AOC-S3816L-L8iR

User's Guide

Revision 1.0b

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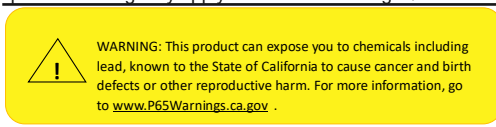

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User's Guide Revision 1.0b

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Rev. 1.0a, January 19, 2024

- Initial document release

Rev. 1.0b, February 2nd, 2024

- Language fine-tuned with up-to-date product notes

Preface

About this User's Guide

This user's guide is written for system integrators, IT technicians, and knowledgeable end users. It provides information for the installation and use of the AOC-S3816L-L8iR expansion card.

About this Expansion Card

The Supermicro SAS AOC-S3816L-L8iR internal RAID controller card features sixteen internal SAS3 ports with two internal SlimSAS connectors. It utilizes a SAS 3816 SAS3 controller chip and features a 1.6 GHz processor. This add-on card supports up to eight SAS/SATA devices or four NVMe devices. This RAID adapter delivers intelligent RAID 0, 1, and 10. The AOC-S3816L-L8iR is streamlined to meet the growing demand for increased data throughput and scalability requirements across enterprise-class server platforms. It is a low-power and cost-effective near-line storage solution that delivers maximum performance and reliability.

An Important Note to the User

All images and layouts shown in this user's guide are based upon the latest PCB revision available at the time of publishing. The card you have received may or may not look exactly the same as the graphics shown in this user's guide.

Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning the AOC-S3816L-L8iR card to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and the shipping package is mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete. For faster service, you can also request an RMA authorization online https://www.supermicro. com/RmaForm/.

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alternation, misuse, abuse, or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.

Conventions Used in the User's Guide

Pay special attention to the following symbols for proper system installation and for safety instructions to prevent damage to the system or injury to yourself:

Warning: Important information is given to ensure proper system installation or to prevent damage to the components or injury to yourself.

Note: Additional information is given for proper system setup.

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Table of Contents

Chapter 1

Overview

1-1 Overview

Congratulations on purchasing your expansion card from an acknowledged leader in the industry. Supermicro products are designed with the utmost attention to detail to provide you with the highest standards of quality and performance. For product support and updates, please visit our website at https://www.supermicro.com/.

1-2 Technical Specifications

General

- Two SlimSAS x8 white (85-Ohm) connector interface
- Supports up to eight SAS/SATA or four NVMe physical devices
- Processor at 1.6 GHz
- Supports 3.0, 6.0, and 12.0 Gb/s SAS data transfer rates, 3.0 and 6.0 Gb SATA, and NVMe Gen 4 (16 GT/s) and Gen 3 (8 GT/s) PCIe
- Supports MCTP over PCIe/I2C
- Supports BMC-enabled management
- Supports MegaRAID® SafeStore Software (Included)
- UEFI Configuration utility
- Supports Hardware Secure Boot
- Thermal operating range: System dependent (55°C or higher with enough airflow)

OS Support

Windows, Linux, and VMWare

Power Consumption

14 watts (max) for AOC-S3816L-L8iR

Physical Dimensions

Card PCB dimensions: 5.11" x 2.71" (L x H)

Note:

1. Being only able to connect two hosts (CPU and Broadcom-based AOC) to certain backplanes (e.g., BPN-NVMe4-216N-S24) with NVMe devices only. There could be limitations on other backplanes with simultaneous connections to two hosts stated above.

2. When a system with IOMMU or VT-d enabled is configured with an iMR controller-based storage add-on-card/module, please make sure the system BIOS supports either IVMD (AMD-based system) or RMRR (Intel-based system) for the iMR controller to work seamlessly with host memory.

Chapter 2

Hardware Components

2-1 Controller Card Layout and Components

Figure 2-1. AOC-S3816L-L8iR

The AOC-S3816L-L8iR is a low-profile SAS controller card with sixteen internal SAS3 ports and two SlimSAS x8 connectors. The following pages describe the components and settings for the AOC-S3816L-L8iR.

2-2 Major Components

The following are the major components that make up the AOC-S3816L-L8iR controller card:

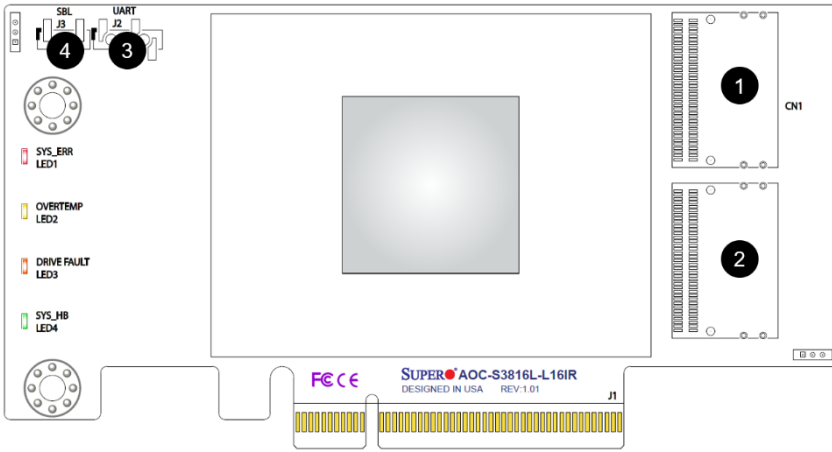


Figure 2-2. AOC-S3816L-L8iR Front Layout

AOC-S3816L-L8iR Major Components	
Component	**Description**
1	SAS Connectors SAS 0-7
2	SAS Connectors SAS 8-15
3	UART Jumper, for engineering debug
4	Serial Boot Loader Jumper, for engineering test

2-3 Front Connectors

SAS Connectors

There are two SlimSAS x8 connectors on the AOC-S3816L-L8iR controller card with sixteen ports to support data transfers. For SAS devices, the ports support data transfer rates of 12, 6, and 3 Gb/s per lane. For SATA devices, the ports support data transfer rates of 6 and 3 Gb/s. This card also provides four ports that support data transfer rates of 16.0, 8.0, 5.0, and 2.5 GT/s for NVMe devices.

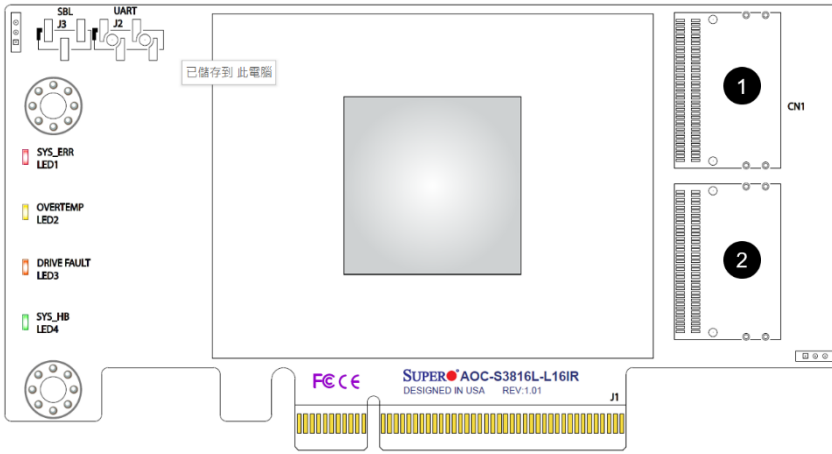


Figure 2-3. Front SAS3 Connectors

AOC-S3816L-L8iR Front Connectors	
Component	**Description**
1	SAS Connectors SAS 0-7
2	SAS Connectors SAS 8-15

2-4 Front Jumper and Header Locations

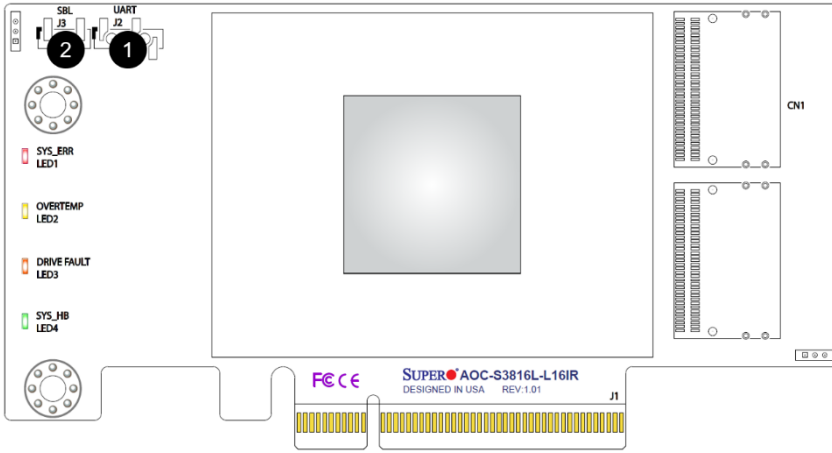


Figure 2-4. Jumper and Headers

AOC-S3816L-L8iR Front Jumper and Headers		
Header	**Description**	**Purpose**
1	UART Debug Header, designated UART0, J2	For Engineering Debug
2	Serial Boot Loader Header, designated SBL_DIS, JP3	For Engineering Debug

2-5 LEDs

System Error LED

A solid red LED indicates a system error has occurred.

Overtemp LED

A solid yellow LED indicates the controller card has overheated.

Drive Fault LED

A blinking orange LED indicates a drive error has occurred.

Heartbeat LED

A blinking green LED indicates the firmware is running on the controller chip.

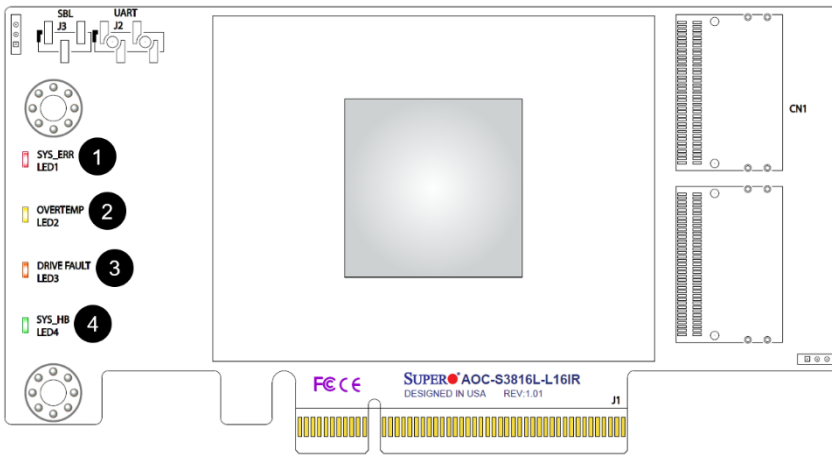


Figure 2-5. LEDs

AOC-S3816L-L8iR LEDs		
Component	**Color**	**Description**
LED1	Red	System Error LED
LED2	Yellow	Overtemp LED
LED3	Orange	Drive Fault LED
LED4	Green	Heartbeat LED

Chapter 3

Installation

3-1 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To avoid damaging your controller card, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the controller card from the antistatic bag.
- Handle the controller card by its edges only; do not touch its components or peripheral chips.
- Put the controller card back into the antistatic bags when not in use.
- For grounding purposes, make sure that your system chassis provides excellent conductivity between the power supply, the case, the mounting fasteners, and the controller card.

Unpacking

The controller card is shipped in antistatic packaging to avoid static damage. When unpacking your component, make sure you are static protected.

Note: To avoid damaging your components and to ensure proper installation, be sure to always connect the power cord last, and always remove it before adding, removing, or changing any hardware components.

3-2 Before Installation

To install the controller card properly, follow the steps below.

Prior to Installation

1. Power down the system and unplug the power cord.

2. Use industry-standard anti-static equipment (such as gloves or wrist strap) and follow the precautions on page 3-1 to avoid damage caused by ESD.

3-3 Installing the Controller Card

Depending upon which system configuration is used, a riser card may or may not be required to install the AOC-S3816L-L8iR.

Installing the Controller Card

1. Power down the system, remove the power cords from the rear of the power supply, and remove the system cover.

2. Verify that your controller card is equipped with the correct length of PCIe slot mounting bracket for your system. The AOC-S3816L-L8iR controller card includes a low-profile PCIe mounting bracket. However, if your system features full-height PCIe slots, replace the low-profile bracket with a full-height bracket.

3. Insert the controller card into an x8 PCIe slot.

4. Connect the SAS interface cables from the controller card to either the direct-attached storage target devices or the cable sockets on the backplanes.

5. The cable latch will click into the locked position when connected properly.

6. Replace the system cover, plug in the power cord, and power up the system.

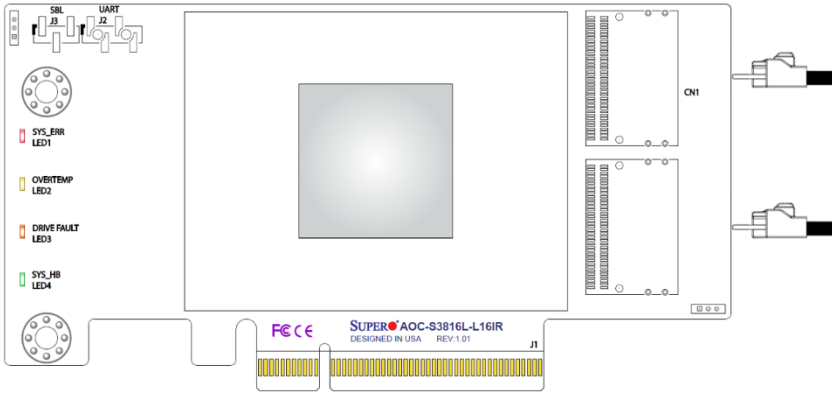


Figure 3-1. Connecting the Cables

3-5 Installing the Drivers in Windows

Refer to the instructions that came with your controller card and follow the manufacturer's recommended steps for installing the NVMe driver. Download the latest drivers from the Supermicro project board at https://www.supermicro.com/wdl/driver/SAS/Broadcom/3808-3816/Driver/.

3-6 Uninstalling the Drivers

To Uninstall the Drivers in Windows:

Follow the system driver uninstall procedure in the operating system.

Chapter 4

Configuring the BROADCOM® 3816 iMR Settings

This chapter provides instructions on how to configure RAID using the BROADCOM <SAS 3816> Configuration Utility. If you do not wish to configure RAID settings, skip this section and go directly to OS installation.

4-1 RAID Minimum Drive Requirements

The AOC-S3816L-L8iR supports up to eight SAS/SATA or four NVMe physical devices with RAID 0, RAID 1, and RAID 10.

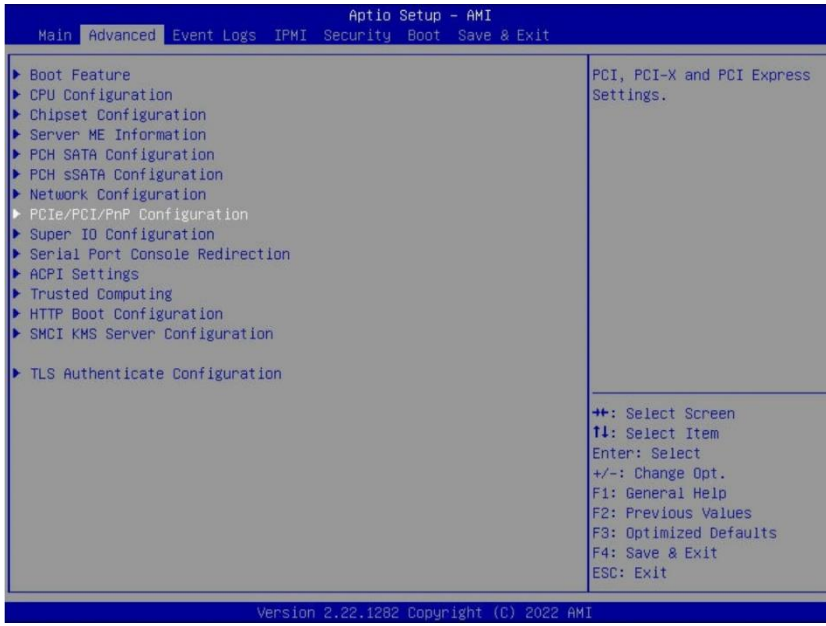
RAID	Minimum Hard Drives
RAID 0	2
RAID 1	2
RAID 10	4

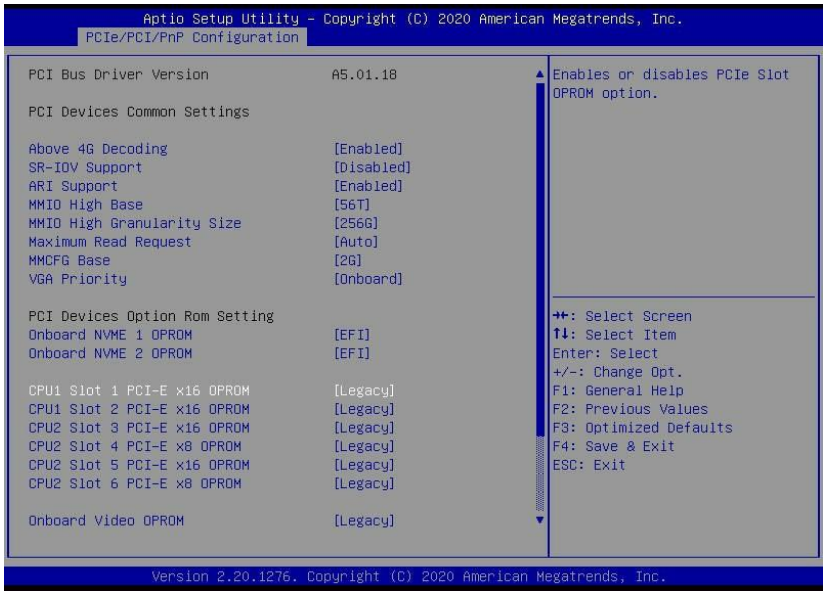
4-2 Using the BROADCOM <SAS 3816> Configuration Utility

Follow the steps below to use the BROADCOM <SAS 3816> Configuration Utility.

1. Reset the system.

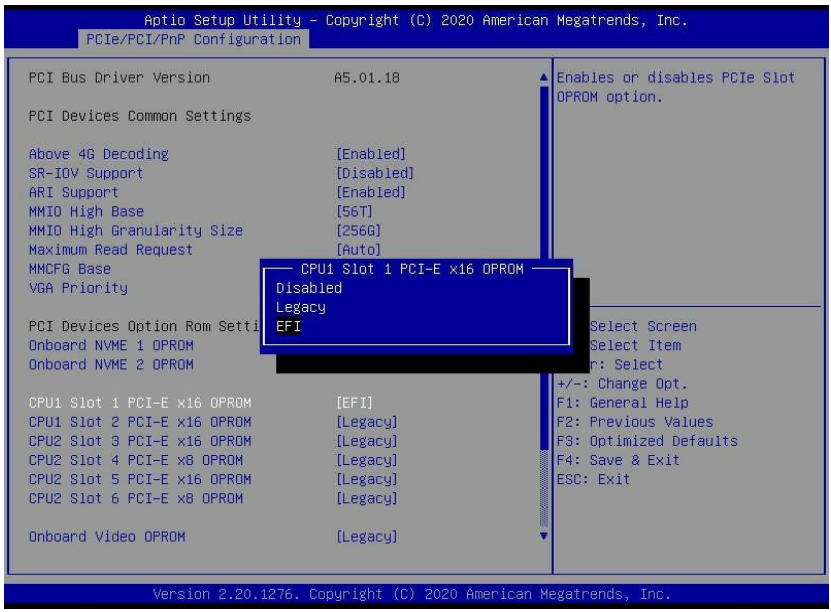
2. Press **<DEL>** to enter the **BIOS Setup Utility**. AOC-S3816L-L8iR only supports **UEFI** mode and a very limited legacy mode. If the **BROADCOM <SAS 3816> Configuration Utility** option is not visible, select **PCIe/PCI/PnP Configuratio**n and then a CPU slot.

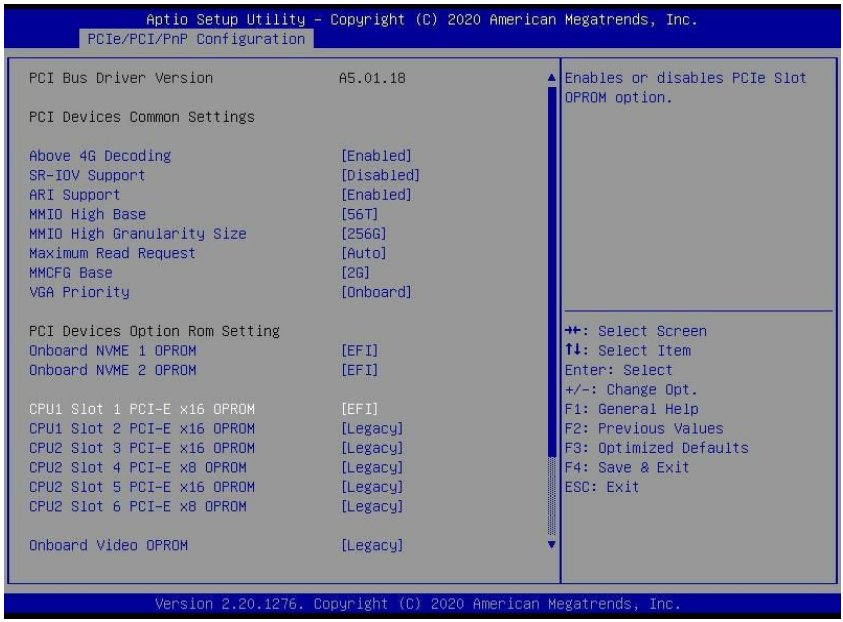




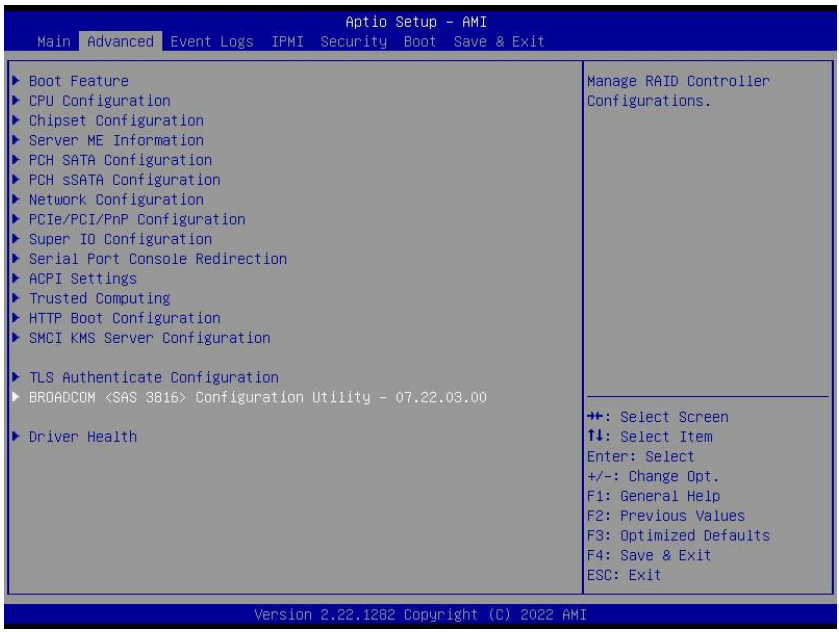
CPU1 Slot 1 PCI-E X16 OPROM Selected

3. When the below screen appears, select **EFI** mode, then press **<F4>** to save and exit.

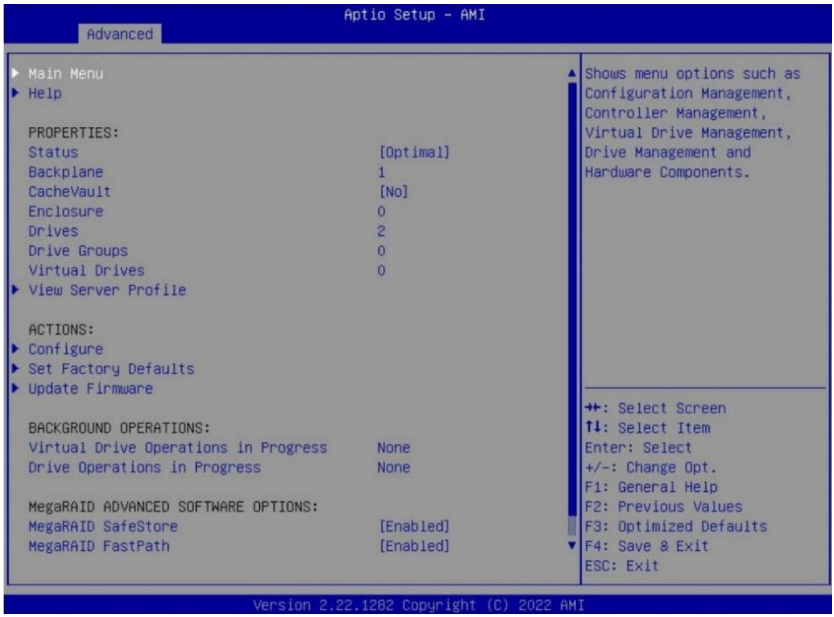




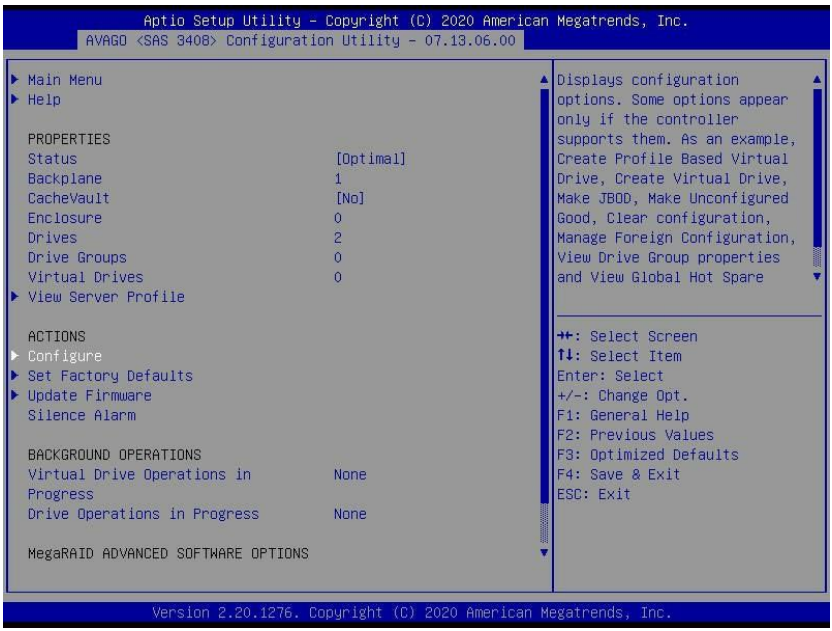
4. Press **<ESC>** to reach the **Advanced** tab, then select **BROADCOM <SAS 3816> Configuration Utility** and press **<Enter>**.

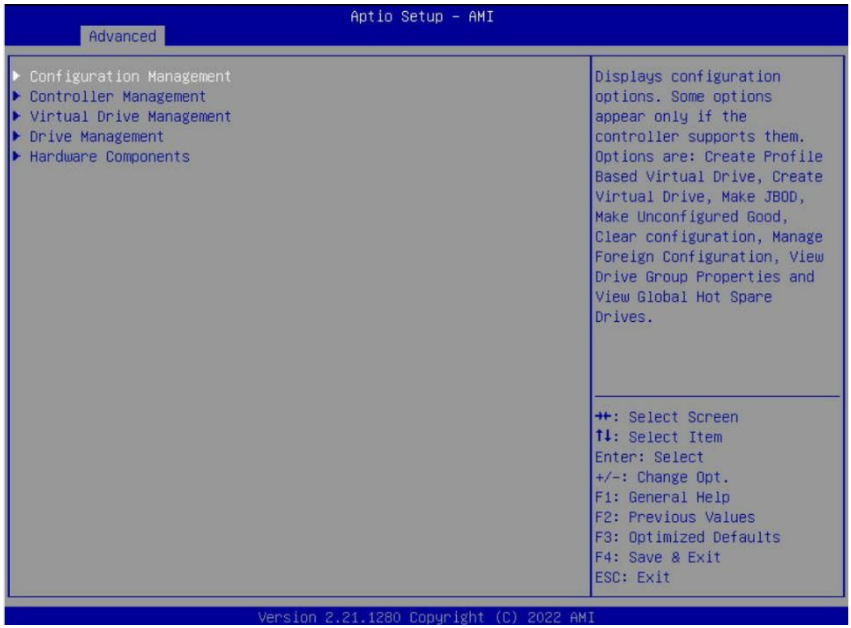


5. Enter **Main Menu** page.

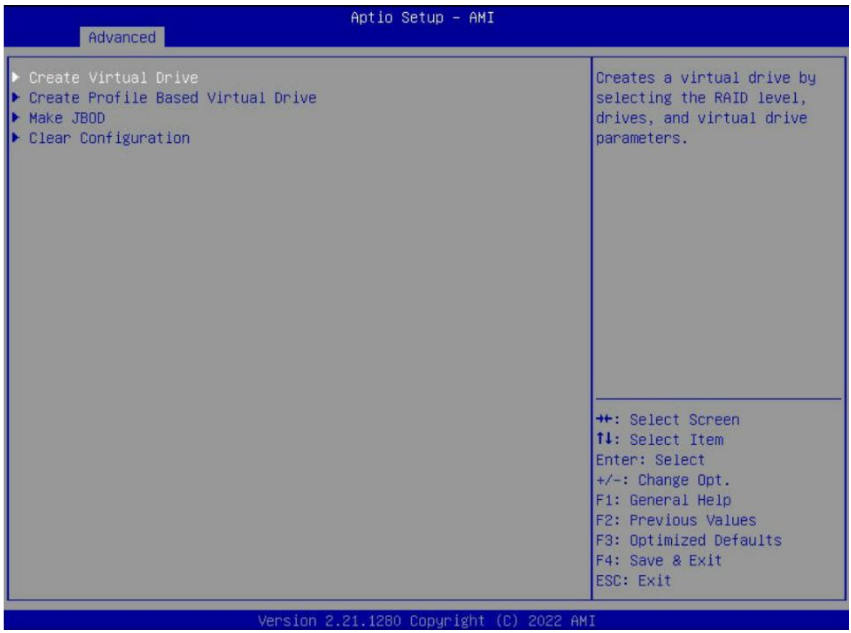


6. Select **Configure** from the Main Menu submenu.

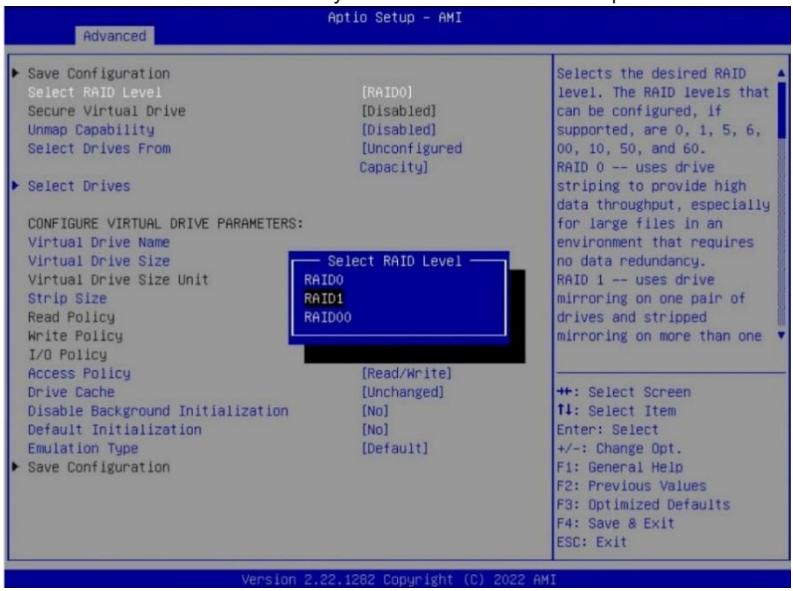




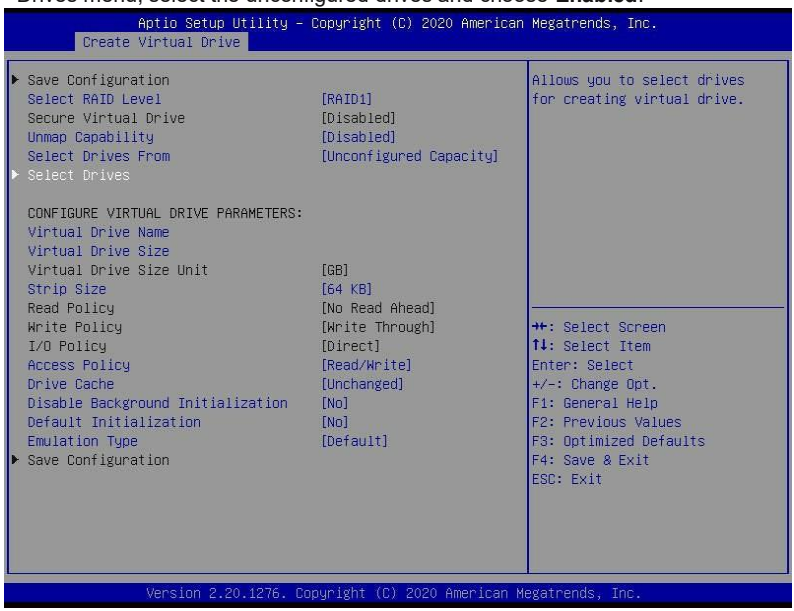
7. Select **Create Virtual Drive** and press **<Enter>**.

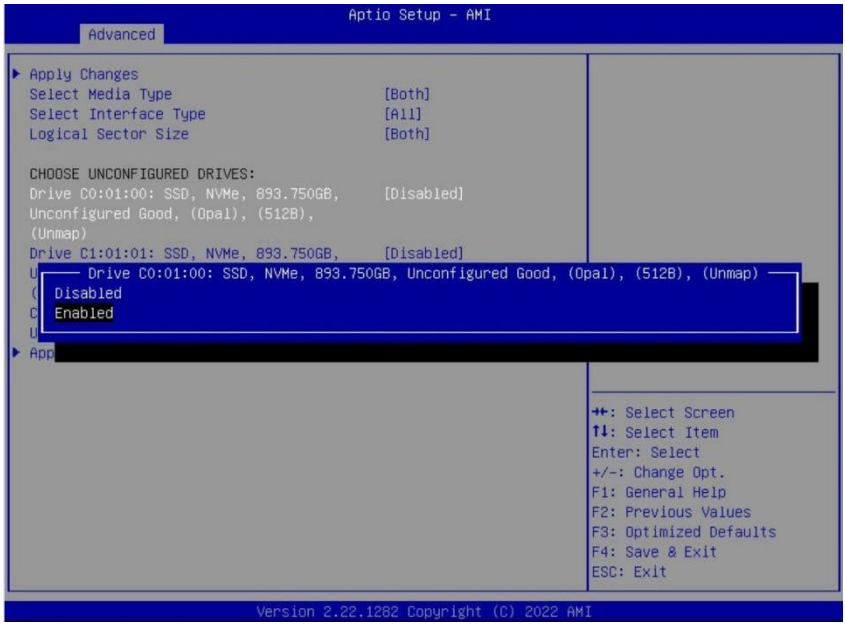


8. On the **Create Virtual Drive** menu, navigate to **Select RAID Level** and press **<Enter>**. Use the arrow keys to select a RAID level and press **<Enter>**.

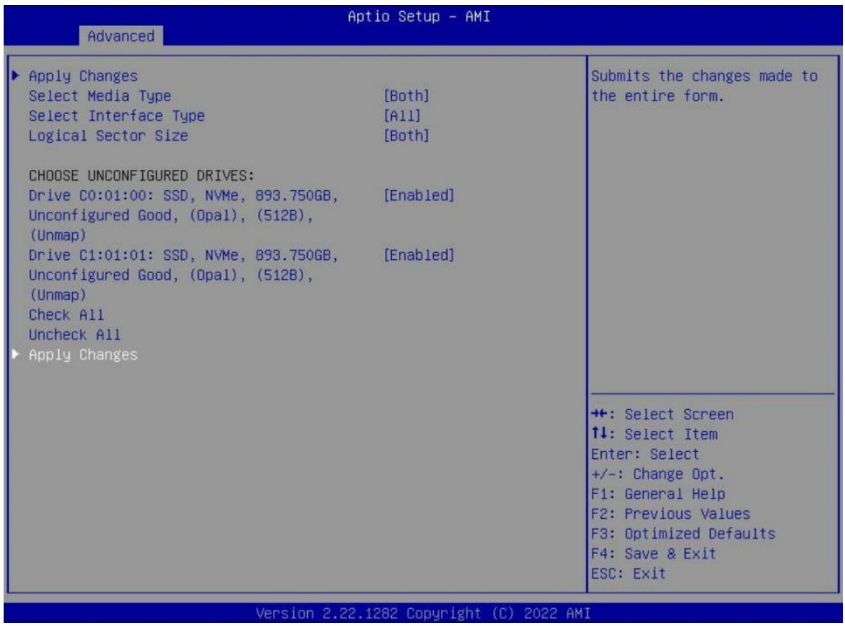


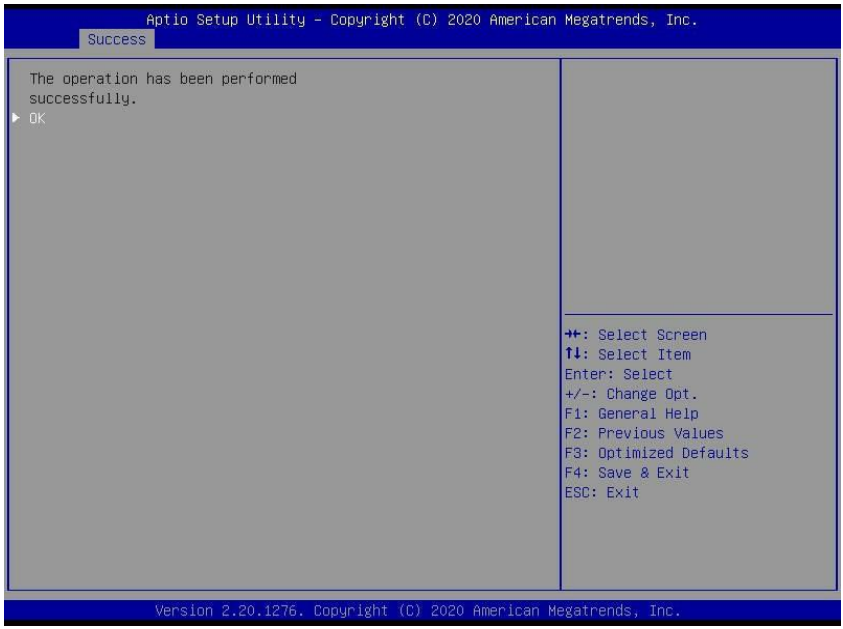
9. Navigate to **Select Drives**, as shown below, and press **<Enter>.**On the Select Drives menu, select the unconfigured drives and choose **Enabled**.



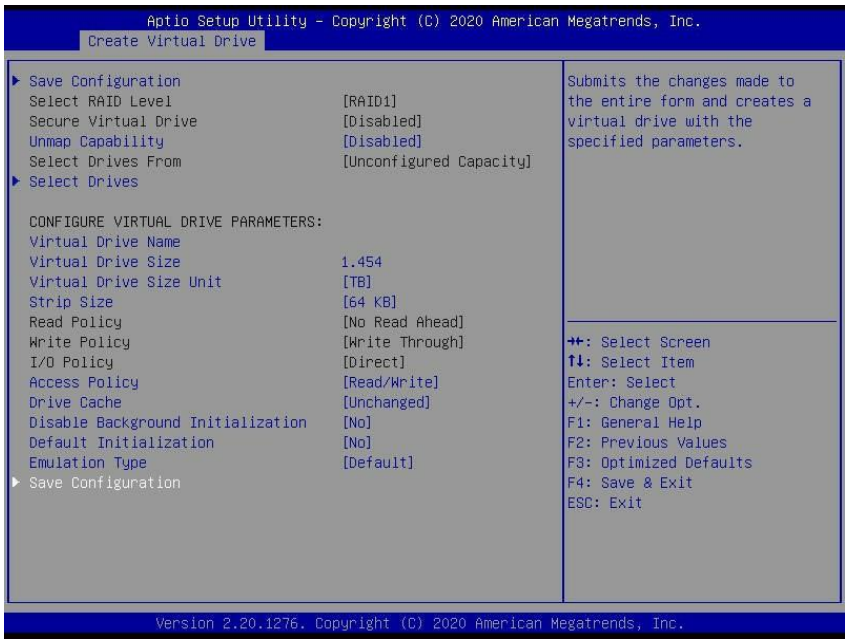


10. Select **Apply Changes** and press **<Enter>**.

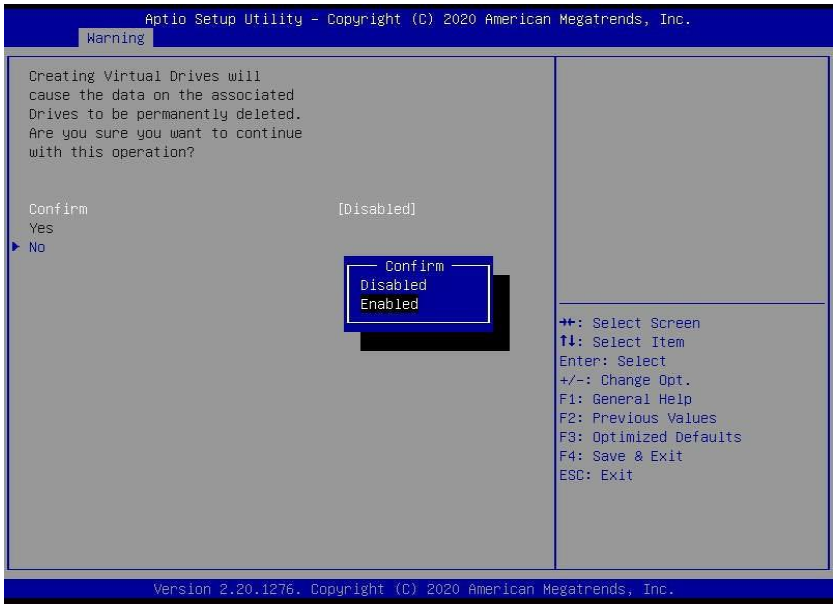




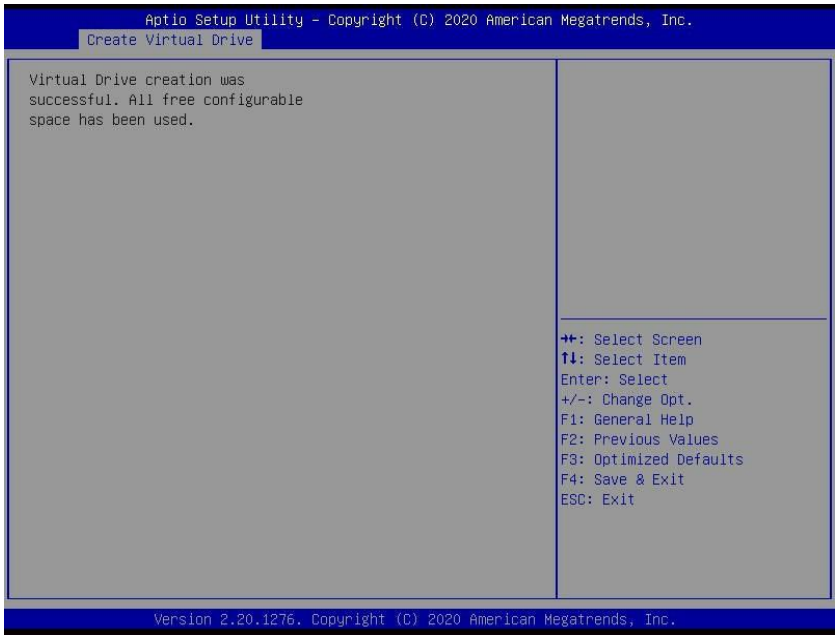
11. Save configuration and press **<Enter>**.



12. Select the **Yes** option and then confirm **Enabled**.



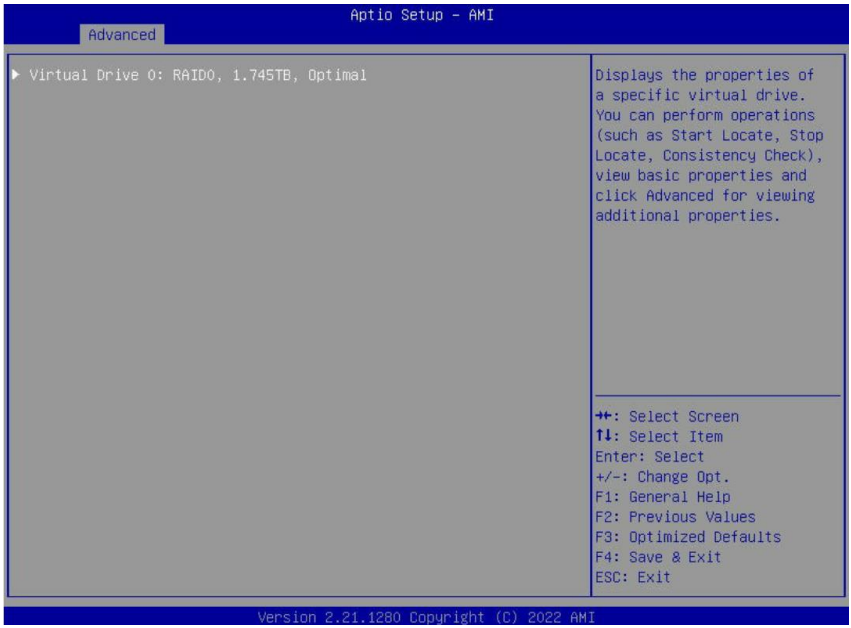
13. The below screen appears once Virtual Drive creation is successful.



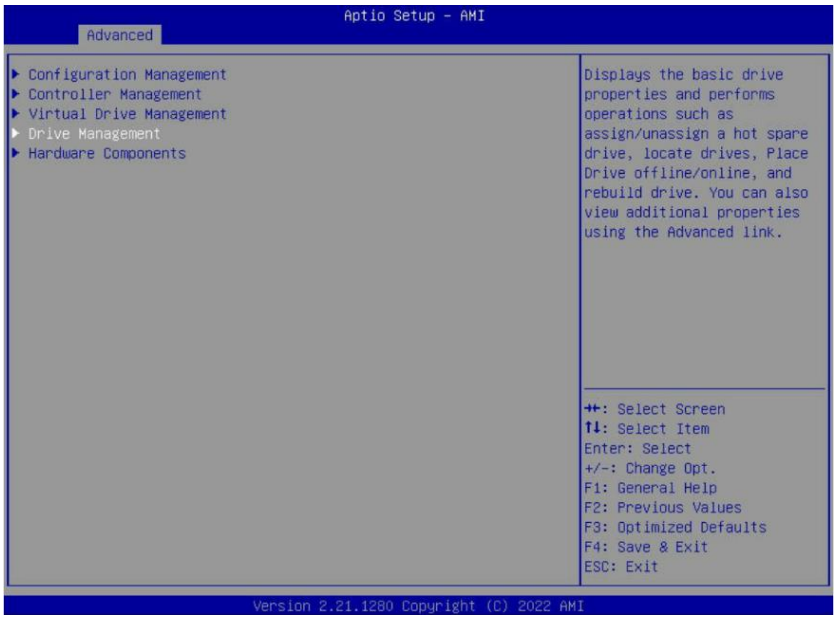
After completing the steps to use the BROADCOM <SAS 3816> Configuration Utility, there are a few optional actions or screenshots that you can observe, act on, or simply ignore. These options include the following:

Select **Virtual Drive Management**

Check the virtual drive status.

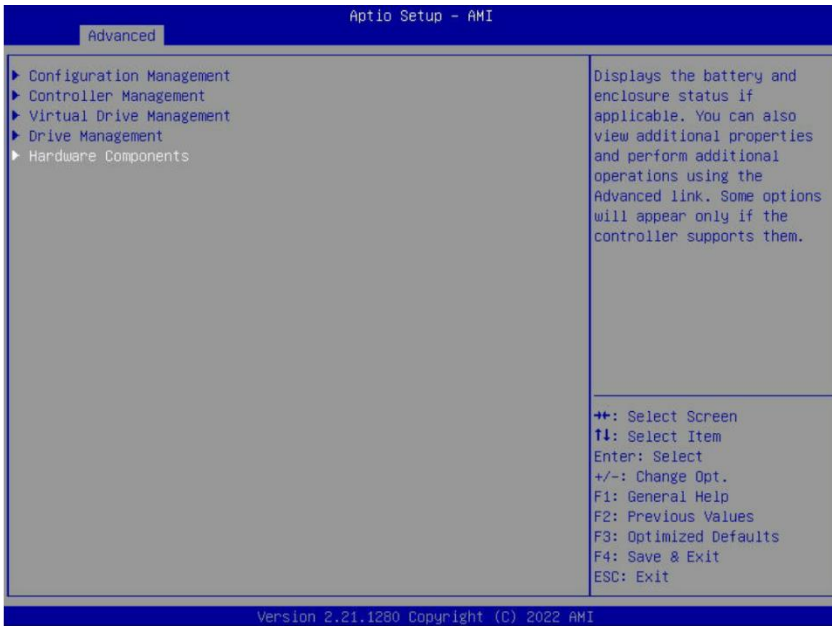


Select **Drive Management**.



Check physical drive status.

Select **Hardware Components**.



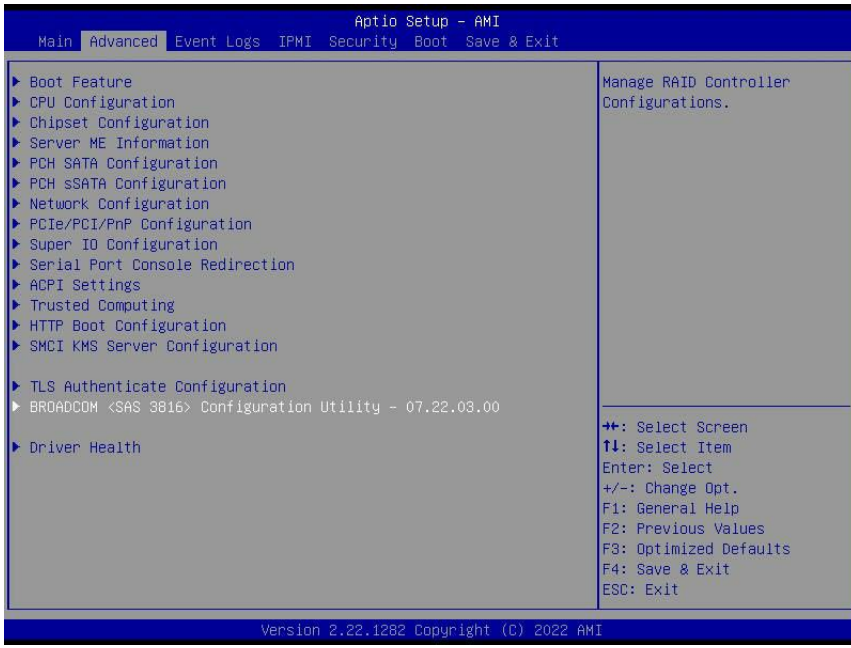
Chapter 5

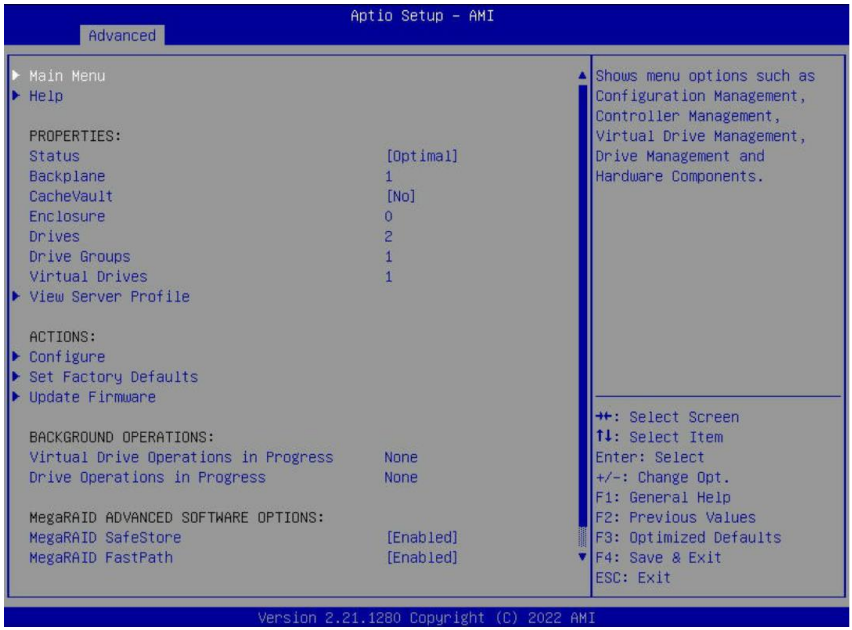
Hybrid Drive Type Change

This chapter provides instructions on how to change the Profile ID. Please remove all the installed devices before changing the Profile ID.

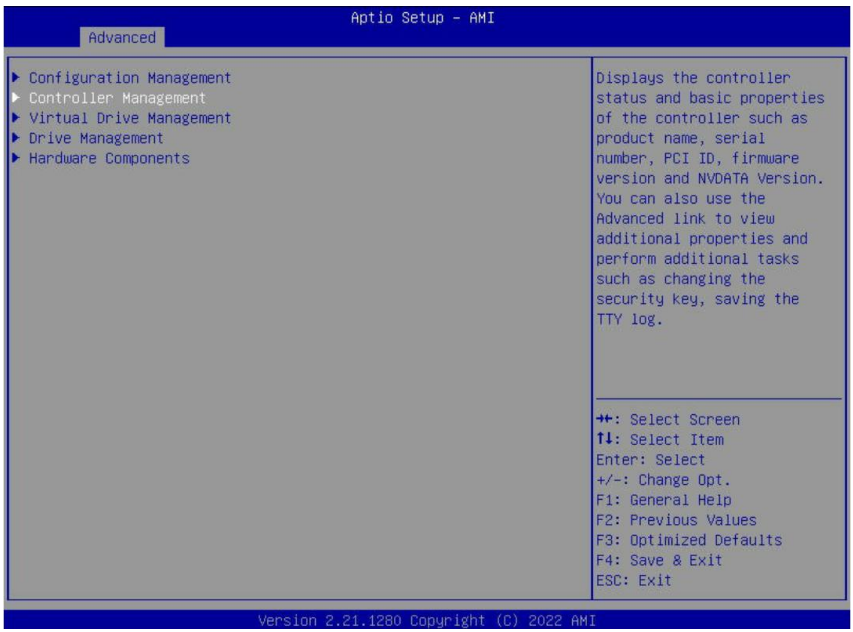
5-1 Changing Drive Type under UEFI

1. Select **BROADCOM <SAS 3816> Configuration Utility** and enter the **Main Menu**.

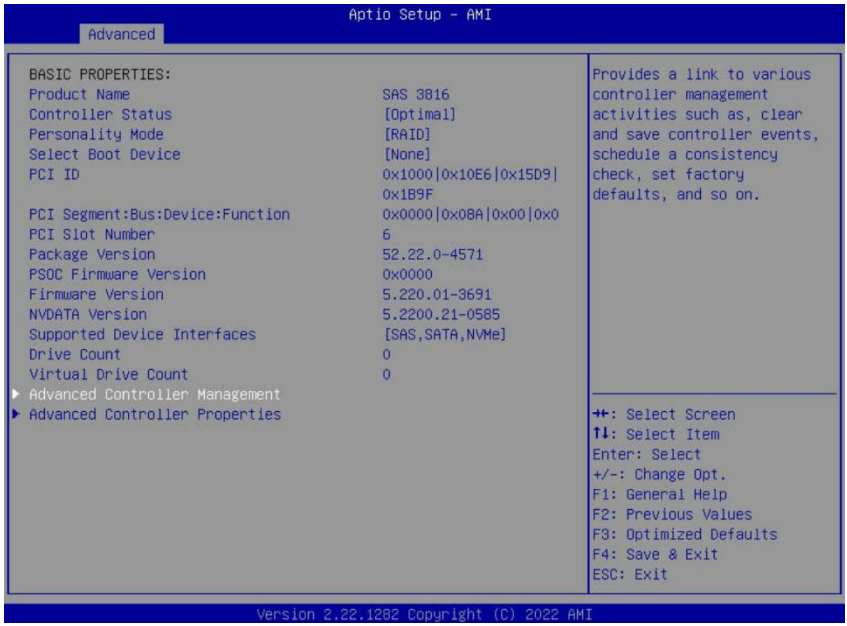




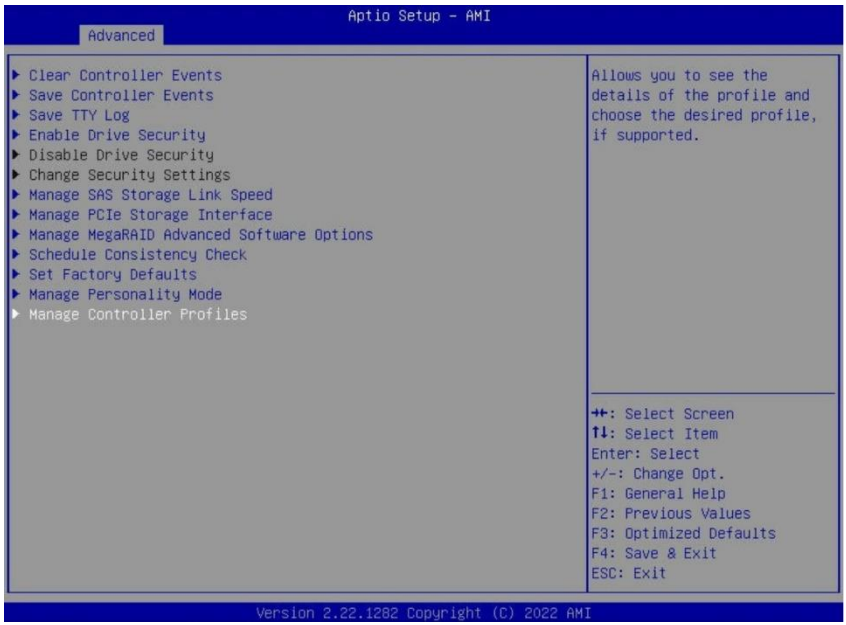
2. On the Main Menu, select **Controller Management**.



3. On the Controller Management menu, select **Advanced Controller Management**.

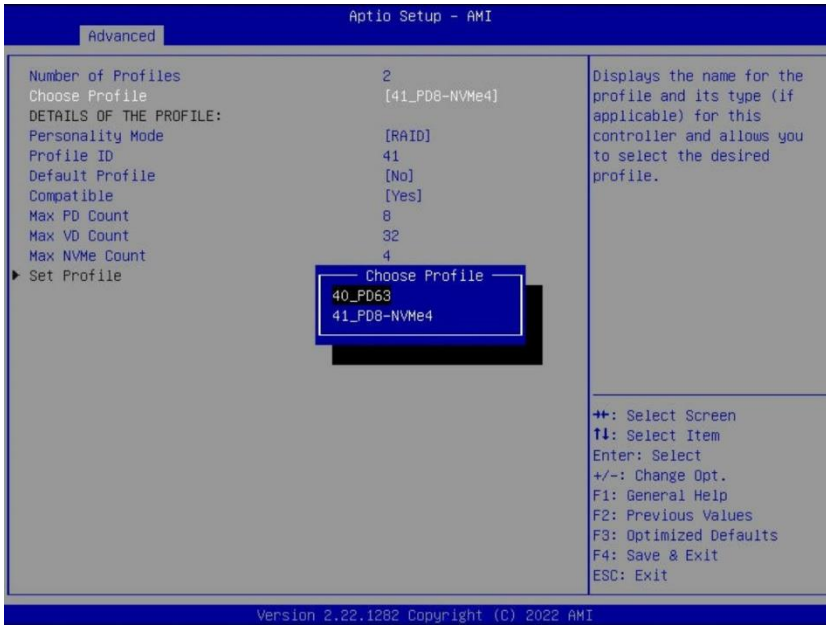


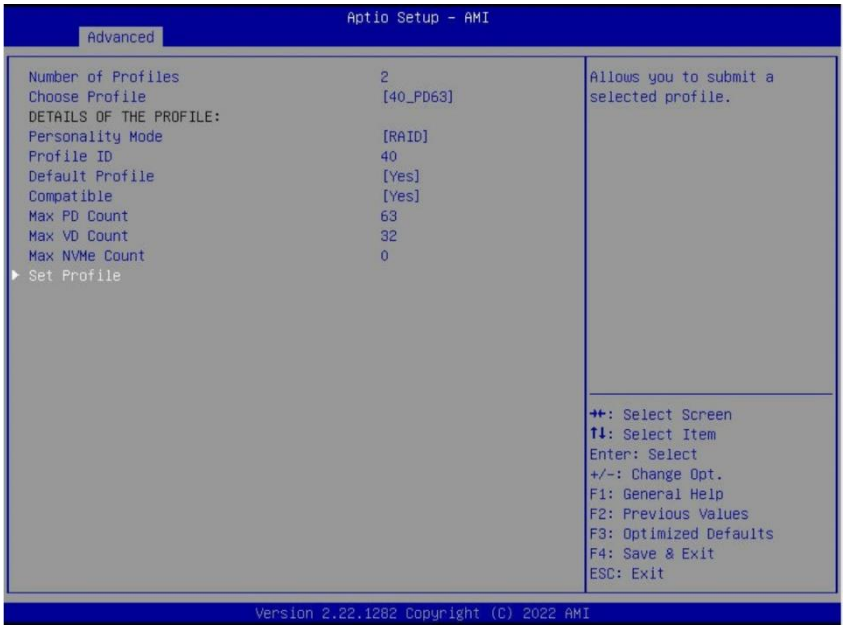
4. Enter **Manage Controller Profiles**.

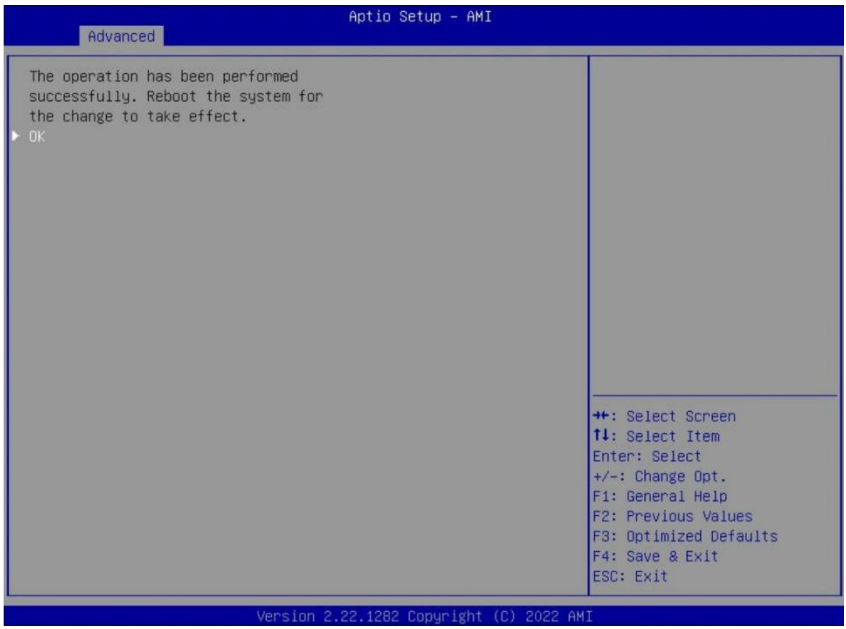


5. Select **Choose Profile** and choose profile name **only if necessary**.

(Please note that the default Profile ID of AOC-S3816L-L8iR is “41” with NVMe support. Users are NOT encouraged to modify the default Profile ID without particular instruction from Supermicro.)







6. Press **<F4>** to save and exit.

(Disclaimer Continued)

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