

VIA Ubuntu Linux 6.10 Desktop/alternate (x86&x86_64) VT6421(L)/VT8237R/VT8237A/VT8237S/VT8251/CX700 V-RAID V2.60 Driver Installation Guide

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1. Summary

This guide describes how to install the VIA V-RAID driver v2.60 and utility of chipsets VT8237R/VT8237A/VT8237S/VT8251/CX700 (Serial ATA RAID controller) and VT6421(L) (Serial ATA+IDE RAID controller) with Ubuntu Linux 6.10 Desktop/alternate. These six chips all support RAID Level 0, RAID Level 1 and JBOD. RAID Level 0+1 is supported by VT6421/VT8251 and RAID Level 5 only VT8251 supports. The RAID introduction is described in detail at the “Appendix” section. The information in this document is provided “AS IS,” without guarantee of any kind.

Note: To avoid the user account permission issue, following commands in this document all run with super user “root”.

2. File descriptions

This package requires 2 files as described below.

Linux_VRAID_V260_ubuntu610.zip 07-04-03 22:55 6,428,226

Readme

V-RAID driver package
this file

3. Install precompiled VIA V-RAID driver binary on an existing Ubuntu 6.10 system with IDE HDD

NOTE: If users are using VT8237R/VT8237A/VT8251/VT6421 SATA controller, the VIA V-RAID driver may conflict with the system's default sata_via/ahci driver. Users can disable the sata_via/ahci first as below steps:

- a. Run command “#rmmod sata-via” and “#rmmod ahci” to unload os default sata/ahci module.
- b. Revise the default sata_via/ahci driver to “.bak” files:

```
#cd /lib/modules/`uname -r`/kernel/drivers/scsi
#mv ahci.ko ahci.ko.bak
#mv sata_via.ko sata_via.ko.bak
#depmod `uname -r`
```
- c. Create a new boot image file and boot with it:

```
#mkinitramfs -o /boot/initrd-V-RAID260.img
```

Before using the RAID function of SATA/PATA controller, users need to check two things first:

- a. Please make sure the RAID BIOS of VT8237R/VT8237A/VT8237S/VT8251/CX700/VT6421(L) integrates with the system BIOS. And users can create RAID HDD by RAID BIOS. If not, update the system BIOS from the motherboard vendor.
- b. SATA/PATA Controller whether changes to **[RAID]** Mode in system BIOS. If not, please refer following steps to change it:

(For Award BIOS) Press “DEL” button to get into BIOS → Integrated Peripherals → VIA OnChip IDE Device → SATA Controller Mode → [RAID] (Maybe name of bios item is different, users should be able to find similar item in bios)

The VIA V-RAID package provides pre-compile binary drivers for user installation. Please refer following steps to install VIA V-RAID driver binary.

```
#unzip Linux_VRAID_V260_ubuntu610.zip
#cd Linux_VRAID_V260_ubuntu610/raiddriver-V2.60/driverdisk
#cp ubuntu610_v260_DD.img /tmp
#cd /tmp
#mkdir raiddriver
#mount -o loop ubuntu610_v260_DD.img raiddriver
#cd /tmp/raiddriver
#./viamraid_ubuntu610_install
```

After install RAID driver completely, users also can run “dmesg” command to check the RAID HDD is workable or not.

```
viamraid: module license 'unspecified' taints kernel.
GSI 20 sharing vector 0xC9 and IRQ 20
ACPI: PCI Interrupt 0000:00:0f.0[B] -> GSI 21 (level, low) -> IRQ 20
PCI: Via IRQ fixup for 0000:00:0f.0, from 11 to 4
PCI: Setting latency timer of device 0000:00:0f.0 to 64
scsi0 : VIAMRAID DRIVER 2.60
Vendor: VIA AHCI Model: RAID 1 Rev:
Type: Direct-Access ANSI SCSI revision: 00
SCSI device sda: 390721967 512-byte hdwr sectors (200050 MB)
.....
.....
sda: assuming drive cache: write through
sda: sda1 sda2
sd 0:0:0:0: Attached scsi disk sda
```

4. Install VIA RAID utility

Before installing VIA RAID utility, users need to install related package: **libgtkmm2.4-dev**. Users can refer following commands to install it.

```
#wget http://apt.ubuntu.org.tw/sources.list.edgy
#cp /etc/apt/sources.list /etc/apt/sources.list.orig
#mv sources.list.edgy /etc/apt/sources.list
#apt-get update
#apt-get install libgtkmm-2.4-dev
```

The package also provides a GUI tool for user to control the RAID card easily. Execute the following command to install and run the VIA RAID utility.

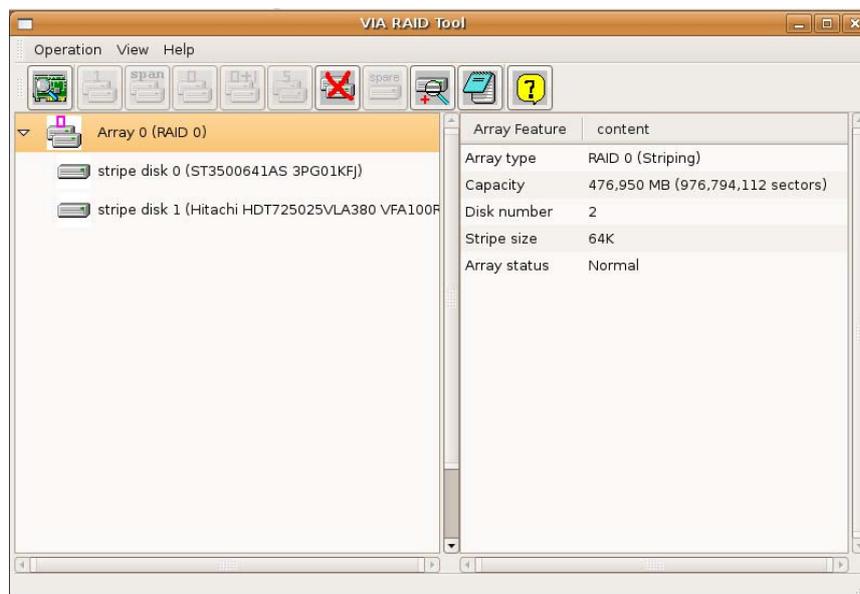
```
#cd Linux_VRAID_V260_ubuntu610/raidtool-V2.60/32-Bit-OS (For 32 bit OS)
#cd Linux_VRAID_V260_ubuntu610/raidtool-V2.60/64-Bit-OS (For 64 bit OS)
#chmod +x install.sh
#./install.sh
```

After running utility install shell, users can find following messages appeared. Users can press button “**Enter**” to continue install utility and utility will be installed to path `/usr/local/bin`.

```
Please specify the base directory to install the files. [/usr/local]
Starting install VIA Raid Tool for Linux, please wait...
```

VIA Raid Tool has been installed successfully. Before run it, users need to install the raid driver first. And the executable file is **viaraid-gtk** under `/usr/local/bin`

```
#viaraid-gtk
```





Users can click  button for more information about how to create RAID mode with the VIA RAID Tool.

If users wanted to remove the VIA RAID tool, please run following command to remove the tool from system.

```
#cd Linux_VRAID_V260_ubuntu610/raidtool-V2.60/32-Bit-OS (For 32 bit OS)
#cd Linux_VRAID_V260_ubuntu610/raidtool-V2.60/64-Bit-OS (For 64 bit OS)
#chmod +x uninstall.sh
#./uninstall.sh
```

5. Install OS Ubuntu 6.10 Desktop/alternate upon RAID HDD

A. Prepare driverdisk prior installing OS

Before installing OS, users need to create a driver disk first. Insert a blank floppy disk and follow the steps below to generate the driver disk.

- For window OS users:

Utility “**rawwritewin.exe**” can create driverdisk and it can be found in following download link

<http://www.chrysocome.net/downloads/rawwritewin-0.4.zip>.

Users can copy driverdisk image **ubuntu610_v260_DD.img** to windows system. Press icon “**...**” to select image path then press “**Write**” button to create driverdisk.



- For Linux OS users:

Users can use command “dd” to create driverdisk under linux OS. Please refer following command:

```
#dd if=ubuntu610_v260_DD.img of=/dev/fd0
```

After driverdisk creates completely, users can prepare to install new system.

B. Install Ubuntu 6.10 Desktop/alternate upon RAID HDD by using driver disk

Note: If users install OS Ubuntu 6.10 with CX700(M/M2) or SATA DVD-ROM, it is recommended to install the Ubuntu 6.10 alternate version.

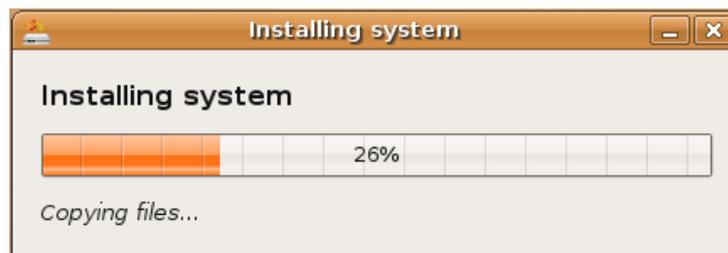
Insert the driverdisk to floppy and boot from CD/DVD ROM to start install OS procedure.

- For installing Ubuntu 6.10 Desktop Version users:

Due to the Ubuntu 6.10 Desktop Version is a Live CD. System can boot into Ubuntu OS with the Live CD first then load VIA RAID Driver manually to recognize RAID HDD. Please refer following commands to load VIA RAID Driver.

```
#modprobe scsi_mod  
#modprobe sata_via -r  
#modprobe ahci -r  
#mount /dev/fd0 /mnt  
#mount /dev/sdx /mnt (For USB Floppy, sdx maybe sdc, sdd or sde...)  
#cp /mnt/* /tmp -rf  
#umount /mnt  
#modprobe usb-storage -r (For USB Floppy)  
#insmod /tmp/i686/viamraid.ko (For x86 CPU)  
#insmod /tmp/x86_64/viamraid.ko (For x86_64 CPU)
```

After driverdisk creates completely, users can prepare to install new system upon RAID HDD by double click “install” icon. And install OS Ubuntu Linux 6.10 with normal step until system “**Installation complete**” message appeared.



When “**Installation complete**” message appeared, users can run following commands to copy VIA RAID Driver to installed system.

```
#cd /tmp
#cp viamraid_Ubuntu610_install i386 i686 x86_64 /target/tmp -rf
#chroot /target
#cd /tmp
#./viamraid_ubuntu610_install
```

After updating VIA RAID Driver to installed system, users can press button “**Restart Now**” to restart system.

- For installing Ubuntu 6.10 alternate Version users:

When installation screen appeared, users can select item of “**Install in text mode**” or “**Install in OEM mode**” to install OS. After choosing one item to install and waiting for “**Choose language**” screen appeared, please press button “**Alt+F2**” to switch to console mode and refer following commands to load VIA RAID driver from driverdisk.

```
#modprobe fat
#modprobe vfat
#modprobe scsi_mod
#modprobe sata_via -r
#modprobe ahci -r
#mount /dev/fd0 /floppy
#mount /dev/sdx /floppy (For USB Floppy, sdx maybe sdc, sdd or sde...)
#cp /floppy/* /tmp -rf
#umount /floppy
#modprobe usb-storage -r (For USB Floppy)
#insmod /tmp/i386/viamraid.ko (For x86 CPU)
#insmod /tmp/x86_64/viamraid.ko (For x86_64 CPU)
```

If driver loaded successfully, user can see the RAID HDD information in other screen. (**Please press button Alt+F4**)

```
Viamraid: module license `unspecified` taints kernel.
ACPI: PCI Interrupt 0000:05:08.0[A] -> GSI 16 (level, low) -> IRQ 20
sata_via 0000:05:08.0: routed to hard irq line 11
.....
.....
Scsi1 : VIAMRAID DRIVER V2.60
Vendor: VIA AHCI          Model: RAID 1          Rev:
Type: Direct-Access      ANSI SCSI revision: 00
```

After driver loaded and RAID HDD can be recognized successfully, users can press button “**Alt+F1**” to return to OS installation screen and install OS Ubuntu Linux 6.10 with normal step until system “**Install complete**” message appeared.

When system install complete message appeared, users can press button “**Alt+F2**” to switch console mode again and refer following commands to copy VIA RAID Driver to installed system.

```
#cd /tmp
#cp viamraid_ubuntu610_install i386 i686 x86_64 /target/tmp -rf
#chroot /target
#cd /tmp
#./viamraid_ubuntu610_install
```

After updating VIA RAID Driver to installed system, users can press button “**Alt+F1**” to return to OS installation screen to select “**Continue**” to restart system.

If users forget to copy VIA RAID Driver to installed system, users may meet system hang issue after system reboot. Users can refer following steps to rescue it:

- a. Insert the driverdisk to floppy and boot from **Ubuntu 6.10 alternate** CD ROM to start install OS procedure.
- b. Users can select item “**Rescue a broken system**” to boot.
- c. Refer the Section 5.B “**For installing Ubuntu 6.10 alternate users**” part to load VIA RAID Driver first.
- d. After loading VIA RAID Driver complete, users can press button “**Alt+F1**” to return to rescue mode screen.
- e. OS Install shell will ask users “**Choose language**” → Select “**Go Back**” → Show message “**Ubuntu installer main menu**” → Select “**Load installer components from CD**” → Show message “**Configure the network**” → Select “**Continue**” → Show message “**Enter rescue mode**” → Select “**/dev/sda1**” (Assume OS is installed at /dev/sda1) → “**Rescue operations**” → Select “**Execute a shell in the installer environment**” → Show message “**Executing a shell**” → Select “**Continue**” → System will appear the console command line and **/dev/sda1 should be mounted at /target**.

```
#cp viamraid_ubuntu610_install i386 i686 x86_64 /target/tmp -rf
#chroot /target
#cd /tmp
#./viamraid_ubuntu610_install
```

- f. After running VIA RAID Driver update shell and new boot image creates successfully, users can reboot system and boot system with new boot image.

6. Verify the success of installation

Assume file “**test.txt**” in RAID Hard Disk which is mounted at /HDD. Run the following commands to verify if the device works.

```
# cp /HDD/test.txt /
# diff /text.txt /HDD/test.txt
```

If there shows nothing after running the “**diff**” command, it means the two files are identical. And the RAID Hard Disk should work properly. And the following table shows the success of RAID functions of the VIA RAID controllers on Ubuntu Linux 6.10.

RAID Controller Tested HDD	CX700 (M/M2)	VT6421(L)	VT8237R (Plus)	VT8237A	VT8237S	VT8251
RAID 0	PASS	PASS	PASS	PASS	PASS	PASS
RAID 1	PASS	PASS	PASS	PASS	PASS	PASS
RAID 0+1	N/S	PASS	N/S	N/S	N/S	PASS
RAID 5	N/S	N/S	N/S	N/S	N/S	PASS
JBOD	PASS	PASS	PASS	PASS	PASS	PASS

Note1: Following listed is each RAID controller supports SATA/PATA port number:

VT8237R/VT8237A/VT8237S supports 2 SATA ports.

VT8251 supports 4 SATA ports.

VT6421(L) supports 2 SATA ports and 1 PATA port.

CX700(M/M2) support 2 SATA ports

Note2: When BIOS setting changes to RAID Mode and install OS with CX700, users need to install OS via a driverdisk.

7. Test configuration

The following hardware configurations were used for test.

A. VT8237R/VT8237A/VT8237S

Mother Board	EPIA-CN13000 (CN700+VT8237R Plus)
CPU	VIA C7 1.3GHz
S-ATA/PATA HDD	SATA: WDC WD2000JS 200GB Hitachi HDT725025VLA38 250GB
IDE HDD	Maxtor 6B120P0 120GB

Mother Board	VT5935C-4 (CN896+VT8237A)
CPU	VIA C7-D 2GHz
S-ATA/PATA HDD	SATA: Hitachi HDT725025VLA38 250GB Seagate ST350064 500GB
IDE HDD	Maxtor 6B120P0 120GB

Mother Board	VT8498B-1 (K8M890+VT8237S)
CPU	AMD Athlon 64 Dual Core 4200+
S-ATA/PATA HDD	SATA: WDC WD2000JS 200GB Hitachi HDT725025VLA38 250GB
IDE HDD	Maxtor 6B120P0 120GB

B. VT8251

Mother Board	VT8435B-1 (K8M890+VT8251)
CPU	AMD Athlon 64 Dual Core 4000+
S-ATA/PATA HDD	SATA: Hitachi HDT725025VLA38 250GB WDC WD2000JS 200GB Seagate ST350064 500GB Hitachi HDT725025VLA38 250GB
IDE HDD	Maxtor 6B120P0 120GB

C. VT6421(L)

Mother Board	EPIA-CN10000 (CN700+VT8237R+VT6421L)
CPU	VIA C7 1.0GHz
Add-on Card	VT5789E (VT6421L)
S-ATA/PATA HDD	SATA: Seagate ST3160812AS 160GB Maxtor 6Y080M0 80GB PATA: Quantum LM15000AT 15GB Seagate ST340014A 40GB
IDE HDD	Seagate ST3120026A 120GB

D. CX700(M/M2)

Mother Board	VT8454B-1 (CX700)
CPU	VIA C7 1.6GHz
S-ATA/PATA HDD	SATA: Hitachi HDT725025VLA38 250GB Seagate ST350064 500GB

Appendix:

A. RAID 0 (Striping)

Reads and writes sectors of data interleaved between multiple drives. When any disk member fails, it affects the entire array. The disk array data capacity is equal to the number of drive members times the smallest member capacity. The striping block size can be set 4KB to 64KB. RAID 0 does not support fault tolerance.

B. RAID 1 (Mirroring)

Writes duplicate data on to a pair of drives while reads are performed parallel. If one of the mirrored drives suffers a mechanical failure or does not respond, the remaining drive will continue to function. Due to redundancy, the drive capacity of the array is the capacity of the smallest drive. Under a RAID 1 setup, an extra drive called "spare drive" can be attached. Such a drive will be activated to replace a failed drive that is part of a mirrored array. Due to the fault tolerance, any one drive of RAID 1 failing does not impact the data access.

C. RAID 0+1 (Striping/Mirroring)

RAID 0+1 is a combination of RAID 0 and RAID 1 array types. A minimum of four drives needs to be installed. With a four-drive array, there must be two pairs of

RAID 0 drives. Each pair mirrors the data on the other pair of striping drives. The data capacity is two times the smallest drive.

D. JBOD (Spanning)

A spanning disk array is equal to the sum of the all drives when the drives used are different capacities. Spanning stores data on to a drive until it is full then proceeds to store files onto the next drive in the array. When any disk member fails, the failure affects the entire array. JBOD is not a really RAID and does not support fault tolerance.