

# **HPT374 UDMA/ATA133 RAID Controller**

## **SuSE Linux**

### **Installation Guide**

Version 2.13

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# 1 Overview

The purpose of this document is to provide clear instructions on how to install and use HPT374 UDMA/ATA133 RAID Controller on SuSE Linux 7.1/7.3/8.0/8.1/8.2 system.

## 2 Installing SuSE Linux on HPT374 Controller

If you would like to install SuSE Linux onto drives attached to HPT374 controller, please perform the following operations:

### Step 1 Prepare Your Hardware for Installation

After you attach your hard disks to HPT374 controller, you can use HPT374 BIOS Setting Utility to configure your hard disks as RAID arrays, or just use them as single disks.

Before installation, you must remove all the disk drives, which are not physically attached to HPT374 controller, from your system.

#### Note

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If you have other SCSI adapters installed, you must make sure the HPT374 controller BIOS will be loaded firstly. If not, try to move it to another PCI slot. Otherwise you may be unable to boot up your system.

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### Step 2 Check System BIOS Settings

In your system BIOS SETUP menu, change **Boot Sequence** in such a way that the system will first boot from floppy or CDROM, and then from SCSI. Refer to your BIOS manual to see how to set boot sequence.

If your BIOS settings do not support such a boot sequence, you can first set it to boot from floppy or CDROM. After you finish installation, set SCSI as the first boot device to boot up the system.

### Step 3 Prepare the Driver Diskette

The driver diskette is provided as an image file (susedd.img).

On a DOS or Windows system, you can make the driver diskette using rawrite.exe. It can be found on the SuSE Linux CD (under /dosutils). Just run it under a command window and follow its prompt.

On a Linux system, you can use the “dd” command to make the driver diskette. Insert a floppy disk into the floppy drive and type the command:

```
# dd if=susedd.img of=/dev/fd0
```

## Step 4 Install SuSE Linux

- 1) Start installing by booting from SuSE installation CD.
- 2) When CD boots, you need to press a key to update driver and select Installation option. For SuSE 8.x, press Alt; For SuSE9.0, press F3; For SuSE Linux 9.1/9.2, press F6 to load the driver; For SuSE 9.3/10.0, press F5.
- 3) Insert the Driver Disk when it displays "Please insert the Driver Update floppy".
- 4) For SuSE 8.1 SMP Installation type "**acpi=off**" and then press "**enter**"; for SuSE 8.2/9.0 Installation type "**hde=noprobe hdf=noprobe hdg=noprobe hdh=noprobe hdi=noprobe hdj=noprobe hdk=noprobe hdl=noprobe**" and then press "**enter**"; for SuSE 8.1 just press "**enter**".

***Note 1:** The kernel parameters, "**hdx=noprobe**", are used to prevent the kernel from loading the default hpt chip IDE driver. When your system has other IDE interfaces supported by Linux, you may need to modify "**hdx=noprobe**" according to your hardware configuration.*

***Note 2:** If you have more than 2 HPT374 controllers on your system, the Linux kernel may be unable to probe onboard IDE controller, and this will cause the CD-ROM to be inaccessible. You can try to add "**ide0=0x1f0,0x3f6,14 ide1=0x170,0x376,15**" in the boot parameters.*

- 5) If you are not installing SuSE 9.0, just skip this step. When Diver Update Menu pop-up, press "OK" and "back" for back to installer.
- 6) Continue the installation as normal. You can refer to SuSE Linux documents about OS installation.

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### Additional Installation Notes

1. The system device mapping order is the same as the order shown in HPT374 BIOS Setting Utility. If you have no other SCSI adapters installed, the device marked as "BOOT" or "HDD0" will be /dev/sda, "HDD1" will be /dev/sdb, "HDD2" will be /dev/sdc, etc. When creating mount points, you must mount /boot on /dev/sda.
2. For SuSE 8.2, if you choose GRUB as boot loader, it's recommended to create a separate partition for /boot. Otherwise the GRUB installation may fail.
3. The driver may work incorrectly on some specific motherboard, such as DFI77B VIA KT400. You can type "**acpi=off**" when a prompted label "**boot:**" appears. When "**Error occurred while installing GRUB**" dialog appears, you can change boot loader from GRUB to LILO.
4. On some motherboard, if multiple IDE controller is built on it, the hard drive on HPT374 will not detected as hde, hdf, and etc. So it is necessary to change **hdx=noprobe** at the same time. Especially for SuSE10.0, If you are installing

OS on the HPT374 chip, update the file  
/linux/suse/ARCH-VERSION/install/update.post2 on the driver disk is  
necessary, too.

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## 3 Installing HPT374 Driver on an Existing System

If you are currently running Linux and would like to access drives or arrays attached to the HPT374 controller, you can perform the following steps.

### Note

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If you use a SCSI adapter to boot your system, you must make sure the HPT374 controller BIOS will be loaded after that adapter's BIOS. If not, try to move it to another PCI slot. Otherwise you may be unable to boot up your system.

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### Step 1 Update Grub

If you are currently running **SuSe Linux 7.1/7.3/8.0/8.1up System**, just go to Step 2. If you are currently running **SuSE Linux 8.1 SMP System**, you must update /boot/grub/menu.lst first.

E.g.

```
default=0
timeout=8
title Linux
    kernel (hd0,1)/vmlinuz root=/dev/hda1 acpi=off
    initrd (hd0,1)/initrd
```

If you are currently running **SuSE Linux 8.2**, you must update /boot/grub/menu.lst first.

E.g.

```
default=0
timeout=8
title Linux
    kernel (hd0,1)/vmlinuz root=/dev/hda1 hde=noprobe
hdf=noprobe hdg=noprobe hdh=noprobe hdi=noprobe hdj=noprobe
hdk=noprobe hdl=noprobe
    initrd (hd0,1)/initrd
```

**Note:** The kernel parameters, "**hdx=noprobe**", are used to prevent the kernel from loading the default hpt chip IDE driver. When your system has other IDE interfaces supported by Linux, you may need to modify "**hdx=noprobe**" according to your hardware configuration.

For SuSE Linux 10.0, you must update the initrd file to prevent hpt366 module to detect the hard drive on the HPT374, please skip 1 and 3, and do the Step 2 and Step 4.

Then reboot the system to make new kernel parameter take effect.

### Step 2 Install the Driver Module

The driver modules are packed in file /linux/suse /**[arch]**-**[version]**/install/update.tar.gz

on the driver diskette. The following example shows how to extract the driver modules for SuSE 8.2 from driver diskette:

```
# mount /dev/fd0 /mnt/floppy
# cd /
# tar xzf /mnt/floppy/linux/suse/i386-8.2/install/update.tar.gz
```

The driver modules will be extracted to directory  
/lib/modules/[*kernel-ver*]/kernel/drivers/scsi/ (or /lib/modules/[*kernel-ver*]/scsi/ for  
kernel 2.2).

### Step 3 Test the Driver Module

You can test out the module to ensure that it works for your system by changing working directory to the location where hpt374.o resides and typing in the command "**insmod hpt374.o**".

Sometimes insmod will report "**unresolved symbols**" when you attempt to load the module. This can be caused by two ways:

1) If your system is using a kernel, which has not built-in SCSI support, you must load the SCSI module before load hpt374.o. Try to load SCSI modules first.

E.g.           # **insmod scsi\_mod**  
              # **insmod sd\_mod**  
              # **insmod hpt374.o**

2) If you recompile the kernel with SCSI support and still receive the "**unresolved symbols**" error, it may be caused that you have configured symbol versioning in kernel. To correct it, recompile the kernel with symbol versioning not configured. Please refer to the kernel documents for more information.

To ensure the module has been loaded successfully, you can check the driver status by typing in the command "**cat /proc/scsi/hpt374/x**", where x is the filename you found under /proc/scsi/hpt374/. You should see the driver banner and a list of attached drives. You can now access the drives as a SCSI device (the first device is /dev/sda, then /dev/sdb, etc.).

#### Example

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You have configured a RAID 0/1 array using 4 disks. It will be registered to system as device /dev/sda. You can use "**fdisk /dev/sda**" to create a partition on it, which will be /dev/sda1, and use "**mkfs /dev/sda1**" to setup a file system on the partition. Then you can mount /dev/sda1 to somewhere to access it.

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### Step 4 Configure System to Automatically Load the Driver

Most likely, you will not want to type in "**insmod hpt374.o**" each time you boot up the system. Therefore you must inform the system when to load the module.

Most likely, you will not want to type in "**insmod hpt374.o**" each time you boot up the system. You can add the driver to the initial RAM disk image to load the driver at boot time:

- 1) Backup the initial RAM disk at first.

```
#mv /boot/initrd-`uname -r` /boot/initrd-`uname -r`.backup
```

- 2) Edit file /etc/sysconfig/kernel and add hpt374 module to the line  
INITRD\_MODULES=..., e.g:

```
INITRD_MODULES="piix hpt374 hpt366"
```

- 3) Run mkinitrd to update the initrd file:

```
#depmod -a  
#mkinitrd
```

If you install the driver onto SuSE Linux 10.0, do the flowing additional step.

```
#mkdir -p /tmp/initrd  
  
#cd /tmp/initrd  
  
#gzip -dc /boot/initrd-`uname -r` |cpio -idumv  
  
#echo -e "install ide-disk modprobe -r ide-core; modprobe ide-core;  
modprobe --ignore-install ide-disk" >>etc/modprobe.conf.local  
  
#echo -e "options ide-core options=\"hde=noprobe hdf=noprobe  
hdg=noprobe          hdh=noprobe hdi=noprobe hdj=noprobe  
hdk=noprobe hdl=noprobe\"" >>etc/modprobe.conf.local  
  
#find * |cpio -o -H newc |gzip -c > /tmp/initrd-`uname -r`  
  
#cp -f /tmp/initrd-`uname -r` /boot/initrd-`uname -r`
```

- 4) If you are using lilo boot loader, run lilo again:  
# lilo

Then reboot your system and the driver will be loaded.

## Step 5 Configure System to Mount Volumes when Startup

Now you can inform the system to automatically mount the array by modifying the file /etc/fstab. E.g. You can add the following line to tell the system to mount /dev/sda1 to location /mnt/raid after startup:

```
/dev/sda1          /mnt/raid          ext2      defaults    0 0
```

## 4 Monitoring the Driver

Once the driver is running, you can monitor it through the Linux proc file system support. There is a special file under /proc/scsi/hpt374/. Through this file you can view driver status

and send control commands to the driver.

#### Note

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The file name is the SCSI host number allocated by OS. If you have no other SCSI cards installed, it will be 0. In the following sections, we will use x to represent this number.

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## Checking Devices Status

Using the following command to show driver status:

```
# cat /proc/scsi/hpt374/x
```

This command will show the driver version number, physical device list and logical device list.

## Rebuilding a Critical Array

A RAID 1 array may become critical after a disk member fails. When an array is in critical status, it will loss the ability of fault tolerance until you finish rebuilding.

Generally rebuilding will automatically start if you have a spare disk or you have put back the failed disk. In these cases, the array only needs to be synchronized to ensure data consistency. If the array is broken, you must first add a disk to the array. To add a disk to an array and start rebuilding, you can use the following command:

```
# echo "hpt rebuild a,b,c" > /proc/scsi/hpt374/x
```

In the command, "a" is array number shown in the logical device list. "b" is channel number, "c" is device number (0 for master device, 1 for slave device). E.g.

```
# echo "hpt rebuild 1,2,1" > /proc/scsi/hpt374/x
```

will rebuild the array with logical device number 1 using the secondary slave disk on the controller.

If rebuilding cannot be automatically started, you can use command

```
# echo "hpt rebuild start" > /proc/scsi/hpt374/x
```

to start rebuilding. To stop the rebuilding process, use command

```
# echo "hpt rebuild stop" > /proc/scsi/hpt374/x
```

## Verifying RAID 1/RAID 5

To RAID 1/RAID 5, verifying will ensure data consistency.

You can use the following command to start verifying:

```
# echo "hpt verify start a" > /proc/scsi/hpt374/x
```



To stop the verifying process, use command:

```
# echo "hpt verify stop a" > /proc/scsi/hpt374/x
```

In the command, "a" is array number shown in the logical device list.

## Rescanning Devices

If you attach a disk after the system boots up, the driver will not detect the disk automatically. In this case, you can tell the driver to rescan the devices attached to it by typing in the following command:

```
# echo "hpt rescan all" > /proc/scsi/hpt374/x
```

This command will rescan all devices and refresh their states.

## 5 Updating the Driver

To update the driver, simply reinstall the driver following the steps in previous section, **"Install RocketRAID 154x/1640 driver on an Existing System"**.

If the driver is loaded in initrd (e.g. when system is installed on the controller), you need to run mkinitrd to update the initrd file and modprobe.conf.local file in the initrd. Also, if you are using lilo boot loader, you need to run lilo again.

## 6 Installing RAID Management Software

HighPoint RAID Management Software is used to configure and keep track of your hard disks and RAID arrays attached to HPT374 controller. Installation of the management software is optional but recommended.

### Checking System Requirements

To run the RAID Management GUI, you must have the following software packages installed on your system:

- 1) X-Window system
- 2) gtk library v1.2 or later.

If you are using KDE or GNOME workstation, they are already installed. Otherwise you may check your system and refer to your Linux system manual for how to install these packages.

### Preparing the Installation Files

You should have two files to finish the installation.

hptinstall.sh	Installation script file
---------------	--------------------------

hptraid.tar.gz

Package of software components

## Installing the Software Package

Before installation, you must log on as root and change the directory to the location where your installation files are. Then you can use the command “**sh hptinstall.sh -i**” to install the software.

The following is an example.

```
[root@tmp]# ls
hptinstall.sh hptraid.tar.gz
[root@tmp]# sh hptinstall.sh -i
Starting hptsvr daemon: done
HighPoint ATA RAID Management Software has been installed successfully!
[root@tmp]#
```

### Note

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If an old version is installed on your system, you will be prompted to choose whether to overwrite existing files or not. To continue installation, type in “**Y**”.

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## Running the Management Software

You must log on as root to run the management software.

To run the software from a console window, you can just type in “**hptraid**” to start it. If you do not want to block the console, type in “**hptraid&**”.

# 7 Uninstalling

## Uninstalling the Driver

You can only uninstall the driver when your system is not booting from devices attached to HPT374 controller. Just remove the lines you added to /etc/modules.conf and /etc/fstab.

## Uninstalling the Management Software

Before you uninstall the software, you must log on as root. Then you can use the command “**hptinstall.sh -u**” to uninstall the software.

```
[root@tmp]# hptinstall.sh -u
Are you sure to uninstall HighPoint ATA RAID Management Software?(Y/N)y
Stopping hptsvr daemon: done
Uninstall finished!
```

