

StreamGuru MPEG2 & DVB Analyzer Version 2.8x

Manual



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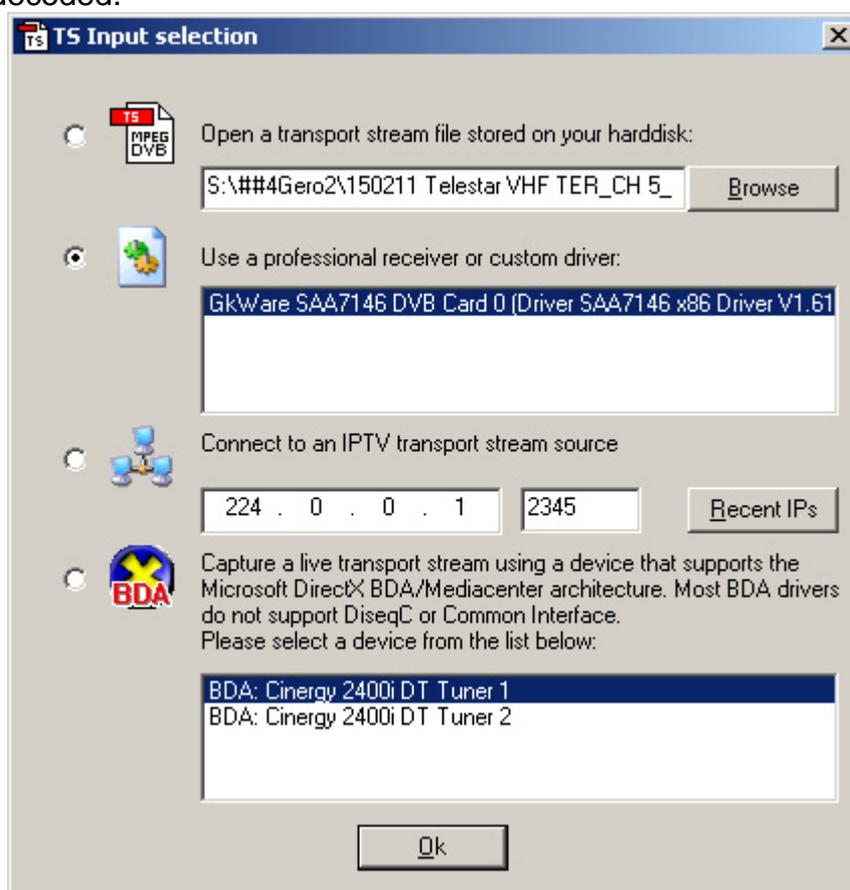
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1. Introduction

First of all, we would like to thank you for choosing the StreamGuru MPEG2 & DVB Analyzer. This manual contains an introduction to most of the features supported by the analyzer. Please contact our support team if you do not find your questions answered here.

1.1. *Selecting an Input Device*

After starting the Analyzer, the first thing you will usually see is the input selection dialog. It allows you to select the device that is used to receive the transport stream that will be decoded.



The analyzer supports several different input methods and devices.

1.1.1. Transport stream files

The analyzer allows you to read and decode files which are stored on the filesystem of your computer. To read a file, you can either enter a valid filename manually or select a file using the Browse button. The analyzer currently supports transport stream files in the following formats:

- n*188 bytes (plain transport stream packets)
- n*204 bytes (transport stream packets followed by 16 byte error correction code)
- n*192 bytes (transport stream packets with 4 byte clock, as used by blu-ray streams)

The file format will be detected automatically.

1.1.2. Professional Receiver devices

This category will contain devices that are supported using manufacturer supplied SDKs or driver interfaces. Devices in this category will be:

- Dektec receiver cards
Our analyzer supports a large number of USB devices and PCI/PCI-Express receiver cards manufactured by Dektec (<http://www.dektec.com>). Devices that have been tested for compatibility include:
 - DTA-115 Modulator with 1 ASI port
 - DTA-140 DVB-ASI In/Out
 - DTA-124 Quad DVB-ASI Input
 - DTA-160 Gig-E + 3x DVB-ASI Input/Output (only ASI ports supported)
 - DTA-2145 dual ASI In/Out
 - DTU-225 ASI In
 - DTU-245 ASI In/Out

If the card has more than one input port, then each port will appear separately in the device list. If the device is not listed in analyzer, please make sure that you update to the latest Dektec driver version.

- B2C2 / Technisat cards
DVB-S and DVB-T receiver cards based on the B2C2 Chipset can be used. These cards will only appear in the professional receiver category if the native driver is used. If the BDA driver is used instead, only the basic BDA features (no DiseqC) will be available.
- SAA7146 based PCI receiver cards with a GkWare supplied driver.
OEM customers who purchase our PCI receiver cards will probably find their installed card in this category.

1.1.3. IPTV feeds

The analyzer can receive and decode IPTV streams. For unicasts, a local IP address can be used. To connect to a multicast on your network, you can enter an arbitrary multicast address. Streams received using this feed type, can be encoded using plain UDP or RTP. The encapsulation type will be detected automatically.

1.1.4. BDA devices / Microsoft Mediacenter compatible drivers

Normal consumer receivers usually come with a BDA (Broadcast Driver Architecture) driver. BDA is a driver interface defined by Microsoft for simple TV playback purposes. It is not intended for use in applications like an MPEG analyzer.

A few technologies which are frequently used in the digital TV area are missing in the BDA architecture. BDA devices do not allow:

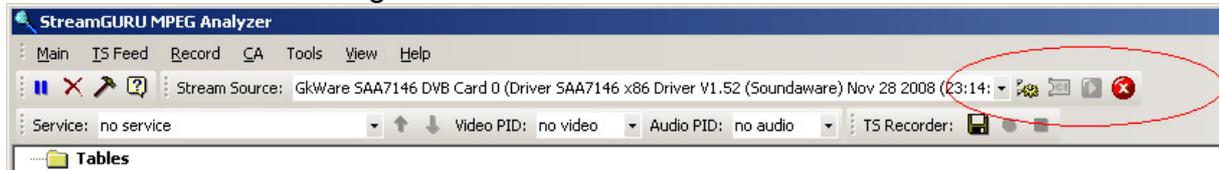
- DiseqC control (or any other kind of motor control)
- EN 50221 Common Interface

There are also different kinds of BDA devices. Some of them already contain an MPEG2 demultiplexer. This is fine for a simple TV playback, but it does not allow the analyzer to access the raw transport streams. Devices which already contain an integrated demultiplexer can not be used with the analyzer.

If you encounter problems with BDA drivers, then please do not hesitate to contact our support. We keep a list of supported and unsupported devices.

1.2. Controlling the feed

Feeds are controlled using the stream source control bar:



The drop down box can be used to select a different feed after the analyzer has been started. The buttons on the right side (marked red) can be used to control the feed.

1.2.1. Tuning / Selecting a file / Selecting an IP Address



This icon will open the feed configuration dialog. For file feeds, you will be able to select a new file or change the playback bitrate. For DVB-S, DVB-C and DVB-T receivers you will be able to tune to a new channel.

1.2.2. Common Interface



If the selected feed has a supported DVB common interface slot, then this icon can be used to display information about the currently inserted CAM module. The icon will be disabled if no CAM inserted or if the current feed does not have any CI slot.

1.2.3. Starting & Stopping the stream

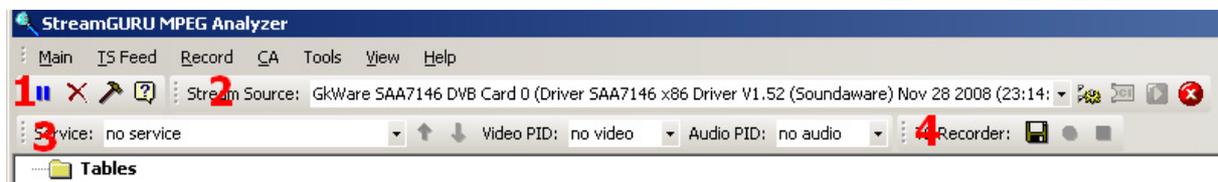


Most feed types do not allow you to change the tuning (or other input) parameters while the stream is active. These two buttons can be used to re-start the feed after tuning or other configuration changes or to stop the feed.

If the feed does not enter the running state after pressing the „Play“ button, then the current configuration or tuning parameters are invalid. You should open the feed configuration dialog (see 1.2.1) to fix this problem.

1.3. The Main Window

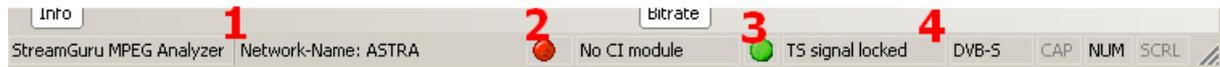
1.3.1. Toolbars



Just below the menu, you will find a number of toolbars which provide quick access to the most important analyzer features.

1. This toolbar allows you to:
 - a. Freeze the current analyzer status.
After pressing this button, most views in the analyzer will stop updating. This specifically includes the table decoder and the service tabs. To resume decoding, just press the button again.
 - b. Reset
Pressing this button will clear most views in the analyzer. It should be used to force a re-acquisition of the SI information. This can be necessary if SI tables are updated without updating the version field.
 - c. Analyzer configuration
This button will open the configuration dialog.
 - d. Info
This button will open the License information dialog.
2. This is the feed selection and configuration toolbar. Please see section 1.2 for details.
3. This toolbar can be used to select a service for the TV playback.
4. This toolbar can be used to record complete transport streams to the harddisk.

1.3.2. Status bar

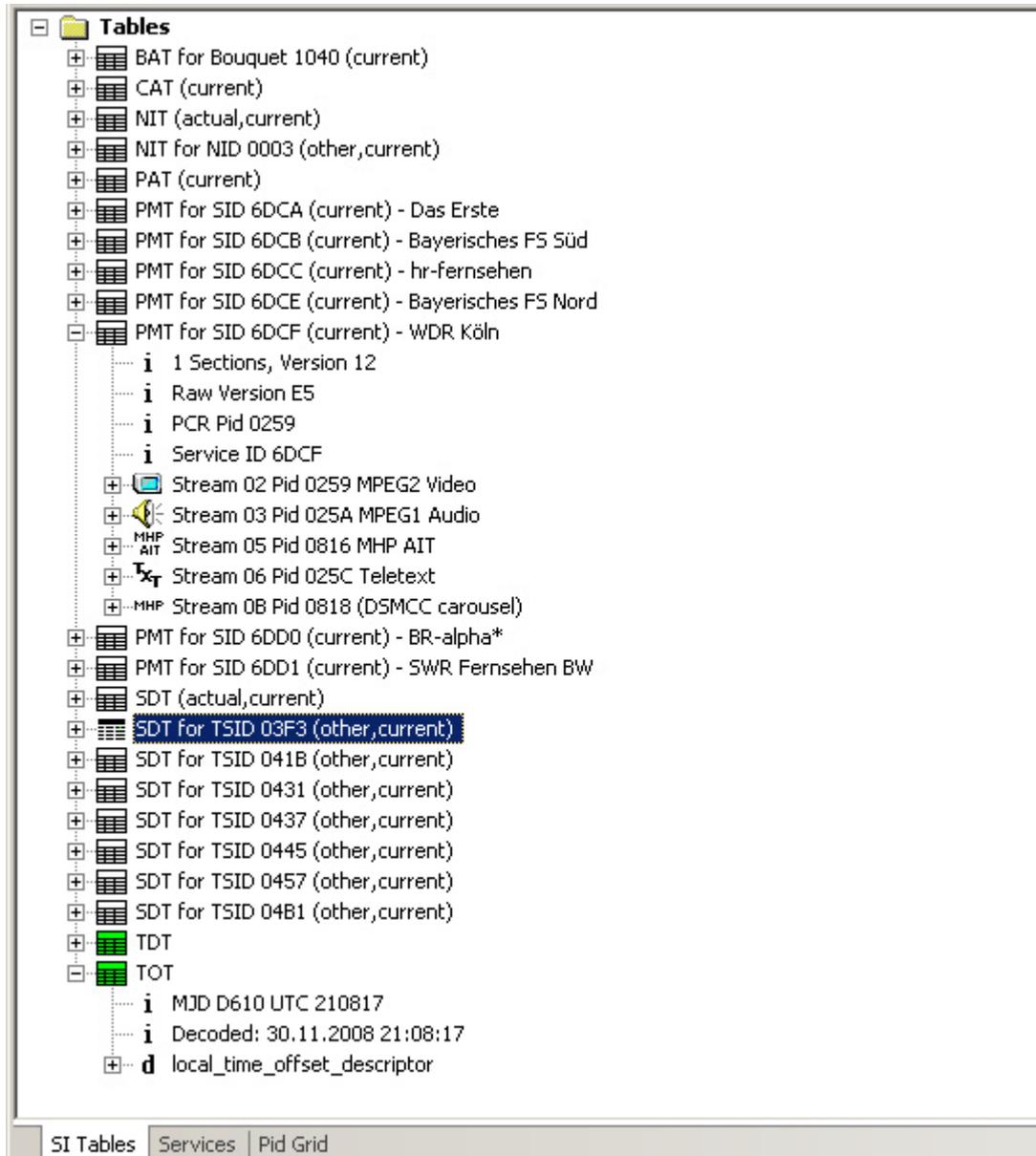


At the bottom of the window, you will find the status bar. It contains the following information fields.

1. Status / Network name Information
This field will contain a short help text if you navigate in the menu.
If the current transport stream contains a NIT (Network information table) with a network name descriptor, then this field will show the network name like in the sample above.
2. Common Interface status
This indicator will be green if a CAM has been detected.
It will be red the current feed has no CI slot or if no CAM is inserted.
3. Lock indicator
This indicator will be green if the current input device has a tuner lock (or other type of valid input signal) or red otherwise.
4. Feed type
This indicator will show the type of the current feed. This can be:
 - DVB-S / DVB-S2
 - DVB-C
 - DVB-T
 - DVB-ASI
 - File
 - IPTV

2. Core features

2.1. The table decoder



The table decoder will display all MPEG-2 and DVB tables and sections found in the current transport stream. The only exception is the EIT (Event information table). Due to the potentially high number of sections, the EIT is handled in a separate decoder.

The tables in this view can have different colors, depending on their status:

- Tables which appear for the first time or which change to a new version are displayed in green.
- Tables which are periodically sent in the stream (unchanged) will be displayed in white.

- Tables which are removed from the stream will be displayed in red for a number of seconds before they are removed completely.

Tables in this view are completely decoded, including all the descriptors defined in the MPEG-2 and DVB specification. A number of additional tasks can be performed using the context menu.

2.1.1. Table level



A raw dump can be opened using the „Show Hexdump“ option. You can also export either the currently selected table or all tables into an XML file.

2.1.2. PMT Elementary Stream level (Audio / Video)



Audio and video PES streams can be recorded to the hard disk in three different formats. The options are:

- Save TS packets
This will store the raw 188 byte packets
- Save as ES stream
This will store only the payload of the PES packets (without header)
- Save as PES stream
This will store the full PES packets (including their header)

For MPEG1 or MPEG2 audio, there is the additional option to search for RDS/UECP data. Only a few radio stations are currently sending RDS data together with their regular DVB broadcasts. See section 3.1 for details.

The analyzer supports the decoding of several proprietary string encodings, including:

2.2. Services

The services tab will display information about the services which are signaled inside the current transport stream.



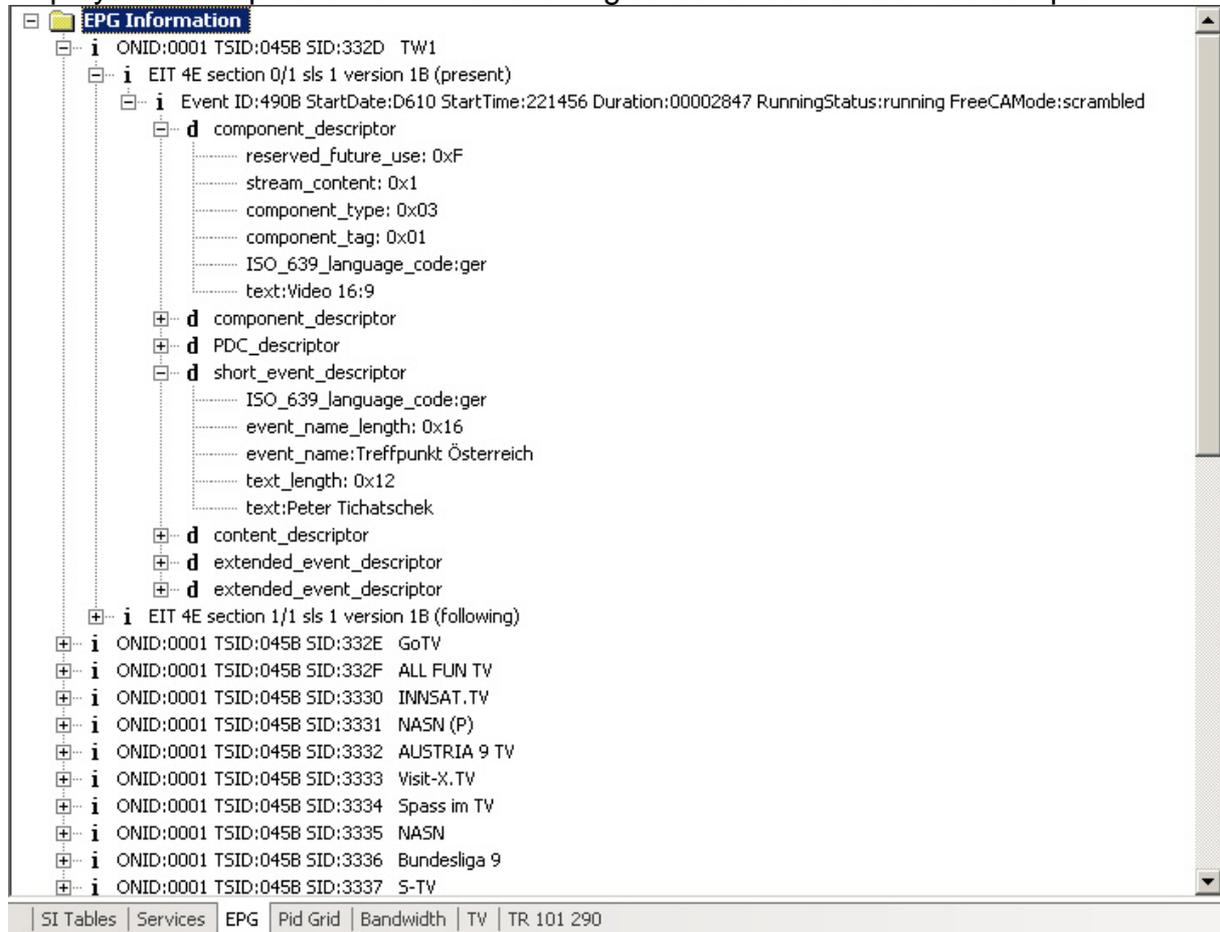
The information displayed in this view comes from several different sources. The elementary stream PIDs are taken from the PMT. The service name and provider information is taken from the PMT.

Scrambled services and streams will have a little key symbol as overlay icon.

The options which are available in the table decoder for elementary stream PIDs can also be invoked using the context menu.

2.3. EIT / EPG

Due to the high data volume, the EPG data which is transmitted in the DVB EIT, is displayed in a separate view. The following screenshot shows a little sample:



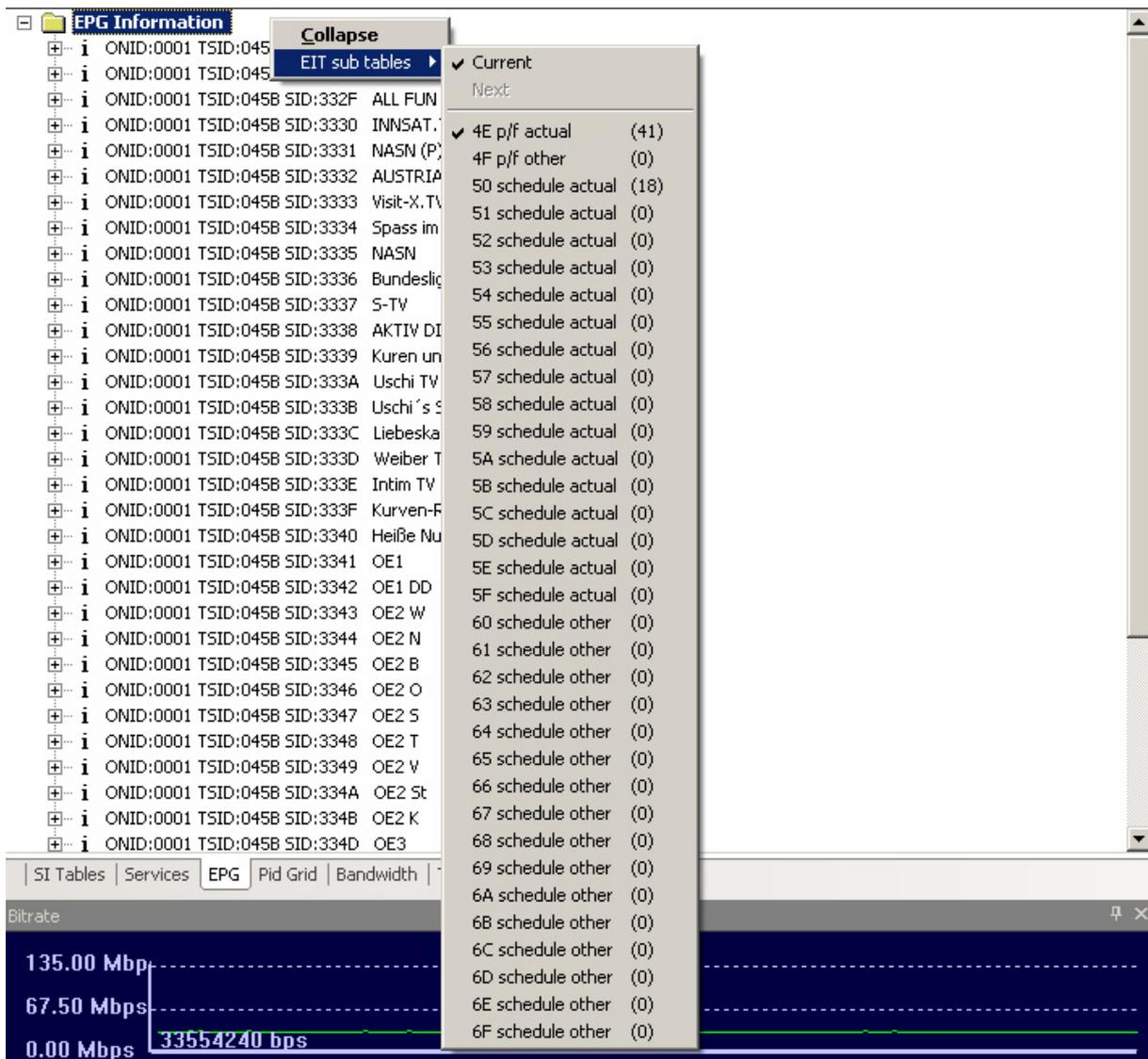
EITs are decoded down to the descriptor level.

At the root you will find all services which are sending EITs on this transponder. The service line contains the full DVB triple (Original Network ID, Transport Stream ID, Service ID) and the service name.

At the next level, the table ID (0x4E in the sample above) the section-number, last-section-number and „segment last section“-number are displayed, followed by the version number of the section.

At the event level, the event ID and the other fields from the DVB EIT event loop are decoded.

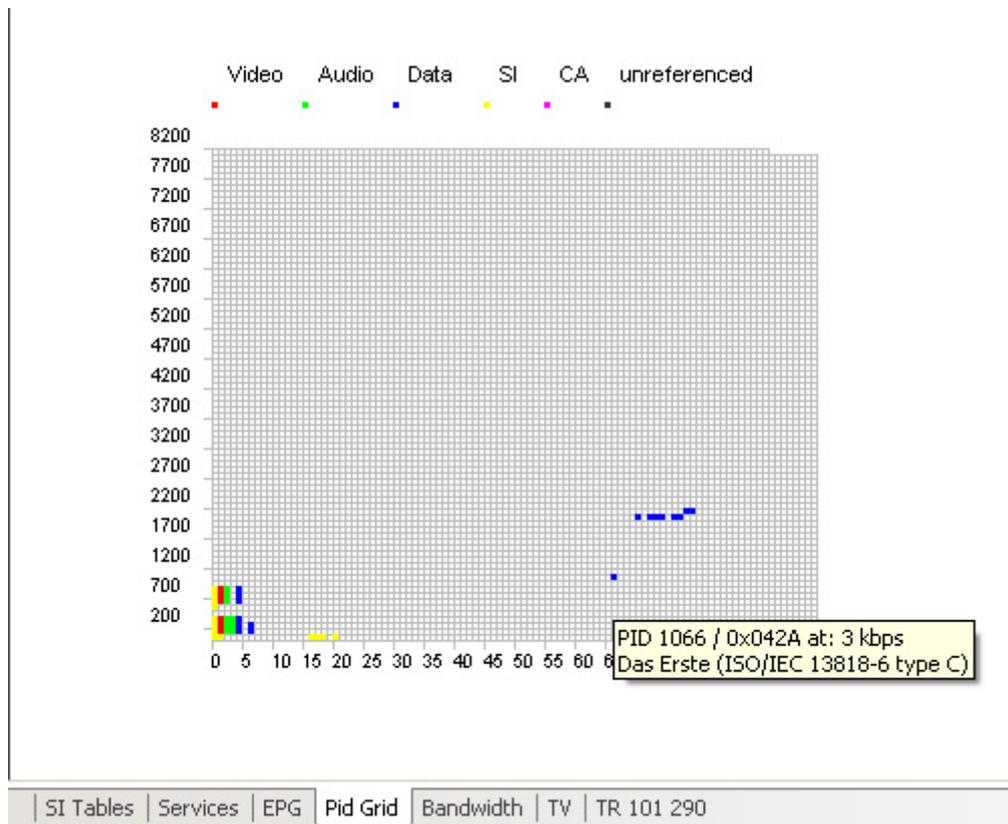
By default, the EPG view only shows the present/following sections. In the context menu you can select different sub-tables:



The numbers in the bracket show the number of currently stored sections in the cache. This cache will grow continuously. It will only discard information if the analyzer is reset.

Please note that it may take several minutes to collect the entire EIT information on a transponder.

2.4. Pid Grid



The Pid Grid provides a quick overview over the PID distribution on the current TS. It also allows you to identify unreferenced pids.

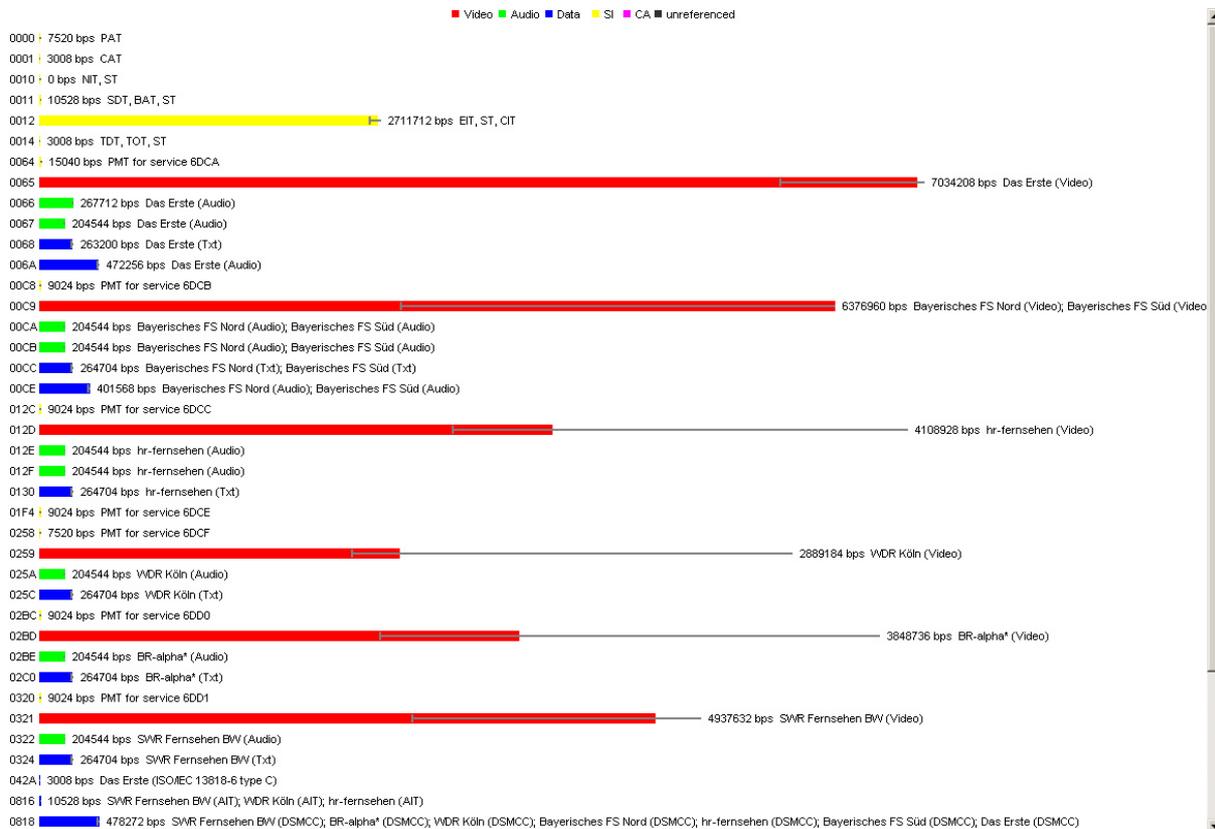
Hovering over a pid with the mouse cursor will open a tooltip with more information about the pid. This tooltip will contain the service name and stream types.

Stream types are colour-coded:

- Red: Video
- Green: Audio
- Data: Blue
- SI: Yellow
- Conditional Access Streams (ECM / EMM): Pink
- Unreferenced: Grey

Unreferenced pids will disappear after a few seconds when the data on this pid disappears.

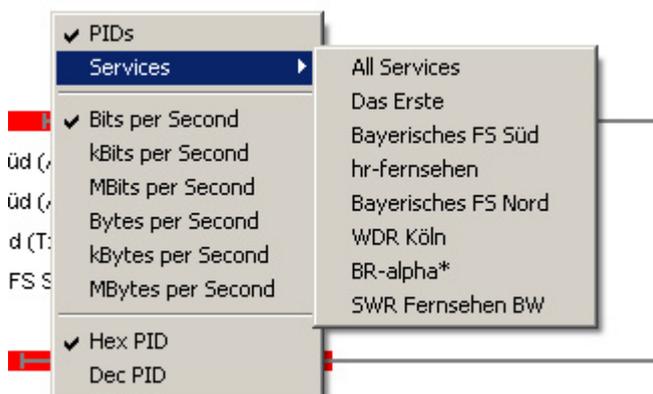
2.5. Bandwidth



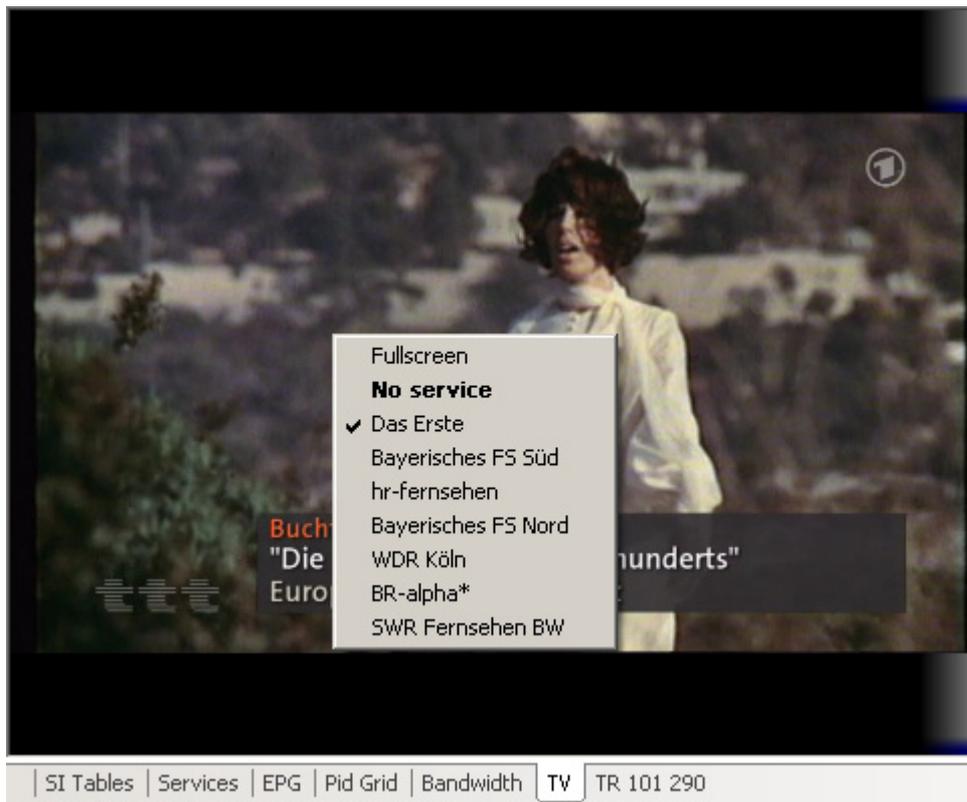
The bandwidth tab allows you to track the bandwidth usage of

- all pids
- or all services (includes all pids referenced in the pid of a service)
- or the pids of one specific service

The mode of operation can be selected using the context menu:



2.6. TV Playback



The analyzer is able to decode live audio and video if appropriate codecs are installed. A large number of 3rd-party DirectShow codecs are supported.

Please select one of the supported codecs in the analyzer configuration before starting the playback.

For MPEG2, we recommend installing the FFDshow tryouts. The latest version can be obtained free of charge from: <http://ffdshow-tryout.sourceforge.net/>.

Please make sure that you enable the MPEG2 support during the installation !

For MPEG4 AVC/AAC, we recommend installing the codecs from Mainconcept.

2.7. Teletext decoder (EN 300 706)

The screenshot displays the StreamGuru Teletext decoder interface. At the top, there are controls for 'Page' (set to 199) and 'Sub-Page' (set to 1), along with a 'Show hidden text' checkbox. The main display area shows a list of teletext pages and their content. The text includes 'ARDtext Mi 10.02.10 20:49:18', 'ZEICHENVORRAT 1/3', and a large red graphic with the number '364'. A context menu is open over the text, showing options like 'No Service', 'Show hidden text', and 'Character set'. The 'Character set' menu is expanded, showing various language options like 'English', 'German', 'Swedish / Finnish', etc. The interface also includes a 'Page' selector (199) and a 'Sub-Page' selector (1).

The analyzer contains a teletext level 1.5 decoder which is based on the EN 300 706 V1.2.1 specification. The controls above the teletext view allow you to select the main page. The “show hidden text” checkbox allows you show or hide text that is encoded using the conceal (1/8) code.

To start the decoder, please select a service from the context menu. Only services with valid teletext signaling (teletext descriptor) will be included in this list.

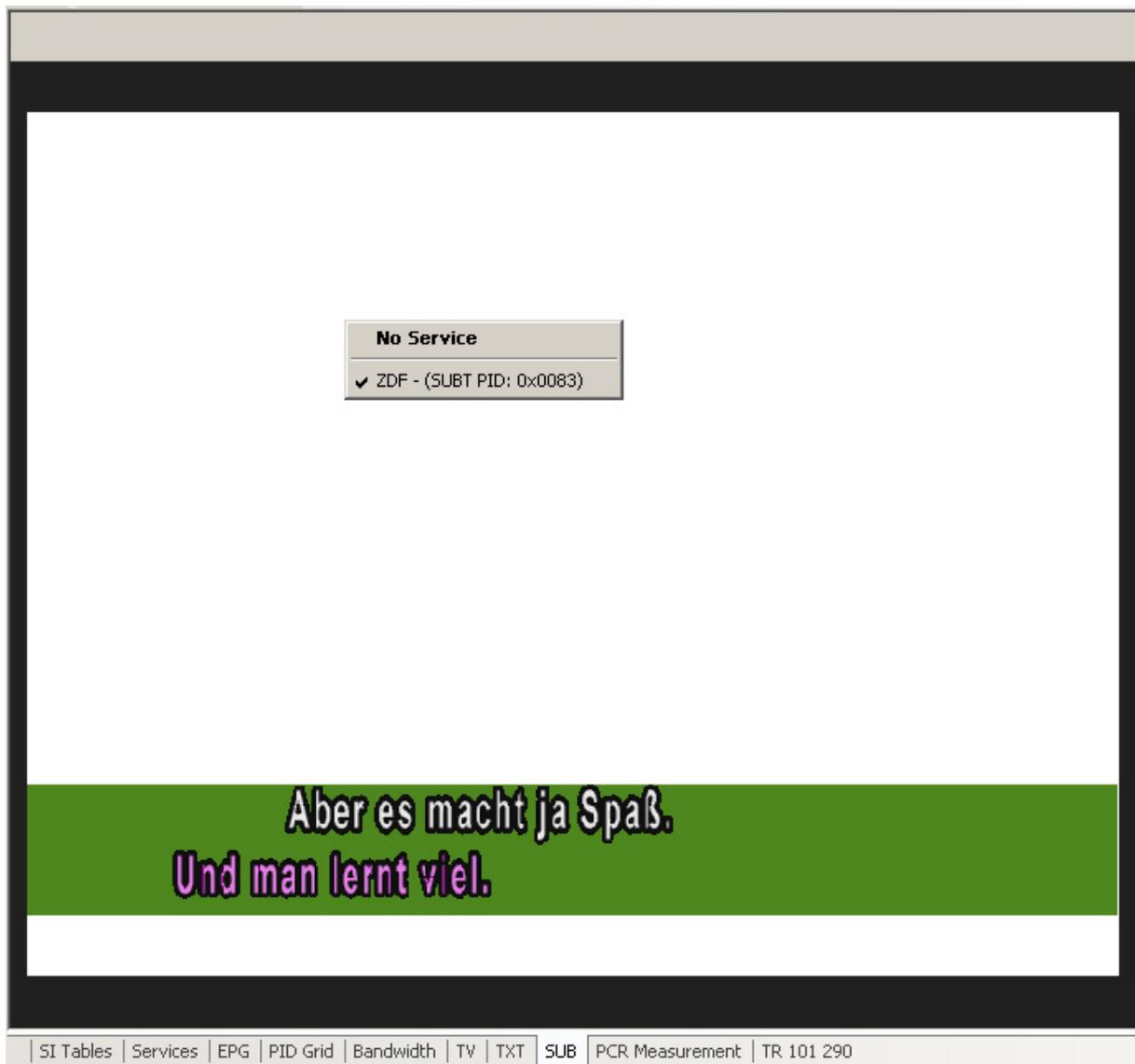
For pages with multiple sub-pages, the sub-page can be selected as well.

The following character sets are currently supported:

- Latin G0
- Latin National option Sub-Sets
- G1 Block Mosaics Set

The correct character set will be configured automatically based on the page header.

2.8. DVB-Subtitling decoder



The analyzer contains a DVB Subtitling decoder based on the EN 300 743 V1.3.1 specification. Due to technical limitations, subtitles are not superimposed onto a live TV picture.

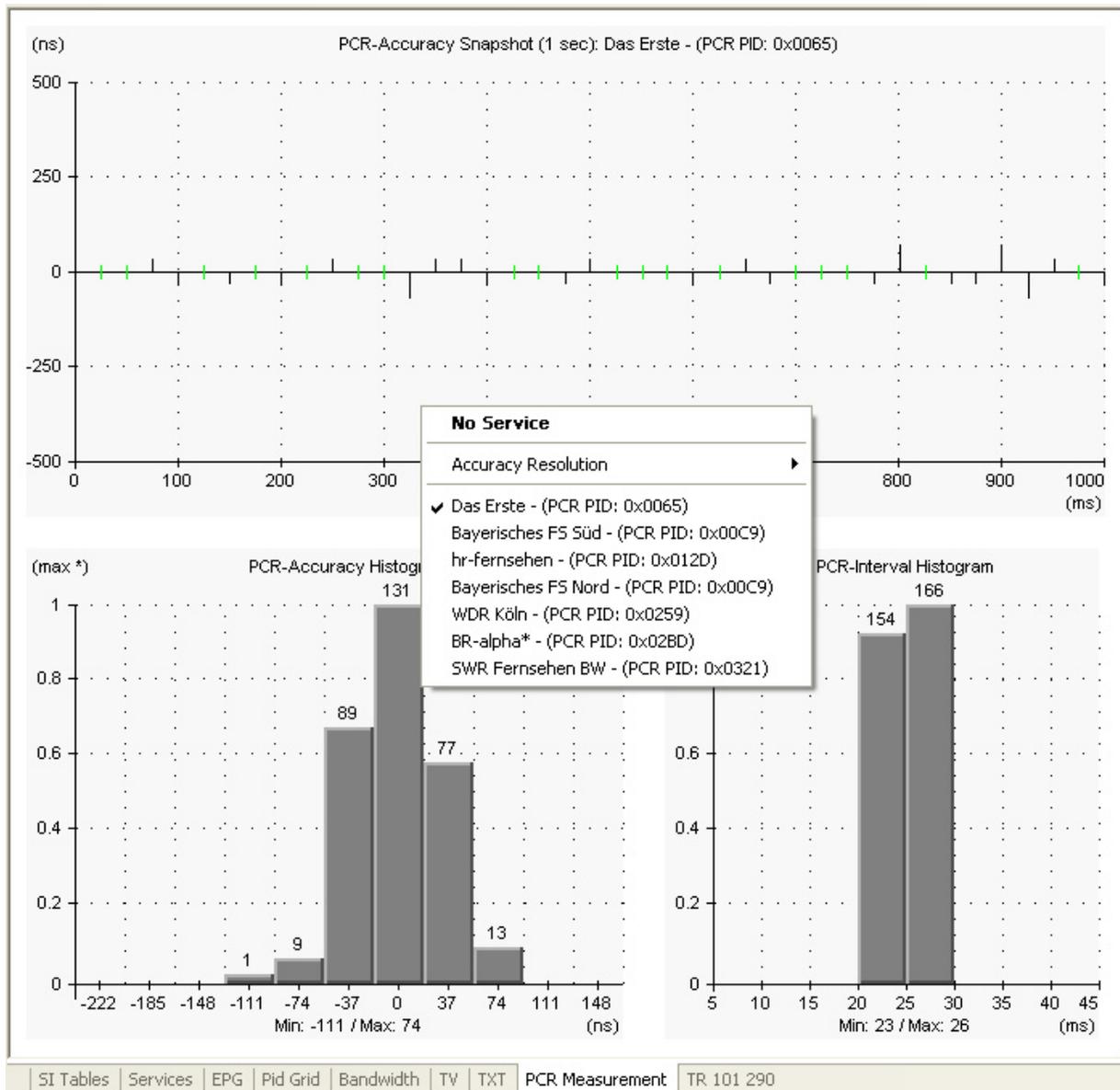
In the sample above, the white area is the transparent background which should normally show video.

The green bar is the location of an active DVB subtitling segment.

Only the text inside this segment would be visible on a real set-top device.

To select a service for the decoder, please use the context menu.

2.9. PCR Measurements



The PCR Measurement view allows you to measure the PCR Interval distribution (lower-right graphics) and the PCR accuracy (top graphics and lower-left graphics).

The scale for the accuracy resolution is selectable between 500ns (default) and 100ns.

PCRs which perfectly match the expected PCR value are drawn in **green**.

PCRs with a deviation smaller than the currently selected resolution are drawn in **black**.

PCRs with a deviation that exceeds the currently selected resolution are drawn in **red**.

2.10. TR 101 290

The DVB TR 101 290 standard defines a number of standard tests that monitoring soft- or hardware should support.

	Indicator	# Err...	Time of last error	Error Message
Priority 1				
●	TS_sync_loss	1	-	-
●	Sync_byte_error	0	-	Synchronized to transport stream
●	PAT_error_2	0	-	-
●	Continuity_count_error	71	Sun Jun 28 01:44:14 2009	-
●	PMT_error_2	0	Sun Jun 28 01:44:12 2009	invalid PMT repetition rate for SVC6DD1 pid 0320
●	PID_error	0	-	-
Priority 2				
●	Transport_error	0	-	-
●	CRC_error	0	-	-
●	PCR_repetition_error	8	Sun Jun 28 01:44:13 2009	PCR interval > 40 ms on PID: 0x02BD
●	PCR_discontinuity_indicator_error	8	Sun Jun 28 01:44:13 2009	PCR interval > 100 ms on PID: 0x02BD
●	PCR_accuracy_error	250	Sun Jun 28 01:44:13 2009	PCR accuracy exceeds +-500 nsec on PID: 0x02BD
●	PTS_error	0	-	-
●	CAT_error	0	-	-
Priority 3				
●	NIT_actual_error	0	-	-
●	NIT_other_error	0	Sun Jun 28 01:44:19 2009	NIT (other) repetition rate error
●	SI_repetition_error	0	-	-
●	Buffer_error	0	-	-
●	Unreferenced_PID	0	-	-
●	SDT_actual_error	0	-	-
●	SDT_other_error	0	-	-
●	EIT_actual_error	0	-	-
●	EIT_other_error	0	-	-
●	EIT_PF_error	0	Sun Jun 28 01:24:06 2009	EIT p/f error
●	RST_error	0	-	-
●	TDT_error	0	-	-
●	Empty_buffer_error	0	-	-
●	Data_delay_error	0	-	-

The analyzer supports most of these tests. The indicator on the left side can show three different colors.

A green dot means that everything is ok.

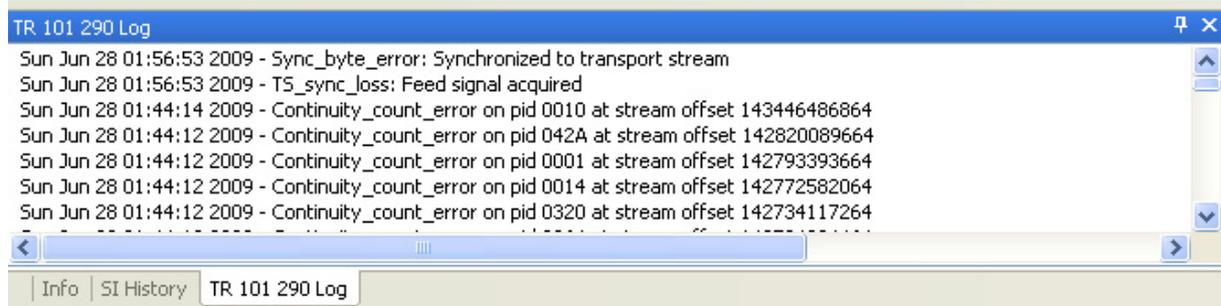
A red dot means there is an error condition.

A grey dot means that this monitoring feature is unsupported.

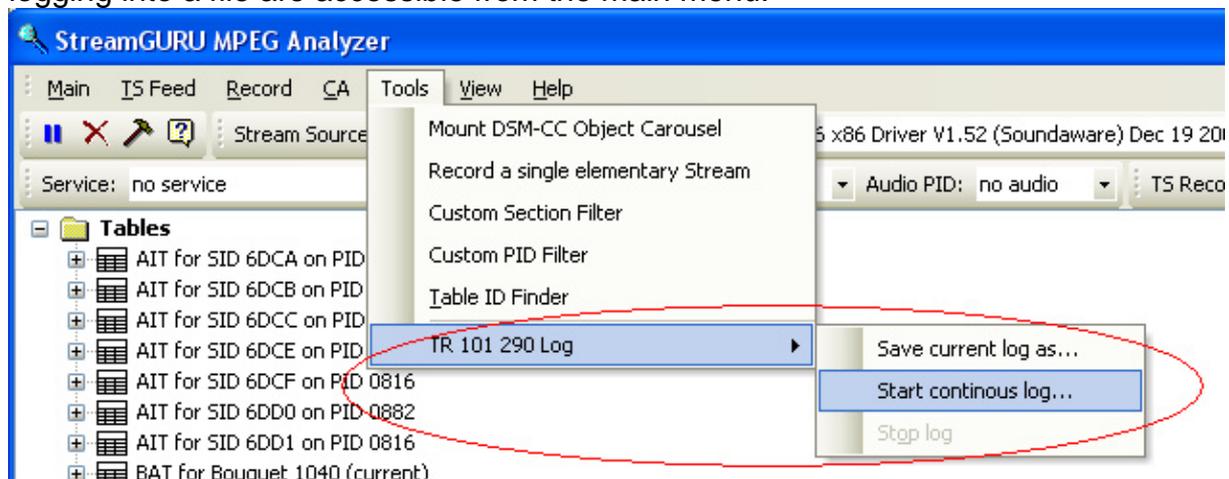
Errors details will be shown on the right side.

The statistics can be reset using the context menu.

TR101 290 errors are also logged into a protocol which can be selected at the bottom left side of the screen:



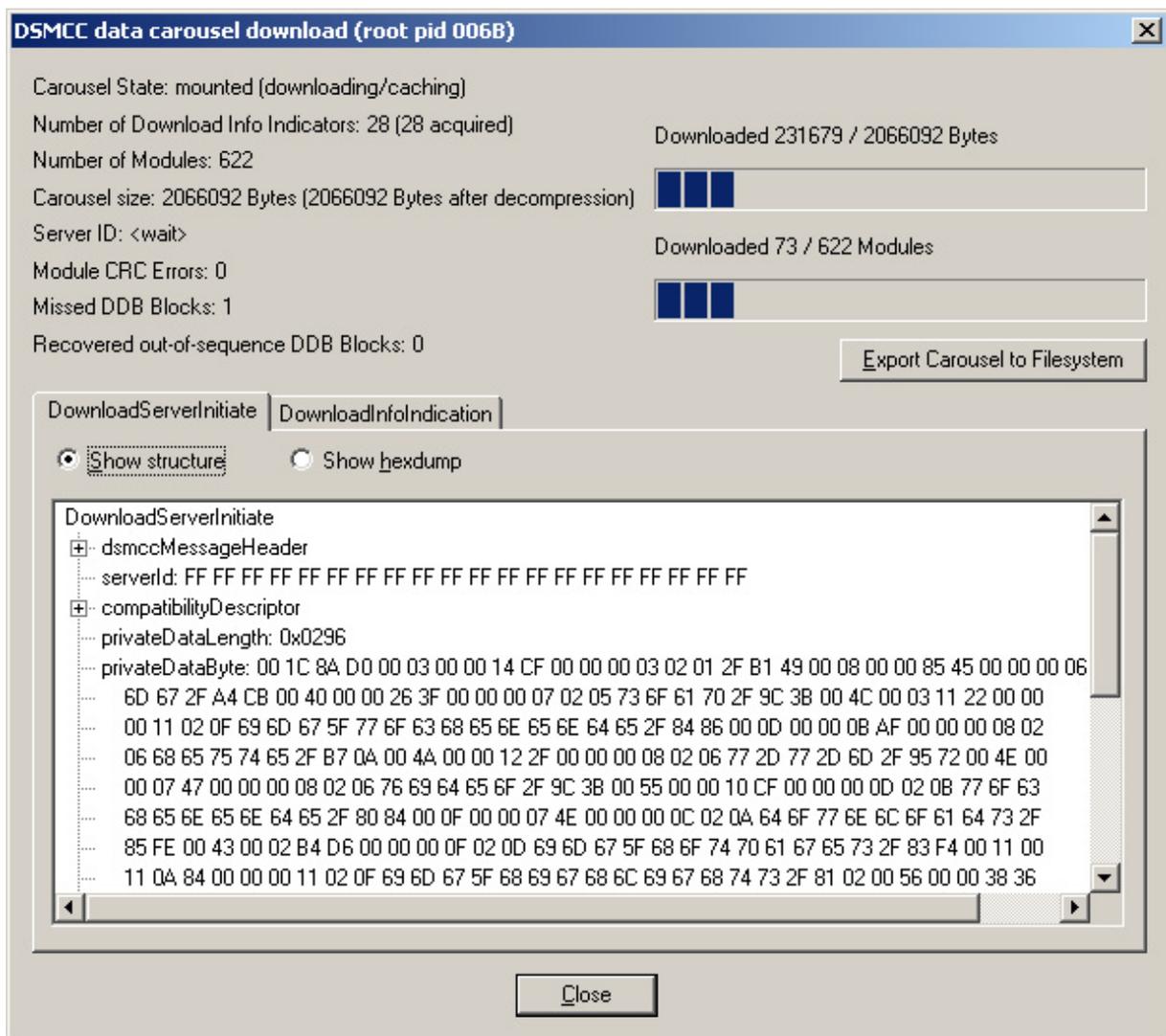
This log can also be written into a text file. The commands to start and stop the logging into a file are accessible from the main menu:



3. Advanced features

3.1. DSM-CC Data Carousels

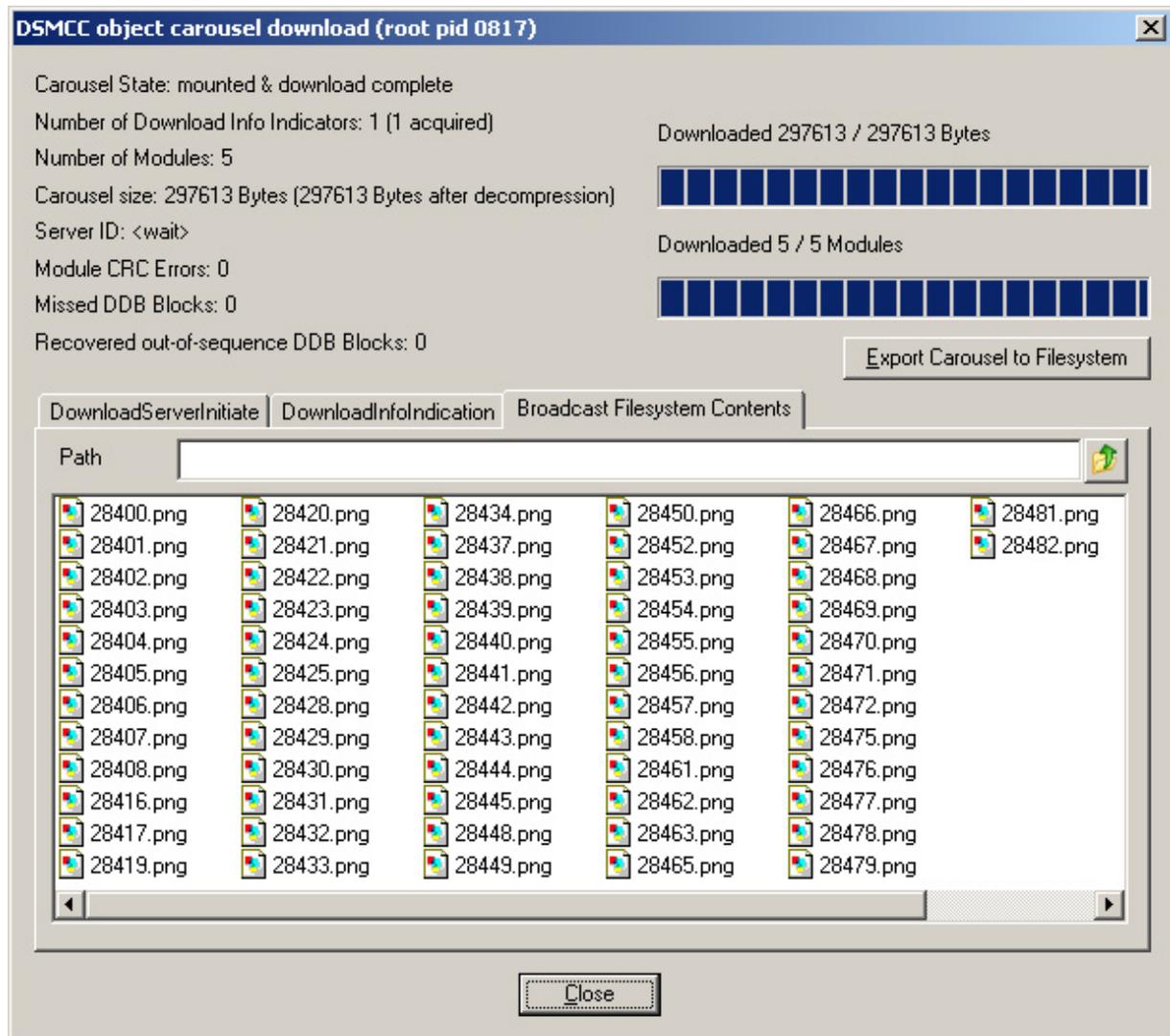
The analyzer can mount DSM-CC Data Carousels as they are used by various data services (including Blucom).



The dumps of the DSM-CC carousel will consist of raw module dumps. If a module compression descriptor is encountered, then the modules will automatically be decompressed.

3.2. DSM-CC Object Carousels

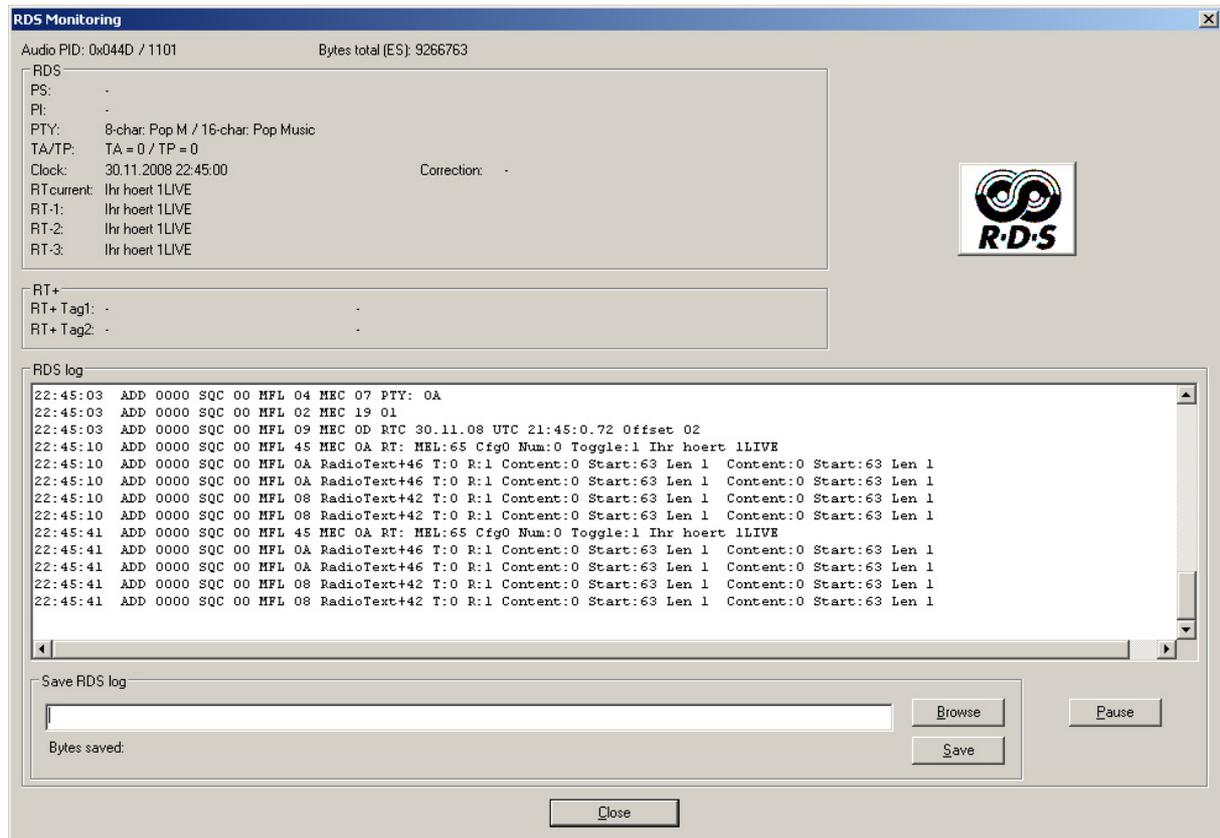
The analyzer can mount DSM-CC Object carousels as they are used by the MHEG-5, HBBTV and MHP standards.



When the root of the filesystem has been downloaded already, it is possible to dump the contents of an object carousel to the hard disk. This dump will include all file and directory objects. The dump will also include raw dumps of the decompressed modules.

3.3. RDS Decoding

Only a few radio stations are currently sending RDS data together with their regular DVB broadcasts. The RDS decoder dialog can be opened from the context menu of a Audio stream in the table decoder view (Section 2.1, PMT) or the service view.



The RDS decoder will decode Radiotext and Radiotext+.

For the exact meaning of the different fields, please refer to the RDS/UECP specification.

This dialog will also allow you to save the text log to the hard disk.

3.4. HBBTV, MHP/GEM and other interactive services

The analyzer automatically identifies and downloads AITs (application information tables) as they are used by the HBBTV (<http://www.hbbtv.org>), MHP and GEM (<http://www.mhp.org>) standards.

The analyzer filtering and decoding is based on the

DVB A137 specification
"Signalling and carriage of interactive applications and services in hybrid broadcast/broadband environments"

For every PMT containing an `application_signaling_descriptor`, the analyzer will try to download and decode the AIT. If multiple services reference the same AITs, these AITs may appear multiple times in the "SI tables" view even if the content is identical.

The sample on the next page shows a service that carries one MHP and several HBBTV applications at the same time.

The application signalling descriptor points at PID 0816. On this pid, there are two AITs with different application types (0001 and 0010).

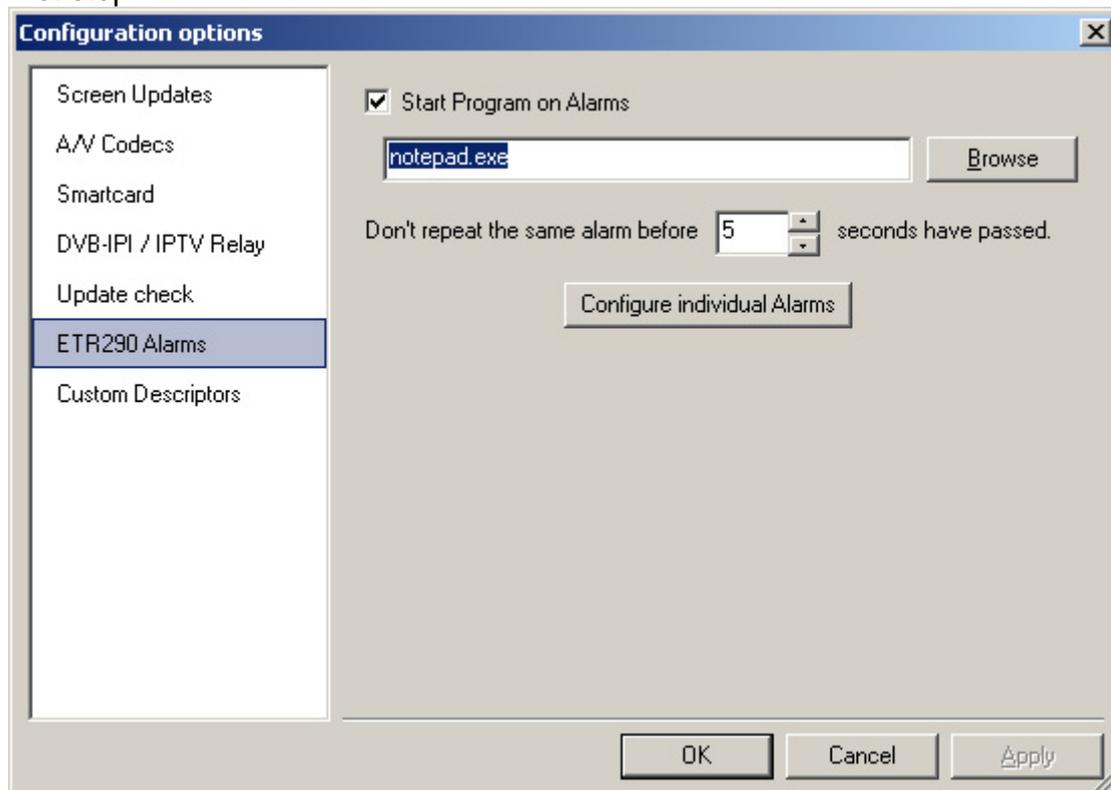
It is also possible to download object carousels, referenced in a `transport_protocol_descriptor` using the DSM-CC download dialog (see section 3.2).

- ⊕ AIT for SID 6DD0 AppType 0010 on PID 0882
- ⊖ AIT for SID 6DD1 AppType 0011 on PID 0816
 - ⋮ i 1 Sections, Version 00
 - ⋮ i test_application_flag: 0
 - ⋮ i application_type: 0001 - DVB-J Application
 - ⊖ i OID:0013 AppId:0100 ControlCode:01/AUTOSTART
 - ⊕ d transport_protocol_descriptor
 - ⊕ d application_descriptor
 - ⊕ d application_name_descriptor
 - ⋮ d dvb_j_application_descriptor
 - ⊕ d dvb_j_application_location_descriptor
- ⊖ AIT for SID 6DD1 AppType 0010 on PID 0816
 - ⋮ i 1 Sections, Version 00
 - ⋮ i test_application_flag: 0
 - ⋮ i application_type: 0010 - HBBTV
 - ⊕ i OID:0013 AppId:0065 ControlCode:01/AUTOSTART
 - ⊕ i OID:0013 AppId:0002 ControlCode:02/PRESENT
 - ⊕ i OID:0013 AppId:0003 ControlCode:02/PRESENT
 - ⊕ i OID:0013 AppId:0004 ControlCode:02/PRESENT
 - ⊕ i OID:0013 AppId:0005 ControlCode:02/PRESENT
 - ⊕ i OID:0013 AppId:000C ControlCode:02/PRESENT
- ⊕ BAT for Bouquet 1040 (current)
- ⊕ CAT (current)
- ⊕ NIT (actual,current)
- ⊕ NIT for NID 0003 (other,current)
- ⊕ PAT (current)
- ⊕ PMT for SID 6DCA (current) - Das Erste
- ⊕ PMT for SID 6DCB (current) - Bayerisches FS Süd
- ⊕ PMT for SID 6DCC (current) - hr-fernsehen
- ⊕ PMT for SID 6DCE (current) - Bayerisches FS Nord
- ⊕ PMT for SID 6DCF (current) - WDR Köln
- ⊕ PMT for SID 6DD0 (current) - BR-alpha*
- ⊖ PMT for SID 6DD1 (current) - SWR Fernsehen BW
 - ⋮ i 1 Sections, Version 02
 - ⋮ i Raw Version C5
 - ⋮ i PCR PID 0321
 - ⋮ i Service ID 6DD1
 - ⊕ Stream 02 PID 0321 MPEG2 Video
 - ⊕ Stream 03 PID 0322 MPEG1 Audio
 - ⊕ Stream 03 PID 0323 MPEG1 Audio
 - ⊖ AIT Stream 05 PID 0816 AIT
 - ⊖ d application_signalling_descriptor
 - ⋮ application: 0x0001
 - ⋮ reserved_future_use: 0x7
 - ⋮ AIT_version_number: 0x02
 - ⋮ application: 0x0010
 - ⋮ reserved_future_use: 0x7
 - ⋮ AIT_version_number: 0x00
 - ⊕ Stream 06 PID 0324 Teletext
 - ⊕ MHP Stream 08 PID 0818 (DSMCC carousel)

3.5. ETR 290 Alarms

The analyzer can trigger automated alarms if errors appear in a stream.

An application which will be launched if an alarm is triggered has to be configured as first step:

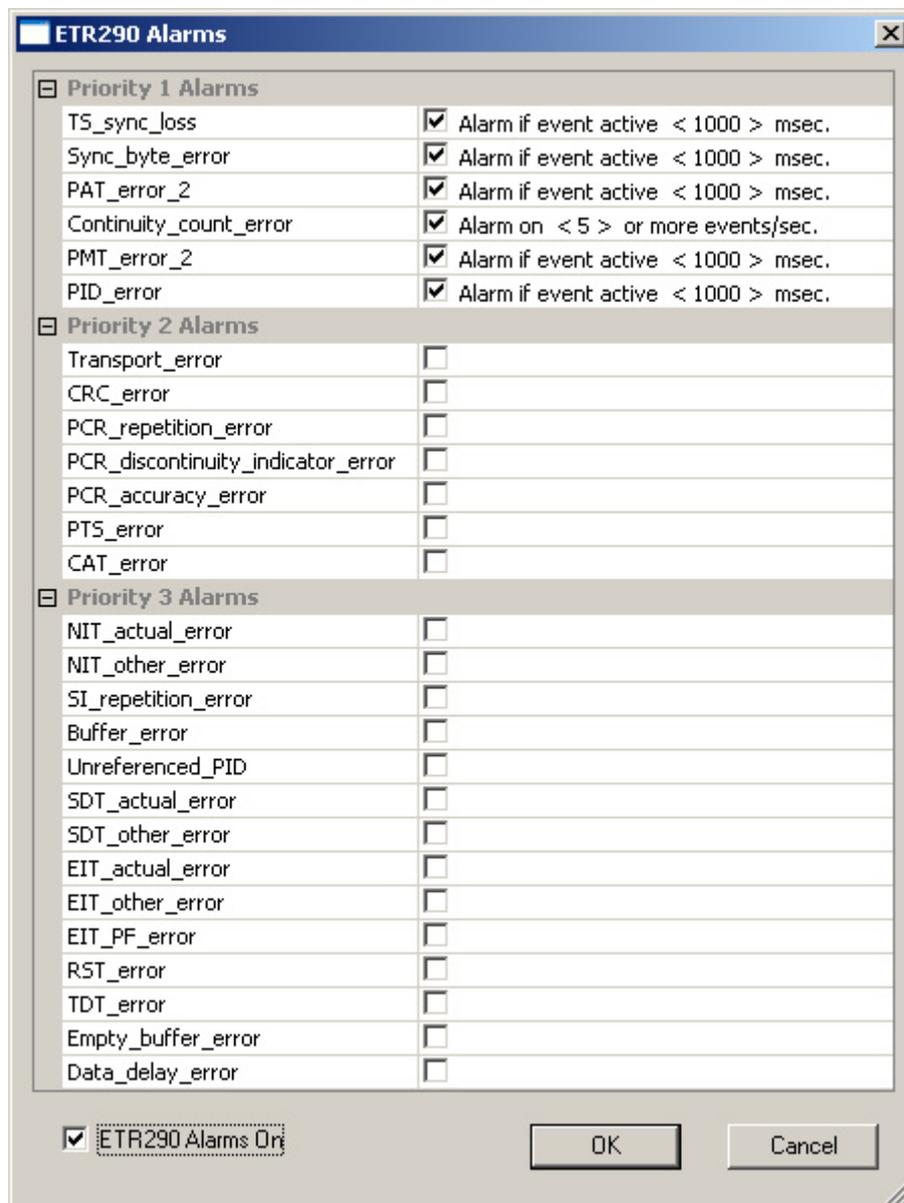


This application will be started with a filename as first parameter. The file contains a text-description of the error(s) that raised the alarm. When the called application terminates, this alarm file will be automatically deleted.



The toolbar can be used to enable or disable the alarms (left button) or to open the alarm configuration (right button, see next page).

The "Configure individual Alarms" button or the toolbar button will open the following configuration dialog:



For every ETR 290 alarm, you can configure an individual threshold to avoid that an alarm goes off due to a single bit-error.

3.6. Support for compressed DVB Strings

The MPEG Analyzer supports the decoding of several proprietary string compression methods.

The currently supported encoding formats are:

- DVB string encoding type 1F 01/02, as used by BBC/Freesat
- String encoding as used by Sky UK
- String encoding as used by Sky Italy

All of these encodings use huffman tables.

For legal reasons, we do not bundle these tables with the analyzer at the moment. The application will show a warning message when it encounters strings that can not be decompressed due to missing tables.

The missing tables have been reverse engineered and published by a few clever guys as part of a few open source projects where they can be downloaded free of charge. After downloading the files, please put them into the MPEG Analyzer application directory (where the MTSA.EXE is located).

3.6.1. Where can you get these tables ?

The tables for BBC/Freesat are available here:
<http://www.rst38.org.uk/vdr/> (freesat.t1 and freesat.t2)

The tables for Sky UK and Italy are available here:
<http://lukkinosat.altervista.org/> (sky_uk.dict and sky_it.dict)

These tables should be complete.

Please note that several other versions of these files are available on the internet as well. Not all of these files contain the complete (as in: error free) huffman trees.

4. Contact & Support

The StreamGuru MPEG Analyzer is a product of

GkWare e.K.
Hatzper Str. 172B
D- 45149 Essen
Germany

For support, please contact us at support@gkware.com .

4.1. *Purchasing information*

Single user licenses can be purchased online.

Homepage: <http://www.streamguru.de/>

Direct shop link: <http://www.streamguru.de/mpeg-analyzer/buy-mtsa/>

We also offer student/hobbyist licenses and discounts if you need more than one license.

4.2. *Licensing / USB License Dongles*

Permanent licenses are installed on Codemeter USB license dongles. After completing the purchasing process, a dongle with the license is shipped by registered mail to the address provided as part of the purchasing process. In order to use these dongles, the Codemeter Runtime from <http://codemeter.com/us/service/downloads.html> needs to be installed.



As long as a (temporary) license file is installed, the software does not check for the presence of a license dongle. Expired temporary license need to be deleted after the arrival of the dongle.

Network/Floating licenses use UDP and TCP port 22350. These ports need to be made accessible in the firewall settings. Additional configuration is required for running a license server. A guide that explains the setup of a license server is available at <http://www.streamguru.de/mpeg-analyzer/buy-mtsa/floating-license/>