A quick introduction to DivX recording

Introduction

This tutorial is meant to give a short introduction to the DivX Codec and the environment necessary to make a recording with your TerraTec TV card.

Please keep in mind that you use this document at your own risk, TerraTec can't be held responsible for any damage or errors that may occur from using this information.

Hardware and Software requirements

To have a smile on your face when you finish reading this tutorial, you will need:

- A computer (really?) with at least 128MB RAM, a large amount of defragmented hard disc space (=>2GB), a CPU with at least 800MHz clock rate and a stable Windows 98SE/ME/2000/XP installation.
- A TerraTV+/TerraTValue/Cinergy card with the official TerraTec WDM software
- A soundcard (i.e. Aureon/DMX6fire/EWS)
- The DivX codec (available for free under http://www.divx.com)
- The Fraunhofer MP3 codec (should have been bundled with your Windows, otherwise it can easily be downloaded) or an alternative MP3 codec (like Lame).

Of course your TV card must be properly installed, and the same applies for the soundcard as well as the rest of the system.
To ensure that your system is properly configured for managing large data streams, it is advisable to read the *Audio Tweaks* tutorial available on the TerraTec Website.

Recording Tutorial

Let's get started: After these few easy steps you will have a pretty nice DivX AVI file on your computer:

Step 1: Installing DivX and the codecs
This is done by downloading the latest DivX codec pack and executing it. Same is done with the audio codecs if necessary. If you want to check which codecs are installed on your computer, click "Audiocodecs / "Videocodecs" in the "Audio, Video, Game Controllers" section of the Device Manager.

Step 2: Launch your TerraTV / Cinergy software and select the source.
Feels just like watching TV: Launch TerraTV and choose the source you wish to record from.

Step 3: Set up your soundcard for recording from the input the TV card is connected to.
This is done in the Audio tab of the TerraTV software - usually the input port is called "Line In".

Step 4: Recording setup
Click on the gear or wrench on the upper left side of the TerraTV Software to open the configuration menu. Choose the "Record" tab and adjust the settings as shown below. Set the file destination to a partition with enough recently defragmented and uncompressed free space.

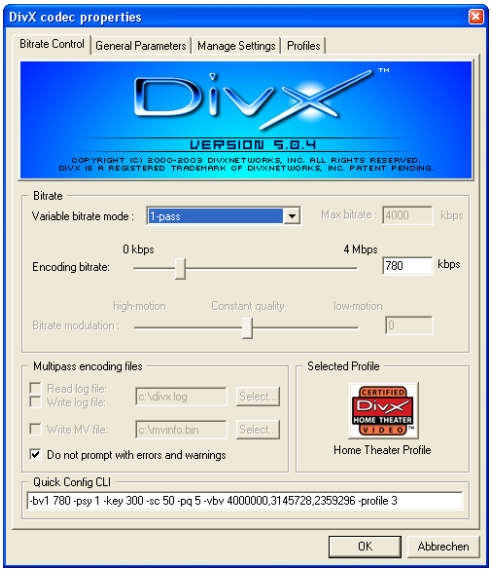
If you are running Windows NT/2000/XP, you should use a NTFS partition for recording, as FAT partitions can only handle file sizes up to 4GB. Under Windows 95/98/98SE/ME you

are limited to 2GB (FAT16) or 4GB (FAT32) per file- please keep this in mind.

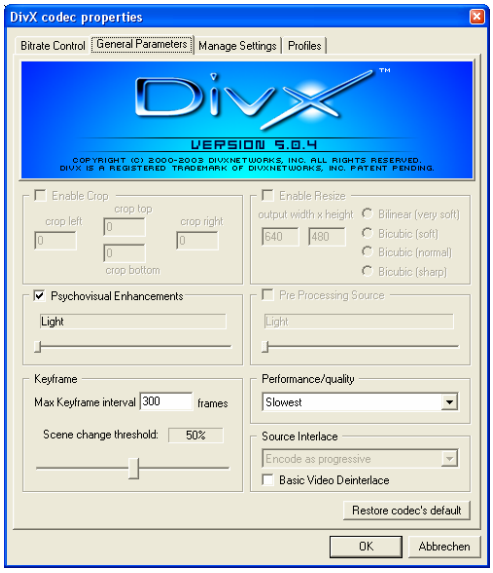
Tip: If you use the Cinergy card, you can also choose the Cinergy Audio Recording Device instead of your soundcard. This is very useful to avoid audio/video de-sync which usually occurs in connection with a bad soundcard setup.

If possible, you should choose YUV under Video Color Format (instead of RGB555), as this is the color format the codec actually works with.

When you have finished this part of the setup it is time to consult the codec configuration submenus, marked in the image above with 1 and 2. First configure the DivX codec itself. We will look into the most important options of the codec now:



Tab 1 : Bitrate Control



Tab 2 : General Parameters

Bitrate Control

The first interesting setting is the bitrate. It is measured in kb/s (Kilobits per second) and it indirectly represents the size of the output video file. A usual value is 780 kb/s, a value between 780 and 900 kb/s should be a good default setting.
Another interesting setting is the *Variable Bitrate Mode*. In some cases it is advisable to encode with a variable bitrate. In a normal movie there are scenes without a lot of motion which can easily be compressed more without visual artefacts surfacing, but there are also scenes with a lot of action which contain so much detail that you need more data to store it without impact. This can be managed by the variable bitrate mode. In general, variable bitrate encoding requires more CPU power but offers better compression results.

General Parameters
This looks similar to the general setup of an MPEG codec, and seeing as DivX is basically a modified MPEG-4 codec, it makes sense.

The most important setting is the Maximum *Keyframe Interval*. To explain this setting, we have to dig a bit deeper into MPEG compression technology.

MPEG knows 3 basic image (frame) types (and some more advanced settings like motion vectors, but we will not examine them here). The first one is the I-Frame (Intra), which is simply a complete image. The second one is the P-Frame (Modifies *Predicted* Image), which contains only the information that can change the last I-Frame to a frame that would represent the next frame.

This means { I-Frame 1 , I-Frame2 } (almost) equals { I-Frame 1, (I-Frame1 + P-Frame 1) }.

Another one is the B-Frame (*Bi-directional*), which corresponds to the P-Frame, with the difference that it can also be related to the next frame.

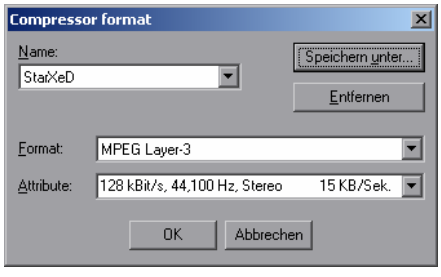
According to the encoded material the encoder uses a specific frame type sequence, the so called GOP (Group of Pictures). This GOP always begins with an I-Frame and has a specific duration (per default 300 frames). So the keyframe interval is the interval between two I-Frames, which represents the GOP-length. The higher the value, the higher the compression factor, with a negative effect on the quality.

In other words: The lower the value, the more complex the scenes can become without causing visual artefacts on the compressed file. For example, cartoon movies can usually be compressed with a higher keyframe interval, action movies should have an interval equal to the default setting or lower. It would be possible, for example, to encode the daily news (without the video reports, just the newscaster) with just one I-Frame (Keyframe) and lots of P-Frames.

The *scene change threshold* affects the automatic keyframing setting, which breaks and restarts the GOP when the scene changes are too complex for managing them with P- and B-Frames.
Another setting to be aware of is the quality/speed setting, which should always remain on slowest in combination with the highest quality. If your computer fails to process the load adequately, try increasing the bitrate instead of accepting visual artefacts.

The *Psychovisual Enhancement* function works as a post-processor virtually enhancing the quality of the encoded image. In our tests we archived good results with the lowest-setting which resulted in slightly stronger colors without making the overall result look like a defective TV.

The next step is configuring the audio codec recording properties. This is found in the audio configuration menu that can be accessed with button 2.



For the format you should choose MPEG Layer-3 (MP3), the attribute should be 128kBit/s, 44,100 Hz, Stereo.

Upon clicking OK you have successfully set up your TV Card for DivX recording.

Tip: You can easily calculate the estimated size of the output file, based on the bitrates you have set up.

Output size = (bitrate audio (kbit/s) + bitrate video (kbit/s)) * time (s)

[8 kbits "=" 1 kb, 1024 kbyte "=" 1 MB]

For example, a 10 sec file with the configuration above (neglecting overhead) would be :

= 128 (kbit/s) + 768 (kbit/s) * 60 (s)
= 53760 (kbit/s) * s
= 53760 kbit -> 6720 kbytes -> **6,56 MB**

Step 5: Lights! Cameras! Action!!

The final step is starting the recorder by pressing the record button in the TV Software. You can end the recording anytime you want by pressing the Stop button or using the Escape key.

The file that results from the recording is your new DivX compressed file.

Enjoy! :)

Useful Links

To explore even more possibilities of recording with DivX, here are some links and programs that can help:

1. **Virtual Dub**
   Virtual Dub is one of the best video cutting and converting utilities. With a size of less than 1MB it fits on a floppy disc and can do everything from transcoding videos up to cutting out commercials from your favorite TV series.

2. **Internet: http://www.slashcam.de (German) or http://www.divxdigest.com (English)**
   Two good PC video related websites.

3. **Internet: http://www.terratec.de -> Tutorial: Audio Tweaks**
   A good tutorial for fine-tuning the PC for audio processing. Almost all the steps apply to video issues as well.