

HPT374 UDMA/ATA133 RAID Controller

Red Hat Linux 9.0

Installation Guide

Version 1.2

Copyright © 2003 HighPoint Technologies, Inc.

All rights reserved.

Last updated on Apr 29, 2003

Table of Contents

1 Overview.....	1
2 Installing Red Hat Linux 9.0 on HPT374 Controller.....	1
Step 1 Prepare Your Hardware for Installation	1
Step 2 Check System BIOS Settings.....	1
Step 3 Prepare the Driver Diskette.....	1
Step 4 Install Red Hat Linux 9.0	2
3 Installing HPT374 Driver on an Existing System.....	2
Step 1 Update Lilo/Grub	3
Step 2 Obtain the Driver Module	3
Step 3 Test the Driver Module	4
Step 4 Configure System to Automatically Load the Driver	4
Step 5 Configure System to Mount Volumes when Startup	6
4 Monitoring the Driver.....	6
Checking Devices Status.....	6
Rebuilding a Critical Array	6
Rescanning Devices	7
5 Updating the Driver.....	7
6 Installing RAID Management Software	8
Checking System Requirements.....	8
Preparing the Installation Files.....	8
Installing the Software Package	8
Running the Management Software.....	9
7 Uninstalling.....	9
Uninstalling the Driver	9
Uninstalling the Management Software	9

1 Overview

The purpose of this document is to provide clear instructions on how to install and use HPT374 UDMA/ATA133 RAID Controller on Red Hat Linux 9.0.

2 Installing Red Hat Linux 9.0 on HPT374 Controller

If you would like to install Red Hat Linux 9.0 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 0, RAID 1, RAID 0/1 or JBOD 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

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.

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

If you are installing RedHat Linux 9.0 on i686 type CPU, just copy all the files under driver/i686 directory to a dos formatted diskette. If you are installing RedHat Linux 9.0 on athlon type CPU, just copy all the files under driver/athlon directory to a dos formatted diskette.

Step 4 Install Red Hat Linux 9.0

- 1) Start installing Red Hat Linux 9.0 by booting with installation CD.
- 2) On "**Welcome to Red Hat Linux**" installation screen, a prompted label "**boot:**" will appear at the bottom of the screen, type in "**linux text expert hde=noprobe hdf=noprobe hdg=noprobe hdh=noprobe hdi=noprobe hdj=noprobe hdk=noprobe hdl=noprobe** " (without quotation mark) and then press **enter**.

Note

The kernel parameter "hdx=noprobe" is used to prevent Linux kernel from loading the default HPT374 chip IDE driver. When your system has other IDE interfaces supported by Linux, you may need to modify "**hde=noprobe hdf=noprobe hdg=noprobe hdh=noprobe hdi=noprobe hdj=noprobe hdk=noprobe hdl=noprobe**" according to your hardware configuration.

- 3) When you will be asked "**Do you have a driver disk?**". Select "**Yes**".
- 4) When "**Driver Disk Source** " appears, select "**fd0**" and then select "**OK**".
- 5) When "**Insert Driver Disk**" appears, insert the driver diskette in the floppy drive and then select "**OK**".
- 6) When prompted "**A few systems will need to pass special options to the kernel at boot time ...**" in the "Boot Loader Configuration" dialog, type in "**hde=noprobe hdf=noprobe hdg=noprobe hdh=noprobe hdi=noprobe hdj=noprobe hdk=noprobe hdl=noprobe**" in the blank.
- 7) When asked "**where do you want to install the boot loader?** " in the "Boot Loader Configuration" dialog, you must select Master Boot Record (MBR) to make your system be able to boot from HPT374 controller.
- 8) Continue the installation as normal. You can refer to Red Hat Linux 9.0 installation guide.

Note

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.

3 Installing HPT374 Driver on an Existing System

If you are currently running Red Hat Linux 9.0 and would like to access drives or arrays attached to the HPT374 controller, you can perform the following steps.

Note

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.

Step 1 Update Lilo/Grub

1. If you are using Lilo to boot your system, update **/etc/lilo.conf**.

E.g.

```
Prompt
timeout=50
default=linux
boot=/dev/hdc
map=/boot/map
install=/boot/message
linear

image=/boot/vmlinuz-2.4.20-8
    label=linux
    initrd=/boot/initrd-2.4.20-8.img
    read-only
    append="hde=noprobe hdf=noprobe hdg=noprobe hdh=noprobe
hdi=noprobe hdj=noprobe hdk=noprobe hdl=noprobe
    root=LABLE=/"
```

Then you need to run lilo:

```
# lilo
```

2. If you are using Grub to boot your system, update **/etc/grub.conf**.

E.g.

```
default=0
timeout=10
splashimage=(hd0,0)/grub/splash.xpm.gz
title Red Hat Linux (2.4.20-8)
    root (hd0,0)
    kernel /vmlinuz-2.4.20-8 hde=noprobe hdf=noprobe
hdg=noprobe hdh=noprobe hdi=noprobe hdj=noprobe hdk=noprobe
hdl=noprobe ro root=LABLE=/
    initrd /initrd-2.4.20-8.img
```

The kernel parameters, "**hde=noprobe hdf=noprobe hdg=noprobe hdh=noprobe hdi=noprobe hdj=noprobe hdk=noprobe hdl=noprobe**", are used to prevent Linux kernel from loading the default HPT3xx chip IDE driver. When your system has other IDE interfaces supported by Linux, you may need to modify "**hde=noprobe hdf=noprobe hdg=noprobe hdh=noprobe hdi=noprobe hdj=noprobe hdk=noprobe hdl=noprobe**" according to your hardware configuration.

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

Step 2 Obtain the Driver Module

You can extract the module file from the file modules.cgz on the driver disk. Using the following commands:

```
# mount /dev/fd0
```

```
# cd /tmp
# gzip -dc /mnt/floppy/modules.cgz | cpio -idumv
```

Driver modules will be extracted:

/tmp/2.4.20-8/hpt374.o	Red Hat Linux 9.0 driver
/tmp/2.4.20-8smp/hpt374.o	Red Hat Linux 9.0 smp driver

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 not configured symbol versioning correctly. To correct it, recompile the kernel with symbol versioning 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

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.

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 install the module and tell the system about it. To install the module, type in the following commands (first change directory to where the proper hpt374.o can be located):

```
# install -d /lib/modules/2.4.20-8/kernel/drivers/scsi
```

```
# install -c hpt374.o /lib/modules/2.4.20-8/kernel/drivers/scsi
```

Then you should inform the system when to load the module.

1. If you have no other SCSI adapters installed, you can edit the file `/etc/modules.conf` and add the following lines:

```
probeall block-major-8 scsi_mod sd_mod hpt374

options -k hpt374
```

This tells the kernel to try loading the SCSI and hpt374 modules whenever it tries to access a SCSI device `/dev/sd[a-z]`. If you have SCSI support compiled in kernel, you may remove the `"scsi_mod"` and `"sd_mod"` from that line.

Notice

Upon your system configuration the modules configuration file may be another file, possibly deprecated `"conf.modules"` file. You may have to check which configuration file you use and modify the correct one.

Now, reboot the system and try to type in the command `"fdisk /dev/sda"`. The kernel should automatically load the HPT374 driver.

2. If you use a SCSI adapter to boot the system, you cannot do as above since this may conflict with other SCSI devices. However, you can add the driver to the existing RAM disk image. First check which image file you are using by checking the `"initrd="` line in file `/etc/lilo.conf`, then using the following commands:

```
# gzip -dc /boot/initrd-2.4.20-8.img > /tmp/initrd.ext2
# mkdir /mnt/initrd
# mount -o loop /tmp/initrd.ext2 /mnt/initrd
# cp hpt374.o /mnt/initrd/lib/ (specify the correct location of hpt374.o here)
```

Now, add a line `"insmod /lib/hpt374.o"` to the file `/mnt/initrd/linuxrc`, just below the line of insmodding SCSI adapter's kernel module. Example of `linuxrc`:

```
.....
echo "Loading scsi_mod module"
insmod /lib/scsi_mod.o
echo "Loading sd_mod module"
insmod /lib/sd_mod.o
echo "Loading aic7xxx module"
insmod /lib/aic7xxx.o          ← SCSI adapter's kernel module
insmod /lib/hpt374.o          ← new inserted line
echo "Loading jbd module"
.....

# umount /mnt/initrd
# gzip -c /tmp/initrd.ext2 > /boot/initrd-2.4.20-8.img
```

If you are using Lilo to boot your system, you also need to run lilo:

```
# 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
```

Or:

```
/dev/sda1      /mnt/raid      ext3    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

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.

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 or a RAID 0/1 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,d" > /proc/scsi/hpt374/x
```


In the command, “**a**” is array number shown in the logical device list. “**b**” is controller number (always 1 if you have one hpt374 controller installed), “**c**” is bus number (1 for first channel, 2 for second channel, 3 for third channel, 4 for fourth channel), “**d**” is device number (1 for master device, 2 for slave device). E.g.

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

will rebuild the array with logical device number 1 using the secondary master 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
```

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. If you want to rescan only a single device, you can use

```
# echo “hpt rescan a,b,c” > /proc/scsi/hpt374/x
```

In the command, “**a,b,c**” specifies the controller, bus and device number for the disk. E.g. 1,2,1 specifies the secondary master disk on the first HPT374 controller.

Note

If the driver detects out a new disk plugged by rescanning the command and there is a broken RAID 1 array, the disk will be automatically used to rebuild the RAID 1 array.

5 Updating the Driver

If you are not booting from disks attached to HPT374 controller, you can update the driver just by reinstalling it following the previous section, “**Install HPT374 Driver on an Existing System**”.

If you are using a system installed to HPT374 controller, you can update the driver by the following steps.

- 1) First obtain the new driver module file hpt374.o. Refer to the previous section “**Obtain the Driver Module**”. In the following steps, we assume you have copied it to /tmp/hpt374.o.
- 2) Replace hpt374.o in the boot RAM disk image, /boot/initrd-2.4.20-8.img.

```
# gzip -dc /boot/initrd-2.4.20-8.img > /tmp/initrd.ext2
# mkdir /mnt/initrd
# mount -o loop /tmp/initrd.ext2 /mnt/initrd
# cp /tmp/hpt374.o /mnt/initrd/lib/hpt374.o
# umount /mnt/initrd
# gzip -c /tmp/initrd.ext2 > /boot/initrd-2.4.20-8.img
```

3) If you are using lilo to boot your system, you must run lilo to reinstall the RAM disk:

```
# lilo
```

4) Update hpt374.o in /lib/modules:

```
# cp /tmp/hpt374.o /lib/modules/2.4.20-8/kernel/drivers/scsi/hpt374.o
```

5) Reboot your system to make the new driver take effect.

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: [ OK ]
HighPoint ATA RAID Management Software has been installed successfully!
[root@tmp]#
```

Note

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”.

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&**”.

If you are using GNOME or KDE, you can also run it from the start menu bar.

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: [ OK ]
Uninstall finished!
[root@tmp]#
```