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## Record HDTV content with Freevo

# TV DINNER

Feed broadcast and cable signals into your personal video recorder and feast later with the Freevo home theater application.

BY PHILIP RAYMOND

I like to own whatever I record. I don't like the idea of my TV recordings being held hostage inside some digital video recorder (DVR) only to end up getting deleted to make room for more captive recordings. That is why I build my own setup instead of using commercial DVRs like Tivo. Until recently, however, I could only record over-the-air HDTV and a very few non-encrypted, cable-provided QAM channels. Then, in June 2008, Hauppauge introduced the HD PVR 1212 device [1].

The Hauppauge HD PVR 1212 is able to record HD from the component cables connected to a cable box, thus taking advantage of the so-called "analog hole." This device makes it possible to record any channel from your cable box, even

premium channels in HD. Fortunately, it also loops the component output through the device to the TV, so you can watch TV while it records. The HD PVR doesn't actually do the recording – your computer does. The HD PVR simply captures the component signal, converts it to AVCHD h.264 video and AAC audio, then sends the information via USB to your computer, where it is recorded. That's where Freevo comes in.

### Now Showing

Freevo [2] is an open source HTPC (Home Theater PC) application that's been around since 2003. As most Linux home-brewed HTPC users know, however, MythTV is the best known and most widely used HTPC application for

Linux. Myth is very good at what it does – which is controlling nearly every media and electronic device in the home. Many people swear by it; others, like me, swore at it, after many frustrating attempts to configure Myth within an Ubuntu desktop environment. Myth simply works better in a setup in which it is the distro, like Mythbuntu, and doesn't need to share memory and hard drive space with anything else. That's what attracted me to Freevo.

Freevo isn't an HTPC built from within like MythTV; it's a home theater platform using the existing media applications, like Mplayer, Xine, VLC, and Mencoder, to behave like an HTPC. For this reason, it is much lighter than Myth and runs just fine on a desktop like Ubuntu or any other distro, even while you do other things like surfing the Internet or writing articles for *Ubuntu User*.

Freevo's newest version is 1.90, with the much anticipated version 2.0 expected within a year. The current version is built to work with Python 2.6, which is a welcome change from the previous versions built with the outdated Python 2.4 (it will also work with Python 2.5). Freevo is offered in both *rpm* and *deb* packages; however, I've had better luck building Freevo from source code. For some reason, the package forms of Freevo always configure incorrectly or seem to be missing something. Freevo is built on Python code, which makes it easy to compile and install both Freevo and its dependencies, most of which are also written in Python. In a terminal, simply *cd* to the directory you extracted to, do *sudo python setup.py install*, and that's it. No *./configure*, *make*, *make install* necessary.

Freevo's website has a good documentation section that can answer most questions you might have about Freevo dependencies and configuration. It is, however, somewhat dated in its information regarding configuration for some HD cards, dongles, and devices like the HD PVR, so I highly recommend joining Freevo's Mailing List. The mailing list provides help you can't get anywhere else, straight from the fans of Freevo, who can provide assistance from our own shared experience.

Freevo can be configured for both internal recording and playback, or you can set up a remote control with a com-



Figure 1: Freevo's splashscreen startup.



Figure 2: Freevo's main menu.

puter in the same room as the TV, with the TV connected to the computer's video and audio card. I set up Freevo just for recording, and I'll explain why by telling you about my setup for HDTV playback.

While looking for a present for myself last year, I found the relatively cheap (US\$ 120) WD TV HD media player by Western Digital. This device works by connecting a USB external hard drive to the media player and records HD video files (and audio, too) to your HDTV via an HDMI cable. Although I do have to transfer my Freevo recordings to the external hard drive (a 1-hour 1080i HD recording takes about 2 minutes to transfer), the playback is always smooth and looks great, even 1080p AVCHD home video content. You can connect two hard drives to it, and it can navigate the content on both drives on the on-screen menu. It plays just about any video or audio codec you can throw at it, even *.flac* audio within Matroska *.mkv* files. So, I bought two of these devices, one for each HDTV.

Fast-forward a year later, and out comes the WD TV Live [3] – the same device, only now with an Ethernet connection. Now I can also use this device to play Freevo recordings from the computer that is recording them and also have the luxury of time-shifting, that is, watching the recording before it's done. Personally, I like both methods, depending on whether I want to archive a recording to an external hard drive.

## Freevo Setup

My HD recording setup with Freevo involves two devices. One is a Hauppauge HVR 950 HDTV [4] over-the-air USB dongle connected to an indoor antenna. The other is the Hauppauge HD PVR connected via component cables from the cable box and USB cable from the HD PVR to the computer. Both devices feed into two different laptops. Each requires a different setup, which I will demonstrate here, to show the two most likely arrangements for those who want to try Freevo for recording HDTV. Note that, because I live in the United States,

these examples are from ATSC (digital) settings. Freevo is also fully adaptable to PAL/DVB settings for other areas; examples and templates available on Freevo's website.

As I said before, Freevo's website is lacking in some information on HDTV configuration, so my HD configuration files can act as templates for setting up Freevo to record HD from over the air or from cable. My settings for the HD PVR were an adventure in hacking. I did apply some information from the MythTV website for getting and installing the drivers for the HD PVR, but everything else was learned through many hours of testing. The drivers for the HD PVR are now included in Linux kernel 2.6.30, the kernel used in the latest editions of Ubuntu, Fedora, and many others. If you are using an older distro with a previous kernel, you will need to download and install the drivers for the HD PVR from [linuxtv.org](http://linuxtv.org) [5]. Additionally, the drivers will need to be re-installed for every kernel upgrade until your distro gets up to 2.6.30.

Once you've installed Freevo successfully, you will need to open a terminal and run `sudo freevo setup`, which will create the `freevo.conf` file. The next step is to configure Freevo for both your computer's hardware and the type of TV capture device you plan to use. Most capture devices are supported, and many run on the v4l or the v4l2 drivers already built into the current Linux kernels, so you don't have to worry about drivers. In regard to Freevo, the default "generic" video plugin works with v4l drivers. The user/custom configuration file is called

### Listing 1: Recording HD from Cable with the Hauppauge HD PVR

```
CONFIG_VERSION = 5.27
TV_RECORD_DIR = '/home/tvphil/Videos'
TV_CHANNELS = 'Comcast','Comcast','NA3'
VCR_CMD = 'cat /dev/video1> %(filename)s & sleep %(seconds)s ; kill -9 $!'
TV_DEVICE = '/dev/video1'
TV_INPUT = 1
TV_REC_SIZE = (1920, 1080)
TV_RECORD_FILE_SUFFIX = '.mpg'
DEBUG = 5
DEBUG_CHILDAPP = 1
```



Figure 3: Freevo's menu list.



Figure 4: Manually programming a selection.

*local\_conf.py*. Once Freevo is installed, you need to create this file, along with a Freevo folder for it, in the *etc* or home directory.

### Channel Surfing

If you are using a USB HDTV dongle for recording over-the-air HDTV, you'll need to download and install DVBCStream [6] and use the *dvbstreamer-livepause* plugin. To capture your local channels for over-the-air digital TV reception, perform the following steps after installing DVBC Streamer.

To begin, plug in the USB TV capture dongle with the antenna attached, then in a terminal, type *setupdvbstreamer -A channels.conf* to create a list of all possible channels. Then, in the terminal,

```
dvbctrl lsservices -- -id| grep ?
-v ^ffff.ffff.
```

This process will take several minutes as Freevo scans all of the channels in your area, referencing against the list you created in the previous step. Next, simply copy and paste the list of captured channels to Freevo's *local\_conf.py* file, in a format similar to the example below. Listings 1 and 2 are examples of the two types of HDTV configurations for the *local\_conf.py* file.

You might be wondering why the HD PVR has an entry of *NA3* for a TV channel. Here we are tricking Freevo into believing there is a channel, when in fact, no channel is present or necessary. With the HD PVR, it is simply recording a stream; there is no channel tuning in-

olved. If you don't give it *NA3*, however, Freevo won't record, because it thinks you need a channel conf. The *VCR\_CMD* starts and stops the stream according to the times you program.

### Recording

You can configure Freevo to start, either when you boot your computer or after, by using a command in a terminal. To start Freevo, in a terminal window, type *sudo freevo recordserver start* then *sudo freevo*, because Freevo needs to start up with root privileges. When used with the HD PVR, you need to open a second terminal to *sudo freevo* because of the false channel mentioned previously. If you're using DVBC streamer, you'll need to start it before starting the recordserver with the command *sudo dvbstreamer -d*. Once

### Listing 2: Recording HD Over the Air with the Hauppauge 950 HVR

```
CONFIG_VERSION = 5.26
TV_RECORD_DIR = '/home/tvphil/Videos'
TV_CHANNELS = [('CBS2 CH', 'CBS2-HD', '00cf.03e7.0001'),
 ('NBCS-DT', 'NBCS-HD', '0233.03e9.0005'),
 ('WLS-DT', 'WLS-DT-7.1', '02bd.03eb.0001'),
 ('Livwell', 'Livwell-7.2', '02bd.03eb.0002'),
 ('WLS-SD', 'WLS-SD-7.3', '02bd.03eb.0003'),
 ('WGN-DT', 'WGN-DT-9.1', '01f7.03ed.0003'),
 ('LATV', 'LATV-9.2', '01f7.03ed.0004'),
 ('WTTW-HD', 'WTTW-HD-11.1', '029f.03ef.0003'),
 ('WTTW-DT', 'WTTW-DT-11.2', '029f.03ef.0004'),
 ('WYCC HD', 'WYCC HD-20.1', '0203.03f1.0001'),
 ('WCIU-HD', 'WCIU-HD-26.1', '0227.03f3.0003'),
 ('MeTV', 'MeTV-26.2', '0227.03f3.0004'),
 ('WFLD DT', 'WFLD DT-32.1', '023f.03f5.0003'),
 ('WPWR-DT', 'WPWR-DT-50.1', '02b7.0459.0003')
]
AUDIO_DEVICE = 'hw.0,0'
plugin.remove('tv.mplayer')
plugin.remove('tv.generic_record')
plugin_record = plugin.activate('tv.dvbstreamer.record')
plugin.activate('tv.dvbstreamer.live_pause')
LIVE_PAUSE_BUFFER_SIZE=(6.25, 30 * 60)
LIVE_PAUSE_BUFFER_PATH='/home/tvphil/freevo/live.buf'
TV_RECORD_FILE_SUFFIX='.mpg'
TV_VIDEO_GROUPS = [
    VideoGroup(vdev='0',
               group_type='dvb',
               desc='Watching Video Group',
               record_group=0)
]
CHILDAPP_DEBUG = 1
```



Figure 5: Freevo's channel list.



Figure 6: A Freevo recording in progress.

Freevo starts up (Figure 1), you might notice that, although Freevo's GUI is nice to look at (Figure 2), you can't navigate it with a mouse. Instead, you navigate with the keyboard direction arrows, spacebar, escape, and enter keys. Freevo 2.0 will finally deliver mouse navigation, but until then, you'll need the arrows.

Next, choose *TV Guide* from the menu (Figure 3) and select the program you want to record from the guide. Or, if you're using an over-the-air capture device, navigate to *Manual Record* on the keyboard and use the spacebar to manually program your selection (Figure 4). Manual Record is also used for the HD PVR. Because you're recording whatever comes out of the cable box, use the cable box TV Guide (Figure 5) to preview and select programs. Then, save and leave Freevo on to record (Figure 6). You can also program Freevo to record days,

weeks, and even months in advance. Even if you shut down your computer, Freevo will retain your programming.

Once your program is recorded, you can watch it several different ways. If it is an HD recording, you might want to watch it on a full-size HDTV. To watch your recording on HDTV, use the WD TV Media Player with an external hard drive feeding it. Wireless N or Ethernet cable networks should have enough speed for most network media players. Another method involves a newer computer with an HDMI port. Just connect an HDMI cable between the computer and your HDTV, and your computer becomes a media player for your HDTV. Also, you can hook your HDTV to the computer video card and audio card if the card supports component out or VGA out.

Aside from the WD TV's great performance, I also like the WD TV media

player because it is smaller than other HDTV playback devices (Figure 7). Both the media player and the external hard drive sit on top of a DVD player. The WD TV is also totally silent while operating. If you use this system to record on-demand movies and programs from your cable or satellite provider, you really don't need a Blu Ray player – yet another reason to try Freevo.

## Conclusion

The *Features* page at Freevo's website explains everything Freevo can do – from RSS news and weather feeds to Linux video games to support for multiple tuners. Although it might take some time to build your Freevo system, once you do, you'll be able to keep all of your HDTV recordings, completely free of DRM restrictions. And, with Freevo 2.0 just around the corner, it will only get better. ■



Figure 7: The media player and hard drive fit almost anywhere.

## INFO

- [1] HD PVR product overview:  
[http://www.hauppage.com/site/products/data\\_hdpvr.html](http://www.hauppage.com/site/products/data_hdpvr.html)
- [2] Freevo homepage:  
<http://freevo.sourceforge.net/>
- [3] WD TV: <http://www.wdc.com/en/>
- [4] WinTV-HVR-950Q hybrid TV stick:  
[http://www.hauppage.com/site/products/data\\_hvr950q.html](http://www.hauppage.com/site/products/data_hvr950q.html)
- [5] HD PVR drivers:  
<http://linuxtv.org/hg/v4l-dvb>
- [6] DVBSreamer wiki:  
[http://www.dvbstreamer.org/mediawiki/index.php/Main\\_Page](http://www.dvbstreamer.org/mediawiki/index.php/Main_Page)