

VIA Ubuntu Linux 7.04 (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 Ubuntu Linux 7.04. The information in this document is provided “AS IS,” without guarantee of any kind.

Note1: This patch package doesn't support RAID mode HDD for controllers VT8237R/VT8237A/VT8237S/VT8251/VT6421(L).

Note2: To avoid the user account permission issue, following commands in this document all run with super user “root”.

2. File descriptions

This package requires 4 files as described below.

ubuntu7.04_DD.img	05-03-07 20:57	1,474,560 Ubuntu 7.04 sata_via/ahci driver disk
sata_via_ubuntu7.04_V130.patch	05-02-07 14:57	3,387 Ubuntu 7.04 sata_via module patch file
ahci_ubuntu7.04_V130.patch	05-02-07 15:00	421 Ubuntu 7.04 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	

Note: The kernel versions of precompiled SATA/PATA patch binary are “2.6.20-15-386(x86)”, “2.6.20-15-generic (x86/x86_64)” and “2.6.20-15-server (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_ubuntu7.04_install**” shell script to install VIA patched SATA/AHCI module to system.

```
#mkdir 1
#mount -o loop ubuntu7.04_DD.img 1
#cd 1
#./sata_ahci_ubuntu7.04_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 Ubuntu 7.04

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

OS	Kernel source/header Package Name	CPU Type
Ubuntu 7.04	linux-source-2.6.20	x86/x86_64
	linux-headers-2.6.20-15-386	x86
	linux-headers-2.6.20-15-generic	x86/x86_64
	linux-headers-2.6.20-15-server	x86/x86_64

```
#apt-get update
#apt-get install linux-source-2.6.20
#apt-get install linux-headers-`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-2.6.20.tar.bz2
#cd /usr/src/linux-source-2.6.20/driver/scsi
#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_ubuntu7.04_V130.patch /tmp/viapatch
#cp ahci_ubuntu7.04_V130.patch /tmp/viapatch
#cd /tmp/viapatch
#patch< sata_via_ubuntu7.04_V130.patch
#patch< ahci_ubuntu7.04_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/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/viapatch
#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/scsi
#mv sata_via.ko sata_via.ko.orig
#mv ahci.ko ahci.ko.orig
#cp /tmp/viapatch/sata_via.ko .
#cp /tmp/viapatch/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 Ubuntu 7.04 upon VT6421 and VT8237R/VT8237A/VT8237S/VT8251 SATA HDD with VIA pre-compiled driverdisk

Note: Due to chipset VT8237R/VT8237A/VT6421 had built-in with default driver “sata_via”, so users can install OS Ubuntu 7.04 upon VT8237R/VT8237A/VT6421(L) SATA/PATA controller directly without any driverdisk.

A. Prepare driverdisk

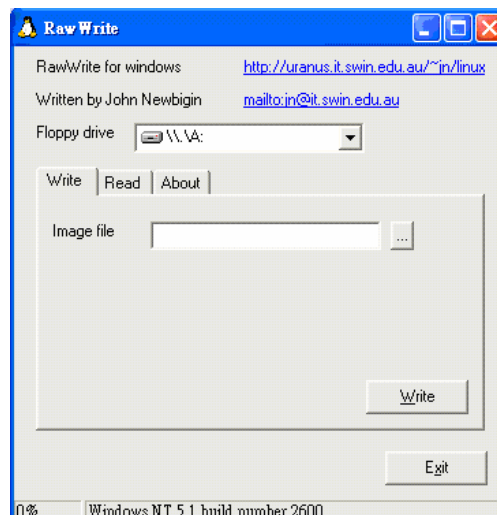
Users can create driverdisk under Window or Linux OS.

➤ For window OS users:

Utility “**rawwritewin.exe**” can create driverdisk and it can be found in following download link

<http://www.chrysocome.net/downloads/rawwritewin-0.4.zip>.

Users can copy driverdisk image “**ubuntu7.04_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=ubuntu7.04_DD.img of=/dev/fd0
```

After driverdisk creates completely, users can find directories “**2.6.20-15-386**”, “**2.6.20-15-generic**” and “**2.6.20-15-server**” in floppy disk. The 2.6.20-15-generic and 2.6.20-15-server modules are used for x86/x86_64 CPU type. And 2.6.20-15-386 module is for x86 CPU. Please refer following detail description.

Folder Name	Description	Module Vermagic
2.6.20-15-386	For x86 CPU platform OS boot use	2.6.20-15-386
2.6.20-15-generic	For x86/x86_64 CPU platform OS install and OS boot use	2.6.20-15-generic
2.6.20-15-server	For x86/x86_64 CPU platform OS boot use	2.6.20-15-server

- B. Install Ubuntu 7.04 Desktop/alternate upon VT8237S/VT8251 SATA HDD by using driver disk

Note: If users install OS Ubuntu 7.04 with SATA DVD-ROM, it is recommended to install the Ubuntu 7.04 alternate version.

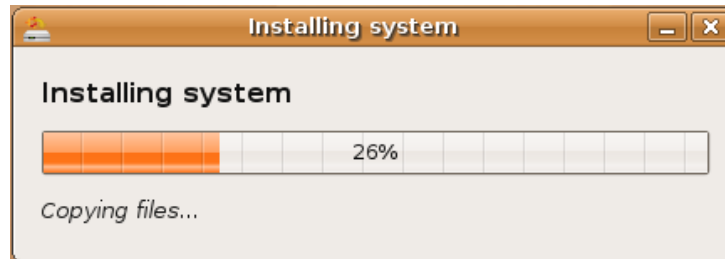
- For installing Ubuntu 7.04 Desktop Version users:

Due to the Ubuntu 7.04 Desktop Version is a Live CD. System can boot into Ubuntu OS with the Live CD first then load VIA SATA/AHCI patched Driver manually to recognize SATA HDD. Please refer following commands to load VIA SATA/AHCI patched Driver.

```
#modprobe sata_via -r
#modprobe ahci -r
#modprobe ext2
#mount /dev/fd0 /mnt
#mount /dev/sdx /mnt (For USB Floppy, sdx maybe sda, sdc or sdc...)
#cp /mnt/* /tmp -rf
#umount /mnt
#modprobe usb-storage -r (For USB Floppy)
#modprobe libata
#insmod /tmp/x86/2.6.20-15-generic/sata_via.ko (For x86 CPU)
#insmod /tmp/x86/2.6.20-15-generic/ahci.ko (For x86 CPU)
#insmod /tmp/x86_64/2.6.20-15-generic/sata_via.ko (For x86_64 CPU)
#insmod /tmp/x86_64/2.6.20-15-generic/ahci.ko (For x86_64 CPU)
```

After driverdisk creates completely, users can prepare to install new system upon SATA HDD by double click “**install**” icon. And install OS Ubuntu Linux 7.04 with normal step until system “**Installation complete**” message

appeared.



When “**Installation complete**” message appeared, users can run following commands to copy VIA SATA/AHCI patched Driver to installed system.

```
#chroot /target
#mount /dev/fd0 /mnt
#mount /dev/sdx /mnt (For USB FI oppy, sdx maybe sda, sdc or sdc...)
#. /sata_ahci_ubuntu7.04_install
```

After updating VIA RAID Driver to installed system, users can press button “**Restart Now**” to restart system.

- For installing Ubuntu 7.04 alternate Version users:

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 ext2
#mount /dev/sda /floppy (Only for USB FI oppy)
#mount /dev/fd0 /floppy
#cp /floppy/* /tmp -rf
#sync
#cd /tmp
#umount /floppy
#modprobe usb-storage -r (Only for USB FI oppy)
#. /sata_ahci_ubuntu7.04_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
.....
.....
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
```

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 Ubuntu 7.04 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 Ubuntu 7.04 install 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_ubuntu7.04_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:

- Insert the driver disk to floppy and boot from **Ubuntu 7.04 alternate** CD ROM to start install OS procedure.
- When installation menu appeared, Users can select item “**Rescue a broken system**” to boot.
- Refer the **Section 5.B “For installing Ubuntu 7.04 alternate Version users”** part to load VIA Patched SATA/AHCI Driver first.
- After loading VIA Patched SATA/AHCI Driver complete, users can press button “**Alt+F1**” to return to rescue mode screen.
- OS Install shell will ask users “**Choose language**” → Select “**Go Back**” → Show message “**Ubuntu installer main menu**” → Select “**Execute a shell**” → Select “**Continue**” → System will appear the console command line

```
Assume Ubuntu 7.04 is installed to partition /dev/sda1
#mkdir /target
#mount /dev/sda1 /target
#chroot /target
#mount /dev/fd0 /mnt
#cd /dev (Only for USB Floppy)
#mknod /dev/sdb b 8 16 (Only for USB Floppy)
#mount /dev/sdb /mnt (Only for USB Floppy)
#cd /mnt
#./sata_ahci_ubuntu7.04_install
```

- 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: Seagate ST340014A 40GB SATA: Pioneer DVD-RW DVR-212BK
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 WD2000FS-22N 200GB (SATA II) SATA: Pioneer DVD-RW DVR-212BK
IDE HDD	Seagate ST340014A 40GB

Mother Board	VT5935C-4 (CN896+VT8237A)
CPU	VIA C7 1.5GHz
S-ATA/PATA HDD	SATA: WDC WD2000FS-22N 200GB (SATA II) SATA: Pioneer DVD-RW DVR-212BK
IDE HDD	Seagate ST340014A 40GB

Mother Board	VT8498B-1 (K8M890+VT8237S)
CPU	AMD Athlon 64 Dual Core 4200+
S-ATA/PATA HDD	SATA: WDC WD2000FS-22N 200GB (SATA II) SATA: Pioneer DVD-RW DVR-212BK
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 WD2000FS-22N 200GB (SATA II) SATA: Pioneer DVD-RW DVR-212BK
IDE HDD	Seagate ST340014A 40GB