

# **RR27xx Controller Windows Boot RAID Installation Guide**

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## Prerequisites for a Bootable RAID Configuration

The RR2720/2721/2722/2711 controllers can support bootable RAID arrays. After configuring an array using the UEFI RAID tool, you can install a Windows or Linux operating system to the RAID. In order to configure a bootable RAID array, you will need the following:

1. RAID controller. A PCIe 3.0/4.0 slot with x8 or x16 lanes.
2. The RR2720/2721/2722/2711 must be installed into a PCIe 3.0/4.0 slot with x8 or x16 lanes.
3. The motherboard needs to be booted into UEFI mode. Confirm that the motherboard boots in UEFI mode.
4. USB flash drive: FAT32 format. Make sure the file system of the USB flash drive is FAT32 format.
5. Secure Boot must be disabled.
6. Install an optical drive into the system (such as a DVD-ROM, DVD-RW or Blu-Ray drive).
7. Prepare the OS Installation disc (Windows 10 & later / Windows server 2016 & later, or a Linux Distribution that corresponds with the binary diver you intend to install). Download and burn an official copy of the latest ISO image of your preferred operating system to a DVD. This should be inserted into the optical drive when booting the system.
8. You will need a USB flash drive– the UEFI package and driver should be extracted to the root directory of this flash drive.
9. Remove all other drives during the OS installation process. Make sure only the controller, the USB flash drive, and the optical drive are installed into the system during this procedure. This includes any other USB hard drives, USB flash drives, memory sticks, or SAS/SATA drives. You can reattach these drives after the operating system has been successfully installed.
10. For Windows 10 /11 users, make sure to Disable Fast Boot.
11. **The following are the basic requirements for installing Windows 11 on your computer.** If your device does not meet these requirements, you may not be able to install Windows 11 on your device; If your device is already running Windows 10, you can use the [PC Health Check app](#) to evaluate compatibility.

### Minimum system requirements

Read [here](#) for more information on system requirements and information on how some PCs might be able to update or change settings to meet the requirements.

<b>Processor:</b>	1 gigahertz (GHz) or faster with 2 or more cores on a <a href="#">compatible 64-bit processor</a> or System on a Chip (SoC).	<b>Graphics card:</b>	Compatible with DirectX 12 or later with WDDM 2.0 driver.
<b>Memory:</b>	4 GB RAM.	<b>Display Resolution:</b>	High definition (720p) display that is greater than 9" diagonally, 8 bits per color channel.
<b>Storage:</b>	64 GB or larger storage device.	<b>Internet connection:</b>	Microsoft account and internet connectivity required for setup for Windows 11 Home.
<b>System firmware:</b>	UEFI, Secure Boot capable. Check <a href="#">here</a> for information on how your PC might be able to meet this requirement.	Your device must be <a href="#">running Windows 10</a> , version 2004 or later, to upgrade. Free updates are available through Windows Update in Settings>Update and Security.	
<b>TPM:</b>	<a href="#">Trusted Platform Module (TPM)</a> version 2.0. <a href="#">Check here</a> for instructions on how your PC might be enabled to meet this requirement.	Certain <a href="#">features require specific hardware</a> . <sup>2</sup> System requirements to run some apps will exceed the Windows 11 minimum device specifications. Check device compatibility information specific to the apps you want to install. Available storage on your device will vary based on installed apps and updates. Performance will scale with higher end, more capable PCs. Additional requirements may apply over time and for updates.	

Please refer to the following link for detailed requirements:

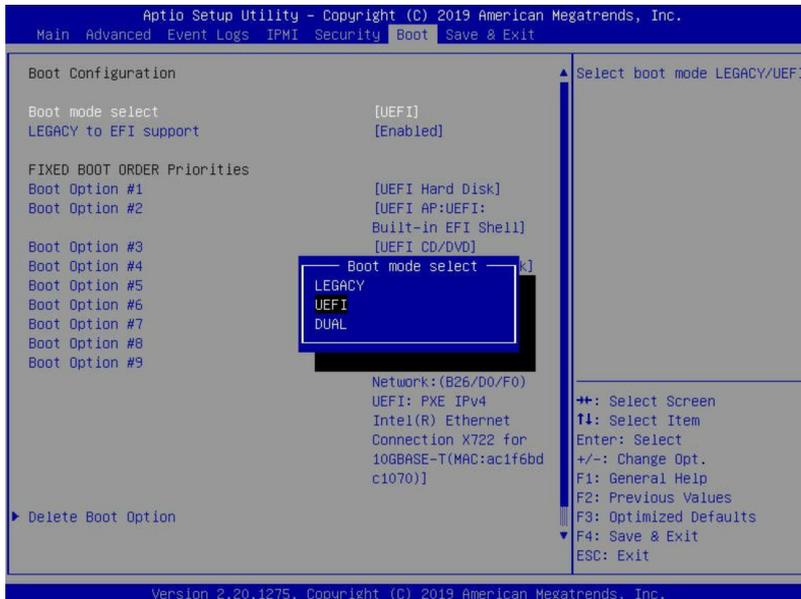
[Windows 11 Specs and System Requirements | Microsoft](#)

## UEFI BIOS Settings

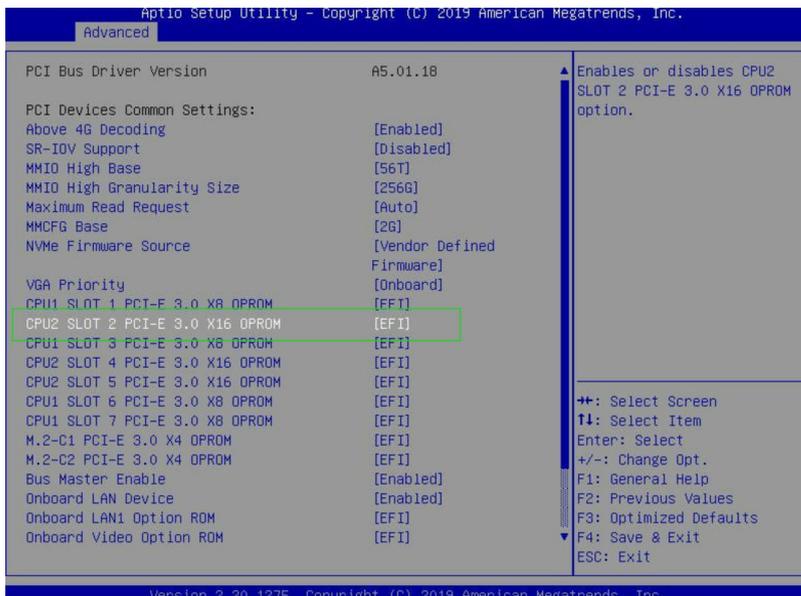
Different motherboards will provide different UEFI-related BIOS settings. Please consult your motherboard’s user manual for more information.

Set UEFI setting with SuperMicro X11DAi-N motherboard as an example.

- a. Set "Boot Mode Select" to "UEFI";



- b. Under "Advanced->PCIe/PCI/PnP Configuration->", change “CPUx Slot x PCI-E OPROM” to "EFI". “x” represents the PCIE slot assignment. For this example, the RR2720 is installed into “CPU2 Slot 2”



- c. Set "Boot Mode Select" to "UEFI";



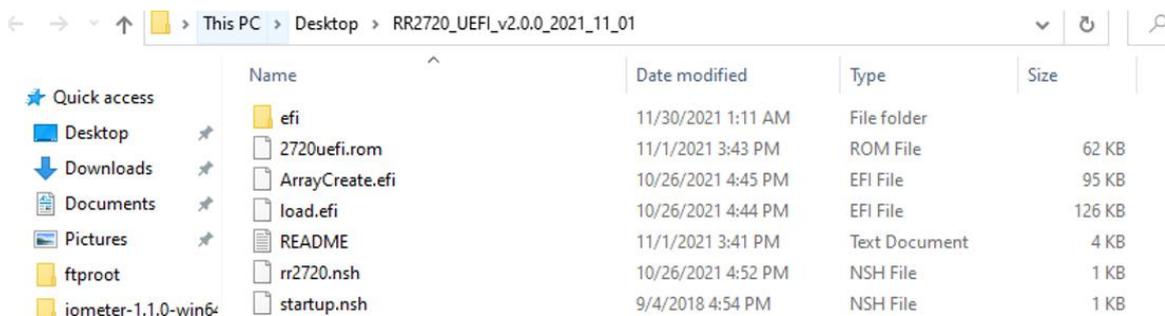
## How to install Windows to the RAID Controller

### Step 1 Preparing the USB Flash Drive

When preparing the USB flash drive, make sure to format the USB partition as FAT32. If another file system is used, the USB drive may not be properly recognized, and will not appear as an option under the motherboard’s UEFI BIOS menus.

### Step 2 Preparing the UEFI Package

The package must be unzipped directly to the root of the bootable USB flash drive (do not extract the contents to a new folder). All of the following items must be present in the root of the USB flash drive. For example (RR2720)



**Note:** If the above content is not present in the root directory, the UEFI boot device will not be properly recognized, and you will be unable to create an array for OS installation.

## Step 3 Creating the RAID Array

- a. Insert the USB flash drive to the motherboard.
- b. The screen should display information about the devices on the motherboard:

```
HighPoint RocketRAID 27xx Controller UEFI driver version v2.0.0.0
Controller ID:2720, Location: 41:0:0
[41:00 ] Start scanning devices...
[41:00 00/00] SATA Device probed.
[41:00 01/00] SATA Device probed.
[41:00 02/00] SATA Device probed.
[41:00 03/00] SATA Device probed.
Adding HPT VDO-0 SCSI Disk Device (SINGLE) Capacity 6001GB BlockSize 512 Bytes
Adding HPT VDO-1 SCSI Disk Device (SINGLE) Capacity 10000GB BlockSize 512 Bytes
Adding HPT VDO-2 SCSI Disk Device (SINGLE) Capacity 4000GB BlockSize 512 Bytes
Adding HPT VDO-3 SCSI Disk Device (SINGLE) Capacity 6001GB BlockSize 512 Bytes
```

- c. Query the files in the USB flash drive and enter the command: **dir**

```
FS0:\2720uefi\> dir
Directory of: FS0:\2720uefi\
10/26/2021  16:56 <DIR>          4,096
10/26/2021  16:56 <DIR>           0
11/18/2021  10:21 <DIR>          4,096
11/01/2021  15:43                62,976  2720uefi.rom
10/26/2021  16:45                96,960  ArrayCreate.efi
10/26/2021  16:44               128,320  load.efi
11/01/2021  15:41                3,142   README.txt
10/26/2021  16:52                 22      rr2720.nsh
09/04/2018  16:54                 240     startup.nsh
        6 File(s)      291,660 bytes
        3 Dir(s)
FS0:\2720uefi\>
```

- d. Enter the following command to flash the UEFI ROM to the RR2720 RAID Controller:  
**rr2720.nsh**

```
FS0:\2720uefi\> rr2720.nsh
FS0:\2720uefi\> 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 65:0:0
Flash size 0x10000, File size 0xf600
Offset address 0x0
EPROM Vendor: WINBOND W25X40BV
Erasing .....Succeeded
Flashing ....

Flashing Success (total retry 0)

Verifying ....

Passed !
FS0:\2720uefi\>
```

When the message 'Passed !' appears, the flash was successful.

- e. At the prompt, enter the following command to change the resolution:  
**mode 100 31**

```

FS0:\> mode
Available modes for console output device.
Col      80 Row    25
Col      80 Row    50 *
Col     100 Row    31
Col     200 Row    63
FS0:\> mode 100 31_

```

- f. Next, enter the following command to enter the RAID creation utility:

### ArrayCreate.efi

```

FS0:\2720uefi> ArrayCreate.efi
Highpoint RAID utility for UEFI (version: 20211022)
==== Controller information:
  PCI Location: 41:00:00
    Vendor: HighPoint Technologies, Inc.
    Product: RocketRAID 272x Controller

==== Physical device list(count 4 of 4):
1/1 TOSHIBA MD04ACA600-47T8K6CVFFQC, 6001075MB(MaxFree 6001075MB), Normal [WC]
1/2 ST4000VX007-2DT166-WDH2VYLX, 4000694MB(MaxFree 4000694MB), Normal [WC]
1/3 ST10000NE0004-2GT11L-ZCH01FM1, 10000764MB(MaxFree 10000764MB), Normal [WC]
1/4 TOSHIBA MD04ACA600-47T8K6C2FFQC, 6001075MB(MaxFree 6001075MB), Normal [WC]

```

- g. Next, create the array using the following command: **create RAID0**

This will create a RAID0 array using all of the HDDs, and configured for maximum capacity:

```

<<< create RAID0
  Creating array: RAID0_000041A7.
  Array created successfully.
=====

==== Physical device list(count 4 of 4):
1/1 TOSHIBA MD04ACA600-47T8K6CVFFQC, 6001075MB(MaxFree 2000381MB), Normal [WC]
1/2 ST4000VX007-2DT166-WDH2VYLX, 4000694MB(MaxFree 0MB), Normal [WC]
1/3 ST10000NE0004-2GT11L-ZCH01FM1, 10000764MB(MaxFree 6000069MB), Normal [WC]
1/4 TOSHIBA MD04ACA600-47T8K6C2FFQC, 6001075MB(MaxFree 2000381MB), Normal [WC]

==== Logical device list(count 1 of 1):
  1 [VD0-0] RAID0_000041A7 (RAID0), 16002779MB (Stripe 64KB), Normal
    1/1 TOSHIBA MD04ACA600
    1/2 ST4000VX007-2DT166
    1/3 ST10000NE0004-2GT11L
    1/4 TOSHIBA MD04ACA600
=====

>>> Please specify command to execute:
<<< _

```

You can now exit the utility. Enter the following command: `exit`.

*Note: For more additional commands, please refer to Appendix of this user guide.*

## Step 4 Install Windows

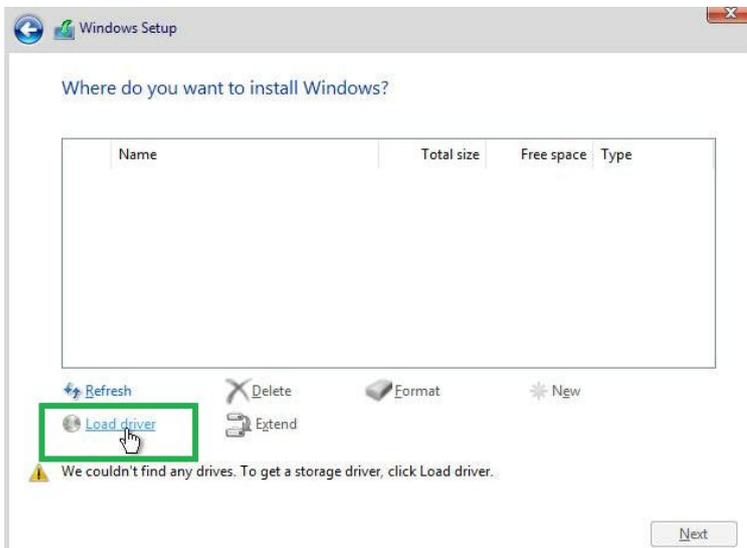
- Insert the Windows install DVD in your optical drive (DVD/Blu-ray, etc.) and then reboot your system.
- The following RAID information should be displayed by the motherboard BIOS post screen:

```
HighPoint RocketRAID 27xx Controller UEFI driver version v2.0.0.0
Controller ID:2720, Location: 41:0:0
[41 00 ] Start scanning devices...
[41:00 00/00] SATA Device probed.
[41:00 01/00] SATA Device probed.
[41:00 02/00] SATA Device probed.
[41:00 03/00] SATA Device probed.
Adding HPT VDO-0 SCSI Disk Device (RAID0) Capacity 16002GB BlockSize 512 Bytes
```

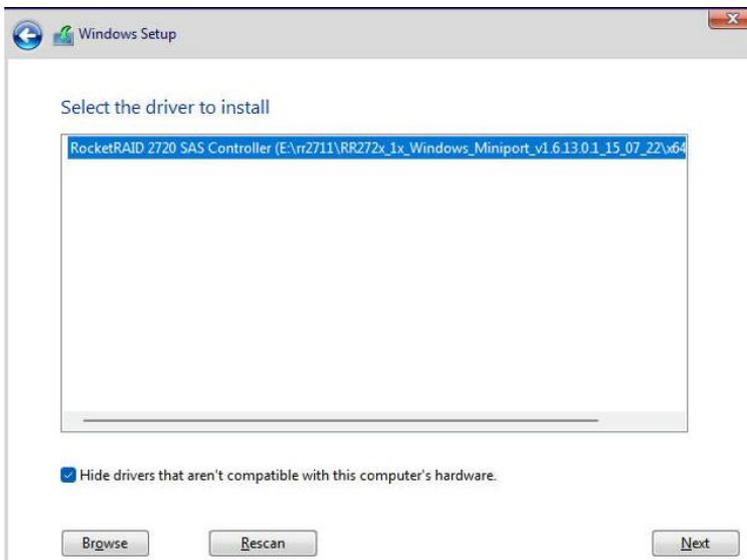
- c. Enter the Boot list, and select start from UEFI BOOT:

```
Boot Override
UEFI: ASUS SDRW-08D2S-U A801
UEFI: Built-in EFI Shell
(B26/D0/F0) UEFI: PXE IPv4 Intel(R)
for 10GBASE-T(MAC:ac1f6bdc1070)
(B26/D0/F1) UEFI: PXE IPv4 Intel(R)
```

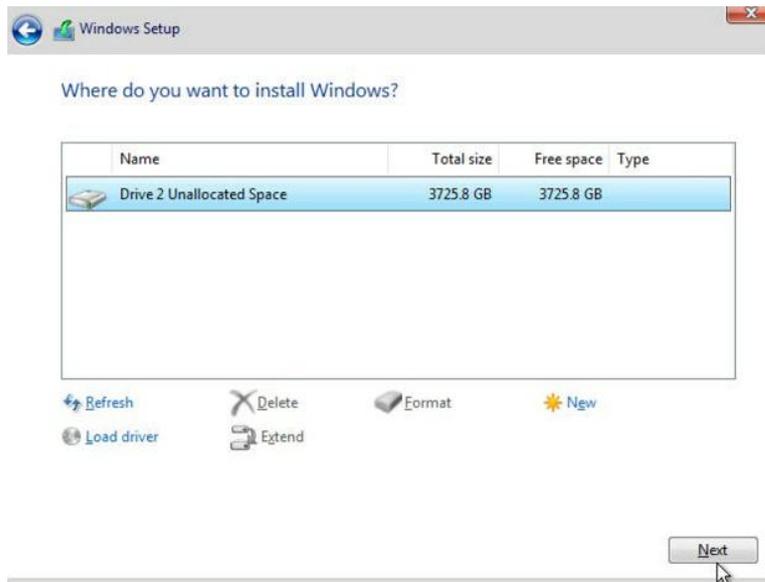
- d. Install Windows, to “Where do you want to install Windows?”; Click “Load driver” , in the pup-up window, click “Cancel”;



- e. Next, insert the USB flash that contains the driver into the motherboard USB slot and click “Browse”. Select the driver file as shown:



- f. After loading the driver, return to the “Where do you want to install Windows?” interface. The previous Legacy disks will now be recognized as a RAID array:



- g. After partitioning, continue and complete the Windows installation procedure.

## Step 5 Disabling Hibernation

After Windows is installed, boot into the operating system and disable Hibernation. Hibernation fails when the system is installed on a RAID; this bug will slow down or prevent startup and disable sleep mode.

If you do not turn the hibernation functionality off, you may experience the following problems:

- Shutdown time is extended by an additional 3-5 minutes.
- You cannot shut down properly; you need to manually press the power switch button of the motherboard to power off the system.

Please use administrator privileges to turn off hibernation using the following command (Command Prompt utility): **#powercfg /h off**

```
Microsoft Windows [Version 10.0.19043.0]
(c) Microsoft Corporation. All rights reserved.
C:\Windows\system32>powercfg /h off
```

Enter the command to check that the quick shutdown is turned off: **powercfg /a**

```
Administrator: Command Prompt
C:\Windows\system32>powercfg /a
The following sleep states are not available on this system:
  Standby (S1)
    The system firmware does not support this standby state.
    An internal system component has disabled this standby state.
    Graphics

  Standby (S2)
    The system firmware does not support this standby state.
    An internal system component has disabled this standby state.
    Graphics

  Standby (S3)
    The system firmware does not support this standby state.
    An internal system component has disabled this standby state.
    Graphics

  Hibernate
    Hibernation has not been enabled.

  Standby (S0 Low Power Idle)
    The system firmware does not support this standby state.

  Hybrid Sleep
    Standby (S3) is not available.
    Hibernation is not available.

  Fast Startup
    Hibernation is not available.
```

## Trouble shooting

### No supporting host adapter is found

Take rr2720.nsh for example.

In the UEFI environment, run the command, "rr2720.nsh (Please see UEFI Read me for specific input content.)".

```
FS0:\2720uefi\> rr2720.nsh
FS0:\2720uefi\> load.efi 2720uefi.rom
Load Utility for Flash EPROM v1.1.3
(built at Oct 20 2021 16:39:13)
No supporting host adapter is found.
FS0:\2720uefi\> _
```

**Solutions:** If you get the message, "No supporting host adapter is found." Try the following,

- The error message is to remind the user that when the card cannot be found in UEFI. Make sure the HighPointRR Controller is installed into a PCIe slot with x8 or x16 lane.
- In order to avoid this slot is broken, so replace the slot and test again.

## No supported controller detected

In the UEFI environment, run the command, "ArrayCreate.efi".

```
FS0:\2720uefi\> ArrayCreate.efi
Highpoint RAID utility for UEFI (version: 20211022)
No supported controller detected.
FS0:\2720uefi\> _
```

**Solutions:** If you get the message, "No supported controller detected." Try the following,

- a. Check whether the Storage option ROM is 'Enabled' in the motherboard BIOS.
- b. Check whether SATA/SAS is connected to the controller.
- c. Replace the motherboard slot, enter the UEFI environment and re-enter the command.

If none of the above methods work, please provide [UEFI log](#). You can submit a support ticket using our [Online Support Portal](#), include a description of the problem in as much detail as possible.

# Appendix

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

- **Create Command**

**Syntax**

Create Array Type (RAID0/RAID1/10/5/50) Member Disk list (1/1, 1/2|\*) Capacity (100|\*)

**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 1/1, 1/2, 1/3, 1/4 10
```

Create RAID50 array with disk 1/1, 1/2, 1/3 and 1/4 and with 10GB 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.