

How to process HDTV from iCord into HDTV disks (BD-5¹, BD-9, BDR, BDRE)

- 0. Introduction
- 1. Transferring the recordings from iCord to PC
- 2. Checking/correcting the recordings
- 3. Cutting the recordings
- 4. Obtaining the subtitles [if available]
- 5. Authoring the disk
- 6. Burning the disk

0. Introduction

The Humax iCord HD is a HDTV dual tuner SAT Receiver with HDD and a quite good connectivity. It's one of the very few receivers that store the whole recording into a single file (be it 83 GB long). This is done however at the expense of a proprietary file system. One can however use Ext3fs-formatted external HDDs if one likes it (most other receivers need FAT32-formatted disks), but the most elegant solution is to use its network interface, which seems to be also faster.



There are lots of guides how to do this and that, but none of them is satisfactory for at least one ground: no cutting involved, no multi audio processing, no subtitles, the involvement of dubious software (trialware, adware etc.) and so on. Not to mention that the vast majority of commercial 1click software actually downsize the HDTV recordings to SDTV. If you have only 1 audio, you don't want subtitles or commercial-removal, prefer an 1click solution and you don't care if you see your result as SDTV, then this guide is not for you, because it involves a lot of transpiration and a bit of inspiration (T.A. Edison). The method was tested and worked 100% every time.

0.1 The tools

Personally I hate to spend money on crap payware, especially when their authors consider you stupid and prevent you from obtaining what you want. Thus the list comprises only freeware or free to use software. If you liked the procedure and their tools, it would be nice to support their authors.

¹ A BD-5/9 is a DVDR/DL that contains a BluRay structure, allowing it to be played by BluRay-Players.

0.1.1 Software

Operation	What I use myself	Comments
Transfer	WinSCP	Any FTP software may work, however WinSCP is the only software I tried that works on my system
File processing	TS Doctor 1.07	At this moment I'm not sure about it's legal status, but it can be obtained for free as a time limited version. H264TS_cutter as alternative.
Subtitles	Project X	The latest version (it's Java based, so be sure you have the latest runtime too)
	Subtitle Workshop	I use also Notepad for small corrections
Authoring	multiAVCHD	The only free BD authoring software (menus)
Burning	ImgBurn	Free and the best burning software
Supporting tools	Java runtime	The latest version - for ProjectX
	FFMPEG / CoreAVC ²	Or any other H.264 codec
	FFMPEG / Ac3Filter	We need audio too ³
	Haali	Or any other TS splitter
	AviSynth 2.58	The latest version, for multiAVCHD

0.1.2 Hardware

At least 1 big (really big) HDD, preferably 2 (not 2 partitions) for faster processing.
An USB HDD **or** a network CAT5 cable (one of them, see next Chapter).

0.1.3 Others

A lot of time, patience and probably coffee (it's politically incorrect to suggest smoking)

0.2 The procedure

The very first step is to install the software - this is an one-time procedure.

The first [repeatable] step would be the transfer of the recordings to one HDD. Then the recordings should be checked for transmissions errors, maybe corrected or recovered if needed. The checked recordings are then cut to keep the essential (no commercials, the beginning and the ending). The recording is then passed into the next step, the extraction of the subtitles. The recording and the subtitles are then authored. Finally the authored masterpiece is burned to a DVDR/BDR or otherwise used (for PS3, for streaming etc.).

1. Transferring the recordings from iCord to PC

The iCord saves the content into a .TS file which comprises everything it was broadcast (video, all the audios, all the subtitles, the teletext, the EPG and so on) for one channel⁴. Up to the firmware revision 1.00.03 this file had the standard .TS format (packet size of 188B). The next revisions changed the format to the new one, .M2TS⁵ (the same format eg the BD has), which has a packet size of 192B, but the extension remained the same, .TS. One has to be careful about these files, since not all the software can cope with

² CoreAVC is commercial, but it's highly recommended. Also Haali is recommended over Gabest.

³ It might however work with the default sound drivers, check before install something.

⁴ There are SAT Receivers that save the whole transponder, so the user has to match the PIDs for audio, video and so on, on his own (or helped by software).

⁵ There are 4 Bytes added that hold a timing reference.

.M2TS files. In addition to this file, the iCord also creates 2 more files, having the same name, that hold the information about the broadcast and the thumbnails. These files are not needed. We need only the .TS file.

There are 2 ways of getting the .TS recording: the USB way and the network way. I'll explain shortly each procedure, however a detailed one is beyond the scope of this guide.

1.1 The USB way

An external HDD (or any storage like SD, memory stick or even a SAT receiver in slave mode) needs to have either the FAT32 or the Ext3fs as the file system. I have no idea what happens when the HDD contains more than 1 partition, I assume that all of them are recognised and listed.

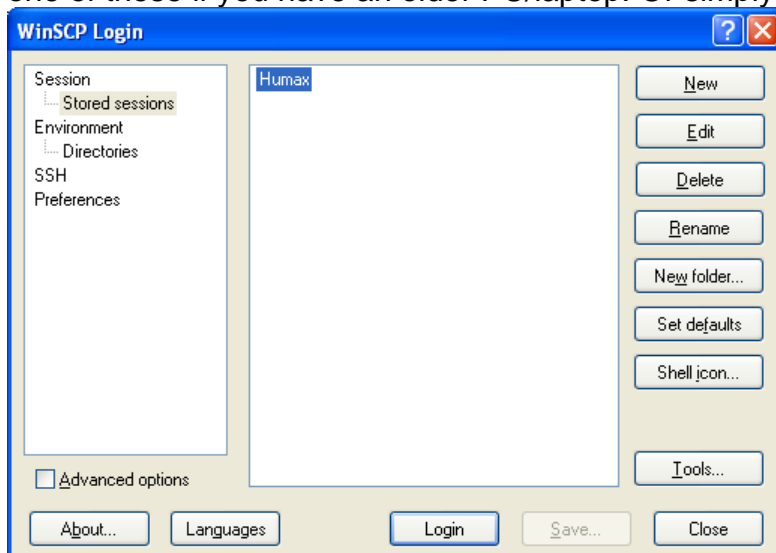
The FAT32 limits the file size to 4GB, which is not appropriate for HDTV recordings, sometimes even for SDTV. It is however extremely well supported by virtually every device.

The Ext3fs is a Linux files system. It can accommodate the huge files of the iCord but it's rather complicated to make the windows recognise it.

To copy the recordings just connect the USB device and select the operation from the menu as described in the manual. A window showing the transfer progress appears and it cannot be eliminated, that means you can't use the iCord for anything else. Of course you can copy 1 file at the time, batch mode is not possible.

1.2 The network way

Just connect the iCord with the PC using the network cable. Most devices are autosensing, that means you don't need the special "crossover" cables, but you may need one of these if you have an older PC/laptop. Or simply put a network switch⁶ in between.

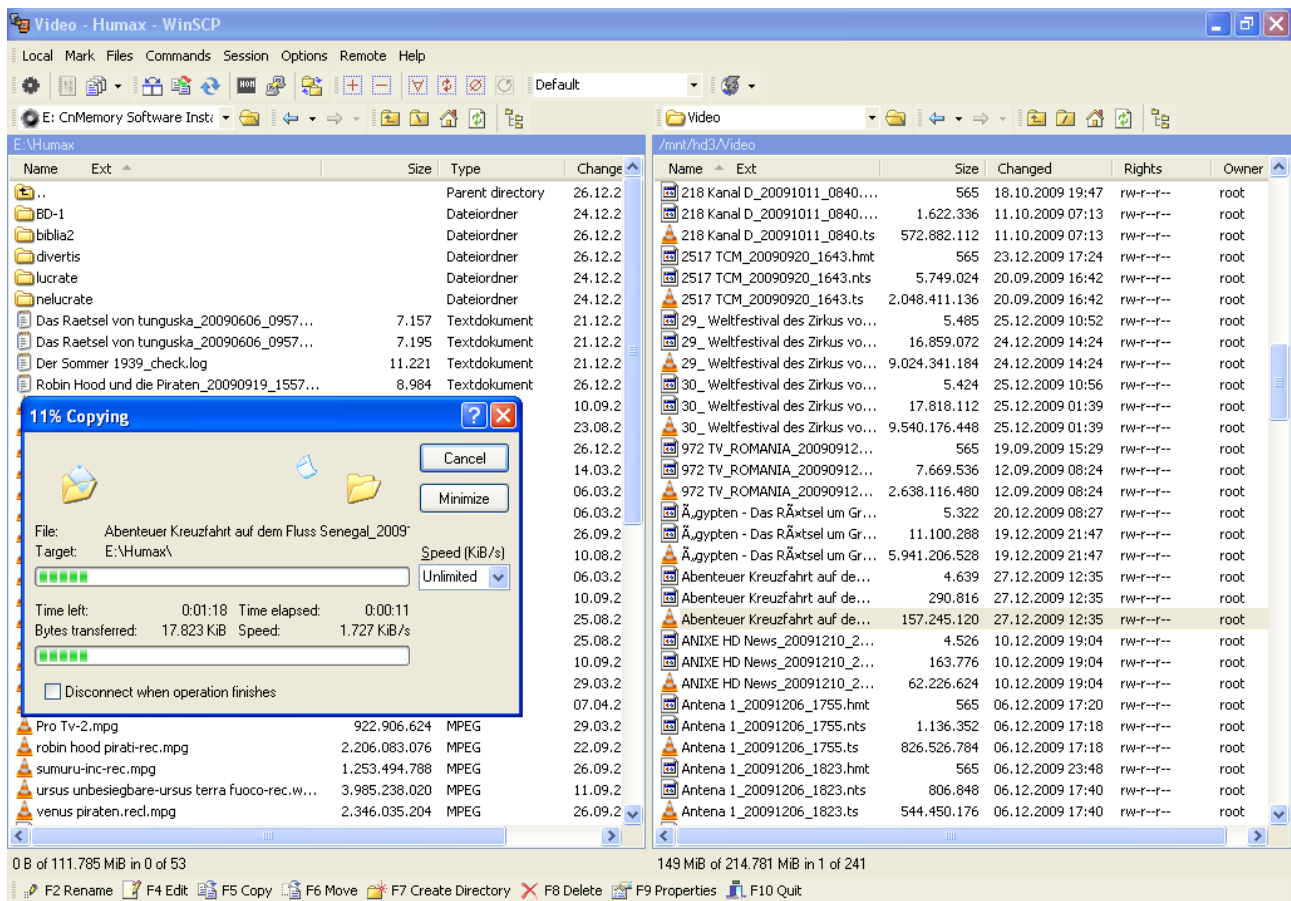


Launch the FTP client, make sure you don't use the passive mode, input the user name (humaxftp or HumaxFTP) and the PIN⁷ for the password and start copying (not moving, see 1.3.5).

The speed depends in various factors, but is essentially governed by the CPU of the iCord.

⁶ Use the simplest switch, a hub or a router needs a proper configuration and the inexperienced user might run into connectivity problems. A simple switch works at the lowest level of network protocols (layer 1) so it physically connects 2 networks without asking any questions. Also called repeater.

⁷ 0000 if not modified by the user.



⚠ Don't put the iCord into Standby during the procedure, it will stop the transfer.

Your iCord can do everything it could in the normal way, that is the transfer runs in the background without interfering with the normal activities of the iCord. You can simply load the list of the files to be transferred and let the iCord do this overnight.

1.3 Troubleshooting and hints

- 1.3.1 If you use the Ext3fs file system make sure you install the adequate driver. There are 2 programs (a driver and a software), both of them are rather instable.
- 1.3.2 Before copying it would be wise to change the iCord to unencrypted radio mode (best) or to SDTV FreeTv (good). The transfer needs CPU power, the video decoding and the decryption requires a lot of CPU power and the transfer rate may be very low. Of course, the iCord can do HDTV PayTV and the transfer, but at the expense of the transfer times.
- 1.3.3 Some recordings put characters in the title (thus in the file name) that are illegal under windows. You have to remove them from the names before doing any transfer. After copying the files, you should rename them back (keep a copy of that character in eg Notepad).
- 1.3.4 There are receivers that came with the MAC address of FF:FF:FF:FF:... which isn't a valid one. Look into internet or in www.icordforum.com how to change this.
- 1.3.5 As in 1.3.3 do the Copy and not the Move. You can delete the files using the iCord. You can do also the Move, but it may be that the iCord gets confused.

2. Checking/correcting the recordings

The advent of digital changed a lot the video world. One of the most important advantage of the digital signals is their immunity to noise. In other words the digital signal can be recovered much easier in its original state. However, there are situations wherein the threshold has been over passed, and no correction can be done.

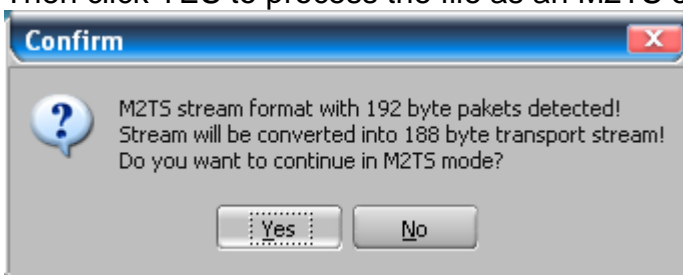
As long as the Quality of the incoming signal is a bit over 50% (as seen in the Info Status) the recordings are stored ok (the iCord corrects them itself). However, if the quality is below, artefacts may appear (pixelation, defective sound, than loss of the image).

The only correction in this case remains the elimination of the defective parts from the recording. There is no software that can fill in the missing gaps, as of today, 16-02-2010. This is done with many programs, but I use TS Doctor.

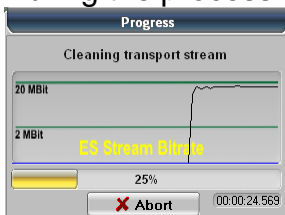
Just drop the file over TS Doctor. It will analyse and correct it. The Teletext isn't selected by default: one can either add it each time by hand, or enable it in the Settings.



Then click YES to process the file as an M2TS one (because it is).



During the processing, a window showing the bitrates of each stream is displayed.



TS Doctor can also cut the file. In the happiest case you need only to cut the biggest part from the middle. In the worst scenario you need to cut off each segment of the interesting

part, when you have say commercials every 10 minutes. Remember, the visible frames are included in the result, so be careful how you cut.

Click Fix and wait. If you cut several segments, you need to load the file again and again, so it might be handy to remember the last time code for a faster scrolling.

3. Cutting the recordings

Practically this was done in chapter 2. But if one thinks that TS Doctor does not do a good job, that one can use the alternatives, the most known freeware being H264TS_Cutter.

Any case, if you have the main recording as a bunch of files (due to commercials) it's highly advisable to join them back into one file. You can do this the hacker way, using any file joiner or even in TS Doctor.

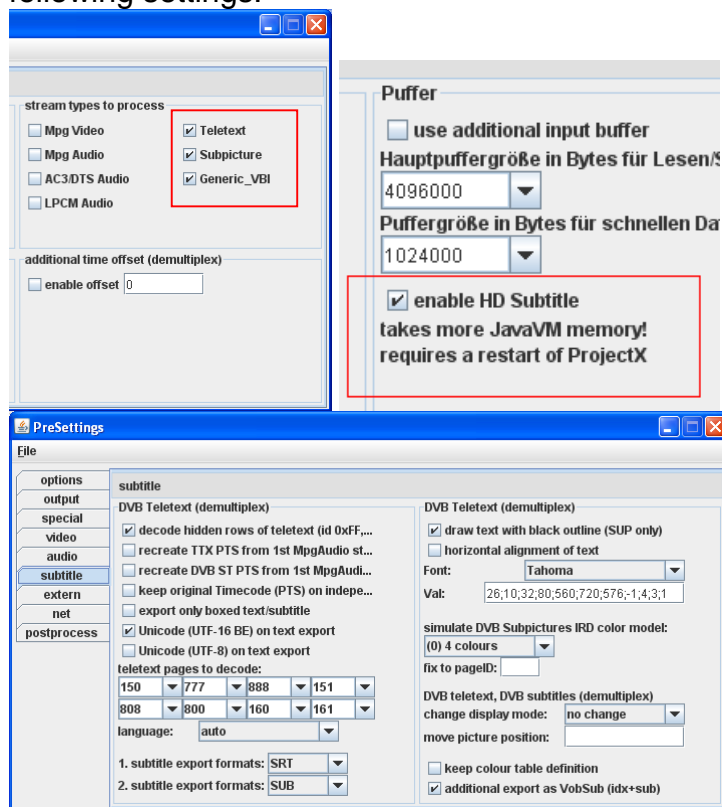
The hacker way is to open a DOS box, go to the folder where you have the files, than type in `COPY /B file1.ts+file2.ts+ etc. result.ts`. The /B is very important, it tells the system to use the binary mode, otherwise the ASCII mode might be used. If the file names have spaces use the " to separe them, like "My recording of 13.01.2010.ts".

In TS Doctor just click on Tools, join files and follow the indications. It's exactly the same, at least in 1.07.

4. Obtaining the subtitles

The DVB standard makes use of 2 different types of subtitles. The original one is similar to the one used in DVD (then in BD), ie a set of bitmap images that have a timing. The other type is derived from teletext and is in text format.

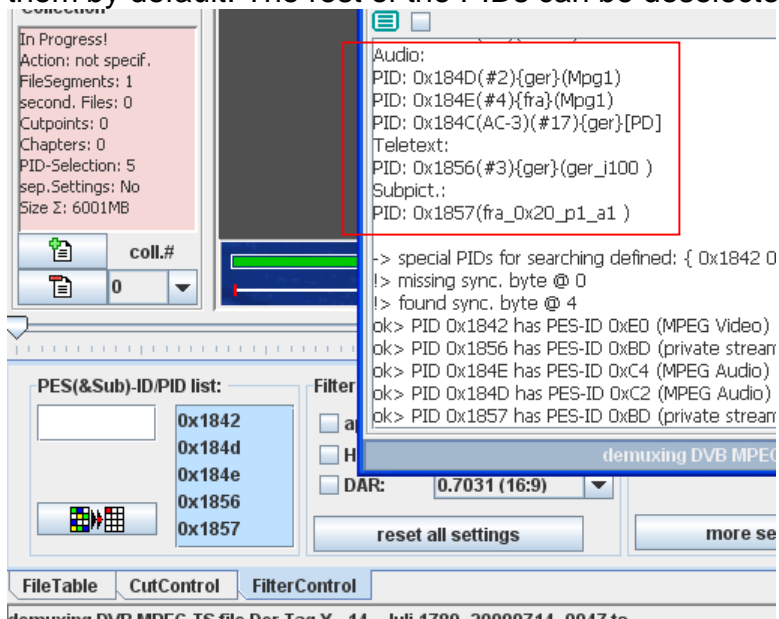
There are several tools to extract the subtitles, but the best one is still Project X. It can extract both the DVB and TXT ones. But ProjectX needs to be set up. So I use the following settings:



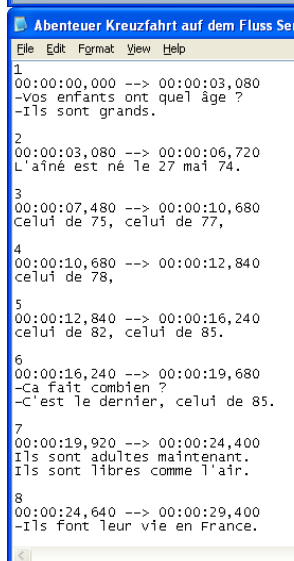
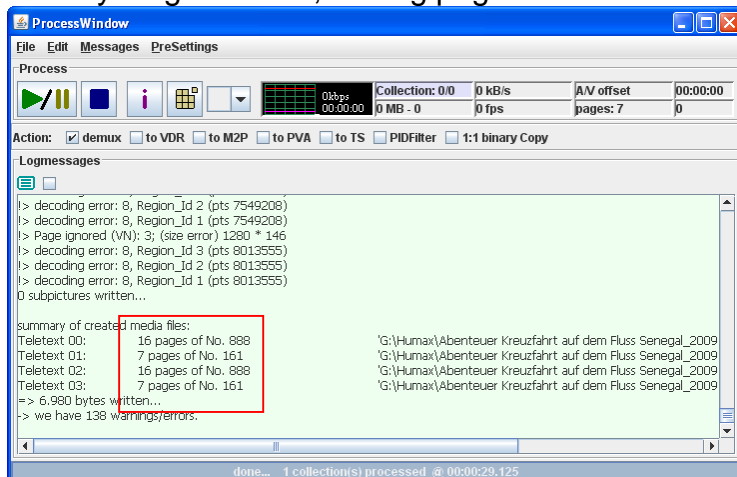
Uncheck all the audio/video streams in the Output tab. Yes, we don't need the video nor the audio. It doesn't harm to demux them too, but it's not needed (we want only the subtitles) and they need space on the HDD. So better off. Also the HD subtitles in the Options tab should be enabled. You need to restart PjX.

ARTE HD doesn't use 151, 160, 161 and so on anymore, but for the sake of completeness I left them on. You can put the necessary page numbers there. UDF-16 is checked to avoid any complications with the other character sets. Since we'll use the text anyway (there might be errors in it), it doesn't matter if we keep or not the original colours (eg ARD, ZDF).

For some reasons I also need to select the PIDs to be processed. For ARTE HD I need to select the TXT PID (0x1856) and the DVB PID (0x1857), my ProjectX doesn't activate them by default. The rest of the PIDs can be deselected, but it doesn't matter anyway.



If everything went OK, the log page will show the number of subtitles converted.



Just the last check for the subtitles. All diacritics (ü,ö,è,â,á) have been kept. Can be done also with a more fancy subtitle editor, but Notepad does it just fine, it's small and loads itself fast.

5. Authoring the disk

For this we will use multiAVCHD. A detailed guide is on the author's site and it's beyond the scope of this guide. MultiAVCHD is anyway in development, so keep an eye onto it. Well, we load the .TS file of step 4., we change the title of the file (media tab, click on the file name in the middle), we select the audio (audio tab, normally it goes automatically if the sender named it, eg DEU, FRA), we add the external .SRT files (subtitles tab), select the language of the subtitles (I like to do properly the things), make the necessary arrangements for the menu (menu tab), pick up the destination type (I use BD, but there are people that need to pick up AVCHD, or VIERA), click Start, sit back, and relax!

MultiAVCHD would do everything for you, including the reconversion of audio tracks if needed (mostly MP2 into AC-3, as MP2 while valid for DVDs is not anymore for BD).

6. Burning the disk

Just select the 2 folders (BDMV and CERTIFICATE) and drag-n-drop over ImgBurn. Click the burning icon and select YES for all the questions it might ask, ImgBurn automatically recognise most of the disk types (a sort of foolproof software).

Of course, you can alternatively create an ISO image (for PowerDVD, PS3 or any other players) or process that folders as you like.

