

Revision History

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HighPoint RR600L RAID Controller Linux Ubuntu Installation Guide

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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 system: Ubuntu 22.10/22.04.1/22.04/20.10/20.04.5/20.04.03/20.04.01/20.04

✧ Supported controller: RR640L/620L

2 Installing Linux Ubuntu on RR 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.

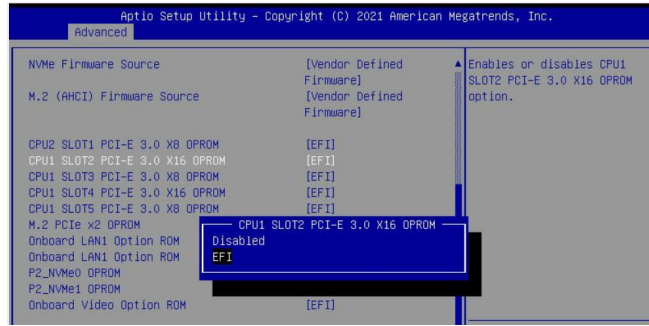
Note

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.

- 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";

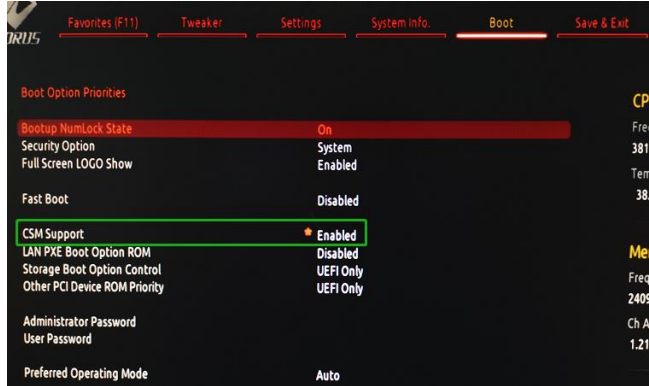


- b. Disable "Secure Boot", set "Attempt Secure Boot" to "Disabled".



1. Set UEFI setting with GA-X570 AORUS MASTER motherboard as an example.

- a. Set " Boot->CSM Support " to "Enabled";

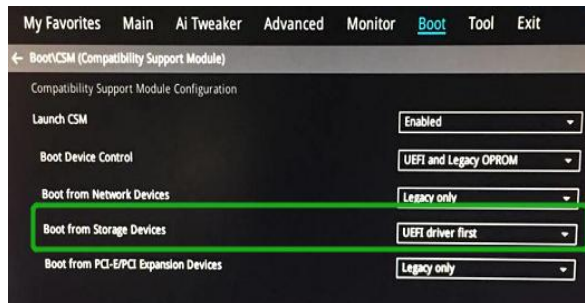


- b. And" Boot-> Storage Boot Option Control " to "UEFI Only";

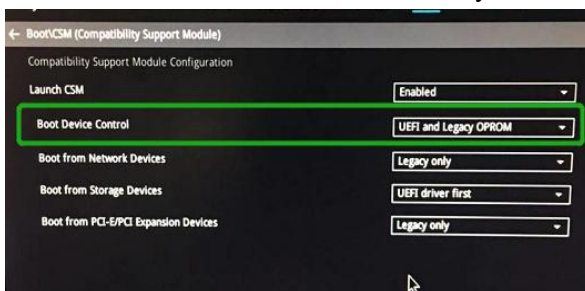


2. Set UEFI setting with ASUS PRIME X299 -DELUXE motherboard as an example:

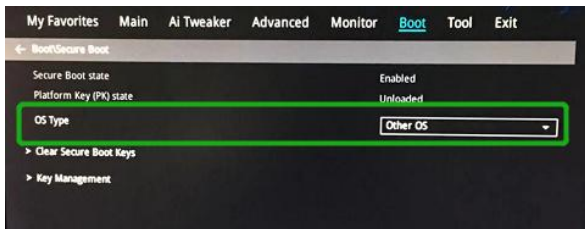
a. Set "Boot from Storage Devices" to "UEFI driver first";



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



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

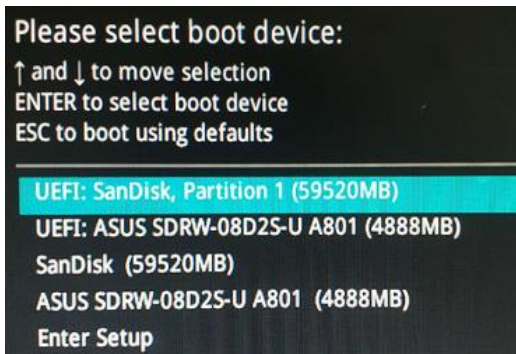


Step 3 Flash UEFI Rom to RAID Controller

For Example RR640L:

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

- a. Unzip RR640L 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;



- c. Command with “rr640L.nsh”, flash UEFI rom to RR640L Controller and reboot;

```
FS0:\> go.nsh
FS0:\> load.efi 640luefi.blf /a /f
Load Utility for Flash EPROM v1.1.5
(built at Mar 6 2023 10:47:10)

Set flash size to 256K
Found adapter 0x6411103 at PCI 177:0:0
Offset address 0x0
EPROM Vendor: WINBOND W25X40BV
Erasing .....Succeeded
Flashing ....

Flashing Success (total retry 0)

Verifying ....

Passed !
FS0:\> _
```

For RR620L:

- Command with “go.nsh”, flash UEFI rom to RR620L Controller and reboot:

```
FS0:\> go.nsh
FS0:\> load.efi 620luefi.blf /a /f
Load Utility for Flash EPROM v1.1.5
(built at Mar 27 2023 15:19:46)

Set flash size to 256K
Found adapter 0x6411103 at PCI 177:0:0
Offset address 0x0
EPROM Vendor: WINBOND W25X40BV
Erasing .....Succeeded
Flashing ....

Flashing Success (total retry 0)

Verifying ....

Passed !
FS0:\> _
```

Step 4 Create Array

- a. Attach four hard disks to RR640L Controller;
- b. Boot, enter the motherboard’s Boot List and select start from UEFI USB flash:

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

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

Command “create RAID0”.

Create RAID0 array with all disks and with maximum capacity.

```
<<< create RAID0
  Creating array: RAID0_000041A7.
  Array created successfully.
-----
==== Physical device list(count 3):
1/1 HDC MUH722020BL5204-BLG2YNHA, 20000521MB(MaxFree 0MB), Normal [RA] [WC]
1/2 HDC MUH722222AL5200-2TG0RM7E, 22000902MB(MaxFree 2000381MB), Normal [RA] [WC]
1/3 HDC MUH722222AL5200-2TG0R8GE, 22000902MB(MaxFree 2000381MB), Normal [RA] [WC]
-----
==== Logical device list(count 1):
 1 [VD0-0] RAID0_000041A7 (RAID0), 60001565MB (Stripe 64KB), Normal
   1/1 HDC MUH722020BL5204
   1/2 HDC MUH722222AL5200
   1/3 HDC MUH722222AL5200
-----
>>> Please specify command to execute:
<<<
```

- d. Command “exit”;
- e. For more command usages, refer to [Appendix A](#).

Step 5 Prepare the Driver Diskette

Extract **RR640l_ubuntuxx.x.x_X86_64_vx.x.x_xx_xx_xx.tar.gz** to top directory of an USB flash drive. It will look like:

```
root@test:/home/test# tar zxvf RR640l_ubuntu20.04.5_x86_64_v1.6.7_23_02_27.tar.gz
hptdd/
hptdd/preinst.sh
hptdd/postinst.sh
hptdd/install.sh
hptdd/postinst2.sh
hptdd/boot/
hptdd/boot/rr64015.15.0-46-genericx86_64.ko.gz
hptdd/readme.txt
root@test:/home/test#
```

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.

[ Asturianu
[ Bahasa Indonesia
[ Català
[ Deutsch
[ English
[ English (UK)
[ Español
[ Français
[ Galego
[ Hrvatski
[ Latviski
[ Lietuviškai
[ Magyar
[ Nederlands
[ Norsk bokmål
[ Polski
[ Português
[ Suomi
[ Svenska
[ Čeština
[ Ελληνικά
[ Българска
[ Русский
[ Српски
[ Українська
```


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+F3** 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)

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

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** ← Create mount point for USB flash drive
- # mount /dev/sda1 /hptdd/** ← Mount the USB flash drive to /hptdd
- # cp -a /hptdd/hptdd /tmp/** ← Copy driver installation file to system temporary directory
- # umount /hptdd** ← Unmount the USB flash drive

```

:~# mkdir /hptdd
:~# mount /dev/sda1 /hptdd/
:~# cp -a /hptdd/hptdd/ /tmp/
:~# umount /hptdd/
:~# █

```

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 RR640L driver.

```

:~# sh /tmp/hptdd/preinst.sh
This step succeeded!

```

- 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”.

```

Installation complete!                               [ help ]
----- 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-mpblocks0mp
      configuring partition: partition-0
      configuring format: format-0
      configuring partition: partition-1
      configuring format: format-1
      configuring partition: partition-2
      configuring lvm_voingroup: lvm_voingroup-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-configure-run'
  running '/snap/bin/subiquity.subiquity-configure-apt /snap/subiquity/1966/usr/bin/python3 false'
  curtin command apt-configure
  curtin command in-target
  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 sasl
      setting up swap
      setup networking config
      writing etc/stab
      configuring multipath
      updating packages on target system
      configuring pollinate user-agent on target
      updating in-trim's configuration
      configuring target system bootloder
      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
  
```

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

If you use Ubuntu desktop , When the installation prompts “Installation Complete”, don’t click Restart Now . please press **CTRL+ALT+F3** and execute following commands.

sh /tmp/hptdd/postinst.sh ← Install RR640L 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@test-desktop:/home/test/Documents# apt-get update
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [107 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [153 kB]
Get:4 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [367 kB]
Get:5 http://us.archive.ubuntu.com/ubuntu focal-updates InRelease [111 kB]
Get:6 http://us.archive.ubuntu.com/ubuntu focal-backports InRelease [98.3 kB]
  
```

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

RR600L Series: <https://www.highpoint-tech.com/rr600-overview>

Extract driver package:

tar zxvf RR64xl_Linux_X86_64_Src_vx.x.x_xx_xx_xx.tar.gz

Run the **.bin** file to install the driver package.

sh rr64xl_Linux_X86_64_Src_vx.x.x_xx_xx_xx.bin or

./rr64xl_Linux_X86_64_Src_vx.x.x_xx_xx_xx.bin

```
root@test:/home/test# ./rr64xl-linux_x86_64_src_v1.7.0_23_03_21.bin
Verifying archive integrity... All good.
Uncompressing RR64xL Linux Open Source package installer.....
Checking and installing required toolchain and utility ...
Found program make (/usr/bin/make)
Found program gcc (/usr/bin/gcc)
Found program perl (/usr/bin/perl)
Found program wget (/usr/bin/wget)
Sourcing file `./etc/default/grub'
```

- j. Follow the prompts to complete the driver installation.

```
SUCCESS: Driver rr640l is installed successfully for kernel 5.4.0-125-generic.
Driver rr640l is installed successfully for kernel 5.4.0-139-generic.
Please restart the system for the driver to take effect.
If you want to uninstall the driver from the computer please run hptuninrr640l to uninstall the driver files.
root@test:/home/test# _
```

- k. 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/rr640l/`. 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/rr640l/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**

```

Ubuntu
*Advanced options for Ubuntu
UEFI Firmware Settings
  
```

Select the **default** kernel (5.4.0-125-generic) and enter the system.

```

Ubuntu, with Linux 5.4.0-139-generic
Ubuntu, with Linux 5.4.0-139-generic (recovery mode)
*Ubuntu, with Linux 5.4.0-125-generic
Ubuntu, with Linux 5.4.0-125-generic (recovery mode)
  
```

Install Linux Opensource driver.

RR600L Series: <https://www.highpoint-tech.com/rr600-overview>

sh `rr64xl_Linux_X86_64_Src_vx.x.x_xx_xx_xx.bin` or

`./rr64xl_Linux_X86_64_Src_vx.x.x_xx_xx_xx.bin`

```

root@test:/home/test# ./rr64xl-linux_x86_64_src_v1.7.0_23_03_21.bin
Verifying archive integrity... All good.
Uncompressing RR64xl Linux Open Source package installer.....
Checking and installing required toolchain and utility ...
Found program make (/usr/bin/make)
Found program gcc (/usr/bin/gcc)
Found program perl (/usr/bin/perl)
Found program wget (/usr/bin/wget)
Sourcing file `etc/default/grub'
  
```

```

SUCCESS: Driver rr6401 is installed successfully for kernel 5.4.0-125-generic.
Driver rr6401 is installed successfully for kernel 5.4.0-139-generic.
Please restart the system for the driver to take effect.
If you want to uninstall the driver from the computer**please run hptuninrr6401 to uninstall the driver files.
root@test:/home/test# _
  
```

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

6 Rebuilding Driver Module for System Update

When the system updates the kernel packages, the driver module `rr640l.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) Member Disk list (1/1, 1/2|*) Capacity (100|*)

Note:

The RR640L controllers can support RAID0/1/10/5

The RR620L controllers can support RAID0/1

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.

- **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.