

Installing and using MythTV

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2003-07-13, v2.53

Initially, installation of MythTV seems like a huge task. There are lots of dependencies, and various distributions seem to do the same thing different ways. This document will attempt to give general installation instructions, as well as including distribution-specific instructions where necessary.

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1. How to obtain this document.

This HOWTO document is maintained at the primary MythTV website: <http://www.mythtv.org> by Robert Kulagowski <mailto:rkulagow@rocketmail.com>. (Please note that I am *NOT* the author/programmer of the MythTV application! See the [contributors](#) section below for a list of the programmers.) The latest version of this document can be found in CVS, accessible either through the [ViewCVS](#) web interface, or directly from the CVS repository. You may download the latest copy of MythTV and the documentation from CVS this way:

```
$ mkdir mythtv
$ cd mythtv
$ cvs -d :pserver:mythtv@cvs.mythtv.org:/var/lib/mythcvs login
Logging in to :pserver:mythtv@cvs.mythtv.org:/var/lib/mythcvs
CVS password: mythtv
$ cvs -z3 -d :pserver:mythtv@cvs.mythtv.org:/var/lib/mythcvs checkout mythtv
```

This documentation will be in the `docs/` subdirectory.

The other MythTV modules may be downloaded from CVS the same way; replace "mythtv" with "mythweather", "mythgallery", "mythmusic", etc.

NOTE: If you are going to use CVS to compile MythTV rather than using the distribution tarball, it is **strongly** recommended that you join the <http://www.snowman.net/mailman/listinfo/mythtv-commits/> and <http://www.snowman.net/mailman/listinfo/mythtv-dev/> mailing list.

It's recommended that you join the user list at <http://www.snowman.net/mailman/listinfo/mythtv-users>.

Searchable archives for the lists are available at http://www.gossamer-threads.com/archive/MythTV_C2/.

This HOWTO is for MythTV v0.10.

2. Introduction.

This HOWTO document will focus on manually building MythTV in a North American environment. If you have installation instructions for a different region or Linux distribution, please send them to the author so that it can be included in other versions of this document.

Hans Kruse has setup a website that focuses on running MythTV in a non-North American environment. See the website at <http://mythtv.nicenemo.net>.

The contributors to MythTV are:

- Lead developer: Isaac Richards, <mailto:ijr@po.cwru.edu>
- Developer: Matthew Zimmerman, <mailto:mdz@debian.org>
- Developer: John Danner, <mailto:jdanner@untzuntz.com>
- Developer: Chris Pinkham, <mailto:cpinkham@bc2va.org>
- Overall structure of HOWTO and Mandrake 9.x documentation: Robert Kulagowski, <mailto:rkulagow@rocketmail.com>
- Red Hat Linux 8.0 documentation: Cedar McKay, <mailto:mythhowto.3.ohthetrees@spamgourmet.com>
- Gentoo documentation and package: Tony Clark, <mailto:tclark@telia.com>
- Debian package: Matthew Zimmerman, <mailto:mdz@debian.org>
- Mandrake 8.2 documentation: Harondel J. Sibble, <mailto:help@pdscc.com>
- Mandrake 9.0 and 9.1 packages: Thac, <mailto:thac@nyvalls.se>
- Red Hat Linux package: Axel Thimm, <mailto:Axel.Thimm@physik.fu-berlin.de>

3. Checking prerequisites.

3.1 Hardware.

Hardware selection is a complex topic, one this HOWTO will only discuss briefly and in general terms. The following subsections offer some general guidance but stop short of offering specific recommendations.

For more detail about actual configurations that others have used, Mark Cooper has setup a hardware database at <http://pvrhw.goldfish.org/>. The website will let you browse what other users have reported as their hardware configuration, and how happy they are with the results.

If you have specific questions about the suitability of specific hardware choices, you can consult the archives of the mythtv-users mailing list or post a question to the list.

CPU Type and Speed

Selection of CPU type and speed is one of the trickiest elements of hardware selection, mainly because there are so many tradeoffs which can be made. For example, if you have plenty of CPU, you can use higher bitrates or capture sizes, etc.

MythTV has two modes of operation. First, it can function as a software video encoder, which means that it uses a fairly generic "dumb" video capture card to get frames of video, encodes them using the CPU on your motherboard and writes them to disk. High-end video capture cards and devices like the Tivo and ReplayTV have dedicated encoder chips which use specialized hardware to convert the video stream to the MPEG-2 format without using the motherboard CPU. The main CPU has the responsibility of running the Operating System and reading and writing the encoded frames to the disk. These tasks have fairly low CPU requirements compared to encoding video, which is why a device like a Series 1 Tivo can run with only 16MB of RAM and a 54Mhz CPU.

There are many variables that go into the question: "How fast a CPU do I need to run MythTV"? Obviously, the faster your CPU, the better your experience will be with MythTV. If you are using the software MPEG-4 encoder and performing the "Watch TV" function, where the CPU is both encoding and decoding video simultaneously to allow Pause, Fast Forward and Rewind functions for live TV requires more CPU than just encoding or decoding. MythTV also supports multiple encoder cards in a single PC, thereby increasing the CPU requirements if you plan on simultaneously encoding multiple programs. As a general guideline, plan on 1Ghz per encoder.

Here are a few data points:

- A PIII/733Mhz system can encode one video stream using the MPEG-4 codec using 480x480 capture resolution. This does not allow for live TV watching, but does allow for encoding video and then watching it later.
- The developer states that his AMD1800+ system can **almost** encode two MPEG-4 video streams and watch one program simultaneously.
- A PIII/800Mhz system with 512MB RAM can encode one video stream using the RTJPEG codec with 480x480 capture resolution and play it back simultaneously, thereby allowing live TV watching.
- A dual Celeron/450Mhz is able to view a 480x480 MPEG-4/3300Kbps file created on a different system with 30% CPU usage.
- A P4 2.4Ghz machine can encode two 3300Kbps 480x480 MPEG-4 files and simultaneously serve content to a remote frontend.

The second mode of operation is where MythTV is paired with a hardware-based video encoder, such as a Matrox G200 or a Hauppauge WinTV-PVR-250/350. In this mode, because the video encoding is being done externally, the CPU requirements are quite low. See the [Video Capture Device](#) section for details.

Memory

A MythTV host that is both a backend and a frontend and using software encoding with a single capture card should run adequately in 256MB of RAM. Additional RAM above 256MB will not necessarily increase performance, but may be useful if you are running multiple encoders.

Hard Disk(s)

Encoded video takes up a lot of hard disk space. The exact amount depends on the encoding scheme, the size of the raw images, and the frames per second, but typical values for MythTV range from 700 megabytes/hour to 2 gigabyte/hour for MPEG-4 and larger for MPEG-2 and RTJPEG.

NOTE: You *must* use DMA for hard drive access to prevent choppy or jittery video. Red Hat Linux 8.0 apparently does not enable DMA at boot time. See the Troubleshooting Section for [instructions](#) on how to do this.

Writing video to disk is sensitive to timing issues; RTJPEG requires less CPU with the tradeoff being larger files and needing to write to the disk faster. MPEG-4 requires more CPU, but the files are smaller. At the default resolution, MPEG-2 creates the largest files of all with almost no CPU impact.

See the Troubleshooting [section](#) for more information.

Video Capture Device

In order to watch live TV, MythTV will need one or more video capture devices with Linux drivers. For a list of video capture cards known to work with Linux, please see `/usr/src/linux/Documentation/video4linux/bttv` for a partial listing; even if your specific card is not listed, it may be that the vendor is actually using a standard reference design and placing their own name on it. See the video4linux mailing list (<https://listman.redhat.com/mailman/listinfo/video4linux-list>) for more information and for specific hardware questions.

The most common inexpensive cards available use the Bt848 or Bt878 video capture chip; examples are the "Hauppauge WinTV Go" card and the "AverTV Desktop PVR" card, both of which use the bttv kernel module.

Newer cards may use the CX23881 series of chips; a driver is available at <http://bytesex.org/cx88/>.

After you have installed a suitable capture device, you can check that the kernel sees it with `lspci`. Look for an entry labeled "Multimedia video controller". To get more detailed information about the card, use `lspci -v` or `lspci -vv`. Ensure that your system is loading the `bttv` modules by typing:

```
# lsmod |grep bttv
```

You want to see the `bttv` module listed.

While inexpensive video-capture cards just capture raw frames, leaving encoding to software, some higher-end cards incorporate hardware-level encoding. Using either a G200 MJPEG encoder card, or a WinTV-PVR-250 or 350 from Hauppauge and the driver from the IvyTV project <http://ivtv.sourceforge.net/> will allow you to use dedicated hardware encoders rather than your CPU. Release 0.10 of MythTV is able to use the PVR-250/350 cards as an input device for live TV and for scheduled recordings. Using the onboard MPEG-2 encoder drastically reduces the CPU requirements for encoding.

Here are some data points for encoding:

- A Celeron 450 uses 2% CPU for encoding a 480x480 16Mbps MPEG-2 stream.

Here are some data points for decoding:

- An Athlon 1800XP can decode a 720x480 8Mbps MPEG-2 file using 10% CPU
- An Athlon 1Ghz can decode a 720x480 16Mbps MPEG-2 file using 30-50% CPU, can decode a 480x480 16Mbps MPEG-2 using 30% CPU and approximately 30% for Live TV at 416x480.
- A P3-550 can decode a 480x480 16Mbps MPEG-2 file with 55% CPU.
- A Celeron 450 (no SSE) can decode a 480x480 16Mbps MPEG-2 file with 80% CPU.

See the [I'd like to use a hardware MPEG-2 encoder](#) section for information on installing a PVR-250 on Mandrake 9.1.

Sound card

The system needs a sound card or an onboard equivalent on the motherboard to play back and in most cases, to record sound. Any sound card that can be operated by the ALSA (Advanced Linux Sound Architecture) kernel modules will work with MythTV.

The usual practice for capturing the audio associated with the video is to run a jumper cable from an audio output on the video capture card to the Line input on the sound card. Some video capture cards use internal audio tuners that work with the kernel `btaudio` module, thereby eliminating the patch cable. This is useful if you will be using multiple capture cards in a single chassis, since each capture card will not need its own sound card. See the [btaudio](#) section for more information.

NOTE: The PVR-250/350 does not require a sound card for audio capture.

Video Display Card

MythTV will work with just about any video card. However, it is highly recommended that you use a card which supports XVideo (XV) extensions. If your card does not support XV, color conversion and scaling will be performed by your CPU rather than the video card. This is very CPU intensive. Check the XFree86 documentation for details if you are uncertain about your preferred card. You may also run `xvinfo`; look for your video card to be listed as one of the adapters.

If you want to use MythTV with a standard television, there are two things that you're going to need:

1. A physical connection from your video card to your TV set, which can either be a TV-out port on the card itself, or an external adapter that converts the VGA signal to an appropriate video signal. "Appropriate" depends on a number of factors, such as video standard (NTSC vs PAL) type of input connection (Composite vs SVideo), etc.
2. An X driver for your video card that supports the XVideo extensions. These extensions transfer some of the processing needed to display full-motion video from the CPU to the card's own hardware. While it is *possible* to run MythTV on a card that does not have XVideo extensions it will require massive amounts of CPU and will most likely result in frame drops.

Both these requirements must be met. There are X drivers that support XVideo on their VGA outputs, but not on their TV outputs.

Cards with TV out

The next section deals with a number of cards that are known to have TV-out ports. The list is unlikely to be complete, so if you know of others, please post a message to the mythtv-users mailing list so the information can be included in future versions of the HOWTO. The list is organized by manufacturer.

Reports here are based on what users of the cards have posted on the mythtv-users mailing list, so if you need configuration details, please search the archives at http://www.gossamer-threads.com/archive/MythTV_C2/Users_F11/ using the card name in your search string.

ATI

ATI makes many cards with TV-out capability, but ATI offers no official support for their use with Linux. The standard XFree86 ati driver does not support TV-out.

The enhanced ati.2 X driver created by the GATOS <http://gatos.sourceforge.net> project offers some support for TV-out, but only in its "experimental" version, available through CVS. There have been reports from people who say they have made this driver work with one or another ATI card. For example, Bruce Markey <mailto:bjm@lvcm.com> writes (on the mythtv-users mailing list): "I got this to work. You can quote me on that. I've used TV-out on several models of ATI cards both All-In-Wonder and regular cards with TV-out." See the "Adventurous Setup" section of http://gatos.sourceforge.net/watching_tv.php for details. Also see <http://www.retinalburn.net/linux/tvout.html> for more information.

Specific cards:

- ATI Rage II+DVD (Mach 64). Ports not described. Reported to work, but no details reported.
- Rage 128 VIVO. Ports not described. Reported to work, but no details reported.
- Radeon 7500. Ports not described. Reported to work, but no details reported.

Matrox

The standard Matrox driver included with XFree86 does not support TV-out.

Older Matrox cards can be used with a proprietary X driver provided by Matrox, and it does simultaneously support TV out and XVideo on some cards. See http://www.matrox.com/mga/support/drivers/files/lnx_21.cfm for details.

Newer Matrox cards can be run with a set of kernel patches (for kernel 2.4.19) and a customized X driver, but this arrangement does not support XVideo on TV-out. See http://www.bglug.ca/matrox_tvout/g450_tvout_howto.html for details.

Specific cards:

- Matrox G400 AGP. Uses external adapter to provide Composite and SVideo ports. Reported to work with the proprietary Matrox X driver.
- Matrox Millennium 450GX AGP. Uses external adapter to provide Composite and SVideo ports. TV-out implementation does *NOT* support XVideo.
- Matrox Millennium 550GX AGP. Uses external adapter to provide Composite and sVideo ports. TV-out implementation does *NOT* support XVideo.

nVidia

Some nVidia cards with TV-out can be run using the standard nv driver in XFree86, combined with the userspace application **nvtv** to control the TV-out port. See <http://sourceforge.net/projects/nv-tv-out/> for details. Recent versions of the nVidia driver have better support for overscan and other features useful with TV-Out, so the **nvtv** application may not be required.

Some nVidia cards can be run with a proprietary nVidia X driver made available by nVidia. See <http://www.nvidia.com/view.asp?IO=linux> for more information.

Specific cards:

- GeForce4 MX440-SE AGP. Has Composite and SVideo ports. Works using the nVidia X driver.
- GeForce2 GTS 64 MB DDR 4x AGP. Has SVideo port. Works using the nVidia X driver. Reportedly works using the nv driver plus nvtv.
- GeForce4 MX420 PCI (BFG Asylum). Has SVideo port. No tests reported.

Savage

The standard savage X driver supports TV out on some Savage cards. Unfortunately, XVideo support for the Savage 2000 card (a very common and inexpensive Savage card with TV out) is broken. See <http://www.probo.com/timr/savage40.html> for details.

Specific cards:

- Savage 2000 AGP. Has Composite and SVideo ports. Does not support XVideo.
- S3 Savage IX 8MB AGP. Has SVideo output. Reported to work.

Other Options

Some devices with onboard TV-out capability, such as XBoxes converted to Linux and some laptops, can be used as MythTV frontends to display on a television screen. Please consult the mythtv-users mailing list for messages that report the details of these special arrangements.

External Adapters

External adapters convert standard VGA output to a form suitable for display on a television. The output format varies by region, since different countries have different TV standards. People on the mythtv-users list have mentioned these adapters:

- AITech Web Cable Plus, powered by external transformer or takes power from PS/2 keyboard connector, support resolutions up to 1024x768, outputs composite and SVideo, provides position adjustment.
- Averkey lite, powered by a USB port, has Composite, SVideo, YPbPr outputs; pan, brightness, overscan/underscan controls; supports up to 1024x768 outputs; and supports PAL and NTSC.
- ADS TV Elite XGA
- AverKey iMicro (comments are generally favorable)
- AITech Web Cable (comments are generally unfavorable, different than the "Plus" version above)
- TVIEW Gold (mentioned once, favorably)

3.2 Software.

There are a few ways of installing programs on Linux systems; you can either use a pre-compiled package, or install from a tarball after satisfying any prerequisites.

NOTE: you must have the MySQL database software installed on a system to store the master database. This does not necessarily mean that MySQL must run on one of the MythTV boxes.

Pre-compiled packages.

A number of people have created pre-compiled packages for MythTV that may make your installation easier.

BIG FAT WARNING: This HOWTO assumes that you have *not* installed MythTV from a package. All example command lines and file locations are based on the MythTV tarball defaults. Some packagers have modified the filenames, binaries and file locations to match what is commonly found in that distribution. Any issues with MythTV installed via a pre-compiled package **MUST** be raised with the packager.

If you use any of the pre-compiled packages you may not need to perform any additional configuration steps in this HOWTO. The next logical step is [configuring MySQL](#), which you may or may not have to perform. See your package documentation.

Red Hat

Axel Thimm has created RPMs for MythTV which may be obtained from <http://atrpms.physik.fu-berlin.de/name/mythtv/>. If you have problems with the RPMs, please send him email directly at <mailto:Axel.Thimm@physik.fu-berlin.de>.

A meta-package created by Axel, called mythtv-suite, will allow you to install all of MythTV and its add-ons, plus all dependencies, but is dependant on having **apt** or **yum** installed and have atrpms enabled as a source. If you haven't downloaded the atrpms-kickstart packages, you can download it here:

<http://atrpms.physik.fu-berlin.de/dist/rh9/atrpms-kickstart/>

Install the package with:

```
# rpm -Uvh atrpms-kickstart*
```

Then update your **apt** package listings:

```
# apt-get update
```

And finally:

```
# apt-get install mythtv-suite
```

These steps however, do NOT perform the installation of any drivers required for **ALSA**, capture cards, **lirc**, etc.

Mandrake

Thac has created RPMs for MythTV for Mandrake 9.0 and 9.1 which may be obtained from <http://rpm.nyvalls.se/> If you have problems with the RPMs, please send him email directly at thac@nyvalls.se.

Debian

Debian packages for MythTV and some of its add-on modules have been packaged by Matt Zimmerman <mailto:mdz@debian.org> and are available at <http://dijkstra.csh.rit.edu:8088/~mdz/debian/dists/woody/mythtv/>, including installation instructions. All of the prerequisites for MythTV are available as Debian packages.

See `/usr/share/doc/packageName/README.Debian` for more information.

Manual installation

You may use the graphical tools that come with your distribution, or you can use command-line utilities. Either system will get the job done, and it all depends on your comfort level with Linux.

In order to compile MythTV, we need to make sure that the software it needs is installed. As of 2003-03-15, this list includes **mysql**, **gcc**, **freetype2-devel**, **XFree86-devel**, **qt-devel** and **lame**. If you're going to use a remote control with MythTV, you're going to need the **cdialog** package in order to compile **lircd** if your distribution doesn't have a pre-packaged **lirc**. If you are using **XMLTV** as a grabber, you will need **perl**.

NOTE: Qt v3.1 is recommended, but not required.

NOTE: If you are going to be using RPMs to install various components, you should be aware that not all packages include the necessary headers for compiling packages. If you're having trouble compiling, ensure that you've installed the -devel version of a prerequisite.

NOTE: Other than where noted, Mandrake 9.1 users may follow the Mandrake 9.0 instructions.

There appears to be issues with ALSA and simultaneously recording and playing sound, which is a core requirement for MythTV. If you are not running ALSA 0.9.0rc6 or higher and experience lock-ups of your system when trying to use MythTV, then please check the main ALSA website and upgrade to the latest version, or see if your distribution has already packaged the latest ALSA drivers.

Graphical installation tools.

Mandrake 9.0

On systems running KDE, a tool which will allow you to see what packages are available and if they're installed on your system can be accessed by clicking **K->Configuration->Packaging->KPackage**

While the graphical tools are nice, the command line tool is actually easier to use. It's strongly recommended that you use the command line tool.

There are many inter-related modules, so make sure that you've got the main package for each one, and not a sub package for an unrelated item. For example, there are many modules that have "perl" in them; some are a part of the apache web server, others are a part of the perl distribution. In each case, we're looking to make sure that the primary module is getting installed.

Click the magnifying glass or press **CTRL-F** and enter "perl" as your search term. You should find it under the "Perl" folder. You need at least the perl 5.80 base package installed. If not, click on the "Mark" button.

If you are going to be installing mysql on this system, search for mysql – it should be under "Databases". Make sure that mysql and mysql-clients are installed. If not, click on "Mark".

Search for gcc. You're going to need gcc and gcc-c++ installed.

Search for freetype2. Make sure that you've got freetype2 and freetype2-devel installed.

Search for XFree86-devel.

Finally, check for qt. You'll need libqt3-devel (under folder "KDE and Qt") and libqt3 ("Libraries").

NOTE for Mandrake 9.1 users: Mandrake 9.1 has removed the MySQL modules from the default installation. Ensure that you install libqt3-mysql.

Make sure that cdialog is installed if you want to use MythTV with a remote control if you need to compile **lirc** from source.

alsa-utils is needed for setting the volume. MythTV now has native volume support, but you may have a special configuration that necessitates an external program to adjust your volume settings. If this is the case, then you can disable native volume support.

If you marked anything to install, click on Install Marked. Click "Yes" or OK if you get a message about satisfying dependencies.

Red Hat Linux 8.0

Red Hat Linux 8.0 does not have the same graphical package manager used by other distributions, so you will need to use Red Hat's package manager. This is the same utility you saw upon installation from the Red Hat Linux 8.0 installation CD, and it allows you to select packages at installation time, or once the system is up and running. You can access this program by selecting

```
RedHatMenu>System Settings>Packages
```

If you did a typical Desktop install of Red Hat Linux 8.0 make sure you have selected:

- KDE Desktop Environment
- SQL Database Server – you will have to click on "details" and make sure "mysql-server" is checked. (only required on the master system)
- Development Tools
- X Software Development
- KDE Software Development
- Kernel Development

Click Install to continue.

You can not install qt-MySQL, a necessary prerequisite, graphically. To install this package using the command line do

```
$ up2date --solvedeps qt-MySQL
```

NOTE: ensure that the correct symlinks have been created for the XFree-86 development libraries:

```
# ln -s /usr/X11R6/lib/libXext.so.6 /usr/X11R6/lib/libXext.so
# ln -s /usr/X11R6/lib/libX11.so.6 /usr/X11R6/lib/libX11.so
```

Command-line installation.

This section details the various methods for installing prerequisites from the command line.

Mandrake

urpmi is the simplest tool for installation of packages from the command line, but properly configuring it can be difficult. The following website <http://plf.zarb.org/~nanardon/urpmiweb.php> will allow you to choose a mirror site and then present the command-line configuration text for that mirror. You will most likely need to add a "Contrib" mirror to your setup. If you add a site from the "Penguin Liberation Front", you will be able to load the lame library without compiling from source.

Special instructions for Mandrake 8.2

Mandrake 8.2 does not have a pre-packaged libqt3-devel, so you must compile and install this manually. The following command will install the prerequisites for qt3, so don't skip this step. The simplest tool for installing packages from the command line is urpmi.

Open a shell, and execute the following. You may get asked a number of questions regarding dependencies. It's best to answer "YES".

```
$ urpmi mesa-common-devel libmngl-devel mysql-devel libunixodbc2-devel
$ urpmi postgresql-devel xfree86-static-libs
```

Once all of the prerequisites have been installed, the next step is to obtain and compile the source RPM.

Go to <http://www.rpmfind.net> and search for qt3. There will be a number of different versions available. As of 2002-12-02, the latest version for Mandrake is called qt3-3.0.5-7mdk.src.rpm. Unless you are running **Mandrake Cooker** (the beta version of the next release of Mandrake), make sure to download the standard "Mandrake" release. Download the .src.rpm file to a directory that you can find.

```
$ su
```

```
# cp qt3-3.0.5-7mdk.src.rpm /usr/src/RPMS/SRPMS
# cd /usr/src/RPMS/SRPMS
# rpm --rebuild qt3-3.0.5-7mdk.src.rpm
# cd ../RPMS
# ls -l
```

The "ls -l" command will show you a directory listing. There should be two files, one will be named "qt3" and the other will be "qt3-devel". The full filenames will vary, so once you know the filename, you can install them with

```
# rpm -Uvh [filename1]
# rpm -Uvh [filename2]
```

Once this has completed (it can take a while, so please be patient), continue by following the Mandrake 9.0 instructions.

Mandrake 8.2 and 9.0

The simplest tool for installing packages from the command line is **urpmi**.

Open a shell, and execute the following, all on the same line. You may get asked a number of questions regarding dependencies. It's best to answer "YES".

```
$ su
# urpmi mysql gcc gcc-c++ freetype2-devel cdiallog alsa-utils
# urpmi XFree86-devel perl
```

NOTE for Mandrake 8.2 users: do not execute the following command. You've already manually installed the files in the previous section.

```
# urpmi libqt3-devel
```

NOTE for Mandrake 9.1 users: execute the following command.

```
# urpmi libqt3-mysql
```

However, you might get this when you execute the command above:

```
[root@pvr root]# urpmi mysql gcc gcc-c++ freetype2-devel libqt3-devel alsa-utils XFree86-devel perl
everything already installed
```

In that case, you're ready to move to the next section.

Red Hat Linux 8.0

[Please submit instructions]

Gentoo.

If Qt has not been installed on your system: Edit `/etc/make.conf` and locate the "USE" variable. If the line is commented out, remove the comment. The line should have at least:

```
USE="mysql qt alsa"
```

Next you need to build Qt. If you don't plan on using the ebuilds as described in the Gentoo section then you also need to install lame.

```
$ emerge qt lame mysql
```

If you have already installed Qt: you will need to rebuild because the default installation doesn't include mysql support, a requirement for MythTV. To enable SQL support, add "mysql qt" to your USE variable in `/etc/make.conf` and rebuild Qt by running

```
$ emerge qt
```

Install MySQL if this is the master system:

```
$ emerge mysql
```

All the necessary files will be downloaded and built. Even on a fast machine this may take a lot of time if you need to do a full Qt build.

4. System Configuration Requirements for Compiling MythTV

Before you compile MythTV from the current source tarball or from CVS, you may need to modify your system configuration in a few ways.

In general, if you install MythTV from pre-packaged binaries for your Linux distribution/version, you don't need to be too concerned about the issues in this section of the HOWTO – the install script for the packages should take care of them. However, this section is still recommended reading which may help if the packager skipped a step in their packaging.

4.1 Software requirements for compiling MythTV

General requirements

MythTV is written in C++ and requires a fairly complete, but standard, compilation environment, including a recent g++ compiler, make, and appropriate headers files for shared libraries. Any standard Linux distribution should be able to install a suitable compilation environment from its packaging system. Section 3.2 of this HOWTO provides some details of how to install the required environment for many distributions.

Subsequent sections of this chapter address the few oddities that you may have to adjust by hand before you compile MythTV.

The reference compilation system for MythTV is Debian.

Distribution-Specific Notes

None

4.2 Shared-Library Requirements for MythTV

Modifying /etc/ld.so.conf

The runtime manager for shared libraries, **/lib/ld.so**, gets information about the locations and contents of shared libraries from `/etc/ld.so.cache`, a file created by **ldconfig** from information in `/etc/ld.so.conf`. Because MythTV installs some shared libraries in `/usr/local/lib`, that directory needs to be added to the list of directories for **ld.so** to search when doing runtime linking of programs. You do this, as root, by editing `/etc/ld.so.conf`, then running **ldconfig**. There are many ways to do this; one that works is to enter this series of commands:

```
$ su -
# echo /usr/local/lib >> /etc/ld.so.conf
# /sbin/ldconfig
# exit
$
```

Distribution-Specific Notes

Red Hat

It appears that Red Hat Linux 8.0 requires that the **ldconfig** command be run twice. Red Hat will also frequently "forget" about the path. It's recommended to run `/sbin/ldconfig` after installing every package. Failing that, always run it if you get an unexpected error about not finding libraries.

4.3 Shell-Alias Requirements for MythTV

General requirements

QT libraries and binaries

The compiler needs to be able to locate QT binaries and libraries in order to compile MythTV. QTDIR needs to be set and `/usr/lib/qt3/bin` must be added to your path. Your distribution may already be making these changes as a part of the installation of the software prerequisites detailed earlier.

One way to do this is as follows:

Open a new shell and switch to superuser mode.

```
$ su
# set
[lots of text]

PATH=/usr/local/bin:/bin:/usr/bin:/usr/X11R6/bin:/usr/games:/usr/lib/qt3/bin:/home/mythtv/bin:/usr/l
QTDIR=/usr/lib/qt3

[lots more text]
```

You should see QTDIR and `/usr/lib/qt3/bin` in your path.

If you don't, do not proceed past this step until you have resolved this error. You may need to manually specify the QTDIR and PATH at the shell prompt before compiling.

Also, check that there has been a link created in `/usr/lib/qt3/mkspecs` called `default`. If not, you'll get errors during the compile. See the Troubleshooting Section for more information.

Distribution-Specific Notes

Mandrake

The following instructions work for Mandrake 9.0 and 9.1 using **bash** as the shell, and may be applicable for a distribution which uses `/etc/profile.d`.

As root, create the following file in `/etc/profile.d`. The example filename is "mythtv.sh". Use what you feel is appropriate.

Open a shell, and switch to superuser mode. **NOTE:** ^D means press CTRL and d at the same time.

```
$ su
# cd /etc/profile.d
cat > mythtv.sh
export QTDIR=/usr/lib/qt3
export PATH=$PATH:/usr/lib/qt3/bin
^D

# chmod a+x mythtv.sh
# exit
$ exit
```

The last two commands are to exit out of the shell. This way, when you next open a shell your new commands will take effect.

Red Hat

Red Hat Linux 8.0 uses an unusual character encoding scheme which causes problems when running certain programs. As a result, whenever you run `setup` or `mythfilldatabase` you will have to set a variable to correct this problem. Failure to set this variable will result in a lot of UTF-8 errors.

There are two modifications that you can make to your system to avoid this problem. The first is a system wide solution, the second will only apply to your current user.

The global change is to modify the `/etc/sysconfig/i18n` file and set `LANG="en_US"`. If you want the change to only affect a single user, you could create a file called `~/.i18n`:

```
$ echo LANG="en_US" > ~/.i18n
```

5. Downloading and compiling.

Get MythTV from the mythtv.org web site. Save the tarball to a directory you can find.

Get XMLTV from <http://xmltv.sourceforge.net>. Download version 0.5.14 if you're in North America.

NOTE: 0.5.14 is the last version that will work with MythTV 0.10. XMLTV 0.5.15 will only work with CVS versions of MythTV. Don't install the latest version of XMLTV if you're not running CVS.

NOTE for Mandrake users: If you have added a "PLF" mirror, you may skip the next step and type:

```
# urpmi libmp3lame0 libmp3lame0-devel
```

NOTE for Red Hat users: lame and lame-devel may be obtained from <http://freshrpms.net/rpm/lame/>. After downloading, be sure to install both:

```
# rpm -Uvh lame*
```

Get lame from <http://www.mp3dev.org/mp3>. Download the source code to v3.93.1 by following the links to sourceforge.net

5.1 Notes on compiling on a system with non-Intel processors.

If you've got a system with an AMD K6-2 or a VIA C3 processor, make the following change in the `settings.pro` file.

Look for

```
-march=pentiumpro
```

and replace it with

```
-march=i586
```

before you compile.

Recent AMD processors, like the Duron, Thunderbird and Athlon don't need this change.

5.2 Building LAME.

Open a shell and switch to the directory where you saved lame.

```
$ tar -xzf lame-3.93.1.tar.gz
$ cd lame-3.93.1
$ ./configure
$ make
$ make test
$ su
# make install
```

Check that it worked:

```
# ls -l /usr/local/lib
-rw-r--r-- 1 root root 381706 Nov 4 14:22 libmp3lame.a
-rwxr-xr-x 1 root root 674 Nov 4 14:22 libmp3lame.la*
lrwxrwxrwx 1 root root 19 Nov 4 14:22 libmp3lame.so ->
libmp3lame.so.0.0.0*
lrwxrwxrwx 1 root root 19 Nov 4 14:22 libmp3lame.so.0 ->
libmp3lame.so.0.0.0*
-rwxr-xr-x 1 root root 360197 Nov 4 14:22
libmp3lame.so.0.0.0*
```

```
# exit
$
```

5.3 XMLTV.

Red Hat Linux 8.0 & 9:

RPMs for **XMLTV** and all of its dependencies can be obtained from <http://atrpms.physik.fu-berlin.de/name/xmltv/>. The web page has a list of all the dependent packages you must download and install.

```
# rpm -Uvh xmltv* perl*
```

If you install from this location you may skip to [Manually building MythTV](#).

Mandrake

You may install the XMLTV prerequisites if you have added a contrib mirror by typing:

```
# urpmi perl-xml-twig perl-xml-writer perl-datemanip perl-libwww-perl
```

and skipping straight to the XMLTV compilation step.

Other distributions and manual installation.

NOTE: Red Hat Linux 8.0 and Suse 8.1 users, you *must* download and install an updated version of libexpat. The version that ships with Red Hat Linux 8.0 and Suse 8.1 (version 1.95.4) is buggy, and will cause problems with XML::Twig. All other distributions may skip this step and proceed with untar'ing the xmltv file.

If you get errors installing XML::Twig or other XMLTV prerequisites, try deleting the old versions of libexpat

```
$ su
# rm -f /usr/lib/libexpat*
# /sbin/ldconfig
# exit
```

Download version 1.95.5 from sourceforge.net: <http://sourceforge.net/projects/expat/>

Open a shell prompt:

```
$ tar -xzf expat-1.95.5.tar.gz
$ cd expat-1.95.5
$ ./configure
$ make
$ su
# make install
# /sbin/ldconfig
# exit
$
```

Continuing on:

Untar the xmltv file:

```
$ tar -xjf xmltv-0.5.15.tar.bz2
$ cd xmltv-0.5.15
```

Install the xmltv prerequisites:

```
$ su
# perl -MCPAN -e shell
cpan> install XML::Twig
cpan> install Date::Manip
Date::Manip is up to date.
cpan> install LWP
cpan> install XML::Writer
cpan> exit
```

Change to the XMLTV directory and compile it:

```
$ cd xmltv-0.5.15
$ perl Makefile.PL
```

You can answer "N" to the tv_check, tv_pick_cgi questions. Say "yes" to the grabber required for your location.

You may get errors about modules not being installed. They shouldn't matter if you're installing North America and have followed the instructions to this point.

```
$ make
$ make test
$ su
# make install
# exit
```

5.4 Manually building MythTV.

Unpack MythTV

```
$ tar -xjf mythtv-0.10.tar.bz2
$ cd mythtv-0.10
$ ./configure
$ make
```

NOTE for Red Hat 8 users: You must manually modify a Makefile within the themes directory, otherwise your on screen display (OSD) will be "generic" rather than themed. The solution is to edit the Makefile within the themes directory and comment out (using a # symbol before each line) every line that starts with the word "strip". Make sure you switch back to the MythTV build directory before executing the next step.

Switch to superuser:

```
$ su
# make install
# exit
```

NOTE: subsequent configuration steps assume that you are within the MythTV directory that you cd'd to above.

5.5 Gentoo.

Installation of MythTV on Gentoo consists of making a local portage directory with the necessary ebuild and digest files. Tony Clark <mailto:tclark@telia.net> has created a portage file which can be downloaded from <http://smalltime.com/mythtv/mythtv-gentoo-portage.tar.bz2>

Once you have downloaded the portage file, installation is simple.

```
$ su -
# emerge rsync # make sure portage is up to date.
# cd /usr/local
# tar xvfjp Path_To/mythtv-gentoo-portage.tar.bz2
# vi /etc/make.conf
```

Add mysql to your USE variable. ie USE="mysql"

Locate the line that contains: #/usr/local/portage and remove the #

```
# ACCEPT_KEYWORDS="~x86" emerge mythtv
```

NOTE: If you have perl dependency problems update to >=ExtUtils-MakeMaker-6.05-r4

6. MySQL.

6.1 Mandrake 9.0

If this is the system maintaining the database, make sure that mysql is running and started at boot. Click on Mandrake Control Center->System->Services, find mysql and click the "On Boot" button and the "Start" button if the mysql status shows that it isn't running yet.

NOTE: There have been reports that mysql isn't starting at boot.

```
$ su
# chkconfig --level 35 mysql on
# /etc/rc.d/init.d/mysql start
# exit
```

6.2 Red Hat Linux

If this is the system maintaining the database, make sure that mysql is running and started at boot. Click on Redhat menu>Server Settings>Services and enter the root password when asked. Check "mysqld" and then click Start. Click Save, then close the window.

This can be done from the command line by typing:

```
# /sbin/chkconfig mysqld on
# /sbin/service mysqld start
```

6.3 Gentoo

After installing mysql you need to initialise the database by running `mysql_install_db` as root.

6.4 Setting up the initial database.

This step is only required on the system maintaining the database, which may or may not be one of your MythTV boxes. If the database is on a non-MythTV machine you'll need to copy the `database/mc.sql` file to it.

To setup the initial mysql databases:

```
$ cd database
```

Mandrake 9.0 and Red Hat Linux

```
$ mysql -u root < mc.sql
```

Debian 3.0

```
$ mysql < mc.sql
```

Gentoo

```
$ su
# mysql < /usr/share/mythtv/database/mc.sql
```

If you've already got a copy of the database installed and need to update the schema, use the `-f` flag to force **mysql** to continue setting up the tables even if they already exist. By default, **mysql** will stop at the first error.

NOTE: It is good practice to set a root password for mysql. Instructions for doing so can be found on MySQL's web site at <http://www.mysql.com/doc/en/Security.html>.

6.5 Upgrading the database

If you need to upgrade the database, either because you're using the CVS version of MythTV, or because you're moving from one release to another, you'll need to run the appropriate **mysql** script found in the `database/` directory. Use the same format as above, replacing "mc.sql" with the appropriate .sql file:

So, if you're upgrading from MythTV 0.9 to 0.10 on a Mandrake system:

```
$ cd database
$ mysql -u root < 0.9-to-0.10.sql
```

Modifying access to the MySQL database for multiple systems

If you're going to have multiple systems accessing a master database, you must grant access to the database from remote systems. By default, the `mc.sql` script is only granting access to the localhost.

To allow other hosts access to your master database, you can either set it up for no security at all, or with more

granularity. Note that the "%" is the wildcard character in MySQL.

NOTE: The "no security" option is *very* dangerous unless you're in a controlled environment.

This example has no security at all, and allows access from any host.

```
$ mysql -u root mythconverg
mysql> grant all on mythconverg.* to mythtv@"%" identified by "mythtv";
```

For a more secure setup, you can restrict which machines or subnets have access. If you have a complete DNS system operational, you could do the following:

```
$ mysql -u root mythconverg
mysql> grant all on mythconverg.* to mythtv@"%.mydomain.com" identified by "mythtv";
```

Finally, if you just want to restrict by IP subnet:

```
$ mysql -u root mythconverg
mysql> grant all on mythconverg.* to mythtv@"192.168.1.%" identified by "mythtv";
```

7. Setting up ALSA and the mixer.

If your video doesn't appear to be in-sync with your audio, it could be because you are listening to the real-time audio from your video card rather than after it's been processed and synchronized to the video by MythTV. Because MythTV is a personal video recorder, "Live TV" isn't really live – to let you pause live TV, MythTV is actually encoding the video, saving to disk, and then playing it back. This procedure puts your MythTV "live" TV about 2 seconds behind real-time, so it's important that you're not listening to the live audio. However, if you're having an issue where the audio and video aren't synchronized by small but varying amount, it's most likely because the sound driver that you're using doesn't have the DSP_CAP_REALTIME capability. This was the case with ALSA (0.5), but not with newer versions (0.9).

What you need to do is to mute the "line-in" of your sound card and also set it as the recording source.

There are two ways to do this. Graphically, and from the command line.

7.1 Graphically setting up the mixer.

Mandrake 9.0 and Red Hat Linux

Open Kmix by clicking K->Multimedia->Sound->Kmix for Mandrake, or

RedHat Menu>Sound & Video>Volume Control

on Red Hat.

Click on Settings->Configure Make sure that "Tick Marks" and "Show labels" have "X"'s in them. This will make it easier to find the correct audio source. Click OK.

On the mixer page, look for Line-In on your sound card. You should see two LED's – a green one at the top, and a red one at the bottom. The green one at the top is for muting; you want to make sure that the green LED is a dark green, meaning that it's "off". You also want to click on the red LED so that it turns bright red, indicating that it's "ON"; this insures that the Line-in is used as the source. Click OK, and make sure that you save the settings so that this is your

default.

Using OSS drivers.

Red Hat Linux 8.0 ships with OSS sound drivers rather than the ALSA drivers recommended by the MythTV team. The OSS drivers do work for many people, and for many cards. We recommend that you give OSS a try since it is already included in Red Hat 8. However, some people report problems (sync and jitter) with OSS, and in addition it does not support full duplex on some cards. Full duplex is required if you want to record and play sound using just one sound card. ALSA has good full duplex support, and also has drivers for some built-in (motherboard) sound cards that OSS does not. Installing ALSA is less painful than you might think, so if OSS does not work for you, installing ALSA is not too difficult. For those of you who do not wish to install ALSA you must do this:

To configure sound to work with MythTV, select

```
RedHat Menu>Sound & Video>Volume Control
```

to open up a mixer. Make sure your global volume (on the far left) is up. Also make sure that the "line in" section has "mute" and "record" checked and that the gain is turned up. You may have to experiment with volume/gain levels to get the best sound. If you experience difficulty with sound try moving your patch cord from "Line in" to "Mic in". You will need to go back to the mixer and select "mute" and "record" on the "Mic in" and turn up the gain for the Mic rather than Line.

Using ALSA drivers.

For those of you who do want to install ALSA please follow the directions below, compiled with much assistance from Gregorio Gervasio.

First you must find out the name of your driver, which isn't necessarily the same as the name of your sound card. Go to <http://www.alsa-project.org/alsa-doc/>, find your sound card on the list and click "details". Near the top it will say something like "The module options for snd-XXX", where XXX is the name of your driver. In the instructions below, replace "XXX" with the name of your driver.

Download the development release (0.9.x) from the ALSA web site <http://www.alsa-project.org>. You need at least three files:

- alsa-driver-0.9.x.tar.bz2
- alsa-lib-0.9.x.tar.bz2
- alsa-utils-0.9.x.tar.bz2

Start with the alsa-driver package:

```
$ tar -xjf alsa-driver-0.9.x.tar.bz2
$ cd alsa-driver-0.9.x
$ ./configure --with-cards=XXX --with-sequencer=yes
$ make
$ su
# make install
# ./snddevices
# exit
$
```

This will compile and install the kernel modules and initialization scripts, as well as create device nodes in /dev.

Install the rest of the packages:

```
$ cd ~
$ tar -xjf alsa-lib-0.9.x.tar.bz2
$ cd alsa-lib-0.9.x
$ ./configure
$ make
$ su
# make install
# exit
$ cd ..
$ tar -xjf alsa-utils-0.9.x.tar.bz2
$ cd alsa-utils-0.9.x
$ ./configure
$ make
$ su
# make install
```

Next, you must edit `/etc/modules.conf` so that the ALSA modules are loaded automatically. The first step is to remove your old OSS configuration to ensure that you don't end up with mysterious conflicts in the future. You should end up with a `/etc/modules.conf` file that has this configuration:

```
alias char-major-116 snd
alias snd-card-0 snd-XXX
# module options should go here
# OSS/Free portion
alias char-major-14 soundcore
alias sound-slot-0 snd-card-0
# card #1
alias sound-service-0-0 snd-mixer-oss
alias sound-service-0-1 snd-seq-oss
alias sound-service-0-3 snd-pcm-oss
alias sound-service-0-8 snd-seq-oss
alias sound-service-0-12 snd-pcm-oss
```

"XXX" should be the ALSA driver name for your sound card/chip. In some rare cases you need to supply extra options to the driver. These options are described in the "INSTALL" file in the `alsa-driver` directory or at <http://www.alsa-project.org/alsa-doc/>.

For now we will assume that no extra options are required. The next step is to ensure that the ALSA drivers are started during boot-up.

```
$ su
# cd /etc/rc.d/init.d
# /sbin/chkconfig --add alsasound
```

The next set of instructions will cause the ALSA volume/mixer/etc. state to be saved when the machine is shut down properly. Note that the mixer settings won't get restored the next time you boot unless you ran the shutdown script or you've explicitly saved the state which you can do as root with:

```
# alsactl -f /etc/asound.state store
```

Reboot your machine. Login and adjust the sound levels using "alsamixer". You should increase the main volume (the first slider) and the PCM volume, and unmute them by hitting "m". For MythTV, if your tuner card audio output is patched to the Line-In input of your sound card, set the Line input for capture by pressing SPACE at the slider and mute it by pressing "M". If you've patched your tuner card to the Mic-In port of your soundcard, follow the same instructions

but make sure that you're on the Mic slider.

Test the driver by playing a simple file:

```
$ aplay /usr/share/sounds/info.wav
```

If it works, you're done installing ALSA!

7.2 Setting the mixer from the command line.

If you have installed the `alsa-utils` package, then the **amixer** program can be used to setup the mixer. The "Master" volume setting is only required on a frontend machine, because it will prepare your machine for playing sound. The "Line" and "Capture" controls are required for your sound card to actually capture audio from the external Line-in. Not all sound cards have a "Capture" control, but if yours does and you don't set it then MythTV will not capture audio.

Note the spelling in the following commands.

```
$ amixer set Master,0 100%,100% unmute
$ amixer set Line,0 75%,75% mute captur
$ amixer set Capture,0 100%,100% mute captur
$ su
# alsactl store
# exit
$
```

If you have multiple sound cards, then use the `-c` parameter to specify which card to adjust. Note that the first card will be "0", the second will be "1", etc.

That takes care of setting the volume correctly, and the ALSA startup script will restore the volume after a reboot.

You may also use the **alsamixer** program to set the volume. First, start **alsamixer** from the command line. You should start out on the "Master" volume control slider. Use the up and down cursor to set the master volume to around 75%. Next, use the left and right cursor keys to move around on the screen until you find the "Line" slider. Press SPACE to set it as the capture source, set the level to around 50–75% and press "M" to mute it. You can now press ESC to exit out of the **alsamixer** program. You can also have MythTV manage all volume and mute settings, but this will only affect the "Master" or PCM volume, not the capture volume. See the mythfrontend setup page for options.

8. Setting up a remote control.

MythTV does not have native remote control receiver and decoder software built-in. Instead, remote control functions are implemented by cooperating with **lirc**, the Linux Infrared Remote Control program. **lirc** handles the IR hardware and passes keystrokes to MythTV, which then acts as if the user had pressed the keys on the keyboard. The file `keys.txt` describes the keys used to control MythTV.

NOTE: If you are running Mandrake 9.1, you may install **lirc** by executing: `# urpmi lirc lirc-remotes` and bypass the manual compilation steps described below by jumping to the [Completing the lirc install](#) section. See the `contrib/mandrake91.etc.sysconfig.lircd` file for an example of how to configure `lircd`.

Some IR devices require a kernel recompile, and some don't. However, all at least require having the kernel source available as a resource for the `lirc` build process.

8.1 Gentoo

To install lirc on Gentoo, all you need to do is:

```
$ emerge lirc
```

8.2 Mandrake 9.0

lircd has two prerequisites: **dialog**, available in Mandrake through the "cdialog" RPM, and the kernel source. Mandrake 9.0 is using the 2.4.19 kernel, so either install the kernel sources from the installation CD or go to <http://www.kernel.org> and download the full 2.4.19 tar file from <http://www.kernel.org/pub/linux/kernel/v2.4/>.

Obtaining the kernel.

Install using urpmi.

```
$ su
# urpmi kernel-source
```

8.3 Red Hat Linux

You should already have the source from the "Kernel Development" package you installed in section 3.2. Ensure that a symlink has been created:

```
$ cd /usr/src
$ su
# ln -s linux-2.4 /usr/src/linux
# exit
```

8.4 Obtaining and compiling lirc.

You're going to need to download and compile **lircd**. Go to <http://www.lirc.org> and download lirc; as of 2002-11-07, the version available is 0.6.6. Grab the remotes.tgz file as well.

```
$ tar -xjf lirc-0.6.6.tar.bz2
$ cd lirc-0.6.6
$ ./setup.sh
```

You're going to need to know what sort of receiver you have and where it's connected. In the case of the Pinnacle Studio TV card, with the IR receiver connected to COM1 (/dev/ttys0), once the configuration menu comes up, perform the configuration by going to Driver Configuration->Other Serial Port Devices->Pinnacle Systems Receiver->OK and on the next page select COM1->OK.

Each remote is different; some remote receivers connect directly to your capture card and not to a serial port, so make sure that you've got the correct one.

You then click "Save Configuration and run configure" to continue.

Make sure you read the last text generated by the configure step. It will tell you if you require a kernel recompile, and what the name of your kernel module will be (if necessary). For instance a home-built receiver may require a kernel

recompile, so you would be notified that you will have to load the `lirc_serial` module. If you did not get any such messages skip the kernel recompile steps below and go directly to making and installing the lirc driver.

Once the configuration step is complete:

```
$ make
$ su
# make install
# chmod 666 /dev/lircd
```

At this point, if you're using a serial receiver, check that the link has been correctly made in `/dev`:

```
$ ls -l /dev/li*
lr-xr-xr-x    1 root    root          5 Jan 27 09:00 /dev/lirc -> ttyS0
srw-rw-rw-    1 root    root          0 Jan 27 15:01 /dev/lircd=
prw-r--r--    1 root    root          0 Jan 27 09:00 /dev/lircm|
```

As you can see, there's a link from `/dev/lirc` to `ttyS0`, aka "COM1".

If the link was not created, ensure that you ran the `make install` step as root. If it still doesn't work, then you must create the link manually. In this example, the IR device is connected to `ttyS0`. If it were connected to "COM2", then use `ttyS1`, etc.

```
$ su
# cd /dev
# ln -sf ttyS0 lirc
# exit
$
```

NOTE: The above example assumes that your receiver uses the standard serial driver. Some receivers do not, including receivers that plug into a TV capture card. Check the lirc documentation, but it may be necessary to replace the link created above with a a character pipe:

```
# mknod /dev/lirc c 61 0
```

See the lirc documentation for additional information. The lirc installation *should* create this for you, so manually creating it indicates that your lirc installation may have other issues.

Recompiling your kernel on Red Hat Linux

Don't Panic! Red Hat makes a kernel recompile very easy. They provide configuration files that make it so you can recompile your kernel with Red Hat defaults. And as a side benefit, your kernel will be compiled specifically for your architecture. For a more detailed description (or if you run into trouble) of how to do this go to

<http://www.redhat.com/docs/manuals/linux/RHL-8.0-Manual/custom-guide/ch-custom-kernel.html>

For the impatient: Make sure you have an emergency floppy boot disk available!

```
$ cd /usr/src/linux
$ su
# make mrproper
# cd configs
# ls
```

at this point you must look at the file names and determine which config file is right for you. For instance if you have an Athlon XP you should choose "kernel-2.4.18-athlon.config" but if you have a dual processor P4 you might choose "kernel-2.4.18-i686-smp.config"

```
# cp yourconfig.config ../.config
# cd ../
# make xconfig
```

At this point you will get a graphical configuration utility. All that you must do to make lirc work is go to the "character devices" section and change "Standard/generic (8250/16550 and compatible UARTs) serial support" from "y" to "m". Now if you want you can have a look around. For instance, you might wish to turn off ham radio support, or perhaps turn off pcmcia support if you are not on a laptop. But be careful! Only change things you know you can change. If you are not sure, just stick to the one required change. Click "save and exit". Next:

```
# make dep
# make clean
# make bzImage modules
# make modules_install
# make install
```

if you are using **grub**, that should be it, reboot and select your custom kernel upon boot. If you are using **lilo**, change your lilo configuration according to <http://www.redhat.com/docs/manuals/linux/RHL-8.0-Manual/custom-guide/s1-custom-kernel-bootloader.html> Remember, if you have any custom kernel modules (ALSA, etc) you will have to recompile/reinstall those.

8.5 Completing the lirc install.

NOTE to Mandrake 9.1 users: skip to the manual start paragraph below.

If the lirc configure program / compile did not mention anything about a kernel module, then you are finished. If it did mention a kernel module, you must edit the `/etc/modules.conf` file. Add this line as the first thing in the file. It must come first, or it may not work.

```
alias char-major-61 XXX
```

replace XXX with the name which you determined earlier, which in this example was "lirc_serial"

```
$ su
# modprobe lirc_serial
# /sbin/ldconfig
```

Next, we're going to manually start lircd the first time. Mandrake 9.1 users, type: `# /etc/rc.d/init.d/lircd start` instead of:

```
# /usr/local/sbin/lircd
```

If this fails, complaining of a missing `lircd.conf` file, then you must find or make one. First look for a premade configuration file at <http://lirc.sourceforge.net/remotes/>. Mandrake 9.1 users, look in `/usr/share/lirc-remotes`. If you find one your remotes either on the website or in `/usr/share`, download or copy the file, name it `lircd.conf` and put it in your `/etc` directory. If you couldn't find your remote, you must make your own `lircd.conf` file.

To make your own `lircd.conf` file

```
$ irrecord myremote
```

Follow the on-screen directions to train your remote and define keys. If your remote ends up working well, you should consider submitting your `lircd.conf` file back to the lirc developers. Once finished:

```
$ su
# cp myremote /etc/lircd.conf
```

now try to start lircd again:

```
# /usr/local/sbin/lircd
```

Now, we're going to add the commands necessary for lircd to run each time we boot. Mandrake 9.1 users, you can execute:

```
$ su
# chkconfig --level 35 lircd on
# exit
```

All other distributions:

```
# cd /etc/rc.d
# cat >> rc.local
echo "Starting lircd"
/usr/local/sbin/lircd
^D
# exit
$
```

This takes care of the lircd portion, which "listens" for the IR signals. If everything went well, the install script for lircd put an appropriate configuration file for your remote into `/etc/lircd.conf`. This file maps the buttons on the remote control to the IR pulses coming from the receiver.

The next step is to convert those signals into something that can be used to control MythTV.

```
$ cd ~/mythtv-0.10/configfiles
$ cp lircrc.example ~/.lircrc
```

or

```
$ cp lircrc.example.pinnaclestudiopctv ~/.lircrc
```

if you've got a Pinnacle Studio PCTV remote.

```
$ irw
```

Start pressing the keys on your remote; **irw** will print the name of the button as it is defined in your `/etc/lircd.conf`. If you don't see anything at this point, you need to troubleshoot further by going back to the lirc home page and investigating from there.

If it is working, then press **CTRL-C** to abort the program. Once you know that your remote is working, you need to run the **irxevent** program, which takes the key presses and sends them to MythTV. **irxevent** isn't a daemon, so if you know that your remote is working you need to invoke it like this:

```
$ irxevent &
```

If **irxevent** isn't running, then MythTV will not respond to your remote control.

8.6 Additional information for lirc.

Take a look at the `lircrc.example` files in the `configfiles/` directory. In my case, (Pinnacle Studio card) the channel up and down functions weren't working, due to the fact that the button names were different than the default `lircrc.example` file that came with MythTV.

The `lircrc.example` file has this:

```
begin
    prog = irxevent
    button = ChannelUp
    config = Key Up CurrentWindow
end

begin
    prog = irxevent
    button = ChannelDown
    config = Key Down CurrentWindow
end
```

but the `/etc/lircd.conf` that comes in the `lircd` package defines the buttons for the Pinnacle Studio PCTV as:

```
channel+          0x0000000000000017
channel-          0x000000000000001C
```

rather than "ChannelUp" and "ChannelDown". I added the following to my `/home/[yourusername]/.lircrc` file:

```
begin
    prog = irxevent
    button = channel+
    repeat = 3
    config = Key Up CurrentWindow
end

begin
    prog = irxevent
    button = channel-
    repeat = 3
    config = Key Down CurrentWindow
end
```

which took care of basic functionality. Because the PCTV Studio remote has additional buttons, look at the `configfiles/lircrc.example.pinnaclestudiopctv` for an example of how to define additional buttons, and how to debug potential button name conflicts between the `lircrc.example` file and how **your** remote defines the button names.

By examining the button names defined in `/etc/lircd.conf` and using the **irw** program to make sure that your remote is working, you can create the appropriate mappings in `.lircrc` to get excellent remote functionality with MythTV.

Note the **repeat** = parameter. This informs the `irxevent` program to pass through every third keypress. By default, `lirc` will only send one keypress to the application, even if you're holding down the key. The actual **repeat** = number will vary from system to system, so experiment and see which value works best for you.

8.7 Configuring lirc for use with an IR blaster.

By Carlos Talbot, <mailto:carlos@talbot.net>

Lirc has support for various IR transmitters. A popular model is the Actisys IR-200L <http://store.yahoo.com/snapstreammedia/irblasbun.html>. It was originally designed for IRDA communication, but can be used to transmit A/V remote control codes. By using the lirc SIR driver, this device can easily be integrated with MythTV. I have tested this device with an AT&T DCT2000 digital cable box but the instructions can be used to configure other IRDA devices and A/V remotes.

Follow the steps in the previous section. When you run `setup.sh`, select option 1, driver configuration. From here select option 6, IrDA hardware. Select your appropriate device and the corresponding serial port, then Save configuration & run configure from the main menu. Once configure is done type:

```
$ make
```

Please note: unlike the Pinnacle receiver above you will be compiling `lircd` in addition to a kernel module for the SIR transmitter. Depending on whether you have your serial port driver configured as a kernel module you might see the following message during make:

```
lirc_sir.c:56:2: warning: #warning
"*****"

lirc_sir.c:57:2: warning: #warning "Your serial port driver is compiled into "

lirc_sir.c:58:2: warning: #warning "the kernel. You will have to release the "

lirc_sir.c:59:2: warning: #warning "port you want to use for LIRC with:"

lirc_sir.c:60:2: warning: #warning "setserial /dev/ttySx uart none"

lirc_sir.c:61:2: warning: #warning
"*****"
```

If you do receive this statement make sure to run the **setserial** command before you load the `lirc_sir` module. Follow this with the install:

```
$ su
# make install
```

You will notice that lirc installs the kernel module in `/lib/modules/uname -a/misc`.

The configuration for starting **lircd** differs if you're going to be sending and receiving IR versus just receiving.

```
# cd /etc/rc.d
# cat >> rc.local
echo "Starting lircd"
setserial /dev/ttySx uart none          # (if required)
modprobe lirc_sir
```



```

/usr/local/sbin/lircd
^D
# exit
$

```

At this point you have to populate the `/etc/lircd.conf` file with the proper codes for your A/V remote. You should be able to find your remote within the lirc remote tar file located at <http://www.lirc.org/remotes.tar.bz2>. In my case I extracted the file from `remotes/motorola/DCT2000` (`gi-motorola-dct2000`)

To test the `lirc_sir` module you can run **irw** to verify the codes are being received. If everything is configured correctly you should see something similar to the following:

```

$ irw
0000000000007ff0 00 1 gi-motorola-dct2000
000000000000bff8 00 2 gi-motorola-dct2000
000000000000f7f0 00 ENTER gi-motorola-dct2000

```

Once you've verified lirc is working you can press **CTRL-C** to exit **irw** and configure the channel changing script.

The path to the channel changing script will need to be entered on the mythbackend setup screen for Input Connections.

This csh script will be called each time MythTV needs to change the channel. Below is a copy of the script followed by the corresponding perl script. Make sure both are in your path. Also make sure you leave the `#!/bin/csh` setting and not change it to `bourne` or `bash`. This will create a frustrating symptom to diagnose where MythTV cannot open `/dev/device`. Unlike `bourne` or `bash`, `csh` scripts automatically close parent file descriptors before they start.

```

$ cd /usr/local/bin
# su
# cat > change_channel.csh
#!/bin/csh
echo "changing to $1"
/usr/local/bin/channel.pl $1 &
^D
# chmod a+x change_channel.csh
# exit
$ exit

```

See `contrib/channel.pl` for the actual file. Copy it to `/usr/local/bin/`

The last statement within the perl script is the `lirc rc` command. This is the command that transmits the code to your cable/dss box. Make sure to have the IRDA device within a few feet of the box.

9. Configuring MythTV.

By this point, all of the prerequisites have been installed, **mysql** is running and has had its initial database setup. It's now time to configure MythTV.

9.1 Configuring the master backend system.

Open a shell and decide where you will store your video files. By default, MythTV will assume that you will be using `/mnt/store/`, but if this directory doesn't exist, or it exists and you don't have write privileges to it then MythTV will fail when you attempt to make a recording. The following example is specific for `/var/video`, but the same instructions would apply if you want to keep the default but don't have the directory structure setup yet. See the [Advanced](#)

Partition Formatting section for hints on creating a partition for MythTV.

If you create a `/var/video` subdirectory, change `/mnt/store/` to `/var/video/` in the setup screens.

```
$ su
# mkdir /var/video
# chmod a+rwX /var/video
# exit
```

The first thing to configure is the master backend system. If you are running multiple backend systems, the master backend will make all decisions about which programs will be recorded on which tuners. If you have only one backend, then it will be its own master.

The master will always choose the first available tuner in the same order as you add cards through "setup". In other words, the second card you add will only be used when there are two overlapping recordings, the third when there are three, and so on. Therefore, you will want to have your largest disk space on the master because the tuner on the master will always be the first choice. You will then want to add your other backends in the order of your preference for recording.

See Advanced Backend Configurations for information on configuring multiple backend systems in various ways.

Because MythTV now uses a database to store most configuration variables, part of the bootstrap of MythTV is to indicate the location of the MySQL database server. If the frontend, backend and MySQL database server are all going to be running on the same box, you can continue to the next step. If not, you'll need to edit the `/usr/local/share/mythtv/mysql.txt` file and change the first line to the IP address of the database server. All other configuration is within the MythTV GUI screens.

NOTE: Users that have been running the frontend and the backend on different machines using Red Hat Linux 8.0 have stated that they have been having issues with remote access to the MySQL database. The following instructions may or may not work. Add the following to `/etc/my.cnf` on the backend machine and restart MySQL.

```
skip-innodb
set-variable=thread_stack=256k
```

Switch to the setup directory and run the setup program:

```
$ cd setup
$ ./setup
```

The backend setup program will start and offer you a number of choices. It is *strongly* recommended that you go through them in order.

The first question will ask if you wish to clear out your existing configurations for your capture cards. Initially, you should say "YES" so that there are no surprises later.

The next question will ask you if you wish to clear out your video source information. You should answer "YES" to this as well.

Once the graphical setup starts, you'll see that there are four choices.

1. General
2. Capture Cards
3. Video Sources

4. Input Connections

Use the arrow keys to move around, and press the space bar to select which option you wish to configure.

General

The first screen of the General configuration deals with IP addresses of the system that you're running setup on and any master backend you may have. If you've only got one machine, then the default values are fine and you can move to the next page by pressing the space bar. If you need to move around the screen, use the arrow keys to move focus between settings and not the mouse.

If you will have multiple backends, then *do not* use the "127.0.0.1" IP address.

It is very strongly discouraged that you make any changes to the port settings from the defaults.

Once you're satisfied with the values, move the focus down to Next and hit the space bar.

The next screen details the Host-specific Backend setup. This is where you will set the specific directory paths for this particular backend. Make sure that you've followed the steps at the beginning of this section and created a directory that exists and that MythTV will have write privileges to. When you're done, press Next to continue, taking you to the Global Backend Setup.

On the Global Backend Setup configure your backend with the appropriate settings. Use the left and right arrow keys to iterate through the choices available on each setting, and the up and down keys to move between settings. Move to Finish when you're done and press the space bar, taking you back to the main configuration screen.

Capture Cards

You should have no capture cards defined, so the highlight will be on (New Capture Card). Press space to begin.

Choose the appropriate settings for your particular tuner. Use the arrow keys to move around and to make your choices, and press RETURN when complete. Pressing RETURN will take you back to the Capture Cards screen; if you have additional capture cards in this machine, press the space bar when the highlight is on the (New Capture Card) row to define another card. Once you have no additional cards to setup, press ESC.

Video Sources

When you start, the highlight should be on (New Video Source). Press the space bar to begin. The first field asks for the name of the video source. You may choose something easy to remember, like "Antenna" or "Cable". Once you've chosen a name, press the down arrow to move to the next field. If you're in North America, move to the Zip/postal code field and put in the appropriate value.

If you're outside of North America, then some manual interaction will be required with XMLTV.

NOTE: If you are in North America, and you enter your Zip/postal code and nothing seems to happen for a very very long time, it is possible that XMLTV is waiting for you to provide some input. Use ALT-TAB or whatever key combination your window manager uses to switch programs and look for a terminal window running XMLTV that may be waiting for input.

Once you have chosen your provider, press RETURN to continue. XMLTV will now begin collecting the initial data for your location. The screen may blank for a few seconds to several minutes, depending on the load of the listings provider and the speed of your connection to the internet. Be patient!

You will then be returned to the Video Sources screen. If you have multiple video sources available, such as Antenna, Cable, etc, go ahead and define them all, even if they're not all going to be physically connected to the master backend server. Once you're done, press ESC to return to the main screen.

Input Connections

The final configuration item is Input Connections. On this screen, you will associate the various video sources you defined earlier with a physical input to a encoder card. It's entirely possible that you have multiple tuners, and each tuner has a different input, so on this screen you let MythTV know which device will connect to which input source.

When you start this screen, you should see a listing of the various input connections available on each of the Capture cards you defined earlier. For example, you may have a capture card with a tuner, a SVideo and a Composite connection. If you wanted to associate the tuner (aka, "Television") with an "Antenna" source you defined in Video Sources, you would move to the /dev/videodevice (Television) → line and press the spacebar. Using the left and right arrow keys will show you the various choices you have already created for video source. In our case, you would use the left/right cursor keys until "Antenna" was shown in the Video Source field. Press down to move to the next setting, all of which should be self-explanatory.

Once you're done, press RETURN to go back to the Input Connections screen. You would then finish associating the video sources to any other hardware devices you have available.

Press ESC to return to the main menu, and press ESC again if you have no further items to configure, thereby returning you to the command line.

9.2 Post-configuration.

Run the mythfilldatabase program as directed. The master backend will obtain guide data for all the video sources you defined during setup.

Once mythfilldatabase has finished, start the master server before continuing.

```
$ mythbackend
```

mythbackend will print information about connections and what it's doing to the console. If you'd like to see the options that are available for mythbackend, type `mythbackend -h` for help.

As of 2003-03-27, the available options are:

```
$ mythbackend -h
Invalid argument: -h
Valid options are:
-l or --logfile filename    Writes STDERR and STDOUT messages to filename
-p or --pidfile filename    Write PID of mythbackend to filename
-d or --daemon              Runs mythbackend as a daemon
-v or --verbose             Prints more information
```

Running mythbackend as a daemon and using the logfile option will allow you to have mythbackend automatically start

up during the boot process. For example, you may add this to your `rc.local` file, or you can follow the steps outlined in the section called I'd like to automatically start mythbackend at system boot time.

9.3 Configuring a non-master backend.

Configuration of a non-master backend follows the same general procedure as that of the master backend, with the exception that you skip over the "Video Sources" step. All possible video sources need to be defined on the master backend system; only the master backend will query a listings provider to obtain guide data for all the slave backends.

Make sure that the IP addresses on the General setup screen are accurate. If the slave backend can't communicate with the master backend due to IP address misconfiguration then MythTV will not function properly.

Ensure that you've granted access to the master MySQL database for remote backends as discussed in the section titled Modifying access to the MySQL database for multiple systems and that you've edited the `/usr/local/share/mythtv/mysql.txt` file and put the correct IP address for the database server.

NOTE: Do not run `mythfilldatabase` on a non-master backend.

9.4 Configuring and running mythfilldatabase.

NOTE: `mythfilldatabase` might take a while to complete, depending on any number of factors, most of which you can't control. It's best to just let the program run to completion.

`mythfilldatabase --manual` is another option; the manual option will allow you to fine tune channel frequencies and specify which channels will be added to the database. If you are not using the `tv_grab_na` grabber, you must use the `--manual` option.

`mythfilldatabase --file` is an option if there isn't an XMLTV grabber for your country, but you **do** have an XML formatted listings file created by some other program.

`mythfilldatabase --xawchannels` is an option if you have used `xawtv` to fine-tune your channels and would like to import the fine tuning offsets into MythTV.

Setting mythfilldatabase to run from cron

In order to keep your database filled, `mythfilldatabase` should be run once a day.

There are two ways to accomplish this: either as a user-based cron job, or as a system based cron. If you use a user-based cron, you can select the time that the cron job will be run. A system-based cron job will run at the same time as any other system cron jobs.

If you are a Mandrake 9.0 user and wish to use a system cron job, you can perform the following steps:

```
$ cd configfiles
$ su
# cp mythfilldatabasecron /etc/cron.daily
```

If you want to know what time your job will run, you can do the following:

```
# cat /etc/crontab
```

```

SHELL=/bin/bash
PATH=/sbin:/bin:/usr/sbin:/usr/bin
MAILTO=root
HOME=/

# run-parts
01 * * * * root nice -n 19 run-parts /etc/cron.hourly
02 4 * * * root nice -n 19 run-parts /etc/cron.daily
22 4 * * 0 root nice -n 19 run-parts /etc/cron.weekly
42 4 1 * * root nice -n 19 run-parts /etc/cron.monthly
# exit
$

```

We can see from the display that the cron.daily job will run at 0402 every morning.

If you wish to specify a custom time, then the user-based cron job is the better method.

The default **configfiles/mythcrontab** file will run the **mythfilldatabase** program every day at 0430. If you want to change this, then open the **configfiles/mythcrontab** file in your favorite editor and modify it as you like. Once you're satisfied with the time that **mythfilldatabase** will run, save and exit, and return to the shell prompt.

```

$ cd configfiles
$ crontab mythcrontab
$ crontab -l NOTE: this is a lowercase L.
# The following will run the mythfilldatabase shell script at 0430
# every day. Format is
# minutes hour day_of_month month day_of_week
# man 5 crontab for more information
# Need to use a shell script because the QTDIR environment variable isn't
# being honored by crontab?
# The next text should be all on the same line.
30 04 * * * /bin/bash $HOME/mythtv-0.10/configfiles/mythfilldatabasecron
$

```

As you can see, **mythfilldatabase** will now be run at 0430 every day.

If you decide to alter the time that the **mythfilldatabase** runs, you can use the **crontab** command to open your existing job and edit it in place.

```
$ crontab -e
```

The **crontab -e** command will allow you to edit the existing crontab. **NOTE:** By default, the crontab will use **vi** as your editor. If you don't like to use **vi**, make sure that you've set **VISUAL** to something other than **vi**.

```

$ export VISUAL=/usr/bin/joe
$ crontab -e

```

This will cause **crontab** to use **joe**, a visual editor that uses the Wordstar command sequence. You may use **emacs**, or any other editor that you're comfortable with. You may also add the **EXPORT** command to your **.bashrc** or to the **/etc/profile.d/mythtv.sh** file.

10. Configuring mythfrontend.

Once you have completed configuration of your backend systems, the next step is to configure the frontend client. You should run the MythTV setup program before using any other modules such as MythMusic, etc. to correctly initialize the

database.

When you start mythfrontend, you should have a number of choices. Before doing anything, go to TV, then to Setup and configure the frontend client.

10.1 General

The General screen has configuration items that don't really fit anywhere else. The first few configuration items asks you to indicate the number of seconds to record before or after a program, which is useful if the broadcast network or your system clock are out of sync and will help prevent you missing the beginning or end of a program.

To change the value, use the left and right arrow keys to increment and decrement the number of seconds. When you're satisfied with the result, use the down arrow to put the input focus on the Next button or press RETURN to continue to the next page.

The next page has a number of options to do with how channels are displayed on your system. The help text will give you more information. Move the focus to Next and press the space bar to continue.

The final General page sets up some final configuration items. See the help text for more information.

10.2 Appearance

This set of screens is mostly concerned with how MythTV will look on your system. From here, you can choose different themes and set the resolution of your system.

10.3 Program Guide

Fairly self explanatory. Note that the alternate program guide does not use the same font settings as defined in Appearance, so if the EPG is unreadable this is where you make the adjustments to fonts, number of elements displayed, etc.

10.4 Playback

The one configuration item which may cause problems on your system is the "Deinterlace playback" setting. MythTV uses a linear blend algorithm for deinterlacing, which will improve how the image looks on your screen. Deinterlacing requires that your processor support SSE. (Streaming SIMD Extensions, aka "MMX2"). Early Intel Celeron (those that don't use the Coppermine 0.18um core and are usually <600Mhz), Pentium Pro and Pentium II CPUs do not have SSE, so make sure that you haven't enabled deinterlacing if your processor doesn't support it. If you enable it, and your processor doesn't support SSE, you will get "Illegal Instruction" errors.

To determine if you've got SSE on an Intel processor, you can:

```
$ cat /proc/cpuinfo
[snip]
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
cmov pat pse36 mmx fxsr sse
```

Notice the **sse** at the end of the line – this tells you that this processor will be able to deinterlace correctly.

On an AMD processor, look for "3dnow" in the cpuid line; "3dnow" is AMD's implementation of SSE instructions, so if your processor has 3dnow you shouldn't have any issues with deinterlacing.

10.5 Recording

Currently, MythTV supports two different video encoders, MPEG-4 and RTJPEG. Take note that RTJPEG has lower CPU demands, but makes large files, and MPEG-4 has high CPU demands, but makes smaller files.

NOTE: although the width and height can be changed to almost anything, if you start MythTV and don't see video or you get "segmentation fault" errors, it is likely that the video4linux (v4l) subsystem did not like the height and width parameters specified. It's best to leave the default as-is until you're sure that MythTV is operational.

11. Using MythTV.

The `keys.txt` file describes what the various keyboard commands are.

NOTE to Red Hat 8.0 users: Red Hat Linux 8.0 ships with Gnome as the default desktop environment. However, Gnome seems to have issues with window focus and window switching which sometimes cause mythfrontend to obscure the video. KDE does not seem to have any such issues. Therefore you will need to switch to KDE by selecting RedHatMenu>Extras>System Settings>Desktop Switching Tool and choose "KDE".

11.1 Using themes with MythTV.

MythTV is "themeable", meaning that the visual appearance of the program can be modified by the user without re-compiling or altering the program functionality. The MythTV website has a Themes section; pick a theme you'd like to use and download it to your system.

Once it's on your machine, you must move the file and untar it:

```
$ su
# cp funhouse.tar.gz /usr/local/share/mythtv/themes
# cd /usr/local/share/mythtv/themes
# tar -xjf funhouse.tar.gz
# exit
```

The theme will now be available in the mythfrontend Appearance section.

11.2 Adding DirecTV information to the database.

A script for adding DirecTV information into the database has been written by tarek Lubani <mailto:tarek@tarek.2y.net> and is available at <http://tarek.2y.net/myth/ppv.pl>. This is currently an external user-supplied program, so if you have issues with the script, please contact the author.

11.3 Adding support for an external tuner.

MythTV supports changing the channel on an external tuner. If you have an external tuner, such as a DirecTV or digital cable set top box, you should add `/usr/local/bin/changechannel` to your Input Connections in the mythbackend configuration GUI.

The **changechannel** program is not supplied with MythTV, so this is going to be dependent on what sort of external tuner you have. Example scripts for Sony and RCA receivers can be obtained from <http://tarek.2y.net/myth/>. This is currently an external user-supplied program, so if you have issues with the script, please contact the author.

Feel free to browse some of what sort of hardware is available at <http://shop.store.yahoo.com/snapstreammedia/cablepacks.html>, or if you wish to assemble your own, rather than purchase, the following may be helpful: <http://www.snapstream.com/products/irblaster/sonydss.htm> for cable pinouts for RCA DSS receivers.

12. MythWeb.

MythWeb allows you to use a web page to control various aspects of your MythTV system. MythWeb is a separate application, but it's dependent on MythTV being installed and operational.

12.1 Installation and prerequisites.

Download mythweb from <http://www.mythtv.org/> and save it to a location where you can find it. The next step depends on whether your distribution has a web server and if you have php support.

Mandrake 9.0

Mandrake 9.0 has **apache** and **php** pre-packaged, so installation is quite simple. Once you have installed the two programs, either with the graphical installer (see instructions in Graphic Install Tools) or through the command line (section Command Line), and you've ensured that the **apache** server will start at boot using the Mandrake Control Center.

NOTE: Mandrake 9.1 users, perform the following:

```
# urpmi apache apache2-mod_php php-mysql
# chkconfig --level 345 httpd on
# /etc/rc.d/init.d/httpd restart
```

12.2 Completing the installation.

```
$ tar -xjf mythweb-0.10.tar.bz2
$ cd mythweb-0.10
$ su
# mkdir /var/www/html/mythweb
# cp -r . /var/www/html/mythweb
# exit
$
```

To access the web page, open a web browser and use **http://[name or ip address]/mythweb/**

NOTE: Make sure that you have a trailing slash on the URL, otherwise you will get a 404 Page not Found error.

13. MythGallery.

MythGallery is a photo and slideshow application. MythGallery is a separate application, but it's dependent on MythTV being installed and operational.

13.1 Installation and prerequisites.

Download MythGallery from <http://www.mythtv.org/> and save it to a location where you can find it.

```
$ tar -xjf mythgallery-0.10.tar.bz2
$ cd mythgallery-0.10
$ make
# su
# make install
# exit
$
```

The configuration for MythGallery is accessed through the main Setup option in mythfrontend. Make sure you set your pictures directory to wherever you're storing your photos.

- Use the arrow keys to move around the thumbnails.
- Use SPACE or ENTER to maximize a photo.
- Use p or P to start the slideshow of all the files in the directory. "Play" or "Pause" on your remote may also work.
- Use SPACE or ENTER to advance to the next photo.
- Use ESC to go up one level, or to exit out of the module if you're at the first level.
- Use the [and] keys to rotate the image.
- Use M to bring up the setup dialog.
- Use I to import pictures; when a photo is maximized this will bring up photo information.
- 7 and 9 are used to Zoom Out and in, 2, 4, 6 and 8 are used to move around while in zoom mode, 5 centers and 0 exits zoom.

13.2 Importing Pictures

The import path in the setup dialog is a colon separated list of directories and/or executable files. When the import key is pressed, a new directory (the destination directory) under the current directory will be created and the import path will be searched. If the item in the import path is a directory (the source directory), the contents of that directory will be copied to the destination directory. If you would like the source directory to be that of a removable device, it might be a good idea to use autofs. See the automount howto at www.linuxdoc.org for info on how to get it working.

If the item in the import path is an executable file, MythGallery will attempt to execute it with the destination directory as its sole argument. Be careful when using executable scripts that the script runs unattended (doesn't need user intervention) and returns properly, otherwise it could create the appearance of MythGallery hanging (e.g. running **smbclient** and prompting for password). Also be sure that scripts have executable permissions set.

Here is an example script that a user may want to run on import:

```
#!/bin/csh

if ($#argv == 0) then
    echo "Usage: $0 dest_dir"
    exit
endif

cd $argv[1]

# get stuff over the network
wget http://www.somesite.dom/dir/file1.jpg
wget http://www.somesite.dom/dir/file2.jpg
```

```
wget http://www.somesite.dom/dir/file3.jpg

# stuff that requires manual module loading and/or fs mounting
modprobe camera_module
mount /dev/camera /mnt/camera
cp /mnt/camera/* $argv[1]
umount /mnt/camera
rmmod camera_module

# perform some processing
foreach pname (`ls *.jpg`)
    jpegtran -flip vertical $pname > $pname.new
    mv $pname.new $pname
end
```

14. MythGame.

15. MythMusic.

MythMusic has a number of prerequisites that must be satisfied before it is operational. Depending on your distribution, some of these prerequisites can be satisfied through the various package managers. If your distribution doesn't offer pre-compiled versions of the software below, then follow the generic instructions for manually compiling and installing the software.

The prerequisites for MythMusic are:

- MAD
- libvorbis-devel
- FLAC
- libcdaudio
- CDParanoia

15.1 Manual installation of prerequisites.

These instructions are for distributions which don't have pre-compiled versions of the software necessary to run MythTV.

Download MAD from <http://www.mars.org/home/rob/proj/mpeg/> Save it to a directory you can find later.

```
$ tar -xzf mad-0.14.2b.tar.gz
$ cd mad-0.14.2b
$ ./configure
$ make
$ su
# make install
# exit
$
```

Download FLAC from <http://flac.sourceforge.net> and install:

```
$ tar -xzf flac-1.1.0.tar.gz
$ cd flac-1.1.0
$ ./configure
$ make
$ su
```

```
# make install
# exit
$
```

Download libcdaudio from libcdaudio.sourceforge.net and install:

```
$ tar -xzf libcdaudio-0.99.9.tar.gz
$ cd libcdaudio-0.99.9
$ ./configure
$ make
$ su
# make install
# exit
$
```

Download cdparanoia from <http://www.xiph.org/paranoia/down.html>.

```
$ tar -xzf cdparanoia-III-alpha9.8.src.tgz
$ cd cdparanoia-III-alpha9.8
$ ./configure
$ make
$ su
# make install
# cd /usr/lib
# ln -sf libcddda_interface.so.0.9.8 libcddda_interface.so
# ln -sf libcddda_paranoia.so.0.9.8 libcddda_paranoia.so
# exit
$
```

15.2 Mandrake 9.0

Mandrake 9.0 has a number of the prerequisites available on the installation CD. Some of the software you're going to need will have to be obtained from the "contrib" or "cooker" development repositories. Applications downloaded from "cooker" come from the development branch, so there may be issues with some software. It isn't recommended that you mix cooker and release-level software.

urpmi is the simplest tool for installation of packages from the command line. The difficult part is the configuration, but this has been made easier at the following website: <http://plf.zarb.org/~nanardon/urpmiweb.php> The website will allow you to choose a mirror site and then present the command-line configuration text for that mirror. You will most likely need to add a "Contrib" mirror to your setup. Once you have done that, you can proceed. If **urpmi** prompts you about other modules that need to be installed to satisfy dependencies, say "Yes".

```
# urpmi libmad0 libmad0-devel libflac4 libflac4-devel libcdaudiol cdparanoia
# urpmi libcddda0 libcddda0-devel libvorbis0 libvorbis0-devel
# urpmi libcdaudiol-devel
```

Additional options with MythMusic

Additional visualizations have been added to MythMusic. If you wish to use these, there are some prerequisites you must install prior to compiling.

- fftw
- OpenGL
- SDL

fftw may be obtained from <http://www.fftw.org/>. In Mandrake 9.1 it may be installed by typing:

```
# urpmi libfftw2 libfftw2-devel
```

OpenGL should be installed on practically all distributions. However, you will need the devel module. In Mandrake 9.1 it may be installed by typing:

```
# urpmi libMesaGLU1-devel
```

SDL may be obtained from <http://www.libsdl.org>. In Mandrake 9.1 it may be installed by typing:

```
# urpmi libSDL1.2 libSDL1.2-devel
```

15.3 Red Hat Linux 8.0

Red Hat provides packages for several of the prerequisites, making installation very simple. Of the prerequisites, Red Hat provides packages for Vorbis, cdparanoia, SDL, and OpenGL (which you probably already have installed). To install these all at once, simply type (all on the same line):

```
$ up2date --solvedeps libvorbis libvorbis-devel vorbis-tools cdparanoia-devel cdparanoia-libs cdpara
```

If you get the following message: "None of the packages you requested were found, or they are already updated" it probably means you already have all of those packages installed.

You must install the remaining packages, (MAD, FLAC, libcdaudio and optionally fftw) manually following the installation directions above. When installing fftw do not use the rpm package offered on the website because it will cause an error, so use the source package instead.

15.4 Compiling MythMusic.

Once all the prerequisites have been installed, you can proceed with getting MythMusic going. Make sure that you run `./configure` first. If you wish to use the new visualizations, make sure you install the prerequisites. Run `./configure --help` for help.

NOTE for Red Hat users: Before compiling, make the following modification to `settings.pro`, otherwise the compile will fail:

Find the following text:

```
INCLUDEPATH *= /usr/local/include
```

immediately below that add

```
INCLUDEPATH *= /usr/include/cdda
```

save and close `settings.pro` and proceed with compiling MythMusic.

```
$ make
$ su
# make install
# exit
$ cd musicdb
$ mysql -u root < metadata.sql
```

15.5 Configuring MythMusic.

Configuration of MythMusic occurs in two places. The main mythfrontend Setup is for global MythMusic configuration. Go to the Setup/MythMusic/General Setup screen and adjust it for your particular setup.

The second configuration screen is within the MythMusic program and will allow you rescan your music library, etc.

Here's some explanation about the Ignore_ID3 and The NonID3FileNameFormat:

If Ignore_ID3 is set to TRUE, MythMusic will try to determine the Genre, Artist, Album, Track Number, and Title from the filename of the mp3 file. The NonID3FileNameFormat variable should be set to the directory/file format where the mp3 files are stored. For instance, I store mine in the above shown Genre/Artist/Album/Track format. MythMusic will then use this information to fill in the proper fields when it populates the musicmetadata table rather than searching for an ID3 tag in the mp3 file.

The files can be layed out in any format, such as:

Genre/Artist/Album/Title Artist/Genre/Album/Title Artist/Album/Title (with Genre left as Unknown)

The track number is optional but can be specified with the title by using the TRACK_TITLE keyword instead of TITLE. If TRACK_TITLE is used, then the filename can have a space, hyphen, or underscore separating the track number from the track title. Keywords are case insensitive, so if you specify GENRE it's the same as Genre in the format field.

The Ignore_ID3 option does not disable the code that determines the track length, just the portion that tries to read ID3 info.

15.6 Using MythMusic.

MythMusic is fairly simple to use. It is recommended that you insert the CD before selecting "Import CD". You should also ensure that your system doesn't try to automount the CD and begin playing it automatically.

Another item to consider: there are some CD's that contain computer data that runs as a "CD Extra" when inserted into some Windows PCs and Macintoshes. As of 2003-06-10, MythMusic doesn't support track skipping or individual track selection, so if you have a CD with "CD Extra" data you will not be able to encode it; MythMusic will hang attempting to encode the non-audio data.

Here's some information on playlist management:

Q: How do I create a new playlist? A: Using the MythMusic "Select Music" menu option, setup the playlist as you normally would by adding songs or other playlists as needed. When you are ready to save the new playlist, highlight "Active Play Queue" at the bottom of the selection tree and hit the "i" key. This will popup a menu allowing you to name and save the new playlist. You can also hit Enter to bring up the popup on the Active Play Queue. This does not work on the playlists above, as Enter is obviously bound to checking/unchecking the boxes. Any number (ie. keypad on remote) will also bring up the menu in both cases.

Q: How do I enter the playlist name in the text field without a keyboard? A: Use the keypad number keys (bound to your remote) to select letters quasi-cell phone style. Keys 2-9 work pretty much like any cell phone text entry. 1 cycles through a few special characters, delete, and space. 0 is like a CAPS LOCK. Hard to describe, fairly easy to use. You will soon be able to specify the cycle timing in a Setup screen. You can type fairly quickly through a combination of jumping around the number keys AND hitting a non-number key (right arrow is particularly good for this) to force the current

character.

Q: How do I edit a playlist? A: Highlight the playlist in the selection tree and hit the "i" key then select "Move to Active Play Queue" in the popup. You can now modify the "Active Play Queue" like normal, adding songs and playlists by selecting them from the song tree. When you are done, highlight the "Active Play Queue" in the selection tree and hit the "i" key then select "Save Back to Playlist Tree". And whatever you were editing as your Active Queue before you moved an existing playlist "on top" of Active reappears. Think of Active has having a push on, pop off capability, but with a depth of only 1.

Q: How do I delete an item from a playlist? A: Highlight the item in the selection tree and hit the "d" key.

Q: How do I rearrange the songs in my playlist? A: Highlight a song and hit the "space" bar, the song will now have pair of red arrows in front of it. Use the up and down arrow keys to move it around in the playlist. When you have it where you want it, hit the "space" bar again.

Q: How do I delete a playlist? A: Highlight the playlist in the selection tree and hit the "i" key then select "Delete this Playlist" from the popup.

15.7 Troubleshooting MythMusic.

You may run into errors when running MythMusic.

When I run MythMusic and try and look up a CD, I get an error message

The full text of the message will say:

databasebox.o: Couldn't find your CD. It may not be in the freedb database. More likely, however, is that you need to delete `./cddb` and `./cdserverrc` and restart mythmusic. Have a nice day.

If you get this message, you should go to the home directory of whatever user MythMusic is running as and type:

```
rm ./cdserverrc
rm -rf ./cddb/
```

These files aren't automatically deleted because of a conscious design decision by the author that programs that automatically delete things are bad.

The files are used to locally cache CD lookups. If you are re-inserting CD's, your machine will not actually have to go out to the internet to determine what is on them. However, the URL used to access the freedb database has recently changed, so the stale information in the files from previous runs of MythMusic would cause the error above. Once the files have been deleted the stale information will be gone and your local database will be rebuilt as you use CDs.

16. MythWeather.

The MythWeather module will obtain the weather information for the location that you specify. You must be running MythTV v0.10 in order to use MythWeather.

NOTE for Red Hat Linux 8.0 users: Red Hat 8 users must make the following modification, or several weather icons will fail to be installed.

From the mythweather build directory move to the mythweather sub-directory and edit the Makefile there.

Find and comment out (using a '#' symbol) the following line:

```
strip "$(INSTALL_ROOT)/usr/local/share/mythtv/mythweather/images/"
```

Change into the MythWeather directory, then make and make install:

```
$ cd mythweather
$ make
$ su
# make install
# exit
```

MythWeather uses MSNBC.com as its source for weather data and weather.com for its radar image.

These are the keyboard commands for MythWeather:

Left Key	Goes back one page, and extends the time spent on the page you are on.
Right Key	Goes forward one page, see above.
Space	Pause, wait on the current page until space is hit again.
Numeric Keys	You can check other weather by keying in other ZIP codes.
Enter Key	Switch between Celsius and Fahrenheit. Can also be used a way to force a data update.
"m" Key	Resets the location to the database default, then updates the data.
"i"	Enter / Save settings
ESC	Exit the settings screen without saving / Exit the program

MythWeather also has an "Aggressiveness" setting. This affects how long MythWeather waits for data from the msnbc.com website before timing out. If you are on a slow connection, or have a slow DNS, or MythWeather just doesn't seem to be working and you've already tried everything else, then try increasing the aggressiveness level parameter. This parameter is inverse; a higher number actually means that MythWeather will be less aggressive, and will therefore wait longer before timing out.

MythWeather will print debugging information on the terminal. If you wish to see additional debugging information while MythWeather is running, run mythweather from the command line with as mythweather --debug

You may also force mythweather to re-run the configuration by starting it on the command line as mythweather --configure. These two options are mutually exclusive.

17. MythVideo.

The MythVideo application will allow you to use an external program to watch media files that are not directly supported by MythTV.

Change into the MythVideo directory, then make and make install:

```
$ cd mythvideo
$ make
$ su
# make install
# exit
```


The next step is to create the videometadata table in the database. Simply do the following:

```
$ cd videodb
$ mysql -u mythtv -p < metadata.sql
```

See MythVideo's README file for additional information.

18. Troubleshooting.

18.1 Illegal Instruction.

This error can happen for the following reasons:

- You have an AMD K6-2 or VIA C3 processor. If you have either of these, make sure that you followed the instructions in this [section](#).
- You have an early production Intel Celeron, Pentium Pro or Pentium II. If you have any of these processors, make sure that your [deinterlace](#) variable is set correctly. Your CPU needs to support SSE instructions for deinterlace support. You may check this by doing a `$ cat /proc/cpuinfo` and looking for "sse" in the processor flags section.

18.2 mythfilldatabase failing.

If mythfilldatabase suddenly appears to be failing, check to see what version of XMLTV you're running. Versions prior to 0.5.4 need to have the following change made: edit the `/usr/lib/perl5/site_perl/5.8.0/XMLTV/ZapListings.pm` file and perform a global search and replace, searching for "tvlistings2" and replacing it with "tvlistings". **NOTE:** It is highly recommended to run the latest version of XMLTV available. In North America, zap2it, the listings provider, has been making numerous changes to their website which negatively impact XMLTV.

18.3 MythTV seems to disappear; can't see video.

If you're using Gnome as your window manager, try switching to KDE. For Red Hat Linux 8.0 users, edit `/etc/sysconfig/desktop` and change "GNOME" to "KDE".

18.4 Fast CPU, choppy or jittery video.

First, you should check that your kernel has been enabled for DMA:

```
[mythtv@pvr mythtv]$ dmesg |grep DMA
ide0: BM-DMA at 0xd800-0xd807, BIOS settings: hda:DMA, hdb:DMA
ide1: BM-DMA at 0xd808-0xd80f, BIOS settings: hdc:DMA, hdd:pio
hda: 156301488 sectors (80026 MB) w/2048KiB Cache, CHS=9729/255/63, UDMA(33)
hdb: 80043264 sectors (40982 MB) w/2048KiB Cache, CHS=4982/255/63, UDMA(33)
```

From the listing above, you can see that hda, hdb and hdc are set for DMA, and hdd is set for pio. If your kernel is not reporting DMA being enabled, you may need to recompile your kernel. Check your motherboard's chipset (look in the "ATA/IDE/MFM/RLL support" section in "make menuconfig") for more information.

Next, check that the hard drive has DMA enabled. Use the **hdparm** program to check and enable DMA.

```
# hdparm -d /dev/hd?
```

will tell you the DMA status for your hard drives. If you run **hdparm** with the **-d1** parameter, it will turn DMA on.

You may also setup your PC to do this at boot time, either by adding the command to your `/etc/rc.local` file, or by adding files to `/etc/sysconfig`.

On Mandrake and other distributions, if you install **hdparm** from an RPM you will most likely get a `/etc/sysconfig/harddisks` file installed. This file will be parsed by the `/etc/rc.sysinit` script. If you use the default `harddisks` file, your changes will affect all IDE devices (including CD ROMs). If you wish to use different parameters for various devices, rename and/or copy the file to `harddiskhda`, `harddiskhdb`, etc. Edit the file to your liking and on the next reboot your setting will be preserved.

18.5 I keep losing all of my settings every time I compile!

MythTV will overwrite any settings in `/usr/local/share/mythtv`. If you want to make sure that you don't lose your modifications, make a directory `~/ .mythtv` and copy your `mysql.txt` file to this location.

18.6 Compile errors.

Some compile errors are worse than others. If you get an error that doesn't abort the compilation, and says something like:

```
cclplus: warning: changing search order for system directory
"/usr/local/include"
cclplus: warning: as it has already been specified as a non-system
directory
```

then it shouldn't be a problem.

If you get an error like `/usr/bin/ld: cannot find -lXext`, the compiler is telling you that you don't have `XFree86-devel` installed, or that your distribution hasn't set it up correctly. This needs to be fixed before MythTV will compile.

18.7 My screen goes blank, but comes back when I wiggle the mouse or use the keyboard.

This is due to DPMS, the Display Power Management System, which is used to save power by turning off your monitor when the system decides that it's not being used or to a screensaver that has defaulted to a blank screen. Since it's likely that watching TV will not generate keyboard or mouse events for a time, you need to turn off DPMS and the screensaver. There are a few ways to do this. You may also need to check your BIOS for power saving modes and disable screen blanking there as well.

Edit your `/etc/X11/XF86Config-4` file, and look for:

```
Section "ServerFlags"
    #DontZap # disable <Ctrl><Alt><BS> (server abort)
    #DontZoom # disable <Ctrl><Alt><KP_+>/<KP_-> (resolution switching)
    AllowMouseOpenFail # allows the server to start up even if the mouse doesn't work
EndSection
```

Add Option "NoPM" "true" and Option "BlankTime" "0" to the ServerFlags section.

Also, look for:

```
Section "Device"
    Identifier "device1"
    VendorName "nVidia Corporation"
    BoardName "NVIDIA GeForce 256 (generic)"
    Driver "nv"
    Option "DPMS"
EndSection
```

In this case, you would need to either delete the Option "DPMS" line, or change it to # Option "DPMS" to comment it out. The next time you start XFree this change will take effect.

Finally, check:

```
Section "Monitor"
    Identifier "monitor1"
    VendorName "Plug'n Play"
    HorizSync 30-85
    VertRefresh 50-160

    # Sony Vaio C1(X,XS,VE,VN)?
    # 1024x480 @ 85.6 Hz, 48 kHz hsync
    ModeLine "1024x480" 65.00 1024 1032 1176 1344 480 488 494 563 -hsync -vsync

    # TV fullscreen mode or DVD fullscreen output.
    # 768x576 @ 79 Hz, 50 kHz hsync
    ModeLine "768x576" 50.00 768 832 846 1000 576 590 595 630

    # 768x576 @ 100 Hz, 61.6 kHz hsync
    ModeLine "768x576" 63.07 768 800 960 1024 576 578 590 616
EndSection
```

Ensure that there isn't an Option "DPMS" in the Monitor configuration.

You can also turn off DPMS from the Command Line, but this will not survive a reboot.

```
$ xset -dpms
```

Using xset +dpms will turn it back on.

Another technique to try, which will turn off the screensaver:

```
$ xset s off
```

You may also combine the command to turn off DPMS and the screensaver:

```
$ xset -dpms s off
```

Finally, depending on your distribution, you may be able to turn it off from within the control panel.

18.8 I can't checkout using CVS anymore!

Isaac has changed some things around. The CVS repository is now known as `cvs.mythtv.org`, rather than `www.mythtv.org` or `mythtv.org` and the path has changed. Make sure you change your `CVSROOT` to point to the new server and path, delete your old tree, and re-do the checkout. See Section 1, [How to Obtain this document](#) for the full name and path.

18.9 I get segfaults / MythTV isn't doing anything.

Without details, the developers will not be able to determine if you have discovered a genuine code-bug, or if the problem is with your system. In order to determine what's going on, you must recompile MythTV with debugging support and run MythTV within **gdb**, the GNU debugger.

Edit the `settings.pro` file. Make sure that the top of the file looks like this:

```
$ cat settings.pro
CONFIG += debug
#CONFIG += release
```

Now, you need to clear out the old versions of the software to ensure that you're running with the debugging code, then compile and install.

```
$ make clean distclean
$ ./configure
$ make
$ su
# make install
# exit
```

At this point, you now have debug-enabled software ready. Let's assume that the problem you're having is in the `setup` program.

```
$ cd setup
$ gdb ./setup

GNU gdb 5.3-1mdk (Mandrake Linux)
Copyright 2002 Free Software Foundation, Inc.
GDB is free software, covered by the GNU General Public License, and you are
welcome to change it and/or distribute copies of it under certain
conditions.
Type "show copying" to see the conditions.
There is absolutely no warranty for GDB.  Type "show warranty" for details.
This GDB was configured as "i586-mandrake-linux-gnu"...
(gdb) handle SIGPIPE nostop
Signal      Stop      Print     Pass to program Description
SIGPIPE     No        Yes       Yes        Broken pipe
```

gdb has a number of options, read the man page for more information.

Once at the `(gdb)` prompt, type `run` to start program execution. When the program segfaults or appears to lock-up (press `CTRL-C`), type

```
(gdb) thread apply all bt full
```

The backtrace information for all the threads should be posted to the mythtv-dev mailing list, along with the steps you followed to get the program to crash.

If you're trying to troubleshoot and you can't get back to the gdb window for some reason, it may be easier to use two systems or to start mythfrontend from the text console.

If you're going to troubleshoot from a remote system, connect to the machine that you're going to test using **ssh** or **telnet**. Next, type `$ export DISPLAY=localhost:0.0`. This will allow the graphics to be displayed on the X console (usually ALT-F6 or ALT-F7) and still give you output and control of **mythfrontend**, either from the **ssh** session, or by switching back to the text console by pressing CTRL-ALT-F1. You can now continue troubleshooting using **gdb** as detailed in the instructions.

18.10 MythTV makes my system crash.

MythTV *can not* crash your system – it is a user-level program. If your system is crashing when you run MythTV, then you have some issue with the drivers for your capture card or other hardware, or the CPU fan has fallen off/broken and your system is overheating when asked to perform a CPU intensive task like encoding video.

18.11 Troubleshooting audio.

By Bruce Markey, <mailto:bjm@lvcn.com> **NOTE:** the following instructions do not apply to PVR-250/350 encoders; the MPEG-2 file will have the audio embedded in the stream so it is not accessible using `/dev/dsp`. See [this](#) in the PVR-250 [section](#) for more information.

Audio appears to be one of the bigger issues that users run into on the mailing list. If the audio isn't configured correctly, then MythTV will often appear to hang, when in fact it is trying to manipulate the audio subsystem and failing. You may or may not receive error messages indicating that the source of the error is the audio subsystem.

You can not use **xawtv** to determine if your audio is working correctly, since **xawtv** is simply using the the analog sound patched through line-in to line-out. It doesn't need to digitize the sound unless you are using the recording function.

A better test to verify that sound will work for MythTV (and recording with **xawtv** for that matter) is to startup **xawtv**, mute the line-in then run `aplay /dev/dsp`. You should hear the recorded audio slightly delayed behind the realtime video. Once this test succeeds, MythTV should work correctly because it writes to and read from `/dev/dsp` in the same way that **aplay** does.

To record audio along with video the audio signal must be digitized by a DSP so that the audio data can be stored in a file. On playback, the audio data is written to `/dev/dsp` and converted back to an analog signal. This analog signal should then be sent to your speakers. Here is what is needed in alsamixer:

CAPTUR source – the analog source to be sent to the DSP. This should be set to the input source from the tuner card to the sound card. In most cases this is Line but this could also be Aux, CD, Mic, etc., depending on how you connect the input cable. This source should be muted to prevent patching through the analog sound. The volume of this source will not affect the record level.

Capture mixer – this sets the level for the analog to digital recording. While a volume of 100% is recommended for testing, distortion may occur. Lowering this level to 75% to 85% may result in better audio quality. "Capture" should be marked as the CAPTUR destination.

PCM mixer – this sets the level for the digital to analog playback. While a volume of 100% is recommended for testing, distortion may occur. Lowering this level to 75% to 85% may result in better audio quality.

Master mixer – sets the level for the analog signal sent to line-out or the speakers.

You may also want to ensure that `/dev/dsp` hasn't already been grabbed by another process, like **esd** or **artsd**. If `/dev/dsp` isn't available, then MythTV won't work. Check your windowmanager documentation for instructions on disabling the sound manager. If you wish to see what application is grabbing a resource, you can use the `fuser` command:

```
# fuser -v /dev/dsp
```

To disable aRts in KDE, go to KDE->Control Center->Sound->Sound System and uncheck the "Start aRts soundserver on KDE startup" box. Run `# killall artsd` from the command line to stop the artsd program.

If you're using multiple sound cards and multiple tuners, use `alsamixer -c 1` to work with the second sound card. The first card is #0, the second card is #1, etc.

18.12 I can't see parts of the On Screen Display.

If you're a Red Hat 8.0 user, make sure that you've followed the instructions which tell you how to modify the Themes makefile. [Link](#).

18.13 The mythbackend program told me to look at this section.

mythbackend does a check to see if your sound device is capable of full duplex operation. If it's not, it's most likely that you're going to run into issues when you try to record and play sound at the same time. If your backend is a separate machine than your frontend, then there's no problem, since you're only going to be doing one thing at a time with the card. Likewise, if you're running the frontend and backend on the same machine, but you're using btaudio as your recording source, and using the playback function of your soundcard, then you also shouldn't have an issue, since the sound card isn't being asked to perform two functions at once.

If you can't get your soundcard to go full duplex and need it to, then check your distribution for updated sound drivers. If your soundcard is not capable of full-duplex operation, either because the drivers don't support it, or it has been designed that way, then you're pretty much out of luck and will either need to purchase a new sound card, or will need to get btaudio [operational](#).

18.14 My remote doesn't work / works sometimes and not others / "ghost" keypresses.

This can be due to a number of factors. The simplest case is the "ghost" keypresses. For me, it was due to compact fluorescent lights in the same room as the IR receiver, which the receiver was picking up as keypresses. Once the lights were switched to incandescent bulbs, the ghost went away.

You may have an issue with **lirc** misinterpreting IR commands from a different remote. I also have an issue where the Tivo "Peanut" remote will eventually cause **lircd** to stop responding; even though **lircd** is configured for the Pinnacle Systems remote, the Tivo remote IR patterns are being seen by the IR receiver.

If your remote has been properly configured, and **irw** and **irxevent** are working correctly, then it's highly likely that your window manager is not giving focus correctly to the various Myth programs as they run. The following window managers are known to work correctly:

- fvwm
- blackbox (using "Sloppy Focus" and "Focus New Windows")

18.15 My PVR-250 card doesn't show inputs in the setup screen.

See message <http://lists.snowman.net/pipermail/mythtv-users/2003-April/002527.html>

18.16 Where's my "canada-cable" entry gone to?

18.17 My channels are off by one.

There is no such thing as "Canada Cable"; Canada uses the same frequencies as the United States. "Canada Cable" was a hack that some people used when they would discover that their channels were off-by-one, ie, when tuning to channel 42, they might get channel 41 or 43. This is actually due to the tuner on the video capture device being mis-detected. You must manually specify the tuner type in your `/etc/modules.conf`. See the video4linux mailing list (<https://listman.redhat.com/mailman/listinfo/video4linux-list>) for more information.

18.18 Mythweb is showing a db_open error when I connect to it.

Find your php.ini file. Make sure you've got a line in it like this:

```
extension=mysql.so
```

Restart apache for it to take effect.

18.19 error: can't find a register in class 'BREG' while reloading 'asm'

This is due to the broken Qt that is being distributed by Suse. To work around this, edit `libs/libavcodec/Makefile` and remove any `"-fPIC"` you find there and then recompile.

18.20 make: * No rule to make target /usr/lib/qt3/mkspecs/default/qmake.conf, needed by Makefile'. Stop.**

This error happens when there's a missing link in the `/usr/lib/qt3/mkspecs` directory. There are two ways to fix this error:

1. Create the link manually:

```
$ su
# cd /usr/lib/qt3/mkspecs
```

```
# ln -sf linux-g++ default
```

and then restart the compile,

or

2. Run **qmake mythtv.pro** in the mythtv directory. Rerunning **qmake** will create a new Makefile for you, however this still doesn't fix the root cause of the issue, which is that your distribution didn't create the symlink for you when the qt3 package was installed. The first choice is the better solution.

18.21 make: * No rule to make target /mkspecs/default/qmake.conf', needed by Makefile'. Stop.**

You didn't set your QTDIR. Re-read the section on [Setting up paths](#).

18.22 My mouse pointer disappears when placed over the MythTV windows.

This is the intended behavior. The MythTV interface is meant for use with a remote control or a keyboard.

18.23 What does "strange error flushing buffer" mean on my console?

Nothing, really. It's just lame (the mp3 encoder) complaining for some obscure reason. This seems to be fixed in more recent versions of the libmp3lame library.

18.24 I can't change the channel when watching Live TV.

Something's wrong with your program database. Did mythfilldatabase run with no major errors?

18.25 Colors are wrong, people have blue faces.

If you are using the binary nVidia drivers, make sure you're using at least version 1.0–2960.

18.26 When trying to run setup, I get an error like this: "./setup: error while loading shared libraries:"

You didn't add `/usr/local/lib` to `/etc/ld.so.conf`. See the section on modifying [/etc/ld.so.conf](#).

19. Miscellaneous.

19.1 I'd like to watch the files without using MythTV / I'd like to convert the files to some other format.

Matthew Zimmerman has created a patch for MPlayer / Mencoder <http://www.mplayerhq.hu> that allows you view the files created by MythTV. MythTV doesn't use standard Nuppelvideo files, which is why you MPlayer complains if you try to view them.

NOTE: If you're using a hardware MPEG2 encoder like the PVR-250/350 you don't need to convert – the files are actually standard MPEG2 with a .nuv extension. Change it to .mpg and the files should display properly in other media players.

Download the patch to MPlayer from Matt's website. <http://dijkstra.csh.rit.edu:8088/~mdz/mythtv/>.

```
$ wget http://dijkstra.csh.rit.edu:8088/~mdz/mythtv/mplayer-0.90rc5-mythtv-20030407.diff
```

Download the source to MPlayer and patch:

```
$ wget http://ftp.lug.udel.edu/MPlayer/releases/MPlayer-0.90.tar.bz2
$ tar -xjf MPlayer-0.90.tar.bz2
$ cp mplayer-0.90rc5-mythtv-20030407.diff MPlayer-0.90
$ cd MPlayer-0.90
$ patch -p1 < mplayer-0.90rc5-mythtv-20030407.diff
```

At this point, you can read the MPlayer documentation and start the compile process.

19.2 I'd like to use some other window manager.

MythTV is not dependent on any particular window manager. If you wish to run a lightweight window manager, the configfiles/ directory has an example of a .twmrc and .fvwmrc file you may use.

19.3 I'd like MythTV to automatically startup.

Here's an example submitted to the mythtv-dev list by Pat Pflaum <mailto:pat@netburp.com> using fvwm:

```
$ cat > .xinitrc
fvwm &
mythfrontend
^D
$ cat > .fvwmrc
Style myth* NoTitle, NoHandles, Sticky, WindowListSkip, SloppyFocus, GrabFocus, BorderWidth 0
^D
$
```

The following also works with blackbox:

```
$ cat > .xinitrc
xset -dpms s off &
irxevent &
mythfrontend &
blackbox
```

Make sure that your .blackboxrc file has:

```
session.screen0.focusNewWindows:      True
session.screen0.focusModel:           SloppyFocus
```

in it.

19.4 What capture resolution should I use? How does video work?

While MythTV allows you to set various GUI and capture resolutions, not all combinations make sense.

First, analog video signals have a defined vertical resolution. In NTSC, the video standard specifies that there are 525 vertical scan lines. Once the "extra" lines are removed (they're used to synchronize the video signal, and encode closed captioning data), you have 480 vertical lines.

In PAL, there are 625 "raw" lines of resolution, with a net of 576 vertical lines.

Horizontally, the maximum you can expect from a Bt8X8 chip is 720.

With this in mind, there are certain commonly accepted values for resolution. While other values may be accepted, they will cause scan lines to be repeated or dropped.

From "best" to "worst", in NTSC:

- 720x480 (but more commonly, 704x480. "DVD" resolution)
- 640x480 4:3
- 544x480 (TiVo high resolution)
- 480x480 (Video CD resolution)
- 352x480 (ReplayTV "Standard" quality)
- 320x480
- 544x240
- 480x240
- 352x240
- 320x240

As you can see, the lower quality values are half of the better ones. 720x240 is possible, but isn't a good tradeoff relative to the number of vertical lines lost. In a PAL country, the you would use values like 720x576 or x288.

The higher resolutions will be more CPU intensive. If the CPU is overtaxed, frames will be dropped causing uneven motion. You will likely see the best results at resolutions which average at least 10% CPU idle time. You can use system tools such as `top` or `sar` to check the CPU % idle while recording. If the CPU average usage is consistently exceeding 90%, frames will need to be dropped during peak times when more than 100% of the available CPU would be needed to process all of the frames.

If you'd like to read more on this, go to the vcdhelp website at <http://www.vcdhelp.com/forum/userguides/94382.php>.

19.5 MythTV GUI and X Display Sizes.

MythTV is designed to be run as dedicated full screen TV application but can also be run as a desktop application on a computer monitor. Here are a few consideration for configuring sizes to best suit you needs.

There are three sizes that are important for matching the MythTV GUI and full screen TV playback to fit the screen:

- the X display size
- the X Desktop (virtual) dimensions
- the MythTV GUI dimensions

The MythTV GUI uses its GUI dimensions regardless of the other two and is anchored to the upper left corner of the X Desktop.

The MythTV full screen mode uses the X display size dimensions regardless of the other two and is anchored to the upper left corner of the X display.

X Dimensions

For output to a Television, common resolutions are 640x480, 800x600, and some rare devices support 1024x768. Generally, higher resolutions are better. However, you may find that you prefer the picture quality at one of the lower resolutions. Everything in MythTV is scalable and should 'fit' regardless of the resolution you choose.

Edit your X configuration file, usually "XF86Config-4", so that the resolution you want to use is listed first in the lists under "Screen". If this resolution is higher than the resolutions supported by your output device, you will see a 'panning' effect where moving the mouse to the edge will scroll around a desktop area which is larger than the display size. If this happens, edit your X configuration file to match the display size then restart X.

MythTV Dimensions

In 0.10, from "mythfrontend" go to Setup->Appearance. The default for the height and width on 0.10 is "0" – this will cause MythTV to automatically size itself to full screen. To ensure that your new dimension settings take effect, exit and restart MythTV.

NOTE: When the GUI is full screen, you may need to set your window manager to 'Click to Focus' for windows to stack properly.

The fonts for the GUI and OSD will scale to whatever sizes you use. Most font sizes can be changed in setup selections. Make sure to use fonts large enough to be read on a TV screen from a distance.

The full screen TV size is based on the X display size. For Xinerama, you can specify a screen in Setup->General. The picture will be stretched to fit the entire screen regardless of the capture resolutions used.

Overscan Dimensions

Because picture edges can be ragged and screen edges aren't straight, Television is designed to project an image larger than the physical screen. This is called "overscan". Underscan is fitting the entire image inside the screen. This is useful for computer monitors so that toolbars and scrollbars at the edges can be seen.

For best results, match the X display area as close as possible to the edges of the physical screen. This can only be adjusted by your tv-out device or by the settings for the television set. Many sets have these adjustments in a 'service mode'.

MythTV has settings for "Overscan" in Setup->Playback. These can not, and do not, cause the image to display beyond the edge of the X display area. The purpose of these settings are to cut off rough edges and to expand the image so that objects will appear to be the same size as a normal overscanned TV picture.

MythTV on the Desktop

When using MythTV on a high resolution desktop monitor, set the MythTV GUI dimensions to something much smaller than your X display resolution but still large enough to read the fonts. The GUI screens will always be in the upper left hand corner. However, your window manager may be able to minimize these (ALT-F4 in KDE for example).

The TV picture will start in full screen mode. Press "f" to put the picture in a window that can be moved and resized. By default, the picture uses the recording resolution for its dimensions. If you check the box "Fixed Aspect Ratio" in Setup→Playback, the windowed picture will always be resized to normal 4:3 shape.

19.6 I'd like to save or restore my database.

See the **mysqldump** manpage for more information.

```
$ mysqldump -u mythtv -pmythtv mythconverg > mythtv_backup.sql
```

To restore: (assuming that you've dropped the database)

```
$ mysql -u root
mysql>create database mythconverg;
mysql>exit
$ mysql -u mythtv -pmythtv mythconverg < mythtv_backup.sql
```

You may need to alter the mysql permissions if this database is being shared with multiple systems. See the [Modifying access to the MySQL database for multiple systems](#) section for more information.

19.7 I'd like to delete the mysql database.

NOTE: Performing this step will remove the entire database. You will lose all of your settings and will need to re-run the mc.sql script to setup the database structure before running the setup program.

```
$ mysql -u root
mysql> drop database mythconverg;
mysql> quit
```

19.8 btaudio

btaudio allows you to obtain the audio data from your tuner card directly over the PCI bus without using a soundcard. This is useful if you would like to use multiple tuner cards in a system without adding a soundcard for each one, or if your existing soundcard is not capable of full-duplex operation.

In order to use btaudio, your tuner card will need certain hardware installed on it, and that hardware must be wired correctly. The chip that will allow you to use the btaudio module is the MSP34xx. However, having a MSP34xx is no guarantee that you will be able to use the btaudio module.

As of 2003-03-31, this is the current list of cards and their status: Works with btaudio:

- Hauppauge WinTV-radio with dbx-TV stereo, model 401
- Hauppauge WinTV-Theater, model 495, 498 (Europe)
- ATI TV Wonder

The following cards do not work:

- Pinnacle Studio PCTV Pro – note: this has a MSP34xx, but it's not wired correctly to the BT878 chip.
- ATI TV Wonder VE
- Leadtek Winfast 2000 XP (PAL, UK and NTSC)
- I/O Magic PC-PVR. No MSP34xx chip.

The following cards have been reported to work, but have issues:

- Avermedia AVerTV Studio (no digital DSP output, "whiney noise" on analog)

See `contrib/example.modules.conf.for.btaudio` for an example file on how to configure btaudio on your system.

Once btaudio loads, it should register additional `/dev/dsp` and `/dev/mixer` devices. Typing `$ dmesg` will let you know what's going on.

19.9 Removing unwanted channels.

If **mythfilldatabase** grabbed a channel which you do not want to include in your TV listings, you can remove the entries from the `xmltv` config file and the `mysql` database. This often happens with premium channels; for example, HBO or Showtime may be available on your cable TV system, but is scrambled because you're not a subscriber to that channel. Since you can never watch it, you want to get rid of it.

First, comment out the channel from the `./mythtv/<sourcename>.xmltv` file by inserting a `"#"` in front of the unwanted entry. This will prevent **mythfilldatabase** from grabbing future listings.

Next, delete the unwanted item from the channel table so that it will not appear in the EPG or when changing channels. The channels will always have "1000" added to them, so for example, assuming that HBO is channel 15:

```
$ mysql -u root mythconverg
mysql> delete from channel where chanid = '1015';
```

Old program data will be removed over the course of a week. However, you may want to immediately delete any current program listings for the channel that has been removed:

```
$ mysql -u root mythconverg
mysql> delete from program where chanid = '1015';
```

19.10 I'd like to use a hardware MPEG-2 encoder (ie, a PVR-250/350).

NOTE: THE FOLLOWING DOCUMENTATION IS PROVIDED AS-IS AND IS NOT GUARANTEED TO WORK WITH YOUR DISTRIBUTION. FOR IVTV DRIVER ASSISTANCE, SEE THE IVTV MAILING LIST.

<https://lists.sourceforge.net/lists/listinfo/ivtv-devel>

These instructions work for Mandrake 9.1 on a backend machine which is hosting a single PVR-250 capture card.

Install the Mandrake kernel source. If you are using a different Mandrake kernel level (ie, not 2.4.21-0.16mdk as in the example below, then alter the **urpmi** command appropriately.)

```
$ uname -a
Linux pvr 2.4.21-0.16mdk #1 Fri Apr 11 06:51:54 CEST 2003 i686 unknown
unknown GNU/Linux

$ su
# urpmi kernel-source
```

NOTE: You do not need to recompile your kernel.

Download the IVTV driver from CVS:

```
$ cvs -d:pserver:anonymous@cvs.sourceforge.net:/cvsroot/ivtv login
<enter> as password
$ cvs -z3 -d:pserver:anonymous@cvs.sourceforge.net:/cvsroot/ivtv co ivtv
```

This should create an ivtv directory. Switch to it and perform the following commands:

```
$ cd ivtv/ivtv/utils
$ wget http://hauppauge.lightpath.net/software/pvr250/pvr250_16_21062.exe
$ su
# ./ivtvfwextract.pl pvr250_16_21062.exe
# exit
```

The **ivtvfwextract** program extracts the firmware required for the card. You may want to go to the Hauppauge website and download the latest Windows driver if the **wget** command fails.

Next, compile the driver:

```
$ cd ~/ivtv/ivtv/driver
$ make
```

NOTE: You may get warnings about i2c during the compile. Ignore them.

Add the following to `/etc/modules.conf`:

```
alias char-major-81      videodev
alias char-major-81-0    ivtv
options ivtv debug=1
options tuner type=2
options msp3400 once=1 simple=1
add below ivtv msp3400 saa7115 tuner
```

NOTE: You must specify the tuner type manually. See `~/ivtv/ivtv/driver/tuner.h` for a listing of tuners. In the above example, `tuner type=2` is a Phillips NTSC. Use an appropriate tuner type for your system and video standard. The `debug=1` parameter on the `ivtv` line actually means less debugging output will be printed.

Next, copy the files that were compiled in the driver directory into the appropriate modules directory:

```
$ su
# make install
# depmod -a
```

Finally, load the ivtv driver:

```
# modprobe ivtv
# exit
```

Check that the card is being recognized on the PCI bus:

```
$ lspci -v
<snip>

00:0c.0 Multimedia video controller: Internext Compression Inc iTVC15 MPEG-2
Encoder (rev 01)
    Subsystem: Hauppauge computer works Inc.: Unknown device 4801
    Flags: bus master, medium devsel, latency 32, IRQ 11
    Memory at d0000000 (32-bit, prefetchable) [size=64M]
    Capabilities: <available only to root>
```

If you don't see your card on the PCI bus, make sure that it's been installed in a bus-master slot. For some motherboards, only the PCI slots closest to the AGP slot are bus-mastering.

Check that the ivtv driver has created a new video device:

```
$ ls -l /dev/v4l/vi*
crw----- 1 mythtv sys      81, 224 Dec 31 1969 vbi0
crw----- 1 mythtv sys      81,   0 Dec 31 1969 video0
crw----- 1 mythtv sys      81,  32 Dec 31 1969 video32
```

In this case, the ivtv device is video0.

Go into `setup/setup` on the machine hosting the hardware MPEG-2 card. When you add a new capture card, ensure that you are using the video0 device.

NOTE: As of 2003-04-25 the ivtv driver does not support VBI, so closed-captioning is not available.

Leave the VBI device, audio device and audio sampling rate limit at the default values. Change the default input to an appropriate setting for your configuration. Change the card type to "Hardware MPEG Encoder Card" and press ENTER.

The remaining setup is just like a standard V4L card; define a video source if you have not already done so, and assign the video source to a video card input on the Input Connections screen.

Some people report issues with the ivtv module not being loaded when required by MythTV. To get around this, you can **modprobe** the ivtv driver before using it. The simplest technique is to add the **modprobe** command to `/etc/rc.d/rc.local`:

```
# echo "/sbin/modprobe ivtv" >> /etc/rc.d/rc.local
```

By default, the IVTV driver uses a 16Mbps peak rate with a 8Mbps VBR. This will create files at about 4GB/hour. If you wish to adjust these parameters, add something like the following to your `rc.local`:

```
/path/to/ivtv/utils/test_ioctl -c bitrate=4500000,bitrate_peak=6000000
```

The actual values to use should be adjusted to your liking and in part depend on the capture resolution. The above example is more than adequate for 480x480. Once the IVTV API has settled down MythTV will incorporate the ability to modify the bitrate internally.

NOTE: some people complain that their PVR-250/350 card is not capturing audio. The most likely source for this is that your system is not loading the correct msp3400.o file; ivtv uses a custom msp3400.c, and if the resulting module isn't loaded you will not get sound. Switch to your `/lib/modules` directory and rename the existing msp3400.o file, then copy the msp3400.o from the ivtv driver directory and re-run **depmod**. If that still doesn't work, then check the ivtv mailing list for more information.

NOTE: Some people report "ghosting" issues with their PVR-250s, where there is a faint copy of whatever is on the screen appearing to the right of the image. If you have this issue, it's fairly obvious. This is a firmware issue, apparently. There are two ways around this:

1. Run at 720x480 resolution
2. Turn off DNR

To turn off DNR, add the following to your `rc.local`:

```
/path/to/ivtv/utils/test_ioctl --set-codec-params=dnr_mode=0,dnr_temporal=0
```

19.11 I'd like to use NFS.

You may want to use a central server to store your files.

On the host machine, (in this case, the hostname is "masterbackend") you'll want to edit your `/etc/exports` file and use something like:

```
/var/video (rw)
```

To export the `/var/video` directory with read / write privileges.

On the "slave" machine, you'll want to edit the `/etc/fstab` file and add something like:

```
masterbackend:/var/video /var/video nfs rsize=8192,wsiz=8192,soft,nfsvers=3
```

Then run `# fstab -a` to re-read the file to mount the file system.

In this case, the source is a machine called "masterbackend" which is exporting the directory `/var/video`, which we're mounting locally at `/var/video`. The `rsize` and `wsiz` options are used to increase the performance of NFS; `soft` mean that NFS will eventually timeout on an error, and the `nfsvers` is required for filesizes over 2GB.

19.12 I'd like to automatically start mythbackend at system boot time.

Red Hat And Mandrake

Here's a method for automatically starting mythbackend submitted by Mike Thomson (<mailto:linux@m-thomson.net>) and Stu Tomlinson (<mailto:stu@nosnilmot.com>).

Copy the files from the MythTV `contrib` directory or from Mike's web site (<http://m-thomson.net/mythtv/>) as follows:

`etc.rc.d.init.mythbackend` should be made executable and copied to `/etc/rc.d/init.d/`:

```
$ cd contrib
$ su
# chmod a+x etc.rc.d.init.d.mythbackend
# cp etc.rc.d.init.d.mythbackend /etc/rc.d/init.d/mythbackend
```

`etc.sysconfig.mythbackend` should be copied to `/etc/sysconfig/`:

```
$ cd contrib
$ su
# cp etc.sysconfig.mythbackend /etc/sysconfig/mythbackend
```

Edit `/etc/sysconfig/mythbackend` if you want to change the defaults (the userid that should start mythbackend, location of the logfile and (if required) the name and location of the mythbackend binary).

Use **chkconfig** to make sure the script is called when entering runlevels 3, 4 or 5:

```
$ su
# chkconfig --level 345 mythbackend on
# exit
$
```

Log files

By default, the log file for mythbackend will be written to `/var/tmp/mythbackend.log`. This has been tested and is known to work on Mandrake and Red Hat, but many people prefer to place logs under `/var/log/`.

To do this, create a group called `mythtv` (or anything you prefer) and add your usual MythTV users to that group. If you changed the user that starts mythbackend from the default of root you *must* perform this step.

Create the directory `/var/log/mythtv` and set its permissions as follows:

```
$ su
# mkdir /var/log/mythtv
# chown root:mythtv /var/log/mythtv
# chmod 0775 /var/log/mythtv
# exit
$ ls -ld /var/log/mythtv
drwxrwxr-x    2 root    mythtv    4096 Apr 28 21:58 /var/log/mythtv/
$
```

Mandrake 9.x

Mandrake adds one more twist in the form of the `msec` utility, which runs regularly and (at the default or any higher security level) sets permissions on many files, including those under `/var/log`.

To tell msec about the MythTV log files and their directory, you need to edit the `/etc/security/msec/perm.local` file to include the following:

```
# /etc/security/msec/perm.local
# Local overrides to the msec program
#
# Full file path          user.group          permissions
/var/log/mythtv/         root.mythtv        775
```

`/var/log/mythtv/*``root.mythtv`

664

A copy of the above has been included in the contrib/ directory. You may add it by typing:

```
$ cd contrib
$ su
# cat etc.security.msec.perm.local >> /etc/security/msec/perm.local
# exit
```

Finally run the msec tool to check and implement your changes.

```
$ su
# msec
# exit
$
```

NOTE: msec can only *reduce* the permissions of files, so if you don't get the results you expect, check that you're not asking msec to add missing permissions to the files or directories you created.

Gentoo

The portage file for MythTV has scripts that will allow you to run mythbackend at startup.

To run mythbackend as a daemon which starts at boot time:

```
# rc-update add mythbackend default
```

To stop mythbackend as a daemon:

```
# /etc/init.d/mythbackend stop
```

To obtain a list of options:

```
# /etc/init.d/mythbackend
```

19.13 Advanced Backend Configurations.

MythTV is flexible in the way that you define multiple backend tuner configurations. The only hard-and-fast rule is that the Master Backend *must* have a capture device defined, but shouldn't imply that the capture device in the MBE must be the first capture card defined in the database.

One example of an advanced configuration is the round-robin scheme. Rather than defining all of the cards on the master, you could first go into setup on the master to define globals such as the general configuration and the channel lineup but not the host-specific configuration item like the capture card. In this example, we will use a 4 tuner configuration, where two slaves have one card each and the master has two.

1. Add the first capture card on one of the slaves. Complete the configuration, connecting the input source to the card. This will get cardid #1 in the database. Exit setup.
2. Configure the first capture card on the master backend. This will get cardid #2 in the database. Exit setup.
3. Configure the first capture card on the second slave. This will be cardid #3 in the database. Exit setup.
4. Configure the second capture card on the master backend. This will get cardid #4 in the database. Exit setup.

Using this scheme, the master backend will not use both capture cards until one of the following happens:

- There are four recordings scheduled for the same time
- Both slaves are not available

The scheduler in MythTV checks whether an encoder is available; if a slave backend isn't running, its encoder isn't available, so the scheduler will look for the next available encoder. This makes MythTV very flexible; slave tuners can come and go, and as long as there are enough tuners for what you'd like to record it doesn't matter which tuner in particular is going to be used.

Using this round-robin scheme along with a shared storage directory like NFS and enabling the Master Backend Override setting will allow you to view content even if the slave backend that recorded a program is not available.

19.14 Advanced Partition Formatting.

MythTV creates large files. The partitions that your distribution sets up for you may not be optimized for large files.

Ext3

With Ext3, your biggest gain is that in case of a crash and reboot you don't have to wait very long for your partition to be remounted. With Ext2, the **fsck** may take a long time to run on multi-gigabyte partitions.

When formatting the partition, the following command line should be better than the default. This example assumes that `/dev/hdb1` has already been created using **fdisk**.

```
# mkfs.ext3 -T largefile4 -m 0 /dev/hdb1
```

The `"-T largefile4"` option creates one inode per 4 megabytes. The `"-m 0"` (zero, not "oh") parameter sets the amount of spaced reserved for root to zero. By default, this is 5%, which on a multi-gigabyte drive is a lot of reserved space.

You may also modify some aspects of a filesystem such as the reserved block percentage after it has been created using the **tune2fs** program:

```
# tune2fs -m 0 /dev/hdb1
```

You can check on your filesystem using the **dumpe2fs** program. See the **man** page for details.

19.15 I'd like to have more flexible disk storage with LVM.

LVM greatly increases the flexibility you have in managing your storage than traditional physical partitions. This section will provide some brief notes on how to use LVM to create storage space for your video files and how to add additional disk space in future. There's lots more that can be done with LVM, so check the LVM HOWTO <http://tldp.org/HOWTO/lvm-HOWTO/> document for details.

Make sure your kernel configuration includes LVM support or that it's available as a module. Today, most vendors include this by default. You'll also want to ensure that you have a copy of the LVM utilities; check your distribution, or get the latest versions from http://www.sistina.com/products_lvm.htm and build them manually.

Check that the **vgscan** program is being run at some point during your boot sequence – most distributions do this by default. Look for a message during boot up that looks like this: `vgscan -- reading all physical volumes`

(this may take a while...)

LVM uses a few concepts you should be familiar with before starting.

- PV (Physical Volume). The actual partition on the hard drive.
- VG (Volume Group). The aggregation of all the PVs make a VG.
- LV (Logical Volume). Subdivision of the pool of space available in the VG into individual chunks, like /usr, /var/video, etc.

The following example assumes that you want to create a LVM partition from a chunk of space in /dev/hda5, using a reiserfs filesystem and mounted on /var/video. You later decide to extend this filesystem by adding a new disk: /dev/hdb.

You need to create at least one LVM partition for a physical volume. Use **fdisk** or your favorite partition editor to set the type to LVM (0x8e). If you're using an entire disk, create one big partition rather than using the device itself. e.g. use /dev/hdb1 not /dev/hdb.

```
# fdisk /dev/hda .... create partition 5, save partition table and reboot if you have to
```

Create the LVM physical volume from the partitions (repeat if you have multiple partitions to use):

```
# pvcreate /dev/hda5
```

Create a LVM volume group out of this physical volume called "VGforMyth" that is allocated in chunks that are a multiple of 64MB

```
# vgcreate --name VGforMyth -s 64m /dev/hda5
```

Create a logical volume of 20GB called "video" and then create the reiserfs filesystem and mount it:

```
# lvcreate --name video --size 20G VGforMyth
# mkreiserfs /dev/VGforMyth/video
# mount /dev/VGforMyth/video /var/video
```

Now create a 5GB volume for mythmusic files if you like:

```
# lvcreate --name music --size 5G VGforMyth
# mkreiserfs /dev/VGforMyth/music
# mount /dev/VGforMyth/music /var/music
```

Display the volume group status: # `vgdisplay -v`

Now, lets suppose you want to add a 60GB hard disk to the system as hdb and allocate 50GB of it to video storage.

First, create a single partition /dev/hdb1 covering the whole disk and make it type 0x8e using your partition editor.

```
# fdisk /dev/hdb .... create partition, set type, save and reboot if it says you have to
```

Create the new LVM physical volume:

```
# pvcreate /dev/hdb1
```

Add the new physical volume to the volume group:

```
# vgextend VGforMyth /dev/hdb1
```

Once you've completed one of the following two procedures, use **df** to check that you've got more space.

ReiserFS

Make the logical volume used for video bigger:

```
# lvextend --size +50G /dev/VGforMyth/video
```

Unmount, resize and remount the filesystem. Technically, you don't need to unmount and remount the ReiserFS.

```
# umount /var/video
# resize_reiserfs /dev/VGforMyth/video
# mount /dev/VGforMyth/video /var/video
```

ext2 or ext3

LVM comes with a program called **e2fsadm**.

Unmount, resize and remount the filesystem. The filesystem *must* be unmounted during this procedure.

```
# umount /var/video
# e2fsadm --size +50G /dev/VGforMyth/video
# mount /dev/VGforMyth/video /var/video
```