

# VIA Fedora Linux Core 7 (x86/x86\_64) VT8237R/VT8237A/VT8237S/VT8251/VT6421(L) Linux\_SATA/AHCI\_Patch\_Kernel\_2-6-x\_Package\_V130 Installation Guide

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## 1. Summary

This guide describes how to install the precompiled SATA/AHCI patched driver binary, how to patch default SATA/AHCI driver source code and rebuild it for the VT8237R/VT8237A/VT8237S/VT8251 south bridge (Serial ATA controller) and VT6421(L) (Serial ATA/PATA controller) in Fedora Linux Core 7. The information in this document is provided “AS IS,” without guarantee of any kind.

**Note: This patch package doesn't support RAID mode HDD for controllers VT8237R/VT8237A/VT8237S/VT8251/VT6421(L)**

## 2. File descriptions

This package requires 4 files as described below.

fc7-DD.img	06-14-07 10:08	1,474,560	FC7 sata_via/ahci driver disk
sata_via_fc7_V130.patch	06-04-07 15:51	3,355	FC7 sata_via module patch file
ahci_fc7_V130.patch	06-04-07 15:51	431	FC7 ahci module patch file
Readme.doc			this file

## 3. Install precompiled SATA/PATA Patch driver binary on an existing system with IDE HDD

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

Chipset	BIOS Mode Setting	Device ID	Module	
			sata_via.ko (SATA I)	ahci.ko (SATA II)
VT8237R(Plus)	IDE	0x3149	V	
VT8237A	IDE	0x5337	V	
VT8237S	IDE	0x5372	V	
VT8251	IDE	0x5287	V	
	AHCI	0x6287		V

VT6421(L)	N/S	0x3249	V	
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**Note: The kernel version of precompiled SATA/PATA patch binary is “2.6.21-1.3194.fc7 (x86/x86\_64)”. If kernel version of user’s system is not listed above, please refer Section 4 to compile patched driver binary manually.**

The package provides VIA pre-compile binary drivers of sata\_via/ahci for user installation. Users can use “sata\_ahci\_fc7\_install.sh” shell script to install VIA patched SATA/AHCI module to system.

```
#mkdir 1
#mount -o loop fc7-DD.img 1
#cd 1
#. /sata_ahci_fc7_install.sh
```

Users also can run “dmesg|tail” command to check the SATA/PATA HDD is workable or not.

```
Vendor: ATA      Model: WDC WD800JD-60LU Rev: 07.0
Type:   Direct-Access          ANSI SCSI revision: 05
SCSI device sda: 156301488 512-byte hdwr sectors (80026 MB)
SCSI device sda: drive cache: write back
SCSI device sda: 156301488 512-byte hdwr sectors (80026 MB)
SCSI device sda: drive cache: write back
sda: sda1
```

#### 4. Compile module with VIA’s Patch file

Users can also compile the driver manually. Please refer the following steps.

- A. Download the OS kernel source package of FC7 and install it

Users can download the kernel package in following path:

<http://limestone.uoregon.edu/ftp/fedora/linux/7/Fedora/source/SRPMS/kernel-2.6.21-1.3194.fc7.src.rpm>

```
#rpm -ivh kernel-2.6.21-1.3194.fc7.src.rpm
#cd /usr/src/redhat/SPECS
#rpmbuild -bp --target $(arch) kernel-2.6.spec
#cd /usr/src/redhat/BUILD/kernel-2.6.21
#mv linux-2.6.21.xxx /usr/src (xxx: i686 or x86_64)
```

- B. Install kernel header package

Users can refer following table to install suitable package depend on the CPU type of system. And these packages can be found in installation CD/DVD disks or the download link

➤ **For x86:**

<http://limestone.uoregon.edu/ftp/fedora/linux/7/Fedora/i386/os/Fedora/kernel-devel-2.6.21-1.3194.fc7.i686.rpm>

➤ **For x86\_64:**

[http://limestone.uoregon.edu/ftp/fedora/linux/7/Fedora/x86\\_64/os/Fedora/kernel-devel-2.6.21-1.3194.fc7.x86\\_64.rpm](http://limestone.uoregon.edu/ftp/fedora/linux/7/Fedora/x86_64/os/Fedora/kernel-devel-2.6.21-1.3194.fc7.x86_64.rpm)

OS	Kernel source or header Package Name	CPU Type
Fedora Core Linux 7	kernel-devel-2.6.21-1.3194.fc7.i686	x86
	kernel-devel-2.6.21-1.3194.fc7.x86_64	x86_64

```
#rpm -i vh kernel-devel-2.6.xxx.rpm
```

### C. Patch the os default SATA & AHCI Driver with VIA patch file

Users can find the kernel source directory in path /usr/src and copy “sata\_via.c” and “ahci.c” to path /tmp/viapatch.

```
#cd /usr/src/linux-2.6.21.xxx/driver/scsi (xxx: i686 or x86_64)
#mkdir /tmp/viapatch -p
#cp sata_via.c /tmp/viapatch
#cp ahci.c /tmp/viapatch
#cp scsi.h /tmp/viapatch
#cp scsi_typedefs.h /tmp/viapatch
#cp sata_via_fc7_V130.patch /tmp/viapatch
#cp ahci_fc7_V130.patch /tmp/viapatch
#cd /tmp/viapatch
#patch<sata_via_fc7_V130.patch
#patch<ahci_fc7_V130.patch
```

If patch was successful, users can find the following message.

```
Patching file sata_via.c
Patching file ahci.c
```

### D. Create a Makefile and prepare to compile it

Users can create a Makefile in path /tmp/viapatch.

➤ **File content of Makefile:**

```
#begin
KERNVER = `uname -r`
KERNELDIR = /lib/modules/$(KERNVER)/build
obj-m := sata_via.o ahci.o
PWD := $(shell pwd)
all:
    $(MAKE) -C $(KERNELDIR) SUBDIRS=$(PWD) modules
#end
```

After creating Makefile and patching successfully, users can compile the sata\_via and ahci modules.

```
#cd /tmp/vi apatch
#make
```

If drivers compile completed, users can find modules “sata\_via.ko” and “ahci.ko” in directory viapatch. And copy the two modules to system.

```
#cd /lib/modules/`uname -r`/kernel/drivers/ata
#mv sata_via.ko sata_via.ko.orig
#mv ahci.ko ahci.ko.orig
#cp /tmp/vi apatch/sata_via.ko .
#cp /tmp/vi apatch/ahci.ko .
#depmod -a
```

#### E. Load Patched SATA and AHCI module

After copying the patched SATA and AHCI module to /lib/modules/`uname -r`/kernel/drivers/ata, users can load the modules directly.

```
#rmmod ahci
#rmmod sata_via
#modprobe libata
#modprobe ahci
#modprobe sata-via
```

### 5. Verify the success of installation

Run the following commands to verify if the device works, assuming there is a “test.txt” file in SATA/PATA Hard Disk which is mounted at /HDD.

```
# 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 SATA/PATA Hard Disk should work properly.

SATA Controller Tested HDD	VT6421(L)	VT8237R	VT8237A	VT8237S	VT8251
SATA1 HDD	PASS	PASS	PASS	PASS	PASS
SATA2 HDD	PASS	PASS	PASS	PASS	PASS
SATA3 HDD	N/S	N/S	N/S	N/S	PASS
SATA4 HDD	N/S	N/S	N/S	N/S	PASS
PATA HDD1	PASS	N/S	N/S	N/S	N/S
PATA HDD2	PASS	N/S	N/S	N/S	N/S

Note: VT8237R/VT8237A/VT8237S supports 2 SATA ports.

VT8251 supports 4 SATA ports.

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

## 6. Install OS FC7 with VT8237R/VT8237A/VT8237S/VT8251 SATA and VT6421(L) SATA/PATA HDD

**Note: Due to chipset VT8237R/VT8237A/VT6421 had built-in with default driver “sata\_via”, so users can install OS Fedora Core 7 upon VT8237R/VT8237A/VT6421(L) SATA/PATA controller directly without driverdisk.**

A. Change the SATA Controller Mode to [IDE] in BIOS with VIA Southbridge VT8237R/VT8237A/VT8237S and VT8251.

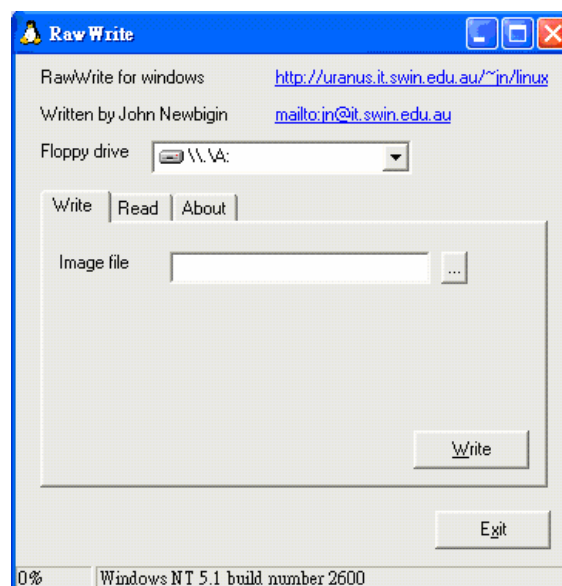
B. Prepare driverdisk to install Fedora Linux Core 7

➤ 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 “**fc7-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=fc7-DD.img of=/dev/fd0
```

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

C. Use the driver disk to install new OS

Insert the driverdisk to floppy and boot from CD/DVD ROM to start install OS procedure. When OS install screen appears, users can press button “ESC” to return to console mode. Users can enter “**linux dd updates**” to load driver from driverdisk.

```
boot: linux dd updates
```

OS Install shell will ask users “Do you have a driver disk?” → Select “**Yes**” → Show message “Driver Disk Source” → Select “**fd0**” → Show message “Insert driver Disk” → Select “**OK**” → Install shell will load the SATA driver from floppy → Show message “More Driver Disks?” → Select “**No**” → Show message “CD Found” → Select “**Skip**” → Show message “Update disk Source” → Select “**fd0**” → Show message “Updates Disk” → Select “**OK**”

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

```
sata_via 0000:05:08.0: version 2.1
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
.....
.....
scsi0 : sata_via
ata3: dev 0 cfg 49:2f00 82:346b 83:7d01 84:5823 85:3469 96:3c01 87:4023
88:003f
ata3: dev 0 ATA-6, max UDMA/100, 78165360 sectors: LBA48
ata3: dev 0 configured for UDMA/100
scsi2 : sata_via
Vendor: ATA          Model: ST340014A      Rev: 8.01
Type: Direct-Access  ANSI SCSI revision: 05
```

After driver loaded and HDD can be recognized successfully, users can install OS Fedora Linux Core 7 with normal step.

**Note: After install OS FC7 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”.

**Ex. Content of /etc/X11/xorg.conf:**

```
Section "Screen"
Identifier "Screen0"
Device      "Videocard0"
Monitor     "Monitor0"
DefaultDepth      24
SubSection "Display"
    Viewport      0 0
    Depth         24
    Modes         "800x600"
EndSubSection
EndSection
```

## ➤ Test configuration

The following hardware configurations were used for test.

### A. VT6421(L)

Mother Board	EPIA-CN10000(CN700+VT8237R Plus+VT6421L)
CPU	VIA C7 1.0GHz
S-ATA/PATA HDD	SATA: Hitachi HDT72502 250GB (SATA II) SATA: Pioneer DVD-RW DVR-212BK
IDE HDD	Maxtor 6B120P0 120GB

### B. VT8237R/VT8237A/VT8237S

Mother Board	EPIA-CN10000(CN700+VT8237R Plus)
CPU	VIA C7 1.0GHz
S-ATA/PATA HDD	SATA: Hitachi HDT72502 250GB (SATA II) SATA: Pioneer DVD-RW DVR-212BK
IDE HDD	Maxtor 6B120P0 120GB

Mother Board	VT5935C-4 (CN896+VT8237A)
CPU	VIA C7 1.5GHz
S-ATA/PATA HDD	SATA: Hitachi HDT72502 250GB (SATA II) SATA: Pioneer DVD-RW DVR-212BK
IDE HDD	Maxtor 6B120P0 120GB

Mother Board	VT8498B-1 (K8M890+VT8237S)
CPU	AMD Athlon 64 Dual Core 4200+
S-ATA/PATA HDD	SATA: Hitachi HDT72502 250GB (SATA II) SATA: Pioneer DVD-RW DVR-212BK
IDE HDD	Maxtor 6B120P0 120GB

### C. VT8251

Mother Board	VT8435B-1 (K8M890+VT8251)
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CPU	AMD Athlon 64 Dual Core 4000+
S-ATA/PATA HDD	SATA: Hitachi HDT72502 250GB (SATA II) SATA: Pioneer DVD-RW DVR-212BK
IDE HDD	Maxtor 6B120P0 120GB