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HighPoint RR2720A RAID Controller Linux CentOS Installation Guide

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1 Overview

The purpose of this document is to provide clear instructions on how to install Linux CentOS on the RR2720A RAID controller.

♦ Supported system: CentOS7.0/7.1/7.2/7.3/7.4/7.5/7.6/7.7/7.8/7.9/8.0/8.1

♦ Supported controller: RR2720A

2 Installing Linux CentOS on RR2720A RAID

controller

If you would like to install Linux CentOS onto drives attached to RR2720A 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 RR2720A 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 RR2720A 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) Twea		Boot Save & Exit
		CP
		Free
Security Option	System	381
Full Screen LOGO Show	Enabled	Tem
Fast Boot	Disabled	38.
CSM Support	* Enabled	
LAN PXE Boot Option ROM	Disabled	Me
Storage Boot Option Control	UEFI Only	Freq
Other PCI Device ROM Priority	UEFI Only	2409
Administrator Password User Password		Ch A
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";



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								
Secure Boot state				E	nabled			
Platform Key (PK)	state				nloaded			
OS Type					Other OS			•
Clear Secure Boo	t 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 (59520M	1B)
UEFI: ASUS SDRW-08D2S-U A801 (SanDisk (59520MB)	
ASUS SDRW-08D2S-U A801 (4888 Enter Setup	MB)

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

```
FS2:\> rr2720.nsh

FS2:\> load.efi 2720uefi.rom

Load Utility for Flash EPROM v1.1.3

(built at Oct 20 2021 16:39:13)

Found adapter 0x27201103 at PCI 1:0:0

Flash size 0x10000, File size 0xf600

Offset address 0x0

EPROM Vendor: WINBOND W25X40BV

Erasing .....Suceeded

Flashing success (total retry 0)

Verifing ....

Passed !

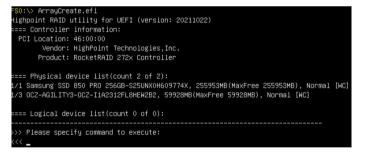
FS2:\> _
```

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/DD/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.

```
<<< create RAID0
    Creating array: RAID0_000041A7.
    Array created successfully.
==== Physical device list(count 2 of 2):
1/1 Samsung SSD 850 PR0 2560B-S25UNX0H609774X, 255953MB(MaxFree 196024MB), Normal [WC]
1/3 0C2-AGILITY3-0C2-I1A2312FL8HEW2B2, 59928MB(MaxFree 0MB), Normal [WC]
==== Logical device list(count 1 of 1):
1 [VD0-0] RAID0_000041A7 (RAID0), 119856MB (Stripe 64KB), Normal
1/1 Samsung SSD 850 PR0 256GB
1/3 0C2-AGILITY3
>>> Please specify command to execute:
```

e. Command "exit";

Step 5 Prepare the Driver Diskette

The directory named hptdd can be created in the USB flash drive and the driver RR272x _

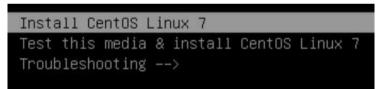
1x_centos7.3_x86_64_vx.x.x_xx_xx_tgz can be extracted in the hptdd directory. It will look like:

```
[root@localhost home]# tar zxvf RR272x_1x_centos7.3_x86_64_v1.10.19_23_04_07.tgz
install.sh
modinfo
modules.alias
modules.cgz
modules.dep
modules.pcimap
pci.ids
pcitable
readme.txt
rhdd
rhel-install-step1.sh
rhel-install-step2.sh
```

Step 6 Install CentOS

For Example: CentOS7.3

- 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 Installation screen appears, press 'e' to edit boot command line option.



On the edit command window, move the cursor to the end of line "linuxefi /images / pxeboot... ", and append "**mvsas.noprobe=1** " (double quotation mark are not include).



Press CTRL+X or F10 to start the system.

e. When the following window appears during the installation process,

CentOS	WELCOME TO CENTOS LINUX 7. What language would you like to use during the i	nstallation process?	CENTOS LINUX 7 INST7 편 vs
	English	English English (United States)	
	Afrikaans	Afrikaans English (United Kingdom)	
	8.905	Amharic English (India)	
	العربية	Arabic English (Australia)	
		Engush (Canada)	
A REAL PROPERTY OF A REAL PROPERTY OF	অসমীয়া	Assamese English (Denmark)	
	Asturianu	Asturian English (ireland)	
	Беларуская	Belarusian English (New Zealand)	
	Български	Bulgarian English (Nigeria)	

Press **Ctrl+ALT+F2** to switch to the shell on console and execute following commands to copy the driver contents:

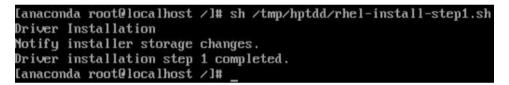
# mkdir /hptdd	\leftarrow Create mount point for USB flash drive
# mount /dev/sda1 /hptdd/	$\leftarrow Mount the USB flash drive to /hptdd$
# cp -a /hptdd/hptdd /tmp/	← Copy driver installation file to system temporary directory
# umount /dev/sda1	\leftarrow Unmount the USB flash drive

[anaconda root@localhost /]# mkdir /hptdd [anaconda root@localhost /]# mount /dev/sda1 /hptdd/ [anaconda root@localhost /]# cp -a /hptdd/hptdd/ /tmp/ [anaconda root@localhost /]# umount /dev/sda1

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 CentOS.

sh /tmp/hptdd/rhel-install-step1.sh

← Load RR2720A driver.



f. Then you will be returned to the installation process.

Note: If not, execute the following command:

restart- anaconda

to back to the installation process.

g. When the following window appears during the installation process,



1) Set Software Selection and choose Server with GUI→Development Tools

0	Minimal Install
	Basic functionality.
0	Compute Node
	Installation for performing computation and processing.
0	Infrastructure Server
~	Server for operating network infrastructure services.
0	File and Print Server File, print, and storage server for enterprises.
0	Basic Web Server
	Server for serving static and dynamic internet content.
	Virtualization Host
	Minimal virtualization host.
۲	Server with GUI
	Server for operating network infrastructure services, with a GUI.
\bigcirc	GNOME De sktop
~	GNOME is a highly intuitive and user friendly desktop environment.
0	KDE Plasma Workspaces ²⁰ The KDE Plasma Workspaces, a highly-configurable graphical user interface which includes a panel, desktop, system icons and d
	many powerful KDE applications.
	Development and Creative Workstation
	Workstation for software, hardware, graphics, or content development.
	Virtualization Hypervisor
	Smallest possible virtualization host installation.
	Virtualization Tools
	Tools for offline virtual image management.
	i construir contract antage management.
	Compatibility Libraries
	Compatibility libraries for applications built on previous versions of CentOS Linux
-	
~	Development Tools
	A basic development environment.
	Security Tools
	Security tools for integrity and trust verification.
_	Security tools for integrity and trust venification.
	Smart Card Support

2) Select Installation Destination

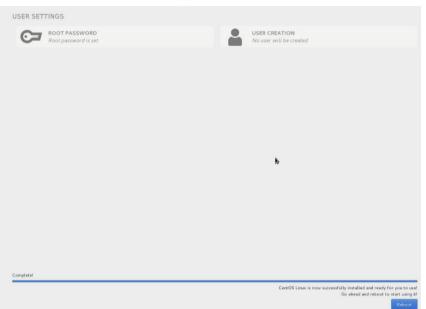
INSTALLATION DESTINATION				
Device Selection Select the device(s) you'd like to Local Standard Disks) install to. They will be left	untouched until you	click on the main menu's "Be	gin Installation" button.
57.3 GIB SanDisk Cruzer Glide 3.0 sda / 992.5 KiB free	111.63 GIB HPT DISK_34_0 sdc / 2014.5 KiB free			
Specialized & Network Disks				ħ

then choose your own disk and **begin installation**.

3) Set Root Password

USER SETTINGS	
ROOT PASSWORD	USER CREATION
Root password is not set	No user will be created

h. When the screen shows that "Complete!".



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

cp -r /tmp/hptdd /mnt/sysimage/tmp/hptdd
chroot /mnt/sysimage
sh /tmp/hptdd/rhel-install-step2.sh
rm -rf /tmp/hptdd
exit
[anaconda root@localhost /]# cp -r /tmp/hptdd /mnt/sysimage/tmp/hptdd
[anaconda root@localhost /]# chroot /mnt/sysimage/
[anaconda root@localhost /]# sh /tmp/hptdd/rhel-install-step2.sh
Driver Installation
Jpdating 3.10.0-514.el7.x86_64...
Driver installation step 2 completed.
[anaconda root@localhost /]# rm -rf /tmp/hptdd/
[anaconda root@localhost /]# sh /tmp/hptdd/
[anaconda root@localhost /]# rm -rf /tmp/hptdd/
[anaconda root@localhost /]# rm -rf /tmp/hptdd/
[anaconda root@localhost /]# sh /tmp/hptdd/

- i. Press ALT+F6 and press Reboot.
- 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:

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_Src_vx.xx.xx_xx_xx_xx.tar.gz

Run the .bin file to install the driver package.

./rr272x_1x-linux-src_vxx.x.x_xx_xx_xx.bin or

sh rr272x_1x-linux-src_vxx.x.x_xx_xx_xx.bin

```
[root@localhost 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 ...
Found program make (/bin/make)
Found program gcc (/bin/gcc)
Found program perl (/bin/perl)
Found program wget (/bin/wget)
```

1. Follow the prompts to complete the driver installation.

```
Found initrd image: /boot/initramfs-0-rescue-0901e87298be438ea34ae500c5388ad1.im
g
Found FreeDOS on /dev/sda1
done
SUCCESS: Driver rr272x_1x is installed successfully for kernel 3.10.0-514.el7.x8
6_64.
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 mvsas successfully
[root@localhost home]#
```

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/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.

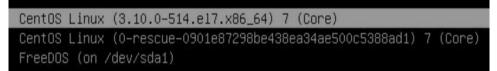
4 Installing RAID Management Software

HighPoint RAID Management Software is used to configure and keep track of your hard disks and RAID arrays attached to RR2720A RAID controller. Installation of the management software is optional but recommended.

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

5 Troubleshooting

- 1. 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.
 - a. Choose "CentOS Linux (3.10.0-514.el7.x86_64) 7" and press enter the system



- b. Install Linux Opensource driver.
- c. 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

d. 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@localhost 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 ... Found program make (/bin/make) Found program gcc (/bin/gcc) Found program perl (/bin/perl) Found program wget (/bin/wget)

e. Follow the prompts to complete the driver installation.

```
Found initrd image: /boot/initramfs-0-rescue-0901e87298be438ea34ae500c5388ad1.im
g
Found FreeDOS on /dev/sda1
done
SUCCESS: Driver rr272x_1x is installed successfully for kernel 3.10.0-514.el7.x8
6_64.
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 mvsas successfully
[root@localhost home]# ■
```

- 2. If you encounter error: some building tools are missing or toolchain to built the driver is incomplete
 - a. The system is not connected to a network (internet connection)

solution:

- Double check the system's internet connection
- Once confirmed, reinstall the driver.

b. This problem can be caused by a lack of dependency packages

solution:

• Make sure that your system can install software from the network.

For example: yum install vim

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 RR2720A 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.

<<< 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.