

# **HPT370/372/372A ATA RAID Controller FreeBSD Installation Guide**

Version 1.0

Copyright © 2001 HighPoint Technologies, Inc.

All rights reserved.

Last updated on Dec 12, 2001

## Table of Contents

---

<b>1 Overview.....</b>	<b>1</b>
<b>2 Installing FreeBSD on HPT370/372/372A Controller .....</b>	<b>1</b>
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 FreeBSD .....	2
<b>3 Installing HPT37x2 Driver on an Existing System.....</b>	<b>3</b>
Step 1 Copy the Driver Module .....	3
Step 2 Test the Driver Module .....	3
Step 3 Configure System to Automatically Load the Driver .....	4
Step 4 Configure System to Mount Volumes When Startup .....	4
<b>4 Monitoring the Driver .....</b>	<b>4</b>
Checking Devices Status .....	4
Rebuilding a Critical Array .....	4
Rescanning Devices .....	5
<b>5 Updating the Driver .....</b>	<b>5</b>
<b>6 Installing RAID Management Software.....</b>	<b>6</b>
Checking System Requirements .....	6
Preparing the Installation Files.....	6
Installing the Software Package.....	6
Running the Management Software .....	7
<b>7 Uninstalling .....</b>	<b>7</b>
Uninstalling the Driver.....	7
Uninstalling the Management Software .....	7

# 1 Overview

The purpose of this document is to provide clear instructions on how to install and use HPT37x (HPT370/372/372A) ATA RAID Controller on a FreeBSD-4.3/4.4 system.

## 2 Installing FreeBSD on HPT370/372/372A Controller

If you would like to install FreeBSD onto drives attached to HPT37x controller, please perform the following operations:

### Step 1 Prepare Your Hardware for Installation

After you attach your hard disks to HPT37x controller, you can use HPT37x 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.

### 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 CDROM, next from and then from floppy drive, 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 CDROM. After you finish installation, set SCSI as the first boot device to boot up the 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 3 Prepare the Driver Diskette

If you are installing FreeBSD, you must prepare a driver disk for HPT37x before installation.

First obtain the driver diskette image file, freebsd.img.

On a DOS or Windows system, you can make the boot diskette using rawrite.exe. It can be found on the FreeBSD CD (under \tools). Just run it under a command window and follow its prompt.

On a FreeBSD 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=freebsd.img of=/dev/fd0
```

## Step 4 Install FreeBSD

- 1) Start installing the FreeBSD by booting with FreeBSD CDROM.
- 2) On loader's screen, it will ask you whether to boot immediately. Press SPACE key to stop loader from autobooting.

```
BTX loader 1.00  BTX version is 1.01
Console: internal video/keyboard
BIOS driver A: is disk0
BIOS driver B: is disk1
BIOS driver C: is disk2
BIOS 636kB/74512kB available memory

FreeBSD/i386 bootstrap loader, Revision 0.8
(mailto:jkhn@narf.osd.bsdi.com, Sat Apr 21 08:46:19 GMT 2001)
-
Hit [Enter] to boot immediately, or any other key for command prompt.
Booting [kernel] in 9 seconds...
```

*<-press SPACE key*

- 3) A prompted label "**ok**" will appear at the bottom of the screen. According to the prompt, type in "load kernel" (without quotation mark) and then press **enter**.

```
Type '?' for a list of commands, 'help' for more detailed help.
ok load kernel
/kernel text=0x24f1db data=0x3007ec+0x2062c -
```

- 4) Insert HPT37x driver diskette into floppy drive now. Type in "load disk1:hpt37x2-4.3" or "load disk1:hpt37x2-4.4" (without quotation mark) and then press **enter**.

```
for FreeBSD 4.3-RELEASE
ok load disk1:hpt37x2-4.3
disk1:/hpt37x2.ko text=0xf571 data=0x2c8+0x254

for FreeBSD 4.4-RELEASE
ok load disk1:hpt37x2-4.4
disk1:/hpt37x2.ko text=0xf571 data=0x2c8+0x254
```

- 5) Type in "boot" and continue the installation as normal. You can refer to FreeBSD installation guide.

```
ok boot
```

---

### Note

The system device mapping order is the same as the order shown in HPT37x BIOS Setting Utility. If you have no other SCSI devices, the device marked as "BOOT" or "HDD0" will be /dev/da0, "HDD1" will be /dev/da1, "HDD2" will be /dev/da2, etc.

---

- 6) Before exiting the installation, an additional step must be taken to copy hpt37x2 driver module to the system. On the driver disk, there is a setup script "**postinstall**" which will do this work for you. Before you reboot the system, press **Alt-F4** to the command shell and type the following commands:

```
# mount -o ro /dev/fd0 /mnt
# sh /mnt/postinstall
# umount /mnt
```

Then press **Alt-F1** to return to the setup screen and choose [**X Exit Install**] to finish setup.

## 3 Installing HPT37x2 Driver on an Existing System

If you are currently running FreeBSD and would like to access drives or arrays attached to the HPTx Controller, you can perform the following steps.

### Step 1 Copy the Driver Module

Insert the driver diskette to floppy drive, then use the following commands to copy the driver module:

```
for FreeBSD 4.3-RELEASE
# mount -o ro /dev/fd0 /mnt
# cp /mnt/hpt37x2-4.3.ko /modules/hpt37x2.ko
# umount /mnt

for FreeBSD 4.4-RELEASE
# mount -o ro /dev/fd0 /mnt
# cp /mnt/hpt37x2-4.4.ko /modules/hpt37x2.ko
# umount /mnt
```

### Step 2 Test the Driver Module

You can test out the module to ensure that it works for your system by loading it during system booting.

If the module has been loaded successfully you should see the HPT 37x banner and a display screen of the attached drives. You can now access the drives as a SCSI device (if you have no other SCSI device, the first device is /dev/da0, then /dev/da1, etc.).

#### Example

```
F1      FreeBSD
Default: F1

>> FreeBSD/i386 BOOT
Default: 0:ad(0,a)/boot/loader
boot:

BTX loader 1.00  BTX version is 1.01
Console: internal video/keyboard
BIOS driver A: is disk0
BIOS driver C: is disk2
BIOS 636kB/74512kB available memory

FreeBSD/i386 bootstrap loader, Revision 0.8
(mailto:jkhnarf.osd.bsdi.com, Sat Apr 21 08:46:19 GMT 2001)
Loading /boot/defaults/loader.conf
/kernel text=0x24f1db data=0x3007ec+0x2062c -
/
Hit [Enter] to boot immediagely, or any other key for command prompt.
Booting [kernel] in 9 seconds...

<-press SPACE key
Type '?' for a list of commands, 'help' for more detailed help.
ok load hpt37x2
```

```
/modules/hpt37x2.ko text=0xf571 data=0x2c8+0x254
ok autoboot
```

---

If you have configured a RAID 0/1 using 4 disks, it will be registered to system as device **/dev/da0**. You can use “**/stand/sysinstall**” to create partitions and disklabels (*like da0s1e*) on **da0**. Then you can create new file system using “**newfs /dev/da0s1e**”. Now you can mount **/dev/da0s1e** to somewhere to access it.

---

### Step 3 Configure System to Automatically Load the Driver

Most likely, you will not want to type “load hpt37x2” each time you boot up the system. Therefore you must install the module and tell the system about it. To configure system to automatically load the driver, type in the following commands:

```
# echo 'hpt37x2_load="YES"' >> /boot/defaults/loader.conf
```

This tells the loader to try loading the HPT37x2 module together with the kernel.

Now, reboot the system. HPT37x2 module should be automatically loaded each time the system starts up.

### Step 4 Configure System to Mount Volumes When Startup

Now you can inform the system to automatically mount the array by modifying the file `/etc/fstab`. Eg. You can add the following line to tell the system to mount `/dev/da1s1e` to location `/mnt/hpt` after startup:

```
/dev/da1s1e    /mnt/hpt      ext2    defaults    0 0
```

## 4 Monitoring the Driver

Once the driver is running, you can monitor the running status of driver.

### Checking Devices Status

Using the following command to show driver status:

```
# sysctl hpt37x2.status
```

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 failed. When an array is in critical status, it will lose 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:

```
# sysctl -w hpt37x2.status="hpt rebuild a b,c,d"
```

In the following command, “**a**” is array number as shown in the logical device list. “**b**” is controller number (always 0 if you have one HPT37x2 controller installed), “**c**” is bus number (0 for primary channel, 1 for secondary channel), “**d**” is device number (0 for master device, 1 for slave device). Eg.

```
# sysctl -w hpt37x2.status="hpt rebuild 1 0,1,0"
```

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

```
# sysctl -w hpt37x2.status="hpt rebuild start"
```

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

```
# sysctl -w hpt37x2.status="hpt rebuild stop"
```

## 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:

```
# sysctl -w hpt37x2.status="hpt rescan all"
```

This command will rescan all devices and refresh their states. If you want to rescan only a single device, you can use

```
# sysctl -w hpt37x2.status="hpt rescan a,b,c"
```

In the command, “**a,b,c**” specifies the controller, bus, and device id for the disk. E.g. 0,1,0 specifies the secondary master disk on the first HPT37x 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

You can update the driver if you have newer driver diskette.

Insert the driver diskette to floppy drive, then using the following commands to update the driver module:

```
# mount -o ro /dev/fd0 /mnt
# cp /mnt/hpt37x2.ko /modules
```

```
# umount /mnt
```

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 HPT37xcontroller. 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.
- 3) Netscape Communicator

If you choose X-User during install FreeBSD system, X-Window system is already installed. Otherwise you may check your system and refer to your FreeBSD system manual for how to install it. As to gtk library and NetscapeCommunicator, you can install them from FreeBSD 4.3/4.4 CD by typing in the following command:

```
# mount /cdrom
# pkg_add /cdrom/packages/All/gtk-1.2.10.tgz
# pkg_add /cdrom/packages/All/netscape-communicator-4.76.tgz
# umount /cdrom
```

### 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 the 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 “**./hptinstall.sh -i**” to install the software.

The following is an example.

```
[root@tmp]# ls
hptinstall.sh hptraid.tar.gz
[root@tmp]# ./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 menu bar:

On KDE, you can start it by choosing “**Menus (menu-bar)->Applications ->HighPoint ATA RAID Management Software**”.

On GNOME, you can start it by choosing “**KDE menus->GNOME->Applications ->HighPoint ATA RAID Management Software**”.

## 7 Uninstalling

### Uninstalling the Driver

You can only uninstall the driver when your system is not booting from devices attached to HPT37x controller. Just remove the line

```
hpt37x2_load="YES"
```

in /boot/defaults/loader.conf, and then delete the driver module **/modules/hpt37x2.ko**.

### 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]#
```