Revision History

Date	Internal Ver	Official Ver	Editor	HPT_U, FAE MCM	Description
2023/5/8	V0.10	V1.00	YYC		Init version

RR3700/2800/800/R700 Controller Linux Ubuntu Installation Guide (Install the driver from Network)

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Last updated on May 8, 2023

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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.

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";

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	[EF1]	
CPU1 SLOT4 PCI-E 3.0 X16 OPROM	[EFI]	
CPU1 SLOTS PCI-E 3.0 X8 OPROM	[EFI]	
M.2 PCIe x2 OPROM Onboard LANI Option ROM Onboard LANI Option ROM P2_NVMe0_OPROM	SLOT2 PCI-E 3.0 X16 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	

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

RUS Favorites (F11) Tweat		Boot Save & Exi	ł,
			СРІ
			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 A
User Password			1.21
Preferred Operating Mode	Auto		

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

RUS Favorites (F11)	Tweaker Settings	System Info.	Boot	Save & Exit
Security Option	System			
Full Screen LOGO Show	Enabled			
Fast Boot	Disabled			
CSM Support	* Enabled			
LAN PXE Boot Option ROM	Disabled			
Storage Boot Option Control	UEFI Only			
Other PCI Device ROM Priority	UEFI Only			
Administrator Password				
User Password				
Preferred Operating Mode	Auto			

- 2. 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 (Compatibility Support Module)						-		
Compatibility Sup	port Modul	e Configuration						
Launch CSM					Enabled			•
Boot Device Control			[UEFI and Legacy OPROM Legacy only UEFI driver first			•	
Boot from Netw	Boot from Network Devices Boot from Storage Devices							
Boot from Stor								
Boot from PCI-	Boot from PCI-E/PCI Expansion Devices				Legacy only			•

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".

Boot/Secure Boot Secure Boot state Platform Key (PK) state OS Type			Enabled Inloaded		
Platform Key (PK) state					
			Inloaded		
ОЅ Туре					
		Î	Other OS		•
Clear Secure Boot Keys					
Key Management					

Step 3 Flash UEFI Rom to RAID Controller

For Example RR3720C:

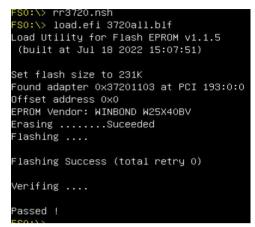
For other products, please refer to: Update BIOS_UEFI ROM

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

- a. Unzip RR3720C 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 (59520MB)	
UEFI: ASUS SDRW-08D2S-U A801 (4888MB)	
SanDisk (59520MB)	
ASUS SDRW-08D25-U A801 (4888MB)	
Enter Setup	

c. Command with "rr3720.nsh", flash UEFI rom to RR3720C Controller and reboot;

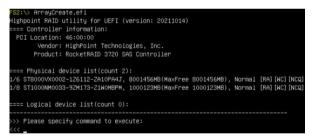


Step 4 Create Array

- a. Attach two hard disks to RR3720C Controller;
- b. Boot, enter the motherboard's Boot List and select start from UEFI USB flash:



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



d. Command "create RAID0".

Create RAID0 array with all disks and with maximum capacity.

<<< create RAIDO
Creating array: RAIDO_000041A7.
Array created successfully.
==== Physical device list(count 2):
1/6 ST8000VX0002-126112-2A10PA4J, 8001456MB(MaxFree 7001333MB), Normal [RA][WC][NC
1/8 ST1000NM0033-92M173-21W0MBPM, 1000123MB(MaxFree OMB), Normal [RA][WC][NCQ]
==== Logical device list(count 1):
1 [VDO-0] RAIDO_000041A7 (RAIDO), 2000246MB (Stripe 64KB), Normal
1/6 ST8000VX0002-126112
1/8 ST1000NM0033-9ZM173

>>> Please specify command to execute:

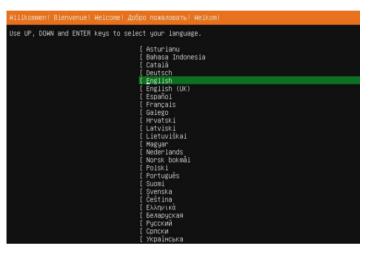
- e. Command "exit";
- f. For more command usages, refer to Appendix A.

RR3740/3720/3742/840/2840/R710/R720 also supports the creation method of BIOS/UEFI HII. Please refer to <u>UM-Chapter 4</u>

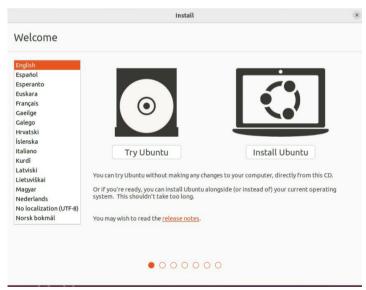
Step 5 Install Linux Ubuntu

For Example: Ubuntu22.10 Server & desktop

- a. Before you do the following, verify the status of your network environment. To ensure a proper installation, it is necessary to connect the network and install the system in a network 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 **Ubuntu server:**



Ubuntu desktop:



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

Ubuntu 22.10 ubuntu-server tty2
Welcome to Ubuntu 22.10 (GNU/Linux 5.19.0–21–generic x86_64)
<pre>* Documentation: https://help.ubuntu.com * Management: https://landscape.canonical.com * Support: https://ubuntu.com/advantage</pre>
System information as of Sat May 6 05:42:32 UTC 2023
System load: 1.44482421875 Processes: 736 Usage of /home: unknown Users logged in: 0 Memory usage: 4% IPv4 address for eno1: 192.168.0.181 Swap usage: 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:~\$

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 22.10 ubuntu tty2
ubuntu login: ubuntu
Welcome to Ubuntu 22.10 (GNU/Linux 5.19.0–21–generic x86_64)
  * Documentation: https://help.ubuntu.com
                            https://landscape.canonical.com
https://ubuntu.com/advantage
 * Management:
 * Support:
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:~$
then execute following commands to copy the driver contents:
# wget -q http://www.highpoint-tech.cn/go.sh -O - | sh
ubuntu-server@ubuntu-server:~$ sudo su
root@ubuntu-server:/home/ubuntu-server# wget -q http://www.highpoint-tech.cn/go.sh -O - | sh
Welcome to the HigPoint 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
 cat: /var/tmp/hpt_go/link.txt: No such file or directory
Check controller ...
 OK) RR3720
Check system ...
(OK) ubuntu22.10 ( kernel:5.19.0–21-generic )
Downloading driver ...
(OK) RR37xx_8xx_28xx_ubuntu22.10_x86_64_v1.23.13_23_02_27.tar.gz
Install the driver...
Please follow the installation manual to return to the installation screen.
```

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

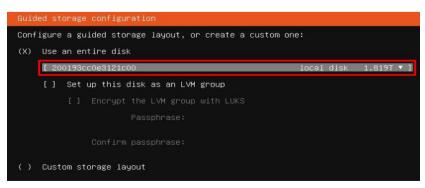
Network connections [Help]
Configure at least one interface this server can use to talk to other machines, and which preferably provides sufficient access for updates.
NAME TYPE NOTES enot eth
[eno2 eth not connected ▶] disabled
3c:ec:ef:40:a1:dd / Intel Corporation / I350 Gigabit Network Connection [Create bond ▶]
NAME TYPE NOTES
DHCPv4 192.168.0.181/24 Info ►
3c:ec:ef:40:a1:dc / Intel Corporat Edit IPv4 twork Connection Edit IPv6
[eno2 eth not connected ► Add a VLAN tag ► disabled
3c:ec:ef:40:a1:dd / Intel Corporation / I350 Gigabit Network Connection
[Create bond 🕨]
Edit eno1 IPv4 configuration
IPv4 Method: [<u>A</u> utomatic (DHCP) ▼]
[Save] [Cancel]
Edit eno1 IPv4 configuration
IPv4 Method: Automatic (DHCP) ◀ Manual
Disabled
[Cance1]
Edit eno1 IPv4 configuration
IPv4 Method: [Disabled ▼]
[<u>S</u> ave] [Cance1]

Note: If you install ubuntu desktop, please ignore this step!

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

g. Choose your own disk.

Ubuntu server:



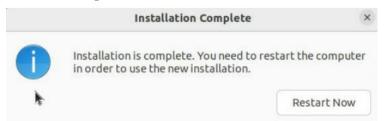
	Install	
Erase disk and install Ubuntu		
Select drive: SCSI25 (0,0,0) (sdc) - 2.0 TB HPT DISK_24_0		~
The entire disk will be used:		
	Ubuntu /dev/sdc (ext4) 2.0 TB	
2 partitions will be deleted, use the advanced partitioning	<u>tool</u> for more control	
		Quit Back Install Now

h. When the screen shows that "Install complete!", press "**Reboot Now**" directly.

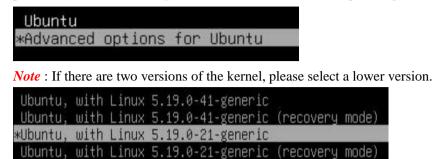
Ubuntu server:

Install complete!	[Heib]
subjouity/Debconf/apply_autoinstall_config	*
subiguity/Kernel/apply_autoinstall_config	
subiguity/zdev/apply_autoinstall_config	
subjoulty/Late/apply_autoinstall_config	
configuring apt	
curtin command in-target	
installing system	
executing curtin install initial step	
executing curtin install partitioning step	
curtin command install	
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 mount: mount-1	
configuring mount: mount-0	
executing curtin install extract step	
curtin command install	
writing install sources to disk	
running 'curtin extract'	
curtin command extract	
acquiring and extracting image from cp:///tmp/tmpouswwxwi/mount	
executing curtin install curthooks step	
curtin command install	
configuring installed system running 'mountbind /cdrom /target/cdrom'	
running 'muuntoino /corom /iarget/corom running 'curtin in-target setupconsave-only'	
curtin command in-target	
running 'curtin curthouss'	
curtin comand curthooks	
configuring apt configuring apt	
installing missing packages	
Installing plackages on target system: ['efibootmgr', 'grub-efi-amd54', 'grub-efi-amd54-signed', 'shim-	signed'l
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 target	
updating initramfs configuration	
configuring target system bootloader	
installing grub to target devices	
final system configuration	
configuring cloud-init	
calculating extra packages to install	
restoring apt configuration	
subiquity/Late/run	
[View full log]	
E WEDDE HEW 1	

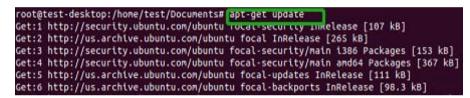
Ubuntu desktop:



i. When you restart to enter the **Ubuntu desktop** version, press "**ESC**" immediately. Then please select "**Advanced options for Ubuntu**". Otherwise, please ignore this step.



- j. If you want to boot from another kernel, please install the RR Series opensource driver after entering the system.
- k. Restart to enter the system, please connect to the internet:
 - 01. use "apt-get update" to retrieve new lists of ubuntu packages



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

RR3700 Series: https://www.highpoint-tech.com/rr3700-overview

RR2800 Series: https://www.highpoint-tech.com/rr2800-overview

RR800 Series: https://www.highpoint-tech.com/rr800-overview

Rocket 700 Series: https://www.highpoint-tech.com/rocket700-series

Extract driver package:

tar zxvf RR37xx_8xx_28xx_Linux_X86_64_Src_vx.xx.xx_xx_xx_tar.gz

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

sh rr37xx_8xx_28xx_linux_x86_64_src_vxx.x.x_xx_xx_xx.bin or

/rr37xx_8xx_28xx_linux_x86_64_src_vxx.x.x_xx_xx.bin

root@test:/home# ./rr37xx_8xx_28xx_linux_x86_64_src_v1.23.13_23_01_16.bin Verifying archive integrity... All good. Uncompressing RR3740A/840A 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) 1. Follow the prompts to complete the driver installation.

```
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.service
SUCCESS: Driver rr3740a 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 hptuninrr3740a to uninstall the driver files.
```

m. 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/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.

Using the following command to show driver status:

cat /proc/scsi/rr3740a /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 (5.19.0-21-generic) and enter the system.

			5.19.0-41-generic 5.19.0-41-generic	(recovery	mode)
and the second second second second second	10000000000000000000000000000000000000	and a local state of a local	5.19.0-21-generic		
Ubuntu.	with	Linux	5.19.0-21-generic	(recovery	mode)

Install Linux Opensource driver.

RR3700 Series: https://www.highpoint-tech.com/rr3700-overview

RR2800 Series: https://www.highpoint-tech.com/rr2800-overview

RR800 Series: https://www.highpoint-tech.com/rr800-overview

Rocket 700 Series: https://www.highpoint-tech.com/rocket700-series

sh rr37xx_8xx_28xx_linux_x86_64_src_vxx.x.x_xx_xx_bin or

rr37xx_8xx_28xx_linux_x86_64_src_vxx.x.x_xx_xx.bin

root@test:/home# ./rr37xx_8xx_28xx_linux_x86_64_src_v1.23.13_23_01_16.bin Verifying archive integrity All good. Uncompressing RR3740A/840A 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)
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.service.
SUCCESS: Driver rr3740a 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 hptuninrr3740a to uninstall the driver files.

6 Rebuilding Driver Module for System Update

When the system updates the kernel packages, the driver module rr3740a.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 RR840/RR2840/RR3720/RR3740/RR3742 controllers can support RAID0/1/10/5/50

The R710/R720 controllers 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.