

VIA Mandriva Linux 2007.1 (x86&x86_64) VT6421(L)/VT8237R/VT8237A/VT8237S/VT8251/CX700 V-RAID V3.00 Driver Installation Guide

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1. Summary

This guide describes how to install the VIA V-RAID driver v3.00 and utility of chipsets VT8237R/VT8237A/VT8237S/VT8251/CX700 (Serial ATA RAID controller) and VT6421(L) (Serial ATA+IDE RAID controller) with Mandriva Linux 2007.1. 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 4 files as described below.

Linux_VRAID_V300_ml2007.1.zip	05-16-07 14:48	3,380,329	V-RAID ML2007.1 driver package
boot-32bit.iso	05-14-07 14:11	2,889,728	boot image for x86 (32 bit) OS
boot-64bit.iso	05-14-07 14:15	3,049,472	boot image for x86_64(64 bit) OS
Readme.doc			this file

3. Install precompiled VIA V-RAID driver binary on an existing Ubuntu 7.04 system with IDE HDD

Before install VIA RAID driver module, users can refer following table to install for VIA SATA/AHCI RAID serial chipset.

Chipset	BIOS Mode Setting	Device ID	Module (viamraid.ko)
VT8237R(Plus)	RAID	0x3149	V
VT8237A	RAID	0x0591	V
VT8237S	RAID	0x7372	V
VT8251	RAID	0x3349	V
VT6421(L)	N/S	0x3249	V
CX700(M/M2)	RAID	0x0581	V

Note: The supported kernel versions of precompiled RAID binary are “2.6.17-13mdvlegacy”, “2.6.17-13mdv (32bit)”, “2.6.17-13mdventerprise” and

“2.6.17-13mdv (64bit)”.

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 package provides VIA pre-compile RAID binary drivers for user installation. Users can use “**viamraid_ml2007.1_install**” shell script to install VIA RAID module to system.

```
#unzip Linux_VRAID_V300_ml2007.1.zip
#cd Linux_VRAID_V300_ml2007.1/raiddriver-V3.00/driverdisk
#cp ml2007.1_v300_DD.img /tmp
#cd /tmp
#mkdir raiddriver
#mount -o loop ml2007.1_v300_DD.img raiddriver
#cd /tmp/raiddriver
#./viamraid_ml2007.1_install
```

After install RAID driver completely, users also can run “**dmesg|tail**” 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 3.00
  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. Users can refer following commands to install it.

```
#rpm -ivh libgtkmm2.4_1-2.10.8-1mdv2007.1.i586.rpm (For 32 bit OS)
#rpm -ivh lib64gtkmm2.4_1-2.10.8-1mdv2007.1.x86_64.rpm (For 64 bit OS)
```

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.

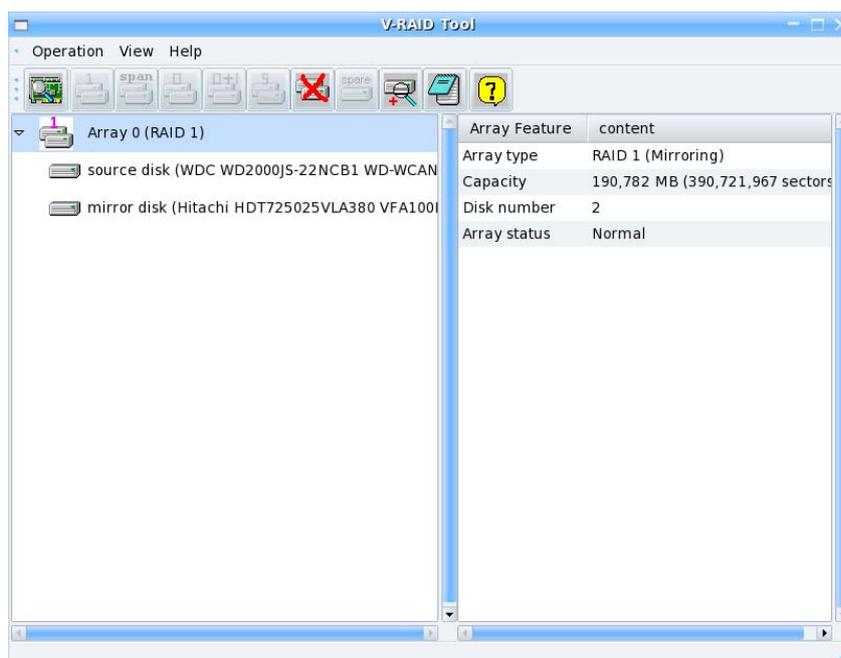
```
#cd Linux_VRAID_V300_ubuntu704/raidtool-V3.00/32-Bit-OS(For 32 bit OS)
#cd Linux_VRAID_V300_ubuntu704/raidtool-V3.00/64-Bit-OS(For 64 bit OS)
#chmod +x install.sh
#./install.sh
```

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**” under /usr/local/bin

```
#viaraid
```



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

Note: When users “Create RAID Array” or “Remove Array” and system shows “Reinstall driver failed” message then RAID utility exit automatically, users need to umount partition of RAID HDD first and run RAID utility again.

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

```
#cd Linux_VRAID_V300_ubuntu704/raidtool-V3.00/32-Bit-OS(For 32 bit OS)
```

```
#cd Linux_VRAID_V300_ubuntu704/raidtool-V3.00/64-Bit-OS(For 64 bit OS)
#chmod +x uninstall.sh
#./uninstall.sh
```

5. Install OS Mandriva Linux 2007.1 upon RAID HDD with VIA pre-compiled driverdisk

A. Prepare driverdisk prior installing OS

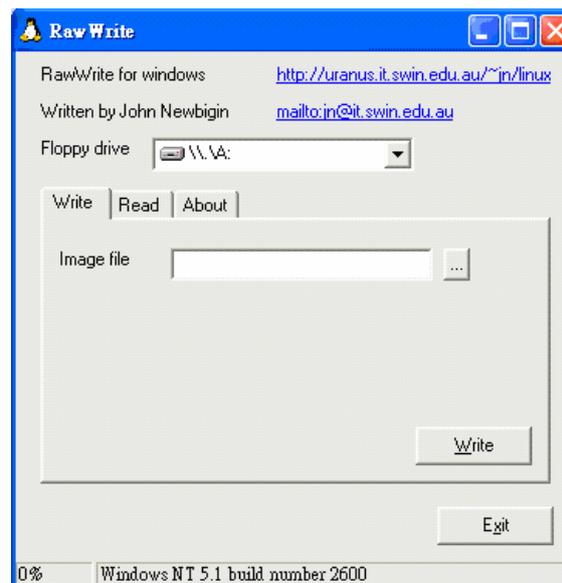
Users can create driverdisk under Window or Linux OS.

- 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 “**ml2007.1_v300_DD.img**” to 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=ml2007.1_v300_DD.img of=/dev/fd0
```

After driverdisk creates completely, users can find 4 directories “**2.6.17-13mdvlegacy**”, “**2.6.17-13mdv-i686**”, “**2.6.17-13mdventerprise**” and “**2.6.17-13mdv**” in floppy disk. The “2.6.17-13mdvlegacy”, “2.6.17-13mdv-i686” and “2.6.17-13mdventerprise” modules are used for x86 CPU type. And “2.6.17-13mdv” module is for x86_64 CPU. Please refer

following detail description.

Folder Name	Description	Module Vermagic
2.6.17-13mdvlegacy	For x86 CPU platform OS install use	2.6.17-13mdvlegacy
2.6.17-13mdv-i686	For x86 CPU platform OS boot use	2.6.17-13mdv
2.6.17-13mdventerprise	For x86 CPU platform OS boot use	2.6.17-13mdventerprise
2.6.17-13mdv	For x86_64 CPU platform OS install and OS boot use	2.6.17-13mdv

B. Install ML2007.1 upon RAID HDD by using driver disk

Note: When install Mandriva 2007.1 with SATA controller VT8237R, VT8251 and VT6421(L), the OS install shell will load default sata_via/ahci module to cause load VIA RAID module fail. To avoid this issue, users can refer following steps.

- a. Burn the file “boot-xxx.iso” to CD-R/RW and boot from it. (xxx: 32bit or 64bit)
- b. When users see message “boot:” appears, users can press button “linux updatemoduls” to start install system procedure.

```
boot: linux updatemoduls
```

- c. After loading VIA RAID Driver complete, users can select item “CDROM drive” to start system rescue procedure.
- d. OS Install shell will show “That CDROM disk does not seem to be a Mandriva Linux Installation CDROM” message, user need to change to Mandriva Installation disk to CD/DVD ROM. Then select “Yes” to continue install Mandriva 2007.1 as normal step until “reboot” screen appears.

Insert the driverdisk to floppy and boot from CD/DVD ROM to start install OS procedure. When OS Install shell appears installation method menu, users can press button “**F3**” → press button “**F5**” → select “**Yes**” → Press button “**Enter**” → Press button “**Enter**” again to install OS.

When user see message “**I can’t mount the selected device ()**”, please press button “**Enter**” to continue to install OS. OS install shell load module from driverdisk.

If driver loaded successfully, user can see the HDD information in other screen. **(Please press button Ctrl+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 V3.00
Vendor: VIA AHCI      Model: RAID 1      Rev:
Type: Direct-Access  ANSI SCSI revision: 00
```

After driver loaded and HDD can be recognized successfully, users can select OS installation method. Users can select item “**CDROM drive**” and install OS Mandriva 2007.1 with normal step until “**reboot**” screen appears.

When “**reboot**” screen appears, users can press button “**Ctrl+Alt+F2**” to switch to console mode again and prepare to create new boot image.

Assume Mandriva 2007.1 is installed to partition sda1 and mount to /mnt

```
#cd /mnt/usr/sbin
#chroot /mnt
#mount /dev/fd0 /mnt
#mount /dev/sda /mnt (Assume device node of USB Floppy is sda)
#cd /mnt
#./viamraid_ml2007.1_install
```

Note: For loading driverdisk from USB Floppy, the device node of USB Floppy maybe sda and SATA HDD is sdb. This may cause kernel panic after system reboot. So users need to revise file “fstab” in /etc and “menu.lst” in /boot/grub then unplug USB Floppy from usb port.

Assume USB Floppy is sda, / is sdb1, swap is sdb2

➤ **Original Content of /etc/fstab:**

```
/dev/sdb1      /          ext3          defaults      1    1
/dev/sdb2      swap       swap          defaults      0    0
None          /media/floppy  supermount  /dev=/dev/sda
```

➤ **Revised Content of /etc/fstab:**

```
/dev/sda1     /          ext3          defaults      1    1
/dev/sda2     swap       swap          defaults      0    0
None          /media/floppy  supermount  /dev=/dev/sdb
```

➤ **Original Content of /boot/grub/menu.lst:**

```
title linux
kernel (hd0,0)/boot/vmlinuz BOOT_IMAGE=linux root=/dev/sdb1
resume=/dev/sdb2 splash=silent vga=791
initrd (hd0,0)/boot/initrd.img
```

➤ **Revised Content of /boot/grub/menu.lst:**

```
title linux
kernel (hd0,0)/boot/vmlinuz BOOT_IMAGE=linux root=/dev/sda1
resume=/dev/sda2 splash=silent vga=791
initrd (hd0,0)/boot/initrd.img
```

After new boot image creates successfully, users can press button “**Ctrl+Alt+F7**” to return to “**reboot**” screen and reboot system. Boot system with new boot image.

If users forget to create new boot image to installed system, users may meet system hang or kernel panic issue after system reboot. Users can refer following steps to rescue it:

- a. Insert the driverdisk to floppy and boot from CD/DVD ROM to start install OS procedure.
- b. When OS Install shell appears installation method menu, users can press button “F3” → press button “F5” → select “Yes” → Press button “Enter” → Select item “Rescue System” → Press “Enter” to start system rescue procedure.
- c. For SATA chipset VT8237R, VT8251 and VT6421(L), users need to boot system with CD-R/RW that burn with “boot-xxx.iso” and type command “linux updatemodules rescue”.

boot: linux updatemodules rescue

- d. When user see message “I can’t mount the selected device ()”, please press button “Enter” to load module from driverdisk.
- e. After loading VIA RAID Driver complete, users can select item “CDROM drive” to start system rescue procedure.
- f. OS Install shell will ask users “Please choose the desired action” → Select “Mount your partitions under /mnt” → System partition will be mounted to /mnt → Press button “Enter” to return menu → Select “Go to console” → System will appear the console command line

Mandriva 2007.1 is mounted to /mnt

```
#cd /mnt/usr/sbin
#chroot /mnt
#mount /dev/fd0 /mnt
#mount /dev/sda /mnt (Assume device node of USB Floppy is sda)
#cd /mnt
#./sata_ahci_ml2007.1_install
```

- g. After running VIA Driver update shell and new boot image creates successfully, users can restart system and boot 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 Mandriva Linux 2007.1.

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.

Note3: For CX700 chipset, users need to add parameter “**irqfixup**” to boot loader config file to avoid “**Disabling IRQ #21**” message.

➤ Test configuration

The following hardware configurations were used for test.

A. VT8237R/VT8237A/VT8237S

Mother Board	EPIA-CN10000 (CN700+VT8237R Plus)
CPU	VIA C7 1.0GHz
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 1.5GHz
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 SATA: Pioneer DVD-RW DVR-212BK
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: Hitachi HDT725025VLA38 250GB Seagate ST350064 500GB 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.