

# VIA Debian Linux 4.0r0 (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 Debian 4.0r0. 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.

Debian4.0r0_DD. i mg	04-18-07 18: 49	1, 474, 560	Debian4. 0r0 sata_v i a/ahci dri ver di sk
sata_v i a_Debian4.0r0_V130. patch	02-12-07 10: 35	9, 339	Debian4. 0r0 sata_v i a modul e patch fi le
ahci _Debian4.0r0_V130. patch	02-12-07 10: 36	469	Debian4. 0r0 ahci modul e patch fi le
Readme. doc			thi s fi le

## 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	

The package provides VIA pre-compile binary drivers of sata\_via/ahci for user installation. Users can use “sata\_ahci\_Debian40r0\_install” shell script to install VIA patched SATA/AHCI module to system.

```
#mkdir 1
#mount -o loop Debian40r0_DD.img 1
#cd 1
#. /sata_ahci_Debian40r0_install
```

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 patched module with VIA’s Patch file

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

- A. Install the OS kernel source and header package of Debian 4.0r0

Users can install the kernel source package by apt update method.

OS	Kernel source/header Package Name	CPU Type
Debian 4.0r0	linux-source-2.6.18	x86/x86_64
	linux-headers-2.6.18-4-686	x86
	linux-headers-2.6.18-4-k7	x86
	linux-headers-2.6.18-4-amd64	x86_64

```
#apt-get update
#apt-get install linux-source-2.6.18
#apt-get install linux-headers-2.6.18-`uname -r`
```

- B. Patch the OS default SATA & AHCI Driver with VIA patch file

Users can install the kernel source first and copy “sata\_via.c” and “ahci.c” to path /tmp/viapatch to compile them.

```
#cd /usr/src
#tar xvf linux-source-2.6.18.tar.bz2
#cd /usr/src/linux-source-2.6.18/driver/scsi
#mkdir /tmp/viapatch -p
#cp sata_via.c /tmp/viapatch
```

```
#cp ahci.c /tmp/vi apatch
#cp scsi.h /tmp/vi apatch
#cp scsi_typedefs.h /tmp/vi apatch
#cp sata_via_Debian40r0_V130.patch /tmp/vi apatch
#cp ahci_Debian40r0_V130.patch /tmp/vi apatch
#cd /tmp/vi apatch
#patch< sata_via_Debian40r0_V130.patch
#patch< ahci_Debian40r0_V130.patch
```

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

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

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

Users can create Makefile in path /tmp/vi apatch.

```
> 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 vi apatch. And copy the two modules to system.

```
#cd /lib/modules/`uname -r`/kernel/drivers/scsi
#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
```

### D. Load Patched SATA and AHCI module

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

```
#modprobe libata
```

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

## 5. Install OS Debian 4.0r0 on VT6421 PATA and VT8237R/VT8237A/VT8237S/VT8251 SATA HDD with VIA pre-compiled driverdisk

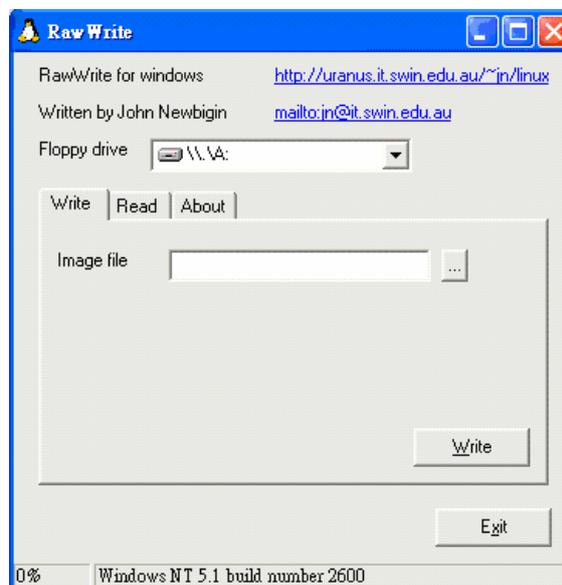
**Note: Due to chipset VT8237R/VT6421 had built-in with default driver “sata\_via”, so users can install OS Debian 4.0r0 upon VT8237R/VT6421(L) SATA controller directly without any driverdisk.**

### A. Prepare driverdisk

Users can create driverdisk under Window or Linux OS.

#### ➤ For window OS users:

Utility “**rawwritewin.exe**” can create driverdisk and it can be found on DVD/CD ROM disk. Users can copy driverdisk image “**Debian40r0\_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=Debian40r0_DD.img of=/dev/fd0
```

After driverdisk creates completely, users can find 5 directories “**486**”, “**686**”, “**686-bigmem**”, “**k7**” and “**x86\_64**” in floppy disk. The 486, 686,

686-bigmem and k7 modules are used for x86 CPU type. And x86\_64 module is for x86\_64 CPU. Please refer following detail description.

Folder Name	Description	Module Vermagic
486	For x86 CPU platform OS install use	2.6.18-4-486
686	For x86 CPU platform OS boot use	2.6.18-4-686
686-bigmem	For x86 CPU platform OS boot use	2.6.18-4-686-bigmem
k7	For x86 CPU platform OS boot use	2.6.18-4-k7
x86_64	For x86_64 CPU platform OS install and OS boot use	2.6.18-4-amd64

B. Install Debian 4.0r0 on VT6421(L) PATA and VT8237R/VT8237A/VT8237S/VT8251 SATA HDD

Insert the driverdisk to floppy and boot from CD/DVD ROM to start install OS procedure. Until OS Install shell appear “**Choose Language**” screen, please press button “**Ctrl+Alt+F2**” to switch to console mode. Users can refer following commands to load module from driverdisk.

```
#modprobe fat
#modprobe vfat
#mount /dev/sda /floppy (Only for USB Floppy)
#mount /dev/fd0 /floppy
#cp /floppy/* /tmp -rf
#sync
#umount /floppy (Only for USB Floppy)
#modprobe usb-storage -r (Only for USB Floppy)
#cd /tmp
#. /sata_ahci_Debian40r0_install
```

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

```
sata_via 0000:05:08.0: version 1.1
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 press button “**Ctrl+Alt+F1**” to return to “**Choose Language**” screen and install OS

Debian 4.0r0 with normal step until “**Finish the installation**” screen appears.

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

```
Assume Debian 4.0r0 installed to partition sda1 and mount to /target
#chroot /target
#mount /dev/fd0 /mnt
#mount /dev/sdb /mnt (Only for USB Floppy)
#cd /mnt
#. /sata_ahci_Debian40r0_install
```

After new boot image creates successfully, users can press button “**Ctrl+Alt+F1**” to return to “**Finish the installation**” screen and select “**Continue**” restart 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 driver disk to floppy and boot from CD/DVD ROM to start install OS procedure.
- b. When users see message “**Press F1 for help, or ENTER to boot:**” appears, users can type command “**rescue**” to start system rescue procedure.

```
Press F1 for help, or ENTER to boot: rescue
```

- c. Refer the **Section 5.B “For installing Debian 4.0r0”** part to load VIA Patched SATA/AHCI Driver first.
- d. After loading VIA Patched SATA/AHCI 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 “**Debian installer main menu**” → Select “**Execute a shell**” → Select “**Continue**” → System will appear the console command line

```
Assume Debian 4.0r0 is installed to partition /dev/sda1
#mkdir /target
#mount /dev/sda1 /target
#chroot /target
#mount /dev/fd0 /mnt
#mount /dev/sdb /mnt (Only for USB Floppy)
#cd /mnt
#. /sata_ahci_Debian40r0_install
```

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

## 6. Test configuration

The following hardware configurations were used for test.

### A. VT6421(L)

Mother Board	EPIA-CN13000(CN700+VT8237R Plus+VT6421L)
CPU	VIA C7 1.3GHz
S-ATA/PATA HDD	PATA: Quantum LM15000AT 15GB
IDE HDD	Seagate ST340014A 40GB

### B. VT8237R/VT8237A/VT8237S

Mother Board	EPIA-CN13000(CN700+VT8237R Plus)
CPU	VIA C7 1.3GHz
S-ATA/PATA HDD	SATA: WDC WD2000JS-22N 200GB (SATA II)
IDE HDD	Seagate ST340014A 40GB

Mother Board	VT5935C-4 (CN896+VT8237A)
CPU	VIA C7 1.5GHz
S-ATA/PATA HDD	SATA: WDC WD2000JS-22N 200GB (SATA II)
IDE HDD	Seagate ST340014A 40GB

Mother Board	VT8498B-1 (K8M890+VT8237S)
CPU	AMD Athlon 64 Dual Core 4200+
S-ATA/PATA HDD	SATA: Seagate 6Y080M0 80GB (SATA II)
IDE HDD	Seagate ST340014A 40GB

### C. VT8251

Mother Board	VT8435B-1 (K8M890+VT8251)
CPU	AMD Athlon 64 Dual Core 4000+
S-ATA/PATA HDD	SATA: WDC WD2000JS-22N 200GB (SATA II)
IDE HDD	Seagate ST340014A 40GB