

VIA Fedora Linux Core 6 (x86/x86_64) VT6421(L)/VT8237R/VT8237A/VT8237S/VT8251/CX700 V-RAID V2.60 Driver Installation Guide

Version 0.8, March 16, 2007
Copyright © 2003~2007 VIA Technologies, INC

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 Fedora Core 6.0. 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.

2. File descriptions

This package requires 2 files as described below.

Linux_VRAID_V260_fc6.zip	07-03-16 10:48 6,768,784	V-RAID driver package
Readme.doc		this file

3. Install precompiled VIA V-RAID driver binary on an existing FC6 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:

- Run command "#rmmod sata-via" and "#rmmod ahci" to unload os default sata/ahci module.
- Modify file "/etc/modprobe.conf":
alias scsi_hostadapter sata_via -> alias scsi_hostadapter viamraid
- Modify file "/etc/hotplug/blacklist":
Add lines with the content: "sata_via" and "ahci"
- 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`
- Create a new boot image file and boot with it:
#mkinitrd /boot/initrd-V-RAID260.img `uname -r`

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_fc6.zip
#cd Linux_VRAID_V260_fc6/raidriver-V2.60/driverdisk
#cp FC6_v260_DD.img /tmp
#cd /tmp
#mkdir raidriver
#mount -o loop FC6_v260_DD.img raidriver
#cd /tmp/raidriver
#. /viamraid_fc6_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
```

If user wants the system to load the VIA V-RAID module automatically upon system boot, edit the "/etc/rc.d/rc.local" and add a line below.

```
modprobe viamraid
```

4. Install VIA RAID utility

Before installing VIA RAID utility, users need to install 4 related packages: **libsigc++20-2.0.17-2**, **glibmm24-2.12.5-1.fc6**, **cairomm-1.2.4-1.fc6** and **gtkmm24-2.10.7-1.fc6**. Users can find the three files for i386 or x86_64 in following downlink: <ftp://ftp.isu.edu.tw/pub/Linux/Fedora/linux/extras/6>.

```
#rpm -i vh libsigc++20-2.0.17-2.xxxx.rpm (xxxx: i386 or x86_64)
#rpm -i vh glibmm24-2.12.5-1.fc6.xxxx.rpm (xxxx: i386 or x86_64)
#rpm -i vh cairomm-1.2.4-1.fc6.xxxx.rpm (xxxx: i386 or x86_64)
#rpm -i vh gtkmm24-2.10.7-1.fc6.xxxx.rpm (xxxx: i386 or x86_64)
```

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.

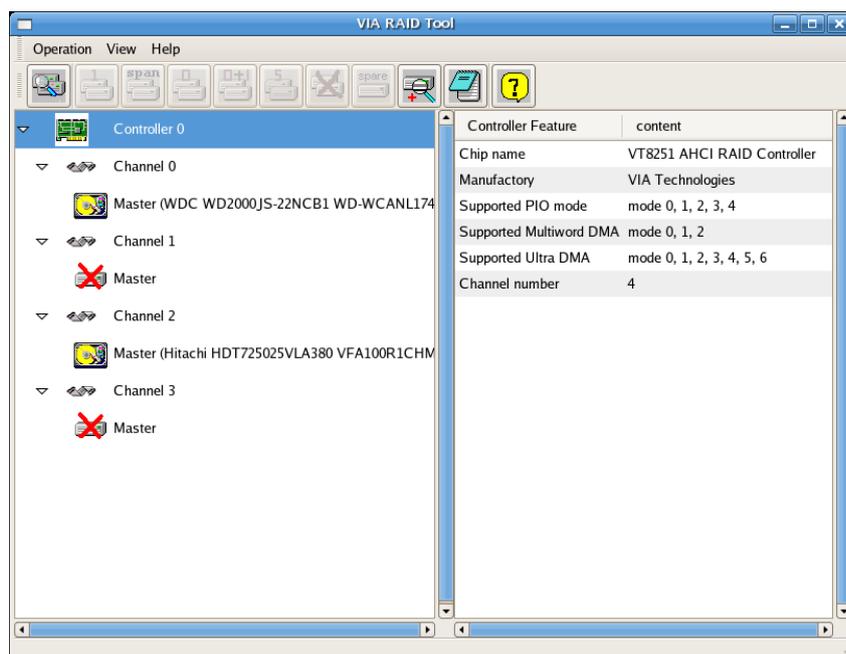
```
#cd Linux_VRAID_V260_fc6/raidtool-V2.60/32-Bit-OS (For 32 bit OS)
#cd Linux_VRAID_V260_fc6/raidtool-V2.60/64-Bit-OS (For 64 bit OS)
#chmod +x install.sh
#./install.sh
```

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_fc6/raidtool -V2.60/32-Bit-OS (For 32 bit OS)
#cd Linux_VRAID_V260_fc6/raidtool -V2.60/64-Bit-OS (For 64 bit OS)
#chmod +x uninstall.sh
#./uninstall.sh
```

5. Install OS Fedora Core 6.0 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://ftp.isu.edu.tw/pub/Linux/Mandrake/official/2007.0/i586/dosutils>.

Users can copy driverdisk image **FC6_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=FC6_v260_DD.img of=/dev/fd0
```

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

B. Install Fedora Core 6.0 upon RAID HDD by using driver disk

Insert the driverdisk to floppy and boot from CD/DVD ROM to start install OS procedure. Users can see following message and type “**linux dd updates pci=conf1**” to load driver from driverdisk.

```
boot: linux dd updates pci=conf1
```

OS Install shell will ask users “**Do you have a driver disk?**” → Select “**Yes**” → Show message “**Driver Disk Source**” → Select “**fd0**” (USB Floppy is sda) → Show message “**Insert driver Disk**” → Select “**OK**” → Install shell will load the RAID driver from floppy → Show message “**More Driver Disks?**” → Select “**No**” → Show message “**CD Found**” → Select “**skip**” → Show message “**Update Disk Source**” → Select “**fd0**” (USB Floppy is sdb) → Show message “**Update Disk**” → Select “**OK**”.

Note: When users use usb floppy to load driverdisk and install OS, users may meet following error message. And users can select “continue” button to continue install OS procedure.

```
No devices of the appropriate type were found on this driver disk. Would you like to manually select the driver, continue anyway, or load another driver disk? .....
```

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

```
Via raid: 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
.....
.....
Scsi 1 : VIA RAID 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 install OS Fedora Linux Core 6.0 with normal step.

If users use usb floppy to load driverdisk and install OS, users may meet kernel panic and following error messages after system reboot:

```
switchroot: mount failed: No such file or directory
Kernel panic - not syncing: Attempted to kill init!
Call Trace: <fffff8013222>{panic+134} <fffff8033b85b>{_spi_n_unlock_irq+9}
.....
.....
```

Users can refer following steps to solve it:

- a. Insert the driverdisk to floppy and boot from CD/DVD ROM to start install OS procedure.
- b. Users can see following message and type "linux rescue" to load driver from driverdisk.

```
boot: linux dd updates rescue pci=conf1
```

- c. OS Install shell will ask users "Do you have a driver disk?" → Select "Yes" → Show message "Driver Disk Source" → Select "fd0" (USB Floppy is sda) → Show message "Insert driver Disk" → Select "OK" → Install shell will load the RAID driver from floppy → Show message "More Driver Disks?" → Select "No" → "Choose a Language" → Select "OK" → Show message "Keyboard Type" → Select "OK" → Show message "Update Disk Source" → Select "fd0" (USB Floppy is sdb) → Show message "Update Disk" → Select "OK" → Show message "Setup Networking" → Select "No" → Show message "Rescue" → Select "Continue" → Show message "Rescue Mode" → Select "OK" → System will appear the console command line.

```
sh-3.1#cd /tmp/updates
sh-3.1#cp viamraid_fc6_install_modules.cgz /mnt/sysimage/tmp
sh-3.1#chroot /mnt/sysimage
sh-3.1#cd /tmp
sh-3.1# ./viamraid_fc6_install
```

- d. After new boot image creates successfully, users can reboot system. Boot system with new boot image.

```
title Fedora Linux Core 6
kernel (hd0,0)/boot/vmlinuz ro root=/dev/sda1 vga=789 pci=conf1
initrd (hd0,0)/boot/initrd-2.6.18-1.2798.fc6.img
```

Note: After install OS FC6 complete and system reboot, but system shows abnormal screen. Users can remove the string "rhgb quiet" in grub config file "menu.lst" in path /boot/grub and add one line in file "xorg.conf".

For Example: Content of /etc/X11/xorg.conf

```
Section "Screen"
Identifier "Screen0"
Device      "Videocard0"
Monitor     "Monitor0"
DefaultDepth 24
SubSection "Display"
    Viewport 0 0
    Depth    24
```

Modes "1024x768"
 EndSubSection
 EndSection

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 Fedora Core 6.0.

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	VT5924C-1 (P8M890+VT8237A)
CPU	Intel Pentium4 LAG775 3GHz EMT64
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: Seagate ST3160812AS 160GB Maxtor 6Y080M0 80GB

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.