host interface can transfer data, receive commands, control devices, and perform other operations, allowing different devices to interact and communicate with each other.
Initialization	The process of making a redundant virtual disk consistent.
Legacy Disk	The newly inserted disk is configured as a legacy disk.
Link Speed	Connection speed of the channel
Link Width	Connection width of the channel
Mirroring	The process of providing complete data redundancy with two disks by maintaining an exact copy of one disk's data on the second disk.
N/A	N/A means nothing is entered in the CLI (command line interface)
Offline	A disk or storage device has been marked by the system as offline, which means that the computer cannot access the data and files on that disk.
PCI Location	The Location of the controller in the system.
Rebuild	The regeneration of all data to a replacement disk in a redundant virtual disk after a disk failure. A disk rebuild normally occurs without interrupting normal operations on the affected virtual disk, though some performance degradation of the disk subsystem can occur.
Rebuild Priority	The priority of rebuilding data onto a new disk after a disk in a storage configuration has failed.
SAS	Serial-Attached SCSI. SAS is a serial, point-to-point, enterprise-level device interface. The SAS interface provides improved performance, simplified cabling, smaller connectors, lower pin count, and lower power requirements.
SATA	Serial Advanced Technology Attachment. A physical storage interface standard. SATA is a serial link that provides point-to-point connections between devices.

SHI	Storage Health Inspector is used to assess and monitor the health of a storage system and ensure its proper functioning and security.
SMTP	Simple Mail Transfer Protocol is the standard protocol for sending and receiving e-mail online. The SMTP protocol transfers e-mail from the sender to the receiver's mail server and allows communication between mail servers.
Temperature	The degree of head present in the supercapacitors, which is measured in Celsius
Vendor ID	A controller property indicating the vendor-assigned ID number of the controller
Virtual disk	A storage unit created by a RAID controller from one or more disks. Although a virtual disk can be created from several disks, it is seen by the operating system as a single disk. Depending on the RAID level used, the virtual disk can retain redundant data if there is a disk failure.

8. Revision History

8.1. Version 1.00, January 11, 2024

Initial version.

8.2. Version 1.01, February 20, 2024

The following changes were made:

●Updated the format of document titles.

●Updated section: 2.7.2.Download the Event Log.

●Updated section: 4.1.3.Step 2 Adjust System EFI Settings.

●Updated section: 4.1.4.Step 3 Enter the UEFI Command Line Utility.

●Updated section: 4.9.Flashing the UEFI ROM.

●Updated section: Table23: Properties for Create Command, add * Interpretation.

●Add section: 5.1.1.Step 1 Adjust System EFI Settings.

●Add section: 5.1.2.Step 2 Enter the UEFI HII.

●Updated section: 5.4.1.Create an array.

●Updated section: 5.5.1.Delete an array.

●Add section: 6.3.2.1.Prerequisites.

●Updated section: 6.3.2.2.Enabling Disk Security.

●Updated section: 6.3.5.Disable Disk Security.

●Add section: 6.3.3.1.Prerequisites.

9. Documentation Legal Notice

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FCC Part 15 Class B Radio Frequency Interference statement

This equipment has been tested and found to comply with the limits for a Class B digital deviceunder part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used by the instructions, may cause harmful interference to radio communications. However, there is noguarantee that interference will not occur in a particular installation. Suppose this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on. In that case, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and the receiver.

- Connect the equipment to an outlet on a circuit different from that to which the receiver isconnected.

- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by the manufacturer could void the user's authority tooperate the equipment under FCC rules.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must acceptany interference received, including interference that may cause undesired operation.

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- European Standard EN55022 (1998) Class B
- European Standard EN55024 (1998)