# HighPoint RR2720A RAID Controller Linux Ubuntu Installation Guide

Copyright © 2023 HighPoint Technologies, Inc.

All rights reserved.

Last updated on April 03, 2023

# **Table of Contents**

1 Overview	1
2 Installing Linux Ubuntu on RR Series RAID controller	1
Step 1 Prepare Your Hardware for Installation	1
Step 2 Check System EFI Settings	1
Step 3 Flash UEFI Rom to RAID Controller	3
Step 4 Create Array	4
Step 5 Prepare the Driver Diskette	5
Step 6 Install Linux Ubuntu	5
3 Monitoring the Driver	8
4 Installing RAID Management Software	9
5 Troubleshooting	9
6 Rebuilding Driver Module for System Update	
7 Appendix A	. 10

# **1** Overview

The purpose of this document is to provide clear instructions on how to install Linux Ubuntu on the RR Series RAID controller.

- ♦ Supported controller: RR2720A

# 2 Installing Linux Ubuntu on Series RAID controller

If you would like to install Linux Ubuntu onto drives attached to RR Series RAID controller, please perform the following operations:

### **Step 1 Prepare Your Hardware for Installation**

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

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

#### Note

**RAID Controller support EFI boot.** If you have other SCSI adapters installed, you must make sure the RR Series controller EFI will be loaded firstly. If not, try to move it to another PCI 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 drive, after you finish installation, set RR Series RAID 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 X11DPi-NT motherboard as an example.

a. "Advanced->PCIe/PCI/PnP Configuration->CPUSlot PCI-E OPROM"
 to "EFI". Suppose RAID Controller is connected to motherboard CPU1 Slot 2
 PCI-E X16, then you should set "CPU1 Slot 2 PCI-E X16 OPROM" to "EFI";

NVMe Firmware Source	[Vendor Defined Firmware]	Enables or disables CPU1 SLOT2 PCI-E 3.0 X16 OPROM
M.2 (AHCI) Firmware Source	[Vendor Defined Firmware]	option.
CPU2 SLOT1 PCI-E 3.0 X8 OPROM	[EFI]	
CPU1 SLOT3 PCI-E 3.0 X8 OPROM	(EFI)	
CPU1 SLOT4 PCI-E 3.0 X16 OPROM	[EFI]	
CPU1 SLOTS PCI-E 3.0 X8 OPROM	(EFI)	
	SLOT2 PCI-E 3.0 X16 OPROM	
Onboard LAN1 Option ROM Disabled		
Onboard LAN1 Option ROM		
P2_NVMe0 OPROM		
P2_NVMe1 OPROM		
Onboard Video Option ROM	[EFI]	

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

System Mode	Setup	Secure Boot feature is
Vendor Keys	Active	Active if Secure Boot is
Secure Boot	Not Active	Enabled, Platform Key(PK) is
		enrolled and the System is in User mode.
Secure Boot Mode	[Custom]	The mode change requires
CSM Support	[Enabled]	platform reset
Enter Audit Mode		
Key Management	Secure Boot	

- 2. Set UEFI setting with GA-X570 AORUS MASTER motherboard as an example.
  - a. Set "Boot->CSM Support " to "Enabled";

RUS Favorites (F11) Twe	aker Settings Syste	m Info. Boot	Save & Exit
			CPI
			Freq
Security Option	System		3814
Full Screen LOGO Show	Enabled		Tem
Fast Boot	Disabled		38.
CSM Support	* Enabled		
LAN PXE Boot Option ROM	Disabled		Mer
Storage Boot Option Control	UEFI Only		Freq
Other PCI Device ROM Priority	UEFI Only		2409
Administrator Password			Ch Aj
User Password			1.21
Preferred Operating Mode	Auto		

b. And" Boot-> Storage Boot Option Control " to "UEFI Only";

Favorites (F11)	Tweaker Settings	System Info.	Boot	Save & Exit
Security Option	Syste	m		
Full Screen LOGO Show	Enab			
Fast Boot	Disab	bled		
CSM Support	* Enabl	led		
LAN PXE Boot Option ROM	Disah	hed		
Storage Boot Option Control	UEFI	Only		
Other PCI Device ROM Priority	UEFI			
Administrator Password				
User Password				
Preferred Operating Mode	Auto			

- 3. Set UEFI setting with ASUS PRIME X299 -DELUXE motherboard as an example:
  - a. Set "Boot from Storage Devices" to "UEFI driver first";

My Favorites	Main	Ai Tweaker	Advanced	Monitor	Boot	Tool	Exit	
- Boot\CSM (Compar	libility Sup	port Module)				-		
Compatibility Supp	port Modul	e Configuration						
Launch CSM				[	Enabled			•
Boot Device Control			[	UEFI and L	egacy OPR	м	•	
Boot from Network Devices		[	Legacy only	1		•		
Boot from Storage Devices				UEFI driver	first		•	
Boot from PCI-I	E/PCI Expan	sion Devices		1	Legacy only		8	•

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

Compatibility Support Module Configuration	
Launch CSM	Enabled
Boot Device Control	UEFI and Legacy OPROM
Boot from Network Devices	Legacy only -
Boot from Storage Devices	UEFI driver first 👻
Boot from PCI-E/PCI Expansion Devices	Legacy only -

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

My Favorites	Main	Ai Tweaker	Advanced	Monitor	Boot	Tool	Exit	
Boot/Secure Boot				and the second				
Secure Boot state				E	nabled			
Platform Key (PK)	state			U	nloaded			
OS Type				0	Other OS			•
> Clear Secure Bool	Keys							
> Key Management								

### Step 3 Flash UEFI Rom to RAID Controller

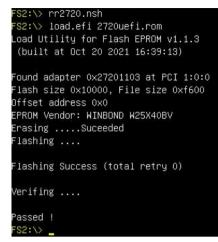
For Example RR2720A:

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

- a. Unzip RR2720A UEFI package to root dir(/) of a USB flash drive, and insert the USB flash drive to the motherboard;
- b. Booting from the UEFI USB flash and enter the UEFI environment;

Please select boot device: ↑ and ↓ to move selection ENTER to select boot device	
ESC to boot using defaults	
UEFI: SanDisk, Partition 1 (59520MI	B)
UEFI: ASUS SDRW-08D2S-U A801 (4	888MB)
SanDisk (59520MB)	
ASUS SDRW-08D25-U A801 (4888M	(B)
Enter Setup	

c. Command with "rr2720.nsh", flash UEFI rom to RR2720A Controller and reboot;

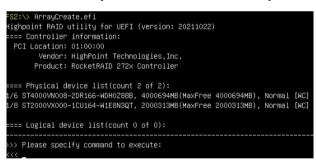


#### **Step 4 Create Array**

- a. Attach two hard disks to RR2720A Controller;
- b. Boot, enter the motherboard's Boot List and select start from UEFI USB flash:

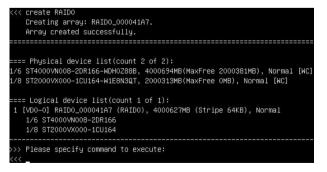
```
Boot Override
UEFI: USB, Partition 1
(B97/D0/FO) UEFI PXE: IPv4 Intel(R) I350 Gigabit Network
Connection(MAC:3cecef40a1dc)
```

c. Command "ArrayCreate.efi" to enter the Utility:



d. Command "create RAID0".

Create RAID0 array with all disks and with maximum capacity.



- e. Command "exit";
- f. For more command usages, refer to <u>Appendix A</u>.

### **Step 5 Prepare the Driver Diskette**

Extract **RR272x\_1x\_ubuntuxx.xx.x\_x86\_64\_vx.xx.xx\_xx\_xx\_xx\_tar.gz** to top(/) directory of an USB flash drive. It will look like:

```
root@test:/home# tar zxvf RR272x_1x_ubuntu22.10_x86_64_v1.10.19_23_02_27.tar.gz
hptdd/
hptdd/install.sh
hptdd/boot/
hptdd/boot/rr272x_1x5.19.0-21-genericx86_64.ko.gz
hptdd/postinst.sh
hptdd/preinst.sh
hptdd/postinst2.sh
hptdd/readme.txt
```

### Step 6 Install Linux Ubuntu

For Example: Ubuntu20.04.5 Server

- a. Before you do the following, verify the status of your network environment. To ensure a proper installation, it is recommended to disconnect the network and install the system in a network less environment.
- b. Insert the USB flash drive to the target system.
- c. Booting from Bootable USB drive (EFI mode).
- d. When the following window appears during the installation process

Willkommen! Bienvenue! Welcome! Добро пожаловать! Welkom!	
Use UP, DOWN and ENTER keys to select your language.	
<pre>[ Asturianu [ Bahasa Indonesia [ Catala [ Deutsch [ English (UK) [ Esgañol ] Français [ Esgañol ] Français [ Calego [ Hrvatski [ Latviski] [ Latviski] [ Latviski] [ Norsk bomål [ Portugués [ Norsk bomål [ Portugués [ Suomi [ Syumiska [ Esknpv.ků [ Esknp</pre>	

Press ALT+F2 to switch to the shell on console 2 and press ENTER to activate this console.

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

Welcome to Ubuntu 20.04.5 LTS (GNU/Linux 5.4.0–125–generic x86_64)
<pre>* Documentation: https://help.ubuntu.com * Management: https://landscape.canonical.com * Support: https://ubuntu.com/advantage</pre>
System information as of Thu Mar 9 01:35:21 UTC 2023
System load: 1.77 Memory usage: 1% Processes: 781 Usage of /home: unknown Swap usage: 0% Users logged in: 0
0 updates can be applied immediately.
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:~\$ _

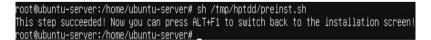
And then execute following commands to copy the driver contents:

# mkdir /hptdd	$\leftarrow \text{Create mount point for USB flash drive}$
# mount /dev/sdb1 /hptdd/	$\leftarrow$ Mount the USB flash drive to /hptdd
# cp -a /hptdd/hptdd /tmp/	← Copy driver installation file to system temporary directory
# umount /dev/sdb1	$\leftarrow$ Unmount the USB flash drive
poot@ubuptu_copuop:/bomo/ubu	atu copuent mkdin (botda

root@ubuntu–server:/home/ubuntu–server# mkdir /hptdd root@ubuntu–server:/home/ubuntu–server# mount /dev/sdb1 /hptdd/ root@ubuntu–server:/home/ubuntu–server# cp –a /hptdd/hptdd/ /tmp/ root@ubuntu–server:/home/ubuntu–server# umount /dev/sdb1

When the USB flash drive is unmounted, please unplug the USB flash drive from the mainboard. And then execute following command to install driver to install the Linux Ubuntu.

# sh /tmp/hptdd/preinst.sh ← Load RR2720A driver.



- e. Then press ALT+F1 to switch back to installation screen and continue the installation as usual.
- f. When the screen shows that "install complete".

	- Finished install!	
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-hptblack10n0p		
configuring partition: partition-0		
configuring format: format-0		
configuring partition: partition-1		
configuring format: format-1		
configuring partition: partition-2		
configuring lvm_volgroup: lvm_volgroup-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://	//media/filesystem	
configuring installed system		
running '/snap/bin/subiquity.subiquity-config	gure-run' gure-apt/snap/sublquity/1966/usr/bin/python3 false'	
running '/snap/bin/subiquity.subiquity-config	gure-apt /snap/subiquity/1966/usr/bin/python3 false'	
curtin command apt-config		
curtin command in-target		
running 'curtin curthooks'		
curtin command curthooks		
configuring apt configuring apt		
installing missing packages		
Installing packages on target system: ['d	efibootmgr', 'grub-efi-amd64', 'grub-efi-amd64-signed', 'shim-signed	3']
configuring iscsi 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 targe	et and the second s	
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		
restoring apt configuration		
		THE R. L.
	[ View full log ]	

press ALT+F2 to the shell and type the following commands:

If you use Ubuntu20.04.5 desktop, When the installation prompts "Installation Complete", don't click Restart Now . please press **CTRL+ALT+F2** and execute following commands.

```
# sh /tmp/hptdd/postinst.sh ← Install RR2720A driver.
```

A message will be displayed that the driver has been installed successfully.

root@ubuntu-server:/home/ubuntu-server# sh /tmp/hptdd/postinst.sh
mount: failed to read mtab: No such file or directory
cryptsetup: ERROR: Couldn't resolve device /dev/sdc2
cryptsetup: WARNING: Couldn't determine root device
W: Possible missing firmware /lib/firmware/ast_dp501_fw.bin for module ast
W: Couldn't identify type of root file system for fsck hook
We have completed the driver installation.
root@ubuntu–server:/home/ubuntu–server# _

- g. Press ALT+F1 and press Reboot Now to finish the installation.
- h. If you want to boot from another kernel, please install the RR Series opensource driver after entering the system.
- i. Restart to enter the system, please connect to the internet:
  - 01. use "apt-get update" to retrieve new lists of ubuntu packages

root@1	test:/home/test# apt-get update	
Get:1	http://archive.ubuntu.com/ubuntu	kinetic InRelease [267 kB]
Get:2	http://archive.ubuntu.com/ubuntu	kinetic–updates InRelease [118 kB]
Get:3	http://archive.ubuntu.com/ubuntu	kinetic–backports InRelease [99.9 kB]
Get:4	http://archive.ubuntu.com/ubuntu	kinetic–security InRelease [109 kB]
Get:5	http://archive.ubuntu.com/ubuntu	kinetic/main amd64 Packages [1,384 kB]
Get:6	http://archive.ubuntu.com/ubuntu	kinetic/main amd64 c-n-f Metadata [30.2 kB]
		kinetic/restricted amd64 Packages [120 kB]

02. Linux opensource driver link, open the following link to enter the "Software Download" page to download:

RR2700 Series: https://www.highpoint-tech.com/rr272x-overview

Extract driver package:

```
tar zxvf RR272x_1x_Linux_X86_64_Src_vx.x.x_xx_xx_tar.gz
```

Run the .bin file to install the driver package.

sh rr272x\_1x-linux-src-vxx.x.x-xx\_xx\_xx.bin or

./rr272x\_1x-linux-src-vxx.x.x-xx\_xx\_xx.bin

root@test:/home# ./rr272x_1x-linux-src-v1.11.0-23_03_17.bin
Verifying archive integrity All good.
Uncompressing RR272x_1x Linux Open Source package installer
Checking and installing required toolchain and utility
Installing program make done
Installing program gcc done
Found program perl (/usr/bin/perl)
Found program wget (/usr/bin/wget)

a. Follow the prompts to complete the driver installation.

```
Its output will be used to detect bootable binaries on them and create new boot entries.

Found FreeDOS on /dev/sdc1

Adding boot menu entry for UEFI Firmware Settings ...

done

Synchronizing state of hptdrv-monitor.service with SysV service script with /lib/systemd/systemd-sysV-install.

Executing: /lib/systemd/systemd-sysV-install enable hptdrv-monitor

update-rc.d: warning: enable action will have no effect on runlevel 1

Created symlink /etc/systemd/system/default.target.wants/hptdrv-monitor.service → /lib/systemd/system/hptdrv-monitor

SUCCESS: Driver rr272x_1x is installed successfully for kernel 5.19.0-21-generic.

Please restart the system for the driver for take effect.

If you want to uninstall the driver from the computer, please run hptuninrr272x_1x to uninstall the driver files.

remove conflicting module mysas successfully
```

b. After the installation is complete, you can perform system update operations.

# **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/rr272x\_1x /. 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.

Using the following command to show driver status:

#### # cat /proc/scsi/rr272x\_1x /x

This command will show the driver version number, physical device list and logical device list.

# **4 Installing RAID Management Software**

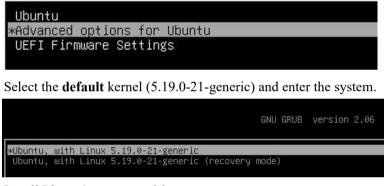
HighPoint RAID Management Software is used to configure and keep track of your hard disks and RAID arrays attached to RR Series RAID Controller. Installation of the management software is optional but recommended.

Please refer to HighPoint RAID Management Software documents 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. Please follow the steps below.

Press ESC when booting, until the following interface appears. Choose "Advanced options for Ubuntu" and press Enter



Install Linux Opensource driver.

RR2700 Series: https://www.highpoint-tech.com/rr272x-overview

### sh rr272x\_1x-linux-src-vxx.x.x-xx\_xx\_xx.bin or ./rr272x 1x-linux-src-vxx.x.x-xx xx xx.bin



Its output will be used to detect bootable binaries on them and create new boot entries. Tound FreeDOS on /dev/sdc1 Adding boot menu entry for UEFI Firmware Settings ... Jone Synchronizing state of hptdrv-monitor.service with SysV service script with /lib/systemd/systemd-sysv-install. Executing: /lib/systemd/systemd-sysv-install enable hptdrv-monitor pydate-rc.d: warning: enable action will have no effect on runlevel 1 Created symlink /etc/systemd/system/default.target.wants/hptdrv-monitor.service → /lib/systemd/system/hptdrv-monitor SUCCESS: Driver rr272x\_ix is installed successfully for kernel 5.19.0-21-generic. Please restart the system for the driver to take effect. If you want to uninstall the driver from the computer, please run hptuninrr272x\_1x to uninstall the driver files. remove conflicting module mysas successfully root@test:/home#

# **6 Rebuilding Driver Module for System Update**

When the system updates the kernel packages, the driver module rr272x\_1x.ko should be built and installed manually before reboot.

Please refer to the README file distributed with HighPoint RR Series RAID Controller opensource package on how to build and install the driver module.

# 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|\*)

Note:

#### The RR2720A controllers can support RAID0/1/10/5/50

#### 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.

<<c create RAID50,3 1/1, 1/2, 1/3, 1/4, 1/5, 1/6</pre>

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.