

# **RR64xL Controller Windows BootRAID Installation Guide**

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# Prerequisites for a Bootable RAID Configuration

The RR640L/642L/644L/644LS 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 x4, x8 or x16 lanes.
2. The RR640L/642L/644L/644LS must be installed into a PCIe 3.0/4.0 slot with x4, 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 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:

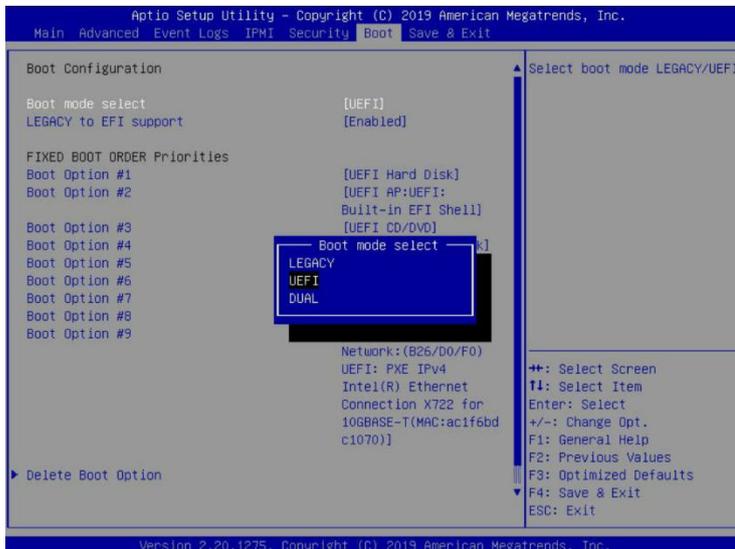
[Windows 11 Specs and System Requirements | Microsoft](#)

# UEFI BIOS Settings

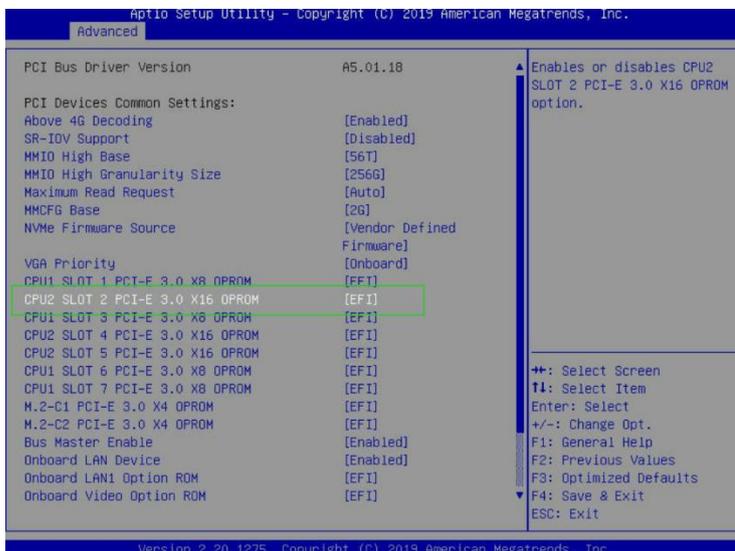
Different motherboards will provide different UEFI-related BIOS settings. Please consult your motherboard's user manual for more information.

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

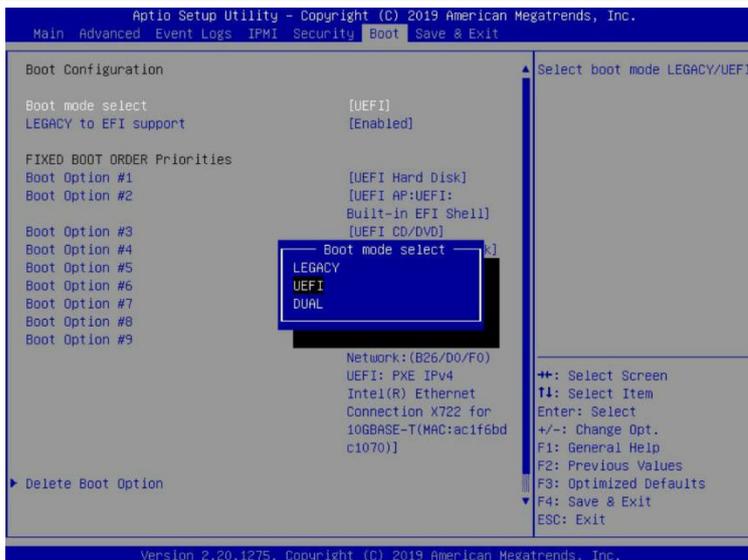
- a. Set "Boot Mode Select" to "UEFI";



- b. Under "Advanced->PCIe/PCI/PnP Configuration->", change "CPUx Slot x PCI-E OPRM" to "EFI". "x" represents the PCIE slot assignment. For this example, the RR6401 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 (RR640L)**

- 📁 efi
- 📄 640luefi.rom
- 📄 ArrayCreate.efi
- 📄 load.efi
- 📄 README
- 📄 rr640l.nsh
- 📄 RR640I\_UEFI\_v1.0.0\_21\_07\_14
- 📄 startup.nsh

**Note:** If the above content is not present in the root directory, the UEFI boot device will not be properly recognized, and/or 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. Booting from the UEFI USB flash and enter the UEFI environment;

```

Boot Override
SanDisk
IBA 40-10G Slot 1A00 v1066
UEFI: SanDisk, Partition 1
UEFI: SanDisk, Partition 2
UEFI: Built-in EFI Shell
Launch EFI Shell from filesystem device
    
```

- c. Command with “**rr640l.nsh**”, flash UEFI rom to RR640l Controller and reboot.

```

EKX II
UEFI v2.70 (American Megatrends, 0x0005000E)
Mapping table
FS0: Alias(s):HD0q0b::BLK1:
  PciRoot(0x0)/Pci(0x14,0x0)/USB(0x10,0x0)/HD(1,MBR,0xF10E0812,0x194000,0x7027000)
FS1: Alias(s):HD0q0c::BLK2:
  PciRoot(0x0)/Pci(0x14,0x0)/USB(0x10,0x0)/HD(2,MBR,0xF10E0812,0x71B8000,0xDFFFF)
BLK0: Alias(s):
  PciRoot(0x0)/Pci(0x14,0x0)/USB(0x10,0x0)
BLK3: Alias(s):
  PciRoot(0x9)/Pci(0x0,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x0)
Press ESC in 4 seconds to skip startup.nsh or any other key to continue.
Shell> arch -off
FS0> rr640l.nsh
FS0> load.efi 640luefi.rom
Load Utility for Flash EPROM v1.1.1
(built at Jun  4 2021 14:44:46)

Found adapter 0x6411103 at PCI 134:0:0
Flash size 0x10000, File size 0xf400
Offset address 0x20000
EPROM Vendor: WINBOND W25X40BV
Erasing ....Succeeded
Flashing ....

Flashing Success (total retry 0)

Verifying ....

Passed |
    
```

When the message ‘Passed’ appears, the flash was successful.

- d. Boot, in the presence of the motherboard Log screen, there will be HDDs information:



- e. Enter the motherboard’s Boot List and select start from **UEFI USB** flash:

```

Boot Override
SanDisk
IBA 40-10G Slot 1A00 v1066
UEFI: SanDisk, Partition 1
UEFI: SanDisk, Partition 2
UEFI: Built-in EFI Shell
Launch EFI Shell from filesystem device

```

- f. 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_

```

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

### ArrayCreate.efi

```

Press ESC in 1 seconds to skip startup.nsh or any other key to continue.
Shell> FS0:
FS0:\> ArrayCreate.efi
Highpoint RAID utility for UEFI (version: 20210604)
Vendor: HighPoint Technologies, Inc.
Product: RocketRAID 640L SATA Controller

==== Physical device list(count 4):
1/1 ST4000VX007-2DT166-HDH2VVLX, 4000787MB(MaxFree 0MB), Normal [RA] [WC] [NCQ]
1/2 ST6000VN0041-2EL11C-ZA196EY4, 6001175MB(MaxFree 0MB), Normal [RA] [WC] [NCQ]
1/3 ST6000VN0041-2EL11C-ZA19J102, 6001175MB(MaxFree 0MB), Normal [RA] [WC] [NCQ]
1/4 ST6000VN0041-2EL11C-ZA190V1D, 6001175MB(MaxFree 0MB), Normal [RA] [WC] [NCQ]

==== Logical device list(count 4):
1 1/1 ST4000VX007-2DT166-HDH2VVLX, 4000787MB(MaxFree 0MB), Normal [RA] [WC] [NCQ]
2 1/2 ST6000VN0041-2EL11C-ZA196EY4, 6001175MB(MaxFree 0MB), Normal [RA] [WC] [NCQ]
3 1/3 ST6000VN0041-2EL11C-ZA19J102, 6001175MB(MaxFree 0MB), Normal [RA] [WC] [NCQ]
4 1/4 ST6000VN0041-2EL11C-ZA190V1D, 6001175MB(MaxFree 0MB), Normal [RA] [WC] [NCQ]
-----
>>> Please specify command to execute:
<<< _

```

- h. Command “**create RAID0**”.  
Create RAID0 array with all disks and with maximum capacity.

```

>>> Please specify command to execute:
<<< create RAID0
Creating array: RAID0_000041A7.
Array created successfully.
-----
==== Physical device list(count 4):
1/1 ST4000VX007-2DT166-HDH2VVLX, 4000694MB(MaxFree 0MB), Normal [RA] [WC] [NCQ]
1/2 ST6000VN0041-2EL11C-ZA196EY4, 6001075MB(MaxFree 2000381MB), Normal [RA] [WC] [NCQ]
1/3 ST6000VN0041-2EL11C-ZA19J102, 6001075MB(MaxFree 2000381MB), Normal [RA] [WC] [NCQ]
1/4 ST6000VN0041-2EL11C-ZA190V1D, 6001075MB(MaxFree 2000381MB), Normal [RA] [WC] [NCQ]

==== Logical device list(count 1):
1 [VD0] RAID0_000041A7 (RAID0), 16002779MB (Stripe 512KB), Normal
  1/1 ST4000VX007-2DT166
  1/2 ST6000VN0041-2EL11C
  1/3 ST6000VN0041-2EL11C
  1/4 ST6000VN0041-2EL11C
-----
>>> Please specify command to execute:
<<< _

```

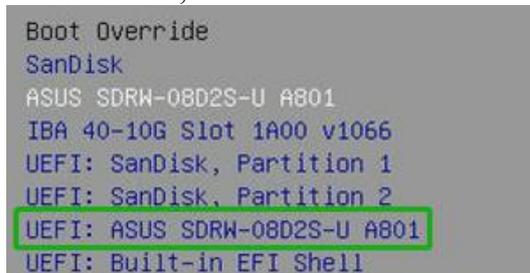
- i. You can now exit the utility. Enter the following command: **exit**;  
Note: For more command usages, refer to [Appendix A](#).

## Step 4 Install Windows

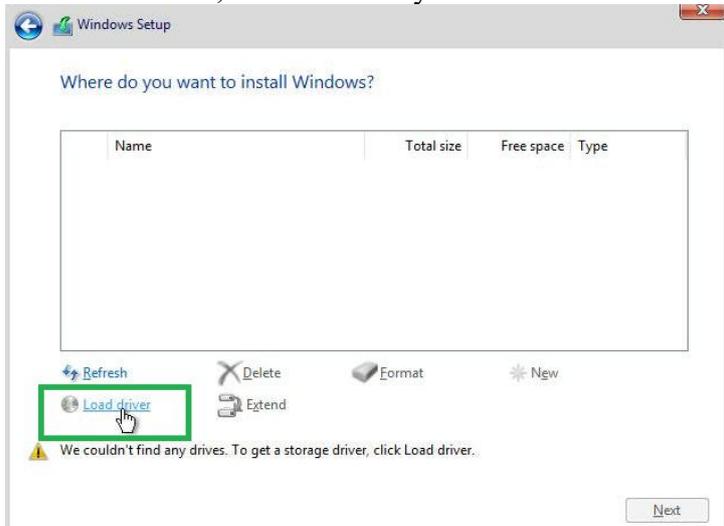
- a. Put the Windows install DVD in your CD-ROM and then reboot your system;
- b. Boot, view RAID information that appears on the motherboard Logo screen;



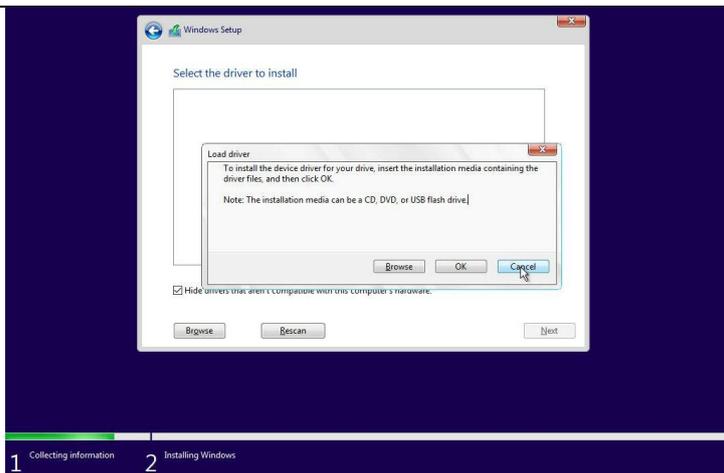
- c. Enter Boot list, select start from UEFI DVD;



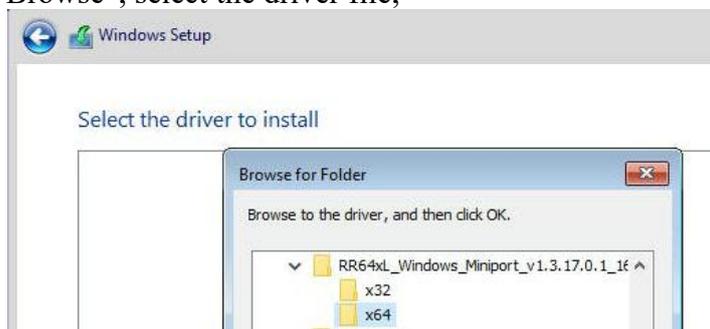
- d. Install Windows, to “Where do you want to install Windows?”;



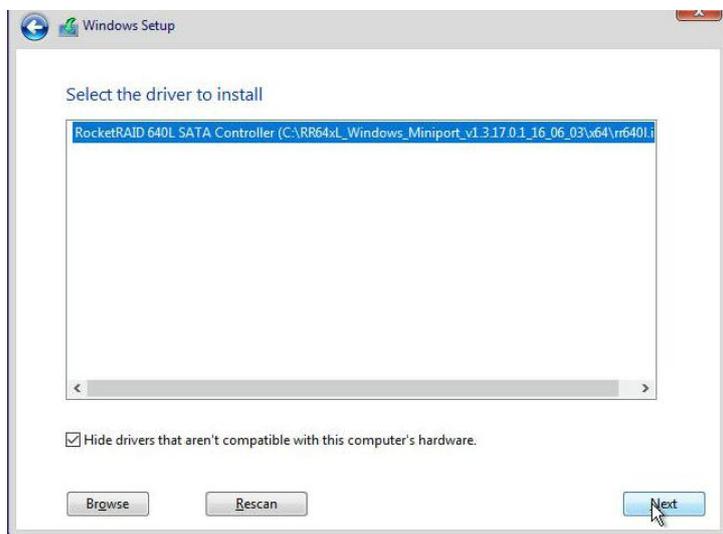
- e. Click “Load driver”, in the pop-up window, click “Cancel”;



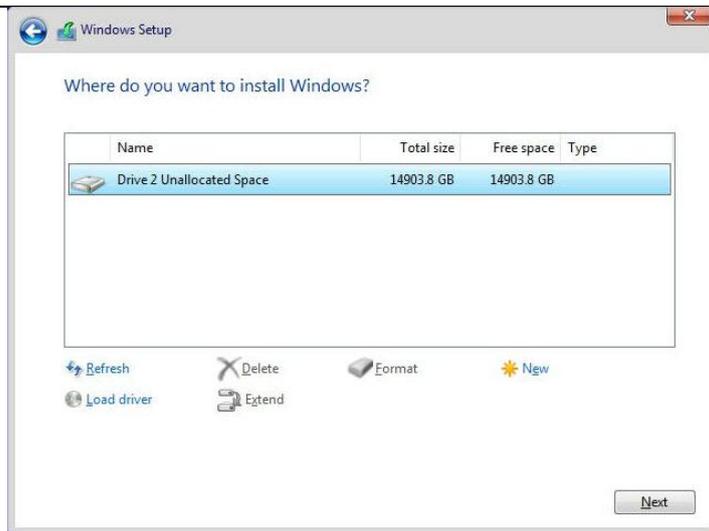
- f. Then plug the USB flash with the driver file onto the USB interface of the motherboard, click “Browse”, select the driver file;



- g. Load the driver;



- h. After load the driver, back to “Where do you want to install Windows?” interface, the Legacy disks have become RAID partitions;



i. After partitioning, continue installing and complete the installation of the Windows.

## 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.
(c) Microsoft Corporation. All rights
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

In the UEFI environment, run the command, "rr6401.nsh (Please see UEFI Read me for specific input content.)".

```
FS0:\> rr6401.nsh
FS0:\> load.efi 640luefi.rom
Load Utility for Flash EPROM v1.1.1
(built at Jun  4 2021 14:44:46)

No supporting host adapter is found.
FS0:\> _
```

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

- a. 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.
- b. 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:\> ArrayCreate.efi
Highpoint RAID utility for EFI v1.2.3
No supported controller detected.
FS0:\> _
```

**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 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 A

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

- **Create Command**

**Syntax**

Create Array Type (RAID0/RAID1/10/5) 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.

- **Delete Command**

**Syntax**

delete {array ID}

**Examples**

<<< delete 1

Delete the first array from Logical device list.

<<< delete 1

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.