

CYPHEROS
TS-DOCTOR
2.1

USERS MANUAL

© 2018 Frank Siek

*(Most of the translation by: **Khan**)*

Table of contents

Chapter 1: INTRODUCTION	5
1.1 Using the TS-Doctor	6
1.2 Procedural method of the application	6
Analysis of the recording	6
Cutting of the recording	6
Checking streams	7
Clearing up streams	7
1.3 Advertisement recognition	7
1.4 Supported Formats	8
1.5 New features of version 2.1	8
Chapter 2: The Main Window	9
Chapter 3: Cutting procedure	11
3.1 Filter/Codecs	11
3.2 Cutting/Preview Window	13
I-Frame – Detection	15
Assigning areas to separate files	16
Keyboard Shortcuts	17
3.3 Result of the processing	19
Chapter 4: Deletion of streams	21
Chapter 5: Preserve	23
Chapter 6: Patch	25
Chapter 7: Tools	27
7.1 Raw Cutter	27
7.2 Command line parameters	28
Chapter 8: Miscellaneous	29
8.1 Effects when you select of a wrong color space	29
Chapter 9: Links	31
Chapter 10: Film Clips	33
Chapter 11: Trademarks	35

1 INTRODUCTION

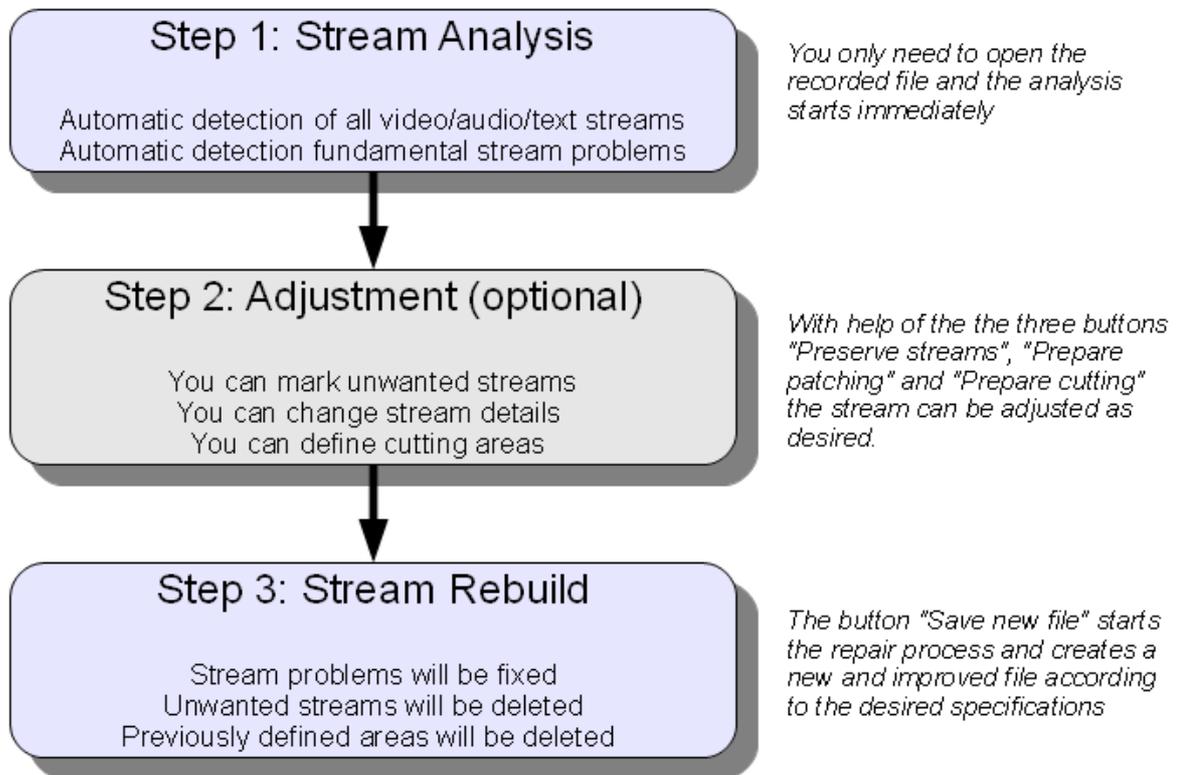
Nowadays users can choose amongst an increasing number of recording hardware that allows to record Satellite or Cable Programs. Unfortunately recordings of Hard Disk Receivers or PCs are often faulty or they are being saved in a proprietary format and therefore won't play on all devices. Especially Hardware Players like Popcorn Hour, WD-TV-HD or Playstation 3 enjoy growing popularity amongst users who like to play their recordings at home. But the devices currently on the market react very sensitive on file formats or errors in a stream and refuse Playback, freeze or spoil the playback performance with sound / video dropouts and other kinds of disturbance.

Cypheros TS-Doctor was designed to scan digital Transport Streams for errors and correct them in a way that the resulting file(s) will play back without surges, dropouts or diverging sound and picture on Hardware- or Software-Media players.

Unlike some other tools, TS-Doctor tries to keep the original stream as untouched as possible during error correction, thus avoiding the creation of additional incompatibilities.

1.1 Using the TS-Doctor

The processing of a transport stream file is simply done in three steps:



1.2 Procedural method of the application

When a file is being opened, TS-Doctor first starts analyzing if its properties match those of a transport stream or not. Is it a regular transport stream with 188 Bytes Package size or is it a M2TS transport stream with 192 Byte Packages? Afterward the existing elements of the stream are being searched through and analyzed.

Analysis of the recording

The format of the recording is analyzed and all elements of the recording are listed. There are various parameters of the recording file checked and, where appropriate, corrected, to bring the file structure and elements in a usable form.

Cutting of the recording

If after opening the recording the "Prepare cutting" - button is pressed, the areas of the recording can be defined that should remain in the new file. Easy to use editing tools enable the rapid selection of the appropriate areas.

Checking streams

When you click on the "Only checking" button TS-Doctor will begin check the stream, without changing your original file. While checking all the stream's components are permanently being investigated and found CRCs are being checked. Errors are reported in a log.

This step is usually unnecessary, because this is also performed when the new file is created from the original recording (Save new file).

Clearing up streams

When you click on the "Save new file" button TS-Doctor will begin cleaning the stream, creating a new copy extracted from your original file. While copying all the stream's components are permanently being investigated and found CRCs are being checked. Unnecessary elements of the stream or too heavily corrupted parts will be deleted.

1.3 Advertisement recognition

The TS-doctor can detect advertisements on the basis of the change to the AC3 format or the aspect ratio. Pro7 and other broadcasters switch often the AC3 format during the commercial breaks and the TS-doctor can detect that. If the TS-doctor detects this during the analysis of the recording, a dialog offers to mark the advertising breaks in the recording automatically.

If no AC3 format change is detected, the TS-doctor supports also the detection of advertising for MPEG2 recording, using the free tool "ComSkip" by Erik Kaashoeks. It easily can be installed in the settings of TS doctors (settings /supported tools /ComSkip).

1.4 Supported Formats

TS-Doctor supports DVB and Camcorder transport streams (Standard and HDTV resolution) of the following kind

.TS	(DVB-Viewer, ProgDVB, Dreambox, Dbox2, Technisat, etc.)
.TRP	(Kathrein UFS-910, etc.)
.TS4	(Technisat HD, etc.)
.M2TS	(Humax iCord, Sony Camcorder, etc.)
.DVR	(Comag SL 100 HD,CMX)
.MTS	(Panasonic Camcorder, etc.)
.REC	(Topfield, etc.)
.TP0	(Homecast, etc.)
.TP	(DVICO, etc.)
.STR	(Sky Box, etc.)
etc.	

and converts them into DVB compliant 188 Byte transport streams (.TS format).

1.5 New features of version 2.1

The video analysis has been significantly improved and accelerated compared to version 2.0, especially for HD recordings.

The optimal recognition methods are now individually assigned for each channel and stored in a database. The most important German and British channels are already predefined. This enables faster and more reliable detection of advertising blocks.

The splitting of the sections to several files has been completely reworked and now allows easy mapping of the sections by simply clicking with the mouse.

MP2 audio tracks are now also checked by CRC, if available.

The TS-Doctor can now also use the H. 265 MFC Video codec of Windows 10 to play H.265 (DVB-T2) recordings, if installed.

Number of supported audio tracks increased from 4 to 10.

User interface improvements and much more.

2 The Main Window

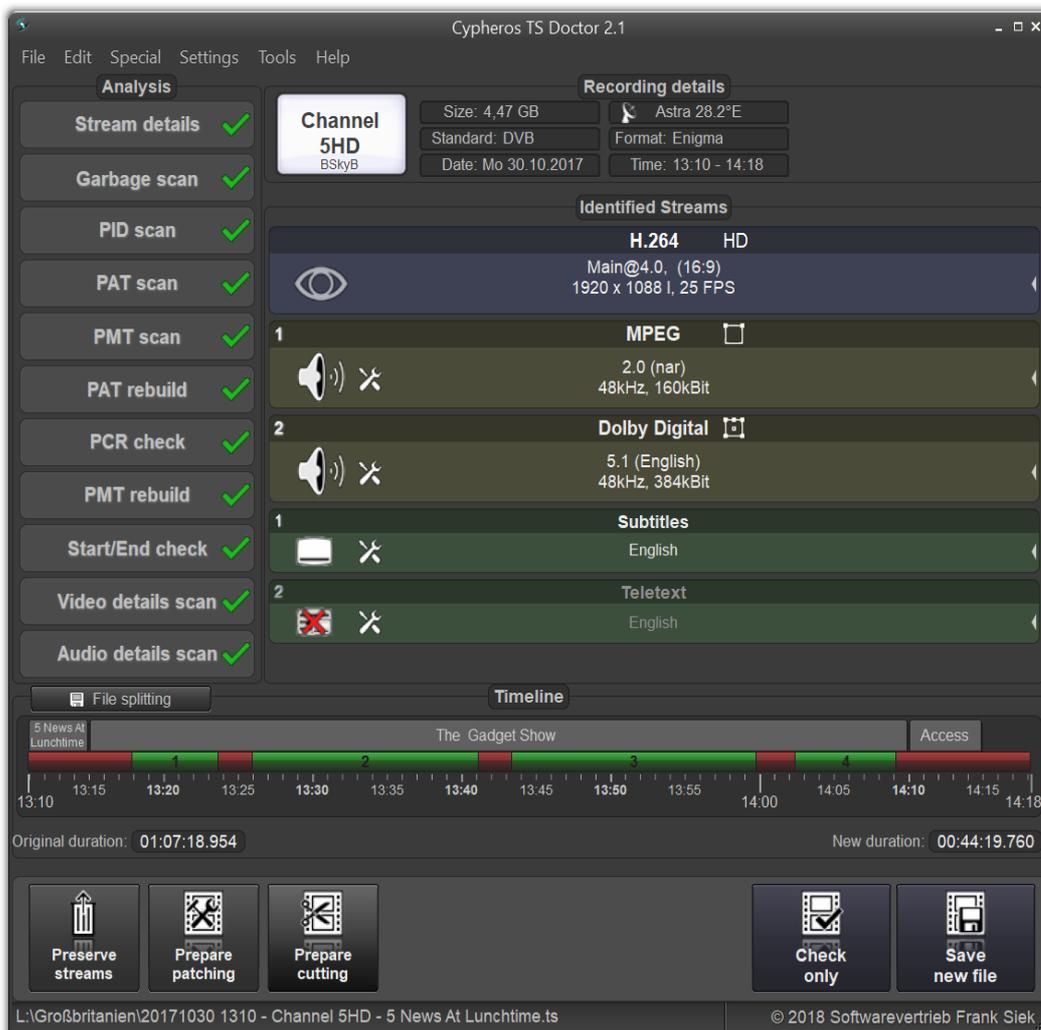


Illustration 1: Main Window

The main window gives you access to all functions of TS-Doctor and provides you with a detailed overview on the features of the opened stream.

When you open a stream, several steps of preparation are being executed. On the left side of the main window you will see their ongoing progress. Each Step should be displayed with a green check-mark, signaling that the particular step has been carried out successfully.

On the right side of the main window the audio and video streams are being listed, which TS-Doctor found in the opened file and its associated system tables.

3 Cutting procedure

TS-Doctor supports cutting of streams to any number of places. This allows to remove commercial breaks from a recording, for example. If the necessary DirectShow codecs are installed on your system (PC) you will be able to cut your recordings precisely within TS-Doctor's video preview window by visually setting trim marks.

Should you ever come across a DirectX error message when opening the preview window, probably a necessary video codec is missing.

3.1 Filter/Codecs

Note, that for video preview TS-Doctor by default lets the graphbuilder (DirectX) choose the appropriate filter / respectively video codec for the particular stream. This means that with an AVC/H264 video stream with AC3 sound another filter is being used than with a MPEG2 video stream with MPEG1 sound.

In case your system should have problems with the automatic choice of filters and the video preview doesn't want to appear, you can as well determine a manual combination of filters in "Settings/Preferences/Preview".

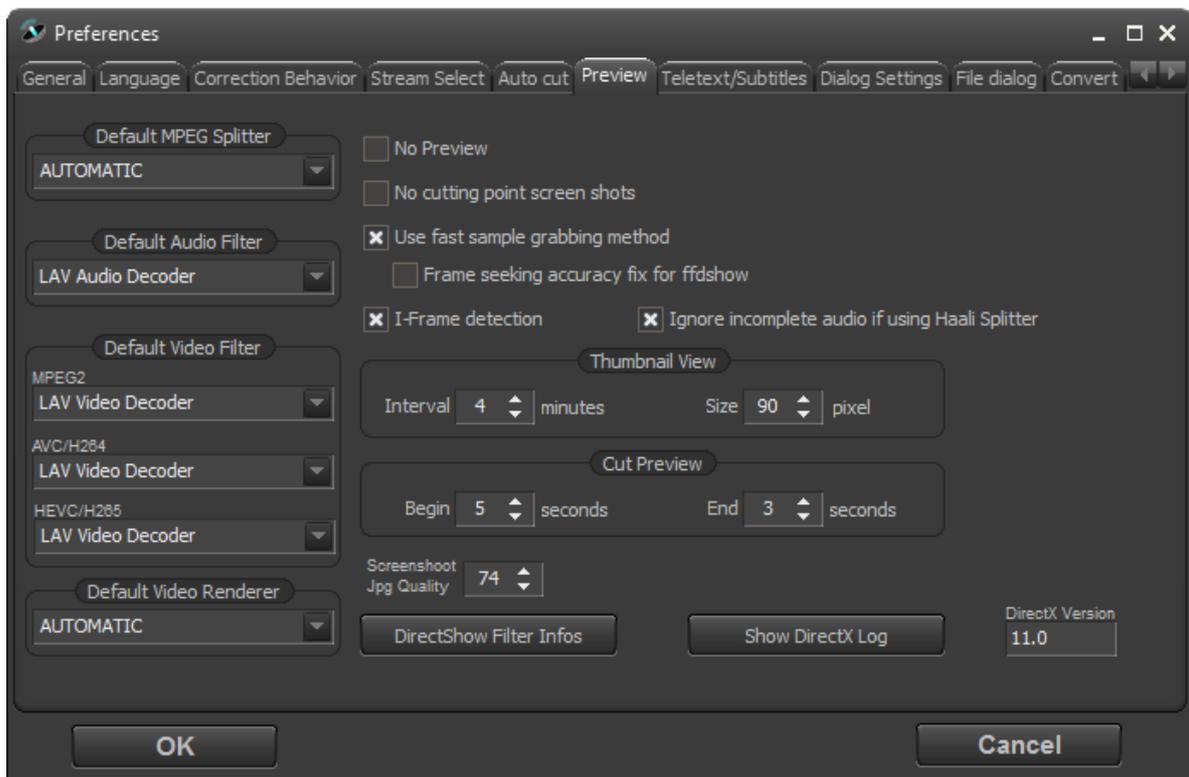


Illustration 2: Manual choice of filters for video preview

Of course the filters you want to use, first have to be installed on your system. For license reasons they are not included in TS-Doctor.

The TS-doctor filesorce filter is automatically used to open the files and works perfectly together with the Haali splitter. It ensures the automatic Assembly of split recordings, eliminates disturbing garbage, skips bad packets and builds into the stream missing PAT and PMT packages, so that a preview for the cut is possible even for difficult source files.

The new mode "AUTOMATIC" let the TS-Doctor choose the best decoder filter. On the basis of a compatibility list the filters are choosen that work the best and most reliable with the TS-Doctor.

The option "No cutting point screen shots" turns off the creation of small screen shots in the cutting list.

The option "Use fast sample grabbing method" allows the use of the new features of single frame view, and thumbnail view in the timeline.

In case, problems with certain filters should appear, by clicking on the button "Show DirectX Log" you can let TS-Doctor show you information about the creation of playback graphs for the video preview.

3.2 Cutting/Preview Window

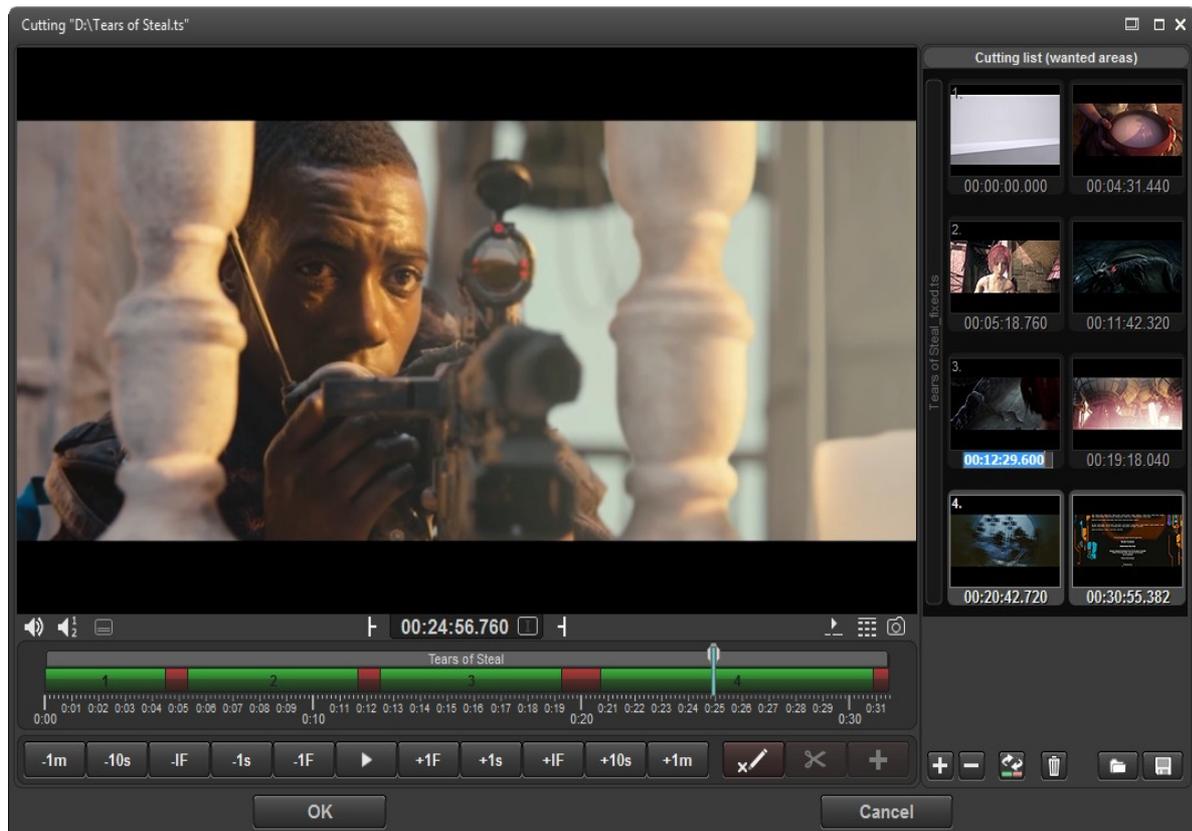


Illustration 3: Cutting window with visual preview

In the cutting/preview window you can add cutting areas and determine cutting points of the beginning and end of the selected cutting area of your recording.

The green areas are the areas that are subsequently included in the final stream and the red areas are removed.

You can move the right or left side of the green bar with the mouse or you can wind your video forwards/backwards to the desired destination and then click on the buttons near the input boxes.

By pressing the „Filter“ button a list of all used Filters/Codecs will be shown the DirectX-Graphbuilder is using for playback.

Cutting areas can be created using markers. Simply put a marker at the beginning of the area to be cut out. In the lower part of the timeline a yellow marker will appear.



Abbildung 4: Marking the beginning of the cut

Forward to the point where the area to be cut ends and place another marker.

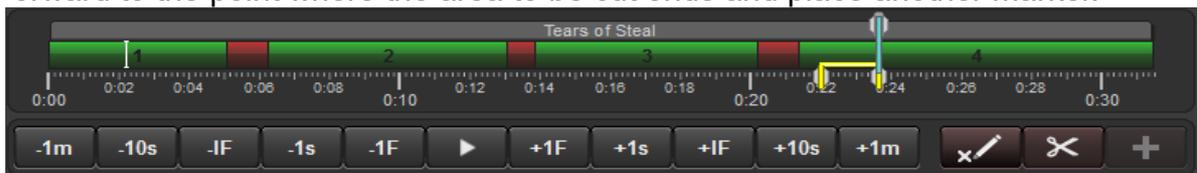


Abbildung 5: Marking the end of the cut

By pressing the cut button (scissors) the yellow area is cleared.



Abbildung 6: Cut the selected area

A area can be added in the same way as the cut. Place two markers at the needed positions in the red area.



Abbildung 7: Marking an area to add



Abbildung 8: Adding an area

I-Frame - Detection

The I-frame - detection is a good help to detect the best points for cutting, as in HDTV recordings (h264) a playback without disturbances is possible only at I-frames. So an I-frame should be chosen for the CutIn and the CutOut.

When shooting in the normal PAL resolution (MPEG2), the TS-Doctor cuts at the GOP borders to avoid greater interferences at the intersections. About 3 frames before the next I-frame is the optimal CutOut points and about 2 frames before the next I-frame is the best place for the CutIn point .

A typical GOP: I2 B0 B1 P5 B3 B4 P8 B6 B7 P11 B9 B10

The letters represent the frame types and the numbers show the order in which the frames are rendered.

Assigning areas to separate files

If you have recorded several programmes or films during a recording and would like to assign them to different files, then this can easily be done in the timeline.

By clicking on the disk icon above the timeline, the file splitting can be activated or deactivated. By clicking on one of the corresponding bars, the assignment and the filename can be changed.

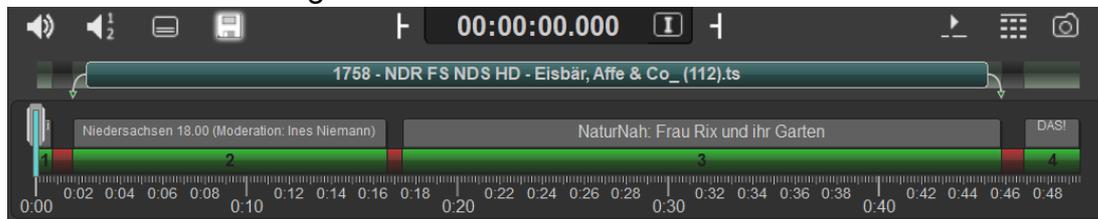


Abbildung 9: Assignment of cutting areas

For example, instead of merging both sections and saving them as one file, you can assign the second section to the file „Niedersachsen 18.00.ts“ and the third section to the file „NaturNah- Frau Rix und ihr Garten.ts“.

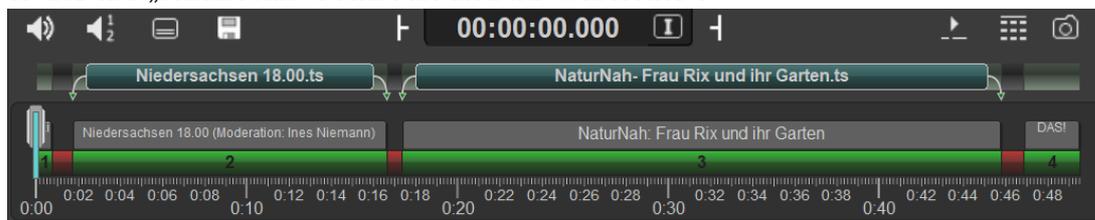


Abbildung 10: Changed assignment of cutting areas

This is of course also possible for a larger number of cutting areas. However, only consecutive ranges can be assigned to one file. So for example, range 1 to 3 to „file1.ts“ and 4 to 7 to „file2.ts“, not 1 and 4 to „file1.ts“ and 2, 3, 5, 6, 7 to „file2.ts“.

Keyboard Shortcuts

[x]	Set marker
[Del]	Delete marked area (markers invisible)
[Del]	Delete selected area (markers visible)
[Ins]	Add area (markers invisible)
[Ins]	Add selected area (markers visible)
[f]	Jump one frame forward
[Shift] + [f]	Jump one frame backward
[Cursor right]	Jump one frame forward
[Cursor left]	Jump one frame backward
[i]	Jump one I-frame forward
[Shift] + [i]	Jump one I-frame backward
[s]	Jump one second forward
[Shift] + [s]	Jump one second backward
[m]	Jump one minute forward
[Shift] + [m]	Jump one minute backward
[y]	Jump to first marker
[Shift] + [y]	Jump to second marker
[n]	Jump to next cutting point
[SHIFT] + [n]	Jump to previous cutting point
[Home]	Set start time of the current cutting list entry to current position
[End]	Set end time of the current cutting list entry to current position
[p]	Play/Stop
[SPACE]	Play/Stop
[CTRL] + z	Undo last action
[c]	Cutting preview
[o]	OK, close dialog
[1]	Single playback speed
[2]	Double playback speed
...	...
[8]	Eight-time playback speed
[SHIFT] + [1]	Single playback speed
[SHIFT] + [2]	Half playback speed
...	...
[SHIFT] + [8]	An eighth playback speed
[ALT] + [1]	1.5 times the playback speed
[ALT] + [2]	2.5 times the playback speed
...	...
[ALT] + [8]	8.5 times the playback speed

3.3 Result of the processing

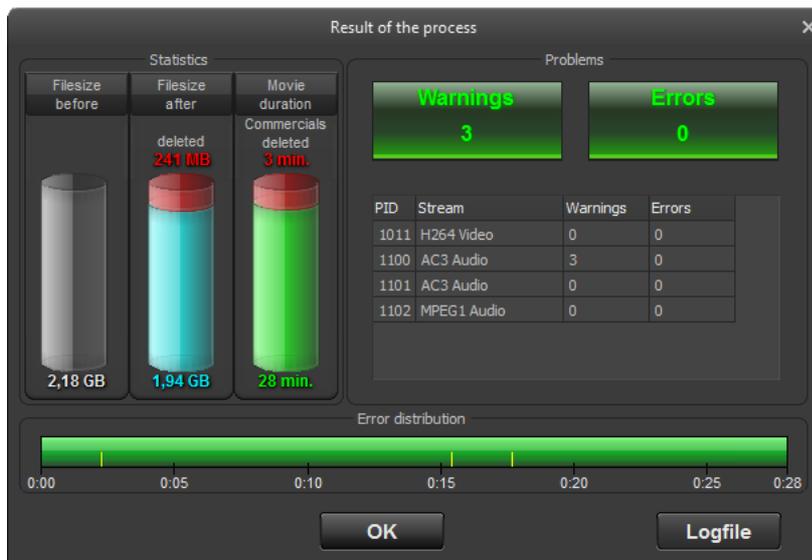


Abbildung 11: Result of the processing

After a new file has been created, a summary is shown with the data selected during the processing. In this example, you can see that the file size has been reduced from the 9,71 GB of the original recording down to 5,47 GB. As TS-Doctor does not change the actual image and sound information, data compression is only achieved by removing advertising and unneeded data streams and fill data. Fill data are redundant data and are often used by broadcasters to obtain a certain minimum data rate. Removing this data resulted in no degradation of image and sound quality, but saves precious space.

Warnings or errors that are found will be shown in this overview. Warnings can usually be ignored and only in rare cases, cause visible or audible errors. Errors are more fatal, especially if these accumulate in certain areas.

DVB transmissions can occur sometimes, but barely affecting the picture and sound quality, as long as they occur only occasionally. Only larger or frequent errors are visible and audible.

The error distribution indicates the accumulation and the temporal distribution of errors and warnings. Red lines are errors and yellow lines are warnings.

If you often have recordings with more than two or three failures, this points to continuous reception problems and the receiving system should be checked.

4 Deletion of streams

TS-Doctor deletes all streams that are of non audio- or non video- format or which are not registered in the PMT system tables. But some of your recordings may have various audio streams in different languages or different formats like AC3 2.0/ AC3 5.1/ MPEG1, etc.

These different audio streams are listed on the right side of the main window. By simply clicking on one of the loudspeaker symbols you can mark the audio stream for deletion. (Note: Right click opens a menu for changing the language descriptor of an audio stream.)

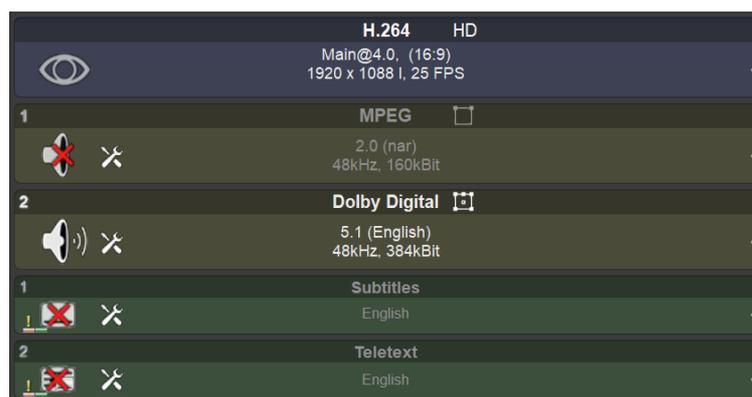


Illustration 12: Deletion of an audio stream

Only audio streams can be marked for deletion and at least one audio stream must be left over!

5 Preserve

With this function you can avoid streams like Teletext to be automatically deleted. Usually TS-Doctor deletes all non audio and non video streams. If you mark one of these streams in the “Preserve streams” window, it won’t be deleted.

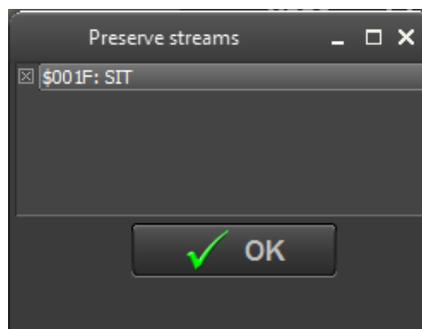


Illustration 13: Preserve streams function

6 Patch

Especially for Dreambox users TS-Doctor has a function built in that allows you to patch the SID (program number) and the PIDs in order to correct the allocation to the EIT and the Meta-file. Without this correction any files, which were edited with tools like TSMuxer or H264Cutter, can't be played back correctly on a Dreambox. TS-Doctor's "Stream Patch" function allows you to reconstruct the original SID and PID allocation.

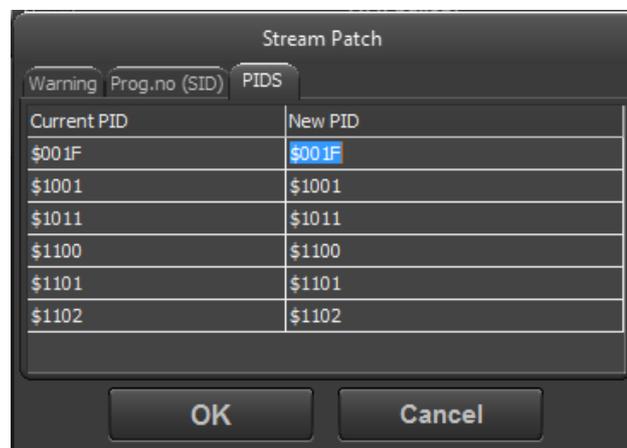


Illustration 14: Patching of PID und SID-allocation

7 Tools

7.1 Raw Cutter

The Raw Cutter allows cutting of transport streams at the package level without altering the stream. This is especially important when a part of a stream is needed for analysis.

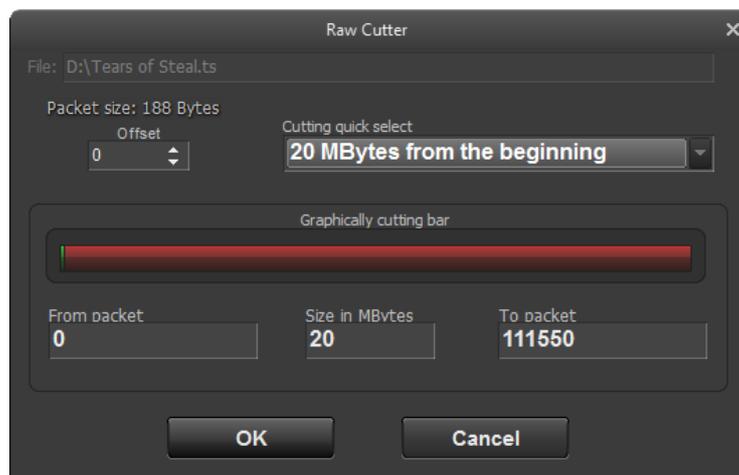


Abbildung 15: Raw Cutter Tool

The Raw Cutter also allows to split a recording from a large file into smaller files of 1, 2 or 4 GB size.

7.2 Command line parameters

Some features of the TS-doctor can be controlled with command line parameters. Thus, processing of recordings of batch scripts is possible.

TSDoctor.exe [Input Filename] [Command] [Option] [Output Filename]

- Command: AUTOFIX (automatically starts the repair of the file)
- Command: AUTOCHECK (automatically starts the checking of the file)
- Command: AUTOBATCH (automatically starts the batch processing of the internal batch list)
- Command: AUTODEMUX (automatically starts the file demuxing)
- Option: CROP=X (Truncates the beginning of the file with X MB when opened)
- Option: LOG (writes a log)

Example:

```
"TSDoctor.exe" "D:\recording\*.ts" Autofix "D:\archive\"
```

For [Input Filename], also wild cards are possible as for example *.ts or REC000.*

If wildcards are used for [Input Filename], the parameter [Output Filename] is interpreted as a directory.

8 Miscellaneous

8.1 Effects when you select of a wrong color space

In their menu under “HDMI Settings” most up-to-date devices offer you the possibility to adjust the color space being used for playback. Manufacturers use different names like Colorspace, RGB-Level, RGB-Range, Color-Range or RGB output area.

You can choose between two possible settings: “PC color space” and “DVD/DVB color space”. The PC color space (Enhanced, Full or L2 color space) utilizes brightness values from 0 – 255. The DVD/DVB color space (Limited or L1 color space) utilizes brightness values from 16 – 235.

Because video data from your playing device (DVD-, DVB-, Bluray or Mediaplayer) is being sent pixel by pixel to your output device (TV, beamer, monitor) via HDMI/DVI, the output device must exactly know how to display the brightness values of all pixels.

If for example a DVD player sends the brightness value” 16” for a pixel to a LCD-TV being set to DVD/DVB color space, the pixel would be displayed as the deepest Black possible for the TV set. If the TV set were adjusted to PC color space instead, the same pixel would only be displayed in a dark Grey, because there are sixteen more possible brightness values down (15 – 0) to the deepest Black. The same difficulties exist with the presentation of White, because the brightness value “235” could either be the brightest White or only a slight Grey.

So it’s important to set playing- and output- devices to the same color space in order to get the correct brightness values being displayed.

Some negative effects are being produced by misleadingly flagged HDTV DVB streams, e.g. broadcasts from German Premiere TV channel “Discovery-HD”. In this case the flag “video_full_range_flags” (which means PC color space) is wrongly being set active. But DVB

streams usually should be broadcasted within the DVD/DVB color space as being regulated by DVB standard. DVB receivers ignore the flag and by default operate within DVD/DVB color space. However, if you playback such a DVB stream on a multimedia player like “Popcorn Hour”, the same problems arise with these streams that you usually get with wrong HDMI color space adjustment.



Illustration 16: Effect of a wrongly set “video_full_range_flag”

9 Links

- [Cypheros Homepage](#)
- [TS-Doctor email support](#)
- [CoreAVC from CORECODEC](#)
- [Mediaplayer Classic HomeCinema](#) (free open source media player)
- [Wikipedia: MPEG transport stream](#)

10 Film Clips

This document contains images from the movie "Tears of Steel" from the Blender Foundation.

(CC) Blender Foundation | mango.blender.org

11 Trademarks

Microsoft, Windows, Windows 2000, Windows 95, Windows 98, Windows ME, Windows NT, Windows XP, and Windows Vista, Window 7/8/10 are trademarks or registered trademarks of Microsoft Corporation. Other product names mentioned in this manual are trademarks or registered trademarks of the respective companies.