

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

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_v i a.ko sata_v i a.ko.ori g
#mv ahci . ko ahci . ko.ori g
#cp /tmp/vi apatch/sata_v i a.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_v i a
#modprobe libata
#modprobe ahci
#modprobe sata-v i a
```

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 /
# di ff /text.txt /HDD/test.txt
```

If there shows nothing after running the “di ff” 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
.....
.....
scsi 0 : 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
scsi 2 : 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