



Linux Ubuntu On HighPoint RR3700/2800/800/R700 RAID AIC Installation Guide (Install the driver from Network)

V1.01-Sept 26st 2023

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1 Overview

The purpose of this document is to provide clear instructions on how to install Linux Ubuntu to an SSD or RAID array hosted by HighPoint RR3700/2800/800/R700 series RAID AICs.

The following is a list of supported RAID AICs, and Linux distributions.

Supported Linux distributions	Ubuntu 20.04 Ubuntu 20.04.1 Ubuntu 20.04.2 Ubuntu 20.04.3 Ubuntu 20.04.4 Ubuntu 20.04.5 Ubuntu 20.10 Ubuntu 22.04 Ubuntu 22.04.1 Ubuntu 22.10 Ubuntu 22.04.3
Supported RAID AICs	RR3740A/ RR3740C RR3720A/ RR3720C RR2840A/ RR2840C RR840A/ RR840C RR3742A R710 R720

2 Installing Linux Ubuntu on RAID AIC

If you would like to install Linux Ubuntu onto drives attached to the RAID AIC, please perform the following operations.

Step 1 Prepare Your Hardware for Installation

After you attach your hard disks to the RAID AIC, you can use **EFI Utility** to configure your hard disks into RAID arrays, or just use them as single disks.

Before installation, you must remove all the Hard disks, which are not physically attached to the RAID AIC, from your system.

You also need to prepare two USB flash drives or one USB flash drive and one optical disc (CD/DVD-ROM); one USB flash drive is used to store the RAID AIC UEFI package, while the other USB flash drive or optical disc is used to burn the ISO.

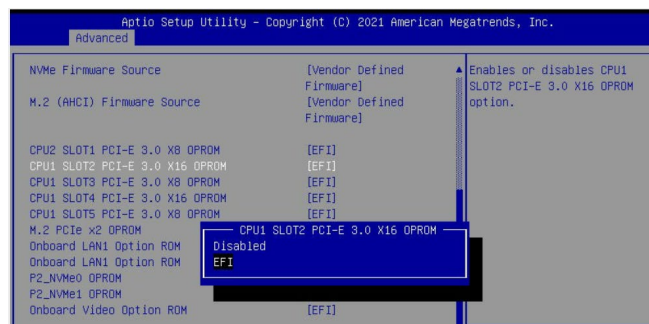
Note

RAID AIC support EFI boot. If you have other SCSI adapters installed, you must make sure the RAID AIC EFI will be loaded firstly. If not, try to move it to another PCIe slot. Otherwise, you may be unable to boot up your system.

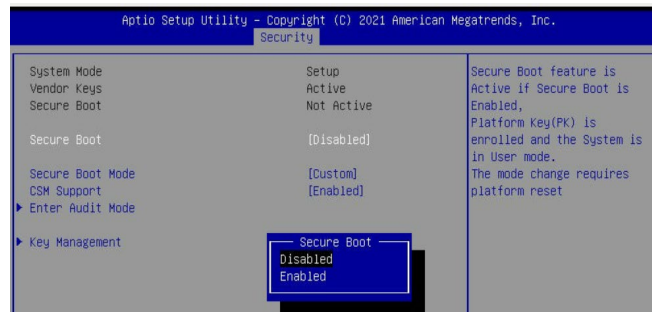
Step 2 Check System EFI Settings

In your system EFI SETUP menu, change **Boot Sequence** in such a way that the system will first boot from **EFI CDROM** or **EFI** a Bootable USB flash drive, after you finish installation, set the RAID AIC as the first boot device to boot up the system. Refer to your motherboard EFI manual to see how to set boot sequence.

1. Set UEFI setting with SuperMicro H11DSi motherboard as an example.
 - a. **"Advanced->PCIe/PCI/PnP Configuration->CPU Slot PCI-E OPROM"** to **"EFI"**. Suppose the RAID AIC is connected to motherboard CPU1 Slot 2 PCI-E X16, then you should set "CPU1 Slot 2 PCI-E X16 OPROM" to "EFI";

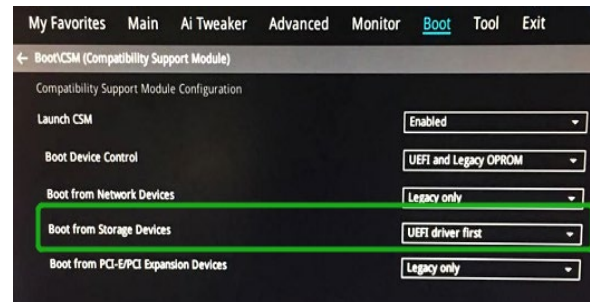


- b. Disable "Secure Boot", set "Attempt Secure Boot" to "Disabled".

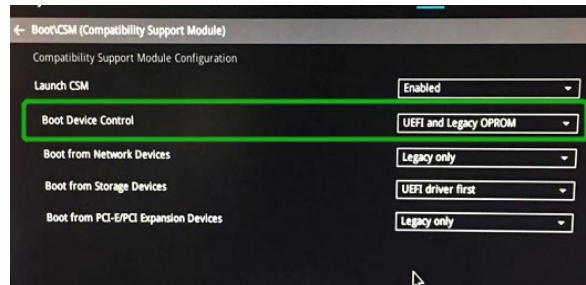


2. Set UEFI setting with ASUS PRIME X299 -DELUXE motherboard as an example:

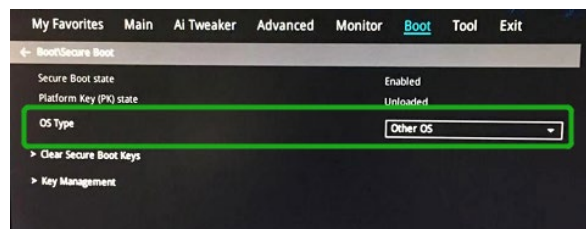
- a. Set "Boot from Storage Devices" to "UEFI driver first";



- b. And "Boot Device Control" to "UEFI Only" or "UEFI and Legacy OPRM";



- c. Set "OS Type" to "Other OS".



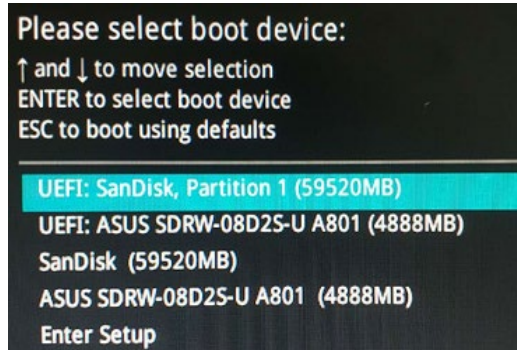
Step 3 Flash UEFI ROM to RAID AIC

Example: RR3720C

For other products, please refer to: [Update BIOS UEFI ROM](#)

Note: *Make sure your USB flash drive partition format is FAT32.*

- a. Unzip RR3720C UEFI package to root dir(/) of the USB flash drive, and connect the USB flash drive to the motherboard;
- b. Boot from the USB flash drive and enter the UEFI environment.



- c. Use the command "go.nsh" to flash UEFI ROM to the RR3720C and reboot the system.

```
FS2:\> go.nsh
FS2:\> load.efi 3720uefi.blf /a
Load Utility for Flash EPROM v1.1.5
(built at Mar 28 2023 17:27:18)

Set flash size to 291K
Found adapter 0x37401103 at PCI 193:0:0
Offset address 0x0
EPROM Vendor: WINBOND W25X40BV
Erasing .....Succeeded
Flashing ....

Flashing Success (total retry 0)

Verifying ....

Passed !
FS2:\> _
```

- d. Use the "exit" command to exit the utility.

Step 4 Create Array

Example: RR3720C

- a. Attach hard disks to RR3720C.

(Install the driver from Network)

- b. Boot, enter the motherboard's Boot List and select start from UEFI USB flash drive. US

```

Boot Override
UEFI: USB, Partition 1
(B97/D0/F0) UEFI PXE: IPv4 Intel(R) I350 Gigabit Network
Connection(MAC:3cecef40a1dc)

```

- c. Use the command “ArrayCreate.efi” to enter the Utility:

```

FS0:\> ArrayCreate.efi
Highpoint RAID utility for UEFI (version: 20211014)
==== Controller information:
  PCI Location: c1:00:00
    Vendor: HighPoint Technologies, Inc.
    Product: RocketRAID 3720 SAS Controller

==== Physical device list(count 3):
1/1 HDC WUH722020BLS204-BLG2YNHA, 20000521MB(MaxFree 20000521MB), Normal [RA] [WC]
1/2 HDC WUH722222ALS200-2TG0RM7E, 22000902MB(MaxFree 22000902MB), Normal [RA] [WC]
1/3 HDC WUH722222ALS200-2TG0R8GE, 22000902MB(MaxFree 22000902MB), Normal [RA] [WC]

==== Logical device list(count 0):
-----
>>> Please specify command to execute:
<<<

```

- d. Use the command “create RAID0”.
This will create a RAID0 array using all of the hard disks, and the maximum available capacity.

```

<<< create RAID0
  Creating array: RAID0_000041A7.
  Array created successfully.
=====
==== Physical device list(count 3):
1/1 HDC WUH722020BLS204-BLG2YNHA, 20000521MB(MaxFree 0MB), Normal [RA] [WC]
1/2 HDC WUH722222ALS200-2TG0RM7E, 22000902MB(MaxFree 2000381MB), Normal [RA] [WC]
1/3 HDC WUH722222ALS200-2TG0R8GE, 22000902MB(MaxFree 2000381MB), Normal [RA] [WC]

==== Logical device list(count 1):
1 [VDO-0] RAID0_000041A7 (RAID0), 60001565MB (Stripe 64KB), Normal
  1/1 HDC WUH722020BLS204
  1/2 HDC WUH722222ALS200
  1/3 HDC WUH722222ALS200
-----
>>> Please specify command to execute:
<<<

```

- e. Use the “exit” command to exit the utility.
f. For additional command lines, refer to [Appendix A](#).

Note: RR3740/ RR3720/ R710/ R720 series RAID AICs also support the creation method of BIOS/UEFI HII. Please refer to [UM-Chapter 4](#).

Step 5 Install Linux Ubuntu

Example: Ubuntu20.04 Server &22.04 Desktop

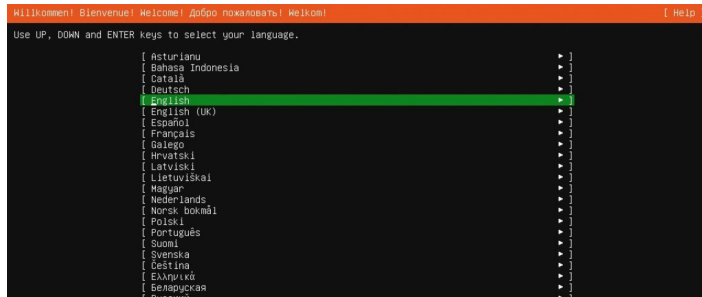
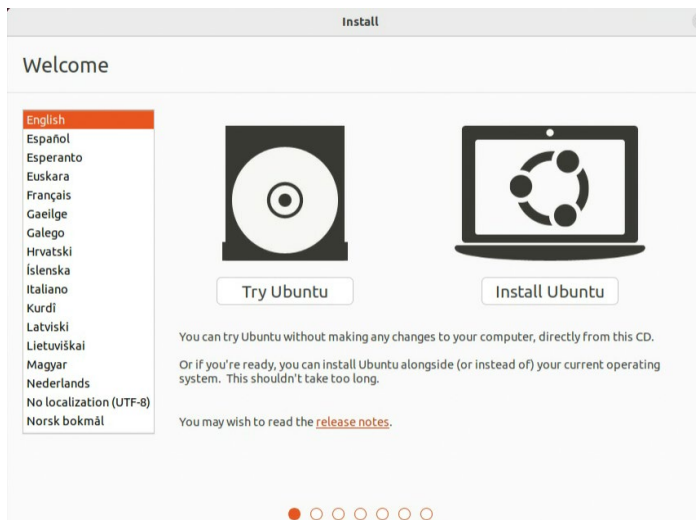
- a. Before starting the installation procedure, verify the status of your network environment.
To ensure Ubuntu is successfully installed to the RAID array, we recommend that the system is connected with the internet and local network.

Note: The purpose of the network connection is to download drivers from the network to complete the installation of the driver.

- b. Insert a USB flash drive or optical disc to the motherboard.
c. Boot the system using a bootable USB flash drive or optical disc.

(Install the driver from Network)

- d. When the following window appears during installation, please refer to the instructions below the two images below, depending on your operating system.

Ubuntu Server:**Ubuntu Desktop:**

- 1). If you use Ubuntu Server, Press **ALT+F2** to switch to the shell on console 2 and press **ENTER** to activate this console.

```

Ubuntu 20.04.4 LTS ubuntu-server tty2

Welcome to Ubuntu 20.04.4 LTS (GNU/Linux 5.4.0-100-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

System information as of Mon Sep 18 19:33:57 UTC 2023

System load:  0.12   Memory usage: 4%   Processes:    456
Usage of /home: unknown   Swap usage:  0%   Users logged in: 0

1 update can be applied immediately.
To see these additional updates run: apt list --upgradable

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu-server@ubuntu-server:~$

```


(Install the driver from Network)

- 2). If you use Ubuntu Desktop, please press **CTRL+ALT+F2** to switch to the shell on console 2 and press **ENTER** to activate this console.

Ubuntu login: ubuntu

```

Ubuntu 22.04.2 LTS ubuntu tty2
ubuntu login: ubuntu
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.19.0-32-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

ubuntu@ubuntu:~$

```

- e. Switch to root privileges.

```

ubuntu-server@ubuntu-server:~$ sudo su
root@ubuntu-server:/home/ubuntu-server#

```

- f. Then execute following commands to download and install the Opensource driver and binary driver.

```
# wget -q https://download.highpoint-tech.com/go.sh -O - | sh
```

Ubuntu Server:

```

root@ubuntu-server:/home/ubuntu-server# wget -q https://download.highpoint-tech.com/go.sh -O - | sh

Welcome to the HighPoint driver installation script (v1.0.0).
The purpose of this script is to help you download the driver from the network and install it automatically.
Copyright (c) 2023 HighPoint Technologies, Inc. All rights reserved.

Check controller ...
(OK) RR3720

Downloading open source ...
(OK) RR37xx_8xx_28xx_Linux_X86_64_Src_v1.23.13_23_01_16.tar.gz

Check system ...
(OK) ubuntu20.04.4 ( kernel:5.4.0-100-generic )

Downloading driver ...
(OK) RR37xx_8xx_28xx_ubuntu20.04.4_LTS_x86_64_v1.23.13_23_03_06.tar.gz

Install the driver...
(OK)

Please follow the installation manual to return to the installation screen.

```

Ubuntu Desktop:

```

root@ubuntu:/home/ubuntu# wget -q https://download.highpoint-tech.com/go.sh -O - | sh

Welcome to the HighPoint driver installation script (v1.0.0).
The purpose of this script is to help you download the driver from the network and install it automatically.
Copyright (c) 2023 HighPoint Technologies, Inc. All rights reserved.

Check controller ...
(OK) RR3720

Downloading open source ...
(OK) RR37xx_8xx_28xx_Linux_X86_64_Src_v1.23.13_23_01_16.tar.gz

Check system ...
(OK) ubuntu22.04.2_desktop ( kernel:5.19.0-32-generic )

Downloading driver ...
(OK) RR3740a_ubuntu22.04.2_desktop_x86_64_v1.23.13_23_06_19.tar.gz

Install the driver...
(OK)

Please follow the installation manual to return to the installation screen.

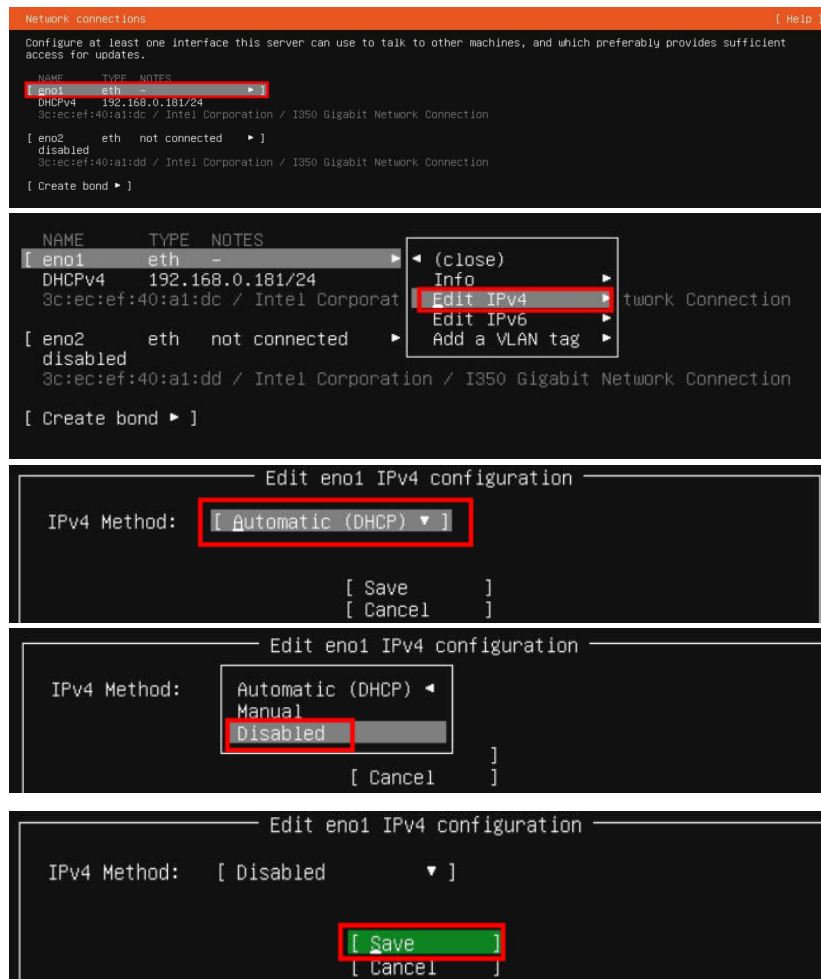
```

(Install the driver from Network)

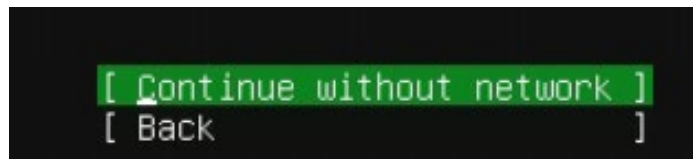
- g. Then press **ALT+F1** to switch back to installation screen and continue the installation.
- h. When the following screen appears during the installation process, please refer to the following steps to disable the network connection.

Note 1: If you are installing an Ubuntu server, the Internet must be disabled. If you are connecting to the Internet at this time, the system will automatically update the latest kernel after the installation is complete and will not save the initial version of the kernel, which will result in the system not booting properly after the installation is complete.

Note 2: If you are installing Ubuntu Desktop, ignore this step! Ubuntu Desktop automatically saves the initial version of the kernel, so there is no need to disable the Internet.

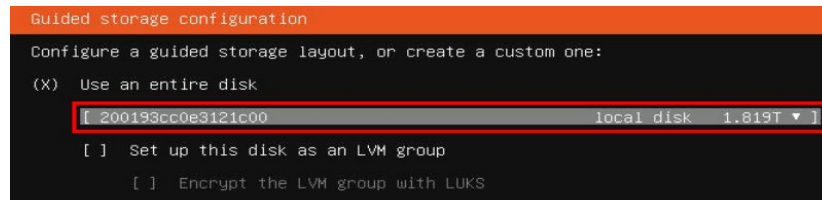


Then choose "Save" and press "Continue without network".

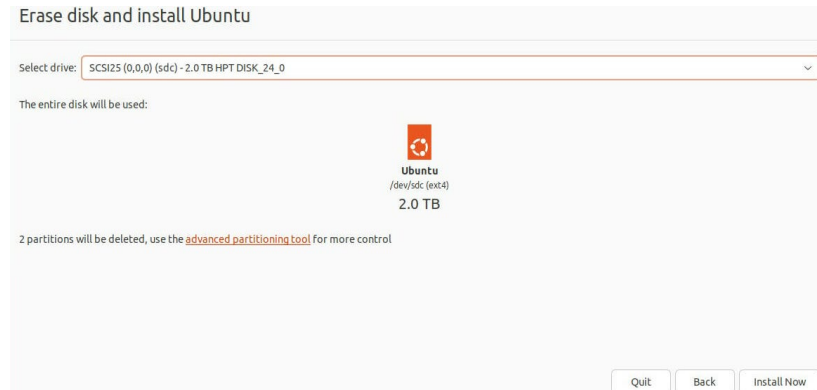


- i. Select the previously created RAID.

Ubuntu Server:



Ubuntu Desktop:



- j. When the screen shows that “**Install complete!**”, switch to the shell on console 2 and check if the driver installation is complete. The green prompt “All the necessary parts have been installed successfully” means the driver has been installed successfully!
- 1). If you use Ubuntu Server, Press **ALT+F2** to switch to the shell on console 2.
 - 2). If you use Ubuntu Desktop, Press **CTRL+ALT+F2** to switch to the shell on console 2.

```
root@ubuntu:/home/ubuntu# wget -q https://download.highpoint-tech.com/go.sh -O - | sh
Welcome to the HighPoint driver installation script (v1.0.0).
The purpose of this script is to help you download the driver from the network and install it automatically.
Copyright (c) 2023 HighPoint Technologies, Inc. All rights reserved.

Check controller ...
(OK) RR3720

Downloading open source ...
(OK) RR37xx_8xx_28xx_Linux_x86_64_Src_v1.23.13.23_01.16.tar.gz

Check system ...
(OK) ubuntu22.04.2_desktop ( kernel:5.19.0-32-generic )

Downloading driver ...
(OK) RR3740a_ubuntu22.04.2_desktop_x86_64_v1.23.13.23_06.19.tar.gz

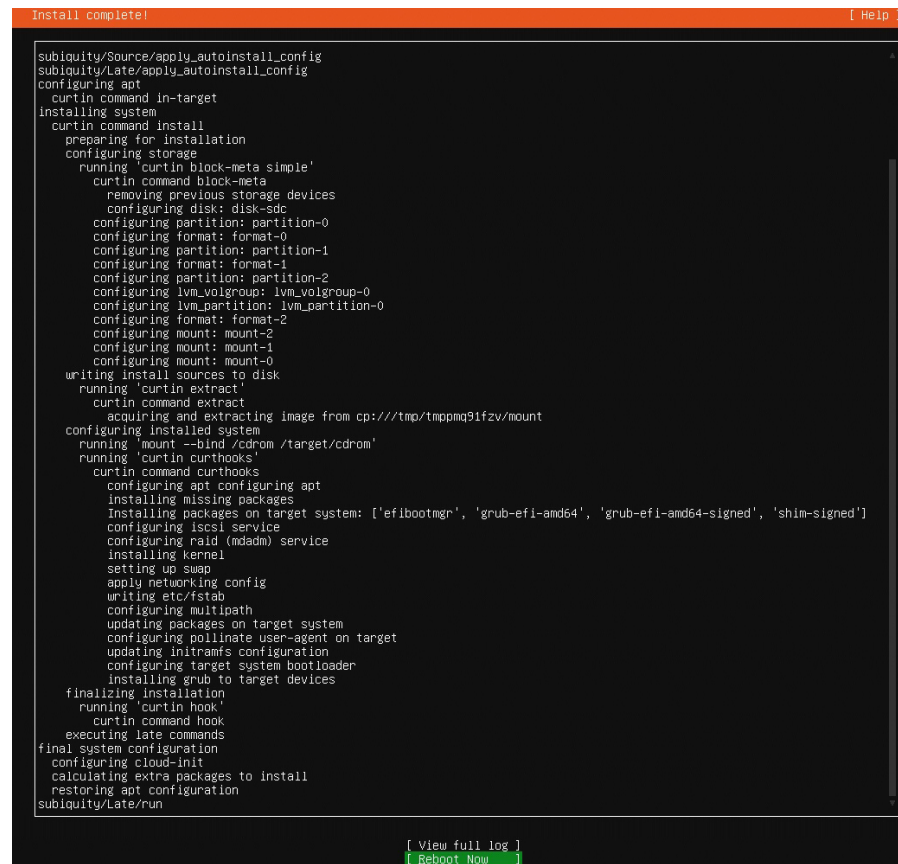
Install the driver...
(OK)

Please follow the installation manual to return to the installation screen.
All the necessary parts have been installed successfully
If there are still problems with the system installation, please contact us at https://www.highpoint-tech.com and send the file /var/tmp/HighPoint_rr3740a_binar
g_driver_ubuntu22.04.2_desktop_23_09_19.tar.gz to us.
root@ubuntu:/home/ubuntu#
```

- k. Then press **ALT+F1** to switch back to installation screen.

(Install the driver from Network)

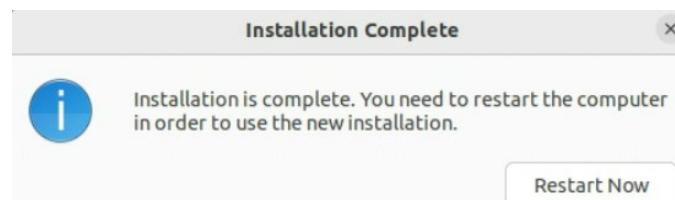
1. Press “**Reboot Now**” directly.

Ubuntu Server:


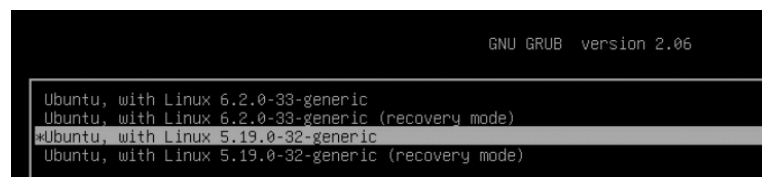
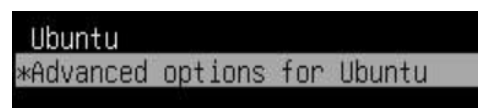
```

Install complete! [ Help ]
subiquity/Source/apply_autoinstall_config
subiquity/Late/apply_autoinstall_config
configuring apt
  curtin command in-target
installing system
  curtin command install
    preparing for installation
    configuring storage
      running 'curtin block-meta simple'
      curtin command block-meta
        removing previous storage devices
        configuring disk: disk-sdc
        configuring partition: partition-0
        configuring format: format-0
        configuring partition: partition-1
        configuring format: format-1
        configuring partition: partition-2
        configuring lvm_voigroup: lvm_voigroup-0
        configuring lvm_partition: lvm_partition-0
        configuring format: format-2
        configuring mount: mount-2
        configuring mount: mount-1
        configuring mount: mount-0
    writing install sources to disk
    running 'curtin extract'
    curtin command extract
      acquiring and extracting image from cp:///tmp/q9ifzv/mount
    configuring installed system
    running 'mount --bind /cdrom /target/cdrom'
    running 'curtin curthooks'
    curtin command curthooks
      configuring apt configuring apt
      installing missing packages
      installing packages on target system: ['efibootmgr', 'grub-efi-amd64', 'grub-efi-amd64-signed', 'shim-signed']
      configuring lscsi service
      configuring raid (mdadm) service
      installing kernel
      setting up swap
      apply networking config
      writing etc/fstab
      configuring multipath
      updating packages on target system
      configuring pollinate user-agent on target
      updating initramfs configuration
      configuring target system bootloader
      installing grub to target devices
    finalizing installation
    running 'curtin hook'
    curtin command hook
    executing late commands
final system configuration
configuring cloud-init
calculating extra packages to install
restoring apt configuration
subiquity/Late/run
[ View full log ]
[ Reboot Now ]

```

Ubuntu Desktop:

- m. When you restart to enter the **Ubuntu Desktop** version, press “ESC” immediately. Then please select “**Advanced options for Ubuntu**”. It is recommended to select lower version kernel to enter; the lower version of the kernel are supported by default.



(Install the driver from Network)

- n. Once in the system, open a terminal with root privileges and use **"apt update"** and **"apt upgrade"** to get a list of new ubuntu packages.

```
root@test:/home/test1# apt update
Err:1 http://cn.archive.ubuntu.com/ubuntu focal InRelease
  Temporary failure resolving 'cn.archive.ubuntu.com'
Err:2 http://cn.archive.ubuntu.com/ubuntu focal-updates InRelease
  Temporary failure resolving 'cn.archive.ubuntu.com'
Err:3 http://cn.archive.ubuntu.com/ubuntu focal-backports InRelease
  Temporary failure resolving 'cn.archive.ubuntu.com'
Err:4 http://cn.archive.ubuntu.com/ubuntu focal-security InRelease
  Temporary failure resolving 'cn.archive.ubuntu.com'
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
W: Failed to fetch https://cn.archive.ubuntu.com/ubuntu/dists/focal/InRelease Temporary failure resolving 'cn.archive.ubuntu.com'
W: Failed to fetch http://cn.archive.ubuntu.com/ubuntu/dists/focal-updates/InRelease Temporary failure resolving 'cn.archive.ubuntu.com'
W: Failed to fetch http://cn.archive.ubuntu.com/ubuntu/dists/focal-backports/InRelease Temporary failure resolving 'cn.archive.ubuntu.com'
W: Failed to fetch http://cn.archive.ubuntu.com/ubuntu/dists/focal-security/InRelease Temporary failure resolving 'cn.archive.ubuntu.com'
W: Some index files failed to download. They have been ignored, or old ones used instead.
root@test:/home/test1#
```

```
root@test:/home/test1# apt upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

- o. Restart and select a new kernel to enter the system.

3 Monitoring the Driver

Once the driver is running, you can monitor it through the Linux proc file system support. There is a special file under `/proc/scsi/rr3740a/`. Through this file you can view driver status and send control commands to the driver.

Note

The file name is the SCSI host number allocated by OS. If you have no other SCSI cards installed, it will be 0. In the following sections, we will use x to represent this number.

Use the following commands to view the driver status, RAID AICs and logical devices or use [RAID Management software](#) to do so.

`cat /proc/scsi/rr3740a/x`

```
root@test-Super-Server:/home/test/Desktop# cat /proc/scsi/rr3740a/0
RocketRAID 37xx/8xx/28xx controller driver v1.23.13

Controller 1: RocketRAID 3720 SAS Controller
-----
1/5/1 ST6000VN0041-2EL11C-ZA190V1D, 6001075MB, Normal [RA][WC][NCQ]
1/6/1 ST6000VN0041-2EL11C-ZA196EY4, 6001075MB, Normal [RA][WC][NCQ]
1/7/1 ST8000VX0002-1Z6112-ZA10PA4J, 8001456MB, Normal [RA][WC][NCQ]

Logical devices
-----
[DISK 0_0] RAID0_000041A7 (RAID0), 18003227MB, Normal
  1/6/1 ST6000VN0041-2EL11C
  1/5/1 ST6000VN0041-2EL11C
  1/7/1 ST8000VX0002-1Z6112
```

4 Installing RAID Management Software

HighPoint's RAID Management Software can be used to check the status of the SSDs/ HDDs and RAID arrays hosted by the RAID AIC. Installation of the management software is optional but recommended.

Please refer to HighPoint RAID Management Software documentation for more information.

5 Troubleshooting

If you do not install the system or update the kernel according to the installation manual, the system will crash and you will not be able to enter.

Controller Not Found

The "Controller Not Found" prompt appears after executing the "**wget -q https://download.highpoint-tech.com/go.sh -O - |sh**" command.

```
Check controller ... (NG) Controller Not Found
Please check that the controller is properly connected to the motherboard.
```

Solutions:

- Enter the **lspci** command to check if the RAID AIC is recognized.
- If the RAID AIC is recognized, please [collect log information](#) and submit a support ticket using our [online support portal](#) and describe the issue in as much detail as possible.
- If the RAID AIC is not recognized, please power off the motherboard, remove the RAID AIC, wipe the RAID AIC "Gold Finger" and replace the PCIe slot, and then reinstall the Ubuntu Linux.

Your system * is not supported

The "Your system * is not supported" prompt appears after executing the "**wget -q https://download.highpoint-tech.com/go.sh -O - |sh**" command.

```
Check system ... (NG) Your system (kernel:5.14.0-284.11.1.el9_2.x86_64) is not supported
The rocky systems we support now are:
.7:4.18.0-425.3.1.el8.x86_64
.1:5.14.0-162.6.1.el9_1.x86_64
.6:4.18.0-372.9.1.el8.x86_64
.0:5.14.0-70.13.1.el9_0.x86_64
```

Solutions:

Please [collect log information](#) and submit a support ticket using our [online support portal](#) and describe the issue in as much detail as possible.

Failed to download the driver

The "Failed to download the driver" prompt appears after executing the "**wget -q https://download.highpoint-tech.com/go.sh -O - |sh**" command.

```
Downloading driver ... (NG) Failed to download the driver
Please contact us at https://www.highpoint-tech.com and send the file /var/tmp/HighPoint_hptnvme_binary_driver_rocky9.1.23_05_22.tar.gz to us.
```

Solutions:

- a. Ensure that the network is properly connected.
- b. Please [collect log information](#) and submit a support ticket using our [online support portal](#) and describe the issue in as much detail as possible if the network is properly connected.

6 Collecting log information

If there are problems with installing or using the system, please enter the log information file path `"/var/tmp/HighPoint_${driver}_binary_driver_${system}_${date}.tar.gz"` and [send us](#) the log information file.

Example: RR3720C & Ubuntu22.04.2 Desktop

```
root@ubuntu:/home/ubuntu# wget -q https://download.highpoint-tech.com/go.sh -O - | sh
Welcome to the HighPoint driver installation script (v1.0.0).
The purpose of this script is to help you download the driver from the network and install it automatically.
Copyright (c) 2023 HighPoint Technologies, Inc. All rights reserved.

Check controller ...
(OK) RR3720

Downloading open source ...
(OK) RR37xx_Bxx_28xx_Linux_X86_64_Src_v1.23.13_23_01_16.tar.gz

Check system ...
(OK) ubuntu22.04.2_desktop ( kernel:5.19.0-32-generic )

Downloading driver ...
(OK) RR3740a_ubuntu22.04.2_desktop_x86_64_v1.23.13_23_06_19.tar.gz

Install the driver...
(OK)

Please follow the installation manual to return to the installation screen.
All the necessary parts have been installed successfully.
If there are still problems with the system installation, please contact us at https://www.highpoint-tech.com and send the file /var/tmp/HighPoint_rr3740a.binary_driver_ubuntu22.04.2_desktop_23_09_19.tar.gz to us.
root@ubuntu:/home/ubuntu#
```

7 Appendix A

Support command: help/info/quit/exit/create/delete

- **Create Command Syntax**

Create Array Type (RAID0/1/10/5/50) Member Disk list (1/1, 1/2|*)
Capacity (100|*)

Note1: The RR840/RR2840/RR3720/RR3740/RR3742 RAID AICs can support RAID0/1/10/5/50.

Note2: The R710/R720 RAID AICs can support RAID0/RAID1/RAID10.

Examples

```
<<< create RAID0
```

```
<<< create RAID0 *
```

```
<<< create RAID0 * *
```

Create RAID0 array with all disks and with maximum capacity.

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

Create RAID1 array with disk 1/1 and 1/3 and with 10GB capacity.

```
<<< create RAID10 *
```

Create RAID10 array with all disks and with maximum capacity.

```
<<< create RAID5 *
```

Create RAID5 array with all disks and with maximum capacity.

```
<<< create RAID50,3 1/1, 1/2, 1/3, 1/4, 1/5, 1/6
```

Create RAID50 array with disk 1/1, 1/2, 1/3, 1/4, 1/5, 1/6 and with sub member count 3 and with maximum capacity.

- **Delete Command**
Syntax

delete {array ID}

- Examples**

<<< delete 1

Delete the first array from Logical device list.

<<< delete 2

Delete the second array from Logical device list.

- **Info Command**
Syntax

info

Display physical device list and logical list

- **Exit Command**
Syntax

Q/q/quit/exit

Quit the application

- **Help Command**
Syntax

H/h/help

This is help message.